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COMSTAFF PROPRIETARY LIMITED

REVIEW OF 1969-1970 SUMMER EXPLORATION PROGRAMME

EXPLORATION LICENCE 1/68, TASMANIA

AMG REFERENCE POINTS ADDED

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1. PREFACE

The Comstaff Exploration Licence No. 1/68 covers an area of 220 square miles in north eastern Tasmania. Regional evaluation of the area was commenced and carried out during the 1968-1969 summer. No field work was carried out during the 1969 winter.

Exploration during the 1969-1970 summer was concentrated in the following areas :

Webb Creek Area

Mt. Stewart

Mt. Jasper - Espea - Bald Hill

For convenience the report on work at Webb Creek is included here, although portion of the area extends into E.L. 5/63, which is also held by Comstaff Pty. Ltd.

2. WEBB CREEK AREA

2.1. GENERAL

Webb Creek is a relatively large tributary of the Huskisson River, and drains the area to the south and south-west of Mt. Ramsay. The area covered lies on the boundary of E.L. 1/68 and E.L. 5/63. (See Plan 2L-1)

A study of available literature had shown the occurrence of several alluvial workings for tin associated with the Meredith granite, of which Mt. Ramsay is formed, and of other alluvial workings for gold and osmiridium, associated with serpentinites, within the drainage basins adjacent to that of Webb Creek.

An ultramafic body (? serpentinite), corresponding approximately to the position of an anomaly detected by an aeromagnetic survey, is shown on the Geological Survey map of the area as being drained by tributary 6 of Webb Creek. (Plan 2L-2).

The aerial photographs of the Webb Creek area indicate an extensive swamp, about three-quarters of a mile long and half a mile wide situated around the middle reaches of the creek. A detailed study of the photographs suggests that the sides of the swamp are steeply sloping and that the alluvium might thus be deep.

It therefore appeared that in the area the following conditions pertained : that there was a large area of alluvium, possibly of substantial depth, in the valley of a creek draining a stanniferous granite, and which also drained a supposed serpentinite. Further the swamp lies within a region where alluvial deposits of gold and osmiridium, derived from ultramafics, had been worked.

For these reasons it was decided that the Webb Creek Area merited investigation.

Geography

The climate, vegetation and topography are typical of the north-western interior of Tasmania. Access was solely by helicopter.

2.2. PROGRAMME FOR 1969/1970

In November the field manager and six field-assistants moved into the area and established a camp in the south-eastern part of the swamp. This team then commenced to investigate the alluvium. It had been intended to do this by means of hand augering and/or Banka drilling at 8 chain intervals along a series of lines cut across the swamp, but because of poor penetration by the auger, a pitting programme had to be substituted for the boring programme.

Alluvium samples collected from the auger holes and pits were panned to obtain the heavy mineral concentrates.

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At the commencement of the pitting programme a geologist joined the camp to carry out a brief regional reconnaissance of the geology of the environs of the swamp and the area drained by Webb Creek and its tributaries.

During the course of this geological reconnaissance several outcrops of a sulphide-bearing rock were encountered, and samples of this were despatched for analysis. It was decided to check further on this sulphide occurrence by means of geochemical stream sediment and soil samples.

Heavy mineral concentrates were also collected from Webb Creek and from each of the tributaries mapped.

2.3. BORING AND PITTING (Plan 2L-2)

A main trace was cut along the length of the swamp, and from this cross-lines B and C, 16 chains apart, were cut across the alluvial flat on a bearing of 102° magnetic. In view of the lack of known fixed points, the main trace was not surveyed in accurately, but the relative positions of the auger holes and pits are correct.

Once the lines were cut, boring was commenced using the Dormer Sand Borer (in effect a hand auger) which has a good performance provided that the particle size within the media through which it passes does not exceed 1 inch. The casing and sand bailer were not used, as "overburden" - in this case the humus and soil layer - was shallow. In suitable ground a depth of 20 feet can be bored in an hour.

Seventeen holes, distributed over 10 sites, were attempted but in the majority of cases it was not possible to penetrate to a depth of more than 2-5 feet, due to the presence of boulder beds within the alluvial material. Details of the auger holes are as follows :-

B5 - One attempt was made, and a depth of 5 feet reached.

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- B6 - two attempts were made, both striking an obstruction at a depth of 2½ feet.
- B7 - two attempts were made, both striking an obstruction at a depth of 2 feet.
- C4 - two attempts were made, both reaching a depth of 3 feet before hitting an obstruction.
- C5 - three attempts were made, two reaching a depth of 2 feet and one a depth of 5 feet, before striking an obstruction.
- C6 - one attempt was made, and this reached a depth of 13 feet before striking an obstruction.
- C7 - two attempts were made, both reaching a depth of two feet before reaching an obstruction.
- C2½ - (east of Webb Creek) two attempts were made and both reached a depth of 5 feet before hitting an obstruction.
- C2 - (east of Webb Creek) one attempt was made and reached a depth of 5 feet.
- D5 - this hole was bored from the bottom of Pit 3, which was 7 feet deep, and reached a depth of 20 feet 9 inches. The total depth before hitting an obstruction at this location was thus 27 feet 9 inches.

In view of the fact that hand-augering was proving an inadequate method of investigating the alluvium, it was decided to pit the swamp in order to obtain more information regarding its depth and the nature of the obstruction encountered in the auger holes. Three pits were dug, one near the centre of the

swamp, one toward the north, and one toward the southern end of the swamp.

Details are as follows :-

Pit No. 1. This was initially attempted at the site of auger hole B6, but was moved to 1 chain east of B7 when the original excavation flooded at a depth of 2½ feet. At the new site pitting reached a depth of almost 14 feet before water became a problem. A seepage at 13 feet began to undermine the boulder bed, and lagging would have been necessary to make this pit safe for working at any greater depth.

Pit No. 2. This was dug at the site of auger hole C5 and reached a depth of about 11 feet before being discontinued.

Pit No. 3. This was dug at the site of auger hole D5 to a depth of 7 feet. Since the ground appeared suitable for augering a hole was bored from the bottom of this pit and reached a depth of 27 feet 9 inches below surface before reaching an obstruction.

Heavy mineral concentrates were collected from both the auger holes and pits, and were examined for gold, osmiridium and tin. Neither gold nor osmiridium were observed, and in all cases the tin values were extremely poor.

Bore and pit logs are submitted as appendices to this report.

2.4. GEOLOGY (Plan 2L-2)

Owing to the nature of the terrain and vegetational cover, geological mapping was almost entirely restricted to stream bed exposures and the picture that obtained was, at best incomplete. In all, 47,300 feet of creek were cut and mapped but it should be borne in mind that outcrops only occurred in about one-quarter of this distance, and that large stretches of creek were devoid of exposure.

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The regional map of the area shows Webb Creek to be on the eastern limb of the Huskisson Syncline, and this was confirmed by field observation. The number of exposures from which dips and/or strikes could be obtained was very limited (nine), but in all cases strikes were within 30° of NNW-SSE and dips, whilst varying from 20° to near vertical, were consistently to the west. The poor degree of exposure prevents any attempt at correlation or detailed interpretation, but a broad and tentative division into three rock units may be made. The western part of the area mapped is occupied by a tuffaceous sequence, exposed in tributaries 6, 7, 8 and 9 and in the upper part of Webb Creek, whilst the central zone is occupied by an arenaceous sequence, seen in exposures in Webb Creek, tributaries 5 and 3 and the lower reaches of tributaries 1 and 2. To the east of this a second tuffaceous sequence is seen in the upper reaches of tributaries 1 and 2.

(i) Western tuffaceous sequence

Known strike length c.	3,000 feet.
Width across strike c.	1,200 feet.
Recorded strikes (magnetic) :	145°, 130°, 165°, 152°.
Recorded dips (W/SW) :	- 80 - near vertical.
Number of exposures :	40

This rock unit comprises a number of low-grade metamorphic derivatives of fine grained greywackes, sub-greywackes and/or tuffaceous siltstones, which present a compact fine grained grey almost cherty appearance. In addition a coarse breccia and a number of fine grained brownish tuffs, and minor amounts of relatively unaltered mudstone and siltstone are present.

The low grade metamorphic members of this sequence include the sulphide-bearing rock, noted above as having been sent for analysis. This carried pyrite and chalcopyrite in blebs and fine stringers, and another extremely fine grained and highly disseminated sulphide, which appeared to constitute up to 30% of the rock. The latter is now thought to be pyrrhotite.

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Analytical results, in p.p.m., of two samples, are as follows :-

	Bi.	Co.	Cu.	Mo.	Ni.	Sb.
Sample 1 ('Spotted Hornfels')	< 10	20	35	6	60	< 10
Sample 2 (meta-calcareous siltstone)	< 1	5	25	4	30	< 1

The samples were also subjected to a forty-two element spectrographic scan, which did not detect an economically significant concentration of any element.

(ii) Arenaceous sequence

Known strike length :	3000 feet
Width across strike :	3000 feet
Recorded strikes (magnetic) :	190°, 135°.
Recorded dips (to W/SW) :	29°, 35°.
Number of exposures :	15

This unit comprises a number of quartzite and sandstone members, in addition to what are apparently very subordinate mudstones. At the bottom of tributary 4A, just above its confluence with tributary 4 is a 45 foot exposure of conglomerate, consisting of large (up to 1") waterworn white quartz pebbles set in a reddish-brown sandy matrix, which probably marks the base of the arenaceous sequence. One exposure of dolerite, of indeterminate form, represents the only evidence of igneous activity within the area of outcrop of the arenaceous sequence.

(iii) Eastern tuffaceous sequence

Known strike length :	6,000 feet.
Width across strike :	3,000 feet.
Recorded strike (magnetic) :	140°, 140°, 142°.
Recorded dips :	36°, 42°, 35°.
Number of exposures :	49

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This sequence consists of a series of alternating acid and (?) intermediate brown and purple micaceous tuffs, mudstones, shales and siltstones with the occasional development of a sandy facies as is seen in the central part of tributary 1. From the evidence available it would seem that this unit forms the base of the succession in the area mapped and that it is overlain in turn by the arenaceous sequence and the western tuffaceous sequence.

Similarities in lithology and strike suggest that these rocks may be equated with, or form part of the same stratigraphic unit as, the Ramsay succession of the Coldstream-Ramsay area.

Structure

The limited nature of field observation precludes the possibility of any detailed interpretation. Such readings as were obtained serve to confirm that the area lies on the eastern limb of the Huskisson Syncline and indicate a flexure in this limb with the dip steepening toward the axis of this structure.

Mineralisation

With the exception of the sulphide-bearing metamorphics of the western tuffaceous sequence, to which reference has been made, no mineralisation was observed.

2.5. GEOCHEMISTRY (Plan 2L-2)

Two minor programmes were instigated to obtain more information on the sulphide occurrences within the western tuffaceous sequence. At the time that this work was undertaken results of the rock analyses were still outstanding, and it was therefore acknowledged that the project might be superfluous. However, in view of the difficulties of access to the area, it was deemed expedient to carry out this sampling before the party was withdrawn.

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Stream sediment samples were collected at 500 feet intervals from tributaries 7, 8 and 9, and were subsequently analysed for Cu, Pb and Zn. The results received have indicated only very low concentrations of these elements.

Three lines, each 3,000 feet long and aligned at 230° magnetic (across strike) were cut, one to the south of tributary 7, one between tributaries 7 and 8 and one between tributaries 8 and 9. A₀ level soil samples were taken at 100 feet intervals along these lines, and these were analysed for Bi, Cu, Pb and Zn, and as in the case of the stream sediment samples no concentration of economic interest was detected.

2.6. HEAVY MINERAL CONCENTRATE COLLECTION (Plan 2L-2)

Four samples were collected from Webb Creek, two from tributaries 4 and 6, and one each from the other tributaries mapped. The concentrates obtained were examined for the presence of minerals of economic importance, particularly gold, osmiridium and tin. Cassiterite was present in the sample from the bottom of tributary 4, and a trace of this mineral was also detected in the samples from tributaries 2, 3, 4A, 5, 6 and 7 and in two of the samples from Webb Creek itself. However, the quantities were not sufficient to arouse any specific interest.

Selected samples have been submitted for analysis for tungsten, tantalum and niobium, however these results have not yet been received.

2.7. Appendix 1BORE LOGS

<u>Hole No.</u>	<u>Core Recovery</u>	<u>Depth</u>	<u>Description</u>	<u>Remarks</u>	
C2	¼ cu.ft.	0 - 4'8"	Brown sandy clay	Good washing, very poor concentrate recovery Some ¼" quartz in pan	
		4'8"- 4'10"	White sandy clay		
		4'10"- 5'0"	Not recovered		
(a)	¼ cu.ft.	0 - 5'0"	Brown sandy clay	Good washing, very poor concentrate recovery Some ¼" quartz in pan	
C2½	(b)	0 - 5'0"	Brown sandy clay		
C4	3/16 cu.ft.	0 - 1'6"	Humus + soil	Good washing, poor concentrate recovery	
		1'6"- 3'0"	Fine sand + ¼" quartz		
C4	(b)	0 - 2'0"	Humus + soil		
		2'0"- 3'0"	Fine sand + ¼" quartz		
C5	5/16 cu.ft.	0 - 6"	Humus + soil	Good washing, very poor concentrate recovery	
		6"- 5'0"	Fine sand		
		0 - 9"	Humus + soil		
C5	(b)	9"- 2'0"	Fine sand		
		0 - 6"	Humus		
C5	(c)	6"- 2'0"	Fine sand		
		¼ cu.ft.	0 - 2'0"		Humus + soil
C6	¼ cu.ft.	2'0"- 5'0"	Fine sand	Good washing, very poor concentrate recovery	
		5'0"- 5'6"	Fine sand		
		5'6"-10'0"	Compact sand		
		7/32 cu.ft.	10'0"-12'6"		Compact sand
		12'6"-13'0"	Compact sand + ¼" quartz		

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<u>Hole No.</u>	<u>Core Recovery</u>	<u>Depth</u>	<u>Description</u>	<u>Remarks</u>
C7 (a)	$\frac{1}{8}$ cu.ft.	0 - 1'0"	Humus + soil	Good washing, very poor concentrate recovery
		1'0"- 2'0"	Fine sand + $\frac{1}{4}$ " quartz	
C7 (b)		0 - 1'0"	Humus + soil	
		1'0"- 2'0"	Fine sand + $\frac{1}{4}$ " quartz	
B5	$\frac{1}{4}$ cu.ft.	0 - 2'0"	Humus + soil	Good washing, very poor concentrate recovery
		2'0"- 5'0"	Black sandy clay	
(a)	$\frac{1}{8}$ cu.ft.	0 - 1'6"	Humus + soil	Good washing, very poor concentrate recovery
		1'6"- 2'6"	Fine grained sand	
B6 (b)		0 - 1'6"	Humus + soil	Good washing, very poor concentrate recovery
		1'6"- 2'6"	Fine grained sand	
B7 (a)	$\frac{1}{8}$ cu.ft.	0 - 1'0"	Humus + soil	Good washing, very poor concentrate recovery
		1'0"- 2'0"	Fine grained sand	
(b)		0 - 1'0"	Humus + soil	
		1'0"- 2'0"	Fine grained sand	
(PIT 3)	$\frac{1}{4}$ cu.ft.	0 - 1'6"	Humus	Not washed.
		1'6"- 7'0"	Brown sandy clay	Channel sample from side of pit. Good washing, poor concentrate recovery.
		7'0"- 9'0"	Light brown compact sand	Good washing, poor concentrate recovery
		9'0"-10'0"	Transition	<u>Trace fine cassiterite</u>
		10'0"-12'0"	White compact sand	<u>seen</u>
D5	$\frac{1}{4}$ cu.ft.	12'0"-17'0"	Compact white sand	Good washing, very poor concentrate recovery.
		17'0"-18'9"	Compact white sand	Good washing, very poor concentrate recovery
		18'9"-19'6"	Transition	
		19'6"-22'0"	Compact light brown sand	

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<u>Hole No.</u>	<u>Core Recovery</u>	<u>Depth</u>	<u>Description</u>	<u>Remarks</u>
	¼ cu.ft.	22'0"-27'0"	Compact light brown very sandy clay	Inclined to "ball" when panned. Some ¼" quartz in pan. Poor concentrate recovery
	1/16cu.ft.	27'0"-27'9"	Very plastic brown clay	Inclined to "ball". Some ¼" quartz present. Poor concentrate recovery.

2.8. APPENDIX OF PIT LOGS

<u>PIT 1</u>			
	0	- 1' 0"	Humus
	1' 0"	- 3' 0"	Grey sandy clay
	3' 0"	- 3' 4"	Sandy clay + small (<lin.) sandstone pebbles.
	3' 4"	-7' 0"	Boulder Bed: matrix of coarse sand, with admixture of organic material, containing ½" - 8" diameter, cobbles of sandstone, quartzite, decomposing granite, microgranite and siltstone. Most fragments are of the 2"-5" fraction. In the eastern side of the pit is a minor clay bed within the boulder bed. This comprises 2-6 in. of putty coloured plastic clay + sericite.
	7' 0"	-12'6"	Boulder Bed: matrix of clayey sand, containing 12 in. cobbles (mainly 3-7 in) of sandstone, decomposing granite, chalcedony and quartzite.
	12' 6"	-13' 0"	Sandy clay with occasional pebbles.
	13' 0"	-13' 9"	Pebble Bed: closely packed 1-2 in. pebbles of sandstone, quartz, chert, decomposing granite and quartzite in a sandy matrix.

PIT 2

0 - 1' 0" Humus

1' 0" - 2' 0" Fine sand + $\frac{1}{4}$ ", quartz particles.

2' 0" - 2' 3" Fine sand

2' 3" - 3' 3" Fine sand + $\frac{1}{4}$ " particles and 1-2 in pebbles of quartz

3' 3" - 4' 3" Pebble Bed: mottled orange gritty clay containing 1-2 in. pebbles of quartzite, sandstone, quartz and decomposing granite.

4' 3" - 5' 3" Cobble Bed : matrix of sand and organic material containing 2-4 in. cobbles and occasional 6 in. boulders of quartzite, shale mudstone and fine sandstone.

5' 3" - 10' 3" Boulder Bed: coarse sandy matrix containing 4-6 in. boulders of quartzite, decomposing granite and fine sandstone.

10' 3" - 11' 3" Plastic clay with glassy quartz particles (< $\frac{1}{2}$ " diam) and occasional waterworn pebbles.

PIT 3 See Bore Log D5

2.9. PLANS - WEBB CREEK AREA

<u>Plan No.</u>	<u>Plan</u>
Tas - 2L-1	Locality Plan
Tas - 2L-2	Geology and Sampling

3.1 GENERAL

The programme for Mt. Stewart forms part of an experiment leading to an understanding of the relationships of stream sediment sample values to soil sample values and both to specific lithologic suites common to the lease areas.

A series of grid lines were cut and sampled over selected areas of stream sediment anomalies in Ni., Co., Pb., Zn., Ag., and Sn. obtained last year.

Previous Work

In January, 1969 a field party was flown into the Mount Stewart area (see Plan No.2E-15) to carry out a programme of stream cutting, sediment sampling, heavy mineral sampling and mapping.

High concentration of Ni., Co., Pb., Zn. and Ag. occurs in a broad belt extending north-south across the area and similarly tin was found in Loughran Creek and Castray Creek and tributaries to the south and east. The tin anomalies in the latter were not defined and hence did not warrant follow-up work at this time. The heavy mineral samples were lost.

3.2 PROGRAMME FOR 1969/1970

The grid comprised 7,000 feet on north-south base line, eight lines eastwards, 1,000 feet apart and seven lines westwards, 500 feet apart. Soil samples from the A₁ horizon were collected at intervals of 50 feet. The base line samples were analysed for Ni., Co., Zn., and Sn., the west 1,000 foot lines for Sn. and the remainder for Ni., Co., Pb. and Ag.

The geology was mapped along the cut lines and heavy mineral samples were taken from carefully selected sites on Loughran, Humphries and Camp Creeks.

Access to Mount Stewart was along a new road from Jasper which includes a short branch to Humphries Creek.

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3.3 GEOLOGY (see Plan No.2E-18)

The area studied comprises a serpentinitised layered ultramafic body, surrounded and intruded by porphyritic biotite granite. The serpentinite is interpreted as a roof pendant within the Meredith granite (Devonian) batholith. Contact metamorphism of the ultramafic rocks adjacent to the granite has reached a grade equivalent to the hornblende hornfels facies. Similar metamorphic rocks crop out in Camp Creek above the junction with Track Creek and appear to be related to a granite dyke. Other granite serpentinite contacts appear to be faulted and are thus not metamorphosed.

A narrow belt of meta-sediments occurs in the headwaters of Loughran and Camp creeks.

Dykes of microgranite, quartz porphyry and greisenized material strike east west and lie between Mine and Humphries Creeks and granite dykes occur in the northern serpentinite. A small intrusion of microgabbro is recorded on line OO E.

A major fault bisects the ultramafic from Loughrans Creek in the west to the Castray river in the east; downthrow is to the south. The southern serpentinite - granite contact is also faulted apparently with a downthrow to the north thus producing a trough in the southern serpentinites. The ultramafic rocks to the north appear to be step faulted on the eastern side and we have no information about the western side.

From the abrupt change in lithology viz. serpentinite to amphibolite schist in Mine creek and along line OO a north - south fault is inferred.

The amphibole schists, consisting of tremolite and actinolite, are derived through metamorphism of the ultramafic rocks. Fresh rock is usually pale yellowish grey or buff coloured which becomes bright green on exposure. Certain mica quartz schists from the Mount Stewart mine contain green carbonates.

The ultramafic suite is comprised of layered dunite peridotite and pyroxenite, the former decreasing towards the east. The layering is rough, ill-defined in the dunite/peridotite and more distinct in the peridotite/pyroxenite.

From correlations of probable cumulates from line to line and orientations measured in the peridotite/pyroxenite zones it is speculated that the body was originally at least two miles in diameter (possibly 10 or more if continuous with Bald Hill), faulted off on the south west and rotated such that the near horizontal original layering are now close to vertical.

Despite considerable obscuring of phase contacts through serpentinisation and metamorphism, sufficient data lead to a general NNE-SSW strike along the base line and thickened layers to the north and east are oriented NE - SW.

Euhedral octahedra of chromite are present in most of the dunites varying in size from 1 to 5 mm. The mineral was seen in other rocks but concentrations up to 5% of the rock are rare and then less than an inch wide. Magnetite is ubiquitous in minor amounts and particularly common to hornfelses.

Talc is a minor constituent of much of the serpentinite and several 2 foot wide stringers of white crystalline to massive talc were recorded in the north. Asbestos is rare being confined to a single occurrence in Mine Creek.

A number of very coarse grained orthopyroxenite veins intersect the layers at a shallow angle and rarely at right angles. A narrow dyke of dunite strikes east west.

Mineralization

A silicified gossan with galena and sphalerite boxworks crops out on the Stewart track between lines 10S and 20S and trace amounts of sulphide were seen in flinty siliceous material on line 10S and on the new road near the Humphries creek branch junction. A tourmaline granite dyke at the headwaters of Castray creek carries visible chalcopyrite and arsenopyrite.

The old mine was worked at one time for silver-bearing galena but had insufficient grade to cover transportation costs. The silver-lead ore was hand-picked from a quartz-sphalerite-galena-chalcopyrite vein in the serpentine schists.

Osmiridium was found in Camp Creek downstream from the 6,000 ft. peg, Loughran's Creek downstream from the 1,000 ft. peg and in the Humphries and Track Creeks. There was nothing in Mine Creek and the Castray River.

3.4 GEOCHEMISTRY (see Plans Nos. 2E-19, 2E-20, 2E-21)

(a) Stream sediment results. Values in excess of thresholds given below were plotted for the following respective elements:-

- nickel - 875 p.p.m.
- cobalt - 45 p.p.m.
- copper - 20 p.p.m.
- lead - 47 p.p.m.
- zinc - 88 p.p.m.
- silver - 1 p.p.m.

(b) Soil sample results. Zinc analyses and tin analyses were made on samples from the base line and western grid respectively.

Grid anomalies were plotted using the following thresholds:-

- Nickel - 2,400 p.p.m.
- cobalt - 600 p.p.m.
- lead - no anomalies
- zinc - 100 p.p.m.
- silver - 2 p.p.m.

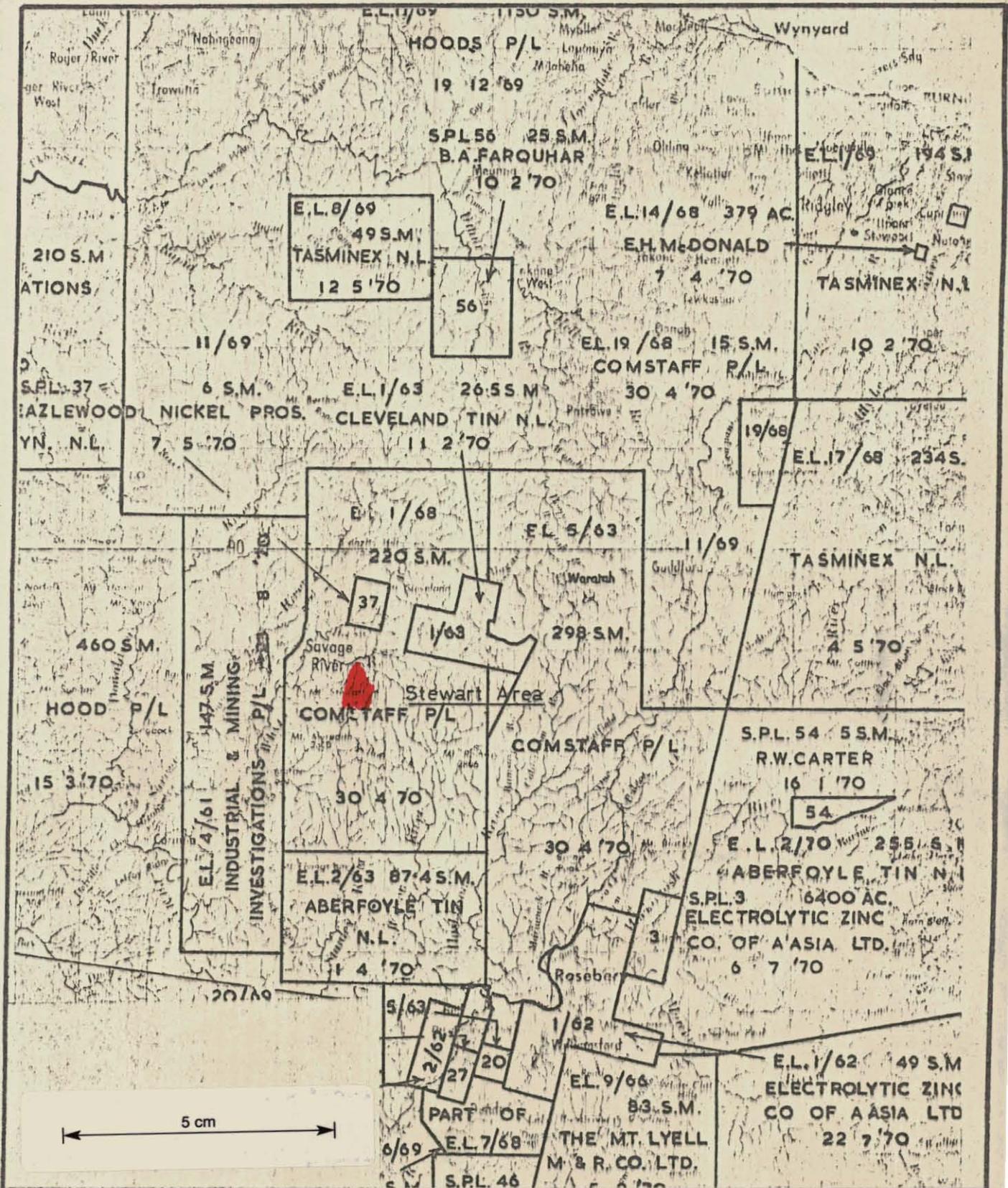
(See Plans 2E-16, 2E-17)

The anomalies for all elements are without pattern, are unrelated to the geology and hence of no consequence.

3.5 PLANS - MT. STEWART

<u>Plan No.</u>	<u>Plan</u>
Tas-2E-15	Locality Plan
Tas-2E-16	Histograms for Silver, Lead and Zinc.
Tas-2E-17	Histograms for Nickel, Cobalt and Tin.
Tas-2E-18	Geology on scale 1:10,000
Tas-2E-19	Geochemistry - Nickel and Cobalt
Tas-2E-20	Geochemistry - Beryllium and Tin
Tas-2E-21	Geochemistry - Copper, Lead, Zinc and Silver.

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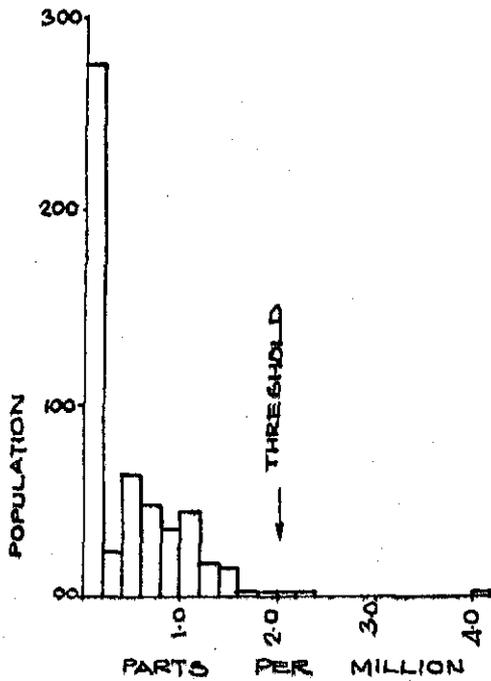
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MT STEWART AREA LOCALITY — PLAN

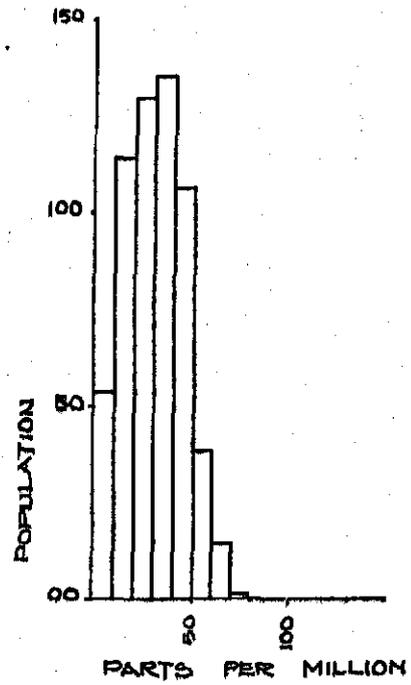
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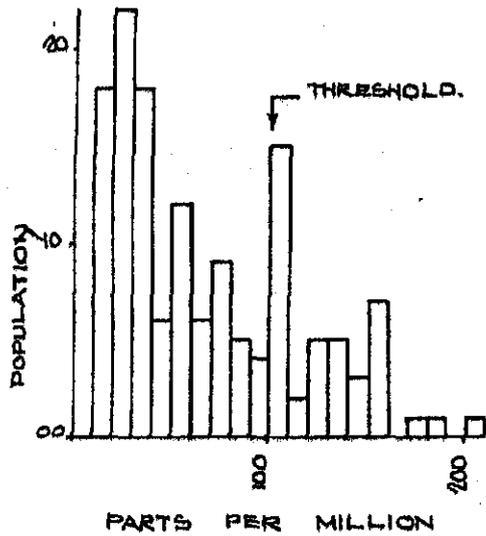
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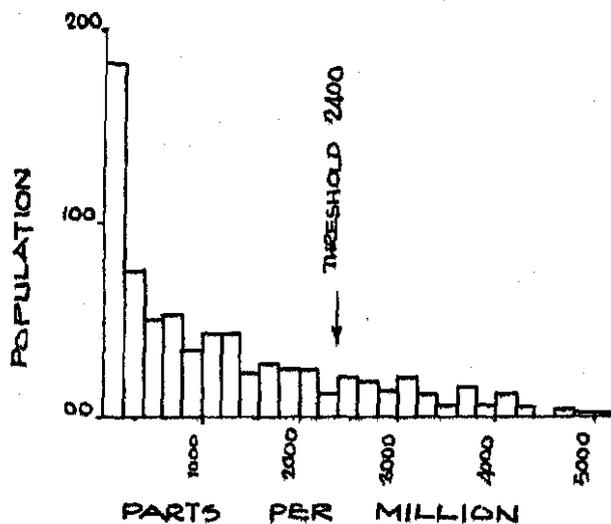
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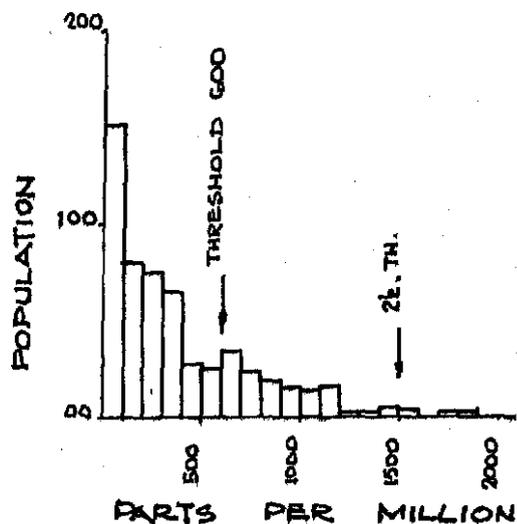
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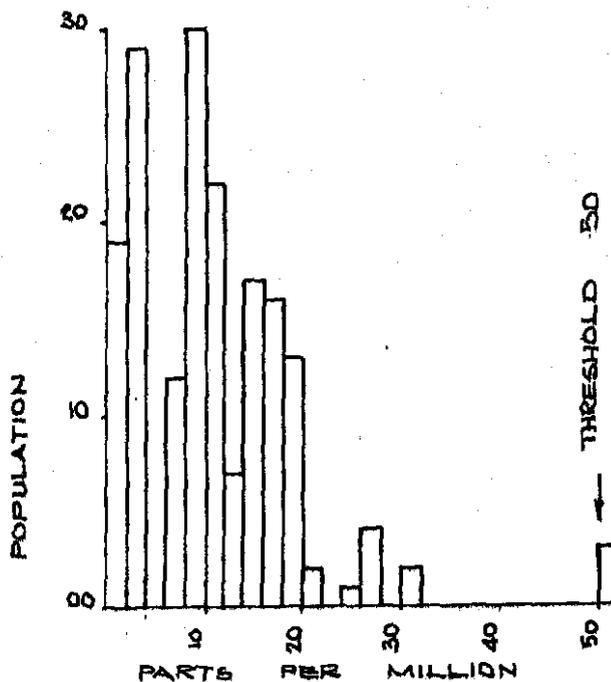
		COMSTAFF PROPRIETARY LIMITED	
		MT STEWART AREA HISTOGRAMS	
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		PLAN N ^o TAS. - 2E - 16	



Ni



Co.



Sn.

930023

		COMSTAFF PROPRIETARY LIMITED	
		MT STEWART AREA HISTOGRAMS	
		Ni , Co , Sn .	
		DRAWN	
		SCALE	
		PLAN Nº TAS - 2E - 17	

4. MT. JASPER - ESPEA - BALD HILL

4.1. GENERAL

Two major programmes have been carried out in this area, one a detailed investigation of geochemical anomalies on the Mount Jasper Soil Sample Grid (1968-9), and the other a regional stream sediment sampling programme to the west and south-west of the Grid. (See plan 2F-24).

In addition to these, minor programmes were undertaken at Espea, on the eastern margin of the Mount Jasper Grid, and at Bald Hill, to the north-west of the Grid.

4.2. MOUNT JASPER SOIL SAMPLE GRID - ANOMALY INVESTIGATION

4.2.1. Previous Work

The work carried out and geological and geochemical information obtained during the 1968/9 field season are described in detail in the report for that season. A summary of this work follows.

A box-work grid, with lines at 1,000 ft. intervals was cut over an area of approximately 4 square miles and soil samples were taken at 100 ft. intervals along each of the lines.

The north of the area is occupied by serpentinitised ultramafics and relatively unaltered pyroxenites which intrude and overlie predominantly basic volcanic and hypabyssal rocks outcropping through the central area of the grid. These rocks, which have undergone low-medium grade metamorphism in turn overlie a mixed sequence of sediments in the south. The whole is overlain unconformably by a quartzite-sandstone sequence in the east. Numerous occurrences of small-scale sulphide mineralisation were observed throughout the area.

For the most part the geochemical results reflected regional geology and known areas of mineralisation, but certain of the copper 'anomalies', which were almost entirely restricted

to the central belt of meta-igneous rocks, appeared to merit further work. This was particularly so in areas where granodioritic/dacitic rocks, the result of secondary silicification, had been observed within the metamorphosed basic igneous suite.

4.2.2. 1969-70 Programme

The work carried out this season was designed to investigate and evaluate the anomalies shown by last year's geochemical sampling, and three methods were used to achieve this end. These were :

Pitting on geochemical "highs"

Close interval soil sampling

Self potential traverses over anomalous lines

Whilst these methods were intended to check specifically on the copper anomalies with the basic suite, the geophysical traverses were sufficiently extensive to cover other rock types and high or anomalous values in other elements.

4.2.3. Pitting (See plan 2F-25)

Prior to the commencement of field work, a considerable amount of time and thought had been devoted to the problems of geochemistry presented by the Mount Jasper area, as a result of which it was strongly suspected that the so called copper anomalies within the basic igneous suite represented no more than a higher background value over this particular rock type. The basic suite, herein after referred to as metadolerite, is by no means homogeneous and includes altered and metamorphosed basalts, dolerites, gabbros, amygdaloidal spilites, diorites, dacites, syenites, granodiorites, trachyandesites and crystal lithic tuffs in greater or lesser amounts, and there is therefore no difficulty in offering an explanation for the fluctuations in level of this higher background.

In order to test and, perhaps to help substantiate this theory, and also to gain a better appreciation of the significance of the geochemical values in general terms, six pits were dug at the foci of copper anomalies. Samples of bedrock

were collected from these pits, and from two other copper anomalies where pitting was not necessary, and these were submitted for analysis for copper and for petrographic description.

The results obtained are tabulated below :-

Specimen No.	Location on Grid	Depth to Bedrock	Cu. value (p.p.m.) soil	Cu. value % Bedrock	Bedrock	Comment
1	20W 39S	2 ft.	375	.005 50	Altered dolerite	
2	50S 13W	5 ft.	590	.03 300	Metadolerite	
3	45S 01W	18 ft.	445	.01 100	(?) Metabasic igneous	Specimen too highly weathered for thin section
4	60S 23E	12 ft.	357	.005 50	Variolitic (?) basalt (spilitic)	
5	55S 17E	10 ft.	299	.005 30	Metadolerite	
	45S 24E	?	275	?	?	Pit abandoned at 8' when bottom collapsed into (?) old adit.
6	20E 47S	0 ft.	345	.03 300	Metabasalt	Pit not necessary bedrock exposed.
7	55S 24E	0 ft.	410	.005 50	Meta-acid crystal lithic tuff	Pit not necessary bedrock exposed.

From these results it is readily apparent that the high geochemical values are not related to significant concentrations of copper within the underlying bedrock.

4.2.4. Close interval soil sampling :

One of the most prominent copper anomalies was that occurring in the area bounded by the 20E, 40S, 30E and 60S grid lines, which, it appeared, might have been associated with a "dacite body" located here. Accordingly an additional 4,600 ft. of line (the two N-S lines between 20E and 30E, and the short E-W cross lines seen on plan 2F-26) were cut over the "dacite", and sampled at 25ft. intervals, so that the "dacite outcrop" is covered by a dense mesh of samples. When the results of these samples, which were analysed for copper only, were plotted it was immediately obvious that no correlation between high copper values and the "dacite outcrop" existed.

It should be noted that the "dacite outcrop" indicated on Plan 2F-25 is that suggested by geological mapping last field season. In fact rock specimens 4 and 7 (Plan 2F-25) theoretically from within this outcrop, have been identified as a variolitic (?) basalt (spilitic) and a meta-acid crystal lithic tuff respectively, suggesting that the "dacite" body is neither as extensive nor as discrete as was previously thought. It is suggested that the dacite body is in fact merely another instance of the patchy secondary silicification of the metadolerite.

Further to this discussion of the so-called "dacite" it should be noted that an exhaustive study of all available petrographic data fails to disclose any instance of a dacite being recorded in the Mount Jasper area.

One sample D 9065, was collected from the area mapped as dacite last season, and this was described by Amdel as a silicified basic rock, in the following terms : "The rock is wholly composed of secondarily derived minerals.....with a matrix of a mosaic of granular quartz which has filled the remaining space.....quartz appears to replace feldspar. The present texture is suggestive of an ophitic igneous rock,

027

and if analogy with the rocks previously described (altered dolerites) holds, the original rock was probably basic." The specimen is located 80 ft. east of specimen 7. (See plan 2F-25 and previous table).

It may also be noted that the only rock sample which was described as containing appreciable mineralisation (D 9054), which contains chalcopyrite and minerals of the millerite and linnaeite groups, is described as an intensely chloritised basic rock, and was a sample of mullock from the adit opening of New Mount Jasper Mine.

Thus there is in fact no association between any mineralisation and a granodioritic/dacitic body.

4.2.5. Self Potential Traverses (See Plan 2F-26)

Some 68,000 ft. of grid line were traversed, covering virtually all areas that were geochemically anomalous. The readings obtained showed only the minor variations in potential associated with normal background for this type of geophysical work, and it therefore seems unlikely that any sulphide ore-body is present.

Plots of observations at the eastern extremities of lines 30E, 40E, 50E and 60E showed the initial downcurve of an anomaly, and led to the investigation of the Espea area.

4.3. JASPER REGIONAL PROGRAMME

In the area to the south and west of the Mount Jasper Grid there lie two geological boundaries which are of interest in that they form suitable environments for mineralisation. In the south is the contact between the northern part of the Meredith granite and the Cambrian system, whilst in the west is the Cambrian-pre-Cambrian boundary, an horizon which in the Renison Bell area has numerous occurrences of mineralization (Plan 2F-27). No work had been done in this area prior to this field season, and because of the possible potential of the two

junctions, it was decided that the area warranted an initial reconnaissance programme.

4.3.1. Work Programme (See Plan 2F-28)

The investigation of the area was achieved by means of stream sediment sampling and regional mapping of the waterways thus sampled. On the major drainages, the Heazlewood and Whyte Rivers, samples were taken at 1,000 ft. intervals, whilst on their tributaries the sample interval was reduced to 500 ft. The Heazlewood River and its tributaries were sampled and mapped from the Jasper camp, and work on the Whyte River system was carried out from a fly camp established on the banks of the Whyte just south of the south-west corner of the Jasper Grid. Some 12 miles of creek were cut, sampled and mapped and about 150 active stream sediment samples collected.

4.3.2. Geology (See Plan 2F-29)

In the northern part of the area covered, that drained by the Heazlewood River and its tributaries, the geology was examined from Bald Hill in the north, and the Mount Jasper Grid to the east. Ultramafic rocks were found to extend southward, and 'metadolerites', i.e. a suite of altered and metamorphosed, basic and intermediate, volcanic and hypabyssal igneous rocks, extended from the east.

The ultramafics may be divided into two types, as shown on the map, namely serpentinites and pyroxenites. The former are dark grey or green to black in colour, and occasionally contain thin (1/2 in.) bands of talcose material along shear planes. Within the main areas of serpentinite outcrop are sporadic patches of relatively fresh and unaltered pyroxenite. Bands of apparently more felsic material have been observed rarely. At one locality on the Heazlewood River, about 1,000 ft. downstream of the western edge of the Mount Jasper Grid, several thin (4 in.) dolerite dykes or sills intrude the serpentinite. These dolerites strike approximately east-west, and dip northwards at 55°. There are several examples of sheared contacts between the serpentinite and the metadolerite, and in these instances blebs

of chalcopyrite are seen associated with the shearing.

The pyroxenites are relatively fresh and unaltered, and are readily recognizable. One almost constant feature is that they are very coarse grained. In places patches and bands of more felsic material are present, and talcose and serpentinous material is seen along randomly orientated shear zones and planes. The relationship between the serpentinite and pyroxenite is not obvious from field observations, but the distribution of the outcrops makes it unlikely that simple layering, as recorded in the Bald Hill ultramafic body, is present.

On the eastern flank the ultramafics most commonly abut against metadolerites, similar to those of the Mount Jasper Grid Area, which again, carry minor amounts of both pyrite and chalcopyrite.

To the west of the ultramafics, and striking approximately NE-SW where it is possible to record this information, are a series of shales, mudstones and greywackes, together with lesser amounts of acid pyroclastics. Recorded dips were vertical or near -vertical to the north-west and minor shearing and thrusting were observed. A few small dolerite dykes intrude this sedimentary sequence.

In the southern part of the area covered, along the Whyte River and its tributaries, exposure is less complete and the information available consequently less. However it appears that here sediments predominate and igneous rocks are reduced to a minor role. The bulk of the succession appears to comprise greywackes and mudstones, with siltstones and micaceous sandstones also present. In the west these rocks strike approximately NW-SE and dip to the south-west at 35° - 75° . No dips or strikes were recorded in the east. Exposures of low grade meta-argillites were noted almost throughout, and in the east, just south of the Mount Jasper Grid, minor amounts of metadolerite, pyroxenite and serpentinite were also observed.

4.3.3. Structure

It is difficult to attempt any structural interpretation

with the limited information available. However, on the basis of the dips and strikes observed it may be very tentatively suggested that structurally the area is part of a plunging antiform. In this case the axis would run approximately E - W, plunging to the west, with the rocks seen in the Heazlewood drainage lying on the northern limb, and those in the Whyte Drainage lying on the southern limb, of the antiform.

4.3.4. Geochemistry (See Plan 2F-28)

All the samples collected were analysed for Cu., Pb., Zn., Co. and Ni. Those collected from the left hand tributaries of the Whyte River are also to be analysed for Sn., but these results are still outstanding.

The results which have been received were plotted as histograms, and in the case of Cu., Pb., Co and Ni. these showed only normal decay curves. In the case of Zn., the histogram showed a threshold at 90 p.p.m., with a maximum value of 154 p.p.m. A low level Zn. anomaly is therefore recorded on the two westernmost right-hand tributaries of the Whyte River.

It should be noted that those samples taken from the Whyte River itself show abnormally high Cu. and Zn. values, reflecting the presence of Cleveland Tin N/L's property at Luina, some 4 or 5 miles upstream. These values were therefore omitted when the histograms were drawn up.

4.4. THE ESPEA AREA

The name "Espea" has been given to the area immediately to the east of the Mount Jasper Grid, its exact location being shown on Plan 2F-24.

No work had been carried out here previously but during the course of self-potential traversing over the Mount Jasper Grid readings that appeared to represent the initial downcurves of self potential anomalies were recorded at the eastern extremities of lines 30S, 40S, 50S and 60S.

4.4.1. Work Programme

Mount Jasper Grid lines 30S, 40S and 60S were each extended to the east by 1,000 feet. Line 50S was extended by 1,500 ft. A series of A₀ level soil samples was taken along these line extensions at 100 foot intervals; the lines were mapped, and self-potential traverses were run along them.

4.4.2. Geology (Plan 2F-30)

The map requires little explanation. The sandstone-quartzite over which the lines have been extended strikes approximately N-S, and dips to the east at 15 -20 . It is poorly fossiliferous, and the species recorded indicate an Ordovician-Silurian age. The rocks themselves are almost pure-white in colour, presenting a very clean appearance, and even where quartzitic are only weakly consolidated. To the north of line 30S bands and/or lenses of coarse conglomerate have been observed, but these have not been seen along the Espea lines themselves. The sandstone/quartzite forms a N-S trending, steep and fairly high ridge, the crest of which runs approximately along line 50E.

4.4.3. Geochemistry

The soil samples collected from the line extensions are being analysed for Ag., As., Co., Cu., Ni., Pb., Sn. and Zn. The results are not yet available.

4.4.4. Geophysics (Plan 2F-31)

Self potential traverses were run along each of the line extensions, and the observed readings, when corrected and plotted described classic anomaly curves. Maximum readings were between -250 and -300 millivolts.

At least three interpretations of these curves may be made :-

- (a) they result from the presence of a sulphide ore-body (presumably elongated).
- (b) they indicate the presence of a N-S fault

- (c) they present a mirror-image reflection of topography, as does sometimes occur with this method.

4.5. BALD HILL

The Bald Hill area lies to the north-west of the Mount Jasper Grid, on the northern side of the Waratah-Savage River Road (Plan 2F-24). Preliminary work carried out here last season indicated a layered ultrabasic, consisting of serpentinised dunite below pyroxenite, in the east and Pre-Cambrian rocks in the west. Between these two units is a narrow strip of (?) Cambrian metasediments, which have a sheared contact with the ultramafics. Small amounts of osmiridium are reported from alluvial workings in the area, and from within the ultramafic.

As part of the initial investigation lines (numbered 1-4, Plan 2D-12) were cut and soil sampled, and anomalous values for nickel and cobalt were recorded.

4.5.1. 1969-70 Programme

The work carried out this season has been the geophysical investigation of geochemical anomalies, and the collection of some heavy mineral concentrates.

Self potential and magnetometer traverses were run over the whole of line 4, and a self potential traverse over the eastern part of line 3.

4.5.2. Heavy Mineral Concentrate Collection (Plan 2D-12)

Six concentrates were collected during the course of reconnaissance visits to the area. These samples are to be examined for osmiridium and other minerals of economic interest. Results are awaited.

4.5.3. Geophysics (Plans 2D-11, 2D-12)

The self-potential traverse over the eastern part of line 3 did not indicate any anomaly, but that over line 4 gave anomalous readings at the extreme west of the line.

The magnetometer traverse along line 4 revealed four magnetically anomalous areas, as may be seen in Plan 2D-11. It is of interest to note that only one of these coincides approximately with the self-potential anomaly.

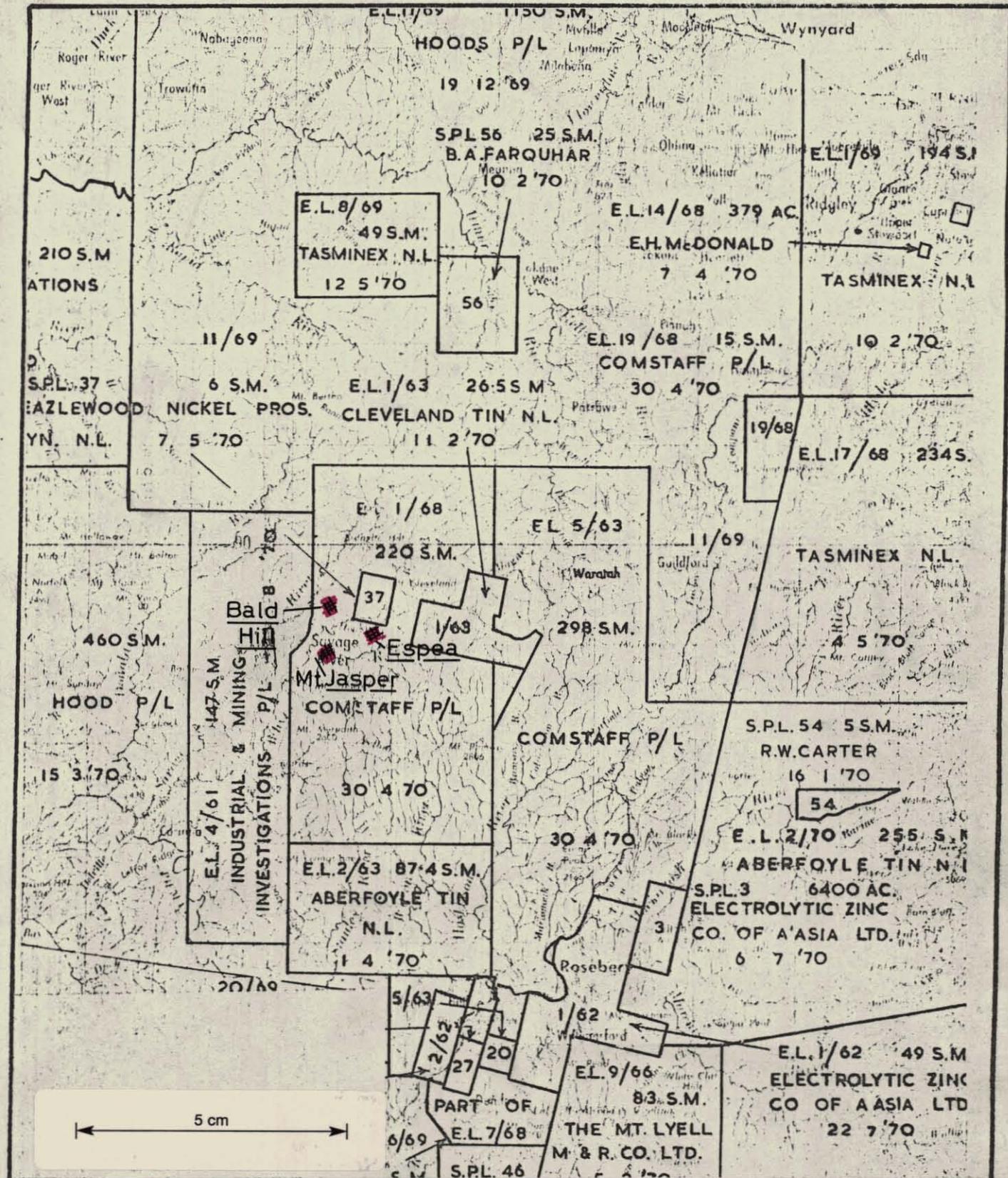
4.5.4. Geochemistry (Plan 2D-11)

Anomalous Co. and Ni values on line 4 have been plotted and reveal a number of anomalous zones. In both cases peaks at the western end of the line appear to correspond quite closely to the geophysical anomalies.

4.6. PLANS - MT. JASPER - ESPEA - BALD HILL

<u>Plan No.</u>	<u>Plan</u>
TAS-2F-24	Locality Plan
TAS-2F-25	Mt. Jasper Grid - Copper Anomaly Investigation
TAS-2F-26	Mt. Jasper Grid - Geophysics
TAS-2F-27	Jasper Regional Programme - Supposed Geological Boundaries
TAS-2F-28	Jasper Regional Programme - Geochemistry
TAS-2F-29	Jasper Regional Programme - Geology
TAS-2F-30	Espea Area - Geology
TAS-2F-31	Espea Area - Self Potential Survey
TAS-2D-11	Bald Hill - Line No.4 Geophysical and Geochemical Anomalies
TAS-2D-12	Bald Hill - Geophysics and Heavy Mineral Collection.

034



COMSTAFF PROPRIETARY LIMITED

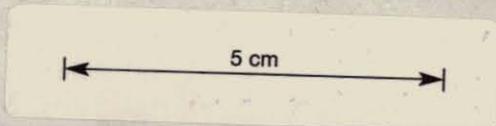
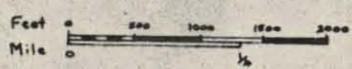
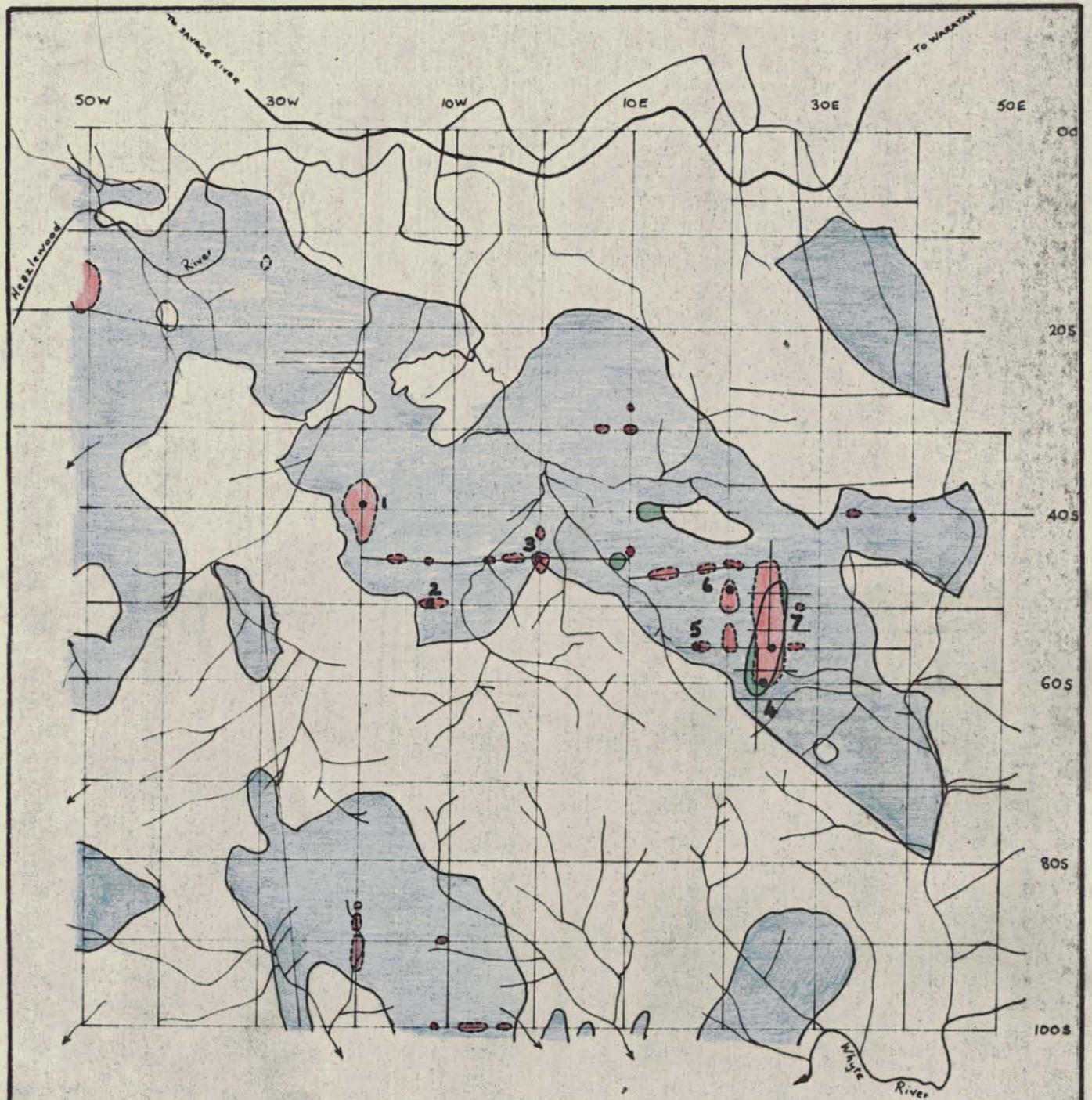
MT. JASPER REGION—ESPEA—BALD HILL

LOCALITY PLAN
930035

DRAWN
SCALE 1: 500,000
PLAN N° TAS-2F-24

70-709

035



- METADOLERITE
- DACITE
- Cu. ANOMALY
- ROCK SAMPLE

930036

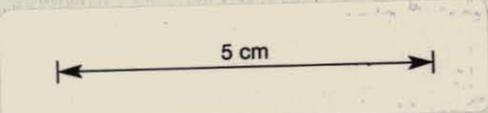
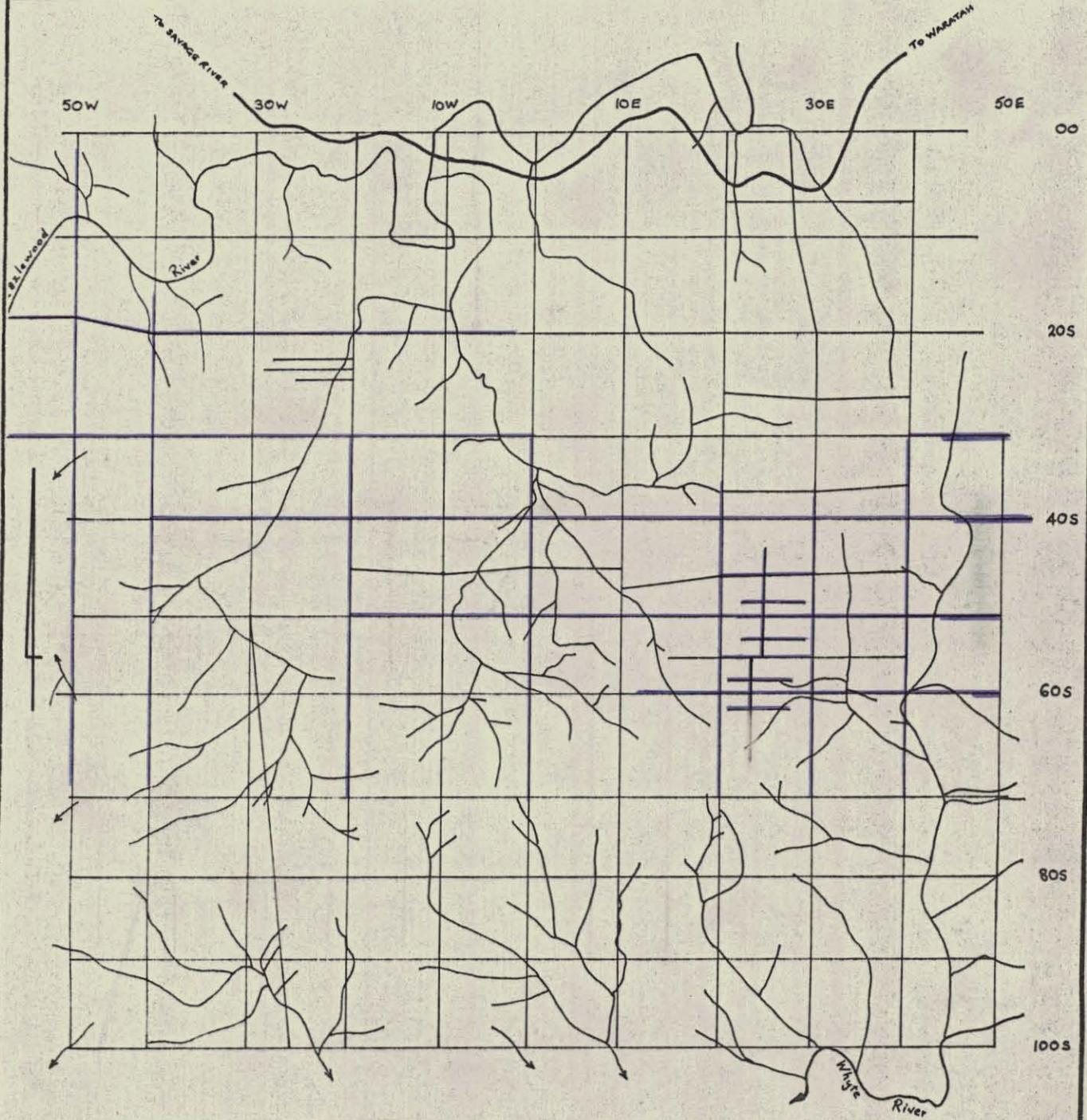
COMSTAFF PROPRIETARY LIMITED

MOUNT JASPER
Cu. ANOMALY INVESTIGATION

DRAWN
SCALE 1" = 1500'
PLAN N° TAS-2F-25

70-709

036



930037

Self Potential Traverse —

Self Potential Anomaly —

COMSTAFF PROPRIETARY LIMITED	
MOUNT JASPER GEOPHYSICS	
	DRAWN
	SCALE 1" = 1500'
	PLAN NO TAS-2F-26

70-709

037

5 cm

Sheets 88/55 + 89/53

Boundary E.L. 1/68

340

S.P.L. 37.

To Westok

Approximate position
Mt. Jasper soil sample grid

890

Orange River

Henalewood River

White River

Mt. Stewart Mine

True North



930038

Scale: 1:50,000

From Geological Survey
Regional Map.

-  PRE-CAMBRIAN
-  CAMBRIAN
-  GRANITE

COMSTAFF PROPRIETARY LIMITED	
MOUNT JASPER REGIONAL PROGRAMME SUPPOSED GEOLOGICAL BDY'S	
DRAWN	SCALE
	1: 50,000
PLAN N ^o	
TAS - 2F - 27	

70-709

038

5 cm



Drainage covered by Stream sediment sampling

Zinc Anomaly Threshold, 90 ppm.

COMSTAFF PROPRIETARY LIMITED

MOUNT JASPER REGIONAL PROGRAMME GEOCHEMISTRY

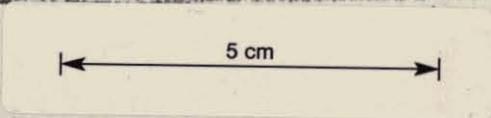
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PLAN N^o TAS-2F-28

70-709

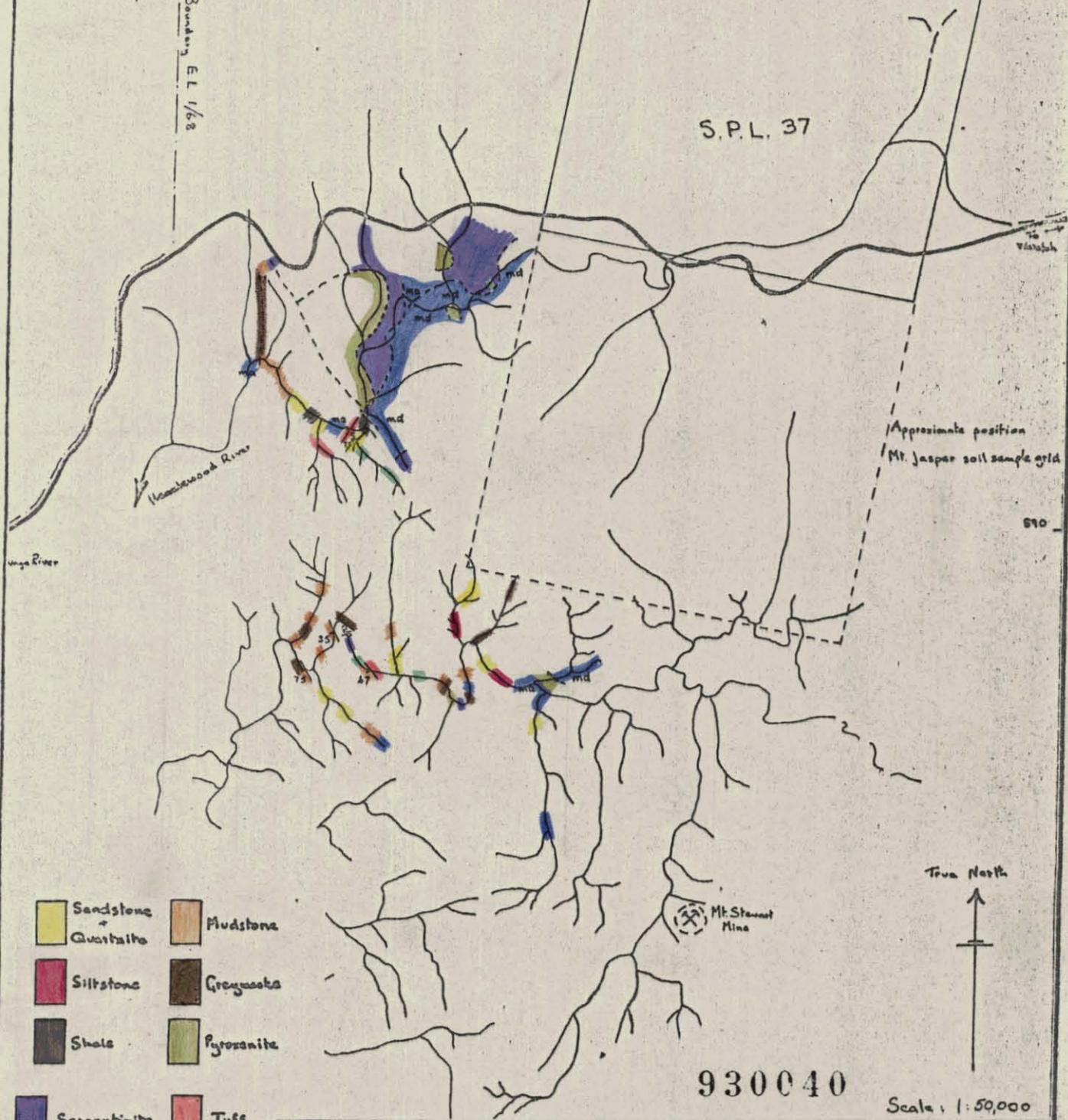
029



Sheets 88/33 + 89/33

Boundary, E.L. 1/68

S.P.L. 37



- Sandstone
- Mudstone
- Siltstone
- Greywacke
- Shale
- Pyroxenite
- Serpentinite
- Tuff
- Dolomite
- Hornfels { metadiorites + meta-argillites

930040

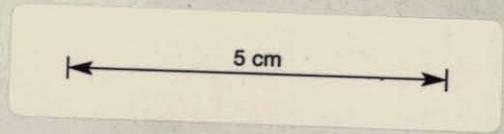
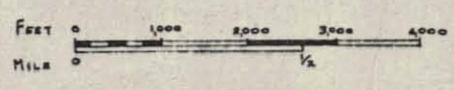
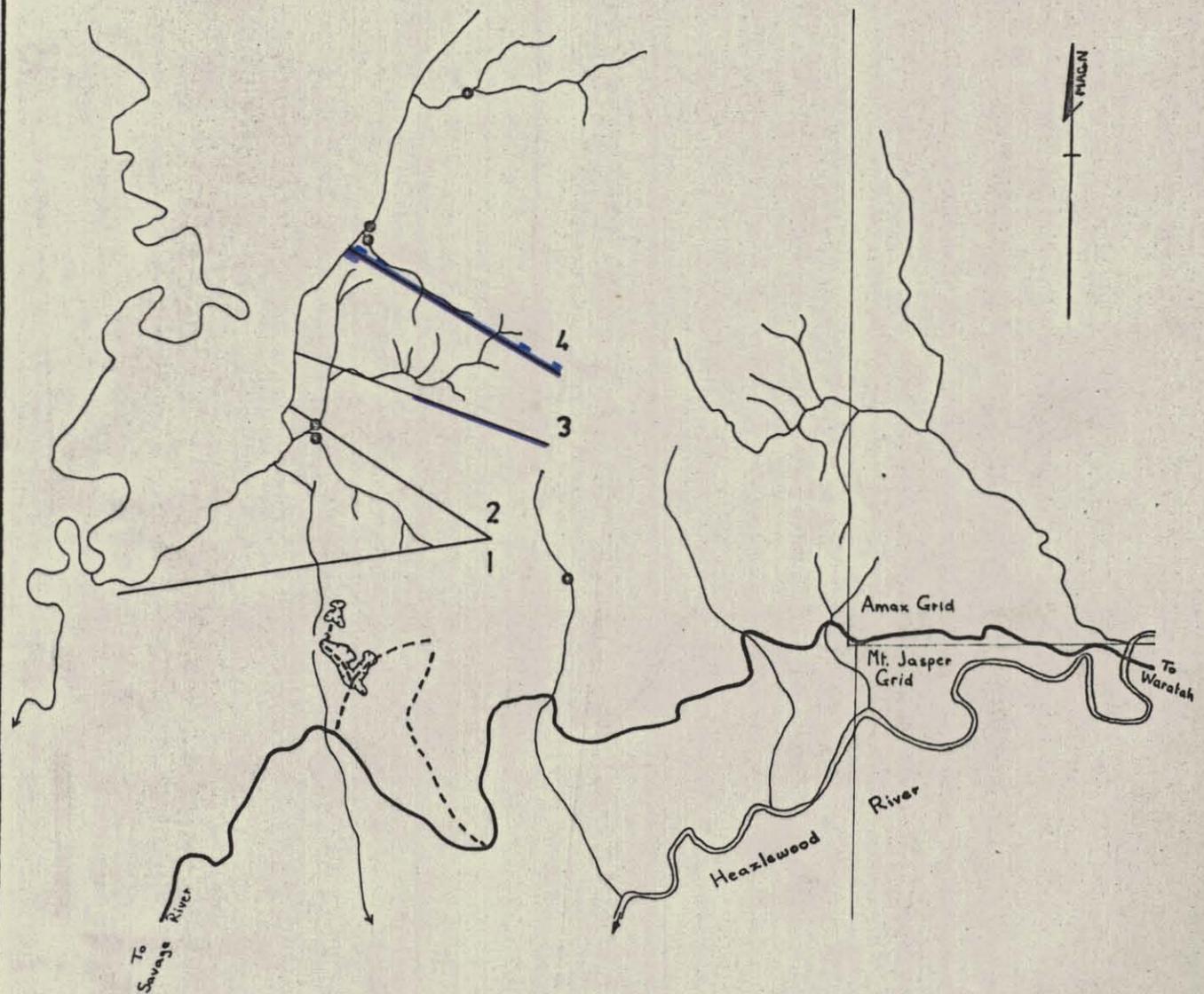
Scale: 1:50,000



COMSTAFF PROPRIETARY LIMITED	
MOUNT JASPER REGIONAL PROGRAMME GEOLOGY	
	DRAWN
	SCALE 1:50,000
	PLAN N ^o TAS-2F-29

70-709

040



Magnetometer: Traverse ———
 Anomaly ———

Self Potential: Traverse ———
 Anomaly ———

Heavy Mineral
 Collection Site ○

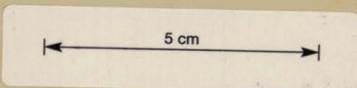
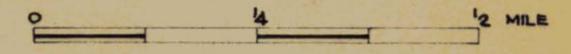
930041

COMSTAFF PROPRIETARY LIMITED	
BALD HILL GEOPHYSICS AND HEAVY MINERAL COLLECTION	
DRAWN	
SCALE	1" = 2500'
PLAN N ^o	TAS-2D-12

70-709

TRUE NORTH

1 : 10,000



Geochemical Sampling

Stream sediment samples were analyzed for:-

	Values were in the order of:	"Risks" were:
Cu	4 ppm	24 ppm
Pb	10-20 ppm	40 ppm
Zn	10-20 ppm	200 ppm

Soil samples were analyzed for:-

	Values were in the order of:	"Risks" were:
Cu	0-8 ppm	24 ppm
Pb	20-30 ppm	120 ppm
Zn	20-30 ppm	220 ppm
Bi	20-30 ppm	50 ppm

LEGEND

- Creek
- Creek, stream sediment sampled
- Cut line
- Cut line with soil sample positions
- Cut line with augering position
- Pit site
- Heavy mineral concentrate site
- Approx boundary of rock groups
- Sandstone
- Quartzite
- Conglomerate
- Siltstone
- Mudstone
- Shale
- Metavolts
- Diorite
- Tuff

COMSTAFF PROPRIETARY LIMITED

WEBB CREEK
GEOLOGY AND SAMPLING

930042

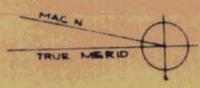
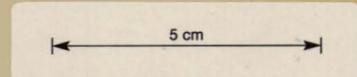
2049

DRAWN
CHECKED
DATE 1969 - 70
SCALE 1 : 10,000
PLAN NO TAS-2L-2



- LOW GRADE AMPHIBOLITE (SERP. HORNFELS)
- HIGH GRADE SERP. SCHISTS (AMPHIBOLITES)
- GRANITE & MICROGRANITE
- QUARTZ PORPHYRY
- MICROGABBRO
- GREYWACKE
- PYROXENITE
- LAYERED ULTRAMAFIC COMPLEX
- METAGEDIMENT SCHISTS
- DUNITE DYKES

PROBABLE CUMULATE LAYERING.



MOUNT STEWART
COMSTAFF PTY. LTD.
GEOLOGY

SCALE 1:10000

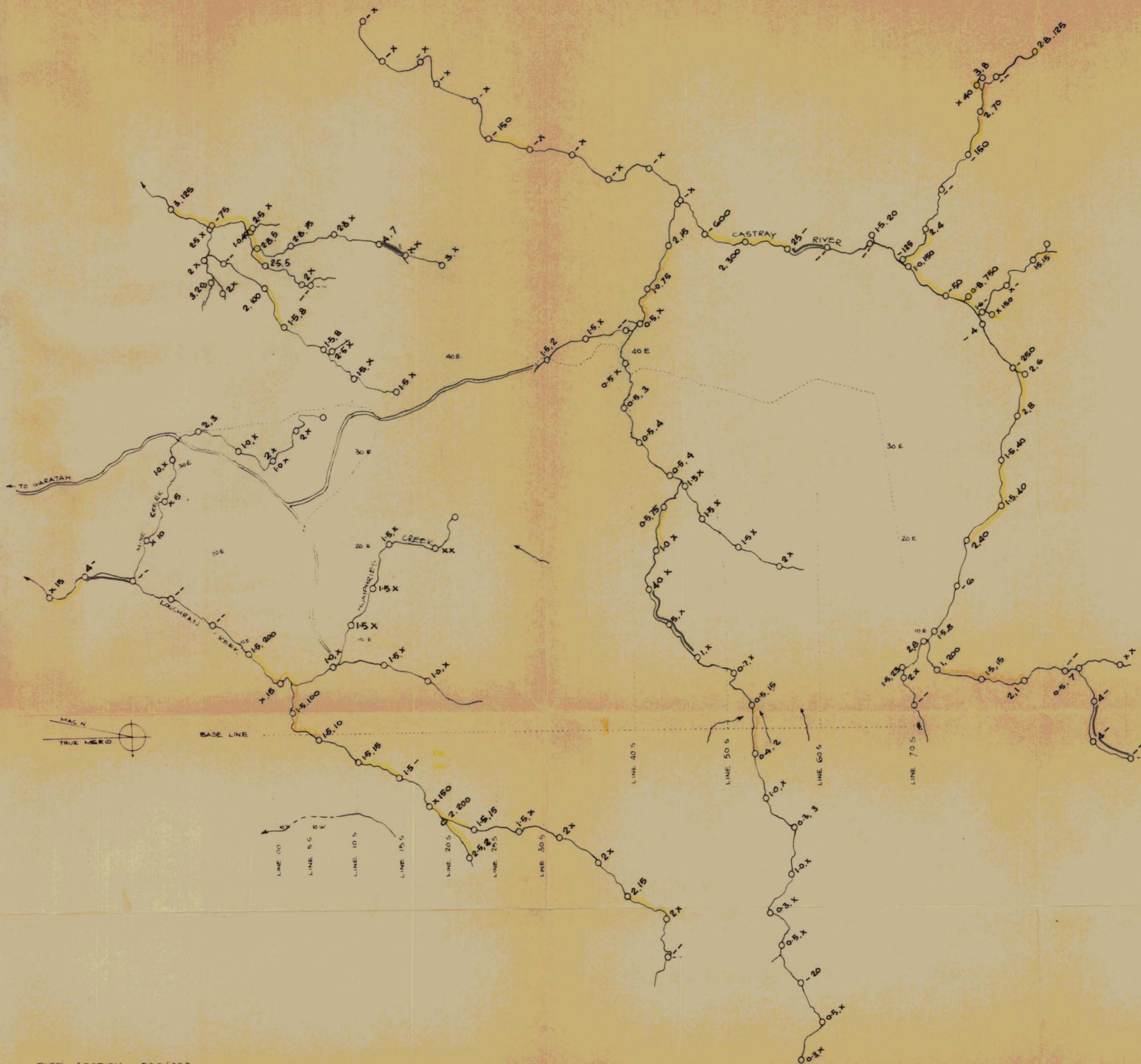
PART SECTION 880/330

930043

2050

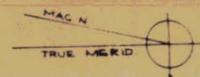
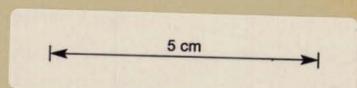
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10-769



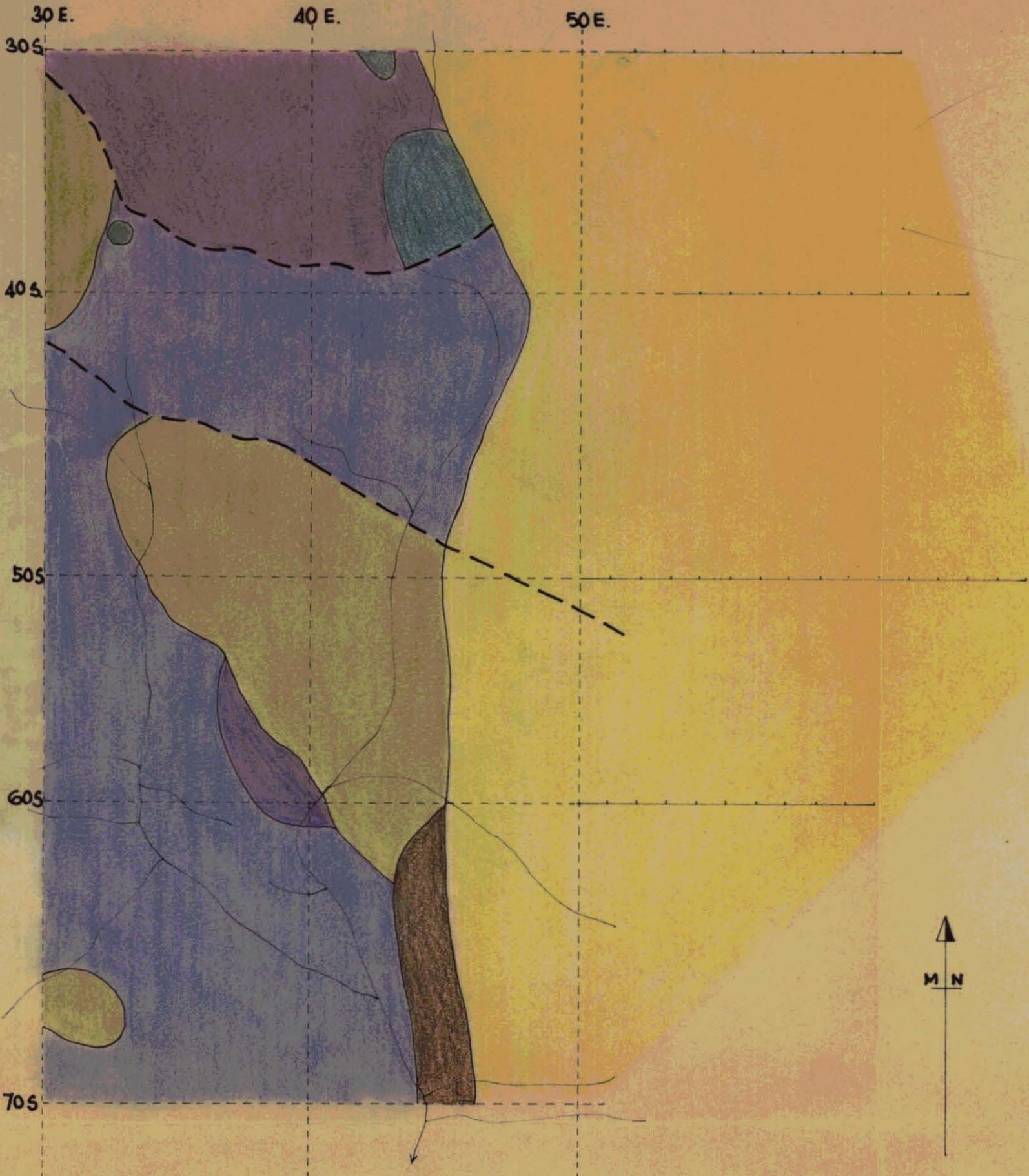
	BACKGROUND	THRESHOLD	THRESHOLD x 2
Be.	4		
Sn.	6	15	30

VALUES PLOTTED ARE FROM THE LEFT Be. Sn.
 X DENOTES NO VALUE
 - DENOTES NO SAMPLE TESTED



MOUNT STEWART
 COMSTAFF PTY. LTD.
GEOCHEMISTRY
 Be. Sn.
 SCALE 1:10000

930045 2052



0 100 200 300 400 500 600 700 800 900 1000 Feet
 SCALE 1 : 5000

5 cm

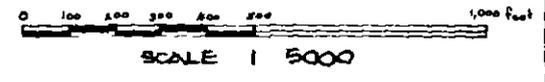
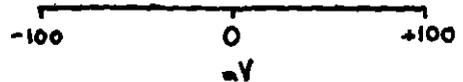
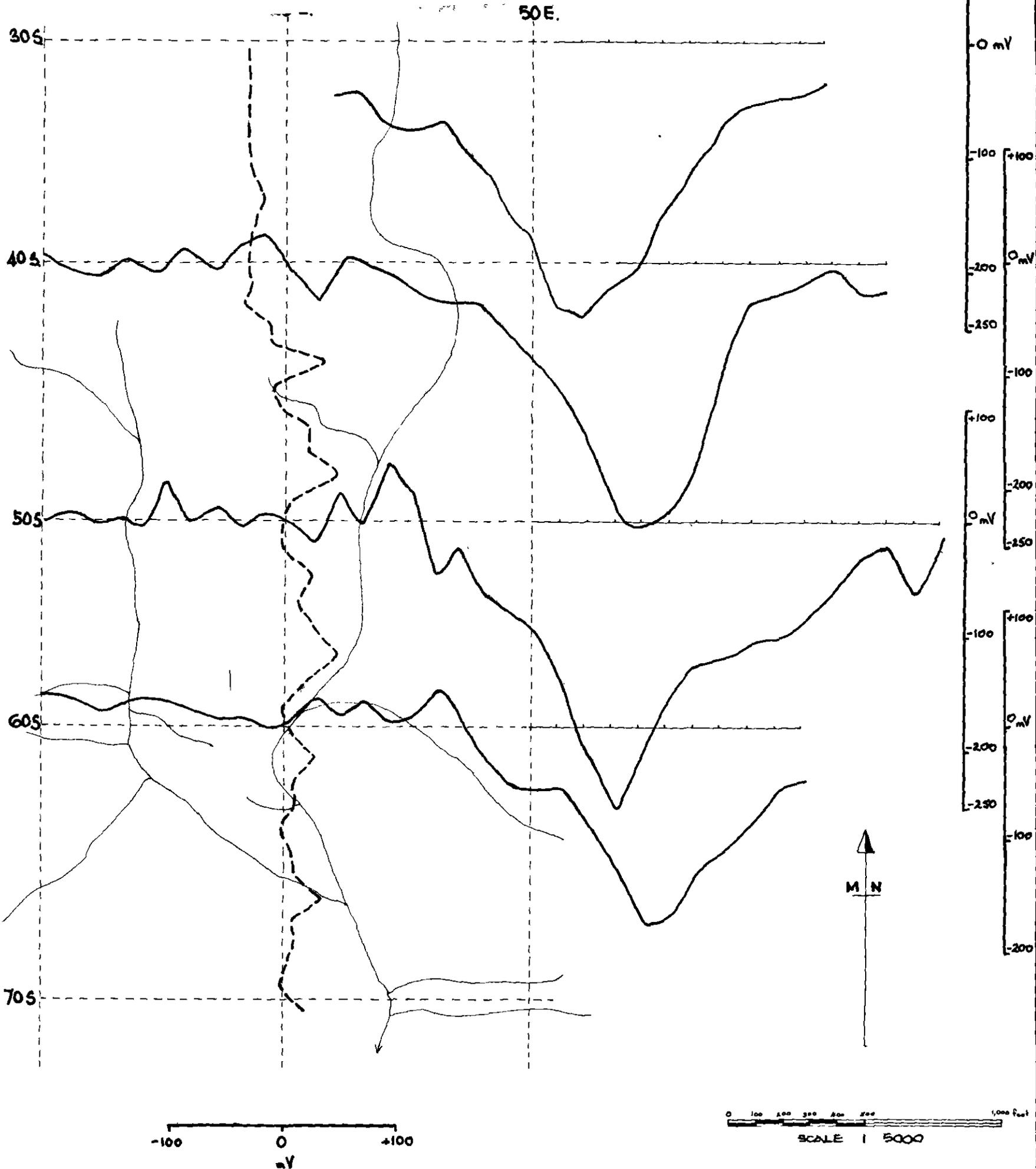
LEGEND

- ← CREEK
- - - CUT LINE (JASP. GRID)
- CUT LINE w. SOIL SAMPLE POSN.
- - - FAULT.

- QUARTZITE SANDSTONE
- MICACS. STONES, C'WACKE, SHALE, CHERT.
- METADOLERITE.
- DACITE
- GABBRO
- PYROXENITE
- SERPENTINITE

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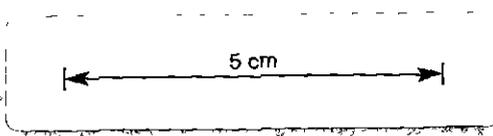
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LEGEND

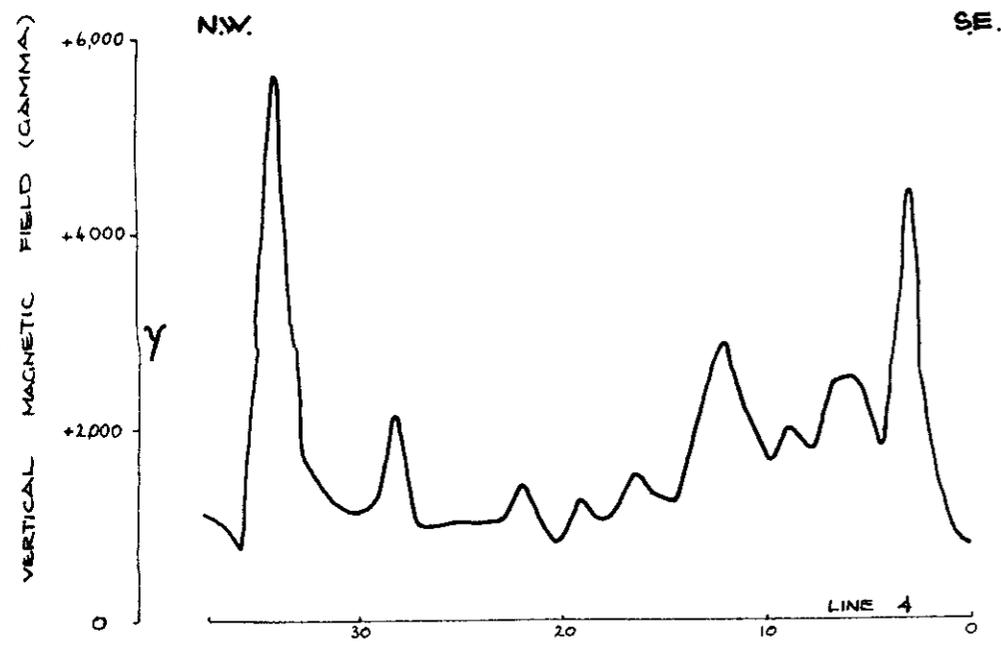
- CREEK
- CUT LINE (JASP. GRID)
- CUT LINE w. SOIL SAMPLE POSN.
- (E-W) } GRAPHS OF S.P. READINGS SUPER-IMPOSED ON TRAVERSED LINES.
- (N-S) }

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ESPEA AREA
SELF POTENTIAL SURVEY

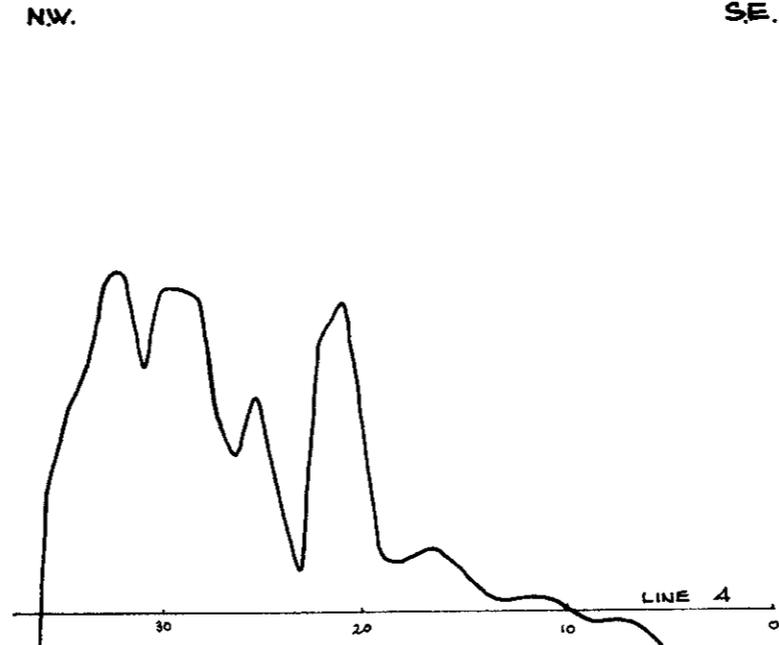


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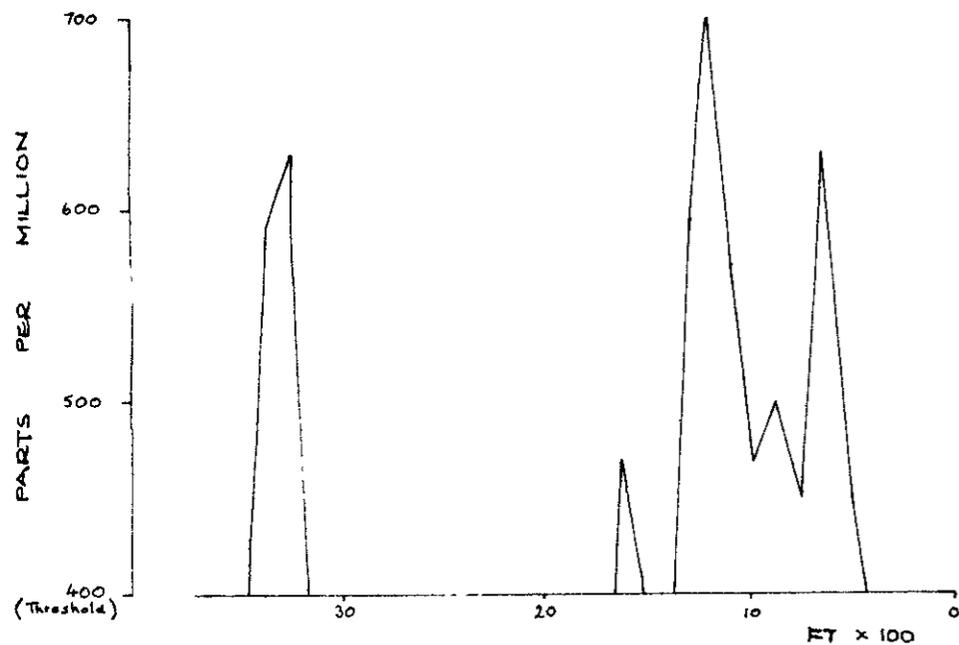
Plan No TAS-2F-31
 70-709



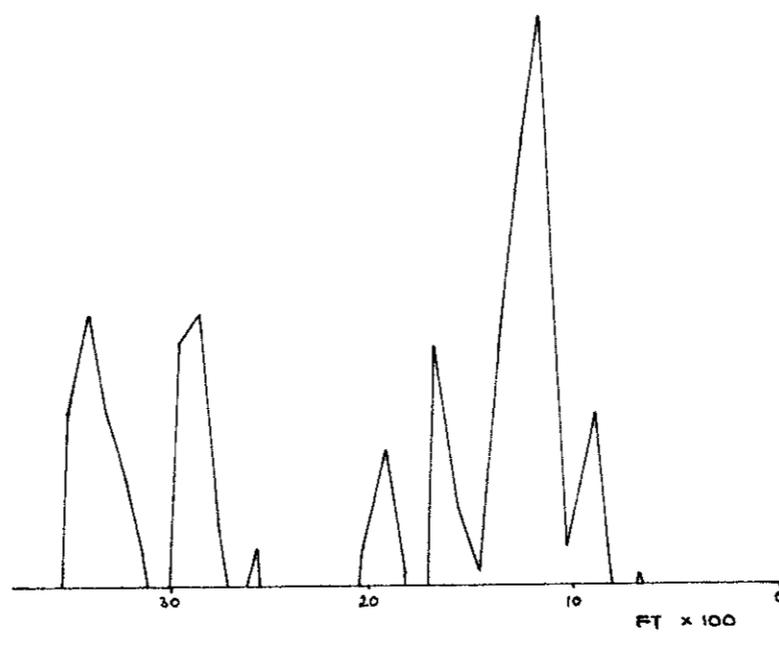
MAGNETIC PROFILE



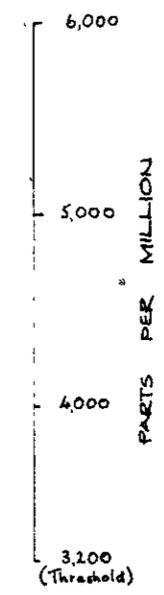
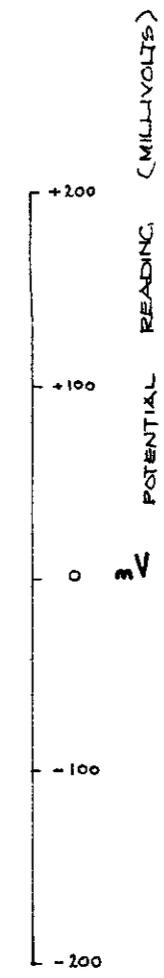
SELF POTENTIAL PROFILE



Co.



Ni.



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BALD HILL
 LINE NO 4
 GEOPHYSICAL &
 GEOCHEMICAL
 ANOMALIES

2056
 Plan No TAS-2D-11
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