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THE MOUNT LYELL MINING & RAILWAY COMPANY LTD.

JUKES-DARWIN AREA, E.L. 21/76

ANNUAL PROGRESS REPORT NO. 1

FOR
YEAR ENDING 29TH JUNE 1977

BY
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1. INTRODUCTION

On 21st June 1976, The Mount Lyell Mining & Railway Company Ltd. marked out an area of 144 square kilometres over the Mt. Read volcanic belt immediately to the south of E.L. 10/69 (Dora-Huxley area Figure 1). Application for an exploration licence was made to the Director of Mines on 2nd July 1976, and was subsequently granted on 1st September 1976, as E.L. 21/76. Getty Oil Development Co. Ltd. entered a joint venture agreement with The Mount Lyell Mining & Railway Company Ltd. to explore the area on 7th April 1977.

Since the exploration licence was granted work has involved an extensive review and collation of all available literature on the area, and confirmatory field inspections in order to establish exploration priorities. This report reviews the available data and outlines the basis of the 1977-78 field program and budget estimates.

The total expenditure for the year ended 29th June 1977 was \$7,893.

The proposed budget estimate for the 1977-78 field program totals \$93,500. The primary objective of the field program is the evaluation of the Clark River volcanic sequence as a host to massive base metal sulphide deposits.

The Jukes-Darwin licence area extends south from the King River Gorge to about 2 km south of South Darwin Peak, covering the southern part of the West Coast Range (Figure 2).

Four-wheel-drive vehicle access onto the Range is achievable via four bulldozed tracks off the Kelly Basin road (a gravel road currently maintained by the H.E.C.):

1. Crotty town site to the Jukes Proprietary workings (currently not negotiable due to an extensive wash-out at the Traveller Creek crossing).
2. Darwin town site to the East Darwin workings.
3. Darwin town site to Intercolonial Spur.
4. Purgatory Gap via Ten Mile Hill onto the Darwin plateau.

The higher ground of the Range is only lightly vegetated with low scrub and button grass, however, the eastern and western slopes (including the Clarke River, Garfield River and Thomas-Currie Rivulet valleys) are generally thickly vegetated, and, almost impenetrable in places.

The Range is exposed to rapidly changeable weather conditions, however, conditions are reasonably stable from November to March, when they become unpredictable.

During autumn, winter and early spring it is usually impractical to plan systematic field work due to the changeable and severe conditions, allied with short daylight hours.

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2. PREVIOUS WORK

2.1 EXPLORATION: PRE 1965

1900?

Intensive prospecting of the area commenced in 1897 following the discovery of copper mineralisation at Lake Jukes. Further mineralisation was located at East Darwin in 1898, and by 1900 several small prospecting companies were operating in the area. Activity had generally ceased by 1903 following the closure of the Crotty Smelters. Most of this work was reported on by various Government geologists, including Twelvetrees (1901), Waller (1903) and Loftus-Hills (1914). However, several Mount Lyell personnel also worked in the area between 1901 and 1918, essentially on adit sampling and detailed investigations of specific prospects (T. Bachelor and W. Cundy 1904, W. Morley 1905-6, L. Williams 1908, T. B. Moore 1912, and R. Murray 1918). A summary of this previously unpublished information located in The Mount Lyell Mining & Railway Company Ltd.'s records, is included below.

Little work was carried out between 1918 and the early 1950's, apart from detailed sampling by G. Douglas for Mount Lyell during 1940. Between 1953 and 1956, Mount Lyell recommenced work in the area, including detailed investigations at the Lake Jukes Proprietary, and East Darwin workings.

In August 1956, The Mount Lyell Mining & Railway Company Ltd., and the Electrolytic Zinc Co. A'Asia Ltd. formed the Lyell-E.Z. Explorations (L.E.E.) joint venture organisation, and, between 1956 and 1962 undertook field work in the area as part of a regional exploration programme in South West Tasmania. This work included:

- (i) Two drill holes in the Lake Jukes mine area (L1-659 feet, L7-491 feet), neither of which intersected significant mineralisation.
- (ii) A detailed ground E.M. (Turam), magnetic and S.P. survey in the East Darwin area, conducted by the B.M.R.
- (iii) A helicopter-borne E.M. survey over Prince Darwin.
- (iv) An airborne magnetic and scintillometer survey over the Jukes-Darwin area.
- (v) A detailed ground magnetic survey at the Jukes Proprietary mine.
- (vi) A regional mapping programme.
- (vii) Detailed adit mapping and sampling at selected localities, with specific emphasis on Findons and Prince Darwin workings.

The results of this exploration programme were not discouraging but the full potential of the area was not adequately evaluated due to the need for L.E.E. to divert personnel and equipment to other parts of South West Tasmania.

United States Metals Refining Co. pegged the area in 1964 (E.L. 2/64) and undertook limited field work, confined to mapping, adit sampling and S.P. surveys over the Prince Darwin, Findons and Jukes Proprietary workings. No further work was recommended.

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2.2 EXPLORATION: 1965-1972

The Broken Hill Proprietary Co. Ltd. (B.H.P.) acquired the area in 1965, as part of E.L. 13/65 which included a large area south of Macquarie Harbour. The latter region absorbed the main thrust of the exploration programme, at least until 1969.

In brief, the exploration programme involved the construction of an access road from Ten Mile Hill to the vicinity of the Prince Darwin workings in order to test the extent of the mineralisation by diamond drilling. Two holes were completed from a site south of the Prince Darwin adit - D.D.H.1 drilled west to test an airborne E.M. anomaly (L.E.E.) with a coincident rock chip copper anomaly and, D.D.H.2 drilled east to test a pyritic zone with a corresponding copper rock chip anomaly (Figure 2).

Subsequently a ground magnetic and rock chip sampling programme was conducted in the Jukes Proprietary area.

2.3 EXPLORATION: 1972-1976

In September 1972, B.H.P. and International Nickel Australia Ltd. (I.N.A.L.) signed a joint venture agreement to explore the Jukes-Darwin area, I.N.A.L. being the operators. Initial investigations involved surface mapping, geochemical orientation studies and a combined turair-aeromagnetic survey of the area.

The turair survey has several shortcomings as it was conducted on a "fixed terms" basis, with a fixed programme which could not be altered. Such an E.M. method can only be considered as a "first pass" in this environment, because it appears that the majority of targets sought in the area may not be electromagnetically conductive.

Following these initial investigations, seven areas were selected for further detailed exploration:

- Priority 1 (i) East Darwin
- (ii) Jukes Proprietary
- Priority 2 (i) Intercolonial Spur
- (ii) Allans Creek - Snake Peak
- (iii) Findons
- Priority 3 (i) Eastern slopes of Sumpters Peak
- (ii) Lake Jukes

Work on the priority 1 areas included 1:5,000 scale geological mapping, 1:1,000 scale detailed mapping of proposed drilling targets, and 1:500 scale mapping of all accessible adits. Chip sampling of these adits was carried out over 2 m sections within mineralised zones and 5 m sections in non-mineralised zones.

Time domain, E.I.P. pole-dipole surveys were completed in both the priority 1 and 2 areas, over a total of 16.5 line km, and as a result a total of three diamond drill holes were completed in the East Darwin and Jukes Proprietary areas. The main conclusion reached by I.N.A.L. was that the prospects and drilling results suggest "that the surface and near surface copper mineralisation is not indicative of economic mineralisation within 500 feet of the surface". (Ruddock, 1974).

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The Electrolytic Zinc Co. A'Asia Ltd. entered the joint venture with I.N.A.L. and B.H.P. and commenced work as the operators in December 1974, having first acquired an area of 46 square km on the western side of E.L. 13/65 under S.P.L.140. E.Z.'s main objective was to investigate the flanking pyroclastic sequences for Rosebery or Que River type Pb-Zn mineralisation. The exploration approach adopted comprised stream sediment geochemistry and some geological mapping, predominantly in the Clarke River valley and Garfield headwaters. Their main conclusions were:

- (1) That the geology of the Clark and Garfield River valleys is not encouraging due to the lack of pyroclastic rocks and the predominance of lava flows.
- (2) Stream sediment geochemistry appears to be a successful exploration technique in this environment.
- (3) The volcanic stratigraphy of the region is yet to be resolved satisfactorily.

Further similar work was recommended but not carried out due to prevailing economic pressures and the need to allocate exploration funds elsewhere. E.Z. withdrew from the joint venture and relinquished S.P.L.140 in August 1975.

Other reports on the area are listed under bibliography.

3. GEOLOGY

The geology (Figure 3) of the Jukes-Darwin area has been extensively reported on in recent years by Corbett (1976), Corbett and Cuffley (1970), Ruddock (1974), Solomon (1960, 1964) and White (1972, 1975), and consequently only a brief statement on its current status need be presented.

The stratigraphic succession in the area may be summarised as follows (Corbett, 1976):

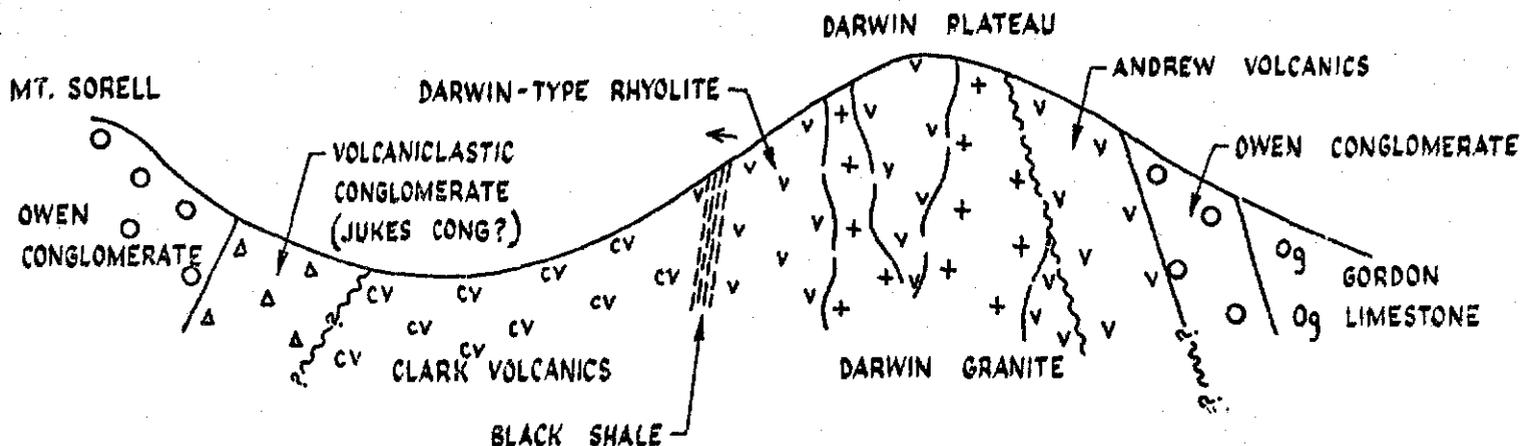
Quaternary: Moraine, outwash gravel and scree deposits of the Clark valley.

Cambro-Ordovician:

- (1) Owen Conglomerate correlate - silicious conglomerate and sandstone.
Unconformity - disconformity.
- (2) Volcaniclastic conglomerate of Mt. Sorell east flank.
- (3) Eastern sequence of volcaniclastic conglomerate, sandstone, tuff and quartz-porphry (Andrew Volcanics, White 1975).
Unconformity.

W.

E.



Diagrammatic cross-section of lithological inter-relationships in Mt. Sorell-Darwin Plateau area.

Cambrian-?Late Proterozoic:

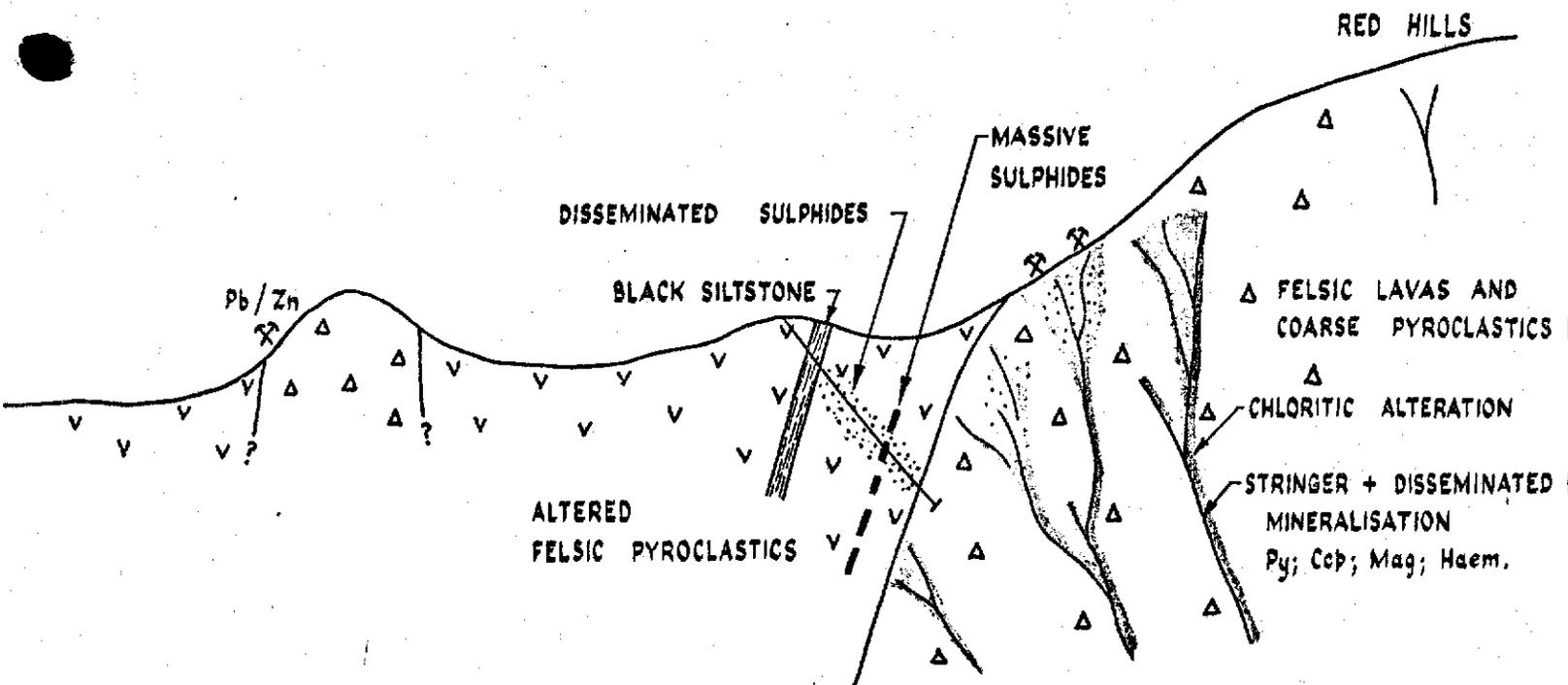
- (4) A sequence of pink to green, fine grained, feldspar-phyric rhyolites (Darwin-type rhyolite, Corbett et al, 1974) and associated pyroclastics (Intercolonial Volcanics, White 1975), intruded by the Darwin Granite on the South Darwin plateau. This unit is characterised by wide spread hematite-magnetite veins, and comprises the host to the bulk of the known sulphide mineralisation of the area.
- (5) A sequence of pale green-grey, quartz-feldspar-phyric rocks, including some flow banded and autobrecciated lavas, pyroclastics and associated slate-siltstone units occur in the Clark valley (Clark Volcanics, White 1975). White reports that both rhyolitic and andesitic varieties are present, and, Corbett (1976) describes a fine grained green basalt adjacent to the western margin of the central rhyolite sequence (4). The contact area between the two units in the Clark River is apparently marked by a slate horizon (Williams 1975, Corbett 1976). Williams also suggested that a similar sequence exists in the Garfield River valley. The latter is supported by observations recorded by Moore (1903).

The relationship between unit (4) and (5) is not clear; White (1975) infers unconformity and equates unit (5) with unit (3), while Corbett (1976) suggests an interfingering relationship. From brief field inspections in the Clark valley, it is considered that unit (5) probably conformably overlies unit (4) although some interfingering of the two may occur (Figure 5), i.e. similar to the geological setting of the Red Hills-Gooseneck area on E.L. 9/66.

Diagrammatic cross-section of Red Hills-Gooseneck area (E.L. 9/66).

W.

E.



The chloritic alteration zones associated with the stringer and disseminated mineralisation of the felsic lava mass, may represent the original channel ways for the hydrothermal solutions and hence may indicate proximity to massive sulphide deposits.

4. MINERALISATION

Mineralisation is extensively distributed throughout the area, but while most occurrences have been explored by adits or trenches, none of the prospects have been of sufficient size or grade to reach the production stage.

Five main mineral assemblages occur in the area:

1. magnetite-pyrite-(chalcopryrite) e.g. Prince Darwin
2. pyrite-chalcopryrite
3. bornite-chalcopryrite-haematite
4. barite-(chalcopryrite)
5. quartz-gold veins (and alluvial deposits).

At this preliminary stage it is more convenient to discuss the mineral showings in geographical groups rather than as mineral assemblage groupings. Prospects are referred to by their common name and changes in mineral tenement notation are recorded to facilitate reference to old reports (Figure 4).

A large volume of geological and geophysical data is available, particularly on individual prospects. Much of this is summarised in this report, but to avoid the immediate re-drafting of the data for this report, the reader is directed to the relevant reports, most of which are held in Mount Lyell files.

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4.1 PROPRIETARY PEAK - KING RIVER

4.1.1 Mt. Jukes Proprietary (6012M)

The Jukes Proprietary mine is located on the northern slopes of Proprietary Peak, high on the southern slopes of the King River Gorge. The property originally comprised two 40 acre sections - 1711/93M and 1713/93M, subsequently replaced by an 80 acre section No. 6012/M. The area may be reached by means of a steep bulldozed 4 wheel drive track from the old town site of Crotty (Figure). R. M. Murray 22.11.1918 M.L. Confidential Letter Book 6 (16.12.15-4.3.19 p.p. 943-949).

Mine Workings

The workings comprise 3 adits and one small blind level, intermediate between the two upper adits, which are connected by a winze.

No. 1 Tunnel was driven due west immediately below the outcrop. After passing through 35 feet of decomposed schist it entered the "ore occurrence", which it traversed obliquely for 30 feet and then entered weakly pyritic chloritic schists which remained to the end.

At 50 feet from the portal a 122 ft. winze was sunk, remaining in the "ore occurrence" to within a few feet of the bottom where it passed into the footwall country". At a depth of 55 ft. an intermediate level was established and extended 50 ft. south and 30 ft. north, with cross cuts west and east at distances 10 ft. south and 25 ft. north of the winze, respectively. The south drive passed obliquely through the occurrence for 20 ft. and then met the hanging wall which it continued to follow.

The cross-cut west off this drive met the probable footwall at 15 ft., the remainder of the cross-cut being in "mineralised schist." The drive north only encountered low grade material, before being terminated at the footwall.

Cundy (21.1.1904) mentioned that bornite had been "reported" during the sinking of the winze, but could not confirm the occurrence.

No. 2 Tunnel (Main Tunnel): This adit was collared on a horizon some 126 ft. lower than No. 1 Tunnel and was driven south west towards the winze. The first 83 ft. traversed green chloritic schists, containing minor chalcopyrite and pyrite. At this distance the schists were leached and contained disseminated blebs of malachite, cuprite and native copper, which continued for a further 75 ft., following along strike, before re-entering the "normal mineralised schist." The copper oxide minerals were well developed at 140 ft. and short cross-cuts were put in on either side of the drive, showing them to extend over a width of 20 ft.

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Subsequently the tunnel was extended a further 112 ft. (total length 270 ft.) to meet the "probable hanging wall of the main ore occurrence, and continued obliquely through it for 106 ft. when it reached the probable footwall." After advancing a further 10 ft. it encountered the winze from the No. 1 Tunnel.

The east cross cut was undertaken 350 ft. from the portal and developed east for 20 ft. to the hanging wall, through low grade mineralisation.

The south hanging wall drive was commenced from the end of the east cross cut and driven south west along a well defined head, considered to be the hanging wall, to a distance of 80 ft. "The material passed through showed only a small amount of chalcopryrite, the drive apparently traversing the outer fringe of the occurrence."

The west cross cut was developed from the end of the latter drive and advanced 20 ft. through low grade mineralisation.

Sampling results:

	From	To	% Cu	oz. Ag	oz. Au
Main Tunnel	270'	320'	1.36	0.2	0.01
Main Tunnel	320'	376'	2.64	0.3	0.02
East Cross Cut	0	20'	1.07	0.3	0.01
South H.W. Drive	0	80'	0.47	0.2	0.01
West Cross Cut	0	20'	1.23	0.2	0.01

No. 3 Tunnel was driven south west for 630 ft. through felsites showing occasional minor mineralisation, "including a seam carrying a fair amount of chalcopryrite at 515 ft. The latter was driven along for a distance of 80 ft. but was found to be unimportant." Cundy (21.1.1904) reported that the vein was irregular in width up to 1.5 ft. and from sampling along its length assayed 10.15% Cu, 3.1 oz Ag and 0.17 oz Au. The vein has not been driven on to the north.

However, the information from the workings indicates the occurrence over a length of 175 ft. and a width of 30 ft.

Geology:

The area is comprised of, (1) "A central rhyolite sequence...." and, (2) "An eastern sequence of mixed quartz-feldspar-phyric lavas, pyroclastics and volcanoclastic rocks apparently overlying the rhyolites." (Corbett, 1976)

The contact between the two sequences "is sub-vertical, and is at least in part a fault, since it also displaces the base of the Owen Conglomerate. The Jukes Proprietary adits are located either on this contact or just west of it, within the rhyolite sequence" (Corbett, 1976). Ruddock (1974) differs in the interpretation of the location of the contact between the two sequences.

On Mt. Jukes these rocks are unconformably overlain by coarse volcanoclastic breccia and conglomerate (Jukes Conglomerate) grading up into the Owen Conglomerate. Elsewhere, it is difficult to distinguish the Jukes Conglomerate from volcanoclastic rocks of the eastern sequence.

The disseminated chalcopyrite-pyrite mineralisation occurs in a north east trending zone of strongly chloritised schistose rocks near the contact between the central rhyolite sequence and the eastern quartz porphyry sequence, which has also been chloritised and mineralised near the contact. The mineralisation and host rocks are very similar to those of the Lyell Tharsis orebody on the Mt. Lyell field.

Recent Exploration

I.N.A.L. (Ruddock, 1974) conducted a restricted pole-dipole I.P. survey on two lines (totalling 1250 m), one across strike (Line 00N) and one along the strike (Line 00E) of the mineralised zone. Subsequently, D.D.H. Z 142003 (224.5 m) was drilled to test the mineralisation and projected extension of a strong I.P. anomalous zone some 100 m below No. 1 and No. 3 adits. The highest assays were obtained from a 6 m section, averaging 0.59% Cu between 139.2 and 145.2 m.

Discussion

The drill hole passed beneath the projected mineralisation in the workings without intersecting any values of significance, but it would appear to have stopped just short of a major I.P. anomalous zone to the west of the workings. Before further drilling is undertaken a systematic I.P. survey is required. At this stage, the tonnage and grade potential appears to be limited (say of the order of 3×10^6 tonnes at 1.5% Cu). Consequently no further investigations are warranted until the potential of the E.L. has been more fully evaluated.

4.1.2 Jukes Consols (Section 3526)

Cundy (11.12.03) reports that an adit located some 20 ft. above the King River, was driven 80 ft. south to test a lode found in the river bed. The lode was 8 ft. wide on surface but "smaller in the tunnel" and comprised veins and blebs of chalcopyrite and pyrite associated with quartz veins in dark green felsite.

The adit has been driven into a knob of pink quartz-feldspar porphyry on the south bank of the river near the contact with the central rhyolite sequence (Corbett, 1976).

4.1.3 King Jukes (Section 5936)

Two adits on this section were driven south (between two haematitic knobs) in chloritic schist and felsite with patchy mineralisation. Loftus Hills (1914) reports the following:

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- (a) Adit 1 (near centre of section) was driven 87 ft. (266 ft. Cundy 1903) south east in unmineralised hard grey felsite.
- (b) Adit 2 (near N. boundary of section) driven 190 ft. at 160° and 20 ft. at 180° with cross cuts 40 ft. E at 123 ft. and 60 ft. E at 156 ft. "The end of the tunnel shows a considerable development of sulphides." The eastern wall of the adit shows abundant leachings of copper sulphate and carbonate, but the western wall shows none. No. 1 cross cut shows very little mineral, the end being in hard red felsite. No. 2 cross cut shows sulphides for the whole length." The ore consists of quartz, chlorite, chalcopyrite and pyrite. Cundy (1903) reports a bulk sample assay of 2.1% Cu, Tr Au, and 0.2 oz/ton Ag.

4.1.4 Imperial Jukes (Section 2547)

Loftus Hills (1914) reports that, "The only work consists of a short tunnel driven in an easterly direction in a grey felsite. No mineralisation whatever is visible."

4.1.5 Crown Jukes (Section 5241)

Loftus Hills (1914) reports a tunnel driven south for 60 ft. to intersect the downward extension of prominent crags of hematite in felsite, but failed to intersect any mineralisation.

4.1.6 Queen Jukes (Section 3530)

An adit has been driven west for 50 ft. in hard pink felsite containing minor sulphide veins (Loftus Hills 1914).

4.1.7 Crotty Jukes (Section 1596)

A small adit was driven beneath Yellow Knob (felsite) but no significant mineralisation was encountered (Loftus Hills 1914).

4.1.8 Lake Jukes (Sections 4811 and 4812)

The main workings are on section 4812 on a log back ridge ("Adit Knob") in the cirque on the eastern face of Mt. Jukes. Reports on this area include; Cundy (22.1.1904), Loftus Hills (1914), Corbett and Cuffley (1970).

The workings were originally opened up because of numerous surface showings of bornite and chalcocite, but gold was later found and an attempt made to work the irregular quartz veins for gold. The latter was found to be unpayable and the mine was closed in 1906 after one crushing of 134 tons of ore yielded 14 ounces of gold (Wade, 1956).

013

Wade reports that four adits were driven and a shallow pit put down (about 30 ft.) in the north end of the outcrop.

Lower Adit	R.L. 2440'	130 ft. in length
Centre Adit	R.L. 2500	80 ft. in length
Upper Adit	R.L. 2580	60 ft. in length
Collins Adit	R.L. 2490	130 ft. in length

Collins Adit had a winze down about 50 ft. with short drives off the bottom.

In 1957 the Lyell-E.Z. organisation completed D.D.H. L1 (650 ft.) which collared near the southern end of the exposed mineralised zone. Only minor pyrite, chalcopyrite and galena was encountered; the only noteworthy assay being 0.34% Pb from 280' to 290'. D.D.H. L7 (491 ft.) was completed in 1958 towards the northern end of the exposed zone, but no significant mineralisation was intersected (Scott, 1958).

No further work is justified at present.

4.1.9 Bean and Thow (Section 1594, 4233)

Loftus Hills (1914) reports chalcopyrite and pyrite exposed in two trenches each about 20 ft. long and 6 ft. deep, cut across a band of green chloritic schist. Corbett (1976) describes the host rocks as a "north west trending band of chloritised, strongly cleaved, green agglomerate" about 20 m wide, dipping and facing south west.

4.1.10 Lake Jukes Proprietary (Section 4414)

On this section a tunnel was driven 234 ft. north east beneath crags of massive red haematite with the object of meeting the Owen Conglomerate contact. However, neither the contact nor any significant sulphide mineralisation was met with.

4.2 INTERCOLONIAL SPUR

4.2.1 Hal Jukes-Hydes (Section 829, 3942, 5925)

This prospect is located in a steep eastern tributary of Sailor Jack Ck., draining the western flank of Intercolonial Spur. The mineralisation comprises splashes and blebs of chalcopyrite, pyrite and minor native copper in a dark green, hard, massive to weakly schistose chloritic felsite, striking 170° (near vertical) over some 1,500 ft. and up to 150 ft. wide. Workings include several trenches (over 2 chains), exposure of a 70 ft. long face in the creek and two adits (Cundy 1904). About 130 ft. below the surface workings a tunnel was driven 135 ft. (040°), but needed to be driven a further 50-100 ft. to intersect the sulphide zone exposed in the creek. Scattered sulphides occur in this tunnel. (Moore 1912). Loftus Hills (1914) reports that a higher tunnel was driven 50 ft. (060°) through a

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"belt of dark green schistose felsite....carrying splashes of chalcopyrite and pyrite". Assays of up to 1.5% Cu have been reported from the prospect, but sampling of the creek section by B.H.P. in 1971 indicated copper values of 0.5% to 1.24% over 24 m. (Ruddock, 1974).

On the ridge above this prospect Morley (1905) reporting on sections 2557, 2558, 2560 mentions an "iron stone gossan formation" about 100 ft. long and 15 ft. wide passing north west through the corner of the 3 sections in hard massive pink felsite. Morleys samples returned no significant assays.

A time domain, pole-dipole reconnaissance I.P. survey was conducted over the northern part of Intercolonial Spur on 4 E-W lines totalling 7,400 m (Ruddock, 1974).

The result indicated a chargeable zone (maximum 25 milliseconds) up to about 100 m wide and 700 m long, along the eastern margin of the "central core rhyolite sequence." On the eastern flank of Intercolonial Spur Ruddock records, "Thin stringers of chalcopyrite occur in chloritised crystal tuffs, over an area of 50 x 100 m on a steep, southeast trending ridge. A sample of gossan float taken from the area assayed 6.1% Cu, 27.5 ppm Ag and 3.9 ppm Au." The reconnaissance I.P. data does not indicate any significant response in this area, however a weak Turain anomaly (28) is located nearby.

On the western side of Intercolonial Spur, 3 reconnaissance traverse lines cross the Hydes-Hal Jukes mineralised zone. The reconnaissance I.P. data indicates two parallel N-S trending chargeable zones:

- (a) Zone 1 located approximately 200 m W. of the base line (access road) extends some 400 m between lines 1N and 3N, and varies in chargeability from about 15 milliseconds (Line 1N, approximately 30 m wide) to 20 milliseconds (Line 2N, approximately 100 m wide) and 25 milliseconds (Line 3N, approximately 50 m wide).
- (b) Zone 2, located approximately 500 m W of the base line is recognisable on all 3 lines and includes the Hydes mineralised zone. This zone varies in chargeability from Line 1N-18 to 20 milliseconds over 100 m, Line 2N-18 to 24 milliseconds over 100 m and Line 3N - 18 to 20 milliseconds over 50 m.

Both zones are open ended and may extend a further 650 m south (Ruddock, 1974).

The I.N.A.L. grid area warrants further evaluation by geochemical soil and rock chip sampling, before considering gridding and geophysical follow-up.

4.2.2 Taylours Reward (Section 3773, 3868, 7913)

This prospect is situated at the southern end of Intercolonial Spur and consists of an E-W trending barite lode about 2,000 ft. long, averaging 3-4 ft. wide, in massive felsite.

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Williams (1908) reports that the lode reaches a maximum width of 12 ft. towards its western end where a 7 ft. deep shaft was sunk (now full of water) and showed a "fair amount" of chalcopyrite covellite and pyrite (one specimen assaying 1.66% Cu), but in general the lode carries little or no sulphide minerals. A 30 ft. adit has been driven west on the eastern end of the lode. Numerous other pure barite veins up to 9" wide crop out in the vicinity.

4.2.3 Sailor Jack Gold Mine (Sections 1900-34 and 1900-35)

Loftus Hills (1914) reported that all the workings were flooded but included an inclined shaft, put down to an unknown depth, in sandstone of the Owen Conglomerate. The intention was to exploit quartz veins containing pyrite and minor free gold.

Moore (1912) records that "On the contact of a residual patch of conglomerate, situated on a spur lying between Conglomerate Creek and Sailor Jack's Creek, there is a large amount of baryte in bunches and terminal veins intermixed with impregnations of red hematite associated with felsites." He describes the country rocks as porphyritic and dark schistose felsites with bands of light pyritic talcose schist.

4.3 CONGLOMERATE PEAK - MT. DARWIN

4.3.1 East Darwin Workings (Sections 2161, 3607, 4655, 3066, 4654, 2158, 4615)

Geology

The zone comprises a thick sequence of "Flanking pyroclastics" (1,000 m) to the east, overlying "Central Core Rhyolite" to the west. The contact is sharp, dipping at 75-80°E, and is probably faulted. Further west in the Snake Peak area the Owen Conglomerate unconformably overlies the "Central Core Rhyolites." This latter sequence consists of massive, well jointed, pink lavas, with intercalations of grey-green banded ash. Magnetite-hematite veins (1-5 cm wide) are common. The "Flanking Pyroclastics" include units of crystal and crystal-lithic tuffs, and banded ash. They are grey-green and well foliated (310-330°/75-80°W). (Ruddock, 1974).

Disseminated pyrite-chalcopyrite mineralisation occurs in an extensive north west trending chloritic alteration zone, (200 m wide and at least 800 m long) in the Flanking Pyroclastics." Six adits and several costeans have tested the zone. Loftus Hills (1914) reported high copper assays from the various workings but more recent systematic adit sampling by Douglas (1940) and Ruddock (1974) revealed 8 m assaying 0.97% Cu in Pearces Adit and two separate 2 m sections assaying 1.3% Cu and 1.55% Cu in Darwin Pty. Adit.

Geophysics

In 1957 the B.M.R. conducted Turam and magnetic surveys on a zone about 1,200 ft. wide from Campe Creek in the north to Souter's workings on the edge of the Allan Creek ravine, a distance of about 2,400 ft. (Rowston, 1959). Self potential was also used but due to technical difficulties no significant indications were disclosed. The Turam survey indicated three phase-difference anomalous zones suggesting that the mineralisation was of only limited extent and in view of the adit sampling results conducted by Douglas (1940) no further work was considered warranted.

Subsequently a pole-dipole I.P. survey was conducted over the area (Ruddock, 1974) and indicated two chargeable zones, probably displaced by a north east trending fault in the vicinity of Line 200S. The two drill holes completed to test the anomalous zone indicated patchy disseminated and stringer pyrite, and only very minor chalcopyrite and some traces of galena.

Conclusions

The drilling has satisfactorily tested the main part of the zone down to depths of between 100 m and 180 m below surface, consequently unless sufficient encouragement can be found to extend the geophysical coverage further south, no further work is warranted at this stage.

4.3.2 Section 2159, 3111

This section is located immediately south of Souter's workings of the East Darwin prospect. Ruddock (1974) recorded a 0.5 m wide barite vein on one of his map sheets, but no further reference to the occurrence can be found.

4.3.3 Section 3109

This section was originally held by the Mount Lyell Extended Co. Both Williams (1908) and Loftus Hills (1914) record schistose chloritic felsites striking 340°. An adit was driven 300 ft. (155°) and passed through 10 ft. of mineralisation at the portal averaging about 1.0% Cu, but the remainder shows few occurrences of mineralisation and the end is in light grey felsite (Loftus-Hills 1914). Ruddock (1974) reports a small costean with "pyrite bombs 4 cm x 10 cm" in tuffs.

4.3.4 Section 2585

Cundy (1904); a "cut in dark green schist" with splashes of pyrite, chalcopyrite and a little native copper. Some 30 ft. below the "cut" a tunnel was driven 132 ft. and at 60 ft. intersected a "pug seam and ore channel" which was driven on to the north for 78 ft. The "ore channel averaged about 14 inches wide but was low grade." At the end of this drive a cross cut (S.W.) passed through silicious pyritic schists, but no significant assays were obtained.

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Loftus Hills (1914) reported minor galena from the pug seam.

4.3.5 Findons Section (265, 3107)

The Findons workings are situated at the headwaters of the Currie River, on the western side of the Snake Peak - Mt. Darwin saddle. Access can only be achieved via helicopter on a 2 hour walk on a well formed track from the East Darwin area.

The workings have been previously described by Cundy (1903), Waller (1903), Loftus Hills (1914), Wade (1957), U.S. Metals Refinery Co. (1964), Corbett and Cuffley (1970), Ruddock (1974) and White (1975). They lie in a north west trending zone (330°/60-80°W) of chloritic pyroclastics and massive rhyolites, which apparently dip and face west (Corbett and Cuffley 1970). Pyrite-chalcopyrite and secondary copper mineralisation occurs in the centre of the belt of chloritic rocks (chalcopyrite becoming abundant in the more intensely chloritic areas) approximately 100 ft. wide and 1,000 ft. long. The belt apparently consists of lenses less than 50 ft. thick, with mineralisation restricted to the central part of each lens.

Workings

No. 1 Trench: 8 ft. long, 3-4 ft. deep. Bulk sample 2.9% Cu (Waller 1903). Disseminated chalcopyrite, covellite and pyrite.

No. 2 Trench: 43 ft. long, with copper mineralisation evident over the first 40 ft. Shaft 18 ft. deep on No. 2 Trench - Cundy (1903) reported "the material appears to be of slightly better quality than that in the trench." Bulk sample assayed 3.0% Cu (Waller, 1903).

No. 3 Trench: 45 ft. north west of No. 2 Trench is 12 ft. long and 3-4 ft. deep. No mineralisation visible due to leaching except in a pit at the western end, 1.5 ft. assaying 3.2% Cu.

No. 4 Trench: 350 ft. north west of No. 3 Trench is 19 ft. long, extensively leached; 2 ft. assaying 2.5% Cu at western end.

An adit 126 ft. long (228°) with a 12 ft. drive to the south east was developed to intersect the mineralisation in the latter trench, (35 ft. above). Minor copper mineralisation was encountered in the drive, which followed a faint, steeply dipping lode shear, about a foot wide. At the 113 ft. mark in the adit the west wall showed 6-7 ft. of malachite staining on seepage (Wade 1957). Wade comments that the assay values of Waller (1903) appear to have been of picked ore.

Geophysics

In 1964, U.S. Metals Refining Co. conducted a self potential survey on 4 traverses (totalling 3,900 ft.) 200 ft. apart and extending approximately 500 ft. on either side of the "lode zone." No electrical disturbance was recorded in the mineralised area.

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Subsequently in 1974, 3 pole-dipole I.P. traverses (totalling 2,150 m) were surveyed over the workings and again only very weak shallow responses resulted. Several strong (greater than 20 millisecond) shallow responses were obtained to the north east of the workings over hematitic zones adjacent to the Owen Conglomerate contact on Snake Peak, and also from within the Conglomerate mass.

No further work is considered warranted at this stage.

4.4 CONGLOMERATE CREEK - GARFIELD RIVER

4.4.1 Snake Spur Sections

Section 2101

Moore (1912) reports numerous superficial trenches and a tunnel about 100 ft. long, driven through "soft decomposed felsite," to cut a 3.5 ft. wide quartz reef (apparently unmineralised), showing in the face. Minor chalcopyrite occurs in the southern trenches.

Loftus Hills (1914) describes a trench 5 chains long (060°) "cutting bands of the porphyroidal series" (320°), varying from green chloritic schist to a "fissile sandstone" (probably similar to that described by Corbett 1970 as apparently overlying the chloritic rocks on Findons Section, essentially on strike to the south east). Minor splashes of pyrite, chalcopyrite, specularite and hematite were recorded, and unreliable assays of up to 5.0% Cu and 0.5 oz/ton Au reported.

Section 3025

Stitt (Circa 1903) describes a 200 ft. trench (060°) varying from 4-9 ft. deep in which the schists become strongly pyritic at 30 ft. The results of his trench sampling were:

<u>Footage</u>	<u>% Cu</u>	<u>Remarks</u>
30-38	0.54	
38-42	0.77	
42-50	2.25	0.42% Cu (Douglas 1940)
60-62	0.55	0.21% Cu (Douglas 1940)
70-80	0.30	0.04% Cu (Douglas 1940)
80-100	0.23	0.14% Cu (Douglas 1940)
100-110	1.42	0.08% Cu (Douglas 1940)
110-120	2.13	3.11% Cu (Douglas 1940)
120-135	3.37	0.08% Cu (Douglas 1940)
135-170	-	0.07% Cu (Douglas 1940)
170-200	-	"Slate with iron oxide and a little native copper" iron oxide.

Murray (1907) reports that the last few feet of the trench cut conglomerate, the remainder being in green-grey schist, occasionally mineralised with pyrite and chalcopyrite. His sampling indicated the following:

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<u>Footage</u>	<u>% Cu</u>	<u>Ag (oz/ton)</u>	<u>Au (oz/ton)</u>
42 - 50	Trace	Trace	Trace
100-110	Trace	"	0.02
110-120	1.2	"	0.02
120-135	1.3	"	Trace

Moore (1912) mentions a pyritic formation 130 ft. wide in the east west trending trench through talcose schist, with a "large hematite formation in the higher part of the trench." This again appears to be a similar setting to that described at Findons (Corbett 1970). Moore also mentions strong pyrite and hematite on Section 2273 immediately to the north west, and pyritic slates and schists in the bed of the Currie River nearby.

4.4.2 Section 2688

On this section, located on the divide between the Currie and Garfield Rivers, Moore (1912) mentions a report of "a large auriferous pyrite formation" which he was unable to locate. It is possible that it may have been confused with the mineralisation of section 3025.

4.5 MT. DARWIN - SOUTH DARWIN PEAK

4.5.1 Sections 1202, 1203

Williams (1908) reports an iron stone lode, several chains long in hard felsite on surface ($110^{\circ}/33^{\circ}\text{E}$) but a 220 ft. long tunnel (290°) driven some 150 ft. lower failed to intersect it (Section 1203). Loftus Hills (1914) mentions hematite, pyrite and minor chalcopyrite at the tunnel portal, the remainder containing sparse patches of native copper. Another 50 ft. tunnel some 50 ft. lower down the slope only exposed minor mineralisation at the portal. On section 1202 Loftus Hills (1914) notes two quartz lodes containing minor sulphides, tested by two small trenches and a 10 ft. tunnel.

4.5.2 Section 3184

Moore (1912) describes an outcrop of quartz 2-3 ft. wide trending east west on surface for 100 ft. in hard felsite and containing pyrite and a little chalcopyrite. A 27 ft. N-S trench (4 ft. deep) cuts the lode which narrows to 18 inches, the host rocks were apparently unmineralised. Another east west trench 24 ft. long cuts across the strike of the quartz lode, which is wider and more strongly mineralised (1.04% Cu, 0.17 oz/ton Ag, 0.48 oz/ton Au).

4.5.3 Section 3353

Morley (1906) reports a sample from an 18 inch "seam" from a trench in the north east corner of the section assayed 17.4% Cu, 1.5 oz/ton Ag and 0.02 oz/ton Au. He subsequently sank a hole 8 ft. deep on the seam which assayed 0.6% Cu.

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4.5.4 Section 3858

This section is located immediately east of the granite contact, in felsite and pyritic-chlorite schist. A 24 ft. long trench (6 ft. deep) cuts an 8 inch barite vein and "another occurrence(?) 12 ft. wide can be traced for a considerable distance" (Moore, 1912).

4.5.5 Sections 5561 and 5562

"A large formation 90 ft. wide, composed of chloritic schist containing pyrite and magnetite, outcrops through the southern part of the lease (5561) and extends south through 5562.....very much contracted in width". On the south west side of a red hill on section 5561, a 45 ft. long trench (up to 7 ft. deep), cuts the western half of the "formation containing a fair percentage of pyrite throughout" but no significant assays (Moore, 1912).

On section 5562 Moore describes a pyritic body 10 ft. wide, between granite walls (exposed in a trench at the head of a creek).

4.5.6 North Prince Darwin - Section 5204 (2632)

Twelvetrees (1900) reports two hematite outcrops 9-10 ft. wide and 500 ft. apart containing pyrite and chalcopryite in chloritic felsites and schist. These rocks are also exposed in an 85 ft. tunnel weakly mineralised with pyrite, hematite and barite.

4.5.7 Prince Darwin Section 3867 (2662)

This section has been described by Twelvetrees (1900), Cundy (1904), Loftus Hills (1914), Douglas (1940), Wade (1957), White (1975), Corbett and Cuffley (1970).

The host rocks are massive and brecciated felsites, extensively replaced by chlorite, hematite and magnetite, and containing disseminated pyrite and chalcopryite. The main adit is 135 ft. long with a 17 ft. cross cut about 85 ft. from the portal. Sampling by the U.S. Metals Refining Co. indicated 125.5 ft. assaying 0.46% Cu, 0.08 dwt/ton Au and 2.39 dwt/ton Ag, confirming the results obtained by Douglas (1940) and Cundy (1904).

Some 320 ft. north and slightly above the latter tunnel, No. 2 Tunnel was driven 47 ft. (045°) obliquely across strike, but was abandoned before reaching its objective, following a fatal accident (Cundy, 1904).

Twelvetrees (1900) reports that the iron formations continue south onto Section 5166 (4245) where it is exposed over a width of 15 ft. on the northern boundary (no sulphides were apparent) and then onto the South Prince Darwin Section 2689 and Tasman Darwin sections.

The U.S. Metal Refinery Co. conducted six magnetometer traverses in the Prince Darwin area which emphasised the "lode zone" as did the self potential survey results.

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It was stated that the shape of the latter anomaly was consistent with an increased depth of burial of the sulphides to the south, which is also consistent with the general geological setting. B.H.P. subsequently drilled two holes in the area on Line 13200N. White (1975) states that the mineralisation consists of very fine grained magnetite in rhyolite, with disseminated pyrite and chalcopyrite, and minor veins of pyrite and magnetite. Near surface leaching had removed all sulphides and the magnetite veins were oxidised to hematite. No significant assays were reported.

4.5.8 Tasman Darwin Section 5560 (3041)

Numerous magnetite-hematite bodies (some carrying sulphides) outcrop in hard felsites to the south of the Prince Darwin sections. Moore (1912) describes an upper body about 2 chains long carrying pyrite and a trace of chalcopyrite and another larger body about 100 ft. lower on the slope, trending N-S across a tributary of the Clarke River. The workings were located on the south side of the creek and comprised a 60 ft. tunnel (130°) oblique to the strike of the body, driven in red felsite containing magnetite and pyrite. Moore estimated that a further 50-60 ft. needed to be driven to reach the "orebody." Loftus Hills (1914) quotes assays of 0.5-1.0% Cu.

4.5.9 Nora River Sections 3359, 3544

Moore (1913) discovered a large gossan over five chains long (155°) on a low divide some 350 ft. above the Kelly Basin railway line (on the north side) at the 6 mile peg. Two trenches 3 chains apart "passed through the boulder debris of iron oxide and exposed the solid capping of limonite,.....which appears to be of great width." A cross cut, about 50 ft. below the surface capping, intersected soft slate (Silurian, Eldon Group) and "the haematite noticed is on the hanging wall side of the lode." The line of gossan was traced from the cut, south east towards the railway line for another 20 chains, and "gossan unearthed on the spur west of, and 150 ft. above the railway line at the 6 mile." No assays were reported and the gossan remains untested at depth.

Moore (1913) also mentions a similar limonite body on Cawthorn's track (location not known, but probably just to the south). Here the limonite zone trended 155°, some 30 chains distant from the railway line.

5. RECONNAISSANCE SURVEYS

5.1 AEROMAGNETIC SURVEYS

In 1957 Lyell-E.Z. Explorations covered the area with an aeromagnetic survey, which was repeated in 1973 in conjunction with a Turam survey conducted by Seigel Associates A'Asia Pty. Ltd, on behalf on International Nickel Aust. Ltd.

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These surveys essentially show a complex N-S zone of high magnetic response over the central lava belt rocks between South Darwin Peak and Mt. Darwin, reappearing again on Intercolonial Spur and in the vicinity of the Jukes Proprietary workings. The zones of subdued magnetic response along this belt correspond with areas overlain by Owen Conglomerate. This effect is clearly apparent south of the Prince Darwin workings where the magnetitic felsites plunge south beneath the Owen Conglomerate.

5.2 TURAIR AIRBORNE ELECTROMAGNETIC - MAGNETIC SURVEY

The survey was conducted by Seigel Associates A'Asia Pty. Ltd. in February 1973 on behalf of I.N.A.L. over an area of approximately 77 square km, involving 86 survey lines (totalling 385 km), including some 20 lines, re-surveyed. Flight lines were essentially east-west with a nominal line spacing of 60 m.

A total of 75 anomalous electromagnetic responses were interpreted, however, these have extremely weak amplitudes and are near or within the noise level (Linford, 1973). The recorded terrain clearance of the helicopter varied between 220 and 700 ft. It was considered that the weak amplitude of the distortions was probably due in part to the altitude flown in the mountainous terrain.

I.N.A.L. selected 8 of the "best looking anomalies" for further investigations, these forming the basis of their work in the area, as the anomalous responses related to known mineralisation in chloritic alteration zones.

5.3 STREAM SEDIMENT SURVEY

In the period December 1974 to March 1975, the Electrolytic Zinc Co. A'Asia Ltd., conducted a geological mapping-stream sediment geochemical survey, concentrating on the flanking pyroclastic sequences for lead-zinc mineralisation, predominantly in the Clarke River valley and headwaters of the Garfield River (Williams 1975). Sampling was conducted at about 200 ft. intervals in the major streams and tributaries and the -80 mesh fraction analyzed for Cu, Pb, Zn and Ag. No responses were obtained for silver.

Copper

- (1) The stream immediately north of the Prince Darwin main adit produced a long copper train over at least 1,600 ft. of between 40 to 70 ppm Cu.
- (2) The headwaters of a stream draining the south west slopes of Mt. Darwin yielded a train at least 600 ft. long of between 30-65 ppm Cu.
- (3) Similar responses were obtained from a tributary of the Garfield River on the north west flank of Mt. Darwin.
- (4) Scattered anomalous Cu responses (30-70 ppm) were obtained in the Garfield River in the vicinity of Turain Anomaly 68.

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Lead

A long train of lead values extends down the north east stream near the headwaters of the Clarke River from the south west flank of Mt. Darwin. The values range between 40-60 ppm Pb over a sequence of autobrecciated felsic lavas, tuffs and slates, locally intruded by basalt adjacent to an old prospect (Corbett 1976). The prospect is apparently unrecorded in the literature. In this vicinity a minor stream contains two responses of 155 ppm Pb.

Zinc

Scattered anomalous zinc values in the range of 40-80 ppm occur in the vicinity of anomalous copper and lead trains.

6. CONCLUSIONS AND RECOMMENDATIONS

The known mineral prospects are essentially confined to the "central lava belt" rocks and have generally been sufficiently well prospected to indicate their immediate potential.

Much of the early prospecting was based on the assumption that the outcrops of haematite and magnetite were surface manifestations of sulphide deposits at depth, and secondly, the similarity between the style of pyrite-chalcopyrite mineralisation and alteration with that of the Lyell mineral field. In brief, the exploration of the area has been pre-occupied with the obvious mineral showings and more readily accessible parts of the area.

Modification of the concepts relating to the geology and metallogeny of the Mt. Darwin-Mt. Tyndall region suggests that potential exists in the Jukes-Darwin area for:

- (1) Lyell-type disseminated pyrite-chalcopyrite deposits, and,
- (2) Rosebery and/or Que River type massive Cu-Pb-Zn sulphide deposits.

The "type 1" deposits do not appeal as economically viable targets for exploration in the short-medium term. Furthermore, the tonnage-grade potential of such deposits in the area would probably be low; optimistically of the order of 5×10^6 tonnes at about 1.5% Cu. However, such deposits could be viable as subsidiary operations to a larger-higher grade based operation in the vicinity.

It is considered that the establishment of mining operations in the area essentially rests on the discovery of massive sulphide type (2) deposits in the flanking pyroclastic-sediment sequences.

Reconstruction of the known geology of the area, gathered by previous workers, suggests an analogous setting in the Clark valley-Mt. Darwin area to that of the Red Hills - Gooseneck area of E.L. 9/66 (Mt. Tyndall area). The preliminary stream sediment geochemical survey of the Clark Valley (Williams, 1975) indicated anomalous copper and lead responses. Otherwise, little exploration has been conducted in this zone, apart from alluvial gold prospecting in the early 1900's and the prospecting on pyrite-chalcopyrite mineralisation in the Currie River area.

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It is recommended that the western felsic lava-pyroclastic-sediment sequence of the Clarke-Currie River zone form the basis of the 1977-78 exploration program, with further geological-geochemical evaluation of anomalous zones on Intercolonial Spur.

7. EXPLORATION PROGRAM AND BUDGET ESTIMATES 1977-78

The basic objective of the proposed exploration program is the reconnaissance evaluation of the pyroclastic-sediment sequences of the Clark Valley, and, Thomas Currie River-Garfield River areas. To this end a total budget of \$93,500 is proposed.

Manpower

The bulk of the field investigations will be conducted between periods 6 and 8, employing two geologists, four field assistants, six track cutters (contractors) and 2 geophysical operations with four assistants (contractors). The total expenditure on salaries, wages and related costs is estimated at \$39,200.

Access

The only existing access into the area is by means of 4 wheel drive vehicle tracks onto the Darwin Plateau and Intercolonial Spur respectively, and then on foot down the steep, rugged western slopes of the Range. Some maintenance is required on the vehicular access tracks, and, \$1,000 (4 days bulldozer hire) has been allocated for this purpose.

In order to maximize the productivity of field parties (periods 6-9), it is proposed to utilise a helicopter for access and field camp supplying, costing some \$7,900 (36 hours).

In the Clark Valley a grid will be established, comprising a 4.5 km, N-S base line located in the vicinity of the river and extending on to Slate Spur, with 12 E-W traverse lines at 400 m intervals (totalling 15.5 km). Assuming a unit cost of \$350/km the line cutting will cost about \$7,000.

Before finalising proposals for the Currie-Garfield area a brief field inspection will be conducted in period 5. However, 20 km of track cutting is proposed, either as access tracks throughout the area, or a grid on the Currie River-Snake Spur zone, for a cost of about \$7,000.

Geophysics

The reconnaissance gradient assay E.I.P. survey of the Clark Valley grid is scheduled for completion in period 8, for an estimated expenditure of \$6,000. Ground magnetic and geochemical soil-rock surveys will also be conducted on the grid in periods 6 and 7. This coverage should be adequate to enable the potential of the zone to be evaluated, and, hence establish any requirement for more detailed investigations.

Depending on the preliminary inspection of the Currie-Garfield area (period 5) a similar gradient array E.I.P. survey may be conducted. The estimated cost of such a survey is \$8,500 (including helicopter hire), however, no allowance for the survey has been allocated in the budget estimates.

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Materials

Field camps sufficient to accommodate at least 10 men, will be established in both areas. The total cost of camping facilities and equipment is provisionally estimated at about \$4,000, and the total cost of materials at \$8,100.

Capital Items

\$8,400 has been allocated for the purchase of a 4 wheel drive vehicle in period 4.

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AMG REFERENCE POINTS ADDED

308030 RIVER

RIVER

TULLAH

PIEMAN

ROSEBERY

MURCHISON RIVER

RENISON BELL

Mt. Murchison

AMG378850E, 5366350N

Mt. Read

Mt. Heemskirk

MT. TYNDALL
Red Hills

Mt. Agnew

ZEEHAN

AREA

E.L. 9/66

TRIAL HARBOUR

HENTY -

YOLANDE
AREA

E.L. 41/71

West

DORA -
Mt. Sedgwick
HUXLEY

AREA



HENTY RIVER

QUEENSTOWN

GORMANSTON

Mt. Owen

THE MT. LYELL M. & R. CO. LTD.
CONSOLIDATED MINING LEASE.

E.L. 10/69

Mt. Huxley

STRAHAN

Mt. Jukes

JUKES -

DARWIN

AREA

Mt. Darwin

Mt. Sorell

E.L. 21/76

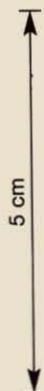
South Darwin
Peak

MACQUARIE

HARBOUR

KING RIVER

SOUTHERN OCEAN



MAP 1

THE MOUNT LYELL M. & R. CO. LTD.
EXPLORATION DEPARTMENT.

EXPLORATION LICENCES

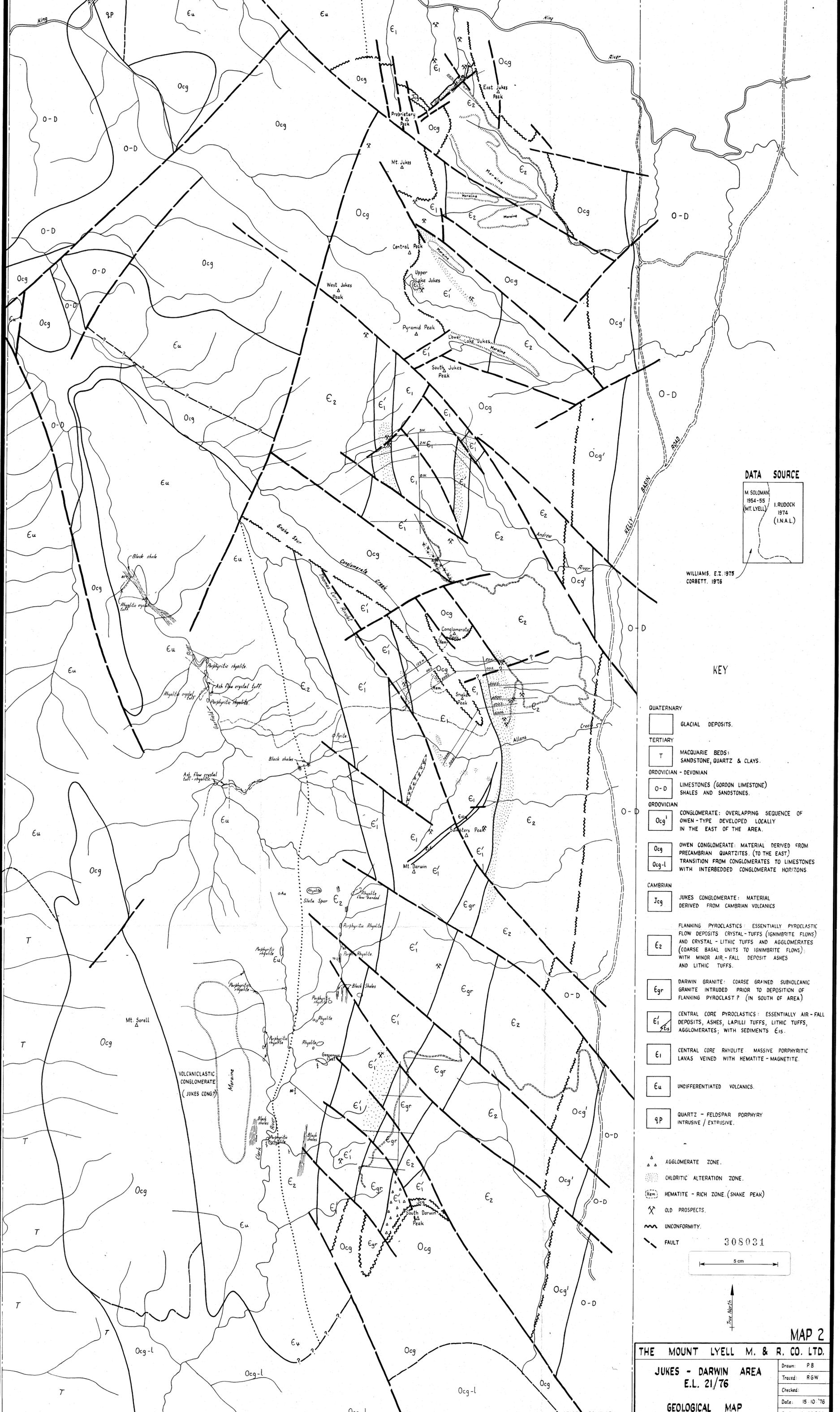
Drawn: R.G.W.

Checked:

Date: April '77

Scale: 1:250,000

028 LOCALITY PLAN 77-121b



DATA SOURCE

M. SOLOMAN
1954-55
(MT. LYELL)

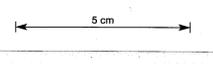
I. RUDOCK
1974
(I.N.A.L.)

WILLIAMS, E.Z. 1975
CORBETT, 1976

KEY

- QUATERNARY**
- GLACIAL DEPOSITS.
- TERTIARY**
- T MACQUARIE BEDS: SANDSTONE, QUARTZ & CLAYS.
- ORDOVICIAN - DEVONIAN**
- O-D LIMESTONES (GORDON LIMESTONE) SHALES AND SANDSTONES.
- ORDOVICIAN**
- Ocg' CONGLOMERATE: OVERLAPPING SEQUENCE OF OWEN-TYPE DEVELOPED LOCALLY IN THE EAST OF THE AREA.
 - Ocg OWEN CONGLOMERATE: MATERIAL DERIVED FROM PRECAMBRIAN QUARTZITES. (TO THE EAST) TRANSITION FROM CONGLOMERATES TO LIMESTONES WITH INTERBEDDED CONGLOMERATE HORIZONS
 - Ocg-l
- CAMBRIAN**
- Jcg JUKES CONGLOMERATE: MATERIAL DERIVED FROM CAMBRIAN VOLCANICS
- FLANKING PYROCLASTICS: ESSENTIALLY PYROCLASTIC FLOW DEPOSITS (CRYSTAL-TUFFS (IGNIMBRITE FLOWS) AND CRYSTAL-LITHIC TUFFS AND AGGLOMERATES (COARSE BASAL UNITS TO IGNIMBRITE FLOWS) WITH MINOR AIR-FALL DEPOSIT ASHES AND LITHIC TUFFS.**
- E2
- DARWIN GRANITE: COARSE GRAINED SUBVOLCANIC GRANITE INTRUDED PRIOR TO DEPOSITION OF FLANKING PYROCLAST? (IN SOUTH OF AREA)**
- Egr
- CENTRAL CORE PYROCLASTICS: ESSENTIALLY AIR-FALL DEPOSITS, ASHES, LAPILLI TUFFS, LITHIC TUFFS, AGGLOMERATES; WITH SEDIMENTS E1s.**
- E1'
 - E1s
- CENTRAL CORE RHYOLITE MASSIVE PORPHYRITIC LAVAS VEINED WITH HEMATITE - MAGNETITE.**
- E1
- UNDIFFERENTIATED VOLCANICS.**
- Eu
- QUARTZ - FELDSPAR PORPHYRY INTRUSIVE / EXTRUSIVE.**
- qP
- AGGLOMERATE ZONE.**
-
- CHLORITIC ALTERATION ZONE.**
-
- HEMATITE - RICH ZONE (SNAKE PEAK)**
-
- OLD PROSPECTS.**
-
- UNCONFORMITY.**
-
- FAULT**
-

308031



True North

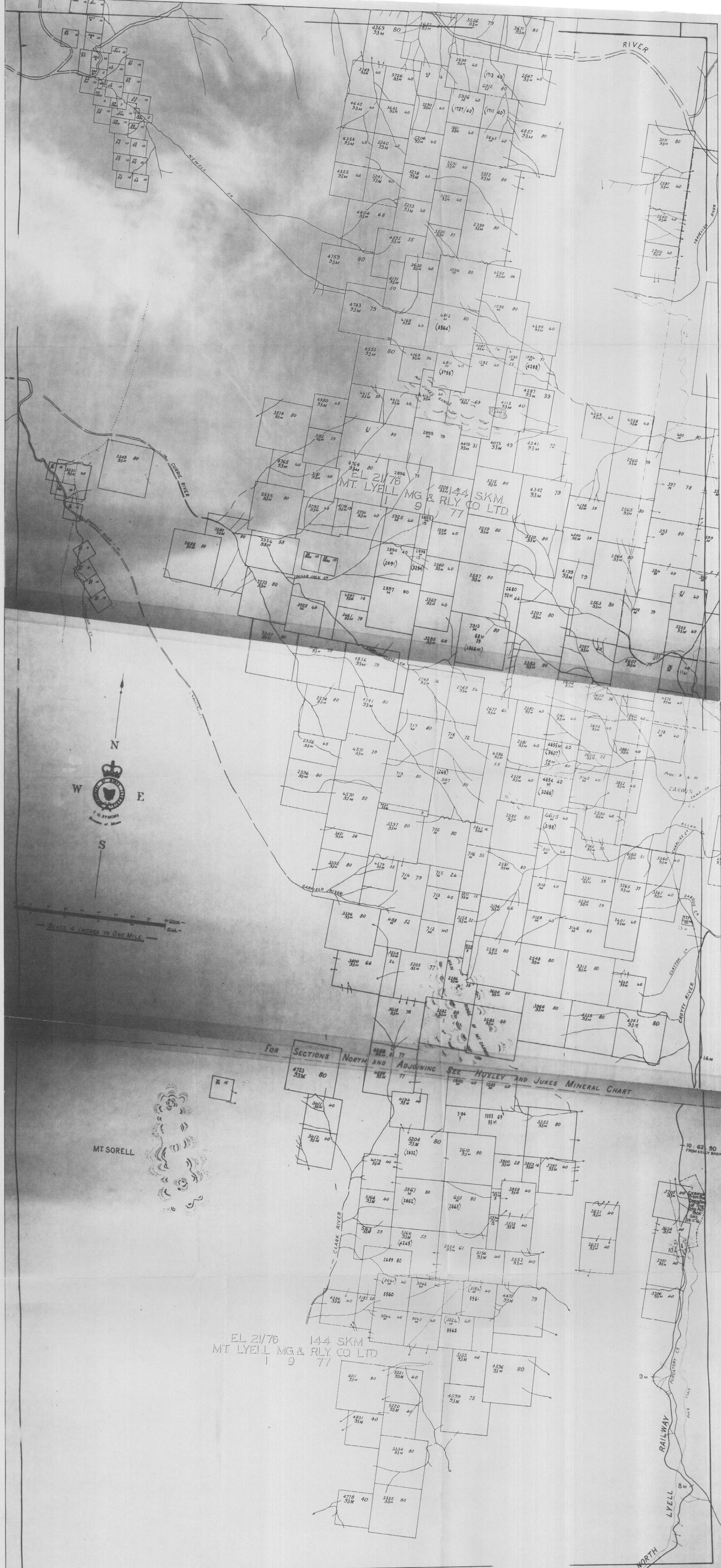
MAP 2

THE MOUNT LYELL M. & R. CO. LTD.

JUKES - DARWIN AREA
E.L. 21/76

GEOLOGICAL MAP

Drawn: P.B.
Traced: R.G.W.
Checked:
Date: 15.10.76
Scale: 1:20,000



SCALE 4 INCHES TO ONE MILE

FOR SECTIONS NORTH AND ADJOINING SEE HUXLEY AND JUKES MINERAL CHART

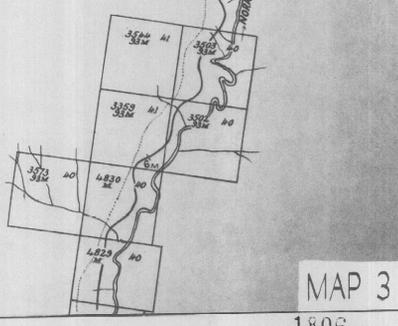
MT SORELL

EL. 21/76 144 SKM
MT LYELL MG. & RLY. CO. LTD
1 9 77

308032



THE MOUNT LYELL M. & R. CO. LTD.	
JUKES - DARWIN AREA	Drawn R.G.W.
E.L. 21/76	Traced R.G.W.
EARLY MINERAL TENEMENTS	Checked
	Date: 6-10-76
	Scale: 1" = 20,000
77-1216	



MAP 3
1806



KEY

-  AEROMAGNETIC CONTOURS.
-  TURAIR ANOMALIES.
-  PROPOSED GRID.
-  PROPOSED CAMP SITES.

SCINTREX PTY.
LTD. FEB. 1973

5 cm



308033 1807 MAP 4

THE MOUNT LYELL M. & R. CO. LTD.

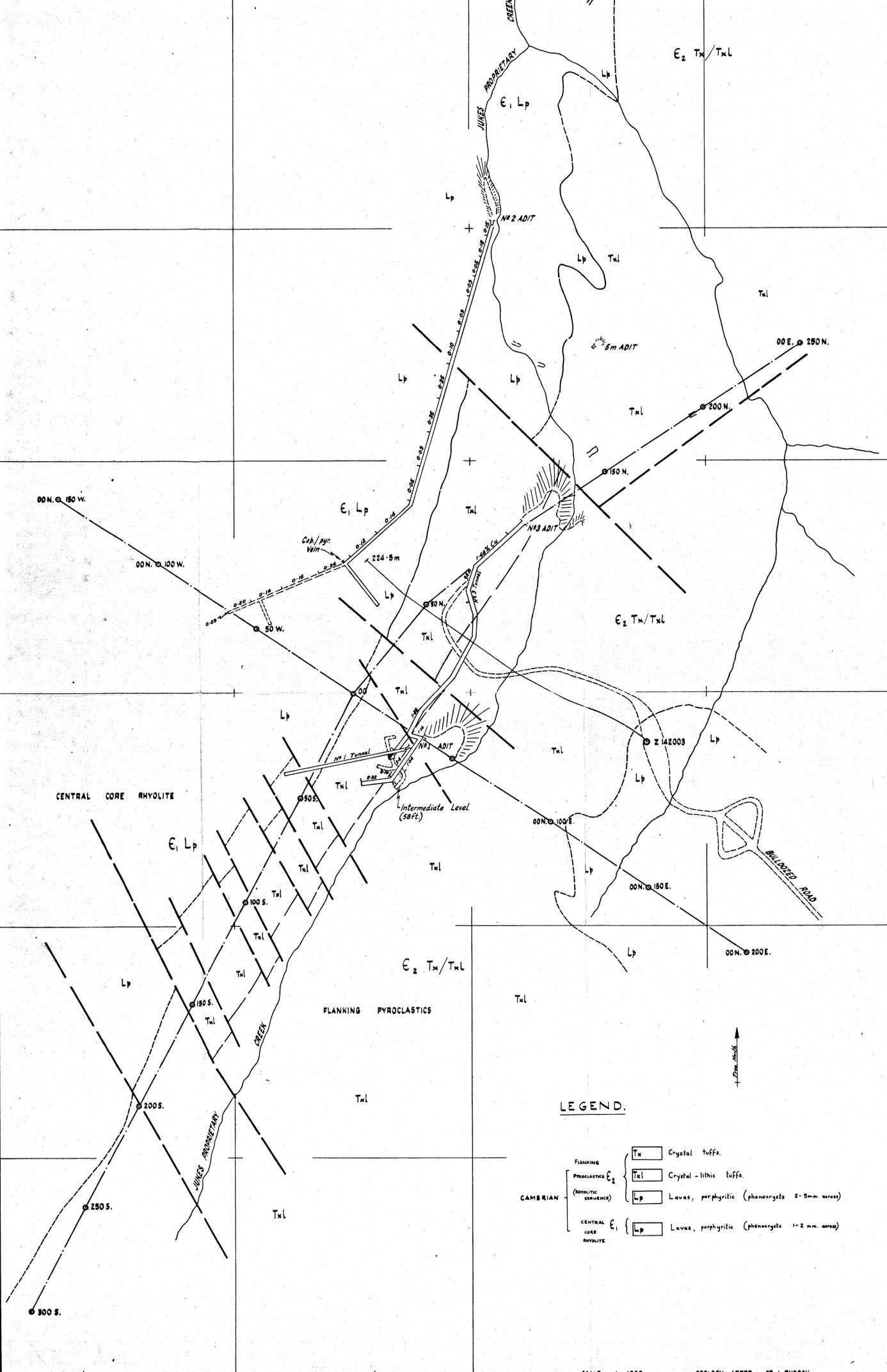
JUKES - DARWIN AREA
E.L. 21/76

RECONNAISSANCE GEOPHYSICS

Drawn	K.O.R.
Traced	R.G.W.
Checked	
Date	29.9.77
Scale	1:20,000

LEASE 80/1049

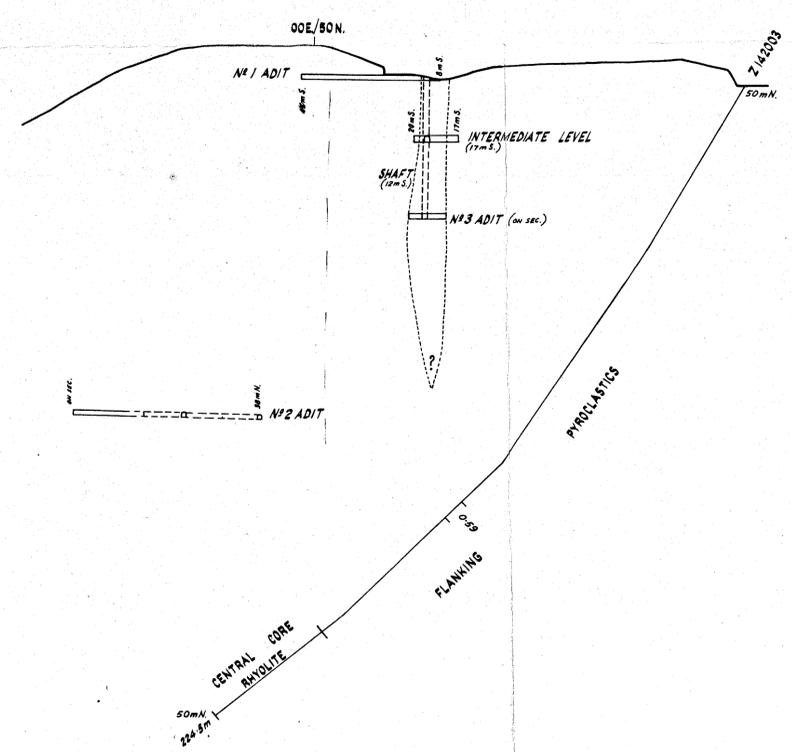
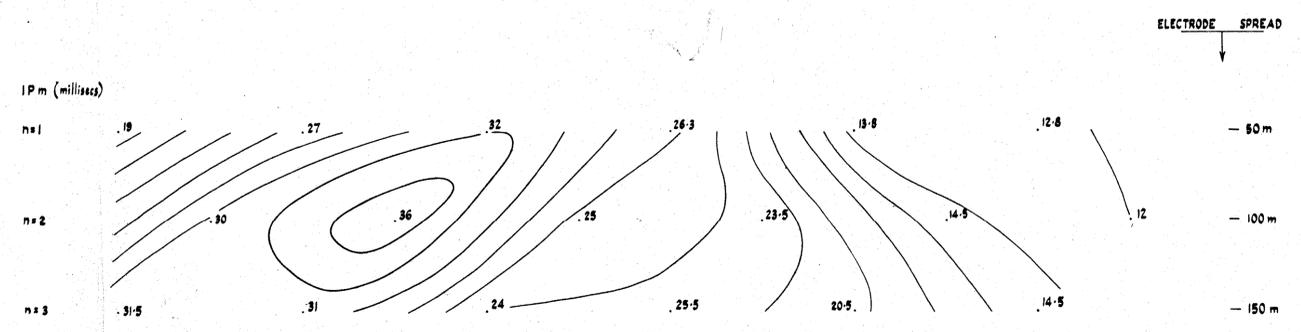
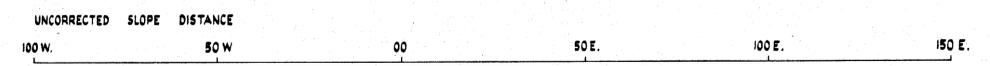
77-1216



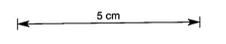
LEGEND.

FLANKING PYROCLASTICS E ₂	[Tx]	Crystal tuffs.
		[TxL]
CAMBRIAN (RYOCLITIC SEQUENCES)	[Lp]	Lavas, porphyritic (phenocrysts 2-5mm across)
	[Lp]	Lavas, porphyritic (phenocrysts 1-2mm across)
CENTRAL CORE RHYOLITE E ₁	[Lp]	Lavas, porphyritic (phenocrysts 1-2mm across)

SCALE: 1:1000. GEOLOGY AFTER DR. I. RUDOCK.



308034



1808 MAP 5

THE MOUNT LYELL M. & R. CO. LTD.	
JUKES - DARWIN AREA E.L. 21/76	
JUKES PROPRIETARY MINE	
Drawn: K.O.R.	Traced: A.G.W.
Checked:	Date: 27.9.77
Scale: 1:1,000	