# SUMMARY OF INVESTIGATIONS
# SOUTH-WESTERN TASMANIA

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By

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MELBOURNE

AUGUST 1964

# PROSPECTING - SOUTHWEST TASMANIA

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## SUMMARY OF INVESTIGATIONS


### SUMMARY

An Exploration Licence covering 6,000 square miles in S.W. Tasmania was granted by the Department of Mines on August 6th, 1964.

All available geological, geophysical and prospecting information has been studied and relevant portions copied. It is concluded that the most favourable mineralized area lies between Cape Sorell and Low Rocky Point.

Consideration is given to the best approach for prospecting our area and it is concluded that the most modern geophysical and geochemical techniques should be applied under the direction of overseas consultants.

A study of the problems involved indicates the following points:

a) Climatic conditions limit the field season to 5 months (November - April) over much of the area but provided suitable camps are established field work could continue throughout the year in the Cape Sorell - Low Rocky Point Area.

b) Access is difficult even in the most favourable areas and the use of helicopters essential. The use of Landrovers is very limited and Bombardiers provide the chief means of transport but their running costs are high and are thought to be about £1 per mile. Haflingers may be of use in limited areas.

e) Reliable radio communication is essential as a safety precaution. Mariner 60A transceivers are recommended by the H.E.C. on account of their cheapness, power, reliability and flexibility.

d) First class accommodation, with adequate heating and drying arrangements for clothes, is essential throughout the year.

e) The employment of experienced geologists with competent field assistants, who are also experienced bushmen, is essential. Special efforts may be necessary to retain their services during the full period of the project.

f) It is essential that the maximum use be made of all fine weather regardless of holidays or working hours.

A separate appraisal of available geophysical information is being made by Mr. C.P. Taylor.

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PLANS:

I Distribution of Vegetation in S.W. Tasmania.

II Plans showing Access Tracks, Isohyets, Location of Shelter Huts, H.E.C. Camps, etc., S.W. Tasmania.

III Geology and Mineral Deposits of S.W. Tasmania. Unavailable

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# I. INTRODUCTION

An area of some 6,000 square miles in South Western Tasmania extending from a peg near Waddamana west along grid line 81,000 yds. N to the coast and south along grid line 47,000 E to coast and covering all country between was pegged on July 20th, 1964. An exploration licence for this area was subsequently granted by the Department of Mines on 6th August, 1964.

Relevant information for the conduct of this prospecting has been sought from all available sources including the following:

State Government Departments:

- Lands and Surveys
- Mines
- Forestry
- Hydro-Electric Commission

Commonwealth Departments:

- C.S.I.R.O. - Soils Division
  Radiophysics Division
- Bureau of Meteorology
- Shipping and Transport
- P.M.G. Radio Branch

University of Tasmania:

- Geology Department
- Geography Department

Tasmanian Museum
Aero Club of Tasmania
Bushwalking Club of Tasmania
D. King of Port Davey
J. Bibby of Adamsfield
Lloyd Jones, Hobart

Copies of all available relevant geological reports, maps and index cards published and unpublished have been made or obtained. Copies of all available topographic and forestry maps, and weather information have been collected.

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Plan I

260008

STRAHAN

QUEENSTOWN

LYELL HIGHWAY

C. Sorell

80

MACQUARIE HARBOUR

TARRALEAH

BIRTHDAY BAY

MODDER R.

BIRCH INLET

GORDON R.

FRANKLIN R.

GORDON R.

Hibbs Pyramid
Pt. Hibbs

SPERO BAY

SPERO R.

WANDERER R.

RIVER

MAYDENA

High Rocky Pt.

SERPENTINE R.

MAINWARING R.

OLGA R.

HARDWOOD R.

LEWIS

Lake Pedder

SOUTHERN

Low Rocky Pt.

ELLIOTT BAY

70

GIBLIN R.

DAVEY R.

OCEAN

BATHURST HARBOUR

Pt St Vincent

PORT DAVEY

COX BLUFF

BG

LEGEND :-

BG Button Grass.

5 cm

DISTRIBUTION BUTTON GRASS AND MOORLAND HEATH COUNTRY S-W. TASMANIA

Scale 1 Inch = 8 Miles

40

47

GS. 658

RAINFALL

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maatsuyker Is.** | | | | | | | | | | | | |
| 4916 | 302 | 318 | 354 | 411 | 473 | 462 | 508 | 506 | 415 | 422 | 391 | 353 |
| **Port Davey** | | | | | | | | | | | | |
| 9096 | 441 | 525 | 731 | 762 | 1054 | 807 | 768 | 999 | 783 | 911 | 602 | 713 |
| **Cape Sorell** | | | | | | | | | | | | |
| 5513 | 267 | 317 | 340 | 468 | 543 | 561 | 663 | 642 | 508 | 463 | 393 | 347 |

TEMPERATURE

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Maatsuyker Is.** | | | | | | | | | | | | |
| Max. 56.6 | 62.7 | 62.4 | 61.5 | 51.4 | 54.5 | 52.1 | 51.5 | 52.1 | 54.1 | 55.8 | 57.5 | 60.7 |
| Min. 46.2 | 51.0 | 51.0 | 50.6 | 48.0 | 46.8 | 44.5 | 43.7 | 43.2 | 44.0 | 45.3 | 46.6 | 48.2 |
| **Port Davey** | | | | | | | | | | | | |
| Max. 59.4 | 66.7 | 65.6 | 63.8 | 59.3 | 55.2 | 52.8 | 52.8 | 52.9 | 56.7 | 58.8 | 61.9 | 66.5 |
| Min. 44 | 49.8 | 48.8 | 47.5 | 45.5 | 42.5 | 39.1 | 38.3 | 39.6 | 42.3 | 43.2 | 44.8 | 48.3 |
| **Cape Sorell** | | | | | | | | | | | | |
| Max. 58.6 | 64.3 | 64.6 | 63.5 | 59.6 | 56.5 | 53.8 | 53.0 | 51.7 | 55.4 | 57.3 | 59.6 | 62.9 |
| Min. 49.1 | 53.1 | 53.6 | 53.0 | 50.1 | 48.5 | 45.5 | 45.1 | 45.2 | 46.3 | 47.6 | 49.3 | 51.7 |

## II. WEATHER

The Southwest of Tasmania is an area of high rainfall, cold weather and strong winds during much of the year. This is particularly true of the higher portions where there is normally a heavy blanket of snow during the winter and spring.

The weather moderates during the summer and autumn months but spells of wet cold weather, even snow, can be expected at any time of the year. The weather is very changeable and unreliable.

The area between Cape Sorell and Elliott Bay enjoys a more moderate climate than further south and east but is still very variable and consequently access from the sea is most unreliable. This portion of our area should have a climate similar to Balfour, and field operations throughout the year are probably feasible.

A summary of available data from the Bureau of Meteorology is tabulated on the opposite page.

The recognized field season extends from November to April but this varies from year to year and may be reduced to some three months effective work.

Discussions have emphasized the importance of taking advantage of what fine weather is available regardless of weekends or holidays and of providing good living facilities at all camps with ample provision for heating, hot showers and drying clothes.

Warm clothing should be carried on all field trips.

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## III. ACCESS

Access is difficult to all portions of the southwest and movement within the region restricted by mountainous terrain, belts of very thick scrub, and by numerous rivers and creeks.

The cover of rain forest often with a thick, almost inpenetrable undergrowth is much more limited than commonly believed and the areas of button grass and moorland heath are extensive as shown on the attached map. Movement over this relatively open country is quite feasible on foot and often by Bombardier but belts of thick forest along stream courses and the presence of numerous small rivers impose severe restrictions on movement from one area to another.

It is apparent that the country included in our Exploration Licence can be considered in two portions namely - Cape Sorell, Elliott Bay Area and the mountainous country east and south of this.

The Cape Sorell - Elliott Bay area is relatively low lying, is bounded on the east and west by button grass country and is open to the sea on the west. The central belt of this area has a thick scrub cover and there are numerous rivers and creeks dissecting it so that vehicular access is almost impossible except along prepared tracks.

Access from the sea is difficult and limited to periods of little or no wind so that shipping may have to wait for a week or 10 days before being able to land, but in view of the close vicinity of Macquarie Harbour and Port Davey sea transport should be considered for coastal traverses and the movement of heavy equipment. Local fishermen with expert knowledge of the coast and weather should be employed.

Access by land is difficult and involves transhipment by flat top barge from Strahan to Birchs' Inlet where a very rough landrover track leads to the Wanderer River. This has been extended as a Bombardier track to Low Rocky Point. Consideration should be given to the possibility of improving this track to a point where it is usable by landrover throughout.

Movement off the track is difficult even on foot though Bombardiers and possibly Haflingers can be used to a limited extent in the more open button grass country. Outcrops are rare in such country so that traverses on foot have little value.

The use of helicopter and small boats is desirable for the initial traverses in this area while Bombardiers will have a limited use for supply and transportation on the eastern portion only.

The country in the vicinity of Port Davey - Bathurst Harbour is relatively open but becomes mountainous a short distance from the coast. The use of helicopters will be necessary due to the presence of thick belts of scrub while Bombardiers may be of limited use locally.

The greater part of our Exploration Licence consists of extremely rugged mountainous country with local areas of button grass but with much thick rain forest. It is unlikely that Bombardiers will be of much value in this portion except as a means of transporting supplies to base camps. Geological investigation will require the use of helicopters but the majority of work will have to be done by foot traverse.

There is a thick cover of rain forest along the Gordon, Franklin, Howard and Davey Rivers and generally east of a line extending due north from New River to which access will be very difficult even by helicopter. Access is possible by boat for 20 - 30 miles up the Gordon River.

Bombardiers or similar tracked vehicles and possibly Haflingers alone are suitable for use in button grass country due to the prevalence of swampy boggy ground. The running costs of Bombardiers are high and estimated by the H.E.C. at about £1 per mile. It is necessary for the Bombardiers to be equipped with a winch and to carry a chain saw. Haflingers have the advantage that they can be carried into position by Bell G.2 helicopters.

The projected road to the junction of the Gordon and Serpentine Rivers is progressing rapidly and already has reached to approximate grid location 73,300 N, 43,500 E and is expected to reach McPartlans Pass by the end of the coming summer. The whole road should be completed within two years.

The completion of this road will enable forward camps to be constructed if necessary and will open up the more inaccessible portions of the southwest to exploration.

Access by conventional aircraft is at present limited to a small strip at Port Davey and the shores of Lake Pedder. In view of the difficulties of obtaining supplies by other means it is recommended that airstrips be constructed at all base camps and that if sufficient flat land be available these should be large enough to take D.C.3's or Bristol Freighters.

The airstrip at Port Davey is small and very rough. If we operate in that area it would be desirable to extend its length to at least 500 yards and regrade the surface.

The use of helicopters will be essential for any geological work outside the coastal strip and is desirable even along the coast. A helicopter will be required for the full period of the field season since no assistance can be expected from the H.E.C. on the way of helicopter charter.

The H.E.C. has found over the past two years that flying helicopters from dawn to dusk 7 days per week they have averaged the following:

3.8 hours per flying day
2.7 hours per hired day

and they were unable to fly roughly 2 days per week. This does not appear to differ widely from our own experience with helicopters in Northern Australia.

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## IV. RADIO COMMUNICATION

Radio communication in Southwestern Tasmania is centred on Hobart Radio which operates on a frequency of 5353.

The only permanent O.P.R. in the area is operated by D. King at Port Davey but a number of mobile O.P.R.'s are operated by the H.E.C. and Forestry Department.

The H.E.C. advise that conditions for radio communication are often very poor in the area and strongly recommend the use of Mariner 60A Transceivers (40 watt output). They have found the A.W.A. Transceivers reasonably reliable but Vaughan transceivers have been found to be useless.

The use of radios by field parties is a matter of policy but would seem desirable as a safety precaution. One method used by L.E.E. in geological traverses when operating with helicopters was to leave a transceiver at the commencement point of field work and another at the terminal point so that they were available at all times within 2 or 3 days walk. On completion of the field traverses equipment was picked up by the helicopter and returned to base.

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## V. AERIAL PHOTOGRAPHS, MAPS ETC.

The Department of Lands and Surveys have a complete coverage of aerial photographs in Southwest Tasmania on a scale of 45 chains to 1 inch with local areas, principally those of interest to the H.E.C., covered by photographs on a scale of 20 chains to 1 inch. They do not prepare mosaics.

Contour plans and maps of the whole area are being prepared by the Department of Lands and Surveys and copies of all available maps have been obtained.

L.E.E. Co. had the area flown by Adastra Aerial Surveys and later had mosaics prepared, mostly on a scale of 30 chains to 1 inch, but the eastern portion was flown on a scale of 60 chains to 1 inch. These are of superior quality to the Lands Department photographs and should be obtained for our investigation, particularly since they are used as base maps for geophysical plans.

It will be necessary to obtain permission from Electrolytic Zinc Company before prints can be obtained from Adastra Aerial Surveys, Sydney.

Poor quality photo-maps on the scale of one inch to one mile are available from the Department of National Mapping.

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## VI. CAMPS

In view of the difficult and often unpleasant working conditions the importance of providing first class accommodation and facilities in camps has been stressed in all discussions.

The extensive experience of the H.E.C. in this area made the following details of their camps a matter of considerable interest.

All H.E.C. camps are galvanised iron with masonite or canite lining. They are prefabricated and lifted by helicopter to the camp site. Sleeping huts are partitioned and designed for two men per unit. All huts are equipped with fuel oil heaters; gas cookers, refrigerators and lights; and briquette hotwater services and equipment for drying clothes. Consideration is now being given to standardising on gas. Local supplies of firewood are considered to be unsatisfactory and are often lacking.

Two or preferably three weeks reserve supply of food must be held at camps in view of the probability of bad weather cutting off access.

Rio Tinto Explorations used prefabricated aluminium huts which were moved by helicopter in the N.W. of Tasmania.

L.E.E. Co. used galvanised iron lined huts in their camps but only operated in the more accessible portions so that their experience is only relevant in the Cape Sorell - Elliott Bay area.

It seems likely that the only place where the use of helicopters will be required for camp construction is in those portions of our licence east and north of the Gordon River, and that in other areas all construction material can be moved by sea, bombardiers or trailer towed by a bulldozer.

The experience gained in construction of our camp at Balfour should be applicable though better accommodation and facilities will be required in the southwest.

If suitable camps are constructed in the Cape Sorell - Low Rocky Point area and the loss of time due to bad weather be accepted then it may be possible to operate throughout the year provided adequate reserves of food and fuel are maintained to overcome periods when access is impossible.

It appears desirable to construct an airstrip at all base camps to reduce dependence on helicopter supplies and overcome difficulties of access by road and sea.

Adequate fire-breaks should be constructed around all camps to prevent their being damaged by bushfires or starting them. The use of kerosine in camps is considered by the H.E.C. to be a fire risk and should be reduced to a minimum.

The Committee for the Southwest is very fire conscious and would cause a considerable public outcry should any extensive bushfire be caused by our operation.

It may be considered desirable to draw on the experience of Mr. W. Chesnut in view of his knowledge of running a camp throughout the year at Balfour.

The location of all known shelter huts and camps on S.W. Tasmania and relevant access tracks have been plotted. H.E.C. huts are available for use in an emergency only.

The Tasmanian Mines Department have a house at Port Davey which they are prepared to make available to us should we operate in that area.

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## VII. FIELD PARTIES

Discussions with the H.E.C., Geological Survey, University of Tasmania and ex L.E.E. personnel all emphasize:

1) It is essential to use experienced geologists at all times - much of L.E.E.'s work is suspect due tothe use of students without adequate supervision.

2) It is essential that the field assistant be a competent bushman and compatible with the geologist since they will be living and working together for weeks on end.

3) The Senior Geologist should live on the field and be available at all times for discussion and assistance to the junior geologists.

4) A field party of 2 men is most desirable with helicopter support or supply drops every 2 or 3 days (3 men make the party too big for helicopter work).

There is disagreement as to how long field parties should remain away from base camps but in general it is felt that this should not exceed two or at the very most three weeks and should be followed by a spell in Hobart. In a number of cases Company exploration parties operating in Western Tasmania fly married men home for a spell each month.

Warm clothing and at least one weeks emergency rations should be carried at all times in view of the very changeable weather and the possibility of having to walk out of an area.

H.E.C. field parties commonly carry small gas stoves or solid fuel (meta etc.) for cooking in view of the danger of bushfires and the total ban on the lighting of fires at periods during the summer. Button grass fires can be started at any period of the year.

It is not expected that the geological staff will operate at full efficiency until they have gained some experience in the local rock types and field conditions so that continuity of geological staff during the life of the project becomes of prime importance.

It is considered that some attempt should be made to offset the uncomfortable, often difficult and occasionally dangerous working conditions and that this could involve the provision of additional amenities and some form of bonus payment, possibly an area field allowance.

Professor S. Carey and T.D. Hughes both stress the desirability of the field geologist familiarising themselves with the rock types of the Mt. Bischoff - Rosebery - Mt. Lyell area before commencing field mapping further south.

T.D. Hughes has further suggested that the Department of Mines attach one of their geologists to our base camp to assist in our investigations.

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## VIII. SCOPE AND APPRAISAL OF PREVIOUS GEOLOGICAL PROSPECTING INVESTIGATIONS

### 1. General

A limited number of prospectors, often with Government backing, have explored the southwestern portion of Tasmania during the past 100 years with the resultant discovery of economic deposits at Port Davey (1881) and Adamsfield (1925).

Various mineral showings have been recorded throughout the area but so much of the country is mountainous with dense scrub cover that it is most unlikely that the central and southern portions have been penetrated. Even where old prospectors, pioneers and explorers did traverse the country their observations extend only for a very limited area outside the route travelled.

Except for some purely geological mapping by the University of Tasmania in restricted areas and investigations by the Hydro-Electric Commission concerned primarily with water conservations reports and maps on geology and mineral resources in Southwest Tasmania have been prepared by only two organizations.

1. Tasmanian Department of Mines
2. Lyell-E.Z. Exploration Co.

### 2. Department of Mines

The work of the Tasmanian Geological Survey in the Southwest is of two kinds.

a) Reconnaissance mapping with a bias toward the search for economic mineralization. This information has been published in the form of Bulletins etc. but there are also a number of unpublished reports and maps available. In general geological boundaries

are reasonably correct but there has been little attempt to map structures or postulate ore-controls and there has been no follow up to the limited surface prospecting by geophysical or geo-chemical methods or by drilling. Most of the maps were prepared without the aid of air photographs and topographic features are not always accurately placed.

b) Detailed mapping with particular emphasise on the correct interpretation of structure and stratigraphy. This mapping was commenced about 10 years ago in the Port Davey area with the idea of carrying out a regional survey of a large area, first around Bathurst Harbour and gradually widening to determine the mineral potential of the Southwest. This idea was later modified and the first objective became the production of a one mile geological sheet. This again has been delayed because of staff difficulties and partly because a topographic base map is not yet available. Portions of this map sheet have been reproduced in Technical Reports and further information is available in the Department. Some of this mapping is of high standard but much is of mediocre calibre and in particular the work of Stefanski must be regarded with the utmost suspicion.

3. Lyell-E.Z. Exploration Co.

Work carried out by the L.E.E. Co. during 1956-1960 was most extensive and involved a number of techniques. The whole of the Southwest was flown to produce aerial photographs, the western portion mostly on a scale of 30 chains to one inch but the eastern half at a scale of 60 chains to one inch from which mosaics were subsequently produced. Much of the western

half and isolated areas in the eastern half was covered by aero-magnetic surveys and smaller areas by aerial electro-magnetic surveys. The results of these surveys are plotted on transparent overlays of the mosaics.

Later ground geological and geophysical (magnetometer, gravimeter, afmag and I.P.) surveys were carried out principally in areas of airborne anomalies. Details of these were not available in Hobart but may possibly be obtained from the Bureau of Mineral Resources who did much of the field work.

Drilling was confined to Moores Valley and Pelias Cove.

Moores Valley area is still held as an Exploration Licence (No.3/59) so that information is not available on that area. Copies of all other L.E.E. reports and maps held by the Department of Mines have been made. It is understood that a number of detailed geological maps and possibly reports are still held by Mt. Lyell or E.Z. Co.

It is difficult because of the varieties of techniques and personnel engaged in this project, to give an overall assessment of its worth, but the information available at least provides a tremendous advantage to any other company engaged in a similar search.

The photo-interpretation of the general geology is probably reasonably satisfactory but because of the number of people involved of variable reliability. Professor Carey, however, considers that the whole area should be re-interpreted by a skilled photo-geologist familiar with the area and Tasmanian rocks. He has offered to undertake this work.

Large scale structures obtained by studying air photos and aerial geophysical results, although given very limited ground checking should be reasonably accurate.

It is probably the detailed mapping, even that at Moores Valley where so much of L.E.E.'s efforts were concentrated, that will reveal the greatest weakness. This is principally because of the employment of junior geologists and often students who made quick trips into selected areas of small dimensions without adequate supervision and to the short period for which most of L.E.E.'s staff remained with the Company.

The H.E.C. geologists are not prepared to accept the reliability of photo-interpretation on any save the broadest of scales and certainly not for structural interpretation. They consider that wherever checked on the ground existing work has been found incorrect.

The University Geology Department accepts photo-interpretations of the Upper Palaeozoic and younger rocks but interpretation of Cambrian and Upper Pre-Cambrian is considered dangerous and that of Middle Pre-Cambrian rocks is quite misleading.

Reports on the geophysical investigations undertaken by the B.M.R. or other geophysical companies in S.W. Tasmania on behalf of L.E.E. should be obtained if possible. No copies are held in Hobart.

Available copies of L.E.E. Co. aero-magnetic and electro-magnetic plans have been passed to Mr. C.P. Taylor for assessment.

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## IX. OUTLINE OF GEOLOGY OF SOUTHWEST TASMANIA

A broad picture of the geology of our Exploration Licence can be obtained by considering the area as a broad northerly pitching geanticline centred on Bathurst Harbour with Cambrian rocks in aynclines on the east and west.

Transgressive Ordovician rocks with thick conglomerates and a core of Silurian are preserved in superimposed folds to the north and west of Port Davey and around Adamsfield while large masses of Permian rocks intruded by Jurassic dolerite occur on the eastern boundaries.

The Precambrian rocks of the area were originally divided into two groups - the Davey and Carbine - but this grouping has been discarded and they are at present divided into "Metamorphosed" and "Unmetamorphosed" groups whose relation is not specified.

The Metamorphosed group consists of a series of phyllites, garnet and mica schists and quartzites which are strongly folded and faulted and often have isoclinal folds overturned to the west. Basic intrusives are found in this group.

The Unmetamorphosed Group consists of shales, schists, quartzites and conglomerates with limestones and thick dolomites in the uppermost beds. They commonly show gentle folding and have suffered less metamorphism than the previous group.

There is great similarity in many of the rock types of these two groups and their distinction in the field is not possible except on the basis of detailed structural and petrofabric analysis.

The Cambrian Dundas Group is found over a large area to the south of Macquarie Harbour and over lesser areas extending from Adamsfield south to Rocky Boat Harbour. They comprise

interbedded shales, siltstones, quartzites, greywackes, tuffs and lavas, limestones, dolomite and chert bands. Lenticular bodies of basic and ultrabasic intrusives are considered to be of Cambrian age. Thick scrub cover and poor exposures often makes the mapping of the Cambrian areas very difficult.

The Ordovician Junee Group which includes the Owen Conglomerate and Gordon limestone are well developed along the Gordon River and the Vicinity of Adamsfield.

The Silurian Eldon Group consists of interbedded shales and quartzites which are found in the lower reaches of the Gordon River and to the east of Reeds Creek.

Granitic intrusives occur in the Low Rocky Point - Elliott Bay area where they range from a potash rich variety (Adamellite) to practically a granodiorite on the upper Lewis River. Smaller areas of granite are found at Southwest Cape and Cox's Bight. These granites and the Cambrian basic - ultrabasic intrusives are the chief source rocks for mineralisation in Tasmania so that their presence can be considered as a favourable indication for mineral prospects.

One of the major difficulties in assessing the available geological maps of the area is the complete absence of fact maps. It is considered desirable that every effort be made to obtain field maps of traverses made by L.E.E. Co. geologists so that an assessment can be made of their interpretation.

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## X. MINERALISED AREAS

The common association of the Younger Precambrian rocks, principally dolomites and quartzites, and Cambrian volcanics plus ultrabasic and granitic intrusives with the main mineral deposits of Tasmania is strongly marked in Western Tasmania where they form a belt extending for some 120 miles from north to south.

Approximately one-third of this belt, a length of some 45 miles, lies within our Exploration Licence and must be considered a most favourable area. In this portion which extends from Cape Sorell to Elliott Bay there are both granitic and ultrabasic intrusives and known occurrences of copper, gold, nickel, chromite, asbestos, dolomite and iron ore.

The presence of schisted Cambrian rocks associated with Owen Conglomerate plus nearby intrusive granite coupled with known copper mineralisation in the area makes the Mt. Osmound area one of considerable interest with some similarity to the Mt. Lyell area.

The ultrabasics of Adamsfield are known to contain osmiridium, considerable quantities of chromite, and may contain nickel. The recent discovery of Cambrian volcanics and other beds to the east and south of Adamsfield increase the mineral potential of the area considerably. This belt of Cambrian rocks is thought to link up with the outcrops at Rocky Boat Harbour so that further detailed mapping may extend the area of potential mineralisation.

There is an unconfirmed report of diamonds being found near the ultrabasics of the Boyes River and an unconfirmed report of the presence of a leached gossan, possibly of a tin sulphide lode, in the Hastings area of Southeast Tasmania.

Two areas of the Precambrian are associated with mineralisation. In the Bathurst Harbour - Cox Bight area small tin veins occur. While these are not considered per se, of economic importance, the tin shed from them has been concentrated in some places into rich patches of alluvial and detrital cassiterite bearing ground. Attention should be paid to possible offshore areas, as in Bathurst Harbour. An alluvial field at the Jane River contained small patches of rich gold bearing ground containing some cinnabar, but the source of the gold has not been found.

Copper has been reported associated with basic dykes of limited extent near Port Davey and in black slates near Mt. Mueller.

The Older Precambrian rocks have always been considered to be barren and have as a consequence been avoided by prospectors for many years. In an area as little known as Southwest Tasmania this would appear to be a dangerous assumption.

H.E.C. geologists advise noting the occasional presence of small veins of galena in the Gordon Limestone so this must also be considered as having some mineral potential.

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## XI. APPROACH TO FUTURE PROSPECTING

Discussions with the Chief Geologists of the H.E.C. and Geological Survey, and Professor S. Carey indicate the following approach to prospecting the southwest of Tasmania.

### (a) Geological

Professor Carey considers that the whole area should initially be mapped using photo-interpretation and that this should be completed in time for use with interpretation of geophysical surveys.

G. Hale and T.D. Hughes consider that geological mapping, under the control of a senior geologist, well experienced in structural mapping, with a team of at least three experienced geologists could commence before or simultaneously with geophysical work. This work should be concentrated in a small area, preferably in the Cambrian of the Cape Sorell - Elliott Bay region. They do not consider further photo-interpretation to be warranted at this stage.

It is probably desirable that a detailed geological photo-interpretation be made of the key areas and that Professor Carey undertakes this work in view of his extensive experience of Tasmanian conditions. This work should be commenced as soon as possible so that it is available for interpretation of geophysical investigations and in time for the coming field season.

### (b) Geophysical

G. Hale, Chief Geologist, H.E.C. doubts the value of aerial geophysics, particularly in the more mountainous areas, and does not consider this approach offers any assistance except in detailed groundwork in local areas.

T.D. Hughes considers the existing aerial geophysics already completed to be sufficient for the initial stages and that additional work should be carried out in smaller selected areas with follow-up ground surveys of any anomalies.

Professor Carey, other members of the University Staff and ex L.E.E. geologists tend to agree with Hughes' thoughts but stress the importance of obtaining a thorough appraisal of existing geophysical work by a thoroughly experienced geophysicist. In general they tend to accept the aeromagnetic cover as satisfactory but are very doubtful of the reliability of the aerial electromagnetic work.

All parties have stressed the importance of obtaining the services of thoroughly competent experienced geophysicists familiar with operations in mountainous conditions and are doubtful whether such personnel are available in Australia.

It would appear desirable to extend existing aeromagnetic surveys to cover the whole of our licence area.

(c) Geochemical

All parties are agreed that geochemistry offers the best approach for making new discoveries in our Exploration Licence and stress very strongly the desirability of obtaining the very best expert overseas knowledge since misleading results and a considerable waste of money will result from the use of inexperienced personnel.

Practically nothing is known of the geochemical conditions in the southwest and apart from minor unskilled investigations by L.E.E. and preliminary work in a very limited area by W. Baker no work has been done in our licence holding.

Considerable preliminary work would be necessary to determine the proper techniques to be used under the conditions prevailing in the southwest where many of the ground and stream waters are very acid (pH 4-5).

Suggested methods of regional investigation include the use of ion adsorption resins placed in streams for varying periods to determine what elements are present, and the testing of stream sediments.

T. Hughes particularly recommends the search for copper in the Mainwaring River area and for nickel in the Hodder-Spero Rivers area.

(d) Drilling

A major criticism levelled at the L.E.E. Co. by all parties is the lack of exploratory drilling following their geophysical work. With the exception of 2 holes at Moores Valley and a limited number of shallow holes at Pelias Cove no drilling was undertaken in four years of prospecting.

G. Hale and T. Hughes both stress that though geological, geophysical and geochemical surveys are good tools in the locating of ore deposits, it is only the drill that gives definite information.

It is considered desirable that, in line with normal overseas practice, all anomalies regardless of surface expression, be drilled to determine their cause.

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## XII. CONCLUSIONS

Prospecting the southwest of Tasmania presents the Company with a greater challenge on all counts than it has faced before, due to the rugged country, extremely bad weather and difficulty of access.

The general geology of the area is poorly known even in broad outline but there is sufficient detail to indicate that our licence includes at least one large area and two lesser areas known to be favourable for mineralisation, and that there may be other areas.

Although some, indeed much of L.E.E.'s work is of doubtful value it must be recognised that they employed a few very competent men and that if we are to succeed where they failed it must be by the employment of better techniques, more experienced geologists and a better appraisal of the opportunities offering.

In view of the physical difficulties involved in prospecting the southwest of Tasmania it is desirable that:

(a) the Company employs all modern techniques to select the most favourable areas;

(b) that the services of suitable overseas consultants be obtained;

(c) that only experienced geologists are utilised in this area and that all efforts are made to ensure continuity of service of these geologists until completion of the project.

It is desirable that the various geological reports, detailed field maps, geophysical reports and any other available information be obtained from Mt. Lyell and Electrolytic Zinc Company to complete our assessment of the area.

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## XIII. RECOMMENDATIONS

1. Copies of Adastra airphotos and mosaics be purchased.

2. Professor Carey be asked to undertake a photo-interpretation of the following areas;

   (a) Cape Sorell - Elliott Bay

   (b) Adamsfield - Rocky Boat Harbour

   (c) Port Davey - Bathurst Harbour

3. All geophysical reports and plans be submitted to a geophysical consultant for appraisal and recommendation as to the most suitable approach.

4. That expert geochemical advise be obtained on techniques, method of approach, and type of personnel required for the investigation.

5. Detailed literature research of the area be continued.

6. A summary of the known mineralisation in West Tasmania be prepared, for comparison with the known geology of the Southwest area.

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PLAN II

64-379

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# MAP SHOWING
# RAINFALL DISTRIBUTION, TRACKS & HUTS
# SOUTH WEST TASMANIA

SCALE OF MILES

5 4 3 2 1 0 5 10 15

5 cm

LEGEND:

- ROADS.
- LAND ROVER OR BOMBARDIER TRACKS.
- WALKING TRACKS.
- H.E.C. CAMPS: 2-5 MEN; 5-10 MEN; 10-20 MEN
- 70" ISOHYET
- HUT

850 000 YD N 145° 147° 850 000 YD N

620 000 YD N 145° 147° 620 000 YD N

300 000 YD E 500 000 YD E

H.N. 7-9-64

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