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COMSTAFF PTY. LIMITED

GEOLOGICAL REVIEW

EXPLORATION LICENCES EL5/63, EL1/68, 7AP/AM

NORTH WEST TASMANIA

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LOCALITY MAP OF TASMANIA

SHOWING EXPLORATION TENEMENTS

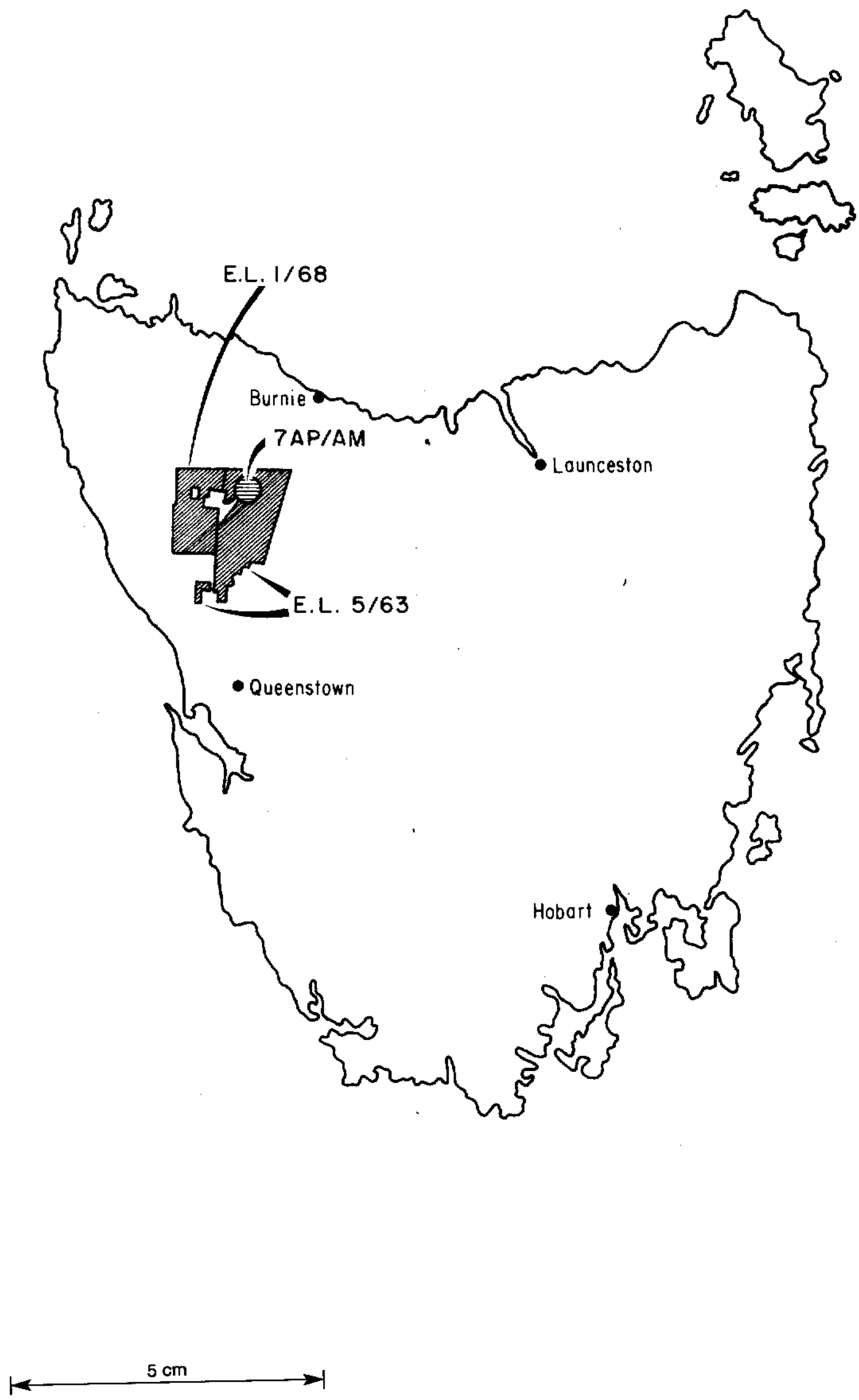

FIGURE - I

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COMSTAFF PROPRIETARY LIMITED
EXPLORATION LICENCES EL5/63, EL1/68 AND 7AP/AM
NORTH-WEST TASMANIA

INTRODUCTION

The Comstaff Exploration Licences EL5/63, EL1/68 and 7AP/AM cover an area of approximately 600 square miles in the north-west of Tasmania (see Figure 1 and Plate 1). Topography is youthful with high relief and fast flowing drainage. The area is one of high rainfall - about 80 inches annual average - and mostly covered with dense forest and thick undergrowth. An east-west highway crosses the northern part of the licence area and a north-south highway traverses the area close to its eastern boundary as does a north-south railway line. There is no present means of ground access into the interior of the area. The above factors all contribute to make the area one where exploration costs are abnormally high and information obtained for dollar spent much less than elsewhere in Australia.

GEOLOGY

The licences occupy an area in the central west of the Palaeozoic Dundas Trough developed between the Tyennan Geanticline to the east and the Rocky Cape Geanticline to the west. (See Plates 2 and 3).

Precambrian rocks have been divided into two groups, "Older" and "Younger". The former consist of deformed, low to medium grade, regionally metamorphosed quartzose schists, sericitic schists, phyllites and amphibolites. The latter consist of quartzites, slates, minor conglomerates, dolomites and possibly some volcanics. The two groups are similar lithologically but the "Younger" is much less deformed or metamorphosed. The groups are supposedly divided by the Frenchman Orogeny but no indisputable unconformity has been found.

The amphibolites being the hosts of iron ore bodies - Savage River - have come under considerable scrutiny which has resulted in some controversy concerning their age, some authors considering them to be Cambrian.

Younger Precambrian rocks occupy the area west of the Comstaff licences encroaching across the north-west of EL1/68 and into the area west of Renison Bell.

Rocks of the Cambrian in north-west Tasmania have been divided into three main lithological assemblages:-

(1) The Success Creek Group and Crimson Creek Argillite.

(2) The Mt. Read Volcanics.

(3) The Dundas Group.

The exact age of all but the Dundas Group is questionable.

The early Cambrian rocks, the Success Creek Group, are a succession of quartzite, slate, sandstone, siltstone, dolomite, laminated greenish-grey or black shale and possibly

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some pyroclastics. Rocks of this group are to be found west of Renison Bell, south-west of Pinnacles and possibly at Mt. Bischoff. It is considered they could be present in the Cambrian-Precambrian contact zone in the north of EL1/68.

The Success Creek Group is overlain by a series of distinctively coloured red, purple, green and grey turbidites, spilite, greywacke, and pyroclastics termed the Crimson Creek Argillite. Conformability or otherwise with the Success Creek Group is disputable. The Renison Bell, Huskisson River, Mt. Bischoff-Cleveland areas all contain rocks belonging to this group.

The Dundas Group of tuffs, slates, greywackes, siltstones and conglomerates is the only Cambrian series so far known to contain fossils and is given a Mid-Upper Cambrian age. The group is represented along the Huskisson River where similar rocks contain fossils of equivalent age. Its contact with the underlying Crimson Creek Argillite is masked by ultrabasics, but is thought to be conformable.

The south-east of the licence area is occupied by the Mt. Read Volcanics. This is a thick pile of potash-rich brecciated rhyolites, agglomerates and tuffs overlain by mainly sodic volcanic breccias, tuffs, keratophyres and quartz keratophyres. Within the volcanics are found thin sequences of bedded slates, tuffs (sericitic schists) and sandstones. The age of these sediments is disputable. Whether they are in situ interactive small basins or whether they have assumed their present position by folding and/or faulting is a matter of conjecture. What is of major importance is that they are hosts of major orebodies. The age of the Mt. Read Volcanics is conjectural but it would seem most probable that they are equivalent to the Upper Success Creek, the Crimson Creek and possibly part of the Dundas Group.

Large sheet-like bodies of serpentinite and serpentinised pyroxenite occur within the Cambrian in the Huskisson River area, and west of Mt. Bischoff. Where stratigraphic relationships have been observed it is claimed these bodies form concordant sheets along the Dundas Group-Crimson Creek Argillite boundary.

Cambrian sedimentation closed with the Jukesian or Tyennan Orogeny. Cambrian and older rocks were gently folded on trends parallel to the margins of the adjacent Geanticlines. Major faulting of a similar trend uplifted the margins of the basin producing a central depression which was split by a slightly emergent axial ridge of Cambrian rocks.

Ordovician sedimentation commenced with the Jukes Breccia or Conglomerate followed by quartzose conglomerate and sandstones of the Owen Conglomerate and concluded with the Gordon Limestone. Following this is the Eldon Group of sediments consisting of sandstones, mudstones and limestones which extend into the Lower Devonian. Rocks belonging to

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these successions are present in the Huskisson and Zeehan Synclines, in a small basin west of Waratah and are to be found as inliers on the Tertiary basalt plateau in the north-east.

Earth movements of the Tabberabberan Orogeny began to effect the miogeosyncline during the Lower Devonian. The first stage of folding with trends controlled by the Geanticlines was accompanied by vertical movements on pre-existing faults near the margins of the miogeosyncline which had been active in the Jukesian Orogeny. In the succeeding stage the influence of the Geanticlines was negligible and the orogeny was dominated by structures of approximately N.W. trend. Superimposition and interference with earlier folds produced severe local complications and resulted in marked changes in plunge. Further movement took place at this stage on pre-existing Jukesian structures.

Tabberabberan deformation was followed by a major phase of granite intrusion. The Meredith Granite and small plugs and dykes of quartz porphyry which intruded along anticlinal axes at Waratah and Renison Bell are considered to belong to this intrusive period.

Tillite and sandstone, considered to be of Permian age, are present in the far north of the area. The north-east is covered by Tertiary basalt.

Evidence of Pleistocene glaciation is present in the south-east. Moraine is known in the Rosebery area and has been recognised in the Pinnacles area. Glacial valleys and moraine of glacial origin are recorded from Mt. Ramsey in the centre of the licences so it is possible the whole south-east of the licence area was subjected to Pleistocene glaciation.

Post early Permian tectonic activity has been largely epirogenic. Tertiary faulting on approximately N.W. trends formed large and small scale horst and graben structures.

MINERALISATION

The finding of tin at Mt. Bischoff in 1871 was the first significant metal discovery in Tasmania. This was followed by the discovery of tin at Heemskirk in 1876, silver-lead at Zeehan in 1882 and gold near Mt. Lyell in 1883. The discovery of rich copper ore at Mt. Lyell in 1884 set off intensive prospecting which continued until the end of the century. Renison Bell (Sn), Rosebery (Zn, Pb, Ag), Hercules (Pb, Zn, Ag), Mt. Magnet (Pb, Zn, Ag), Mt. Farrell (Pb, Zn, Ag), Cleveland (Sn), King Island (W) and Savage River (Fe) were all soon discovered. Prospecting activity declined drastically during the early part of the present century; the Zeehan field and the Mt. Bischoff deposit were almost exhausted, extraction difficulties hindered the development of the Rosebery and Hercules mines and many of the smaller mines were worked out. 11 ?, Platinoids were discovered in 1925 and in the early 1930's open cut mining of low grade copper ore commenced at Mt. Lyell. Solving of extraction problems enabled large scale exploitation of the Rosebery mines to commence in 1936. The scheelite deposits of King Island were put into large scale production about 1950. During the 1960's the Savage River iron ore and Cleveland tin deposits were brought into production and new orebodies have been discovered at Renison, Mt. Lyell and on King Island.

The most important host rocks are the ultrabasic dykes or sills in the younger Precambrian (Savage River), younger Precambrian quartzite (Zeehan), Lower Cambrian dolomite and shale (Renison, Mt. Bischoff), Lower to Middle Cambrian sandstone, shale and chert (Mt. Cleveland), shale, slate and schist in the Mt. Read Volcanics (Hercules, Rosebery, Mt. Farrell) and schist considered to be altered Mt. Read Volcanics (Mt. Lyell). Platinoids and nickel mineralisation are known in Cambrian ultrabasics and silver-lead mineralisation is known in Ordovician limestone. Tin has been won from the Devonian granites; from lodes in the Heemskirk Granite west of Zeehan and from alluvials in streams draining the Meredith Granite.

Within the most important host rocks, the Cambrian, mineralisation seems to be concentrated at a particular stratigraphic level. Orebodies at Mt. Lyell, Rosebery, Hercules and Mt. Farrell appear to be at a level in the Mt. Read Volcanics near the top of the Success Creek phase. Renison, Mt. Bischoff and King Island orebodies appear to be within and near the top of the Success Creek phase. Regardless of the arguments of ore genesis of specific deposits all the known orebodies in Cambrian rocks appear to be concentrated about this particular stratigraphic level.

The age of the orebodies is inherently a part of the genesis argument. However, whether the orebodies be the result of a concentration of syngenetic mineralisation, or whether they be wholly epigmetic or a combination of both processes, an abundance of evidence is available to suggest they were all deposited in their present form later than the N.W. cleavage and therefore almost certainly late in the Tabberabberan Orogeny.

The depth of oxidation of ores is extremely limited in most cases and varies according to their history of glaciation, length of time exposed and the topography. Sulphides outcrop where Pleistocene glaciation has scoured the deposits (Hercules, Rosebery, Chester) and also where the relief is extreme and rainfall high (Mt. Lyell). Away from the areas of Pleistocene glaciation and in lower relief, exposure to weathering has in many cases been longer than in the cases mentioned above and oxidation may extend as deep as 70 feet below surface (Renison, Savage River). Gossanous material was recovered from a Comstaff diamond drill hole, north-west of Renison, from 250 feet below surface. Insufficient correlative data are known at the present time to enable an interpretation of this fact.

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MINERALISATION WITHIN THE LICENCE AREAS

Silver-lead-zinc mineralisation is known two miles north-west of Renison in dark grey to black shales near the top of the Success Creek phase. Geochemical soil sampling closer to Renison has given anomalous values for silver, lead and tin. Tin mineralisation is present in Crimson Creek rocks at Exe River 2½ miles east of Renison.

The Chester pyrite deposit of 2 million tons (with minor copper) is in a schist zone in the Mt. Read Volcanics 4 miles north of Rosebery. At Pinnacles and Silver Falls, 2½ miles and 5½ miles respectively north of Chester, zinc, lead and silver mineralisation is present, once again in the Mt. Read Volcanics. These deposits are in rocks near the base of the Mt. Read Volcanics which places them stratigraphically near the top of the Success Creek Group.

At. Mt. Bischoff tin ore occurs near the top of a succession of thinly bedded grey quartzites, sheared dark grey to black shales, and grey dolomite, overlain conformably by tuffs, volcanics, mudstones and cherts. The structure is unknown but it is thought to be a WSW plunging anticlinorium with a width of at least five miles. Smaller folds with a similar trend are present on the limbs. Superimposed on the major structure are minor NE trending folds and NS trending faults that cause changes in plunge of the minor folds. The structure has been intruded by quartz porphyry dykes and sills which radiate from a centre near the summit of Mt. Bischoff. Tin is found as cassiterite in quartz porphyry dykes and sills, in sulphide lenses or concordant sheets in dolomite, in tensional fissure lodes and along tension joints.

Within two miles west and north-west of Mt. Bischoff are a number of small lead-silver prospects about which very little is known.

Eleven miles west of Mt. Bischoff is an area where Cambrian ultrabasics and volcanics and a small basin of Ordovician and Silurian sandstones, mudstone and quartzite have been intruded by the Devonian Meredith Granite. Platinoids and nickel ore have been won from the Bald Hill ultrabasic. Silver-lead ore has been won from sheared and altered ultrabasics at a number of prospects and from shales and limestones at Bells Reward. At Mt. Jasper copper ores have been won from ultrabasics. Recent work has led to the recognition of disseminated copper sulphides in "granitic" intrusives as well as in brecciated dacites and trachyandesites - a porphyry copper environment. Recent work has also led to the recognition of chalcopyrite, millerite (NiS) and linnaeite (Co_3S_4) in serpentinised ultrabasics.

Specimens of massive galena, said to come from Valentines Peak in the far north-east of the licence area, were brought to Waratah by a prospector during 1968. Valentines Peak is an area of Cambrian volcanics and pyritic shales and no previous record of lead mineralisation there is known.

At Rosebery lenses of barite are associated with the zinc-lead-silver orebodies. Near Mt. Read, at Mt. Sedgwick, Mt. Darwin and other localities a particular type of potassic lava was intruded by veins up to 200 feet wide of magnetite-hematite-barite, these components being primary constituents of the magma. "Extensive deposits" of barytes have been reported from the Mt. Block-Mt. Charter area in the Mt. Read Volcanics in the south-east of the licence. Lead-barium mineralisation is also recorded from Lynch Creek and Just in Time near the Huskisson River south-west and west of Silver Falls.

Low silver-gold values are recorded from Mt. Charter-Gold Hill near the eastern boundary of the licences. The values are claimed to occur in two belts of shearing within Cambrian sediments, pyroclastics and acid to intermediate intrusives, all of which have been partly silicified.

The chief minerals on record as having been won from alluvial or eluvial deposits are cassiterite, osmiridium, platinum and gold.

Bismuth mineralisation is recorded at Mt. Ramsay.

PREVIOUS WORK

In 1950 North Broken Hill Limited carried out a limited investigation of the Owen Meredith-Bon Accord area and the nearby Poseidon prospect north-west of Renison Bell. Results of this investigation are not on file in the Mines Department, but it has been recorded that the investigation was not complete at the time of its abandonment.

In the early 1950's Electrolytic Zinc Company examined the Godkin-Bell's Reward area 13 miles west of Waratah and are also believed to have examined the Silver Falls area. Five diamond drill holes totalling 3,157 feet drilled in the former area gave negative results and no records of work in the latter area are known.

From 1957 to 1961 Rio Tinto Australia Exploration and Electrolytic Zinc Company of Australasia jointly carried out an investigation in north-west Tasmania which included part of the present Comstaff ground. This investigation was chiefly related to the geological control of mineralisation, comprehensive stratigraphic and structural studies and palaeotectonic interpretations. This was followed by geophysical and geochemical surveys of specific areas. Only one of these areas, Chester-Pinnacles, is within the Comstaff licences. As no sub-surface work was done it must be concluded that results obtained were not encouraging and/or areas of higher priority existed elsewhere.

During the period 1963-1966 the Aberfoyle group held a lease on the south-western slopes of Mt. Bischoff. Acting on a geological interpretation of a NE-SW fault with the western block of sediments downthrown, four diamond drill holes were completed with negative results.

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In 1963 Mt. Costigan Mines Limited was granted EL5/63. Mt. Costigan was joined in 1964 by Broken Hill South Limited and Comstaff Pty. Limited formed to investigate the area which was subsequently reduced to its present size. Within the limits of the present licence work has been concentrated at Mt. Bischoff with a small amount of work being done at Renison Bell West, Exe River and Pinnacles. A small amount of geophysics and geochemistry was also done along the major road system in the area. Anglo American Corporation (Australia) Limited joined Comstaff Pty. Limited and assumed management during the 1967-68 field season, continuing the previously prepared field season programme.

Because of the belief of immediate mining possibilities at Mt. Bischoff exploration in the area has been dominated by this project. Diamond drilling to test for extensions of previously worked orebodies and exploratory holes to test theoretical geological interpretations has formed the major part of the Mt. Bischoff project. In December 1966 Broken Hill South Limited estimated reserves as indicated by drilling to be:-

(a) Sulphide lode 1,325,000 tons at 0.83% Sn.

(b) Porphyry Block interpreted in White Face Dyke 3,300,000 tons at 0.42% Sn.

Diamond drilling continued through 1967 and was discontinued in early 1968 to allow an appraisal of all known facts to be undertaken before deciding on the future of the project.

At Renison Bell West geophysics (I.P. and magnetics) in 1964 and 1965 was followed by soil geochemistry, 1965-68, and three inconclusive diamond drill holes, one drilled in 1965 and the other two in 1967-68. At Chester-Pinnacles an incomplete geochemical soil sampling programme has been in progress since 1965 accompanied by geological mapping during 1968.

At Exe River ground magnetics in an area of 1,000' x 500' was followed by one diamond drill hole of 600 feet drilled at 10^{o} below horizontal which gave low values for tin, lead, zinc and silver.

ASSESSMENT OF PREVIOUS WORK

Probably the most significant conclusion that can be drawn from various authors to date is that the known base metal orebodies of importance in north-west Tasmania all occur at approximately the same level in the stratigraphic column, viz. the top of the basal Cambrian Success Creek Group.

Geologists of R.T.A.E. who have carried out probably the most comprehensive geological investigation of the area suggested the name Owen Rift Fault for a wide zone of shearing which they claimed was dismembered by later cross faulting and was the northern extension of the

Great Lyell Fault Zone. The Owen Rift Fault was suggested as belonging to a system of faults which they said developed with thick accumulations of Cambrian volcanics. Movement was suggested as commencing in early Cambrian time and the fault rejuvinated in younger periods. The zone was recognised from Mt. Lyell to Rosebery and at Chester with no recognition between Rosebery and Chester.

The conclusion drawn from the above two points was that important mineralisation phenomena in West Tasmania were likely to have occurred in Cambrian time and were possibly related to an Orogenic phase separating the Cambrian basal sequence (Success Creek Group) and the massive volcanics (Mt. Read Volcanics) from the overlying sediments.

R.T.A.E.'s subsequent exploration programme and many others based on the above conclusions have to date failed to locate another mine. Subsequent geological work has also failed to substantiate the early Cambrian Orogenic Phase postulated by R.T.A.E.

The only indisputable point is the concentration of known orebodies about a particular stratigraphic level. How the orebodies were localised is problematical and will vary from body to body.

The R.T.A.E. programme was concentrated mainly in an area to the south of the present Comstaff licences with only a little work being carried out in the south-east of EL5/63. North Broken Hill Limited partly investigated a small area north-west of Renison Bell while Electrolytic Zinc Company did some work south-west of Cleveland and at Silver Falls. Various companies have examined Mt. Bischoff.

Within the present licences Comstaff's ground investigations have been concentrated (a) in an area of about one square mile north-west of Renison Bell, (b) in about three square miles between Chester and Silver Falls and (c) at Mt. Bischoff. An aerial Afmag survey was completed and some ground regional work was undertaken.

It is thus evident that very little of the licence areas have been systematically investigated.

EXPLORATION CONSIDERATIONS

Rugged topography, dense forest with thick undergrowth, high rainfall, and lack of access roads are the difficulties to be overcome in a regional examination of the licences to determine, with any degree of certainty, localities of interest. Difficulty of access is the main cause of the abnormally high cost of exploration when compared with other areas. Roads cost \$3,000 - \$4,000 per mile with two bulldozers taking an average of 10-12 days to complete one mile. Streams have to be cut open at an estimated cost of \$80-\$100 per mile and grid lines cut at an estimated cost of \$160-\$500 per mile, depending on the locality.

Coupled with the problem of access are the problems of physical hardship and emergency exit in the case of accident. It is considered that a field party consisting of six people should not remain in a field camp for more than one month at a stretch. Following this they should have a rest period of one week. With the continuous use of cutting implements accidents are an ever-present hazard. With the construction of access roads injured or ill people can be brought out by vehicle, either one based in the camp or one summoned by radio. With the use of a helicopter to establish and service camps in remote areas the helicopter can be summoned by radio in emergencies. One would hope the weather would not prevent such mercy flights.

An appraisal of the use of geochemistry in the area by Dr. F.W. Cornwall is attached to the report.

Close Interval Regional Drainage Geochemistry will undoubtedly work in the area free of glacial deposits, but is penalised by the lack of access. This could be overcome by dividing the licences into drainage basin areas of practical size with a base camp in each serviced by a helicopter. Such a programme would need a labour force of at least 50 people for two field seasons and cost something of the order of $350,000 to $400,000.

Geochemical soil sampling will have to be restricted to selected areas of high potential based on either geological consideration in relation to known mineral occurrences or over drainage anomalies. The main cost involved would be in line cutting.

Airborne geophysical methods can be used but they must not be height critical. Specialist advice on a possible method is needed but before being employed it should be demonstrated that known orebodies give a recognisable response by whatever method is recommended. Airborne magnetics outline the areas of known ultrabasics and suggest other localities of interest. An airborne Afmag survey by McPhar Geophysics Limited encountered "remarkably few anomalies". "There are few indications of the large anomalies that are typical of extensive fault and shear zones. This lack of response is unusual for an area with pronounced linears and the reported abundance of both pyrite and graphite. It would appear that any large faults in the area are non-conductive and that many of the sulphide bodies do not have enough electrical continuity to respond to inductive methods. The latter has been proven by ground test surveys on the Chester Mine". McPhar recommended three zones west of Waratah as primary targets and 14 zones elsewhere in the area as secondary targets. Considering that the Chester pyrite body - 2,000,000 tons of 40% sulphides - gave no response the results obtained must be inconclusive. However, the zones mentioned west of Waratah should be checked out on the ground.

REVIEW OF EXPLORATION TARGETS

Regional geological work must be devoted, as one stage of the programme, towards locating areas of outcrop of basal Cambrian sediments followed by an examination of the structural environment in which they are found. Geologically interesting zones can then be examined in further detail.

Two areas where work has been done in the past, but for different reasons, (a) west of Renison Bell and (b) Chester-Pinnacles-Silver Falls, are targets for this suggested approach. Two areas in the north of EL1/68 where the Cambrian-Precambrian contact is present (a) six miles west and north-west of Mt. Bischoff and (b) three miles east of Savage River, should also be examined.

During the past year geological examination of a previously neglected area (Mt. Jasper-Mt. Stewart) 13 miles south-west of Mt. Bischoff strongly suggests a far more detailed examination is warrented.

Aeromagnetics reveal high order anomalies in localities of known ultrabasics west of Pinnacles. This anomalous zone extends north along the Cambrian-Ordovician contact for about 15 miles before curving to the west into another area of known ultrabasics south-west of Mt. Bischoff. Old reports mention the presence of "iron capped lodes" and "gossanous material associated with serpentinites" in this zone.

Also the possibility exists for the location of basins of mineralised sediments within the Mt. Read Volcanics in the south-east of EL5/63 such as those at Hercules, Rosebery and Mt. Farrell.

Finally the enigma of Mt. Bischoff has to be satisfactorily solved.

Because of the physical difficulties involved all the above prospects cannot be examined in one field period of approximately four months. However, they should be exhaustively investigated at some time during the exploration programme for the examination of the Comstaff licences.

<u>B. McBRIDE</u>

Melbourne
6th November 1968
BMcB/GE

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COMSTAFF AREAS, TASMANIA

GEOCHEMICAL CONSIDERATIONS

1. INTRODUCTION

1.1 Regional Geological Setting

The Comstaff ground in Tasmania occupies an area of approximately 594 square miles in the north western portion of the State.

All the known mineral occurrences within ~~the~~ and adjoining Comstaff ground are associated with Cambrian Sediments and Volcanics.

In the Eastern part of the area the known massive sulphide deposits at Rosebery, Hercules and Farrell are located in tuffaceous shales in a sedimentary series within massive Pyroclastic rocks of the Mt. Read volcanics.

The Cleveland tin-copper deposit ten miles west of Waratah is located in argillaceous sedimentary rock of the Dundas beds and overlain by volcanics.

In the Renison Bell area tin mineralisation is located in folded sedimentary rocks of the Crimson Creek Formation which has been intruded by a quartz porphyry related to the Meredith Intrusive.

At Mt. Bischoff the tin mineralisation is associated with a swarm of quartz porphyry dykes intrusive into late Precambrian or early Cambrian sandstone shales and dolomite.

The quartz porphyry dykes are thought to be related to the Meredith granitic stock which crops out two miles south of Mt. Bischoff.

In the central, western and north western part of Comstaff ground the Cambrian sediments and volcanics have been intruded by Cambrian basic and ultrabasic rocks, some of which (i.e. Bald Hill and Mt. Stewart) have yielded osmoridium in alluvials draining the ultrabasics and occurrences of nickel sulphides, heazlewoodite and pentlandite, are reported from a large serpentine body near the Heazlewood River Bridge, 16 miles west of Waratah.

1.2 Topography, drainage, vegetation and soils

The area is characterised by a youthful topography with high relief and is drained by fast flowing incised rivers and tributaries, being an area of high rainfall all the rivers and most of the tributaries flow throughout the year.

A greater part of this area is covered by dense forest and closely spaced undergrowth making access to almost any area extremely difficult. Except for the larger rivers, access up the tributary drainage requires actual cutting of the dense undergrowth.

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In the Eastern Comstaff area - particularly around the northern extension to Rosebery, i.e. Chester, Pinnacles, Silver Falls area, the overburden is predominantly glacial boulder clay on hill slopes and alluvium filled valleys.

Shallow residual soils predominate in the western half of the area.

The depth of weathering of the underlying rocks is negligible and oxidation of existing deposits, even the massive sulphide deposits of Cleveland and Rosebery, is limited a few inches or feet.

1.3 General Geochemical Consideration

Ideally a geochemical drainage survey based on ½-¼ mile sampling of all the drainage in the area would be an effective method of reconnaissance exploration of the whole concession. Relatively close spaced sampling of all tributary drainage would be necessary in view of the youthful drainage pattern and lack of oxidation of the relatively narrow, sharply cut off orebodies. However, in view of the extremely difficult access throughout the area, where access roads cost $3,000-$4,000 per mile and the fact that all drainage has to be cut open at an estimated cost of $70 per mile, drainage reconnaissance over the whole concession would be too expensive to even contemplate by this method.

Geochemical soil sampling of the residual soil areas in the central and western part of Comstaff ground should be an effective method of exploring underlying tin and base metal deposits, but will have to be restricted to selected areas of high potential based either on geological considerations in relation to known mineral occurrences or over drainage anomalies. The cost of soil sampling will be expensive due to the high cost of road access to any area and high cost of line cutting on geochemical grids. Line cutting cost will average not less than $160 per mile.

The major cost of either drainage reconnaissance or soil sampling will therefore be the cost of road access and drainage or line cutting.

In the glaciated areas the effectiveness of soil sampling will be limited to those areas where it is possible to auger through the glacial overburden to or near the underlying weathered bedrock.

At best this procedure is fraught with difficulties as glacial overburden is of variable thickness and large boulders are present within the till. The interpretation of the results under these conditions will not be easy. It is recommended that orientation surveys be conducted over known occurrences in the glaciated areas to test the effectiveness of Ao zone sampling in the decomposed vegetative zone at the top of the soil profile, to determine whether this material has accumulated any of the indicator elements.

The present method of augering through the till overburden appears to be intermittently effective as some of the holes on some of the lines appear to penetrate the overburden sufficiently to give a geochemical response. Anomalies are therefore partially discontinuous, though they will serve the purpose of broadly outlining an anomalous area which can then be followed up by I.P. and or trenching.

In the residual soil areas soil samples should be collected at approx. 15" below the surface by digging holes with a pick mattock and taking the soil samples with a truncated builder's trowel in soil above bedrock.

In view of the extremely steep topography in many places, there is a distinct danger of anomalies becoming displaced by soil creep, landsliding or slumping, and in some instances may even be buried if the underlying ore-shoots are located in nearby valleys covered by barren colluvium.

When a soil anomaly has been outlined it will be advisable to study its position in relation to the topograpny in designating the follow up procedure whether by I.P. or trenching and diamond drilling.

For example, a down slope displaced anomaly should be followed by an I.P. survey and the bedrock trenched to expose the ore before diamond drilling is attempted.

2. SAMPLING AND LINE INTERVALS

In glaciated terrain where auger sampling is proposed in the Chester-Silver Falls area north of Rosebery a line interval of 500' and sample interval of 50' is recommended.

In the residual soil areas initial sampling lines should be spaced at not more than 1,000' preferably 500', and samples taken at 100' intervals on these lines. Lines to be located across the expected strike. If no information is available on expected strike of mineralisation a box grid pattern is recommended as in the Mt. Jasper copper area.

3. ACCESS

In view of the high cost of access by road construction, an investigation should be made into the use of helicopters as a main source of access to the isolated areas, perhaps combined with the use of boats on the main rivers.

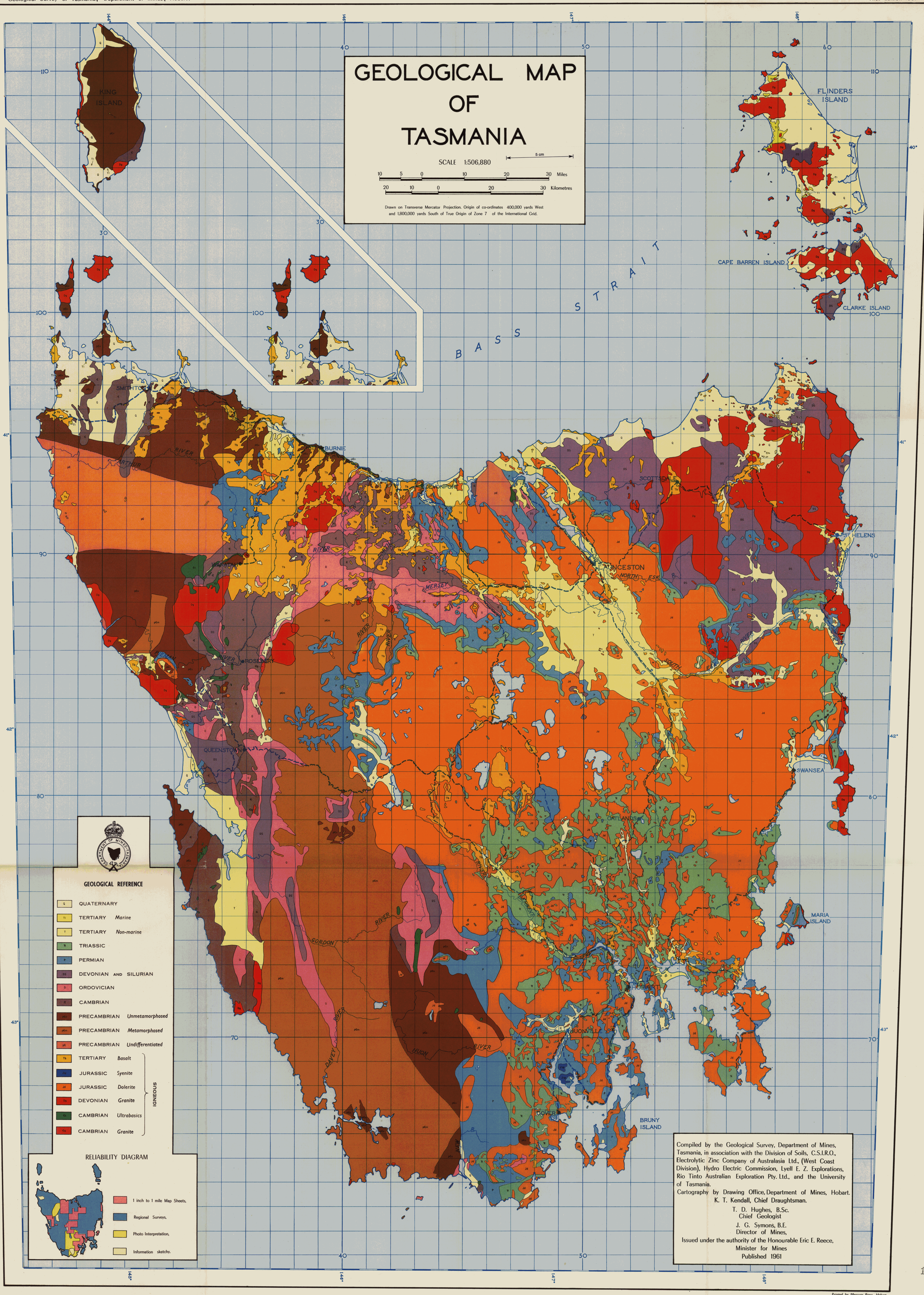
DR.F.W.D. CORNWALL

Melbourne
21st October 1968

099017 017 PLATE I

PLATE 2

First Edition 1961



Printed by Mercury Press, Hobart