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EL 76/87

Scamander, eastern Tasmania

REVIEW OF GEOLOGY, PREVIOUS EXPLORATION AND PROSPECTIVITY

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89-2953

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SUMMARY

EL 76/87 includes most of the Scamander Mineral Field, a zoned sequence of sub-economic tin-tungsten, base metal and silver-gold quartz vein deposits in Lower Palaeozoic turbidite sediments within the metamorphic aureole of the Devonian Blue Tier batholith. Historical production for the field is about 80 tonnes copper, 3 tonnes metallic tin, 1 tonne of tungsten and about 10 000 oz of silver. None of the deposits is presently being worked.

Following discovery and early mining between the 1870s and early 1900s, the field remained virtually neglected until the late 1950s when a period of intensive exploration began. Several major companies thoroughly explored the area for tin-tungsten and base metals. Only BHP remains in the district, with a 10 km^2 EL (12/78) within EL 76/87 covering several of the tin and base metal prospects.

The EL is virtually unexplored for gold despite its widespread if minor occurrence at several prospects. Recent assays of ore from two of the silver mines near Scamander confirm its early reported presence. There is an obvious need to undertake detailed gold assessments of known prospects, and several untested gold plays which have wide application in northeastern Tasmania can be generated in a search for new gold deposits.

The area is not prospective for primary tin-tungsten or base metals, or placer deposits of gold or other heavy minerals. A low prospectivity play exists for alluvial tin in a Tertiary deep lead.

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INTRODUCTION

AREA, LOCATION AND ACCESS

EL 76/87 covers 250 km² of Tasmania's northeastern coast between Scamander and St Helens. About one-third of the licence lies offshore and is not considered further in this review.

Access to the district is via the Tasman Highway from Hobart (300 km) or Launceston (200 km) to Scamander or St Helens. The coastal and central parts of the EL are well-served by a network of sealed and unsealed secondary roads, many of which provide access to the Forestry Commission plantations. Parts of the west and northwest have limited access.

West of the coastal zone, the EL is rugged, with steep youthful valleys. Vegetation is either Pinus radiata plantation or open schlerophyll eucalypt forest.

LAND TENURE (Figure 1)

EL 76/87 comprises	km²
• Tasmanian territorial seas	104.6
• State Forest (green on Figure 1)	98.0
• Private property (yellow)	41.3
• Crown land (white)	6.4
and excludes	
• EL 12/78 (BHP)	10.0
• St Helens Point State Recreation Area (orange)	10.7
• Scamander Coastal Reserve (orange)	2.5
• Crown Reserve (orange)	0.1
• part of Mining Lease 85M/80	0.1

PREVIOUS LITERATURE

Numerous mining company and other geological reports dealing with the area are held by the Tasmanian Department of Mines. They comprise

- 1886-1911 — Early reports by government geologists on the geology, mines and prospects of the area
- 1911-c.1950 — Occasional reports by government geologists

• 1964-present	Technical reports by government or University geologists
• 1959-present	Many company progress, annual, final and relinquishment reports now held on Open File in the Department of Mines. These number more than sixty.

The detailed perusal of some Open File reports, possible newspaper articles and other documents such as original mine plans, is outside the present scope of this prospectivity review.

The most important reports are mentioned in the text and listed in the References.

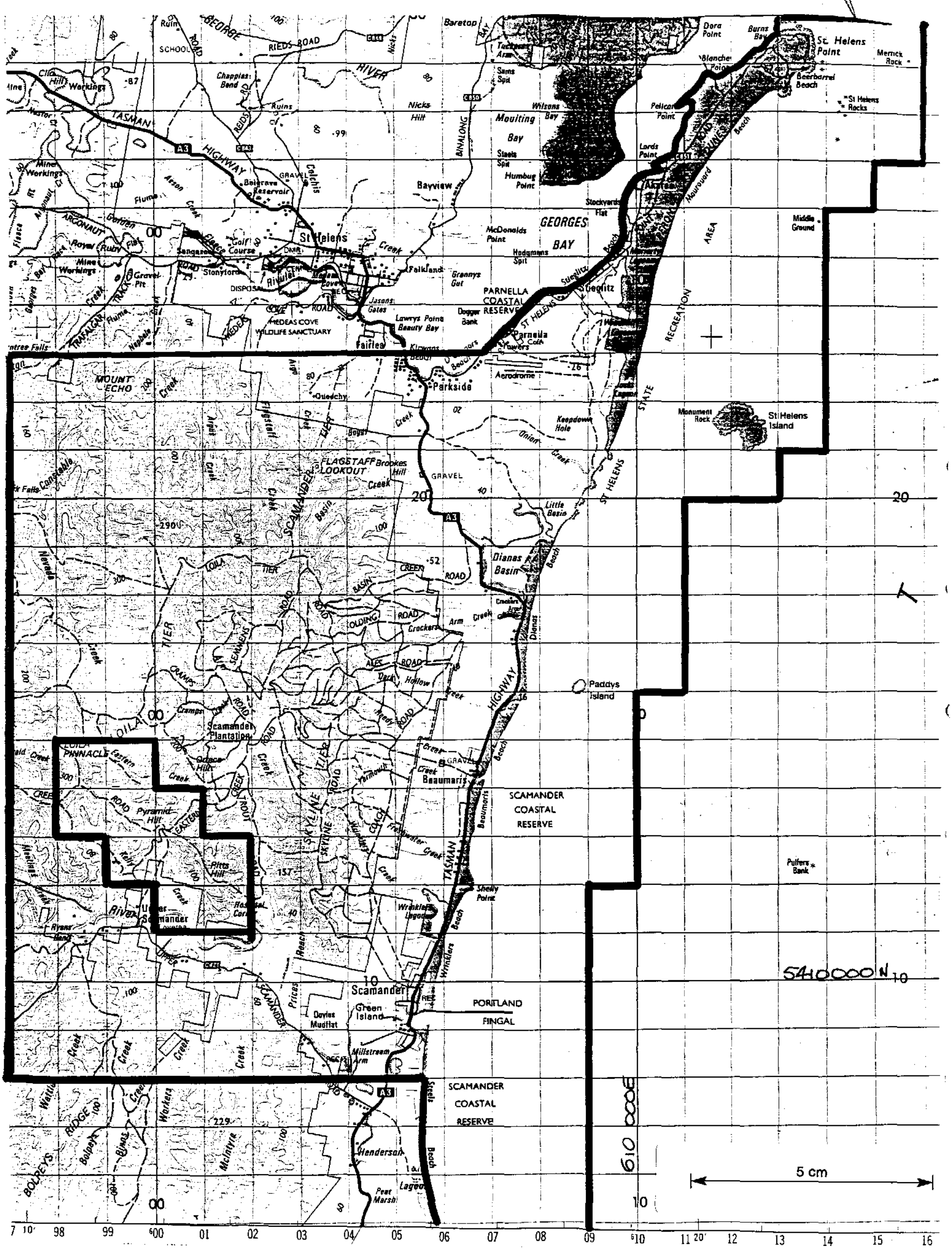


Figure 1 EL 76/87 Land tenure (1:100 000). Green = State forest; yellow = private land; orange = State reserves; white = crown land.

GEOLOGY

REGIONAL GEOLOGICAL SETTING

Tasmania is the southern extremity of the Tasman fold belt system of Palaeozoic-Mesozoic age. In northeastern Tasmania the dominant rock types include the Mathinna Beds (a Palaeozoic turbidite sequence) and a suite of Upper Devonian granitic rocks which intrude them and which give rise to the tin-tungsten and possibly the gold-silver mineralisation of the area (Figure 2).

Several stages of deformation, uplift and erosion have occurred subsequent to granitic intrusion of the Mathinna Beds. The granites now crop out over more than 2500 km^2 as the Blue Tier Batholith (1800 km^2) and Scottsdale Batholith (750 km^2). The granites and the Mathinna Beds are unconformably overlain by sub-horizontal Permian and Triassic sediments, and locally by Triassic lavas. Jurassic dolerite sills have intruded the Mesozoic sediments, and Tertiary sediments and basalts occupy extensive areas. Recent sediments are confined to valleys and coasts.

The granitic rocks range in composition from granites to granodiorites with associated adamellites, monzonites and minor aplites and diorites. Radiometric ages (Groves, 1977) range from 321-375 my (Upper Devonian). Field relations suggest the granitoids occur extensively at shallow depth beneath exposed Mathinna Beds and recent work (Turner et al, 1986) suggests they may include high-level intrusives and even sub-aerial extrusives.

The Mathinna Beds probably range in age from Early Ordovician to Early Devonian. They are poorly exposed, but consist predominantly of unmetamorphosed sandstone to finely laminated sandstone deposited as a turbidite succession in a NE-SW trending trough adjacent to a Precambrian block to the west. The Mathinna Beds were deformed during the upper-Middle Devonian Tabberabberan Orogeny into a series of major, superimposed NNW-SSE trending folds with wavelengths of several kilometres, and later modified by folding during granitic emplacement.

TENEMENT GEOLOGY

Although the dominant rock type on the EL is the Mathinna Beds, the tenement partly straddles the southeastern boundary and 2 km wide contact aureole of the Blue Tier Batholith, which itself is comprised of several petrologically

distinct granitic bodies. The granitic rocks are regarded as being responsible for virtually all the primary mineralisation of the area, and they probably extensively underlie the Mathinna Beds at shallow depth.

Widespread deposits of unconsolidated Tertiary and Quaternary sediments crop out in the NE of the EL near St Helens, and near Scamander.

The geology of the area is summarised in Figure 3 (back pocket).

Siluro-Devonian Mathinna Beds

These rocks are usually poorly exposed. However, three lithological successions can be recognised: dominantly sandstone, dominantly sandstone and mudstone, and dominantly mudstone. Massive quartzite beds are locally common, where silicification seems to be related to mineralisation proximal to granitic intrusions. Metamorphism reaches spotted hornfels grade within the aureole of the granite, but is only minor adjacent to the Scamander Tier Dyke (Figure 1).

Folding in the Mathinna Beds trends NW-SE with wavelengths of about 3 km with superimposed minor folding and slaty cleavage. However, bedding is the dominant planar structure. An extensive series of NW-trending fault zones up to 3 km long is sub-parallel to fold trends. A second extensive set of tensional fractures with no preferred orientation but generally striking 20-100° and perpendicular to bedding seems closely related to mineralisation. This set probably evolved with regional folding and later reactivation during granitic intrusion.

The 1:50 000 geological map of the area (McClenaghan et. al. 1987) shows few faults. However, figure 3 includes some structural lineaments of the EL interpreted from air photos for this review.

Upper Devonian Granitic Rocks

On petrological and structural criteria, Cocker (1977) subdivided the granitic rocks in the St Helens area (Figure 3) into

- the George River Granodiorite
- Constable Creek Granite
- Scamander Tier Granodiorite
- Grant Point Granite
- Akaroa Granodiorite

Minor spatially associated dyke rocks include monzonites, aplites, spessartites and tholeiitic dolerites, some of unknown but demonstrably pre-Permian age. The granitoids are locally characterised by magmatic layering and mineral alignment. Mechanics of intrusion for each of the main granitic types are unclear, but the George River Granodiorite seems to have been emplaced by forceful stoping, and the Scamander Tier Dyke by forceful dilation. The Dyke is a prominent feature of the EL, up to 500 m wide, tapering southwards for 15 km from Georges Bay and locally hosting Ag-Pb-Au mineralisation.

The granitoids are calc-alkaline rocks which seem to have developed as separate magmas from the partial melting of different source rocks - the George River, Scamander Tier and Grant Point bodies from igneous sources, and the Constable Creek and Akaroa bodies from sedimentary sources.

The circular outcrop pattern of the Akaroa Granodiorite and Grant Point Granite suggests high level emplacement - possibly as a caldera. A similar mode of origin has been recognised by Turner et. al. (1986) for the St Mary's Porphyry, an Upper Devonian granodiorite immediately south of the EL.

Metamorphic effects of the granitoids vary - from minor in the case of the Scamander Tier Dyke, to a metamorphic aureole up to 2 km wide associated with the Constable Creek Granite. The Constable Creek pluton may be a sheet-like body dipping gently eastwards under the Mathinna Beds (Groves 1972), and giving rise to a wide aureole which has locally produced indurated quartzites and spotted hornfels.

Tertiary and Quaternary sediments

The Tertiary rocks consist of discontinuous, partly consolidated deposits of conglomerate, gravel, sand and derived lag unconformably overlying older rocks. Detrital material is largely derived from the Mathinna Beds. Two types of deposits are recognised -

- beach deposits of coarse sand and fine gravel, and
- valley fill of poorly sorted conglomerate, sand, clay and gravel.

Immediately north of the EL, Thureau's Deep Lead (Jack, 1964 [b], Jennings, 1968), a buried channel of the ancestral George River, contains up to 90 m of interbedded Lower Tertiary sand, gravel and interbedded basal lava, with stanniferous horizons near its base. The Lead and surrounding areas have been

successfully worked for alluvial tin. Whereas the George River may have flowed through Steiglitz during the Tertiary (Cocker, 1977), the Scamander River might have flowed south from its present course - through Henderson Lagoon where the Tertiary sediments of the area may in part represent a deep lead system (Jennings, 1968).

The Quaternary deposits of the EL consist of coastal dunes, river bars and alluvial flats, some derived from the reworking of Tertiary deposits.

MINERALISATION

REGIONAL SETTING

Figure 4 (reproduced from Collins and Williams, 1986) is a schematic east-west geological cross-section of Tasmania showing the styles of mineralisation associated with various metallogenic deposits. Northeastern Tasmania is represented on the right hand side of the diagram. Primary economic mineralisation in the province is dominantly either

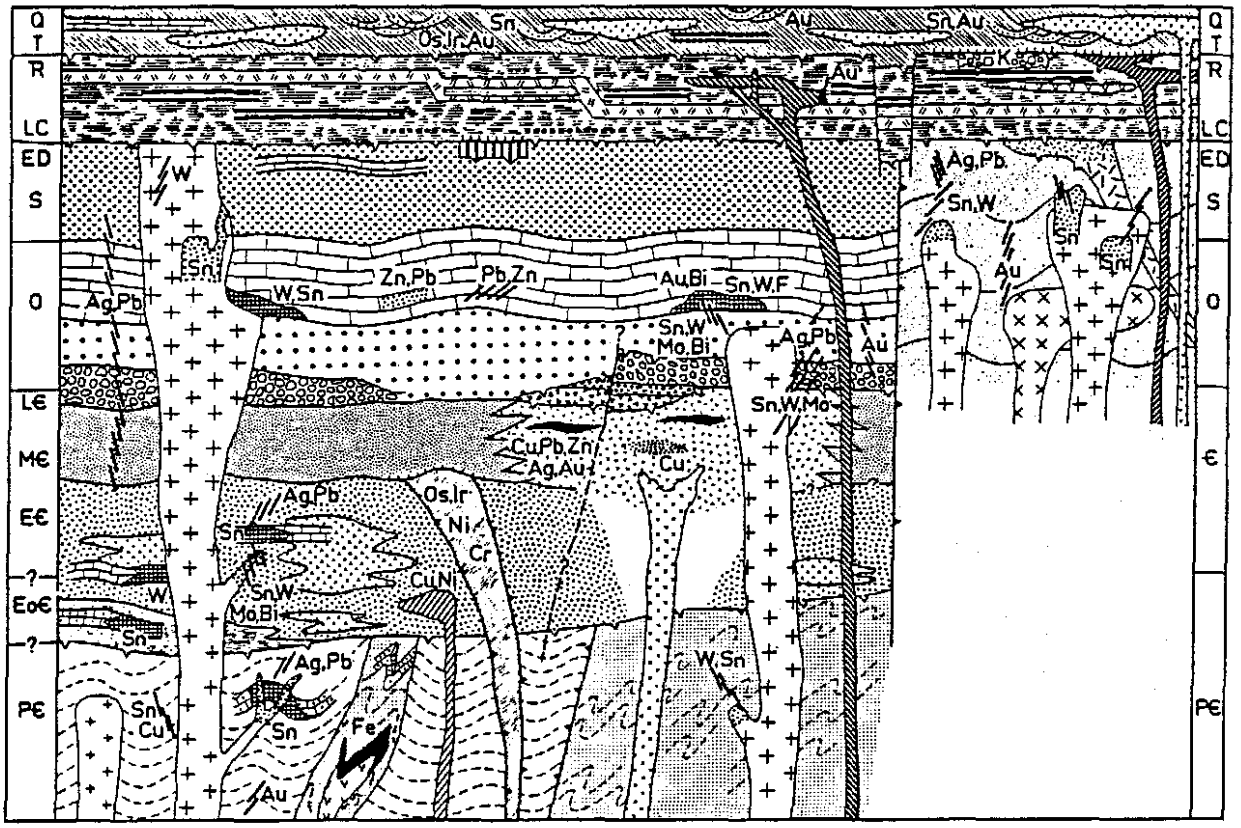
- disseminated tin in greisenised muscovite-biotite granite, and associated tin-tungsten bearing quartz veins in the Mathinna Beds in the metamorphic aureole of the granite, or
- gold and minor silver in quartz veins in the Mathinna Beds and granodiorite, probably related to granodiorite.

Alluvial tin and gold deposits derived from these primary mineralisation styles are concentrated in the Tertiary sediments, with minor reworking into the Quaternary.

Northeastern Tasmania has been a major producer of tin (about 50 000 tonnes) and gold (about 30 tonnes), and a minor producer of tungsten, silver and lead.

PRIMARY MINERALISATION

Mineralisation is widespread on the EL, which surrounds and includes most of the known base metal deposits of the Scamander Mineral District. The primary mineralisation consists predominantly of small, discontinuous, cross-cutting sulphide-bearing hydrothermal quartz lodes of variable mineralogy in both the Mathinna Beds and the granitic rocks.



QUATERNARY–TERTIARY
Glacial and fluvial deposits, minor limestone
Basalt
CRETACEOUS
Conglomerate, Sandstone
Syenite / Appinite
JURASSIC
Dolerite
TRIASSIC – LATE CARBONIFEROUS
Glacial, marine, freshwater sequences (• • • oil shale —— coal measures) Parmeener Super-Group)
MIDDLE – LATE DEVONIAN
Altered Granite
Granite / Adamellite
Granodiorite
Porphyrite (St Marys Porphyrite)
MIDDLE DEVONIAN
Speleologic deposits
EARLY DEVONIAN/ORDOVICIAN (E.Tas)
Quartzwacke, mudstone (Mathinna Beds)

EARLY DEVONIAN – SILURIAN (W.Tas.)
Quartz sandstone, mudstone, minor limestone (Eldon Group)
ORDOVICIAN (– LATE CAMBRIAN) (W.Tas.)
Limestone, mudstone (Gordon Limestone)
Quartz sandstone
Siliciclastic conglomerate, sandstone (Owen Conglomerate)
CAMBRIAN – EOCAMBRIAN
Conglomerate,sandstone, Volcanic–volcaniclastic sequences (Tyndall Group)
Mainly felsic volcanics with associated granitoids (Mt Read Volcanics)
Mudstone, greywacke, turbiditic conglomerate (Dundas Group)
Mudstone, greywacke with tholeiitic basalt and minor limestone (Crimson Creek Formation)
Sandstone, mudstone, dolomite (Success Creek Group)
Serpentinized ultramafic complex
Dolerite – gabbro
PROTEROZOIC
Sandstone, mudstone with basalt and dolomite/magnesite (Rocky Cape region)
Quartzite, schist – metamorphosed Precambrian (Tyennan region)
Granite / Adamellite

Transitional, intrusive boundary
Unconformity
Erosional surface
Fault

MINERAL DEPOSITS
Alluvial, eluvial
Veins
Skarn, replacement
Massive sulphide/oxide
Disseminated (greisen and volcanogenic)

Figure 2 Schematic geological cross section of Tasmania and mineral deposits associated with various metallogenic episodes (from Collins and Williams, 1986).

The mineralisation exhibits a seemingly marked regional zonation, similar to the classical zoned deposits of Cornwall and Zeehan, and probably related to the granitic rocks and metamorphic aureole of the Blue Tier Batholith. Many workers including Groves (1972) recognised several zones, schematically shown in Figure 1, and from the granite outwards, consisting of

- a tungsten zone : W-Mo-(Sn)-(Bi)
- a tin zone : Sn-(Cu)-(Zn)
- a copper zone : Cu-Pb-Zn
- a silver-lead-zinc zone : Ag-Pb-Zn-(Au)

A small group of quartz-gold-silver vein deposits about 10 km west of the EL is probably unrelated to this zonation.

Various small mines and prospects developed in the late 1800s on the mineral deposits of the district. Names and locations of the more important ones are shown on Figure 1, and pertinent geological aspects of each are summarised in Table 1. Most of the mines and prospects proved to be uneconomic or subeconomic; all are abandoned but most have been reassessed by various mining and exploration companies in the past thirty years.

The silver-lead-zinc deposits are unusual in that they are hosted not in the Mathinna Beds but in the altered granodioritic rocks of the Scamander Tier Dyke, and have received virtually no attention from recent exploration companies.

PLACER MINERALISATION

Alluvial tin in Tertiary sediments has been the only significant placer mineral in the district. The tin is derived from the tin-bearing granites of the Blue Tier Batholith. Extensive workings occur immediately north of the EL, notably in the sediment-filled lead system of the ancestral George River and tributaries (Jack, 1964[b]).

There are minor placer tin deposits on the EL in the valley of the present Scamander River. These were explored at the turn of the century but were soon abandoned, and again briefly in the 1950s.

HISTORY OF MINING AND EXPLORATION

The district has undergone two phases of mining history -

- an early period of small-scale mining, mainly from 1875-1900, and
- a post-1950 phase of exploration by large mining companies.

Table 1 Summary of Mines and Prospects of the Scamander Mineral Field within EL 76/87

Mine or Prospect	Ore Mineral	Geology/host	Style of Mineralisation	Ore Minerals	Grade	Remarks
Echo	tungsten-tin	Granite-Mathinna Beds contact	quartz veins in both rock types	wolframite, molybdenite, bismuthinite, scheelite, arsenopyrite, pyrite	1% WO3	Production: 1 tonne wolframite; main vein (of 40 over 170 m strike) up to 2 m wide.
Lutwyche	tungsten	Mathinna Beds	thin quartz veins in indurated sandstone	wolframite, molybdenite, pyrite, chalcopyrite	unknown	veins up to 0.5 m thick. Mineralisation patchy.
Great Pyramid	tin	Mathinna Beds	thin tin veins and stockworks some disseminated in breccias	cassiterite, pyrite, chalcopyrite	0.9% Sn	Within BHP's current EL. Production 1928-36 was 3 tonnes of tin. Intensive recent exploration by BHP indicated up to 8 m tonnes grading 0.15% Sn
Pinnacles (east and west)	tin	Mathinna Beds	thin, discontinuous quartz veins	cassiterite & sulphides	unknown	Explored and drilled by BHP in 1965. Within BHP's current EL
Lolla Tier	tin	Mathinna Beds	quartz veins in and subparallelled to fault zone	cassiterite, arsenopyrite chalcocite, covellite chalcopyrite, galena, sphalerite	locally 2-4% Sn	Mineral zonation evident along 1.5 km fault zone trending NNW
Orieco	copper	Mathinna Beds	numerous subparallel fractures within major NW-trending fault zone	chalcopyrite, pyrite, arsenopyrite, sphalerite, galena, pyrrhotite, bornite + supergene sulphides and oxides	up to 28%	Production (all pre-1911) 450 tonnes ore averaging 15-28% Cu. Extensive workings; some detailed studies of ore mineralogy. Extensive gossans.
North and South Orieco	copper	Mathinna Beds	fractures subordinate to main fault zone	arsenopyrite, pyrite, sphalerite	unknown	Partially drilled in 1941. Gossanous
Paul Beahr's	copper	Mathinna Beds	As for Orieco	As for Orieco	unknown	On Orieco fault zone; gossanous
Dunns	copper	Mathinna Beds	Disseminated ? sulphides in sedimentary units	As for Orieco	up to 0.15%	On fault zone parallel to Orieco fault zone; lode 0.3 m wide.
Ringarooma, North Ringarooma	copper	Mathinna Beds	As for Orieco	No data	unknown	Gossanous
North Scamander	copper	Mathinna Beds	Numerous, thin mineralised quartz veins trending WNW, and partial replacement of shales	sphalerite, pyrrhotite, magnetite, pyrite, chalcopyrite	up to 1.7% Cu	Magnetite unique. Some recent investigations
Silver Echo	copper	Mathinna Beds	Mineralised quartz pod in contact aureole adjacent to granites	pyrrhotite, chalcopyrite, pyrite, cuprite	up to 0.3% Cu	Gold in assays up to 26 g/t
Scamander	silver, lead, zinc	20 m thick dyke of altered granodiorite and porphyry	Quartz filled fractures in granodiorite, some disseminated mineralisation	Dom. arsenopyrite, pyrite, sphalerite, galena; all silver-bearing	up to 280 g/t Ag	Production to 1893 about 1500 oz silver
Scamander Bell and Beulah	silver, lead, zinc	Granodiorite and porphyry	As above	As above	up to 3000 g/t Ag (Beulah)	Production at Beulah in 1897 was 4500 oz silver
Yarmouth	silver, lead, zinc	Mathinna Beds	Quartz-filled fractures	As above	Up tp 1400 g/t Ag	

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EARLY MINING HISTORY

Copper and silver mineralisation had been known in the district for "some years" before 1886 when Thureau (1886) reported on the silver mines in the Scamander area. He visited the Scamander, Scamander Bell, Beulah and Yarmouth workings, describing their mineralogy and the occurrence in each case of free gold with the silver. Assays reported by Thureau ranged from 6000 g/t silver and 15 g/t gold in the Scamander Mine, to 60 g/t gold and "a considerable percentage of silver per ton" in the Yarmouth workings. Thureau's report and maps were printed for public use.

The silver mines were visited by Montgomery (1893) in October 1892. He reported that very little mining had been undertaken in the district, the most extensive being that of the Scamander River Silver Mining Company. At the time of Montgomery's visit, however, the main shafts of the Scamander mine (up to 45 m deep and partly below sea level) were flooded and abandoned. Chip samples of quartz ore from the mine dumps gave assays of up to 1200 g/t silver, "distinct traces" of gold and 6% lead. Montgomery recommended dewatering and further exploratory mining.

Harcourt-Smith (1897) reported on several mines and deposits in the Scamander area. He visited the various workings then operating in the copper zone, including the Orieco Mine and North Scamander prospect, and the Beulah silver mine operated by tributors but owned by the Beulah Silver Mining Company. He described the workings at Orieco in detail, noting that one sample assayed 2% copper, 250 g/t silver and 3 g/t gold. A similar gold assay was obtained from the North Scamander workings. Harcourt-Smith also reported gold in the Beulah silver workings, and from 2-20 g/t gold at Yarmouth where work had been stopped by water ingress.

Waller (1901) reported in detail on the mines in the area, including the copper and tungsten deposits, and alluvial tin northwest of St Helens and in the Scamander River. Waller was not encouraged by the small reserves and low grades of alluvial tin indicated in the Scamander River by the then recently-formed Scamander Tin and Gold Mining Company.

Twelvetrees (1911) published the then most definitive report on the Scamander Mineral District, describing in detail the geology and mineralogy of all the major mines and prospects - most of which were by then abandoned.

The first phase of mining in the area lasted perhaps 25 years, proving the widespread distribution of subeconomic copper, tin, tungsten, silver and gold. In the period 1910-1940 the largest producer was the Great Pyramid Tin Mine, discovered in 1909, and worked intermittently until 1936 producing 3 tonnes metallic tin from 330 tonnes of ore.

RECENT EXPLORATION HISTORY

General comments

Since the 1950s the area covered by the present Licence has been partly included in exploration licences held by various, often large, mining companies. Exploration activity is summarised in Table 2. Most of the results of this exploration effort are recorded in numerous Open File Company Reports held by the Department of Mines. In addition, aspects of the Scamander Mineral Field have been the subject of various technical reports - principally in Mines Department publications. Those most relevant to the present study are listed in the Bibliography and include, since 1964 :

Jack (1964 a)	Great Pyramid Tin Mine
Jack (1964 b)	alluvial tin near St Helens
Jennings (1968)	alluvial tin in Scamander River
Groves and Baker (1971)	mineralogical studies of ores in area
Groves (1972)	zonation of mineral deposits in area
Groves (1977)	geology of the Blue Tier Batholith
Cocker (1977)	geology of the St Helens area
McClenaghan et al (1987)	1:50 000 geological map of area

Electrolytic Zinc Company Ltd.

EZ's work in the late 1950s on EL 2/59 included a regional aeromagnetic survey of much of north-eastern Tasmania. Several anomalies were recorded within the present EL 76/87, including the Great Pyramid Tin Mine, the Yarmouth Creek area, and Paul Beahr's and Cramp's Prospects (Figure 3). Subsequent follow-up ground checking at Great Pyramid confirmed an 1850 gamma anomaly related to magnetite associated with sulphides. Assays of sulphides yielded (among other metals) 0.2 g/t gold in magnetite-rich specimens. Dewatering and follow-up geophysics was recommended but apparently not attempted.

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Table 2 Summary of previous exploration within or near EL 76/87 (Adapted from Ruxton, 1984)

COMPANY, YEAR AND PROSPECT	WORK COMPLETED	RESULTS/COMMENTS
Rio Tinto 1957 Scamander Flats	- alluvial testing for tin	
Lyell-E.Z. 1959-1962 Fingal-Scamander	- airborne magnetics, E.M. - follow-up anomaly, North Scamander - I.P., ground magnetics, McPhar R.E.M. rock sampling, 1 DD hole of 50 m at North Scamander	- hole at North Scamander intersected 2 m of 1.5% Pb, 4.4% Zn, 0.1% Cu, 30 ppm Ag at 40 m. No Sn or Au analyses
B.H.P. 1965 North Scamander Pinnacles	- rock chip sampling, soil sampling - magnetics, soil sampling, 6 shallow percussion holes	- dump samples returned values less than 0.01% Sn
Austminex 1965 Scamander regional	- stream samples (Sn, Zn, Cu, Mo, heavy metals)	- no significant anomalies outside known areas
Consolidated Goldfields 1967 Loila Tier	- dug pits, costeans	- Sn, W mineralisation similar to Pyramid
Geophoto (Texins) 1969 Scamander regional	- stream sampling (Mo, Bi, Cu, Pb, Zn, Ag) - airborne radiometric survey - digital fracture analysis	- digitized data for Tl^{208}, Bi^{214}, K^{40}, Pb, Zn, Mo, Ag, Bi
Geophoto (Texins) 1970 South Pyramid	- trenching, rock chip samples (78)	- Sn range 0.05-1.18% Sn
Geophoto (Texins) 1970-1971 Constables Creek/Echo	- soil sampling (Mo, Bi, W, Sn) - 5 DD holes - Cobra drill rock sampling	- narrow intersections low grade Sn (to 0.3%) W (to 0.2%), Bi (to 0.2%), to 70 ppm Mo
Geophoto (Texins) 1971-1972 Lutwyche	- gridding, trenching, rock chip sampling (Mo, Bi, Sn, W) - 4 DD holes (Cu, Mo, Bi, W, Sn)	- some high grade patches tungsten - narrow quartz veins
Geophoto (Texins) 1972 Wolfram Creek (Baden Powell?)	- gridding, soil sampling (Sn, W, Mo, Bi) - Cobra drill sampling	- soils consistently going 0.14% Sn
Scamander Mining 1970 Orieco Mine	- regional mapping - rock sampling (Cu, Pb, Zn) - 2 DD holes	- no Sn results; narrow massive sulphide intersections
BHP-Shell 1978-84 St Helens-Scamander	- regional mapping, structural lineaments, soil sampling, airborne magnetics, rock chip (Sn, W)	- no significant results in relinquished area
BHP 1984 Great Pyramid area	no released data	no released data

BHP

During 1964-65, BHP conducted a mapping and drilling programme at the Great Pyramid Tin Mine. Twenty-three percussion holes, and one diamond drill hole were completed. BHP relinquished the area because it considered reserves too small.

Texins Development Pty Ltd

From 1969 to 1974, EL 6/68 included much of the present EL 76/87 with the exception of the eastern third. The licence was granted to Texins Development Pty Ltd and explored by Geophoto Resources Consultants. Both companies were subsidiaries of Texas Instruments. Geophoto conducted a comprehensive exploration programme, including literature research, photogeology, geological reconnaissance, regional gamma ray spectrometry, drainage geochemistry, digital fracture analysis and where necessary, follow-up prospect assessment including gridding, mapping, geochemistry, geophysics, sampling and drilling at several old workings.

Geophoto's regional drainage geochemistry involved 1613 samples assayed for Cu, Pb, Zn, Ag, Mo and Bi. Anamolous zones were shown to correspond broadly to areas of known mineralisation. Geophoto's prospect assessments are summarised as follows (Mortimore, 1974) as an example of the generally thorough exploration of the district:

- Great Pyramid : immediately south of Great Pyramid Tin Mine (held by others); gridding; 400+ rock chip samples assayed for Sn, some for Cu, Zn, Ag. Not encouraging.
  Prospect abandoned.
- Loila Tier : held under mineral lease to other parties. Literature review.
- Lutwyche : rock geochemistry - 57 samples assayed for Sn, W, Mo, Bi
  : gridding (7000 m), mapping, soil geochemistry of 275 samples assayed for Sn, W, Mo, Bi.
  : diamond drilling - 4 holes totalling 900 m assayed for Cu, Mo, Bi, W, Sn. Poor grades and reserves
  : Prospect abandoned.
- North Scamander : soil and rock geochemistry - 42 samples assayed for Cu, Pb, Zn, Ag.
  : gridding (25 000 m) and mapping

: soil geochemistry - 826 samples assayed for Cu, Pb, Zn, Ag
: Reconnaissance VLF
: rock geochemistry - 68 samples assayed for Cu, Pb, Zn, Ag
: Results indicate low-medium grade, small tonnage lead-zinc deposit. Prospect abandoned.

- Pinnacles : gridding (3000 m)
: soil geochemistry - 90 samples assayed for Cu, Pb, Zn, Ag, Mo, Bi, W, Sn. Encroached into then-current mining lease and not followed up.

- Silver Echo : soil geochemistry - 20 samples assayed for Cu, Pb, Zn
: results discouraging; prospect abandoned.

- Upper Scamander : stream geochemistry - 140 samples assayed for Cu, Pb, Zn, Ag, Mo, Bi.
: gridding (1500 m)
: soil geochemistry - 560 samples assayed for Cu, Pb, Zn, Ag
: IP survey (4000 m)
: Diamond drilling - 2 holes totalling 250 m assayed for Cu, Pb, Zn, Ag, Co, Ni, Cd, Sn
: results inconclusive. Prospect abandoned.

- Wolfram Creek area : stream geochemistry - 120 samples assayed for Cu, Pb, Zn, Ag, Mo, Bi, W, Sn.
: rock geochemistry - 12 samples assayed for Mo, Bi, W, Sn
: gridding (7000 m)
: soil geochemistry - 225 samples assayed for Mo, Bi, W, Sn
: Cobra rock drilling - 27 samples assayed for Mo, Bi, W. Sn
: results discouraging. Prospect abandoned.

In its final relinquishment report in 1974, Geophoto included a complete list of company reports and a detailed bibliography.

Aberfoyle Development Company

In 1970, Aberfoyle reported on a detailed reassessment of the Great Pyramid prospect, then held under lease by the Lloyd Price Syndicate. Aberfoyle, which was then mining tin-tungsten at the NE Tasmanian Aberfoyle and Storey's Creek Mines, conducted a soil geochemistry survey in the vicinity of the old mine

workings, drilled 137 percussion holes and assayed 2950 samples for tin. The company concluded there were inferred reserves of 2.66 million tonnes of ore grading 0.31 % Sn, and indicated reserves of 1.4 million tonnes at 0.31 % Sn. Follow-up diamond drilling in 1971 intersected subeconomic mineralisation.

Scamander Mining Corporation

At about the same time (1970) the Scamander Mining Corporation NL conducted SP surveys over the Orieco, North? Orieco, Ringarooma and North Ringarooma prospects, concluding that the SP anamolies obtained were explained by the known buried sulphides in each case, that no further SP work was warranted and that IP might be a useful exploration tool.

Bay Exploration Pty Ltd

In 1970, Bay Exploration Pty Ltd commissioned a prospectivity review of EL 34/70 which included the southern part of the present EL 76/87. The report concluded the area had potential for tin-tungsten in quartz-filled fissure lodes in the Mathinna Beds, alluvial tin in the lower Scamander Valley, and copper-lead-zinc hosted in the Mathinna Beds.

BHP-Shell Joint Venture

BHP and Shell Metals (Billiton) jointly explored EL 12/78 from 1978 to 1984. The original licence of 276 km^2 covered all the central and southern portions of the current EL 76/87, but was subsequently reduced to 125 km^2 in 1984, and later to the present 10 km^2 over the Great Pyramid and adjacent prospects. Shell managed the exploration programme regionally targetted at tin-tungsten deposits in fracture/vein systems, greisenised granite and fault-bounded bodies. The joint venture (Ruxton, 1984) carried out an aeromagnetic survey, regional mapping, stream sediment sampling, regional rock chip sampling, a structural lineament survey and ground follow-up of two regional anomalies. BHP concluded that the relinquished part of the EL had been thoroughly prospected, with no areas of interest outlined.

PROSPECTIVITY

GENERAL COMMENTS

The following geological observations arising from past mining and

exploration are relevant to any prospectivity assessment of EL 76/87.

- Base-metal, tin, tungsten, gold and silver mineralisation is widespread. No other currently economic ore minerals have been discovered within the EL.
- All mines and prospects have proved so far to be uneconomic, or at best, subeconomic.
- The problem is not so much ore grades, but reserves, since most of the mineralisation appears to be in small moderate-high grade, low volume ore bodies of the structurally controlled fault or fissure quartz vein type. The exception seems to be the stockwork and disseminated tin ores of the Great Pyramid Tin Mine.
- Exploration by various companies over the past 30 years has been thorough and, at prospect level, often intense. At a regional level, studies have included - aeromagnetic and airborne radiometric surveys
  - structural lineament analysis
  - stream sediment sampling and assaying
  - reconnaissance mapping and aerial photointerpretation
  - soil geochemistry
  - rock chip sampling and assaying.

Most anomalies corresponded to known mineralisation. In several instances, ground follow - up resulted in the discovery of previously unknown but uneconomic mineralisation. One or two anomalies remain unexplained.

- Historically, exploration companies have targetted the base metal, or tin-tungsten, potential of the area.
- At prospect level, the known mineralisation has not been adequately tested for gold, despite its apparently persistent, if minor, occurrence throughout the district.
- The alluvial or placer potential of the area has received scant but probably sufficient attention. There is no potential for heavy minerals in present-day beach sands because the entire coastal strip from St Helens to Scamander is a coastal reserve and alienated from mining.

In the following paragraphs the prospectivity of the area is assessed in terms of base metals (Cu, Pb, Zn), tin-tungsten and gold-silver deposits. The 10 km^2 area of BHP's EL 12/78 (Figure 3) is excluded.

BASE METAL PROSPECTIVITY

In view of the very thorough exploration carried out over thirty years by several companies, the prospects of finding new base metal deposits must be regarded as low. It would be difficult to justify any regional exploration effort directed towards this end.

At prospect level, the Orieco trend including the Orieco workings, Dunns and Paul Beahrs are probably underexplored and assessment directed towards a base metal + gold ore body would be worthwhile (see Gold Prospectivity below).

TIN-TUNGSTEN PROSPECTIVITY

Regionally the area has been adequately explored for tin-tungsten and all tin-tungsten prospects have been thoroughly assessed. With the exception of the subeconomic Great Pyramid Tin Mine in BHP's EL 12/78, all known prospects are uneconomic.

The prospectivity for alluvial tin is low, but better than for primary tin deposits. Although the Quaternary and Recent deposits of the lower Scamander River valley have been explored, there remains an untested play of alluvial tin in a buried Tertiary deep lead beneath the present-day low saddle immediately northwest of Henderson Lagoon. (Several writers have suggested that the ancestral Scamander River flowed south near its present-day mouth, through Henderson Lagoon to the sea near Falmouth.) The concept could be easily tested but I would regard the chances of finding economic deposits low. Gold is known as an economic accessory in placer tin deposits elsewhere in northeastern Tasmania, but the association is unrecorded in the alluvial tin workings at St Helens and is unlikely at Scamander.

GOLD-SILVER PROSPECTIVITY

Probably partly because of the depressed gold price throughout much of the exploration history of the district, the EL remains basically untested for gold. In particular, the four coastal silver prospects of Scamander, Scamander Bell, Beulah and Yarmouth have been neglected despite the known association of gold with the silver.

Regional exploration concepts could be generated to explore for

new economic gold deposits, and there are several gold plays which could be explored on, or adjacent to, known prospects. The plays have wide application throughout the northeastern Tasmanian gold province.

Known prospects

(a) Gold-silver deposits genetically related to granodiorite - of several styles :

- as disseminated sulphides + gold hosted in altered or greisenised granodiorite - thus allowing the possibility of increased tonnages compared with vein deposits.
- as sulphides + gold + silver in structurally controlled quartz-filled veins or stockworks hosted in granodiorite: e.g. Scamander, Scamander Bell.
- as above, but hosted in the Mathinna Beds and in some cases spatially unrelated to granodiorite
- as disseminated sulphides + gold in favourably disposed and originally porous Mathinna Beds sandstones. (This play, widely observed and reported by early geologists to the northeast goldfields, remains completely untested in the province despite the chance of proving up low-moderate tonnages of low-moderate grade rather than the small tonnages-high grades typically expected of quartz-gold vein deposits.)

(b) Gold as an economic accessory in known base metal deposits

These potentially include all the known Cu-Pb-Zn deposits of the area, but most are on EL 12/78 and excluded from direct exploration. For example, anomalous gold up to 0.2 g/t was recorded in magnetite + sulphide ore from the North Scamander Mine.

In my view, the base metal deposits along the Orieco trend of prospects are the most prospective in this regard. Up to 3 g/t gold was reported by early workers from the Orieco Mine.

New Deposits

Three concepts which could be tested include

(a) the association between granodiorite and gold mineralisation, especially along the Scamander Tier Dyke. (Throughout the northeastern Tasmanian granitic province, there is a well-established antipathetic association of tin-tungsten with biotite granite and a suspected association of gold with hornblende-bearing granodiorites.)

(b) epithermal gold. At least one writer (Cocker, 1977) has remarked on the caldera-like outcrop pattern of the Grant Point Granite and Akaroa Granodiorite. This suggests the possibility that the various granitoid bodies of the area are high-level intrusives. The Scamander Tier Dyke and its associated gold-silver mineralisation might then properly be regarded as epithermal, opening up the possibility of blind, disseminated low-grade deposits. In support of the caldera play, Turner et al (1986) has recently shown the St Marys Porphyrite, bordering EL 76/87 to the south and long regarded as a typical deep-seated granitic intrusion, to be a largely sub-aerial caldera extrusive of ignimbrites and associated feeder dykes unconformably overlying the Mathinna Beds.

(c) Gold in late-stage mafic (doleritic) dykes.

Dark, mafic dykes are commonly spatially associated with granitoids in northeastern Tasmania. Their ages are uncertain. Some carry disseminated sulphides. At least one dyke within the EL has been reported as carrying up to several per cent sulphides. Gold may be associated with the sulphides. The concept is untested.

REFERENCES

COCKER, J.D. 1977. The geology of the St Helens area : petrology and structure of the granitoid rocks in GROVES, D.I., COCKER, J.D., JENNINGS, D.J. The Blue Tier Batholith. Bull. Geol. Surv. Tasm. 55

COLLINS, P.L.F. and WILLIAMS, E. 1986. Metallogeny and Tectonic Development of the Tasman Fold Belt System in Tasmania in E. Schreibner (Ed.), Metallogeny and Tectonic Development of Australia. Ore Geol. Review, 1, 153-201.

GROVES, D.I. 1972. The Zoned Mineral Deposits of the Scamander-St Helens District. Bull. Geol. Surv. Tasm., 53

GROVES, D.I., COCKER, J.D., JENNINGS, D.J., 1977. The Blue Tier Batholith. Bull. Geol. Surv. Tasm. 55

GROVES, D.I. and BAKER, W.E., 1971. The cobalt and nickel content of some sulphides from ore deposits in eastern Tasmania. Tech. Rep. Dep. Mines Tasm. 14, pp 27-35

GROVES, D.I. 1977. The geology, geochemistry and mineralisation of the Blue Tier Batholith in GROVES, D.I., COCKER, J.D., JENNINGS, D.J. The Blue Tier Batholith, Bull. Geol. Surv. Tasm., 55

HARCOURT-SMITH, J., 1897. Report on the Scamander Mining District in April 1897. Rept. of the Sec. for Mines Tasm. for 1896-7

JACK, R. 1964 (a). Great Pyramid Tin Mine. Tech. Rep. Dep. Mines Tasm. 8, 25-44

JACK, R., 1964 (b). Thureau's Deep Lead, St Helens. Tech. Rep. Dep. Mines Tasm. 8, 63-71

JENNINGS, D.J., 1968. Alluvial Tin in the Lower Scamander River Valley. Tech. Rep. Dep. Mines Tasm. 11, pp 32, 34-36.

JENNINGS, I.B., 1968. Geological Investigation and Results of Drilling for Tin, adjacent to the George River. Tech. Rep. Dep. Mines Tasm., 12, 19-24

McCLENAGHAN, M.P., TURNER, N.J., WILLIAMS, P.R., 1987. 1:50 000 geological map series 8515S. St Helens. Geol. Surv. Tasm.

MONTGOMERY, A., 1893. Report on the Silver-Bearing Lodes of the Scamander River District. Rept. of the Sec. for Mines Tasm. for 1892-3

MORTIMORE, I.R., 1974 Final Report on Exploration Activities within EL 6/68, N.E. Tasmania. Prepared by Geophoto Resources Consultants for Texins Development Pty Ltd. Open File Rept. Dept. Mines Tasm. 74-999.

RUXTON, P.A., 1984 Relinquishment report for a portion of EL 12/78, Scamander (Billiton Aust.) Open File Rept. Dept. Mines, Tasm.

THUREAU, G., 1886. Report on the Scamander Silver and Gold Deposits, Parliamentary Paper 73. Tas. Dept. Mines Old Series 67, 1886, 3-5

TURNER, N.J., BLACK, L.P. and HIGGINS, N.C., 1986. The St Mary's Porphyrite - a Devonian ash-flow tuff and its feeder. Aust. J. Earth Sci., 33

TWELVETREES, W.H. 1911. The Scamander Mineral District. Bull. Geol. Surv. Tasm. 9

WALLER, G.A. 1901. Report on the Mining Districts of the Scamander River and St Helens. Rept. of the Sec. of Mines Tasm. 1900-1907

APPENDIX 1

Petrological and mineralogical notes of samples from the Scamander and Scamander Bell silver mines (descriptions supplied by Stephens Lapidary). Sample numbers correspond to those in Appendix 2.

Scamander Silver Mine

Sample S1(a)

This is an altered granodiorite containing mainly quartz, feldspar and mica.

Plagioclase (about 40%) is the most abundant mineral. It is so turbid that lamellar twinning is only just visible. The grains are about 4-5 mm in diameter and subhedral.

Quartz (about 20%) is present as clear equidimensional grains about 3-5 mm in diameter.

Orthoclase (about 20%) occurs mostly as a graphic inter-growth with quartz between the larger quartz and plagioclase grains.

Anomalous blue chlorite (about 15%) occurs as partial and total replacement of muscovite and as felted aggregates.

Rutile and other oxide accessory minerals are present occasionally as quite large grains and aggregates often associated with chlorite.

Sulphides are present as minute grains - mainly pyrite and chalcopyrite, but are an insignificant proportion of the rock.

The field appearance of the rock which suggests the presence of sulphides is probably due to the larger grains of oxide accessory minerals in the chlorite.

Sample S1(b)

This specimen is mostly quartz gangue but containing some quite large areas of arsenopyrite.

These were originally variable to 10 mm diameter enhedral grains of arsenopyrite which are now weathered and contain a skeletal network of about 50% transparent low reflective material. This material contains about a 5-10% network of fine covellite stringers.

?Scorodite

027

Sample S1(d)

This sample consists of two zones - one mostly arsenopyrite, the other mostly pyrite.

Arsenopyrite zone

- *arsenopyrite (almost 90%), variable sized, enhedral and crushed*
- *galena and sphalerite (about 5%), patchily distributed around fractured arsenopyrite*
- *very minor pyrrhotite with galena and sphalerite.*

Pyrite zone

- *pyrite (about 50%) separated by gangue. Grains have high sphericity and very ragged, fractured edges; variable grain size.*
- *galena included as small patches and vein infillings in some larger pyrite grains.*

Scamander Bell Mine

Sample SB5

Mostly quartz. One or two grains of pyrite are present in a partially decomposed state. Some of these contain minute inclusions of a soft white mineral, possibly galena. Grain size is too small for accurate optical determination.

APPENDIX 2

Gold, arsenic and silver assays of samples from the Scamander and Scamander Bell Silver Mines.

Sample	Description	AMG	Gold (g/t)	Arsenic (%)	Silver (g/t)
Scamander Mine					
S1(a)	altered granodiorite	047092	<0.03	0.09	<5
S1(d)	vein quartz + sulphide		<0.6	c 8	67
S1(e)	altered porphyry		<0.03	0.11	<5
S1(f)	hornfelsed Mathinna		<0.03	1.2	39
S2(a)	spoil + sulphides		0.7	c 25	385
S2(b)	vein quartz + sulphides		<0.03	0.21	<5
S2(d)	altered granodiorite		0.03	1.1	122
Scamander Bell Mine					
SB1	greisenised granodiorite	044101	<0.03	<0.01	<5
SB2	lateritic ironstone		<0.03	0.02	<5
SB3	vein quartz		<0.03	<0.01	<5
SB4	ferruginous soil		<0.03	0.02	<5
SB5	vein quartz + sulphides		0.9	0.06	220

Notes

1. These samples were collected in January 1988 during a reconnaissance field trip to the EL.

2. Samples S1(f) and S2(d) are perhaps significant in that they lend support to the idea that mineralisation extends into altered country rock rather than being restricted to quartz veins.

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GEORGE RIVER GRANODIORITE

GRANT POINT GRANITE

AKAROA GRANODIORITE

BLUE TIER BATHOLITH

CONSTABLE CREEK GRANITE

Caldera structure ?

TASMAN SEA

ST HELENS ISLAND

SCAMANDER Tier Dyke

TUNGSTEN ZONE

TIN ZONE

COPPER ZONE

SILVER LEAD ZONE

SILVER ECHO (Cu, Mo)
MINING LEASE 85M/80 (25ha)

ECHO (W, Mo)

LOILA TIER (Ag, Pb)

BADEN POWELL (W, Mo)

PRICE (W, Mo)

LUTWYCHE (W, Mo)

CARSON DE BEERS (W, Mo)

WEST PINNACLE (Sn)

EAST PINNACLE (Sn)

GREAT PYRAMID (Sn)

NORTH ORIECO (Cu)

DUNNS (Cu)

ORIECO (Cu, Zn)

SOUTH ORIECO (Cu)

NORTH RINGAROOMA?

RINGAROOMA (Pb, Zn, Cu, Ag)

PAUL BEAHRS (Cu, Pb, Zn)

NORTH SCAMANDER (Pb, Cu, Zn, Ag)

EL 12/78 10km² (BHP Co. LTD)

EL 76/87 250 km²

BEULAH (Ag, Pb, Au)

SCAMANDER BRILL (Ag, Pb, Zn, Cu, Au)

SCAMANDER (Ag, Pb, Zn, Cu, Au)

YARMOUTH (Ag, Pb, Zn, Au)

EL76/87

HOBART

PROJECTION: Universal Transverse Mercator (UTM)
HORIZONTAL DATUM: Australian Geodetic Datum 1966
VERTICAL DATUM: Australian Height Datum. (Tasmanian) excepting offshore islands whose datum is mean sea level.
GRID: 1000 metre intervals of the Universal Transverse Mercator Grid, Zone 55 (Australian Map Grid). Australian National Spheroid. Grid values are shown in full at the south west corner of the map.
CONTOUR INTERVAL: 10 metres with 50 metre index contours.
WORLD GEODETIC SYSTEM 1972: To convert co-ordinates from this system to Australian Geodetic Datum 1966, increase the value of latitudes by 5.3", equivalent to 165 metres, and decrease the value of longitudes by 4.2", equivalent to 118 metres. To obtain heights decrease satellite heights by 2 metres.
MAGNETIC VARIATION: True, Grid and Magnetic North are shown diagrammatically for the centre of this map. Magnetic North is correct for 1985 and moves easterly about 0.1° every two years.

SCALE 1:25 000
1 millimetre on the map represents .25 metres on the ground

BOUNDARIES shown on this map are NOT authoritative. For full particulars please consult the Registrar General's Division, Lands Department, or the Survey Division, Lands Department. Areas within proclaimed towns or less than two hectares may not be depicted. Boundaries of Crown Land (including Reserves) extend to low water mark. To give a land parcel reference, prefix parcel number with municipal number. To use this number to gain title or survey information please consult the Mapping Division. Property and parcel boundaries are shown as at 'Bicentennial' 1985.

MEAN TEMPERATURE RANGE (°C)
J F M A M J J A S O N D
MAXIMUM

UNIVERSAL GRID REFERENCE
GRID ZONE DESIGNATION 55G FG
100,000 METRE SQUARE IDENTIFICATION
To give a standard reference to the nearest 100 metres
1 State name and number of this map
2 Locate first VERTICAL grid line to the left of point and read large figures only or enter the top or bottom margin e.g. 91
Estimate tenths from grid line to point e.g. 5
3 Locate first HORIZONTAL grid line below the point and read large figures only or either the left or right margin e.g. 12
Estimate tenths from grid line to point e.g. 3
SAMPLE POINT 9153 123
To give full grid reference, prefix with Grid Zone Designation and 100,000 metre Square identification letters e.g. 55GFQ91123

INDEX TO ADJOINING MAPS
PYENGANA 5842
ST HELENS 5042
BRILLIANT 5841
DUBLIN TOWN 5842
ST MARYS 5838
GRAY 5839
More detailed TASMAPS are available for areas shaded

KEY

- Geological boundary (approx)
- Geological boundary (inferred)
- Limit, metamorphic aureole of Blue Tier Batholith
- Abandoned mine or prospect
- Fault

Roads maintained for continuous / public use: Primary road with route number; Secondary road with route number; Minor road with route number; Other road
Roads of restricted use or access: Other roads with bridge; Vehicular track with gate
Walking track or horse trail (approximate position) with bridge
Railway with station; Places entered in National Estate Register
Power transmission line and pylon positions
Building; Feature of historic or special interest; Ruin; Mine
Post office; Police station; Fire station; School
Caravan park, Camping ground; Public toilets
Deposit area, Information centre, Cemetery
Picnic area, Trig station beacon, Spot elevation
Contour with value; Depression contour
Quarry, pit or open cut mine
Rock scree; Broken rocky surface
Dense forest; Medium forest
Low dense vegetation; Distinctive grass
Orchard; Pine plantation
Eucalypt plantation; Submerged trees

T	Tertiary and Quaternary sediments	
+ Dg	Devonian granite	BLUE TIER BATHOLITH
+ Dgr	George River Granodiorite	
+ Dgc	Constable Creek Granite	
+ Dgg	Grant Point Granite	
+ Dga	Akaroa Granodiorite	
+ Dgs	Scamander Tier Granodiorite	
Pm	Palaeozoic Mathinna Beds (Pmm metamorphosed Pm)	

Swamp
Windbreak
Wet area; Subject to flooding
Waterfall; Rapids
Indefinite shoreline or floodbank; Levee
Tidal rocks or ledge; Offshore rock
Navigation light or lighthouse; Exposed wreck
Sand; Tidal reef
Saline coastal flat; Tidal flats
Jetty, Launching ramp

(H) Aeromagnetic anomaly (EZ)
Radiometric anomaly (Geophoto)
Course of ancestral Scamander River ?
Potential for alluvial tin in buried leads
Known prospects with potential economic gold

Lineaments inferred from aerial photos

5 cm

P.F. MINING SHELF (No.16) PTY LTD
EL 76/87

GEOLOGY, MINERALIZATION AND PROSPECTIVITY

No.	Fig
DATE	Jan
COMPILED	W.C
DRAWN	J.T.,
SCALE	1:25

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