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MICROFILMED

REGIONAL STUDY OF THE BEN LOMOND GRANITE

by

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AMG REFERENCE POINTS ADDED

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Ben Lomond Granite, Avoca Area

Several different granitic phases were recognised in the Ben Lomond area. A total of twenty samples ~~was~~ <sup>were</sup> collected, marked RS (Rossarden) and RG (Royal George). The sample locations are shown in Fig.6.

- Rossarden

The dominant granite type in the area is a coarse, uneven-grained pink, biotite granite. It is well exposed in some new road cuttings along the Castle ~~Creek~~ <sup>Cary</sup> Rivulet. The dark colour of the quartz grains is striking (See photo RS/10). Near the roof of the granite towards the contact with the Mathinna beds (e.g. near Rex Hill and south of Storeys Creek) porphyritic phases are common (photo RS/9).

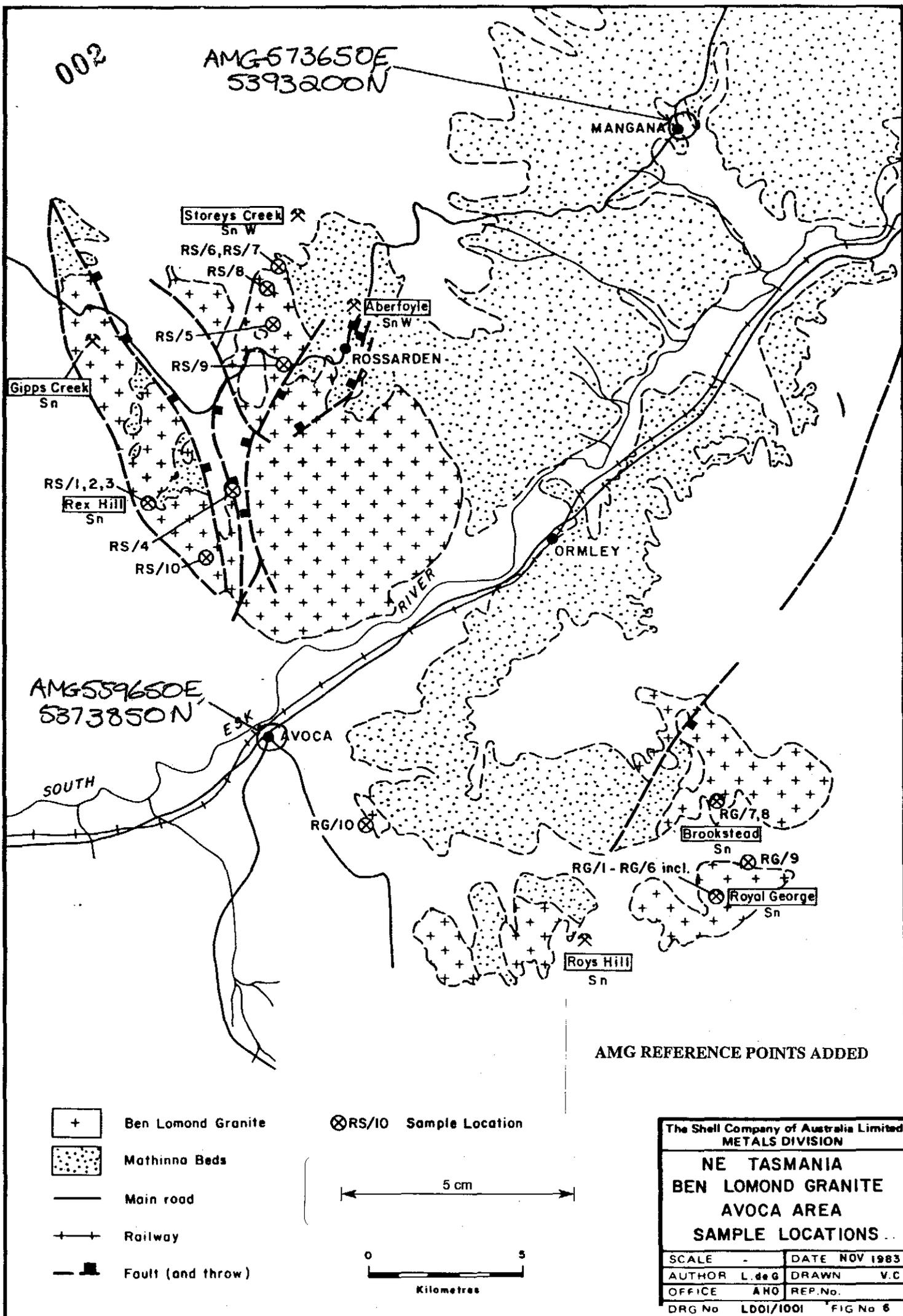
At the contact with the Mathinna Beds there is a sheet of aplitic, sericitized, tourmaline granite (RS/6) which is underlain by an equigranular to inequigranular muscovite bearing tourmaline granite (photo RS/7).

In the vicinity of the mineralised site of Rex Hill, which is also near the contact with the Mathinna beds (see Fig.6) there is a porphyritic phase which is locally strongly sericitized. The quartz in the porphyritic granite is subhedral in shape and very dark. In addition a pale, weakly miarolitic, aplitic granite, occurs as dykes.

Thin section studies (see Appendix 1), show that the coarse grained granite (RS/4 and RS/10) contains minor traces of fluorite and may contain minor Topaz. These samples have respectively been classified as alkali granite and as adamellite. According to the Ti/10-Rb/3-Sr classifier, the rocks are calc-alkali granites rather than adamellites (see Fig.7a). This diagram shows that the ternary composition of the rocks is identical. The remainder of the samples plot in the alkali granite field.

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AMG 573650E  
5393200N



AMG 559650E  
5373850N

MANGANA

Storeys Creek  
Sn W

RS/6, RS/7

RS/8

Aberfoyle  
- Sn W

ROSSARDEN

Gipps Creek  
Sn

RS/5

RS/9

RS/1, 2, 3  
Rex Hill  
Sn

RS/4

RS/10

RIVER

ORMLEY

AVOCA

SOUTH

RG/10

Brookstead  
Sn

RG/7, 8

RG/1 - RG/6 incl.

Royal George  
Sn

Roys Hill  
Sn

AMG REFERENCE POINTS ADDED

- + Ben Lomond Granite
- . Mathinna Beds
- Main road
- + + Railway
- ■ Fault (and throw)

⊗ RS/10 Sample Location

5 cm

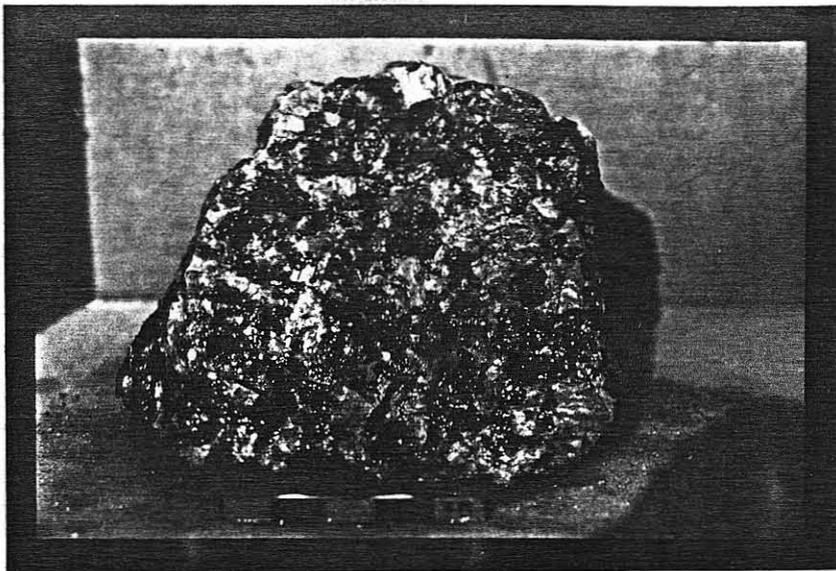
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Kilometres

The Shell Company of Australia Limited METALS DIVISION	
NE TASMANIA BEN LOMOND GRANITE AVOCA AREA SAMPLE LOCATIONS	
SCALE	DATE NOV 1983
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DRG No LD01/1001	FIG No 6

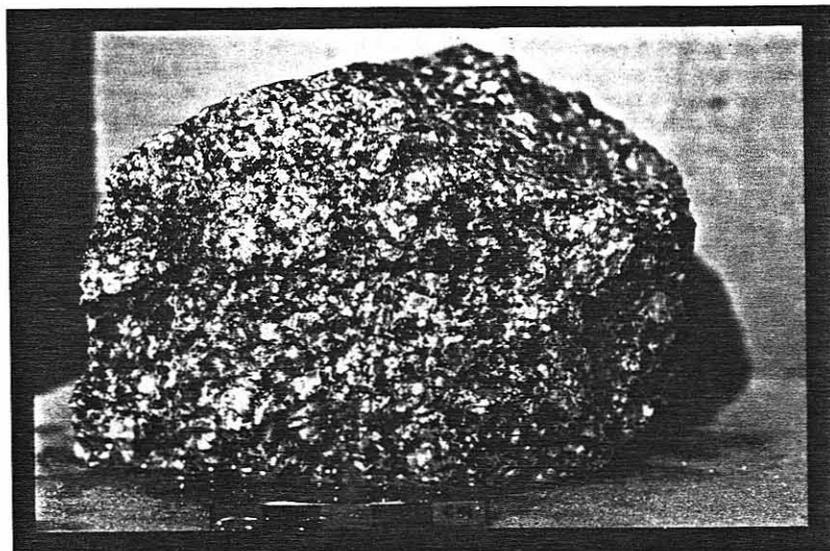
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RS/10 Coarse Ben Lomond granite

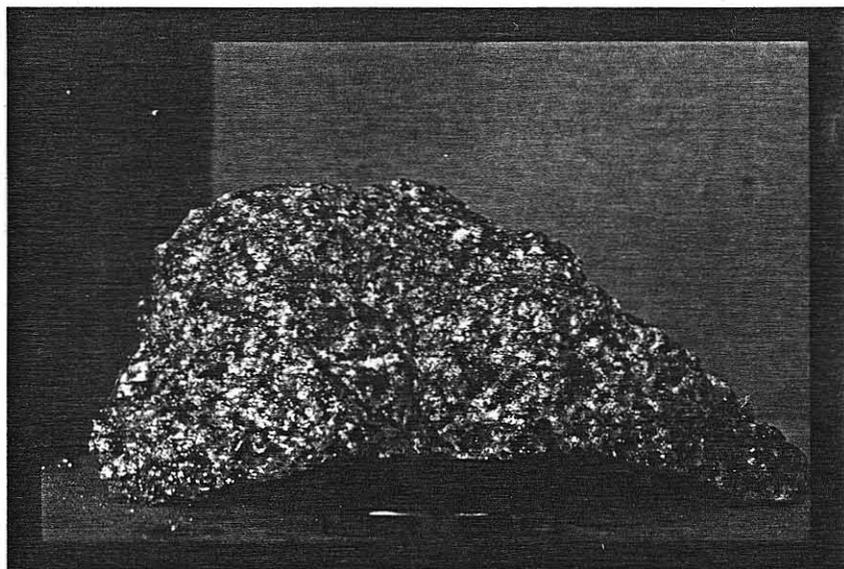
Coarse grained, pink inequigrannlar biotite, calc-alkali granite. This granite phase is dominantly developed in the Rossarden area. Note dark, "smoky" quartz grains. This granite may contain minor fluorite and secondary tourmaline.

RS/9 Porphyritic Ben Lomond granite

Altered porphyritic, alkali-granite from the Rossarden area. Porphyritic phases are well developed near the roof contact. Biotite has been replaced by muscovite pseudomorphs. Sample contains traces of secondary fluorite, schorl and anatase. Note dark smoky quartz.

RS/7 medium to fine grain Ben Lomond granite

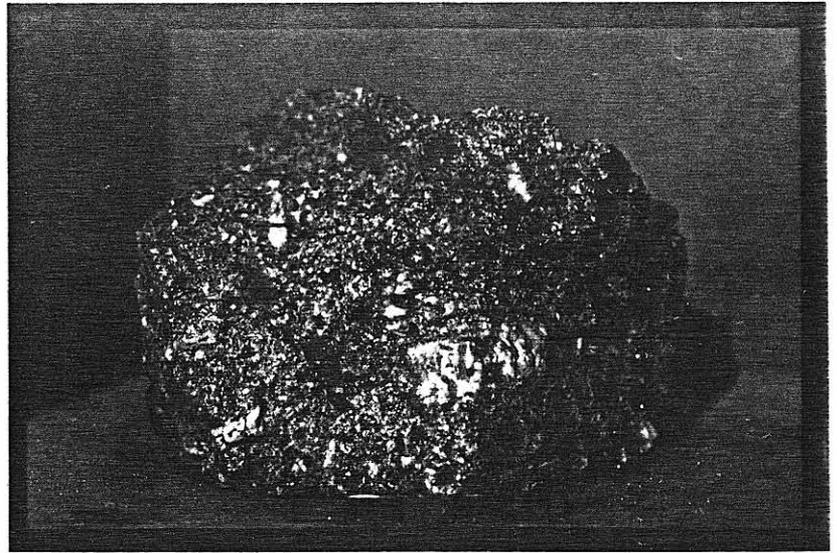
Sericitized, muscovite, tourmaline alkali granite. Plagioclase is extensively altered by sericite. Sample contains minor primary schorl and sporadic cluster of primary muscovite.



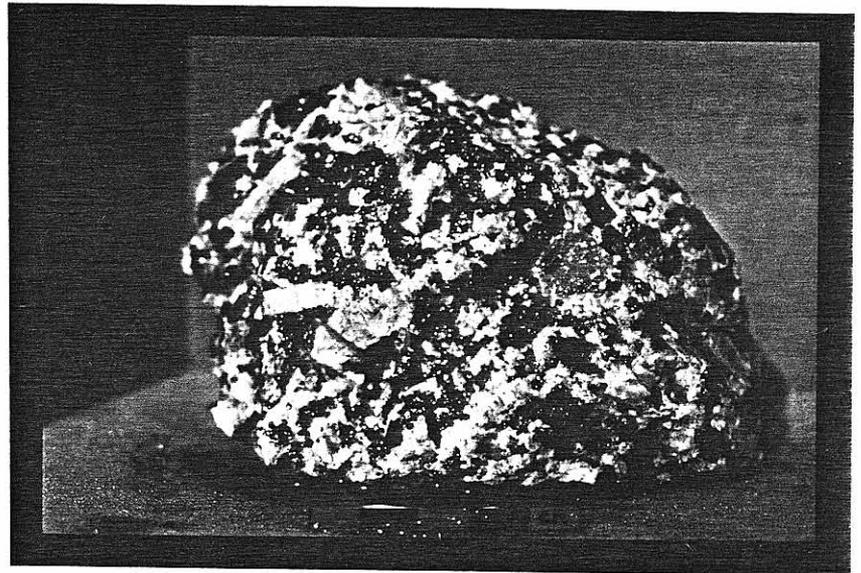
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RG/3 Ben Lomond porphyritic granite

Two mica, tourmaline bearing, alkali granite from Royal George tin mine. Sample contains small clots of primary tourmaline as well as topaz. Brown biotite may have selvages of muscovite.

RG/5 Ben Lomond inequigrannlar granite

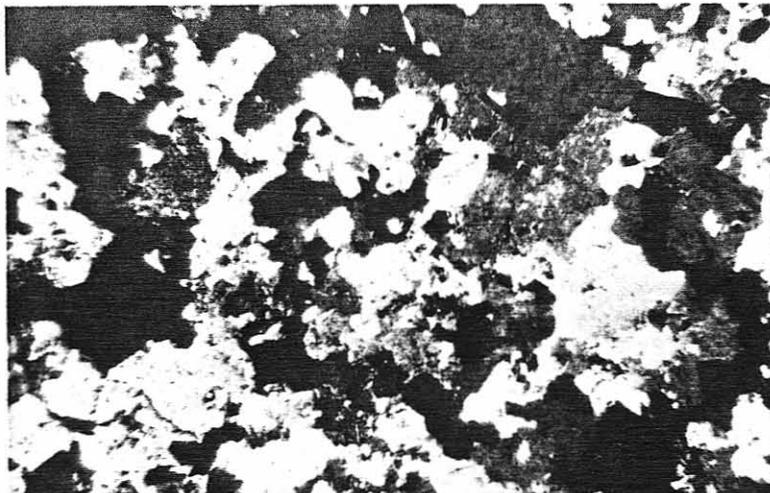
Medium to coarse, uneven grained tourmaline, topaz, alkali granite from Royal George Mine. Sample contains primary biotite and muscovite and both primary (green-brown) and secondary (red-brown) schorl.



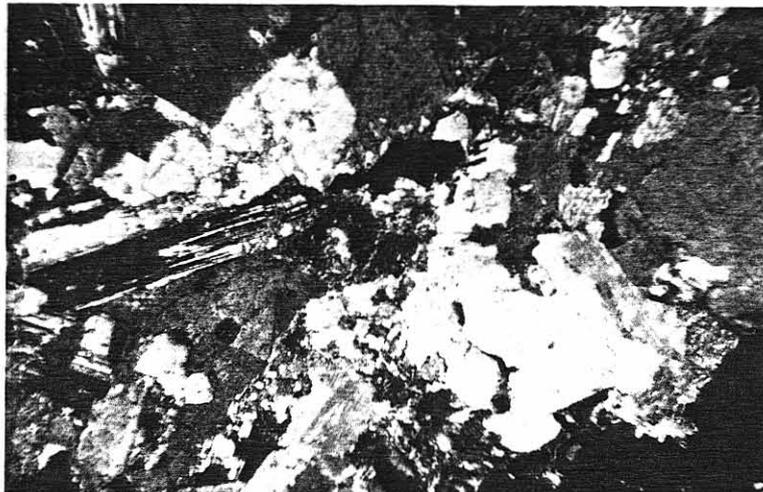
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RS/6

Primary tourmaline (yellow longitudinal sections and grey/blue for basal sections and black in extinction) set in quartz/k-feldspar/plagioclase.

RS/7

Primary muscovite surrounding a corroded quartz grain (top left) with secondary muscovite/sericite developed in plagioclase, (middle right), contact alkali granite, Ben Lomond Rossarden.



Sample No.	Classification - Composition	Fabric	Accessories	CENTRAL MINERALOGICAL SERVICES Comments
RS-1 (T.S. 46022)	Alkali Granite. Quartz (30 %), microcline-microperthite (35 %), weakly muscovitised albite (weakly zoned An 7, 30 %), and extensively muscovitised-sericitised pale to mid-brown biotite (5 %).	Porphyritic (quartz, K-feldspar, rarely albite), uneven-grained granitic. Incipiently stressed.	Traces primary muscovite, apatite, zircon, rare green schorl. Traces secondary fluorite, biotite-reptactive limonite.	Mildly greisenized biotite granite, strictly alkali granitic. Biotite and phenocrystal plagioclase selectively altered. Fluorite develops from biotite. Sericite is hydromuscovite in part.
RS-2	Micro-Adamellite. Quartz (35 %), orthoclase (30 %), weakly/variably sericite-muscovite-stained oligoclase (incipiently zoned An 25, 30 %), with minor sericitised biotite (2-3 %).	Weakly quartz-porphyritic, slightly quartz-vuggy, medium, even-grained granitic. Incipiently stressed.	Traces primary green-brown schorl, minor traces zircon, rare ultrafine magnetite.	Slightly vuggy character consistent with a relatively shallow minor intrusive. Alteration analogous to RS-1. Rare biotite inclusions in quartz are mid- to dark brown.
RS-3	"Greisen". Quartz variably stained with micro-inclusions of topaz, fluorite, green biotite. Disseminated films semi-sericitic white mica. Disseminated grains, clusters cassiterite. Late clots of siderite.	Variable, but essentially medium- to coarse-grained, granular to subhedral quartz. Weakly banded (mica, cassiterite).	Traces sericitised biotite, minor traces galena, pyritised pyrrhotite, late limonite (after siderite).	Siliceous greisen-type vein characteristics. Cassiterite colour-variable (colourless, brown-red), sized <math>50\mu</math> to 1.5 mm, mode 100-200 $\mu$ , variously embedded in quartz, "sericite", siderite.
RS-4	Alkali Granite. Orthoclase-perthite and quartz with relatively minor weakly zoned, variably sericitised albite (An 5), disseminated variably muscovitised brown/red-brown biotite.	Coarse, but uneven-grained granitic. Incipiently stressed. Rare quartz-healed microfractures.	Minor traces zircon, topaz. Rare apatite. Traces secondary chlorite, vermiculite, fluorite, limonite (after biotite).	Affinities with RS-1, but distinctly coarser-grained to the extent that modal analysis is impractical. Topaz is partly sericitised. Quartz veinlets include rare fluorite.
RS-5	Alkali Microgranite. Quartz (30 %), orthoclase microperthite (35 %), weakly sericitised incipiently zoned albite (An 5, 30 %), with disseminated sericitised/muscovitised biotite (5 %).	Coarsely quartz (-orthoclase-albite) porphyritic with an even, medium-grained granitic to micrographic groundmass.	Traces primary topaz, minor traces zircon, (oxidised) magnetite. Traces secondary anatase.	Weakly micrographic (granophyric) "quartz-feldspar porphyry". Rare relict biotite is red-brown (titaniferous); anatase represents "ex-solved" $TiO_2$ in altered biotite.
RS-6	Tourmaline Microgranite. Incipiently zoned albite (An 5, 40 %), quartz (30 %), orthoclase (20 %), with disseminated pale blue-green schorl (3 %), clots of muscovite (2-5 %).	Slightly vuggy, medium, uneven-grained granitic.	Traces topaz.	Distinctly relatively albitic (sodic) alkali microgranite with "primary" tourmaline, partly concentrated in microlytic vugs with quartz, muscovite.
RS-7	Greisenized Adamellite. Quartz (30 %), sericite-stained to sericite- and muscovite-pseudomorphed oligoclase (unzoned, An 17, 40 %), and relatively weakly sericitised orthoclase (30 %).	Even-grained, granitic (mean 2 mm). Stressed variably microfractured/sericite-healed.	Sporadic clusters of primary muscovite, traces variably sericitised schorl, traces zircon, rare sp.	Variably muscovitised-sericitised adamellite with traces primary schorl, but no tangible altered biotite. ?wolfram is ultrafine, fracture-related.
RS-8	Mica Adamellite. Quartz (30 %), orthoclase-perthite (25 %), weakly muscovite-stained oligoclase (unzoned, An 13, 35 %), disseminated flakes, clusters muscovite (5 %), mid-brown biotite (2 %).	Uneven-grained, granitic, weakly feldspar-porphyritic. Unstressed.	Traces primary colour-variable schorl, apatite, zircon.	Mildly muscovitised mica adamellite with affinities to RS-7. Biotite, muscovite are locally intergrown, with muscovite overgrowing biotite.

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Sample No.	Classification - Composition	Fabric	Accessories	CENTRAL MINERALOGICAL SERVICES Comments
RS-9	Porphyritic Adamellite. Quartz (30 %), orthoclase-microperthite (35 %) and weakly muscovitised oligoclase (unzoned, An 13, 30%) with disseminated siderite-stained white mica pseudomorphs after biotite.	Orthoclase-porphyritic uneven-grained granitic, essentially unstressed.	Traces relict biotite, zircon. Traces secondary fluorite, schorl, anatase.	Similarities with RS-8 and RS-7. Mildly muscovitised, with traces oligoclase-replacive schorl, mica-derived fluorite. Biotite is mid-brown, locally weakly mottled to
RS-10	Adamellite. Quartz (35 %), orthoclase-perthite (30 %) and weakly muscovite-stained oligoclase (unzoned, An 27, 30 %) with disseminated variably chloritised mid- to dark brown biotite.	Relatively coarse and even-grained granitic, very incipiently stressed.	Relatively conspicuous zircons (in biotite). Traces secondary K-spar and fluorite.	Slightly relatively green-brown. "basic" biotite adamellite. Secondary K-feldspar is interleaved with chloritised biotite, represents "exsolved" potassium. Fluorite is altered mica-derived.
RG-1	"Greisen". Quartz with subordinate intergrown topaz, subordinate to minor included and intergranular fine-grained white mica, disseminated cassiterite and degraded/ferruginised siderite.	Similar to RS-3 (medium-grained granular quartz, weakly banded). Quartz-intergranular cassiterite.	Rare corroded relict phenocrystal quartz. Minor traces biotite, rare zircon as inclusions in quartz.	Affinities with RS-3. In comparison, this rock exhibits certain ill-defined altered "porphyry" characteristics. Cassiterite is relatively pale, sized 25-200 $\mu$ , mean
AG-2	Greisened "Granite". Quartz and muscovite in varying proportions with frequent muscovite pseudomorphs after biotite. Minor vugs of quartz and colour-variable schorl.	Medium-grained, crudely banded. Incipiently stressed/microfractured.	Minor traces topaz, relict granitic zircons, secondary sphene, rare cloudy ultrafine ?cassiterite.	Thoroughly greisened (silicified, muscovitised) biotite-rich granitoid. Stress postdates the texturally late vuggy quartz. ?Cassiterite restricted to biotite-pseudomorphous muscovite aggregates.
RG-3	Topaz-Mica Micro-Adamellite. Quartz (30 %), orthoclase-microperthite (30 %), weakly muscovitised oligoclase (unzoned, An 25, 30 %), disseminated variably muscovitised biotite (3 %), weakly sericitised topaz (3 %).	Quartz-feldspar-porphyritic, medium-grained granitic, locally micrographic, unstressed.	Rare zircons, minor trace primary muscovite.	Quartz-feldspar porphyry with affinities to RS-8, similarly locally muscovite-selvaged mid-brown biotite. Relatively conspicuous primary topaz.
RG-4	Topaz-Mica Microgranite. Quartz (35 %), orthoclase-microperthite (30 %), weakly sericitised muscovitised albite (unzoned, An 7, 30 %), weakly/variably sericitised orange-brown biotite (5 %), similarly altered topaz (2 %).	Weakly quartz-feldspar-porphyritic, medium-grained granitic.	Minor traces zircon, primary muscovite, secondary pyrite (in relatively sericitised biotite and albite).	Close affinities with RG-3, but contrasting in relatively sodic plagioclase and relatively titaniferous biotite. Similarly mildly greisened (muscovitised).
RG-5	Tourmaline-Topaz Granite. Quartz (40 %), orthoclase-perthite (35 %), weakly sericitised albite (relatively zoned, An 7 to An 4, 15 %), disseminated green-brown schorl (3 %), moderately sericitised biotite, topaz.	Coarse, uneven-grained granitic. Incipiently stressed.	Minor traces primary apatite, zircon, muscovite, secondary red-brown schorl.	Relatively differentiated (potassic) alkali granite with late magmatic green schorl, topaz, orange Ti-biotite. The secondary schorl is biotite-replacive, titaniferous.
RG-6	Greisen. Quartz with varying proportions of topaz, disseminated pyritised pyrrhotite. Sporadic vugs of quartz and colour-variable schorl. Disseminated clots of sericite, minor disseminated cassiterite.	Variable, but essentially medium-grained, semi-banded, locally vaguely "granite"-pseudomorphous.	Traces stannite, arsenopyrite, chalcopyrite, white mica (inclusions in quartz), rare zircons.	Affinities with RS-3, RG-1. Probably a vein with greisened (silicified/topazised) "granite" intraclasts. Cassiterite is colour-variable, <50 $\mu$ to 350 $\mu$ grains in quartz, locally selvaged with stannite.

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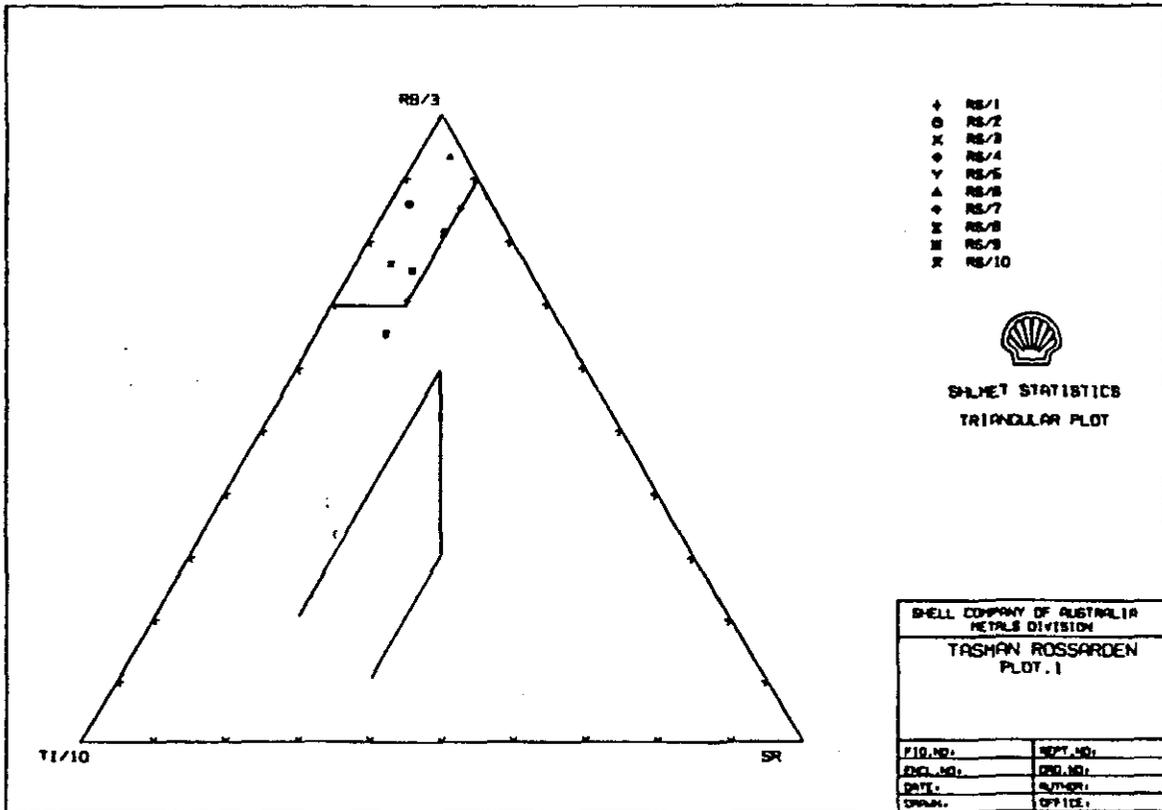
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Sample No.	Classification - Composition	Fabric	Accessories	CENTRAL MINERALOGICAL SERVICES Comments
RG-7	Quartz-Schorl Vein. Quartz with subordinate to minor blue-green to brown schorl, thinly disseminated wolframite. Sporadic late veins, veinlets of muscovite, fluorite, kaolin-illite.	Coarse mildly stressed to fractured muscovite-fluorite-healed quartz. Semi-granulated wolframite.	Minor traces sulphide (?jamesonite) as inclusions in fluorite.	Fractured quartz-schorl(-wolframite) vein with "secondary" white mica-kaolin-fluorite veins, veinlets. Granulated wolframite is corroded by fluorite, clays.
RG-8	Tourmaline-Topaz Granite. Quartz (30%), orthoclase-perthite (30%), sericite-stained albite (sim. RG-5, 30%), disseminated variably muscovitised orange-brown biotite (5%), green-brown schorl, topaz.	Similar to RG-5, weakly albite-porphyritic.	Zircon, rare apatite. Traces secondary siderite (partly ferruginised), fluorite schorl (sim. RG-5).	Close affinities, in terms of primary and secondary features, with RG-5. Main contrast is the presence of siderite stainings in altered biotite and relatively sericitised albite.
RG-9	Topaz Granite. Quartz (30%), orthoclase-perthite (35%), sericite-muscovite-stained albite (weakly zoned, An 7, 30%) with disseminated variably muscovitised orange-brown biotite (5%), minor weakly sericitised topaz.	Analogous to RG-5, RG-8.	Traces primary muscovite, zircon, secondary fluorite, oxidised siderite.	Close affinities with RG-5, RG-8, but devoid of primary schorl. Similarly altered (mildly greisenized).
RG-10	Tourmaline Microgranite. Quartz (30%), orthoclase (35%), incipiently sericite-stained plagioclase (weakly zoned, An 10, 25%) with disseminated variously chloritised or tourmalinised biotite, patchy poikilitic schorl.	Feldspar-quartz (-biotite)-porphyritic, medium-grained, granitic to weakly micrographic schorl.	Minor traces zircon, apatite, late-magmatic muscovite, secondary siderite, fluorite, muscovite.	Tourmaline grades from late-magmatic blue-green/mottled green-brown schorl in semi-graphic intergrowths with feldspar to late biotite-replacive orange-brown schorl.

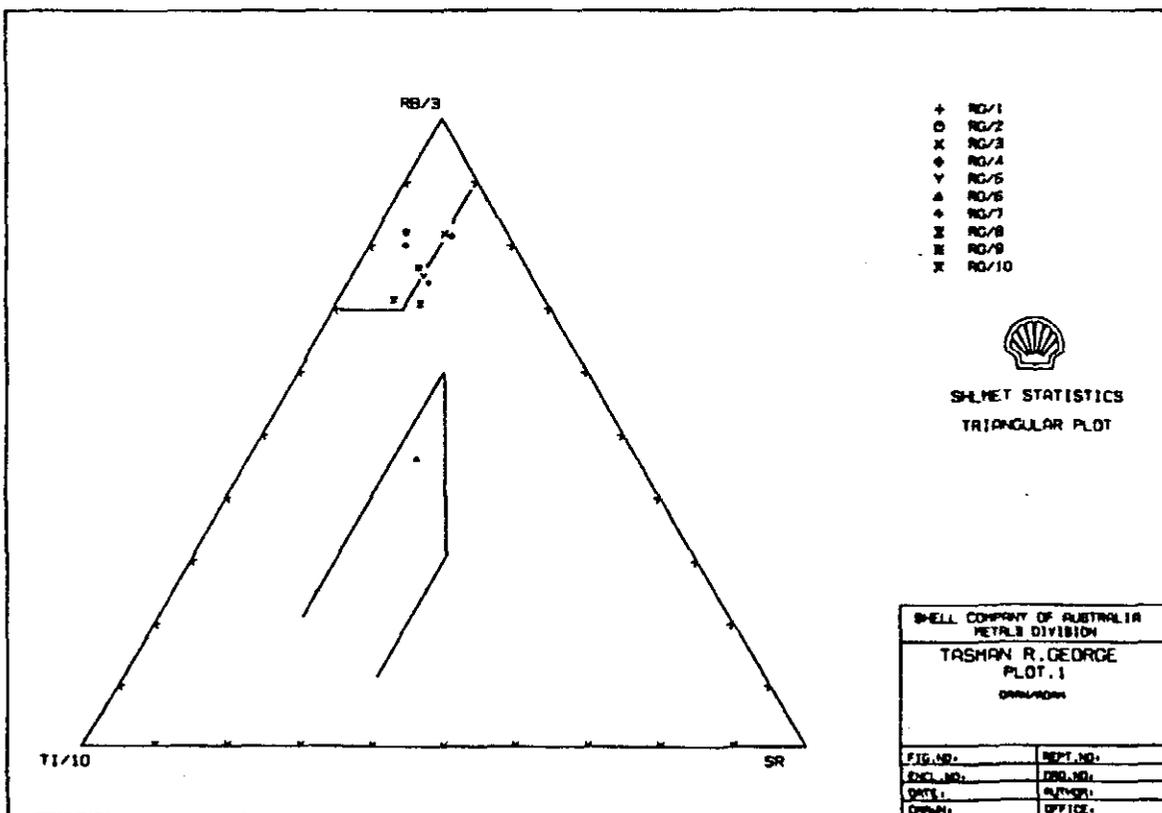
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**FIG.7(a) Ternary diagram Rb/3-Ti/10-Sr,  
plot of Rossarden samples**



**FIG.7(b) Royal George samples**

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Thin section studies of the roof zone granites show tourmaline and/or topaz are common as minor accessory minerals (photo micrograph RS/6 and RS/7). It is of interest to note that the "contact" aplitic tourmaline granite is microlitic with tourmaline partly concentrated within vugs, indicative of second boiling activity.

The granites in the Rossarden area are generally mildly sericitized. The biotites are generally brown and are not strongly chloritized.

- Royal George

Sampling in the Royal George area was mainly confined to the old Royal George tin mine and the Brookstead Sn- prospect. In the immediate surroundings of the Royal George tin mine, there are two main granite types, a porphyritic, tourmaline granite with a fine matrix and a coarse inequigranular, tourmaline bearing biotite granite (see photo RG/3 and RG/5). The former contains pegmatitic eyes of K-feldspar as well as clots of tourmaline. Tourmaline may occur with quartz and may form flat lying (?) zones. Sericitization is prominent especially near the siliceous lode material. The porphyritic granites resemble those at Rex Hill. This type of granite is widely distributed as is shown by the occurrence of a similar tourmaline bearing granite at RG/10, a few km south of Avoca. Coarse grained inequigranular tourmaline bearing biotite granite resembling RG/5 also occurs at the Brookstead prospect. Thin section work has shown that in addition to tourmaline, topaz is a very common constituent.

On the basis of the Ti/10-Rb/3-Sr ternary diagram all samples can be classified as alkali-granites (see Fig.7b).

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GEOCHEMISTRY

All samples were submitted for chemical analyses. Samples were analysed for major elements as well as for the following minor - and trace elements, F, Ga, Li, Mo, Nb, Rb, Sn, Sr, U, W and Zr. In addition the total gamma radiation was measured for each sample. The latter is expressed as equivalent uranium oxide ( $\text{EU}_3\text{O}_8$ ). The range of elements was selected to satisfy demands of this study as well as to provide extra data for the SCOA granite data base. The latter will be used for comparative geochemical studies at a later date.

The total sampled population forms a fairly regular differentiation series as is demonstrated in Fig.11c.

(a) Ben Lomond Granite (RS & RG)

On the basis of Ti/10- Rb/3- Sr- diagrams (Fig.7a & 7b) it was already established that all Ben Lomond granites sampled are differentiated alkali granites. As such it is difficult to establish trends, as all granites represent the differentiated end of the granitoid field.

- Major Elements

Overall, the major elements have a restricted composition.  $\text{SiO}_2$  is slightly higher in the altered and greisenised samples (see table 3). The generally low ferro-magnesium levels are typical of highly fractionated granites. The slight increase of iron in the the greisenized samples is probably caused by the presence of ankerite and/or sulphides (see mineralogical description Appendix I). The perceived mineralogical differences between granites and adamellites (e.g. An content of plagioclase) are not readily evident from the average major element composition of these groups. On the basis of the major elements the granites can be classified as high silica, peraluminous alkali granites. The aluminium index (the ratio of molecular  $\text{Al}_2\text{O}_3/(\text{CaO} + \text{Na}_2\text{O} + \text{K}_2\text{O})$ ) is well over 1. In the absence of less differentiated members (Scottsdale batholith?)

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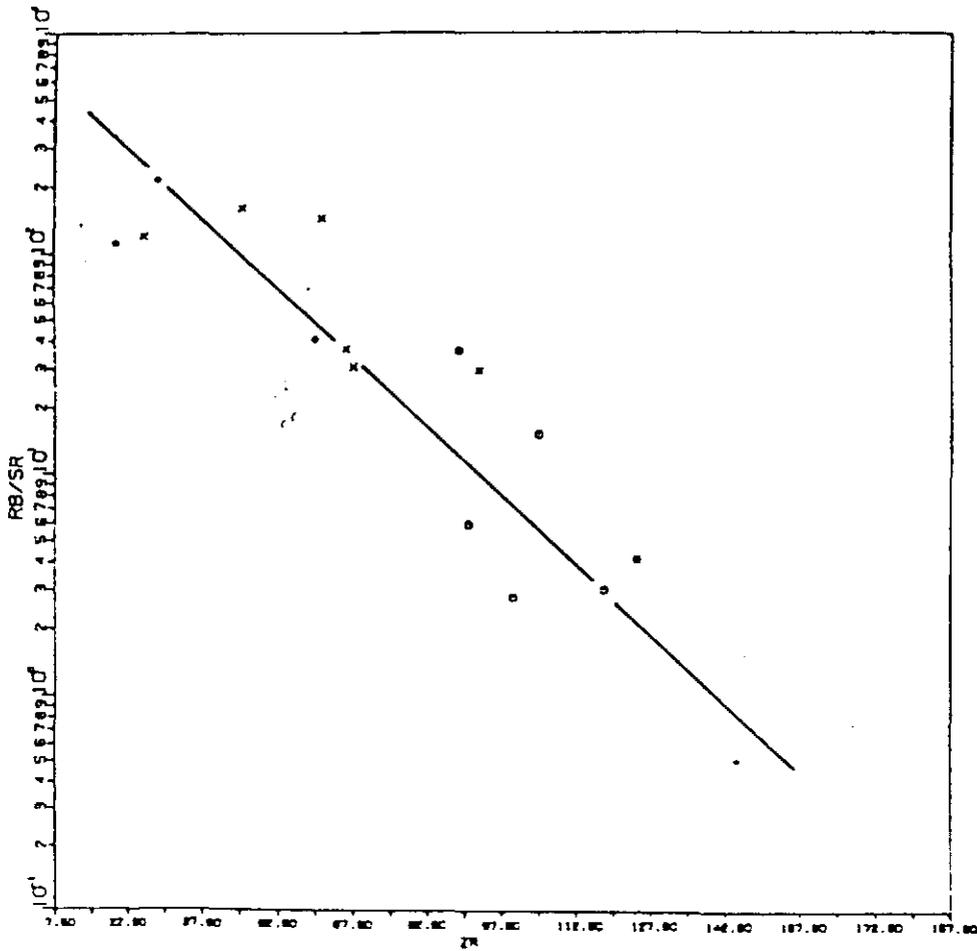


Fig. 11c

Binary plot Rb/Sr vs Zr.  
Averages of all samples based on CMS classification  
(excluding lode samples).

- GRANODIORITES (D)
- ◊ GABBROS (G)
- x DIORITES (D)
- ◊ GREISENSIS (S)

CORRELATION COEFFICIENT = -0.76

The Shell Company of Australia Limited	
METALS DIVISION	
<p><b>BINARY PLOT</b> Rb/Sr vs. Zr</p>	
SCALE	DATE NOV 83
AUTHOR LDG	DRAWN
OFFICE AHD	REP. No
DRC No	FIG No 11c

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TABLE 3

Average major element compositions - Ben Lomond Granite.

	R..G*) 9 MEAN	R..A 6 MEAN	R..S 2 MEAN
SiO2	75.78	76.25	78.10
Al2O3	12.71	13.00	12.90
TiO2	0.07	0.06	0.05
Fe2O3	1.43	1.21	2.26
MgO	0.03	0.03	0.01
CaO	0.38	0.34	0.04
Na2O	2.31	2.37	0.57
K2O	5.03	4.99	3.42
MnO	0.03	0.02	0.05
P2O5	0.11	0.06	0.06
LOI	0.91	0.98	1.70
TOTAL	98.80	99.32	99.18

TABLE 4

Average trace element composition - Ben Lomond Granite.

	R..G 9 MEAN	R..A 6 MEAN	R..S 2 MEAN
BA	65.00	75.83	42.50
FZ	0.39	0.31	1.67
GA	25.78	25.00	18.00
LI	153.33	159.17	145.00
MO	23.33	20.67	22.00
NB	24.67	29.67	28.00
RB	638.89	636.67	550.00
SN	31.11	27.33	3490.00
SR	24.67	22.50	15.00
U	22.00	16.33	13.00
W	25.56	17.50	22.50
Y	44.33	72.50	15.00
ZR	93.00	89.00	60.00
EU308	40.11	36.17	17.00
BA/RB	0.10	0.12	0.08
RB/SR	29.71	36.50	40.83
SNFORM1	0.58	0.72	2.25
SNFORM2	10.02	6.76	28.41
SNFORM3	0.75	0.08	0.06
TI/10	44.63	33.97	32.97
ALINDEX	1.28	1.32	3.67
RB/3	212.96	212.22	183.33

\*) Coding

R = Rossarden/Royal George

A = Calc-Alkali Granites

G = Alkali Granite

S = Greisen

014

it is somewhat premature to use this as evidence for classing these granites as S-types.

Fluorite levels are high and increase systematically with the Al index, the greisenised and cassiterite bearing greisens having the highest F-levels.

- Trace Elements

The trace element levels of the Ben Lomond granites (table 4) generally correspond well with the established ranges and patterns of the alkali-granites of the Blue Tier batholith as established by Groves et al (1977), McClenaghan et al (1982), i.e.

\* enriched in: F, Li, Rb, Nb, Sn, W

\* depleted in: Ba, Sr, Zr

Uranium levels with an average of 23 ppm (range 7-36 ppm) can be regarded as anomalously high. This, however, is not uncommon for tin granites. The Y-levels have a large range and decrease with increasing alteration.

Gallium does not vary between the two groups of granites but is depleted in the silicified greisens. This may be related to the lower  $Al_2O_3$  levels in the latter.

Trace element trends are illustrated in the Ba/Rb-Ti and Rb/Sr-Zr plots (Fig.12 & 13). The plots are based on averages according to field classification. Both figures show a regular trend from Biotite granite - two mica granite - two mica tourmaline granite - to muscovite tourmaline (contact zone) and greisenised granites, illustrating increasing differentiation in the direction of the contact zone. This trend may be explained by the combined effects of fractionation and hydrothermal alteration in the roof zone.

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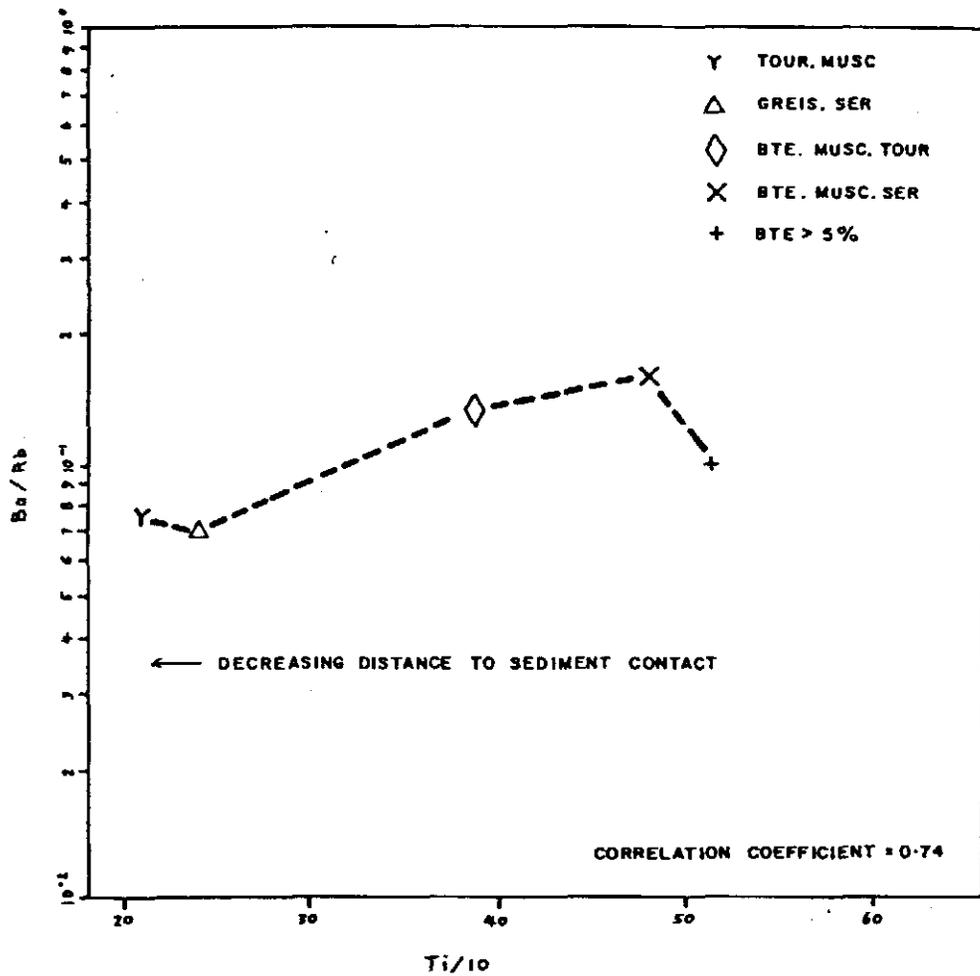


Fig. 12

Binary plot Ba/Rb vs Ti/10 Ben Lomond granites. The trend shows little variation in the Ba/Rb ratio, but a notable decrease in Ti towards the sediment contact. Plotted values are averages according to granite type (field classification).

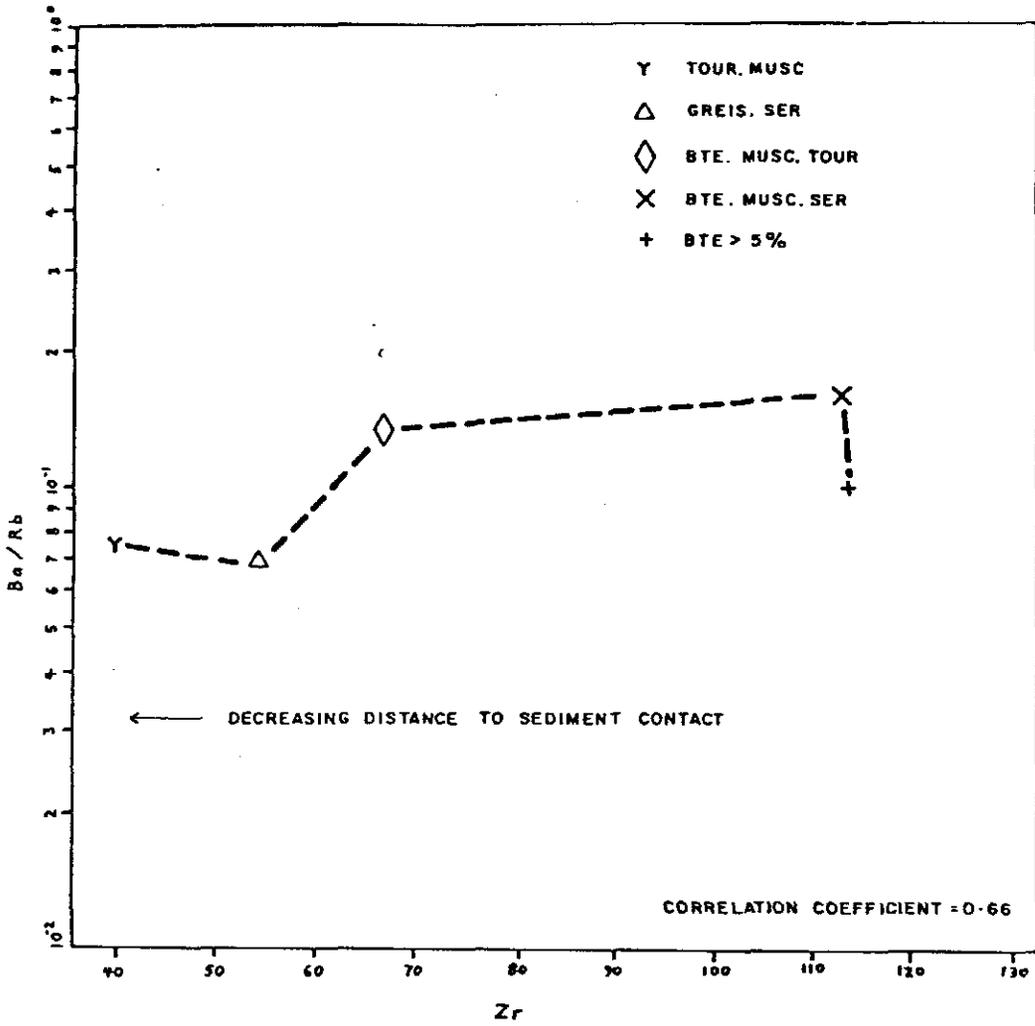


Fig. 13

Binary plot Ba/Rb vs Zr Ben Lomond granites. The trend is similar to the one in Fig. 12. Plotted values are averages according to granite type.

017

From an exploration point of view, the tin potential of the Ben Lomond granites (excluding the altered and greisenized types) can be recognised by low Ba/Rb ( $< 0.2$ ) and high Rb/Sr ( $> 20$ ) ratios. In addition the F- and Li- contents are distinctly elevated. Also the granites are anomalous in U and total gamma radiation ( $EU_3O_8$ ).

COMPUTER CODING OF N.E. TASMANIA GRANITE SAMPLESColumn 1 = Regional Classifier

R = Rossarden/Royal George

Column 2 = Texture

- 1 = porphyritic
- 2 = aplitic/porphyritic
- 3 = Coarse equigranular
- 4 = Coarse inequigranular
- 5 = Medium to coarse grained
- 6 = Medium to fine grained
- 7 = micro grained/aplitic
- 8 = Pegmatite
- 0 = Lode

Column 3 = Mineralogy (field classification)

- 1 = Hornblende/Biotite
- 2 = Biotite < 5%
- 3 = Biotite > 5%
- 4 = Biotite/Muscovite
- 5 = Sericitized Biotite/Muscovite
- 6 = Biotite/Muscovite/Tourmaline
- 7 = Tourmaline/Muscovite
- 8 = Muscovite/sericite
- 9 = Greisenised
- 0 = Lode

Column 4 = Classification CMS Adelaide

- A = Adamellite
- D = Granodiorite
- E = Lode
- G = Alkali Granite
- P = Pegmatite
- S = Greisen

SHELL METALS AUSTRALIA  
 SHLMET FILE PRINT PROGRAM  
 BLUE TIER GRANITES

REC #	STATION NUMBER	STATION NAME	SI02	AL203	TI02	FE203	MGO	CAO	NA2O	K2O	MNO	P2O5	LOI	BA
1R15G	0	RS/1	73.70	12.10	0.09	1.51	0.01	0.62	2.60	3.33	0.02	0.02	1.10	110.00
2R28A	0	RS/2	77.40	12.80	0.05	0.60	0.06	0.09	2.20	2.20	0.01	0.01	1.40	80.00
3L0DE	0	RS/3	77.60	6.90	0.09	5.55	0.20	0.78	0.01	0.10	0.23	0.02	3.60	3.00
4R42G	0	RS/4	77.10	11.50	0.12	1.66	0.07	0.67	1.99	3.99	0.01	0.01	1.10	70.00
5R12G	0	RS/5	77.60	12.00	0.09	1.37	0.04	0.12	2.20	2.20	0.01	0.01	1.00	40.00
6R27G	0	RS/6	75.30	14.60	0.01	0.93	0.02	0.16	5.50	5.50	0.01	0.01	0.80	25.00
7R57A	0	RS/7	75.00	14.30	0.02	1.20	0.01	0.07	7.75	4.44	0.03	0.03	0.60	80.00
8R56A	0	RS/8	74.80	14.10	0.04	1.27	0.02	0.24	6.00	6.00	0.03	0.03	1.00	115.00
9R12A	0	RS/9	75.40	12.10	0.08	1.48	0.08	0.72	0.00	0.00	0.00	0.00	1.60	85.00
10R42A	0	RS/10	78.40	11.40	0.11	1.72	0.01	0.70	2.25	2.25	0.00	0.00	1.50	50.00
11R29S	0	RS/11	77.50	13.80	0.04	2.70	0.01	0.03	0.01	0.01	0.00	0.00	2.00	25.00
12R17S	0	RS/12	78.70	12.00	0.07	1.83	0.01	0.06	1.13	1.13	0.00	0.00	1.40	60.00
13R17A	0	RC/13	76.50	13.10	0.04	1.14	0.01	0.22	2.40	2.40	0.00	0.00	0.80	45.00
14R12G	0	RC/14	76.70	13.10	0.04	1.14	0.01	0.22	2.40	2.40	0.00	0.00	0.80	45.00
15R45G	0	RC/15	76.00	13.00	0.07	1.08	0.03	0.03	1.15	1.15	0.00	0.00	0.80	45.00
16L0DE	0	RC/16	73.70	11.60	0.07	0.00	0.09	0.03	0.01	0.01	0.00	0.00	4.90	0.00
17L0DE	0	RC/17	76.00	10.90	0.06	3.95	0.15	0.66	0.01	0.01	0.00	0.00	1.40	50.00
18R42G	0	RC/18	75.20	12.80	0.09	1.73	0.01	0.50	1.86	1.86	0.00	0.00	0.60	35.00
19R42G	0	RC/19	75.10	12.70	0.07	1.75	0.02	0.51	1.15	1.15	0.00	0.00	0.90	40.00
20R14G	0	RC/20	75.30	12.60	0.09	1.82	0.05	0.48	2.20	2.20	0.00	0.00	0.80	30.00

1010

SHELL METALS AUSTRALIA  
 SHLMET FILE PRINT PROGRAM  
 BLUE TIER GRANITES

020

REC #	STATION NUMBER	STATION NAME	FZ	GA	LI	NO	NU	RR	SN	SR	U	W	Y	ZR
1R15G	0	RS/1	0.31	22.00	70.00	30.00	24.00	590.00	18.00	28.00	32.00	10.00	80.00	133.00
2R2BA	0	RS/2	0.10	18.00	140.00	18.00	30.00	470.00	22.00	7.00	16.00	15.00	75.00	120.00
3LODE	0	RS/3	0.53	18.00	240.00	30.00	40.00	460.00	7150.00	14.00	34.00	20.00	100.00	153.00
4R42G	0	RS/4	0.37	18.00	65.00	18.00	24.00	560.00	14.00	28.00	38.00	20.00	115.00	150.00
5R12G	0	RS/5	0.16	22.00	160.00	28.00	36.00	660.00	18.00	14.00	16.00	5.00	65.00	160.00
6R27G	0	RS/6	0.24	17.00	170.00	16.00	34.00	740.00	44.00	12.00	12.00	1.00	3.00	18.00
7R37A	0	RS/7	0.33	22.00	200.00	20.00	38.00	650.00	48.00	26.00	10.00	20.00	14.00	24.00
8R36A	0	RS/8	0.32	22.00	230.00	16.00	30.00	650.00	42.00	26.00	6.00	20.00	16.00	24.00
9R12A	0	RS/9	0.47	13.00	130.00	32.00	30.00	660.00	14.00	24.00	10.00	1.00	175.00	20.00
10R42A	0	RS/10	0.32	22.00	85.00	14.00	38.00	520.00	8.00	26.00	6.00	1.00	125.00	20.00
11R29S	0	RS/11	0.44	20.00	90.00	26.00	36.00	360.00	670.00	18.00	20.00	2.00	14.00	55.00
12R17S	0	RS/12	0.44	20.00	180.00	18.00	20.00	740.00	280.00	12.00	6.00	2.00	16.00	55.00
13R17A	0	RS/13	0.43	150.00	150.00	24.00	22.00	670.00	28.00	26.00	1.00	2.00	30.00	55.00
14R12G	0	RS/14	0.36	160.00	175.00	38.00	26.00	730.00	50.00	28.00	1.00	2.00	18.00	44.00
15R45G	0	RS/15	0.36	175.00	100.00	26.00	34.00	430.00	7350.00	22.00	1.00	2.00	30.00	70.00
16LODE	0	RS/16	0.70	100.00	210.00	28.00	110.00	570.00	4100.00	12.00	1.00	19.00	20.00	75.00
17LODE	0	RS/17	0.20	210.00	180.00	18.00	22.00	650.00	18.00	26.00	1.00	2.00	10.00	75.00
18R42G	0	RS/18	0.60	220.00	180.00	18.00	22.00	650.00	18.00	26.00	1.00	2.00	26.00	80.00
19R42G	0	RS/19	0.59	220.00	230.00	34.00	24.00	640.00	20.00	24.00	1.00	2.00	26.00	80.00
20R16G	0	RS/20	0.37	28.00	170.00	10.00	20.00	550.00	16.00	20.00	1.00	2.00	36.00	85.00

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SHELL METALS AUSTRALIA  
 SHLMET FILE PRINT PROGRAM  
 BLUE TIER GRANITES

REC #	STATION NUMBER	STATION NAME	EU3DB	BA/RB	RB/SR	SNFORM1	SNFORM2	SNFORM3	TI/10	ALINDEX	RB/3
1	00	RS/ 1	40.00	0.19	21.07	0.32	1.74	0.00	53.95	1.08	196.67
2	00	RS/ 2	22.00	0.12	45.71	0.57	4.01	0.01	29.97	1.36	223.33
3	00	RS/ 3	42.00	0.01	47.14	0.36	46.07	0.06	53.95	1.86	220.00
4	00	RS/ 4	35.00	0.13	20.00	0.04	0.33	0.00	71.94	1.16	186.67
5	00	RS/ 5	42.00	0.06	47.14	0.45	7.46	0.00	53.95	1.23	220.00
6	00	RS/ 6	10.00	0.06	51.67	1.99	58.80	6.67	5.99	1.42	246.67
7	00	RS/ 7	10.00	0.12	45.71	1.43	11.99	0.37	11.99	1.49	216.67
8	00	RS/ 8	24.00	0.18	37.50	0.85	4.78	0.03	23.98	1.42	216.67
9	00	RS/ 9	70.00	0.13	27.50	0.11	0.87	0.00	47.96	1.18	220.00
10	00	RS/ 10	65.00	0.07	20.00	0.36	3.71	0.00	65.94	1.10	173.33
11	00	RG/ 1	24.00	0.07	20.00	0.39	8.47	0.03	23.98	3.63	120.00
12	00	RG/ 2	10.00	0.08	41.67	3.92	48.35	0.09	41.96	1.71	246.67
13	00	RG/ 3	26.00	0.07	20.57	0.99	14.81	0.06	23.98	1.33	223.33
14	00	RG/ 4	24.00	0.06	22.81	0.25	4.07	0.03	23.98	1.43	243.33
15	00	RG/ 5	60.00	0.13	22.50	0.33	2.42	0.01	41.96	1.34	210.00
16	00	RG/ 6	40.00	0.13	3.94	0.02	0.18	0.00	41.96	9.78	63.33
17	00	RG/ 7	28.00	0.04	47.50	0.31	8.81	0.11	35.97	2.82	190.00
18	00	RG/ 8	42.00	0.13	18.06	0.83	6.33	0.01	53.95	1.35	216.67
19	00	RG/ 9	44.00	0.12	26.67	0.80	6.33	0.01	41.96	1.30	213.33
20	00	RG/ 10	44.00	0.09	27.50	0.20	2.17	0.00	53.95	1.25	183.33

121

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022

Ben Lomond Granite

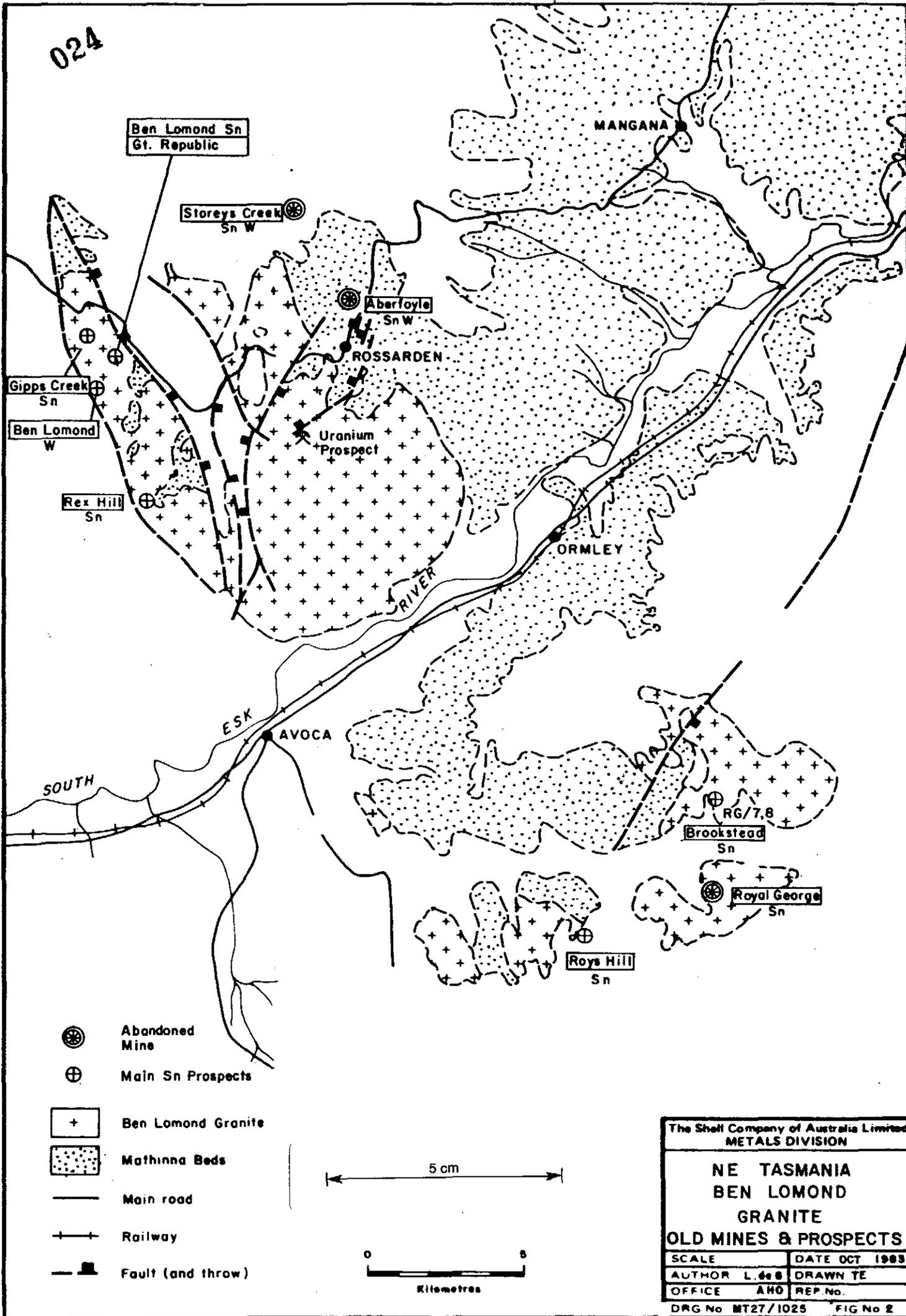
The highest recorded production of hard rock tin in N.E. Tasmania originates from the Avoca area. The recorded production originated from essentially 3 mines (see Table 7). All mining activities have been abandoned in the area, the last ones to close being the underground operations at the Rossarden and Storeys Creek Mines (1979).

The known reserves are estimated to be at least 14,000 t Sn metal (based on a preliminary assessment of mining the Rossarden vein system by open cut methods (Wright, 1983) and informal information obtained from Amax on Royal George).

Apart from the mines, the area contains numerous Sn- prospects as well as Uranium occurrences (see Fig.22). From limited field observation, the styles of Sn- mineralisation can be divided into two types:

- Sn-W bearing vein systems within the Mathinna Beds
- Steeply dipping quartz greisen lodes within granite.

024



Ben Lomond Sn  
Gt. Republic

Storeys Creek  
Sn W

Aberfoyle  
Sn W

Gipps Creek  
Sn

Ben Lomond  
W

Rex Hill  
Sn

Uranium  
Prospect

ORMLEY

ESK  
AVOCA

RG/7,8  
Brookstead  
Sn

Royal George  
Sn

Roy's Hill  
Sn

-  Abandoned Mine
-  Main Sn Prospects

 Ben Lomond Granite

 Mathinna Beds

 Main road

 Railway

 Fault (and throw)

5 cm

0 8  
Kilometres

The Shell Company of Australia Limited METALS DIVISION	
<b>NE TASMANIA BEN LOMOND GRANITE OLD MINES &amp; PROSPECTS</b>	
SCALE	DATE OCT 1983
AUTHOR L. G. S.	DRAWN TE
OFFICE AHO	REP. No.
DRG No MT27/1025	FIG No 2

023

TABLE 7

Recorded Tin Production and Established Tin Potential,  
Rossarden, Royal George, Avoca Area  
(Various Sources)

	Ore (Mln. t)	Grade (%)	Sn-Metal (t)	W <sub>3</sub> (t)	Potential (Sn-Metal)
Rossarden (1939-1979)	2.1	0.5 Sn, 0.3 W <sub>3</sub>	15,489	5,383	>10,000 (@ ±0.2% Sn) (Open cut)
Storeys Creek (1939-1979)	1.1	0.2 Sn, 1.3 W <sub>3</sub>	1,980	11,990	?
Royal George	N/A	>0.5 Sn(?)	1,141	?	>4,000 (@ 0.4% Sn)
Rex Hill	N/A		826xSnO <sub>2</sub>		?
Total					>14,000

TABLE 8

Assay Results, Grab Samples Avoca Area

Location	Sample	Sn ppm	W ppm	Mo ppm	F%
R. George	sericitized granite	6,700	25	26	0.44
R. George	silicic lode	7,350	50	26	2.77
Brookstead	tourmaline/quartz	7,100	1,95%	28	1.20
Rex Hill	silicic lode	7,150	30	30	0.55
	sericitized granite	1.02%	-	-	-

025

The former has been mined at Rossarden and Storeys Creek. The mineralised veins are massive, milky quartz (high temp?) and may reach over 1m in thickness. The vein system coalesces and splits up. The vein system at Rossarden is spatially directly related to an aplitic granite. Sn- grades generally decrease with depth while W increases with depth. The overall grade drops with depth (Blissett, 1959). Several mineralised vein systems are known in the area. Some may be amenable to open cut mining, but need further exploration.

Steeply dipping quartz greisen lodes occur at Rex Hill, Royal George, Brookstead, Roys Hill, "Ben Lomond Tin and Tungsten Mines", the Great Republic Mine, Longtunnel and Roys