

# Section 1: Economic and General Geology

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## 1. Notes on a reconnaissance of the granitic rocks of Flinders Island

D.I. Groves

At the request of J.E. Shirley, acting on behalf of T. Green who holds an exploration licence (E.L. 27/70) covering Flinders Island, a visit was made to that island in the company of J.E. Shirley and K.D. Corbett between 16 and 21 August 1970. The object of the visit was to make a reconnaissance of the granitic rocks of the island to assist later systematic mapping, and to ascertain the location of possible source rocks for known and potential alluvial tin deposits.

Although several mapping projects have been carried out on the island (e.g. Blake, 1947; Everard, 1950; Jack, 1966; Sutherland, unpublished) little work has been done on subdivision of granitic rocks, although D.J. Jennings of the Department of Mines collected several granitic samples from the island in 1969 (Department of Mines Plan 3274). The distribution of granitic rocks examined on this visit, and on the visit of D.J. Jennings, are discussed below.

### GEOLOGY OF GRANITIC ROCKS

It became immediately apparent that the areas designated as granite on all previous maps were grossly exaggerated. An attempt was made, largely by photo-interpretation with limited ground control, to divide areas of actual 'granite' outcrop from areas of quartz gravels and sands, and thick silica-rich soils that probably lie over granitic rocks (fig. 2). The folded sedimentary sequence that has been correlated with the Mathinna Beds of north-east Tasmania was not examined in any detail during this study, but appears to be generally poorly exposed, occurring mainly as scattered angular blocks of siltstone and mudstone in clayey soils.

Nine main types of granitic rocks were distinguished on the basis of their macroscopic features, although it is probable that several of these types are gradational. Microscopic investigations of the collected samples have not yet been undertaken but the numbers of specimens collected are shown in Figure for future reference. The granitic rocks are in general superficially similar to granitic rocks from the Blue Tier Batholith in north-east Tasmania (e.g. Gee and Groves, 1971), and are probably of similar age (Upper Devonian), although results on samples sent for isotopic age determinations in 1969-70 are not yet available.

#### Mt Tanner Area

The granitic rocks of the Mt Tanner area were examined on Mt Tanner, Tanner Bay, Killiecrankie Bay, NE of The Paps and at Leeka. The rocks are predominantly grey to yellow-brown, coarse-grained biotite granite/adamellites that are porphyritic in places with large K-feldspar phenocrysts. Xenoliths occur only rarely. At Killiecrankie Bay the granitic rocks have a very variable texture with abundant mineralogical banding, dykes of tourmaline-bearing pegmatites, microgranites and aplites. Dykes of late acid rocks are generally rare elsewhere. Similar coarse-grained biotite granite/adamellites occur on the ridge immediately east of Whitemark, and similar rocks also occur on the southern end of this ridge towards Ranga, but they are generally finer grained. (fig.2).

### Palana - North Point Area

The granitic rocks of this area are essentially grey porphyritic biotite granite/adamellites with relatively sparse K-feldspar phenocrysts, abundant biotite and sparse muscovite. Xenoliths are relatively common. At North Point several flat-lying banded sheets of muscovite-bearing microgranites and large pegmatite patches occur in the porphyritic granite. At Quoin Hill to the north of this general area there are exposures of medium-grained biotite-muscovite granites that exhibit similarities to the 'tin granites' of north-east Tasmania (e.g. Thomas, 1943).

### Emita - Blue Rocks Area

The granitic rocks of the Emita-Blue Rocks area are similar to those of the Palana - North Point area. Along the coastline between Emita and Settlement Point there are numerous acid dykes containing tourmaline and biotite clots, together with thick microgranite dykes and pegmatites.

### Ranga Area

The granitic rocks of this area are similar to those of the two areas previously described, but are more variable in texture and composition, particularly as muscovite is a significant component of some rocks.

### Mt Killiecrankie - Mt Boyes Area

The rocks of this area are pale grey porphyritic biotite granites, containing abundant K-feldspar phenocrysts and relatively sparse biotite. Pegmatites, aplites and microgranites are generally not abundant, although on the western slopes of Mt Boyes there are several patches of biotite-muscovite microgranite.

### Pats River Area

This area contains biotite-hornblende granodiorites and biotite granodiorites that contain abundant xenoliths. They show no cataclastic foliation as recorded from some similar granodiorites in north-east Tasmania, and also exhibit a marked lack of acid dykes.

### Patriarchs Area

The rocks exposed on the Middle Patriarch and the northern end of The Dutchman are yellow-brown, medium- to coarse-grained biotite-muscovite granites. Xenoliths are relatively rare, and acid dykes have not been seen.

### Lady Barron Area

The granitic rocks of this area are compositionally and texturally similar to those of the Patriarchs area, but are generally white in colour. They are medium- to coarse-grained biotite muscovite granites and/or adamellites that contain limited xenoliths.

### Loccota Area

These rocks are extremely coarse-grained porphyritic biotite-muscovite granite/adamellites with abundant, very large K-feldspar phenocrysts. Small bodies of muscovite granite and biotite-muscovite microgranite occur in places, and xenoliths occur rarely.

## REGIONAL STRUCTURE OF BEDROCK

Insufficient work has been done to define positively any regional structure in the granitic rocks and Mathinna Beds on Flinders Island. The outcrop pattern of the Mathinna Beds, and isolated bedding determinations, suggest that they may form essentially NNE-trending blocks, particularly if the flat area to the north of Centre Hill is underlain by Mathinna Beds. This appears possible as there is a distinct break in the outcrop of granitic rocks in this area whereas elsewhere they crop out boldly if somewhat sporadically. There are some indications from the distribution of the granitic rocks that they may also represent large blocks with N- to NNE-trending sides, but this requires far more work for verification.

## DERIVATION OF ALLUVIAL TIN DEPOSITS

The granitic rocks in the headwaters of present drainage of Pats River, Officers Creek and Leventhorpe Creek, where tin deposits are known (Jack, 1966), appear in the area covered to be largely even-grained biotite-muscovite granites. These granites are similar to the 'tin granites' of north-east Tasmania (e.g. Thomas, 1943), from which most of the alluvial tin deposits in north-east Tasmania appears to have been locally derived. The tin deposits of the Tanners Bay field (Jack, 1966) occur in Tertiary sediments along the contact between two contrasting granite types, neither of which are 'tin granite' varieties (fig. 2). However the exposures in the base of the worked pits are of greisenised biotite-muscovite granite similar to the 'tin granites'.

It appears likely from this somewhat cursory examination that the cassiterite in the alluvial tin deposits has been derived from similar 'tin granites' to those in north-east Tasmania, from which alluvial tin deposits have also been derived. It obviously requires further detailed work for this association to be verified, but if correct it could be used as a prospecting guide for further tin deposits in the low lying areas at the base of granite hills. This prospecting technique would be particularly suitable in the Furneaux Group where there are large areas of well-exposed granitic rocks, and large areas of flat-lying intervening ground with possible economic potential. Previous prospecting work has largely ignored the determinations of source rocks, and therefore has not successfully confined the search for tin deposits to small areas of relatively high potential, which can be investigated more thoroughly.

## REFERENCES

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- GEE, R.D.; GROVES, D.I. 1971. Structural features and mode of emplacement of part of the Blue Tier Batholith in northeast Tasmania. *J. geol. Soc. Aust.* 18:41-56.
- JACK, R. 1966. Flinders Island tin deposits. *Tech. Rep. Dep. Mines Tasm.* 10:49-51.
- THOMAS, D.E. 1943. Tin deposits of the Blue Tier district. *Unpubl. Rep. Dep. Mines Tasm.* 1943:35-73.

# BEDROCK SKETCH MAP FLINDERS ISLAND



Geology by D.I. Groves  
 Drawn by T.R. Bellis  
 September 1970

### QUATERNARY and TERTIARY

- Mainly marine sediments
- Areas previously mapped as granitic rocks - largely quartz gravels and thick granite soils

### SILURIAN-DEVONIAN

- Mathinna Beds - outcrop, scree and soils - sketched from previous maps

### DEVONIAN

- Undifferentiated granitic rocks
- Pink to yellow-brown medium-grained biotite granite, biotite-muscovite granite and biotite-muscovite microgranite. Xenoliths very rare.
- Grey porphyritic biotite granite/adamellite with minor microgranites, apites and pegmatites. Granite/adamellite with abundant biotite, relatively sparse phenocrysts and rare muscovite. Xenoliths fairly common.
- Grey porphyritic biotite granite with minor pegmatite and apites. Phenocrysts abundant and biotite relatively sparse. Xenoliths rare.
- Grey to yellow-brown coarse-grained (porphyritic) biotite granite with minor pegmatites and microgranites. Xenoliths rare.
- Grey to yellow-brown medium-to coarse-grained biotite granite. Xenoliths rare.
- Yellow-brown medium-to coarse-grained biotite-muscovite granite. Xenoliths rare.
- White medium-to coarse-grained biotite-muscovite granite/adamellite. Xenoliths rare.
- Coarse-grained porphyritic biotite-muscovite granite with minor muscovite granite and biotite-muscovite microgranite.
- Biotite-hornblende granodiorite and biotite granodiorite. Xenoliths relatively common.

Specimen locality D.I. GROVES, August 1970

Specimen locality D.J. JENNINGS, 1969

Tin prospects

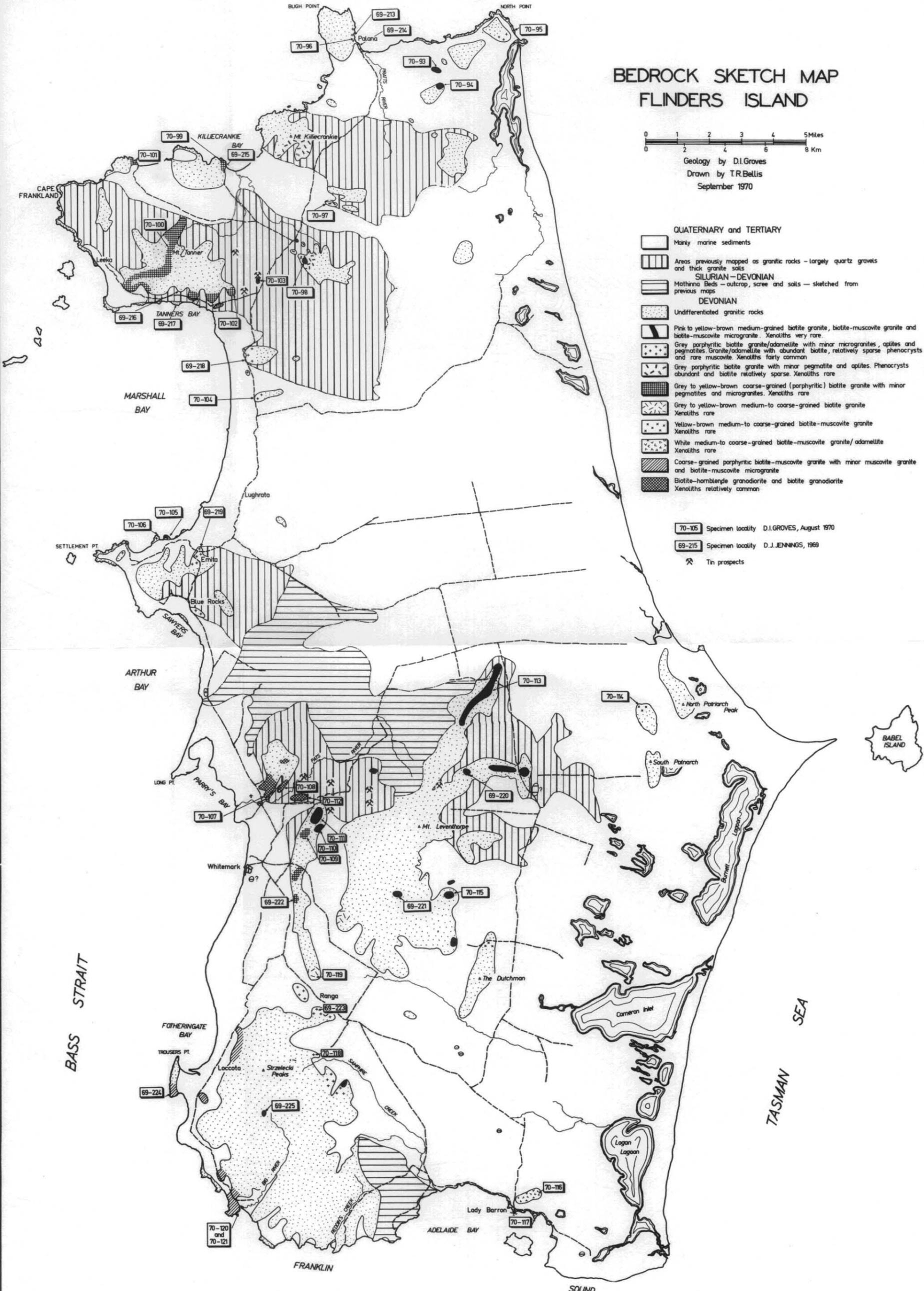


Figure 2.

