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PEGMATITES IN THE HAY RIVER 4-MILE SHEET AREA,
NORTHERN TERRITORY.

by

D.J. Forman & K.G. Smith

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

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ABSTRACT

Numerous pegmatites crop out in a small part of the area covered by the Hay River four mile sheet (F53/16), Northern Territory. The area is remote and waterless. Some of the pegmatites carry muscovite in books whose size would encourage prospectors, but much of the feldspar of the pegmatites is microcline, which is generally unfavourable for the occurrence of commercial quantities of muscovite. The area was mapped in 1959. No signs of prospecting were seen.

INTRODUCTION

The Hay River four mile sheet is bounded by the 23rd and 24th parallels of south latitude and the meridians of 136 degrees 30 minutes and 138 degrees of east longitude (fig. 1). Figure 2 shows the area where pegmatites crop out on the Hay River sheet. There are no formed roads leading to this area; tracks made by geologists and surveyors provide access. One of these tracks joins the track from Junction Bore to Lucky Bore (fig. 2) about six miles south east of Junction Bore. Another track follows the Hay River from Junction Bore to Mt. Winnecke.

The area is on the northern fringe of the Simpson Desert. The country consists of sandplain with small peaks of igneous and metamorphic rocks, and buttes and mesas of sedimentary rocks; sand dunes occur to the south, east and west. The sandplain is covered by spinifex and sparse shrubs; gidyea trees grow on small areas underlain by limestone.

The closest supplies of permanent water are located at Junction Bore and at Lucky Bore; each of these is about 30 miles from the centre of the area where pegmatites crop out. After heavy rains, water can be obtained from a soakage in the Hay River about 5 miles upstream from Mt. Winnecke. The Hay River rarely flows. Water might be obtained by sinking shallow wells in the bed of the stream, or by boring in alluvium on its banks.

The authors mapped the pegmatite bearing area during 1959, when a field party from the Geological Branch of the Bureau of Mineral Resources, Geology and Geophysics mapped the Tobermory and Hay River four mile sheets. This survey was part of a regional survey of a large part of Central Australia; the same field party had previously mapped the Huckitta four mile sheet, where the geology of pegmatite outcrops was reported by D.R.G. Woolley (Records 1959/88). This record continues the party's policy of reporting areas of mica-bearing pegmatites.

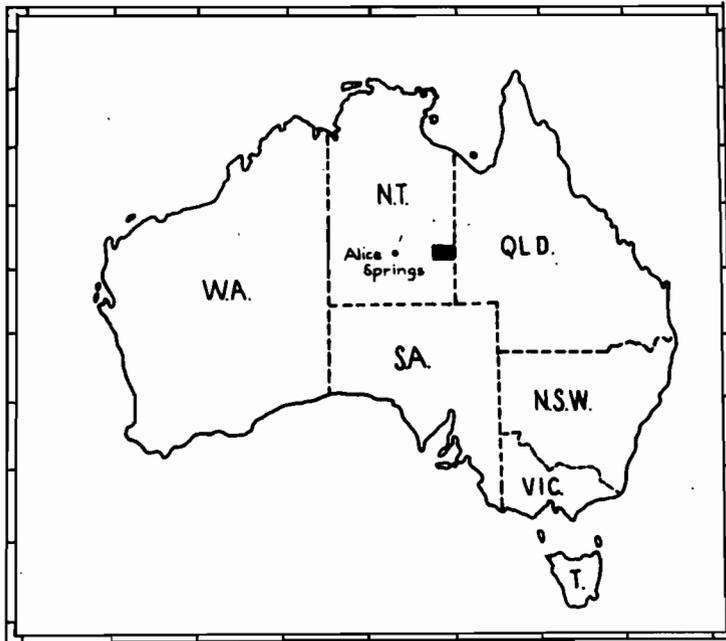


FIG. 1
LOCALITY MAP

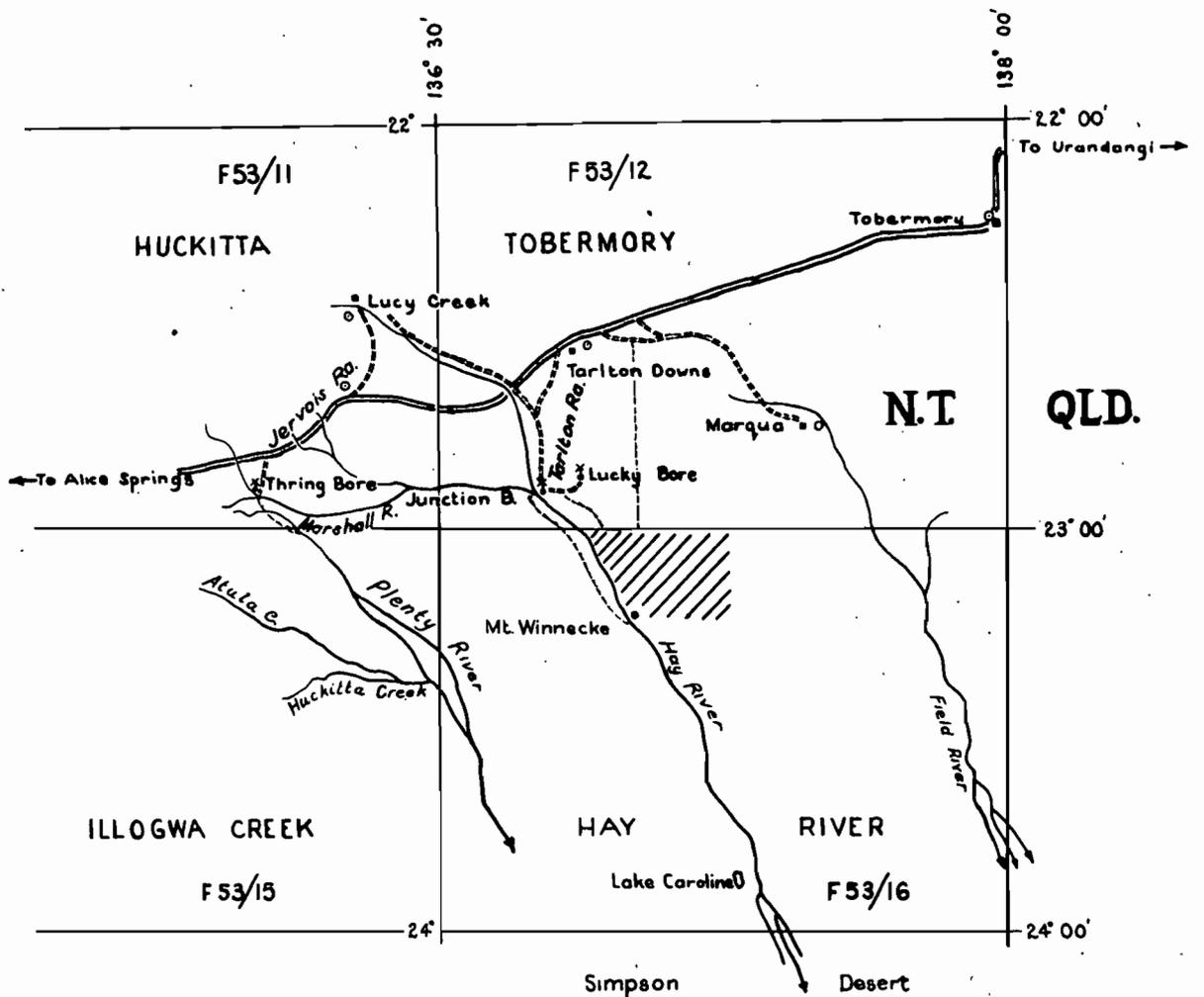


FIG 2
LOCALITY MAP
Scale 32 miles to 1 inch

REFERENCE	
	Main Track
	Vehicle Track
	Track
	Homestead
	Licensed Landing ground
	Area in which pagmatites occur

GEOLOGYThe pegmatite-bearing rocks:

The following is a summary of the sequence in the Precambrian rocks.

Upper Proterozoic	Sediments
	Unconformity
	Pegmatites and quartz blows
	<u>Intrusive contact</u>
	<u>? albite dykes and granite</u>
	<u>aplite dykes</u>
	<u>Intrusive contact</u>
Lower Proterozoic	Coarse-grained porphyritic granite, coarse, even-grained granite, medium even-grained granite, quartz porphyry and quartz feldspar porphyry. (A granite complex with intrusive and gradational contacts between rock types).
	<u>Intrusive contact</u>
? Archean	Schists, meta-quartzite, meta-conglomerate and gneiss of Arunta Complex.

The plate shows the field relationships and structure of these rocks.

The Pegmatites:

Pegmatites are abundant. They range from a few feet to 300 feet in length and are up to six feet wide. Typically they contain quartz, microcline, muscovite, and tourmaline; zoning of minerals is common in the larger pegmatites. Grain size ranges from fine to coarse.

Average grain size is defined (Joklik, 1955, p.137):

Fine-grained----less than one inch,

Medium-grained----between one and four inches,

Coarse-grained----greater than four inches.

The recorded strikes were insufficient to prove a preferred orientation of the pegmatites. The measured strikes show a poorly-defined maximum at 300 degrees and a less distinct one at 25 degrees. Nearly all are discordant with the foliation of the enclosing rock.

The pegmatites are mostly small, ramifying, irregular in shape, and fine to medium-grained. Some are more regular (tabular or lenticular) in shape.

Most contain a high proportion of muscovite, in small books.

Joklik (1955 p.178) gave the following suggestions for prospecting for mica:

"In selecting a pegmatite which is to be explored for shoots of payable mica, some desirable features should, in the writer's opinion, be borne in mind ----

- (1) The pegmatite should be
 - (a) Discordant
 - (b) Coarse grained
- (2) The pegmatite should contain only small amounts of --
 - (a) Graphitic pegmatite
 - (b) Biotite
- (3) The pegmatite should be well zoned.
- (4) The presence of a prominent tabular quartz core is desirable.
- (5) The predominant feldspar in the pegmatite should be plagioclase, not microcline.
- (6) The presence of some book mica at the surface is desirable."

Very few of the pegmatites in the Hay River area are coarse-grained, and the dominant feldspar in most cases is microcline, not plagioclase.

A few of the pegmatites reach a large size. The time available for the survey did not allow for all pegmatites within the area to be examined and possibly large pegmatites occur partly covered by sand at the base of the hills. None was examined by costeaning.

Details of all the larger pegmatites seen, and a selection of typical smaller ones, are summarized in the accompanying table. The number by which each pegmatite is designated is the field point number of the locality at which the pegmatite occurs. These numbers are recorded on air-photographs held by the Bureau of Mineral Resources in Canberra. The points are plotted on plate 1.

REFERENCES

- | | | |
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Table of Pegmatites in the
Hay River 4-Mile Area

Abbreviations Used :

Q = Quartz F = Feldspar F(m) = Microcline
F(p) = Plagioclase M = Muscovite
T = Tourmaline

Number	Dimensions	Mineral Content	Strike	Concordance	Remarks
31	Ramifying veins	Q, F, M, T.		In granite	
33		Q, F(m), M.	350	In granite	Coarse grained
34	Ramifying veins	Q, F(m), M.	360	In granite	
35	Ramifying veins up to 3ft wide	Q, F(m), M.	270	In granite	
37	Ramifying veins 6in-12in wide	Q, F(m), M, T.	280 10	In granite	Coarse grained abundant 2" x 2" books of muscovite
38		Q, F(m), M, T.	10	Concordant	
39	6 in wide	Q, F(p), M, T.		Discordant	
40	Small proportions	Q, F(p), M.		Discordant	
41	6 in wide ramifying	Q, F(m), T.	360	Concordant	
42	300ft x 2ft	Q, F(m), M.		Concordant	Coarse grained
45	300ft x (3ft-6ft) 150ft x 2ft 180ft x 3ft	Q, F(p), M, T.	320	Discordant	
46	Ramifying	Q, F(p), T.		Discordant	
49	Thin veins	Q, F(m),	290	Discordant	
66		Q, F(m), M.	30		
201	Ramifying veins	Q, T, M.			
207	100ft x 6in	Q, F, M.	360	Discordant	
216	60ft x 18in	F(m), M.	300		
218		Q, M, T.		Discordant	
242	180ft x 18in	Q, F.	80	Granite	

Number	Dimensions	Mineral content	Strike	Concordance	Remarks
82	20ft x 1ft	Q,F(m),M,T.		Discordant	Muscovite sparse thumb- nail size.
88		Q,F(m),M,T.	320	Discordant	Medium-grained
93	1½ x 1½ in.	Q,F(p),M,T.		Discordant	Abundant 1½/ 1½in books of mica.
101	50ft x 2ft	Q,F(m),M,T.	310	Discordant	Books of mica up to 4in 4in.
125	1ft wide	Q,F(m),M.	345	In granite	4 in.x 4 ins.
1521	Small	Q,F(m).		In granite	Fine to coarse grained.
1664	100ft x 1ft Irregular	Q,F(m),M.	285	Concordant	Thumb-nail size mica, medium- grained peg- matite
1717		Q,F(m),M.		In granite	Thumb nail mica

GEOLOGICAL MAP OF PART OF HAY RIVER 4-MILE SHEET SHOWING PEGMATITE LOCALITIES

APPROXIMATE SCALE



GEOLOGY BY K.G. SMITH AND D.T. FORMAN

Reference	Symbol	Description
QUATERNARY	Qs	Sand, dunes
? PERMIAN	Pt	Coarse grained - medium grained, poorly sorted sandstone and white laminated siltstone
MIDDLE CAMBRIAN	Em	Platy blue limestone with lenses of medium grained calcareous sandstone
	EmS	? Laminated siltstone, white-grey chert and sandstone
UPPER PROTEROZOIC	Egr	White - pale yellow green, medium grained, thin bedded - laminated, indurated, fluggy, quartz sandstone and some arkose
LOWER PROTEROZOIC	Egr	Coarse grained perthritic granite, coarse grained even granite, medium grained even granite, medium grained perthritic granite, fine grained even granite, quartz perthite and quartz feldspar perthite albite dykes and granite aplite dykes.
? ARCHEAN	Aa	Schists, meta quartzite, meta conglomerate and gneiss

Geological boundaries	Faults
Established boundary, position approximate	Inferred probable or indefinite fault
Interfered, probable or indefinite boundary, concealed	Dykes or veins
Strike and dip of strata	Pegmatite
Inclined	Pegmatite with point number of locality
Trend of bedding	Quartz vein
Strike and dip of foliation	Photo location
Inclined	Photo centre, photo number and run number
Vertical	
Strike and dip of foliation and plunge of lineation	
Inclined	
Inclined, dip not measured	
Vertical	
Strike and dip of joints	
Inclined	
Vertical	
Folds	
Established synclinal trough - position approximate (showing direction of plunge)	

