COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

REPORT No. 89

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# The Geological Relationships of the Rum Jungle Complex, Northern Territory

BY

J. M. RHODES

*Issued under the Authority of the Hon. David Fairbairn*
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MINISTER: THE HON. DAVID FAIRBAIRN, D.F.C., M.P.

SECRETARY: SIR HAROLD RAGGATT, C.B.E.

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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## SUMMARY

The Rum Jungle Complex is a granitic complex which occupies the core of an eroded dome of low-grade metasediments. Six major units have been distinguished in the Complex; these are, in order of decreasing age, schists and gneisses, granite gneiss, meta-diorite, coarse granite, large feldspar granite, and leucocratic granite. Veins and dykes of pegmatite and amphibolite, and quartz-tourmaline veins are also present.

The metasediments have not been intruded by the granites of the Rum Jungle Complex as was previously thought but rest unconformably on the eroded surface of the older rocks. During a later period of folding and low-grade metamorphism the metasediments were domed around the granitic basement. The structure is similar to some of the mantled gneiss domes in Finland.

## INTRODUCTION

The Rum Jungle Granite was first mentioned, but not defined, by Fisher & Sullivan (1954). Because it is, as will be described here, a complex of metamorphic and granitic rocks I have renamed it the Rum Jungle Complex. Its extent and the geological setting are delineated in a map published by the Bureau of Mineral Resources (B.M.R. 1960). It lies in the core of a dome of low-grade Lower Proterozoic metasediments of the Pine Creek Geosyncline (Malone, 1962 a & b). The Complex is situated at Rum Jungle in the Northern Territory, about 50 miles south of Darwin. Interest in the region has been continuous since 1949, when uranium-copper mineralization was discovered at Rum Jungle in the metasediments adjacent to the Complex. Previous workers believed that the metasediments were domed and intruded by the granite (Sullivan & Matheson, 1952; Malone, 1962a). Sullivan & Matheson (1952) and Roberts (1960) have suggested that the uranium mineralization was related to the granite intrusion, but Condon & Walpole (1955) considered that the uranium mineralization was controlled by the sedimentary environment and was unrelated to the granite.

In 1962 B.P. Ruxton and J. Shields of the Bureau of Mineral Resources (pers. comm.) recognised two main types of granite, an early coarse-grained variety associated with migmatite and a later leucocratic type. They also found, at the margins of the Complex, evidence suggesting that the surrounding metasediments rest unconformably on some if not all of the granitic rocks of the Complex.

The results of a more detailed study of the rocks in the Complex and their relationships with the surrounding low-grade metasediments are presented in this Report.

## GENERAL RELATIONSHIPS

The Rum Jungle Complex occurs in two adjacent structures which are surrounded by domed metasediments (Fig. 1). In the larger southern dome the Complex has an area of about 80 square miles; and the area of the smaller northern dome is about 8 square miles. Exposures in the southern, central, and north-eastern parts of the Complex are scattered but fairly abundant, but in the north and north-west there are few exposures and the boundaries are ill defined.

The Giants Reef Fault, a dextral wrench fault with a north-easterly strike, cuts both the Complex and the surrounding metasediments. It has a horizontal displacement of 3.6 miles.

The domed metasediments dip outwards from the Complex at angles ranging from $30^{\circ}$ to $70^{\circ}$, except where they are faulted against the granitic rocks or intensely contorted. Malone (1962 a & b) made similar observations, but he maintained that the granite was a concordant intrusion which locally transgressed the metasediments. However, he also states that the Beestons Formation, which is the oldest exposed unit of the surrounding metasediments, 'may have been deposited directly on basement'.

Figure 1 shows that the direction of foliation in the various units of the Complex does not appear to be related to the concentric pattern of the surrounding metasediments.

## THE METASEDIMENTS

The metasediments surrounding the Rum Jungle Complex have been divided into the Batchelor Group and the overlying Goodparla Group, the latter including the Golden Dyke and Masson Formations (Malone, 1962 a & b). They are considered to be of Lower Proterozoic age (Walpole & Smith, 1962).

The Batchelor Group consists mainly of arkose, grit, conglomerate, quartz-greywacke, quartz-hematite breccia, and phyllite, interlayered with dolomite, tremolite-quartz-calcite schist, tremolite-talc schist, and talc schist. Malone (1962 a) also records andalusite-muscovite schist, but a close examination by the author failed to find andalusite in the phyllites near the contact with the Complex. Roberts (1960) records the presence of two generations of andalusite in the mineralized shear zones of White's mine. He states, however, that the andalusite is confined to the shear zones and is not found in rocks of the same lithology on either side of it. Malone interprets the assemblages as products of contact metamorphism, although they may equally well be low greenschist facies assemblages.

The Golden Dyke Formation overlies the Batchelor Group and is nowhere in contact with the Complex. It consists predominantly of pelites and semi-pelites. Both the Golden Dyke Formation and the Batchelor Group are locally silicified, and in places the silicification is accompanied by quartz-tourmaline veins.

The Acacia Gap tongue of the Masson Formation is a tongue of predominantly arenaceous rocks which lenses into the lower part of the Golden Dyke Formation.

Amphibolites, composed of hornblende or actinolite and plagioclase, occur in the Golden Dyke Formation on the western side of the Complex. They probably represent tholeiitic dolerite sills (see Table 1) which were emplaced in the sediments before folding and metamorphism. Similar amphibolite bodies occur in other parts of the Pine Creek Geosyncline (Bryan, 1962).

Although in general the metasediments form a broad dome dipping away from the Complex, in detail the structure is complicated. P. Williams of Conzinc-Rio Tinto (pers. comm.), who made a structural study of the area, identified three major periods of folding: an early east-west folding, a period of north-west folding, and a subsequent folding sub-parallel to the Giants Reef Fault. The north-west folding is the most prominent and coincides closely with the main direction of folding in the Pine Creek Geosyncline.

## ROCKS OF THE COMPLEX

Six major rock units have been distinguished in the Rum Jungle Complex (Fig. 1). In order of decreasing age these are: schist and gneisses, granite gneiss, meta-diorite, coarse granite, large feldspar granite, and leucocratic granite. Veins and dykes of pegmatite and amphibolite are also present. The amphibolites in the Complex are mineralogically and chemically similar to those in the surrounding metasediments. Quartz-tourmaline veins are fairly common at the margins of the Complex and in the surrounding metasediments.

The schists, gneisses, and granite gneiss are strongly contorted, but the general direction of strike is easterly. The meta-diorite and the granites are mostly massive, except that a locally developed conspicuous foliation with a constant strike of about $140^{\circ}$ can be found throughout the Complex, irrespective of the distribution of the major rock types or the boundaries between them. This secondary foliation is sub-parallel to the axes of the north-westerly folds of the surrounding metasediments. In places the shearing has been so intense that otherwise massive rock develops a segregation banding consisting of alternating light and dark bands. All the rocks of the Complex show varying degrees of post-crystalline fracturing, deformation, and retrogressive metamorphism. Many parts of the contact between the Complex and the metasediments have been intensely sheared and mylonitized, and it is difficult to distinguish between the sheared granite and sheared arkose of the Batchelor Group.

## Schists and Gneisses

The schists and gneisses, which are believed to have originated from sedimentary rocks, include biotite gneiss, biotite-muscovite gneiss, biotite granofels, thinly banded feldspathic gneiss, quartz-muscovite schist and possibly phyllite, chlorite schist, and actinolite schist. They are found in a small, poorly exposed area on the eastern side of the Complex or as inclusions and remnants within the younger rocks of the Complex. The phyllites and the chlorite and actinolite schist occur along the immediate margin of the Complex. Because of the paucity of outcropit is not clear whether they are locally retrogressively metamorphosed schists and gneisses or low-grade metamorphic rocks of the surrounding Batchelor Group.

The schists and gneisses contain quartz, microcline, plagioclase, biotite, and muscovite in varying proportions, with sphene, magnetite, and fluorite as common accessory minerals. In some localities biotite forms small ovoid clusters that may be relicts of original garnet. Pinnite pseudomorphing cordierite is found in large granofels inclusions within the coarse granite near the railway east of Mount Fitch. Fine microscopic veinlets of microcline and quartz are invariably present along grain boundaries and cutting fractured minerals.

The presence of oligoclase, or oligoclase and minor epidote, suggests that they have formed under conditions of the almandine-amphibolite facies (Turner & Verhoogen, 1960).

## Granite Gneiss

The granite gneiss occurs in an arcuate belt, which has been displaced by the Giants Reef Fault, in the centre of the Complex (Fig. 1). The relationship of the granite gneiss to the meta-diorite and coarse granite is uncertain as they do not come into contact, but the granite gneiss contains inclusions of schist and gneiss and is cut by the leucocratic granite (Pl. 4, Fig. 1) and by pegmatite veins. It appears to grade into the large feldspar granite by the increase in the number of large microcline crystals.

It is medium and even-grained, and ranges from well-banded granite gneiss (Pl. 1, Fig. 1) through streaky and nebulitic granite gneiss to homogeneous granite gneiss (Berthelson, 1961). In places it is agmatitic and contains both rounded and angular inclusions of contorted schist. The irregular orientation of the foliation in the inclusions indicates that they have been rolled (Pl. 1, Fig. 2).

The granite gneiss is extensively contorted, but the general trend of the foliation or banding ranges from $90^{o}$ to $180^{o}$, the most prominent direction being about $110^{o}$. The foliation and banding are generally vertical or steeply inclined. Because of the intense folding, and the intimate association with the schists and gneisses, the granite gneiss is believed to be older than both the meta-diorite and the coarse granite.

The granite gneiss consists of microcline, quartz, oligoclase, and biotite, with muscovite in places, and accessory apatite, fluorite, and zircon. The presence of small grains of secondary epidote in the oligoclase, indicates that the rock has undergone slight retrogressive metamorphism.

## Meta-Diorite

The meta-diorite is of small areal extent and occurs in two localities, one south of Manton Dam and the other on the eastern side of the Complex, south of the Giants Reef Fault. It also occurs as small inclusions or remnants in the large feldspar granite.

The rock is dark, fine-grained, and massive, except where locally sheared. It cuts sharply across the foliation and banding in the metamorphic rocks (Pl. 2, Fig. 1) and is intruded and veined by the leucocratic granite (Pl. 3, Fig. 2). Its relationship to the coarse granite is not known, but it appears to grade laterally into the large feldspar granite. The meta-diorite is of magmatic origin and was emplaced after the metamorphism and migmatization of the schists and gneisses, but before the intrusion of the leucocratic granite.

The meta-diorite is composed of oligoclase ($An_{26}$), biotite, and quartz, with minor epidote, sphene, and magnetite. Also present are microscopic intergranular patches and veins of aplitic microcline and quartz similar to those in the schists and gneisses. The bending or fracturing of many of the plagioclase crystals is probably related to the strong north-west shearing. The epidote inclusions in the oligoclase indicate partial retrogressive metamorphism. Epidote also occurs in clusters with biotite. The retrogressive metamorphism of the meta-diorite inclusions in the large feldspar granite has been complete, and the epidote is accompanied by secondary albite. There is also an increase in the proportion of intergranular aplitic material.

## Coarse Granite

The coarse granite is confined to the southern end of the Complex. It is a pink, leucocratic, massive, coarse and fairly even-grained adamellite. It contains xenoliths of schist and is cut by veins of the leucocratic granite (Pl. 4, Fig. 2). The coarse granite appears to grade into the large feldspar granite, and is thought to be the older of the two.

The coarse granite consists of microcline, quartz, plagioclase, biotite or chloritized biotite, and sericite. Fluorite is a common accessory, as in the leucocratic and large feldspar granites. The pale blue opalescent quartz is characteristic. The plagioclase ranges from albite ($An_5$) to oligoclase ($An_{12}$) and appears to be primary, but in some crystals small amounts of secondary carbonate are present. Along the southern margin of the Complex, where the shearing has been most intense, the plagioclase has been almost completely sericitized, and veinlets of quartz cut the fractured mineral grains.

## Large Feldspar Granite

The large feldspar granite is the most extensive and widely distributed member of the Complex. It contains inclusions or remnants of schist, gneiss, and diorite. The contacts with the inclusions and with the older members of the Complex are gradational with a gradual increase in the proportion of large feldspar crystals (Pl. 3, Fig. 1), and the large feldspar granite is nowhere clearly intrusive into the older members of the Complex. The granite is intruded and veined by pegmatites and by the leucocratic granite (Pl. 5, Fig. 1). Where some veins of leucocratic granite cut across the large feldspar granite, accretions of large feldspar crystals occur at the contact within the large feldspar granite.

The large feldspar granite is an adamellite composed of microcline, quartz, plagioclase, and biotite or chloritized biotite. It is characterized by the abundance of large tabular or ovoid feldspars up to 2.5 inches long (Pl. 2, Fig. 2; Pl. 5, Fig. 1). The feldspar is generally microcline, but albite is found at the contact with the meta-diorite to the south of the Giants Reef Fault. The accessory minerals include magnetite, abundant sphene, apatite, zircon, and fluorite, with secondary muscovite, epidote, and carbonate. Intergranular veins of aplite and patches of microcline and quartz, similar to those found in other members of the Complex are abundant, and many crystals are veined or entirely enclosed by the fine-grained aplite. Many of the plagioclase crystals have been partly digested by the fine-grained aplite, and replacement of the plagioclase by microcline is a common feature in the large feldspar granite.

The plagioclase ranges in composition from albite to oligoclase. The albite is secondary and is intergrown with secondary calcium-bearing minerals such as epidote and calcite. Many of the plagioclase crystals have also been extensively replaced by sericite. The retrogressive metamorphism to the greenschist facies appears to be closely associated with the quartz-microcline veining. In the diorite and granite gneiss there is relatively little quartz-microcline veining and the degree of retrogressive metamorphism is small, but in the large feldspar granite, where the veining by quartz and microcline is more intense, the degree of retrograde metamorphism is much more pronounced.

Leucocratic Granite and Pegmatites

The large intrusion of leucocratic granite in the southern part of the Complex has been displaced by the Giants Reef Fault. Smaller intrusions occur in the west and to the south and west of Manton Dam. Numerous dykes and veins of leucocratic granite occur in the large feldspar granite, and to a lesser extent in the other members of the Complex. The smaller and poorly exposed dome at the northern end of the Complex probably consists mainly of leucocratic granite with abundant inclusions of gneiss and granite gneiss. The leucocratic granite south of Manton Dam also contains many gneissic inclusions. It is the youngest member of the Complex, and is cut only by the quartz-tourmaline veins, and veins of pegmatite (Pl. 5, Fig. 2) and amphibolite.

The leucocratic granite is a fine to medium, even-grained, pink or grey adamellite which is aplitic and pegmatitic in places. It consists of microcline, quartz, albite, chloritized biotite, minor muscovite, and accessory apatite, magnetite, fluorite, zircon, and occasionally epidote. The textural relationships suggest that the microcline and albite crystallized simultaneously. The albite is considered to be primary, because secondary calcium-bearing minerals are absent (Marmo, 1961). The texture and mineralogical composition of the leucocratic granite is similar to the late kinematic granites of Finland (Marmo, 1955). In some specimens a little fine microcline-quartz aplite is found along the intergranular boundaries. The aplite is similar to that in the large feldspar granite. The intergranular aplite is probably a late magmatic phase of the leucocratic granite, and is probably related to the larger aplite and pegmatite veins in the granite.

The grey granite to the east of Mount Fitch is rather coarser than the leucocratic granite, but they are mineralogically and chemically similar. It also contains primary albite, and to the south-east it appears to grade into the leucocratic granite. The Mount Fitch granite contains radial clusters of tourmaline and veins of tourmaline and quartz, mostly along joint planes, especially at the margins of the Complex. The Mount Fitch granite is believed to be a coarser variety of the leucocratic granite.

The sporadic veins and dykes of pegmatite in the Rum Jungle Complex appear to be mostly associated with the leucocratic and large feldspar granites. They consist mainly of microcline and quartz, with small but varying amounts of muscovite. Although some of the pegmatites cut the leucocratic granite (Pl. 5, Fig; 2), they are believed to be late-stage differentiates of this granite, and some of the veins of leucocratic granite grade into pegmatites with large feldspar crystals along the margins or centres of the veins. Quartz and muscovite occasionally accompany the development of feldspar.

Amphibolite and Quartz-Tourmaline Veins

The amphibolite veins and quartz-tourmaline veins are the youngest units in the Rum Jungle Complex. Thin veins of amphibolite intrude both the coarse and leucocratic granites. They consist of plagioclase ($An_{54}$) and hornblende, and are mineralogically and chemically similar to the intrusive amphibolite bodies in the surrounding low-grade metasediments (see Table 1).

Table 1.

| | 1 | 2 | 3 |
|---|---|---|---|
| $SiO_2$ | 51.5 | 52.5 | 50.83 |
| $TiO_2$ | 0.72 | 1.01 | 2.03 |
| $Al_2O_3$ | 13.8 | 12.8 | 14.07 |
| $Fe_2O_3$ | 2.40 | 1.78 | 2.88 |
| FeO | 8.7 | 11.90 | 9.00 |
| MnO | 0.18 | 0.21 | 0.18 |
| MgO | 7.65 | 5.35 | 6.34 |
| CaO | 11.40 | 9.40 | 10.42 |
| $Na_2O$ | 1.37 | 2.70 | 2.23 |
| $K_2O$ | 0.18 | 0.17 | 0.82 |
| $H_2O$ | 1.71 | 1.71 | 0.91 |
| $H_2O$ - | 0.16 | 0.14 | - |
| $CO_2$ | 0.08 | 0.09 | - |
| $P_2O_5$ | 0.08 | 0.31 | 0.23 |
| Total | 99.93 | 100.07 | 99.94 |

(1) Amphibolite, intrusive into Golden Dyke formation, Dolerite Ridge. Analyst: C.R. Edmund, Australian Mineral Development Laboratory.

(2) Amphibolite, intrusive into the Rum Jungle Complex. Analyst: C.R. Edmund.

(3) Average tholeiitic basalt (Nockolds, 1954).

They are probably tholeiitic dolerites which have undergone low-grade regional metamorphism.

The quartz-tourmaline veins cut both the surrounding metasediments and the rocks of the Complex, but they are only found along joint planes at the margins of the Complex and as veins extending into the metasediments. The quartz-tourmaline veins in the Complex cut and displace pegmatite veinlets in the Mount Fitch granite, but their relationship to the amphibolites is not known.

## RELATIONSHIP BETWEEN THE RUM JUNGLE COMPLEX AND THE SURROUNDING ROCKS

It is clear that the Batchelor Group must be younger than the schists and gneisses and that it must rest unconformably upon them.

The granitic rocks of the Complex may be (1) all intrusive into the metasediments; or (2) some intrusive, and the others older than the metasediments, as are the schists and gneisses; or (3) all unconformably overlain by the younger metasediments.

Nowhere has a clearly intrusive contact been observed. The evidence for intrusion is the doming of the metasediments around the Complex, and the silicification, metamorphism, and the presence of quartz-tourmaline veining in the metasediments along the margin of the Complex.

It was pointed out earlier that the mineral assemblages previously taken as indicative of contact metamorphism (Malone, 1962a) can also be interpreted as being the result of low-grade regional metamorphism of the greenschist facies. The presence of andalusite crystals is the main obstacle to the latter interpretation, but they are confined to mineralized shear zones and appear to be of hydrothermal rather than contact metamorphic origin.

Both the metasediments and associated quartz-tourmaline veins are commonly silicified along the margins of the Complex. The quartz-tourmaline veins are younger than the leucocratic granite and the pegmatites. If they were related to the leucocratic granite one would expect them to occur around the edges of the granite in the centre of the Complex, but this is not so. They are mostly confined to the metasediments and along fractures and joint planes in the marginal rocks of the Complex. Furthermore, silicification of low grade metasediments is quite common elsewhere in the Katherine-Darwin region, and quartz-tourmaline veins can be found far from any known granite contacts. All that can be confidently stated is that the quartz-tourmaline veins are younger than the metasediments and the leucocratic granite. It is probable that the quartz-tourmaline veins were probably formed during the low-grade metamorphism of the region, and that they are not related to the granites in the Rum Jungle Complex.

The doming of the metasediments around the Rum Jungle Complex was previously thought to have been due to the intrusion of granite (Sullivan & Matheson, 1952; Roberts, 1960; Malone, 1962a). This doming, whatever the cause, must have occurred either during or after the major folding in the region, otherwise the domed structure would have been distorted. As has been suggested, all the members of the Complex have been sheared along a direction parallel to the major fold axes of the area. Therefore these rocks must have been present prior to the folding and could not have domed the metasediments by diapiric intrusion. Furthermore, within the Complex, cutting the leucocratic and coarse granites, are amphibolites mineralogically and chemically similar to the amphibolite sills in the surrounding metasediments. As these amphibolites appear to have been domed together with the metasediments it is improbable that the leucocratic granite, or any earlier member of the Complex, could have been responsible for the doming, since they are older than the amphibolites.

Both the coarse and leucocratic granites contain xenoliths of older rocks of the Complex. If either of these granites had intruded the metasediments it would be reasonable to expect some assimilation zones containing many xenoliths, particularly at the immediate margins of the Complex where granite is in contact with banded ironstones or quartz-hematite breccia. Such zones have not been found. In a few places within the Complex there are small outcrops of banded ironstone. These could be interpreted as roof pendants, but the surrounding granite is free from xenoliths or any sign of contamination and therefore it is believed they are downfolded or faulted blocks. Further evidence against intrusion is that although the leucocratic granite veins all the older rocks of the Complex, it has not been found veining the metasediments even where the large feldspar granite, containing leucocratic granite veins, is in contact with them.

There is little, if any, reliable evidence that any of the rocks of the Rum Jungle Complex are intrusive into the metasediments, and it is probable that the metasediments rest unconformably upon them. This is supported by the distribution of rock types within the Complex, as seen in Figure 1, which is more suggestive of an inlier of granitic basement unconformably overlain by metasediments than of a series of successive diapiric granitic intrusions.

The Batchelor Group contains abundant arkose and conglomerate. The arkose is composed of grains of microcline and quartz in a sericitic and chloritic groundmass. The quartz is a blue opaline variety similar to the opaline quartz in the coarse granite. The conglomerates contain sporadic pebbles of the coarse granite and leucocratic granite and other rocks of the Rum Jungle Complex. The leucocratic granite pebbles are texturally and mineralogically identical with the leucocratic granite of the Complex, and contain primary albite, a diagnostic feature of this granite.

From the evidence cited above it is clear that the metasediments have not been intruded by any of the granites of the Rum Jungle Complex, and that they have been partially derived from the rocks of the Complex, upon which they rest unconformably. Later multiple folding and low-grade regional metamorphism of the sediments of the Pine Creek Geosyncline has resulted in the underlying granitic rocks becoming uplifted and domed contemporaneously with the overlying metasediments, as in the case of some of the mantled gneiss domes of Finland (Eskola, 1948). Indeed the lithology of the surrounding Batchelor Group and Golden Dyke Formation is remarkably similar to their Finnish counterparts.

The Finnish domes described by Eskola range from those in which the gneissic or granitic material occurs as a basement inlier, through concentrically foliated gneiss domes that have been partly granitized and remobilized and intrude the overlying metasediments, to domes in which remobilization has been complete and the granite is fully intrusive into the metasediments. The Rum Jungle Complex appears to correspond to Eskola's earlier type, illustrated by the eastern Joensuu dome, where doming has not been accompanied by development of concentric foliation, granitization, or remobilization. At Rum Jungle, unlike many of the better developed Finnish mantled gneiss domes, the late kinematic leucocratic granite was emplaced before the metasediments were deposited.

In the Katherine-Darwin region, there are several apparently intrusive granites surrounded by domed metasediments. These granites may correspond to the final intrusive stage of Eskola's mantled gneiss dome series, and further investigations of granites in the area may show the presence of other members of the series.

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Plate 1

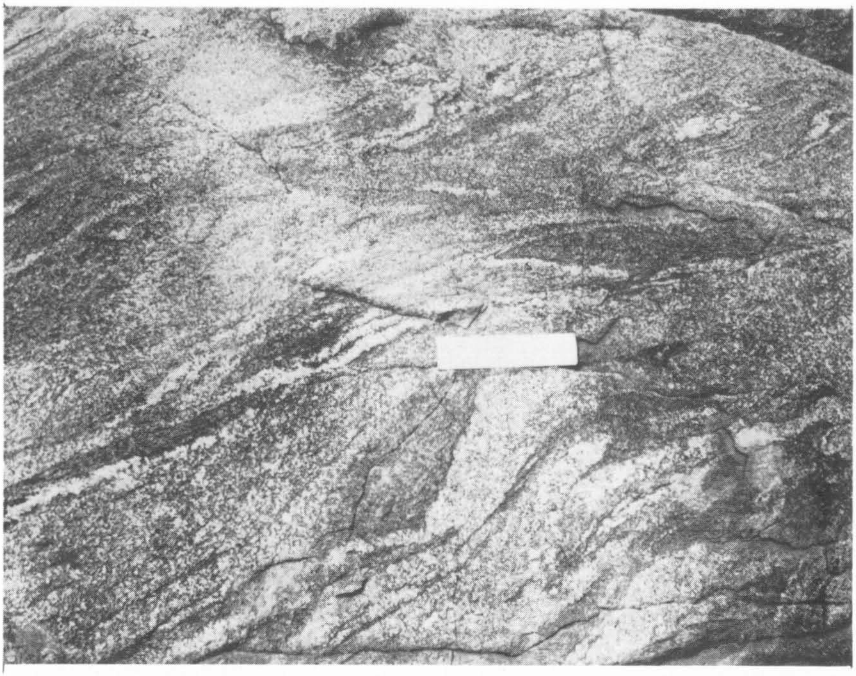

Fig. 1: Well-banded and contorted granite gneiss.

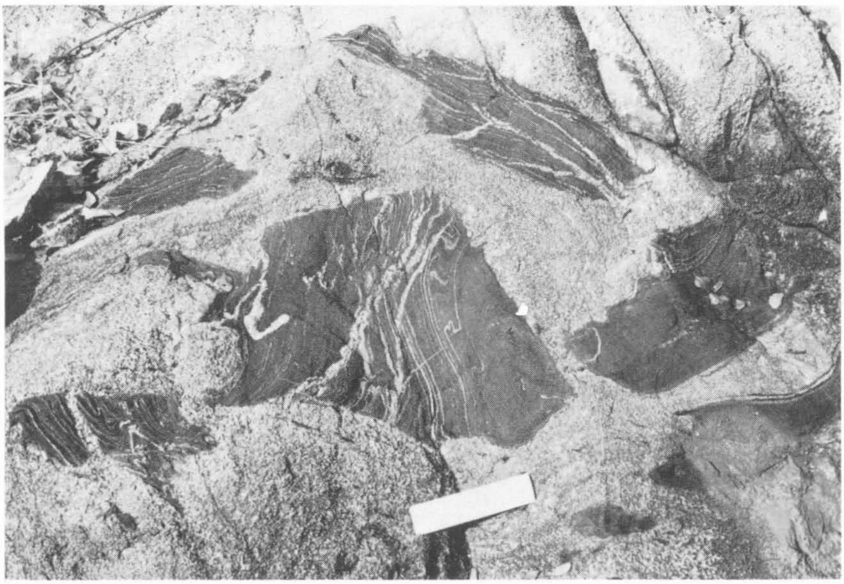

Fig. 2: Agmatitic granite gneiss, containing abundant schistose inclusions. (This photograph was taken within a few yards of Fig. 1.)

Plate 2

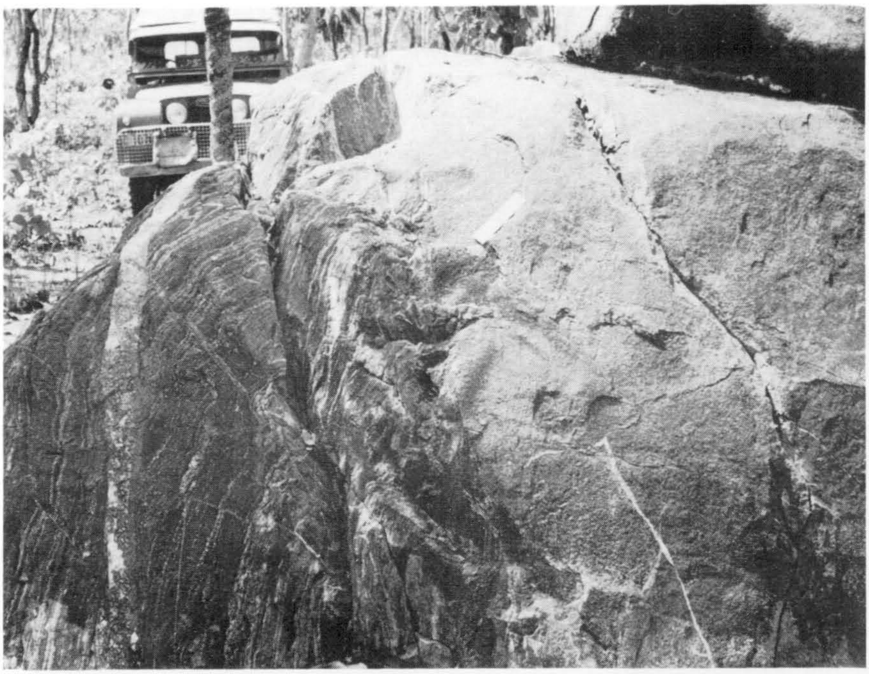

Fig. 1: Meta-diorite cutting across the foliation of thinly banded gneisses.

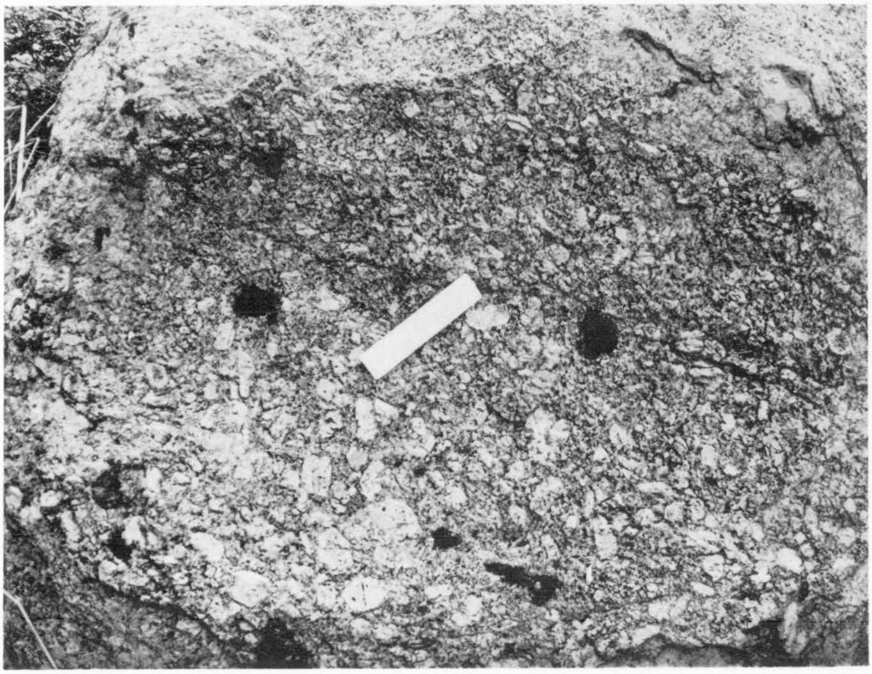

Fig. 2: Typical large feldspar granite.

Plate 3

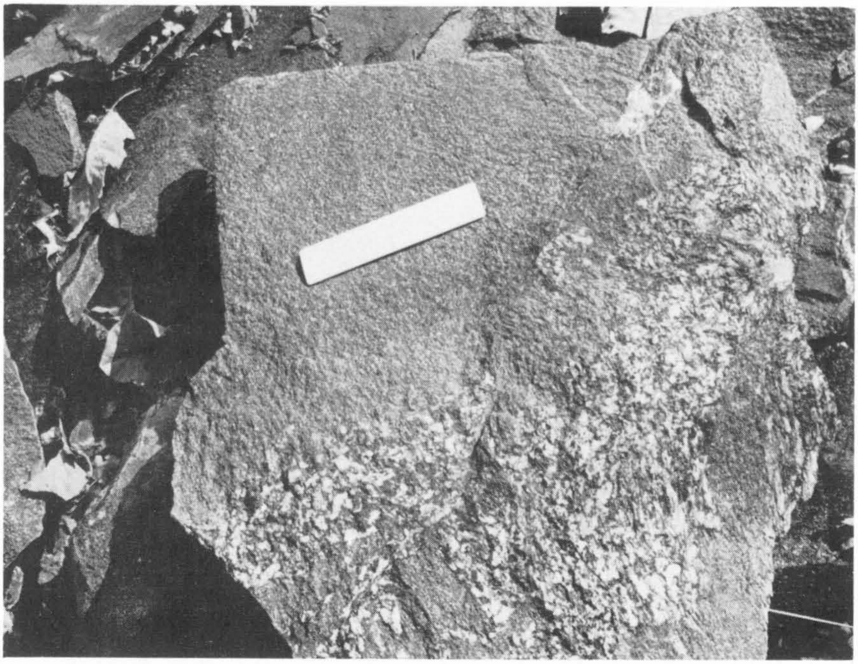

Fig. 1: Gradual transition from metadiorite to large feldspar granite by accumulation of feldspar crystals.

Fig. 2: Meta-diorite cut by thin veins of leucocratic granite.

Plate 4

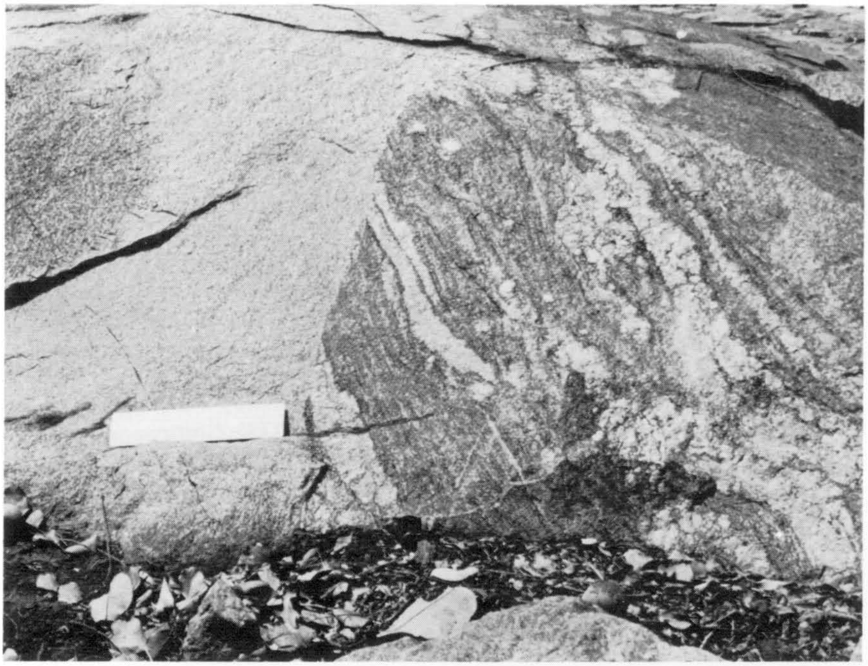

Fig. 1: Well-banded granite gneiss cut by the leucocratic granite.

Fig. 2: Coarse granite cut by a dyke of leucocratic granite.

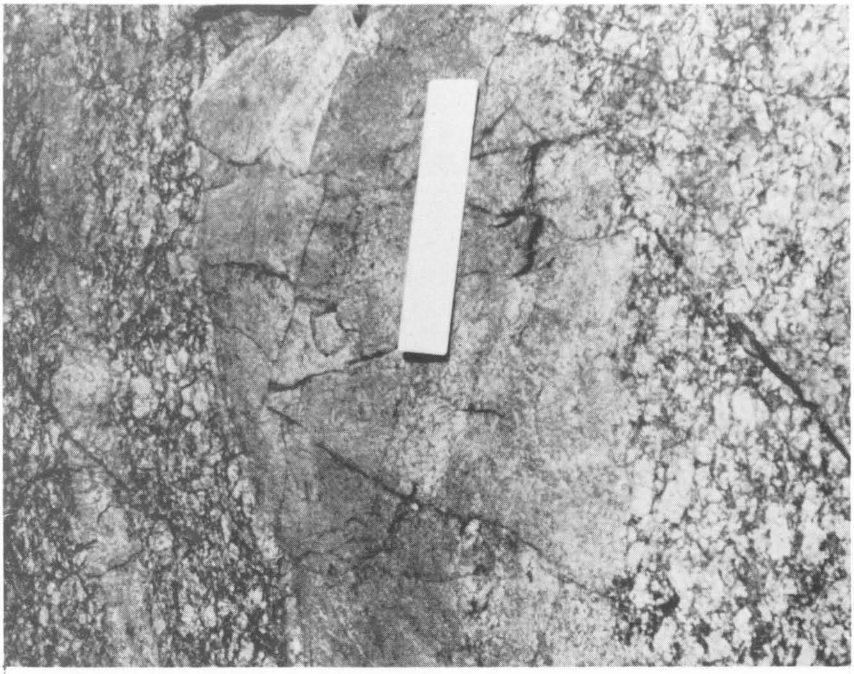

Fig. 1: Large feldspar granite cut by a vein of leucocratic granite.

Fig. 2: Leucocratic granite cut by a thin vein of pegmatite.

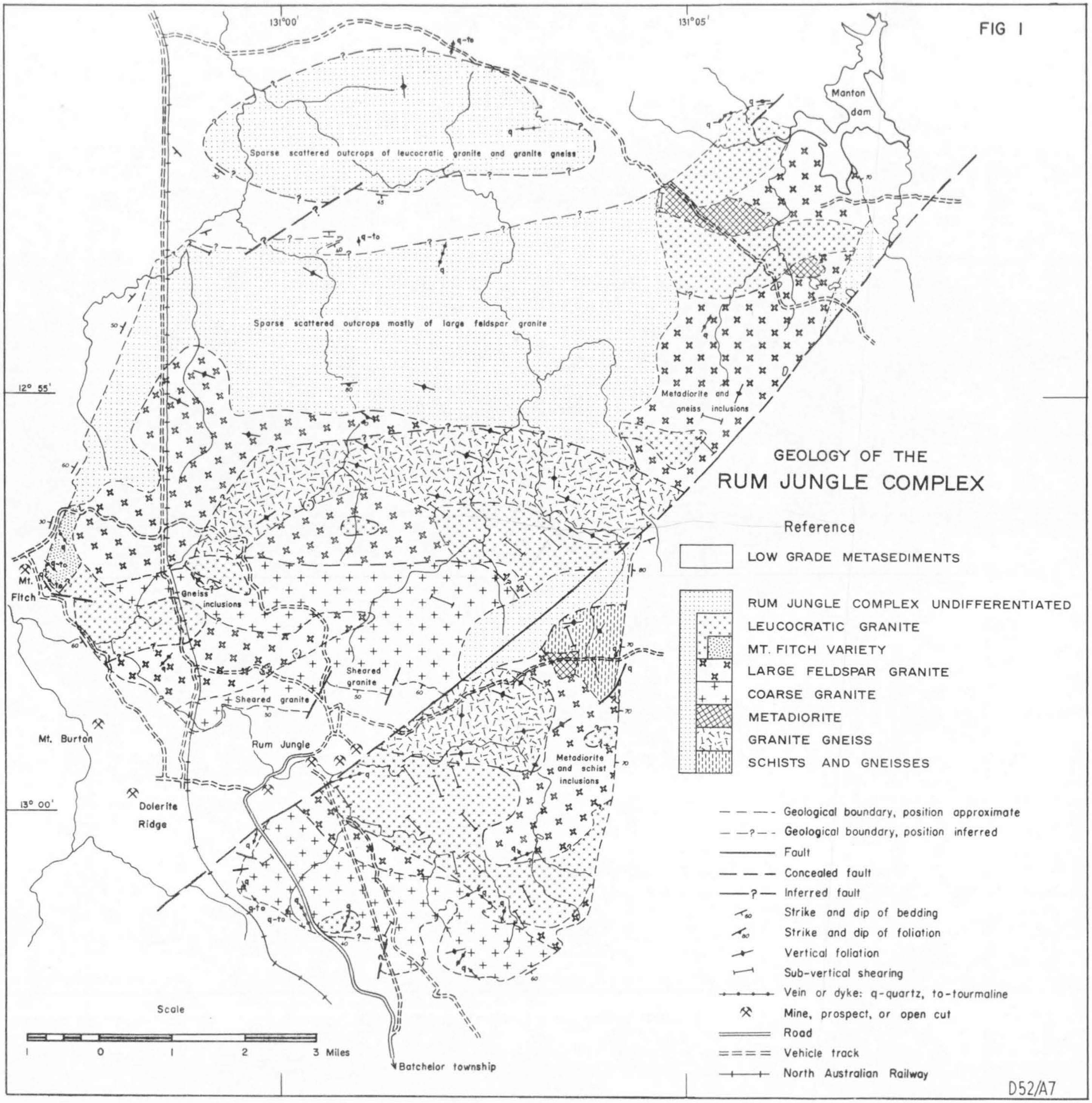

FIG I
GEOLOGY OF THE
RUM JUNGLE COMPLEX
Reference
LOW GRADE METASEDIMENTS
RUM JUNGLE COMPLEX UNDIFFERENTIATED
LEUCOCRATIC GRANITE
MT. FITCH VARIETY
LARGE FELDSPAR GRANITE
COARSE GRANITE
METADIORITE
GRANITE GNEISS
SCHISTS AND GNEISSES
Geological boundary, position approximate
Geological boundary, position inferred
Fault
Concealed fault
Inferred fault
Strike and dip of bedding
Strike and dip of foliation
Vertical foliation
Sub-vertical shearing
Vein or dyke: q-quartz, to-tourmaline
Mine, prospect, or open cut
Road
Vehicle track
North Australian Railway
131°00'
131°05'
12° 55'
13° 00'
Manton dam
Sparse scattered outcrops of leucocratic granite and granite gneiss
Sparse scattered outcrops mostly of large feldspar granite
Metadiorite and gneiss inclusions
Mt. Fitch
Gneiss inclusions
Sheared granite
Sheared granite
Mt. Burton
Rum Jungle
Metadiorite and schist inclusions
Dolerite Ridge
Scale
1 0 1 2 3 Miles
Batchelor township
D52/A7