1969/9
(4)

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORDS 1969/9

RECONNAISSANCE IN THE MARY KATHLEEN-CLONCURRY AREA, JULY-AUGUST 1968

by

G. Derrick

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Records 1969/9

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SUMMARY

Geological reconnaissance in the Mary Kathleen-Cloncurry area was undertaken during July and August, 1968, as a preliminary to detailed mapping of parts of the Cloncurry Sheet area in 1969. Although the country is rugged, the great number of mines in the area have ensured a complete network of tracks throughout. A possible camp-site has been located along the Cloncurry River about 5 miles south of Cloncurry township. Aerial photographs at 1:85,000, 1:50,000, 1:25,000 and 1:20,000 scale will be used in the mapping, particularly the 1:50,000 set. The set at 1:20,000 scale were flown in 1968 in colour.

Revision of aspects of the regional geology of Carter et al (1961) appears necessary e.g., the Charleys Creek Formation is more extensive than originally mapped, and may be equivalent to parts of the Ballara Quartzite and Corella Formation. Parts of the Leichhardt Metamorphics can be assigned to the Argylla Formation, while the upper part of the Mitakoodi Quartzite is possibly equivalent to the Answer Slate. The Corella Formation contains limestone, marl, siltstone, shale and quartzite, and metamorphic and metasomatised equivalents. Transported and intraformational calc-silicate breccia are widespread throughout this unit. The Corella Formation is older than the Marimo Slate in some areas, but possibly interfingers with it in others. Metamorphic rocks noted include garnet, andalusite and cordierite schist, scapolite limestone and cordierite-anthophyllite rock.

Economically the area is still a notable source of copper, uranium, limestone, manganese etc. Many copper shows were examined, but only one small deposit of malachite in limestone appeared to be an original discovery. Limestone for fluxing purposes at Mount Isa is at present being mined at Lime Creek, while manganese is sporadically mined from the Overhang deposit. Manganese appears to be concentrated along unconformities between the Corella Formation, Marimo Slate and Mitakoodi Quartzite, with some local redistribution along strike faults.

Rock geochemistry and age determination programmes will possibly accompany the detailed mapping programme, which will commence in the 1:63,360 area immediately south-west of Cloncurry.

INTRODUCTION

Reconnaissance of parts of the Cloncurry 4-mile Sheet area was undertaken during July and August, 1968, as a preliminary to proposed detailed mapping of the Precambrian belt by the Bureau of Mineral Resources and the Geological Survey of Queensland from 1969 onwards. The object of this survey was to gain information on the lithology, structure and economic geology of the various rock units, assess areas of special complexity, examine some of the stratigraphic relationships determined by Carter et al (1961), and locate tracks and possible camp sites for 1969. The survey was operated from the Georgina Phosphate Party base camp at Camooweal.

Figure 1 shows the areas and units mapped in broad detail, and areas of special interest.

Location and Access.

The area examined extends from the East Leichhardt River eastwards to Cloncurry. Although the country is rocky and exceedingly rough in places, the great number of mines in the area have ensured a complete network of tracks throughout. Some of the tracks are disused, but are negotiable by Land-Rover. Alluvial tracts are uncommon except along the Cloncurry river, and vehicle access off most of the tracks is limited.

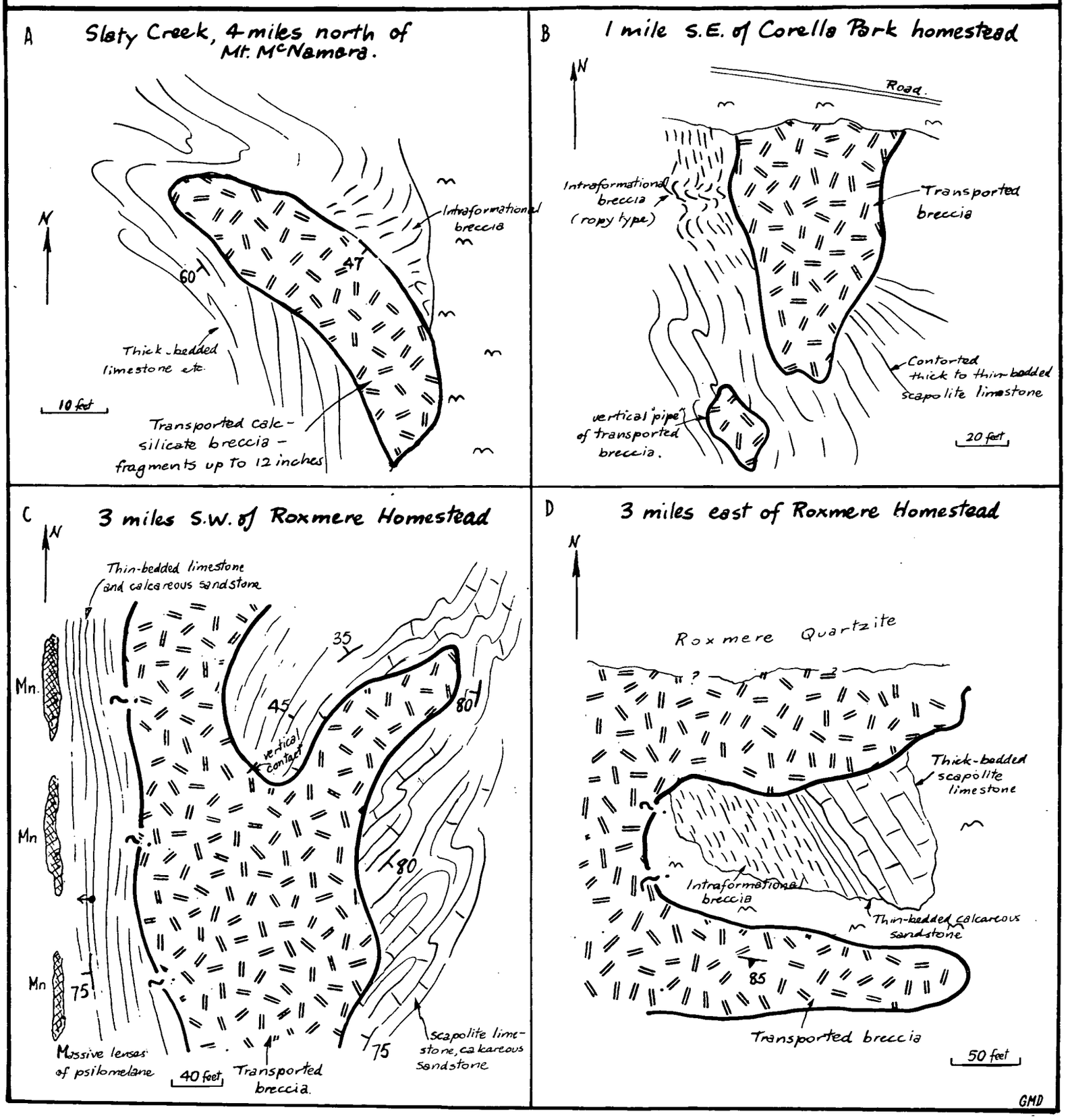
REGIONAL GEOLOGY

Only information additional to that compiled by Carter et al is listed below.

(a) Argylla Formation

Pink acid volcanics typical of the unit were seen in several localities, and field work coupled with photo-interpretation indicates that some rocks previously assigned to the Argylla Formation near the East Leichhardt River are actually part of the Charleys Creek Formation. This is treated further in the discussion on detailed map area A. Near the East Leichhardt River crossing pink porphyritic volcanics, probably Argylla Formation, occur in what was previously mapped as Leichhardt Metamorphics. The volcanics contain zones rich in platy phyllitic fragments, possibly of intraformational origin. Conglomerate occurs at the base of the overlying Charleys Creek Formation, which here consists of black flaggy quartzite, feldspathic quartzite and banded amphibole-cordierite rock.

Fig. 2. BRECCIA TYPES ~ CORELLA FORMATION



To accompany Record 1969/9.

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(b) Corella Formation

This unit includes limestone, marl, siltstone, shale and quartzite, and metamorphic and metasomatized equivalents. Calc-silicate breccia is also widespread. At least two breccia types, one transported and the other intraformational, can be distinguished. The transported breccia, with fragments up to 12 inches diameter, rests with angular unconformity over other units of the Formation (Fig. 2). It is localised in extent, and appears to have infilled elongate depressions in the original carbonate sequence. The intraformational breccia has been termed "ropy" by Carter et al.

Approximately three miles north-west of Chumvale homestead, near Cloncurry, calc-silicate rocks of the Corella Formation appear to be unconformably overlying mica schist, which shows a strongly developed east-west cleavage. It is possible that this mica schist is an extension of the Soldiers Cap Formation immediately east of Cloncurry, where east-west axial plane cleavage is also prominent in a similar rock type. Alternatively the calc-silicate rocks could be overlying a northward extension of the Mitakoodi Quartzite, although mica schist in the Quartzite is rare.

If the mica schist is part of the Soldiers Cap Formation, it would appear that the Soldiers Cap Formation is younger than the hypothetical northward extension of the Mitakoodi Quartzite. This would be contrary to the idea held at present that the Soldiers Cap Formation is a time equivalent of the Marraba Volcanics, a unit older than the Mitakoodi Quartzite.

Near Butchers Bore the Corella Formation contains garnet and cordierite schist as well as marl, impure quartzite and massive lenses of specular hematite. Other areas of Corella Formation are described in the accounts of the detailed map areas B and D.

(c) Mitakoodi Quartsite

This is a highly feldspathic unit which contains some pillow lavas and tuff near the top. About 8 miles south-west and 15 miles west of Cloncurry, massive manganese deposits are located along the contact between the Quartzite and the Corella Formation. Further to the south, an apparent structural discordance between the Marimo Slate and Mitakoodi Quartzite was investigated. It is now thought that the upper boundary of the Mitakoodi Quartzite should be raised to include a pale orange-brown phyllite or siltstone which appears conformable with the quartzite proper, and which E.K. Carter feels is a possible equivalent of the Answer Slate, on the Duchess Sheet to the south. This phyllite and the Marimo Slate are separated by thin calcareous beds and a massive coarse-grained quartz sandstone which is manganiferous in places (e.g. the Overhang deposit). An unconformity is suspected between the Slate and quartz sandstone, but this has not yet been proven.

GEOLOGY of MARY KATHLEEN URANIUM DEPOSIT and ENVIRONS. Fig.4.

REFERENCE

Corella Fmn.

- Amphibolite, biotite amphibolite, banded gneiss, cordierite hornfels.
- Laminated white quartzite, actinolitic and feldspathic quartzite, plus garnet, diopside and scapolite.
- Laminated mafic-rich quartzite, intraformational breccia.
- Grey to buff, massive to blocky quartzite, cross-bedded.
- Dolerite sill, metasomatised.
- Cobble and boulder conglomerate
- Banded calc-silicate rock, lime-stone, marl.
- Cordierite-anthophyllite-muscovite rock
- Pale pink acid volcanics
- Garnetite
- Plb — Ballara Quartzite
- Mount Burstall Granite - even-grained leucocratic syenogranite with fluorite. Acid porphyry dykes
- Pg — Gneissose granite with amphibolite remnants
- pEl — Recrystallised dacite- Leichhardt Mmics.

AREA B

Cameron Fault

Mary Kathleen

Wollondonga

Mt. Colin

Jubilee

Elaine x Dorothy

Mt. Burstall

Mt. Lindsay

North-West Highway

aplitic margins

not mapped

2000 0 2000 4000 6000 FT.

To accompany Record 1969/9.

F54/A2/11

DESCRIPTIONS OF DETAILED MAP AREAS A,B,C, and D

Area A (figure 3)

The field work undertaken in this area was limited, but combined with photo-interpretation indicates a number of complex stratigraphic relationships.

At point A in figure 3 sediments of the Charleys Creek Formation occur which were previously mapped as Leichhardt Metamorphics. They are overlain by a series of quartzite ridges (unit 2 -- see reference, fig. 3) which are readily traced for 15 miles southwards and at least 7 miles northwards from the original limits of the Charleys Creek Formation. At point C the quartzite ridges appear to be a part or all of the Ballara Quartzite, while at points B and H the same sequence has been mapped as part of the Argylla Formation.

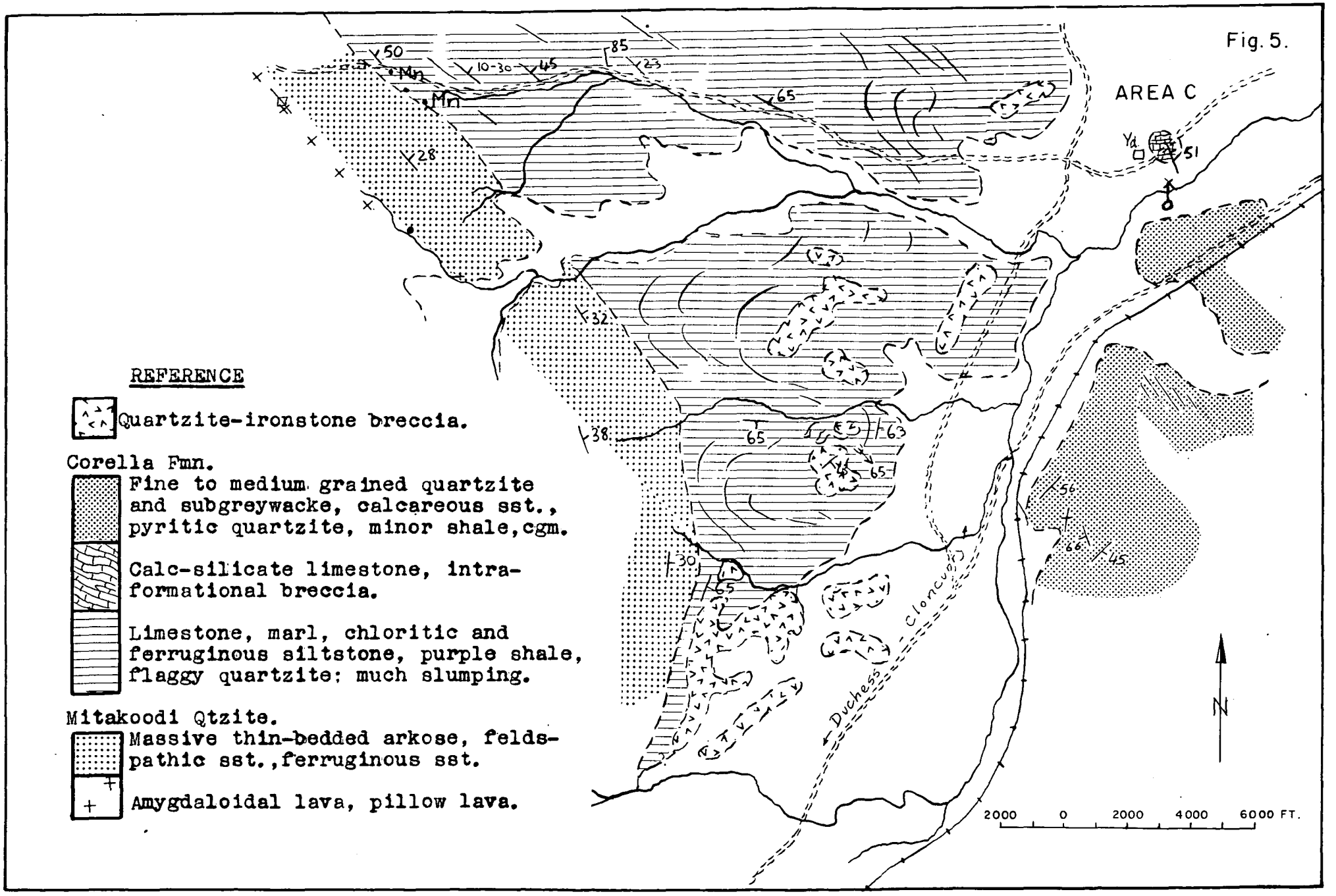
The Corella Formation appears to overlap and/or interfinger with unit 3 of the Charleys Creek Formation at point E, while at D the Corella Formation overlaps the ridge-forming quartzite (unit 2). In the road cutting at D the Deighton Quartzite overlies unconformably a weathered conglomerate which is possibly part of the Corella Formation.

The area of Deighton Quartzite has been significantly reduced by photo-interpretation. Units 6 and 7, previously mapped as Deighton Quartzite, appear to be overlapped by a massive white quartzite, and so can be separated from it. Similarly unit 2A just north of point F is apparently overlain by Corella Formation, and thus is older than Deighton Quartzite proper. It is possibly equivalent to unit 2, the ridge-forming quartzite of the Charleys Creek Formation. At point G the massive white quartzite (Deighton Quartzite) overlaps part of the Corella Formation, while 2 miles north of point G the reverse relationships hold. The rocks immediately west of Deighton Pass are low grade shales, slates and limestone (unit 9) and have been mapped previously as Corella Formation. The dips in this unit and the Deighton Quartzite strongly suggest that it is a younger unit deposited in a downwarp in Deighton Quartzite.

Area B (figure 4)

At Mary Kathleen, the synclinal axis of the Mary Kathleen structure is discontinuous, being displaced south of the mine by a combination of transverse and strike faulting. The synclinal axis immediately north of the ore-body probably lies in the unit known as the "breccia-conglomerate". Within the ore-body the simple syncline is replaced by a series of smaller-scale en echelon folds. The fold structures are outlined by the disposition of a dolerite sill near the ore-body.

Fig. 5.



REFERENCE

Quartzite-ironstone breccia.

Corella Fmn.

Fine to medium grained quartzite and subgreywacke, calcareous sst., pyritic quartzite, minor shale, cgm.

Calc-silicate limestone, intraformational breccia.

Limestone, marl, chloritic and ferruginous siltstone, purple shale, flaggy quartzite: much slumping.

Mitakoodi Qtzite.

Massive thin-bedded arkose, feldspathic sst., ferruginous sst.

Amygdaloidal lava, pillow lava.

To accompany Record 1969/9.

F54/A2/12

Metasomatism is most marked in the east limb of the structure, closest to the Mount Burstall Granite. The metasomatism involves selective replacement along bedding of the original impure laminated quartzite by dense fine-grained feldspar, coarse-grained stellate scapolite, garnet, diopside and epidote.

Acid volcanics form a belt adjacent to the western edge of the Wonga Granite, a mile west of Mary Kathleen. These may be a unique lithology within the Corella Formation. Alternatively, they may be a southerly extension of the Argylla Formation which was shown on the original map as extending only as far as the Wonga Fault, about 10 miles due north of Mary Kathleen.

Area C (figure 5)

This area contains Corella Formation overlying Mitakoodi Quartzite. Manganese is developed at certain points either at or near the unconformity between the two units. The Corella Formation is characteristically slumped, especially in the central parts of the map area. The limey sediments are low grade, although some fibrous metamorphic amphibole occurs in the northern part of the area. Massive quartzite-ironstone breccia is very well exposed overlying Corella Formation unconformably. It shows little or no bedding, and appears to form a broad linear belt trending just east of north. This unit could be part of the Chumvale Breccia, or a much more recent deposit. The linear distribution of the breccia suggests a relation between it and a prominent strike fault zone which occurs between the Corella Formation and Mitakoodi Quartzite further to the south.

Area D (figure 6)

This shows Corella Formation-Marimo Slate relationships. In the far east of the area, Marimo Slate is younger than the Corella Formation, and separated from it by earthy manganese concentrations and strike faulting. The Slate is concretionary and sulphide-bearing, and at least two slate units can be delineated. Small copper deposits occur just south of Slaty Creek, and at the south end of Embla Ridge. In the south-west, the Corella Formation consists mainly of calc-silicate breccia (see Fig. 2) and limestone. The relation between this exposure of Corella Formation and the Marimo Slate is not known; since the slate is younger than the Corella Formation in the east, this area of Corella Formation could be the exposed core of a zone of meridional anticlinal folds (which are well displayed by the Slate). Alternatively the Corella Formation could interfinger with the Slate in this area, but more detailed work is required. Limestone and calcareous phyllite flank quartzite and slate east of Embla Ridge, and could be part of either the Marimo Slate or Corella Formation.

Quartzite-ironstone breccia in the north-west of the map is a southerly extension of the breccia described from Area C (fig. 5).

AREA D

REFERENCE

Marimo Slate

Concretionary slate, shale, minor phyllite. Some sulphide.

Flaggy limestone, calcareous phyllite.

Undiff.- pale blue to fawn quartzite, flaggy arkose, calcareous phyllite, shale, c.g ferruginous sandstone

Corella Formation:- calc-silicate breccia, limestone, quartzite.

Quartzite-ironstone breccia.

2000 0 2000 4000 6000 FT.

N

Fig. 6.

Czs

Qa

Embla Ridge

Slaty Creek

Clioncurry River

Black Slate
Lucky Will
Little Jump

To accompany Record 1969/9.

F54/A2/13

ECONOMIC GEOLOGY

Manganese deposits occur in linear zones adjacent to contacts between the Marimo Slate, Corella Formation and Mitakoodi Quartzite. In most cases the manganese is associated with iron-enrichment and silicification in zones of strike faulting, but in some localities massive manganese occurs in areas devoid of faulting. These concentrations possibly reflect original sea-floor deposits and thus may mark an unconformity.

Copper: A number of small shows in the Marimo Slate developed in recent months were examined. They all contain malachite, chrysocolla and azurite in narrow quartz stringers subparallel to cleavage and/or bedding in the host slate. There is no obvious igneous source of the copper, which could be redistributed syngenetic material. The slates elsewhere in the area are usually pyritic, carbonaceous and graphitic.

Other copper deposits examined include the Jubilee and Mount Lindsay (both operating), Mount Colins and Wollondonga. The Jubilee lode is grossly conformable with steeply dipping amphibolite and mesocratic gneiss, which is usually feldspathised and veined by stringers of quartz, calcite and actinolite. The ore is chalcopyrite and minor bornite, in a pyrite-pyrrhotite-quartz-calcite gangue. Mount Lindsay, Wollondonga and Mount Colins all occur close to the contact between the Corella Formation and the Burstall Granite. All occupy east-west fracture systems, and the Mount Lindsay and Mount Colins deposits are characterised by massive siliceous gangue which appears to have replaced calcite.

Only one small copper occurrence was located which appeared to have been overlooked by past prospectors. Iron-stained segregations of malachite occur scattered through a massive limestone lense 400 yards south of the main road between Mary Kathleen and Mount Isa, 4 miles east of the East Leichhardt River. Although small, the deposit resembles the Mount Frosty deposit 5 miles to the east, which though primarily mined for limestone flux, contained extremely rich pockets of massive copper sulphide.

Limestone: The Lime Creek and Robin deposits are the current source of flux for Mount Isa Mines. The Robin is the larger deposit of the two, and occurs in the Charley's Creek Formation. The Lime Creek deposit is in the Corella Formation, and the quality of the lime is at present being affected by quartz veins and segregations of pyrrhotite.

Ilmenite occurs in a quartz-biotite-hornblende-apatite-scapolite vein cutting biotite amphibolite of the Leichhardt Metamorphics, in a road cut 3 miles west of Mary Kathleen. The ilmenite forms large tabular crystals up to 3 cms. across, and the apatite occurs as euhedral crystals up to 3 cms. diameter. The vein is of mineralogical interest only.

REFERENCES

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EDWARDS, A.B., and BAKER, G., (1954) Scapolitisation in the Cloncurry District of North-Western Queensland J. Geol. Soc. Aust. 1

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APPENDIX

Conclusions and Recommendations for 1969 Mapping Programme.

General

From the reconnaissance mapping it appears that revision of the stratigraphy and delineation of a large number of distinct lithologies are to be expected when detailed mapping commences. The relationship of the Marimo Slate to the Mitakoodi Quartzite and Corella Formation, and the various rock units described from the Deighton Pass area appear to pose most problems. The Marimo Slate is interesting economically since it is in this unit that small copper deposits are at present being found and exploited. If the slate is younger than both the Mitakoodi Quartzite and Corella Formation, then it could be a possible time equivalent of the Mount Isa Shale and the host rocks of the McArthur River deposits.

The Corella Formation appears suitable for detailed subdivision, and palaeogeographic reconstructions appear possible despite folding and metamorphism. The metamorphic and metasomatic rocks offer scope for detailed mineralogical and petrological study, in particular in relation to the occurrence of economic mineral deposits.

Metamorphic events and their distribution relative to granite bodies and tectonic belts should be re-examined, and a closer study of granite types, their field relationships and further collection for age determination appears necessary.

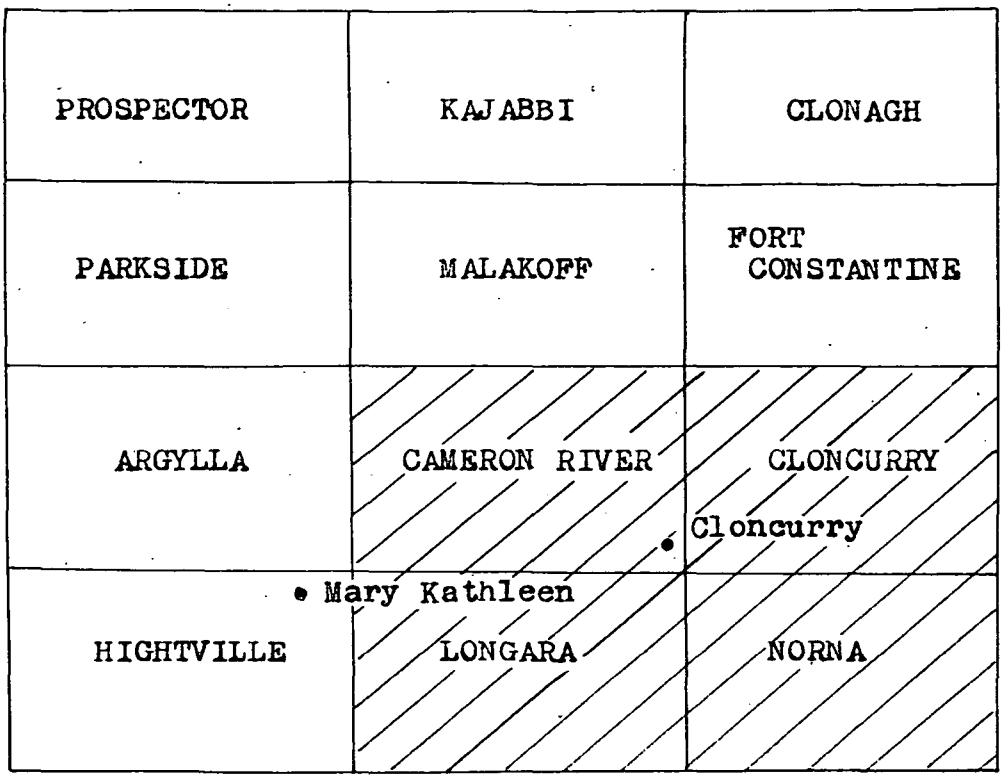
Geochemistry

Rock geochemistry in the area would be of assistance in determining the original nature of the metasedimentary rocks, and indicating the amount of metasomatic transfer throughout the area. For example, trace element work on cordierite-anthophyllite rocks by Ramsay (1968) has suggested that the parent rock could have been a shale enriched in magnesia by evaporite minerals, so that large-scale magnesia metasomatism need not be invoked. Similarly the geochemistry of scapolite-bearing rocks suggests that this mineral has formed through isochemical adjustment within rock units, rather than by wholescale introduction of soda and chlorine from an external, unknown source (Edwards and Baker, 1954).

The geochemistry of amphibolite and limestone bodies would be particularly significant, since a large number of copper deposits are associated with them. As well as Cu, the distribution of other elements, such as Pb, Zn, U, Th, Be, Ni, Co, Ti, Mn, and Mg, in the various rock types should be studied.

The amount of stream sediment sampling in the area by private companies is unknown, although it is probably extensive when the activity of exploration companies in the past few years is taken into account. At present I see no real need for BMR to undertake a regional stream sediment sampling programme.

Fig.7. 1:63,360 MAPS
CLONCURRY 1:250,000



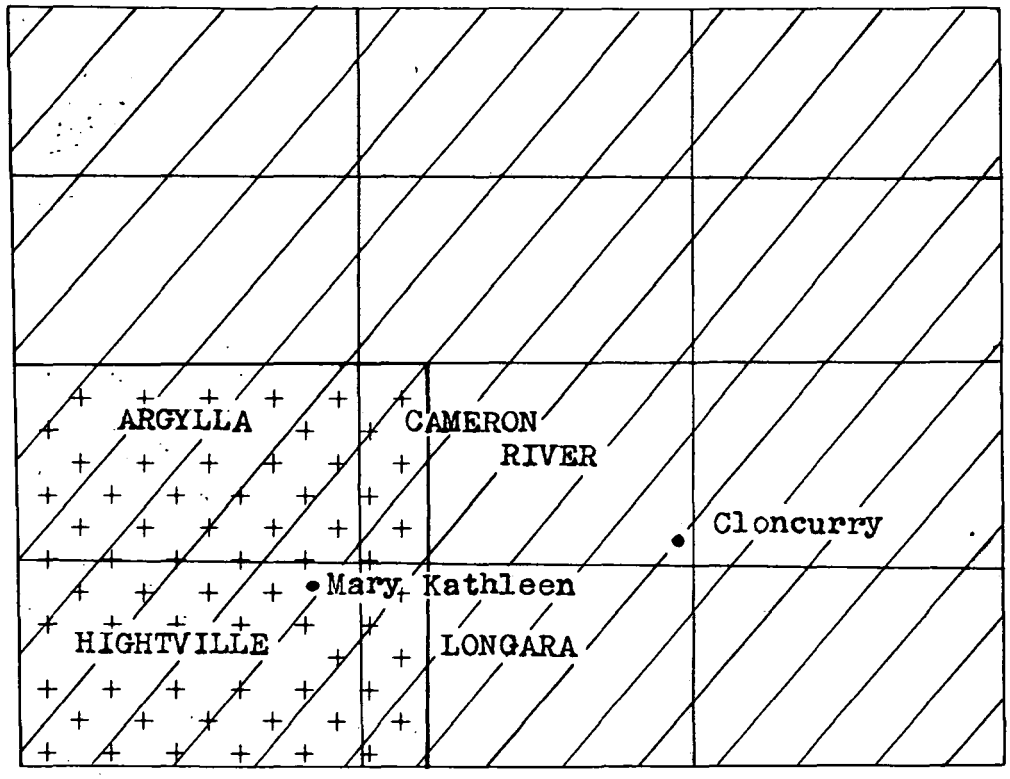
Proposed area to be mapped, 1969.

To accompany Record 1969/9.

F54/A2/14

Fig.8. AERIAL PHOTO COVERAGE

CLONCURRY 1:250,000



RC 9 1:85000 1966.

1:50000 1950

ARGYLLA 1:25000 1956

RC 8 1:20000 1968 colour

To accompany Record 1969/9.

F 54/A2/15

Areas to be Mapped, 1969

These are shown in figure 7 and have been suggested by Carter partly because they are adjacent to the anticlinal core of Argylla Formation, Marraba Volcanics, etc., which should provide a suitable stratigraphic "starting point". The proposed base camp site is on the Cloncurry River about 5 miles south of Cloncurry township. The site is accessible and central to the area proposed for mapping. A shift of base camp is not envisaged.

Rate and Nature of Mapping

A party of four geologists may be able to completely map a maximum of 3 one-mile sheets in a normal 4 to 5 month field season, assuming 80% or more outcrop. In the rugged and more complex areas e.g. near Deighton Pass, only two sheets per season might be possible. A greater amount of walking than usual is envisaged, and good use could be made of two vehicles working in conjunction, thus avoiding retracing of traverses. A helicopter programme has not been planned for 1969, but in the central highland belt 20 to 30 hours might be warranted in 1970.

Photographs and Compilations

Aerial photographs available for 1969 are as follows:-

a.	RC9,	1:85000,	1966,	6,800' = 1"
b.	RC8,	1:20000,	1968,	1,600' = 1"
c.		1:25000,	1956,	2,000' = 1"
d.		1:50000,	1950,	4,000' = 1"

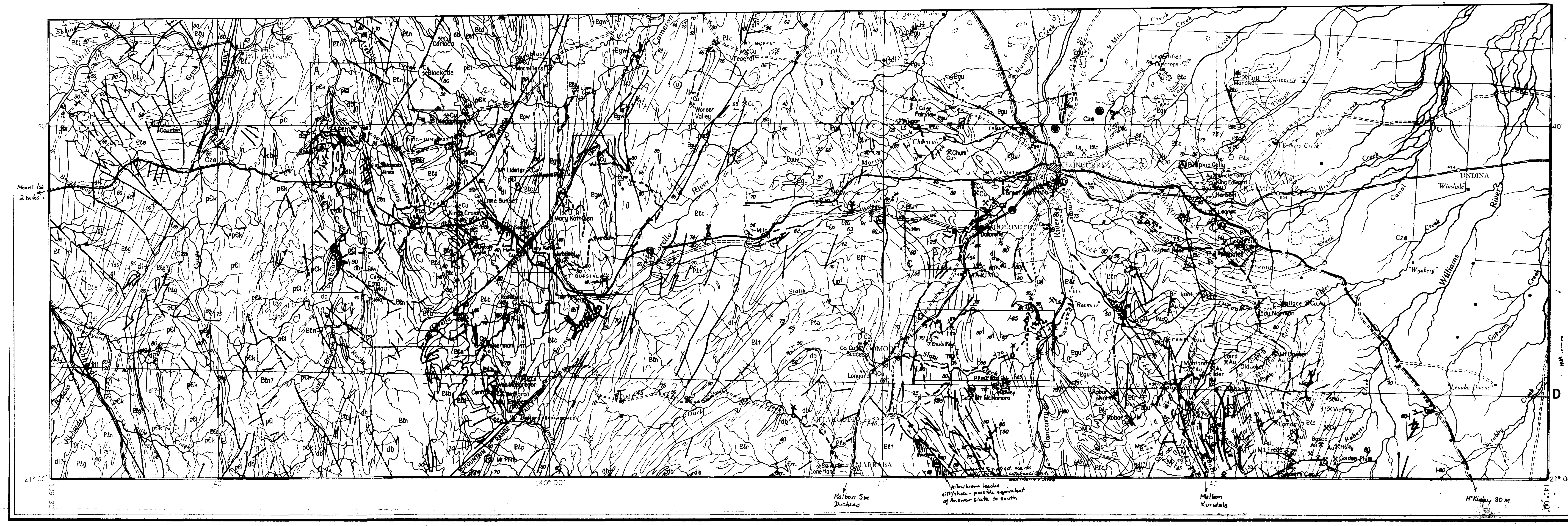
Complete coverage of the area is given by a and d; photos a are a useful reference for large-scale structures and regional relationships of rock units. Photos d will be used extensively in the mapping, though these were found to be inadequate in certain complex areas. The RC8 photos b are available in both colour and black and white, both sets of prints being of excellent quality. Only a small part of the area to be mapped in 1969 is covered by this photography, which will be of greater use in 1970. The 1956 photos c cover certain one-mile areas, and will be excellent for detailed work. Figure 8 shows the aerial photo coverage of the Cloncurry Sheet.

Field compilation will be at various scales, depending on the aerial photos used. Final compilation for publication will probably be at 1:100,000, although some areas would be best represented at 1:50,000 scale.

Many of the mines provide excellent exposures, and full use should be made of them to study geological processes in unweathered rocks. Most operators at the working prospects were extremely co-operative and interested in the proposed BMR programme, and access to underground workings was offered in most cases. Carpentaria Exploration in Cloncurry have a comprehensive file system of all mineral deposits and prospects in the area, and have kindly made this available to BMR for perusal. Similar co-operation concerning access to company leases was received from Mary Kathleen Uranium Ltd.

PART OF CLONCURRY SHEET SHOWING ADDITIONAL TRACKS AND GEOLOGY, AND AREAS COVERED BY DETAILED MAPS A, B, C, D

Fig. 1.



	dl	Gabbro, micro-gabbro, dolerite
Mount Isa Shale	Ꝑli	Clay, dolomitic and carbonaceous shale ("slate"), siltstone and quartzite
Surprise Creek Beds	Ꝑlu	Dolomitic shale, quartzite; siltstone, shale slate carbonaceous slate and conglomerate
Myally Beds	Ꝑly	Sandstone with some siltstone, shale and conglomerate
Deighton Quartzite	Ꝑld	Quartzite and conglomerate
Chumvale Breccia	Ꝑlv	Breccia, with quartzite and sericitic schist and recrystallized limestone
Roxmere Quartzite	Ꝑlr	Quartzite
Knapdale Quartzite	Ꝑlk	Quartzite
Charley Creek Formation	Ꝑlh	Interbedded calc silicate rocks and quartzite, some schist
Corella Formation	Ꝑlc	Calc-silicate rocks with schist, quartzite, slate and recrystallized limestone breccia
Marimo Slate	Ꝑlm	Slate, carbonaceous in part, quartzite, recrystallized limestone, schist, basalt, and tuff
Mount Philp Agglomerate	Ꝑlp	Agglomerate and basalt with interbedded quartzite, calcareous in part, and calc-silicate rocks
Mitakoodi Quartzite	Ꝑlt	Quartzite with altered basalt tuff, and schist
Marraba Volcanics	Ꝑla	Altered basalt and tuff with interbedded metamorphosed sediments
Eastern Creek Volcanics	Ꝑle	Altered thinly interbedded basalt, and arenaceous sediments with tuff, slate and recrystallized limestone
Soldiers Cap Formation	Ꝑls	Schists, including mica-garnet-andalusite schist, interbedded altered basalt, quartzite, slate and "felsites"
		Dolerite dykes and sills
	db	Altered dolerite dykes and basalt
Ballara Quartzite	Ꝑlb	Quartzite with conglomerate
Leander Quartzite	Ꝑlq	Quartzite with few altered basalt flows and tuff
Mount Guide Quartzite	Ꝑlg	Quartzite feldspathic in part, conglomerate
Argylla Formation	Ꝑln	Acid and basic lavas with quartzite recrystallized limestone agglomerate arkose and schist

LOWER PROTEROZOIC

ARCHAEAN

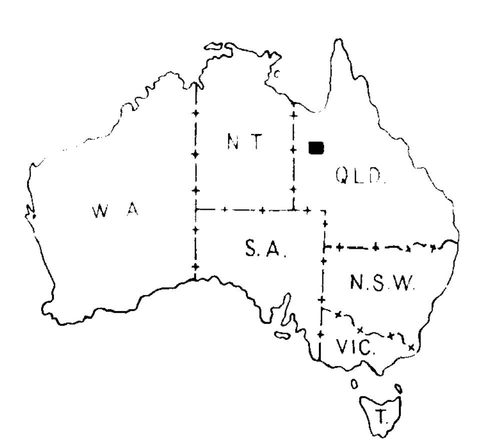
Leichhardt Metamorphics	pЄl	Recrystallized dacite, with some basalt schist, gneiss and migmatite

Granites

Naraku Granite	Ꝑgu	Mainly medium-grained red granite with some older coarse-grained granite
Wonga Granite	Ꝑgw	Mainly porphyritic red granite and augen gneiss. Some younger massive granite
Kalkadoon Granite	pЄk	Complex of coarse and fine grained, porphyritic, foliated and massive granites

These are composite bodies, each probably of two ages in the Proterozoic. The Kalkadoon Granite may also include ? Archaean intrusives

Compiled and published by the Bureau of Mineral Resources, Geology and Geophysics, Department of National Development, in conjunction with the Geological Survey of Queensland. Topographic base compiled and drawn by National Mapping Section, Department of the Interior. Aerial photography by the Royal Australian Air Force; complete vertical coverage at 1:50,000 scale. Transverse Mercator Projection.



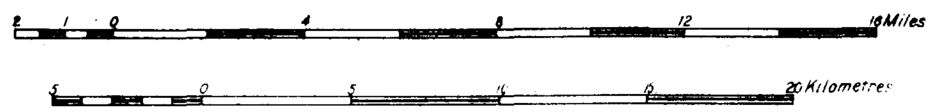
INDEX TO ADJOINING SHEETS
Showing Magnetic Declination

CAMOOWEAL	DOBBYN	MILLUNGERA
MT ISA	CLONCURRY	JULIA CREEK
URANDANGI	DUCHESS	MCKINLAY

ANNUAL CHANGE 0°E

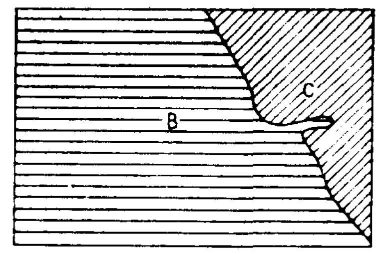
—— Bitumen
– – – Additional Tracks
Bore and mill

Scale
4 Miles to 1 Inch



Section C-D
(Folding schematic)

GEOLOGICAL RELIABILITY DIAGRAM



B Detailed reconnaissance — numerous cross-traverses and air-photo-interpretation

C Sketchy — few traverses and air-photo-interpretation

To accompany Record 1969/9.

Geology by: E.K.Carter, [illegible], [illegible], J.F.Ivanac, K.A.Townley, [illegible], [illegible], K.R.Walker, [illegible], [illegible], [illegible].
Compiled, September, 1967 by: E.K.Carter.
Drawn by: J.A.Boag, H.F.Joechel.

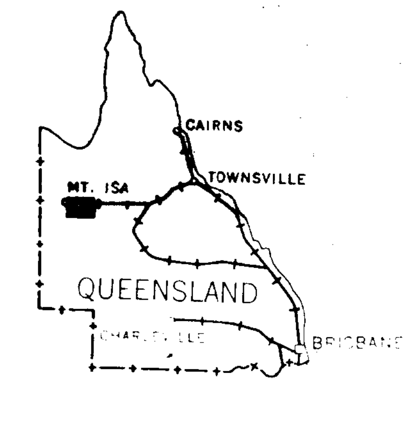


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Fig. 3.

PHOTO-INTERPRETATION OF THE CHARLEYS CREEK FORMATION AND ASSOCIATED UNITS, EAST LEICHHARDT RIVER AREA, CLONCURRY SHEET

2000 0 2000 4000 6000 FT.

AREA A

Argylla Creek

To Blockade mine Cu

To Cloncurry 50 miles - old Mt. Isa - Cloncurry road

Robin (Lsl)

Deighton Pass

previously Corella Fmn

previous easterly limit of Charleys Creek Formation.

Cu

To Mt. Isa 17 miles

Charleys Creek

previously mapped as Argylla Fmn.

Leichhardt River

East Leichhardt River Dam.

North-Western Highway

Mary Kathleen 6 miles

To Mount Frosty 1 mile Cu, Lst.

previously Deighton Quartzite

previously mapped as part of the Deighton Quartzite

previously mapped as Ballara Quartzite.

A B C D E F G H

Reference

Fault

Mine or prospect

Photo-interpretation: 5°→15°; 15°→45°; >45°

9 Shale, limestone: originally mapped as Corella Formation, but possibly overlaps Deighton Quartzite.

8 Massive white quartzite ~ Deighton Quartzite

7 Photo-interpreted unit - forms lens in banded quartzite, with rapid thickness variations, or is overlapped by uppermost Deighton Quartzite. Possibly a dark coloured ferruginous or calcareous fine-grained sediment.

6 Banded quartzitic photo pattern - originally a part of Deighton Quartzite, but apparently overlapped by uppermost massive white quartzite in Deighton Quartzite.

4 Corella Formation - folded calcareous and calc-silicate rocks - overlaps or is partly equivalent to part of Charleys Creek Formation.

Banded calcareous sediments plus limestone, massive actinolite rock - mostly photo-interpreted.

3

3

Part of Charleys Creek Formation - possibly overlapped by [illegible] and Corella Formation.

2 Horizontal banding:- ridge forming quartzite with interlayered soft beds - possibly Charleys Creek Formation.
Inclined banding:- possible equivalents to east - overlain ?unconformably by [illegible]

1 Pale pink acid volcanics ~ mainly Argyla Formation

To accompany Record 1969/9.

GMD

F54/A2/10

Locality Map ~ Cloncurry 4-mile Sheet.