COMMONWEALTH OF AUSTRALIA.

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**DEPARTMENT OF NATIONAL DEVELOPMENT.**

BUREAU OF MINERAL RESOURCES

GEOLOGY AND GEOPHYSICS.

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**RECORDS.**

1955/66

# RECONNAISSANCE REPORT GEORGETOWN AREA, NORTHERN QUEENSLAND.

by

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## SUMMARY

Investigation of indications of widespread radioactivity in the Georgetown area of Northern Queensland showed that little significance can be attached to them. Most anomalies recorded were found to occur in granite rocks. In general, radioactivity throughout the area was found to be very low in comparison with other areas where uraniferous orebodies have been found. The area flown is not considered promising as a future source of radioactive ore.

## INTRODUCTION

A reconnaissance survey of the Georgetown area on the Etheridge Goldfield, northern Queensland, was carried out by the writers and T. Connah, Queensland Geological Survey, during May 1955. This followed a reconnaissance airborne survey of the area which had been carried out by the Bureau of Mineral Resources in November, 1954.

The airborne survey consisted of a number of east-west runs flown at a height of 500 feet. The flight lines were spaced at one-mile intervals. A Chalk River scintillation counter with two 2-inch diameter crystals in series was used. Forty-one radiometric anomalies were recorded.

Owing to the short time available for the ground survey and the distances and terrain separating the anomalies, it was not possible to examine all anomalies. Instead, the anomalies were grouped according to their geological setting and selected anomalies from each group examined.

Further reliable evidence of the value of the anomalies was generously provided by geologists from Mt. Isa Mines Ltd. who also passed on other useful information on the geology of the area as a whole.

Two uranium showings located by prospectors in the district were examined. The regional geology of the area was studied in order to determine whether the sedimentary environment bore any resemblance to other known uranium fields in Australia.

Records of mining activity on the Etheridge field are available. Minor quantities of base metals have been won but the main metal product was gold. Cameron (1900) gives the most concise account of the geology of the area.

The area is covered by aerial photographs on a scale of 1:50,000 - Georgetown 4-mile sheet E/54/12 of the Australian National Grid.

Location and Access

The Georgetown area is situated in central northern Queensland, about half way between the ports of Cairns on the east coast and Normanton on the Gulf of Carpentaria. A 3'6" gauge railway connects Forsayth to Cairns. Another railway runs from Normanton to the old gold mining centre of Croydon.

The road links are in general little better than bush tracks and some are impassable for short periods during the summer monsoonal wet season.

## GENERAL GEOLOGY

Precambrian sediments, metasediments and igneous rocks crop out in the Georgetown area. The rocks are commonly referred to as part of the Etheridge "Complex" but are actually of group rank. West of the Delaney River (Plate 1), the basal unit of the succession consists of interbedded basalts, quartzites, mica schists and amphibolites. These rocks are partly granitized along the western margin of the Forsayth Granite where they have been transformed in part into biotite gneiss. A dyke of rhyolite intrudes the metasediments near anomaly No. 23 (Plate 1).

The formation grades upwards into a sequence consisting mainly of chlorite and mica schists.

The regional strike is arcuate and swings from west to north-west along the Langdon River.

Metamorphic effects decrease in intensity to the west, and between North Head and the Langdon River the chlorite and mica schists grade into greywacke and siltstone and chert.

The area west of the Langdon River is occupied almost entirely by acid to intermediate volcanics - the so called Croydon "Felsites." This formation is dominantly rhyolitic. The rock types have been described by Stevens (1955) from a suite of specimens collected by Prichard.

Cameron (1900) records a sedimentary unit which he refers to as "Later Sedimentary Strata." These rocks were not seen during the present reconnaissance.

Remnants of the Blythesdale Sandstone of Cretaceous age crop out as scattered residuals throughout the field.

Plate 1 shows a rough sketch map of the region based on Prichard's map and on the writers' own observations.

The rocks of the Etheridge Group are often equated to those of the Cloncurry-Mt. Isa district. This is not a good comparison in any sense other than that they are both Precambrian in age. A much better comparison would be with the Knights Creek/Burrell Creek succession of the Pine Creek geosyncline (Walpole and White, 1955).

One of the most noticeable features of the region is the great number of quartz reefs, lenses and blows. The Georgetown (or Etheridge) area is fundamentally a goldfield in which the mineral occurrences are small in size and almost all of the quartz reef type.

In this respect, too, the area closely resembles the central section of the Pine Creek geosyncline, and in the writers' opinion compares most unfavourably with the Corella-Mirimo and Eastern Creek successions in the Mt. Isa-Cloncurry area and with the Alligator River and Rum Jungle areas of the N.T. These are fundamentally base metal provinces and quite different from the Georgetown area.

Copper and lead mineralization occurs in the Georgetown area but in general the occurrences are all of the quartz vein type. (The writers have no information on the Einasleigh Copper Mine.) In general, too, most of the base metal showings are outside the area flown.

## RADIOACTIVITY

### General

Radioactivity in the area as a whole was found to be very low. This conclusion was reached after several long traverses had been carried out using a Detectron scintillation counter and after discussions with Mt. Isa Mines airborne team. The Forsayth granite is not markedly radioactive except in the Mt. Lighthouse area. In this region, both Mt. Isa Mines Ltd. and prospectors have reported monazite concentrations in creek beds.

Of the 41 anomalies which were located within the Georgetown area, 7 were investigated by the writers. At least four more weeks would have been required to inspect all the anomalies. Access is difficult, and with the information collected, the value of these anomalies in terms of uranium is confidently predicted as being negligible - particularly as the majority of them are known to occur in granite.

No gridding was done but an area of at least 400 yards radius around each anomaly position was closely prospected. The search was extended further if a reasonable cause for the anomaly could not be established.

### Description of Anomalies Visited

#### Anomaly No. 13

Geological setting: Granite outcrops in alluvium.

Radioactivity in granite outcrops measured 0.04-0.045 (using a Detectron scintillation counter) milliroentgens/hour as against 0.01 to 0.03 milliroentgens/hour on alluvium. A N.S. traverse across the anomaly was paced. The readings ranged from 0.015 to 0.035 for ½ mile. Over the next ¼ mile the counts dropped to 0.01 milliroentgens/hour.

A traverse north of the anomaly using an Austronic P.R.M. 200 geiger counter gave much the same result - the counts ranged from 190 per minute to 65 per minute.

In both traverses the maxima were recorded over granite outcrop and the minima over alluvium.

The net result of the traverses was to show a plateau of approximately 3 x background value, which extended along the line of flight for about half a mile. The geological setting indicates that the plateau is probably roughly circular in shape - in other words the anomaly would have given much the same registration had the flight line been from any direction.

At anomaly No. 23, the line of flight of VH-BUR was reflown from an Auster aircraft at a height of 50 feet, using a Halross 939 scintillation counter. The Auster was loaned for this purpose by Mt. Isa Mines. A broad plateau with a $2\frac{1}{2}$ x background count was recorded. The plateau indicated from the Auster aircraft agrees with the results obtained on the ground.

Anomaly No. 14

Geological setting - granite.

Radioactivity - All readings much the same as for No. 13 with only minor variations.

Anomaly No. 23

Geological setting - Prominent ridge of chiastolite schist on west flank of south-plunging anticline. Beds dip 60° to 80° to west and are strongly fractured, crumpled and intruded by numerous quartz veins.

Radioactivity - The chiastolite schist bed showed activity equivalent to 2 x background (125 cpm.) as against a much lower count in the surrounding rocks (65 cpm.).

The anomaly is considered to be due to a large mass with a slightly higher radioactivity, and topographically higher than the surrounding rocks.

Anomaly No. 31

Geological setting - Mineralized (gold) quartz filled shear in granite. Strike of shear 80° magnetic.- approximately parallel to the line of flight.
Radioactivity - Maximum count obtained in the area was 200 yards to the west of the anomaly position and was 300 cpm. (P.R.M. 200 geiger counter). 140-175 cpm. were obtained in the surrounding granite.

The anomaly can be attributed to radioactivity in the shear zone. The anomaly was checked from an Auster aircraft at heights of 50 to 100 feet and from several directions. Counts up to 2 x background were recorded over a wide area around the shear zone.

Anomaly No. 32

Geological setting - Biotite gneiss with minor pegmatite veinlets. At anomaly position gneiss is sheared but no mineralization can be seen.

Radioactivity - 160 cpm. were registered over the hill on which the anomaly was located as against 70-80 cpm. in the surrounding rocks. The anomaly is due to mass effect of an outcrop giving radioactivity slightly higher than background.

Anomaly No. 34

Geological setting - Fine grained granite.

Radioactivity - 150 cpm. (using P.R.M. 200).

The anomaly is due in part to topography, in part to mass effect of a granite mass with radioactivity slightly higher than the surrounding metasediments.

Anomaly No. 33

Geological setting and radioactivity much the same as for anomaly No. 34.

Limkins Prospect

Limkins Prospect is situated on Kurrajong Creek 5 miles ENE of the old gold mining townsite of Percyville (plate 1). The prospect was discovered by E. Hall of Einasleigh in September 1954.

The prospect is located on strong, east-striking, quartz-filled fracture in granite and granitized sediments. A small shoot of secondary ore is localised in a minor zone of cross fracturing consisting of closely spaced joints which strike at 300°.

The shoot is apparently in a form of a pipe. A pit 14 feet wide by about ten feet long and 4 feet in depth has been sunk on the showing. The ore is patchy and locally controlled by the cross fractures. Torbernite is the main mineral present. The small quantity of ore removed from the pit at the time of the inspection may bulk as high as 0,5% $U_3O_8$. One specimen was assayed by Mt. Isa mines for a uranium oxide content of 4%.

The prospect has little economic significance although a few tons of good grade secondary ore may be won from it. Prospecting along the main east striking fracture and in the area surrounding the prospect did not indicate any further significant radioactivity.

A rough sketch map of the prospect is shown on Plate 2.

Blackwell Prospect

This prospect is located 8 miles west of Georgetown and about one-half mile north of the main Georgetown-Croydon road. The claim was registered as EXT. MR Claim No. 90578 by A. R. Blackwell.

Radioactivity was detected by Blackwell in old lead workings and at several points on the surrounding area. A specimen from a pit on an old working was assayed by the Bureau of Mineral Resources for a value of 0.15% $eU_3O_8$.

Plate 2 shows a sketch plan of the prospect. No identifiable uranium minerals were seen. The main radioactivity was located in ferruginous quartzose lode material, but is confined to the northern end of one shallow pit.

The lode shear itself is weakly mineralized and discontinuous. In no place does the mineralization extend over a reasonable width. Radioactivity along the lode in general is very weak. The prospect has no economic significance.

West of this prospect, A.R. Blackwell has located three 'hot spots.' In general, these show activity up to 4 to 5 times background and consist of minor ferruginous shear zones in either altered rhyolite or sediments. The hot spots are scattered over an area of several square miles. None of the showings has any economic value.

Other Prospects

The following information was supplied by geologists from Mt. Isa Mines.

Anomalies No. 4, 5, 6

Anomalies No. 4, 5, and 6 are all located in a dyke of diorite which gives radioactivity up to 4 x background as against 2 x background in the surrounding sediments. A broad 3-4 x background plateau is recorded from a height of 50 feet.

Anomaly No. 35.

Anomaly No. 35 is in barren granite. No significant anomalies were recorded from the Auster aircraft in the area surrounding anomalies No. 37, 38 and 39.

The old Dorothy Copper mine is situated ½ mile N.E. of anomaly No. 35. Shallow workings extend along a series of joints in granite for about half a mile. The joints strike east and dip north at 50° and are filled with very thin veinlets of azurite. A 12 x background count was recorded in a shaft at a depth of 20 feet. No economic significance can be attached to this radioactivity.

Slight radioactivity, equivalent to 5 x background was recorded from Lowdins workings, north of the Dorothy copper mine. A specimen which assayed 0.6% $U_3O_8$ was collected by Mt. Isa Mines geologists from near "Kaizer Bills" copper show, approximately 5 miles west of Einasleigh and ½ mile N of the Einasleigh-Forsayth road. The sample was collected from a minor sheared zone in quartzite approximately 1 chain west of the old workings. The showing had no economic significance.

Summary of Geological Setting of Georgetown Anomalies

| | | |
|---|---|---|
| Anomaly Nos. | 1, 2, 3, 7, 8, 9, 36, 37, 38, 39, 40 | - in Croydon Volcanics |
| " " | 4, 5, 6 | - Diorite Dykes |
| " " | 10, 11, 12, 13, 14, 15, 16, 17, 18,) 19, 20, 21, 22, 24, 25, 26, 27, 28,) 29, 30, 31, 33, 34, 35 | - in Granite |
| " " | 23, 41 | - Sediments and Metamorphics |
| " " | 32 | - Biotite Gneiss |

## CONCLUSIONS

1. The Georgetown area does not appear to be favourable for the occurrence of economic uranium mineralisation. When compared with the main known areas of uranium mineralisation in northern Australia, it appears to be very similar to the central or trough zone of the Pine Creek geosyncline where a number of small shows have been found in the past, but where the greatest number of mineral showings are of the small quartz reef type - gold, tin, tungsten, etc.

2. It is possible that the main areas in the Georgetown district of base metal (copper) mineralisation such as Einasleigh, Gilberton and Ortona, which are on the fringe of the country flown, might be more favourable for the occurrence of uranium minerals than the quartz-gold vein country actually traversed. It is desirable that a ground reconnaissance, prefably by a geological-geophysical team, should precede any further airborne survey.

## ACKNOWLEDGMENTS

The writers wish to thank Mr. T. Connah and the Chief Geologist, Queensland Geological Survey; the Mt. Isa Mines Co. Ltd., for their assistance and courtesy.

## REFERENCES

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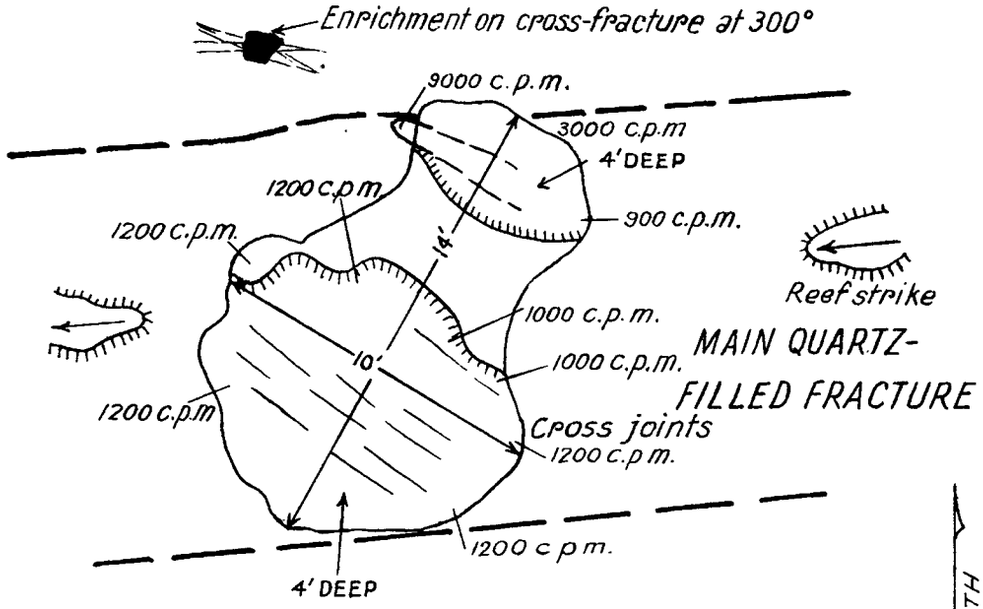
SKETCH PLAN

# LIMKIN'S PROSPECT

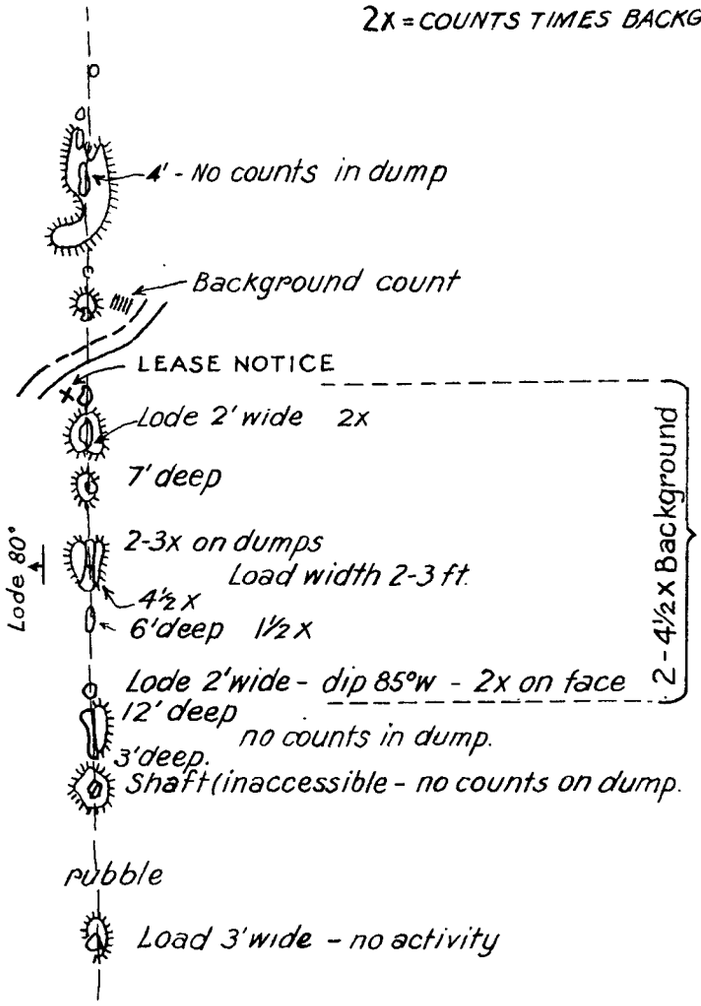
(NOT TO SCALE)




SKETCH PLAN

# BLACKWELL'S PROSPECT

2X = COUNTS TIMES BACKGROUND




MAGNETIC NORTH

SCALE OF FEET

100 50 0 100 200

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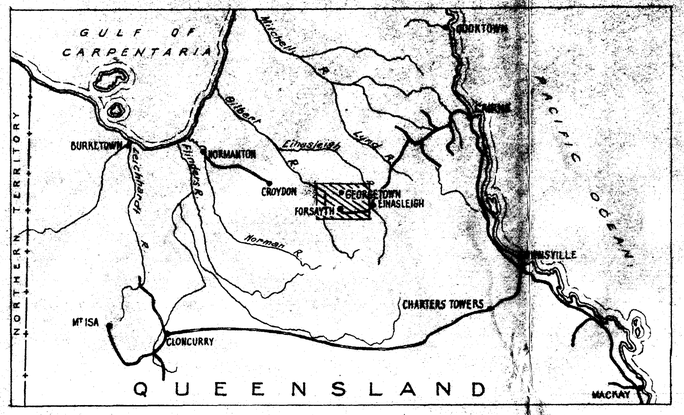
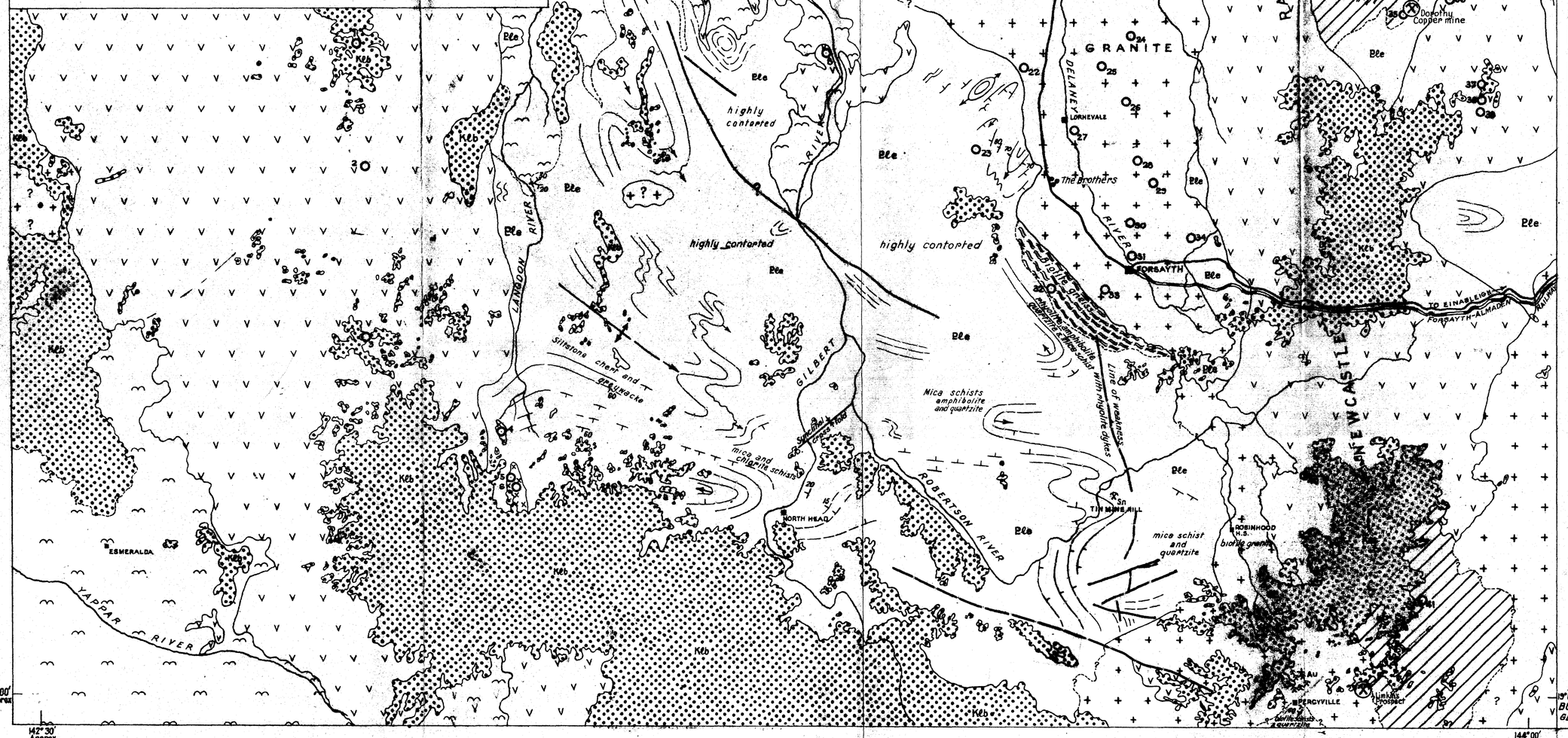
Q44-1a





# RECONNAISSANCE GEOLOGICAL MAP

# GEORGETOWN AREA

## QUEENSLAND

SCALE OF MILES *(Approx)*

4 0 4 8 12

## Reference

RECENT

- ⌒ ⌒ *Alluvium*

CRETACEOUS

- Klb *Blythesdale Formation*

PALAEOZOIC

- V V V *Croydon Volcanics*

LOWER PROTEROZOIC

- Ble *Etheridge Group*
- ▨ *Undifferentiated Granite & Metamorphics*
- \+ + + *Granite*
- x x x *Diorite Dyke*
- *Established geological boundary*
- ---?---? *Inferred boundary*
- 20 *Strike and dip of strata*
- *Trend lines (observed & interpolated)*
- *Plunge of lineation*
- *Anticlinal Crest*
- *Synclinal Trough*
- *Fault*
- *Inferred fault*
- ⚒ *Mine workings*
- ⊗ *Uranium prospect*
- O21 *Airborne Anomaly*
- *Railway*
- *Road*

GEOLOGY BY B. P. WALPOLE
(AFTER C.E.PRICHARD)

*BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS - JULY 1955*

**Q44-1**