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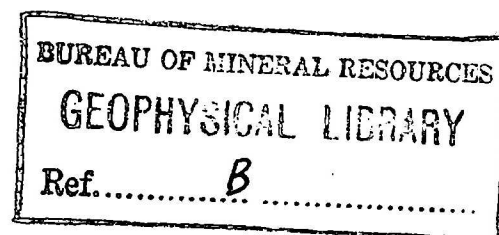
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PRELIMINARY REPORT ON AIRBORNE SCINTILLOGRAPH SURVEYS AT  
CHILLAGOE AND EINASLEIGH-GILBERTON, QUEENSLAND (1955)

by



W.D. PARKINSON AND J.M. MULDER

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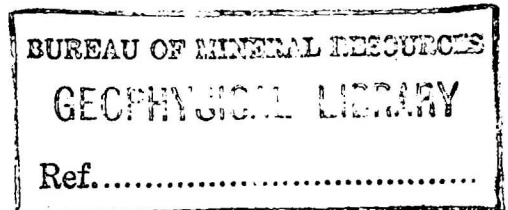
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## CONTENTS

	<u>Page</u>
1. GENERAL	1
2. OPERATIONS	1
3. INSTRUMENTS	1
4. AREAS AND RESULTS	2
(a) Chillagoe District	2
(b) Einasleigh-Gilberton District	2
5. POSITIONS OF ANOMALIES	3
6. LOW-LEVEL INVESTIGATION BY AUSTER AIRCRAFT	3

## ILLUSTRATION

Plate 1. Locality map.

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## 1. GENERAL

Airborne scintillograph reconnaissance surveys have been carried out over two areas in Northern Queensland selected in consultation with the Queensland Department of Mines. The areas are:-

- (a) Chillagoe.
- (b) Einasleigh-Gilberton.

Both areas were surveyed by officers of the Bureau of Mineral Resources in D.C.3 aircraft VH-MIN during September and October, 1955. Some of the localities in which anomalies were recorded, were re-surveyed at low level in Auster aircraft VH-GVC.

Details of the areas flown are shown on the accompanying map. The results obtained are described briefly below. The total area covered during the initial airborne scintillograph reconnaissance over the two areas was 9,800 square miles. Flights were made at a height of 500 feet and flight lines were spaced one mile apart. After a preliminary inspection of the results had been made additional surveys were made at heights of 500 and 200 feet over sixteen selected localities containing anomalies. Many of these areas were quite small, and some contained only one anomaly. Flight traverses were half a mile apart in some places and one mile in others; in some cases only one traverse was made over the point of interest. The localities selected are shown on the map as dotted rectangles, the outlines of which correspond to the boundaries of the aerial photographs used in making the additional surveys during which 670 traverse miles were flown.

On 8th and 9th November, immediately after the completion of the reconnaissance by D.C.3 aircraft, detailed low-level surveys were made in the Auster aircraft over ten of the selected localities, at a height of 100 feet. The results of the Auster surveys are discussed separately at the end of the report.

The party engaged in surveys in the D.C.3 aircraft comprised Captain D.K. Duffield and F/O Purnell of T.A.A. and Messrs. F.J. Merrick, W.A. Irving, R. Baeke and B.C. Hamilton and Miss N. Cullen of B.M.R., with Dr. W.D. Parkinson, Senior Geophysicist in charge of the party.

The Auster party comprised J.M. Mulder, Geophysicist in charge, K. Kern and A. Crowder.

## 2. OPERATIONS

Navigation was by reference to photo-mosaics and aerial photographs. The position of the D.C.3 aircraft was recorded continuously throughout the survey by the operation of a vertical strip camera which photographed the ground directly below the aircraft. The aircraft was flown during the initial survey at a nominal height of 500 feet above the ground on traverses one mile apart but, as stated above, during the additional follow-up by the D.C.3 aircraft on areas of interest, the aircraft was flown at both 500 and 200 feet above the ground. The actual height of the aircraft was recorded continuously by a recording radio-altimeter.

## 3. INSTRUMENTS

Two M.E.L. Chalk River scintillation counters were used in the aircraft, each coupled to its own continuous recorder. The two instruments were of about equal sensitivity, but were connected to separate ratemeters having time constants of one and two seconds respectively. The two records obtained were generally similar. For the preliminary assessment, the records have been corrected only approximately for variation in the height of the aircraft.

#### 4. AREAS AND RESULTS

(a) Chillagoe District.

(i) Initial Reconnaissance Survey.

The area is a rectangle bounded by the parallels 17°00'S and 17°35'S and the meridians 144°00'E and 144°33'E and has an area of about 1,500 square miles. Its position is shown on the accompanying map.

The area surveyed includes an exposure of pre-Cambrian rocks stretching roughly from Bolwarra Homestead to Mungana. These are bounded on the west by Cretaceous sandstone and on the south-west by granite. The granite and the Palaeozoic sediments near Mungana show a higher average radiation than the rest of the area. The Palaeozoic sediments contain most of the large anomalies recorded in the area. A total of 20 well-defined anomalies and several lesser ones have been identified in a preliminary analysis of the records. Three of these anomalies are sharp.

(ii) Additional Survey by D.C.3 Aircraft.

Of the three sharp, well-defined anomalies, two in the Brown Creek and Dargalong areas are near the pre-Cambrian rocks. These were investigated by re-flying at two altitudes, and the indications are that they represent large low-grade sources. The two localities are indicated in the accompanying map by dotted rectangles. Both of these were further investigated by the Auster aircraft and the results are discussed below. The third sharp anomaly was not investigated because it appears to be on granite.

(b) Einasleigh-Gilberton District.

(i) Initial Reconnaissance Survey.

The area is of irregular shape, and covers the exposed pre-Cambrian rocks in the four-mile sheets of Atherton, Einasleigh, Clarke River and Gilberton. It covers about 8,300 square miles and adjoins the Georgetown area which was surveyed by D.C.3 aircraft VH-BUR in 1954.

Most of the area surveyed consists of pre-Cambrian and granite formations. Tertiary lava flows cover sections in the north-east and south. In the south-east, and in a small region north of Einasleigh, there are Palaeozoic sediments. The pre-Cambrian is overlain in the west by Cretaceous sandstone. A total of over 100 well-defined anomalies and several lesser ones were recorded. About 30 of these are sharp and many of the sharp anomalies are on granite areas. There are concentrations of sharp anomalies over pre-Cambrian rocks in the one-mile areas of Mt. Surprise, Kidston, Dumbano and Victor. Several anomalies are due to rocks of other types cropping out through the lavas, which have only a very low radioactivity. Some of the granite bodies and the Palaeozoic sediments near Einasleigh have higher radioactivity than normal.

(ii) Additional Surveys by D.C.3 Aircraft.

About 20 of the well-defined, sharp anomalies were re-surveyed from 500 and 200 feet. The small areas in which this re-surveying was carried out are shown in

the accompanying map by dotted rectangles. Eight of the fourteen localities in the Einasleigh-Gilberton District were further investigated by the Auster aircraft, and the results of this investigation are discussed below. Of the remaining six, three areas appear to warrant further investigation. They are Werrington, Carpentaria South and Louis Knob. In addition to these areas, a strip along the northern part of the one-mile sheets of Victor and Mt. Hogan contains many small, very sharp anomalies. The topography of the region is too rugged to allow flying at 200 feet in a D.C.3 aircraft, so the region could not be flown at two heights as were the other small areas. Further surveying by some other method, such as Auster aircraft or vehicle, is necessary in this region.

#### 5. POSITIONS OF ANOMALIES

The positions of the anomalies described above are as yet known only approximately. Their exact positions will not be known until the photographic record has been examined in detail and the positions of flight lines determined.

When that has been done, the positions of all the anomalies will be marked on appropriate maps or photo-mosaics and will be published for general use in making ground investigations.

#### 6. LOW-LEVEL INVESTIGATION BY AUSTER AIRCRAFT

Of the sixteen small areas re-surveyed by the D.C.3 aircraft, eight in the Einasleigh-Gilberton District and two in the Chillagoe District were further investigated by Auster aircraft VH-GVC hired from Southern Airlines and fitted for scintillograph surveying by the Bureau of Mineral Resources. The survey was carried out from a height of about 100 feet. The separation of traverses varied from one-quarter to one-tenth of a mile.

The greatest intensity of radioactivity recorded in these low-level investigations was over the Carpentaria Downs locality. It amounted to almost six times normal intensity over an area of about one-eighth of a mile square. Radiation equal to five times normal was recorded over a larger area in the Dargalong locality.

Areas over which the radioactivity was more than three times normal are in the Dinner Creek, Gilbert River and Quartz Blow Creek localities. Readings of more than twice normal were found over the localities of Elizabeth Creek, Gilberton and Fossilbrook. The other two areas (Einasleigh River and Brown Creek) gave radiation only slightly higher than normal.

From the sharpness of the recorded profiles, it appears that the areas in which the anomalies give the greatest promise of being associated with radioactive deposits are Gilbert River, Quartz Blow Creek and Carpentaria Downs. These should be given priority in any ground radioactive investigations based on the airborne scintillograph surveys.

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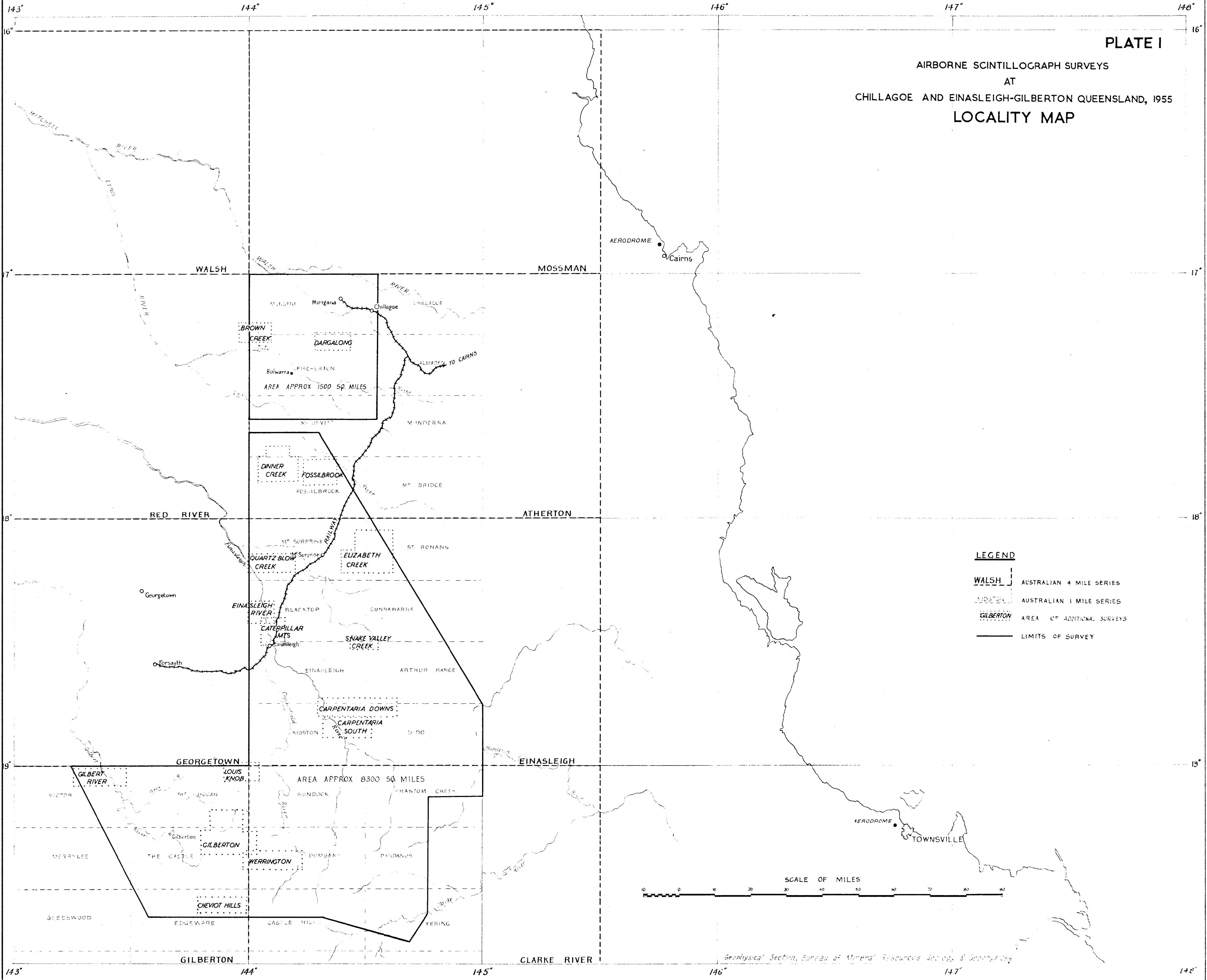


PLATE I

AIRBORNE SCINTILLOGRAPH SURVEYS  
AT  
CHILLAGOE AND EINASLEIGH-GILBERTON QUEENSLAND, 1955  
LOCALITY MAP

- LEGEND**
- WALSH AUSTRALIAN 4 MILE SERIES
  - MOSSMAN AUSTRALIAN 1 MILE SERIES
  - GILBERTON AREA OF ADDITIONAL SURVEYS
  - LIMITS OF SURVEY

