COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

RECORDS

RECORDS 1960 No. 50

SELWYN AREA CARBORNE RADIOMETRIC SURVEY QUEENSLAND 1956

by

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CONTENTS

ILLUSTRATIONS.

1. INTRODUCTION.

The survey described in this report was carried out for two reasons :-

(1) to search for new uranium deposits in areas where some uranium was known to occur.

(2) to test the applicability of the carborne scintillation counter, and compare the results with those obtained by ground parties using conventional hand-held counters.

The Geological Section of this Bureau was asked to suggest suitable areas already surveyed with hand-held counters; they suggested the three areas (plate 1) covered in this present survey.

The work was carried out between September and November 1956 by L.E. Howard, geophysicist, and R. Norman, geophysical assistant.

2. GEOLOGY.

The surveyed areas lie within a much larger area which was mapped a few months earlier by a Bureau geological party led by W.A. White, and were selected by him as being suitable on geological grounds for the occurrence of uranium mineralisation. The rock type in the areas selected is generally slate adjacent to granite, and the surveys were in some cases extended slightly beyond the granite contact. Uranium mineralisation was previously known to occur in the Mt. Cobalt area in three places :-

(i) Mariposa Prospect, about 2 miles west of Mt. Cobalt.

(ii) An outcrop about one mile north of Mariposa Prospect in which uranium minerals were located at about the same time by the prospector who discovered the Mariposa occurrence.

(iii) Mt. Cobalt Mine.

Copper mineralisation is widespread in the three areas surveyed; silver minerals occur in the Gorge Creek area and, of course, cobalt in the Mt. Cobalt mine.

3. TECHNICAL DETAILS.

A. Equipment.

The apparatus comprises a scintillation meter and a Monroe odograph mounted in a Landrover. The output of the scintillation meter is recorded continuously on a Kelvin Hughes recorder driven by a flexible drive from the vehicle speedometer outlet. The odograph plots continuously on a sheet of paper the course taken by the vehicle. The scale at which the course is plotted can be selected to have any value between approximately 5 inches to 1 mile and 3 miles to 1 inch. During these surveys the scale selected was either 1 inch to 1 mile or 1½ inches to 1 mile.

The odograph consists of three main units :-

(i) Power Supply.

This provides the high voltage required for the vacuum tubes from the 12 volt battery.

(ii) Compass unit.

This measures the heading of the vehicle continuously and passes this information into the plotting unit by means of a flexible drive. The compass should be mounted in a position where the earth's magnetic field is not appreciably distorted by magnetic materials in the vehicle. It is normally mounted in the rear of the Landrover and should be compensated at regular intervals for the effect of the magnetisation of the vehicle.

(iii) Plotting unit.

This unit plots the position of the vehicle. The distance traversed is introduced by the rotation of a flexible drive connected, as stated earlier, to the vehicle's speedometer outlet. The heading is introduced by the rotation of the compass cable. These two quantities are combined and integrated in the plotting unit and the result is plotted to the desired scale. The plotting unit is mounted directly behing the driver.

The scintillation counter was designed and constructed in the Bureau's radiometric laboratory by D.F. Urquhart and W. Burns. The detector head consists of a large plastic phosphor 5 inches in diameter and 5 inches long, viewed by a Dumont photomultiplier type 6364. This gives a normal count rate of about 10,000 counts per minute when traversing over non-radioactive ground such as alluvium. The time constant of the ratemeter is about 1 second.

The recorder is driven by a flexible drive coupled to the speedometer outlet on the vehicle. This ensures that the reading on the recorder can be correlated with the position of the vehicle recorded on the odograph chart.

B. Method of Survey.

The most satisfactory method of traversing an area is by straight and parallel uniformly spaced lines. Even if this were possible it would be necessary for the lines to be very close together (about 200 feet) to ensure that any uranium minerals in the surface rocks were detected. In practice, it is necessary to compromise in both ways. Because of the rugged nature of the terrain, it was usually necessary to detour around the numerous obstructions such as cliffs, creeks and fences. Although the resulting traverses bear little resemblance to straight lines, an attempt was made to keep their average direction constant, The average spacing between lines was much greater than that necessary to ensure complete coverage because the time available was insufficient to cover the areas to be surveyed with an average spacing of less than 1/6 mile. To enable the correlation between odograph and scintillation records to be made as easily as possible, the survey was done in separate traverses each about two or three miles in length and marked with the same number on scintillometer and odograph charts. In addition, the direction of the traverse was marked on the odograph chart. For final plotting these traverse lines were all redrawn on a separate map.

4. DISCUSSION OF RESULTS.

The intensity recorded by the scintillation counter is indicated on plate 2 by variations in the type of line used to denote the traverses. The normal reading of radioactivity over slates was approximately 10,000 to 20,000 c.p.m., over granites, from 20,000 to 80,000 c.p.m. and in the vicinity of known uranium occurrences the count rate would be usually greater than 50,000 c.p.m.

The results are discussed below under the two headings of track surveys and surveys of particular areas.

A. Track Surveys.

Before the survey of the particular areas was commenced, tracks in the Selwyn-Kuridala area were traversed.

(i) Mt. Cobalt.

A sharp anomaly with maximum value at about 50,000 c.p.m. was recorded when passing along

the track beside the dump of the Mt. Cobalt Mine. Uranium mineralisation in this mine has been known for many years and as it has been thoroughly tested and drilled, no further investigation was made.

(ii) Mariposa.

This is a uranium prospect about three miles north of Mt. Cobalt. Readings of about 80,000 c.p.m. were obtained at a distance of about 100 feet from the small pit which had been dug to test the mineralisation. Higher readings would have been obtained if the vehicle could have approached closer to the prospect.

(iii) North Mariposa.

This anomaly was first located from the Mariposa track about 700 to 800 feet from the outcrop. The outcrop is on a nearly vertical cliff face, which makes a close approach with the vehicle rather hazardous. Like the other two anomalies mentioned above, it appears to have been thoroughly investigated by geologists.

(iv) Haematite.

About 7 miles north of Selwyn, on the main Cloncurry road, the road cuts through the formation of an abandoned tramway. The rocks used in the ballast are slightly more radioactive than the surrounding rocks and a short sharp increase in radiation was observed in passing through the cutting. This has been observed by prospectors in this area on earlier occasions. No uranium minerals appear to be present in the rocks and the increase in radioactivity is probably due to the fact that the rocks contain a slightly higher than normal (e.g. .0002 percent U_3O_8 equivalent) concentration of uranium or thorium.

(v) True Blue Track.

This anomaly, by far the largest located in the area, is on the track from Kuridala to the True Blue Mine. Readings of about 400,000 c.p.m. were obtained over a small area measuring about 100 feet x 50 feet. The radioactivity was found to be due to small pebbles resembling laterite but containing a black mineral. These pebbles appear to be confined to the top 6 inches of soil, as a portable counter placed on the bottom of a small hole showed a considerable reduction in count rate as the hole was deepened. A small sample of these pebbles assayed approximately 6 percent U_3O_8 equivalent, the activity being due to U_3O_8 uranium. There is a significantly high level of activity in the sand of a creek bed about 300 yards from this anomaly. Apart from this, the radioactivity of the rocks

enclosing the anomaly shows no significantly high value. A detailed survey with the vehicle was impossible because of large rock outcrops and the rough terrain. It is not known whether this anomaly had been previously located and it is not considered likely that it is related to any economic deposit of uranium minerals.

B. Area Surveys.

(i) Agate Downs Area.

This area is just south of the Cloncurry River and about two miles west of the Cloncurry-Selwyn railway line. Only two small areas of high radioactivity were located and no localised high spots occurred within either of the areas. The radioactivity is considered to be due to the presence of a slightly higher than average activity distributed throughout the rock. No radioactive minerals were observed.

(ii) Gorge Creek Area.

This area lies to the north of the Agate Downs area and is crossed by the main Selwyn-Cloncurry road. No significantly high readings were obtained. Higher readings near the northern border of the area are due to the extension of granite into this region.

(iii) Mt. Cobalt Area.

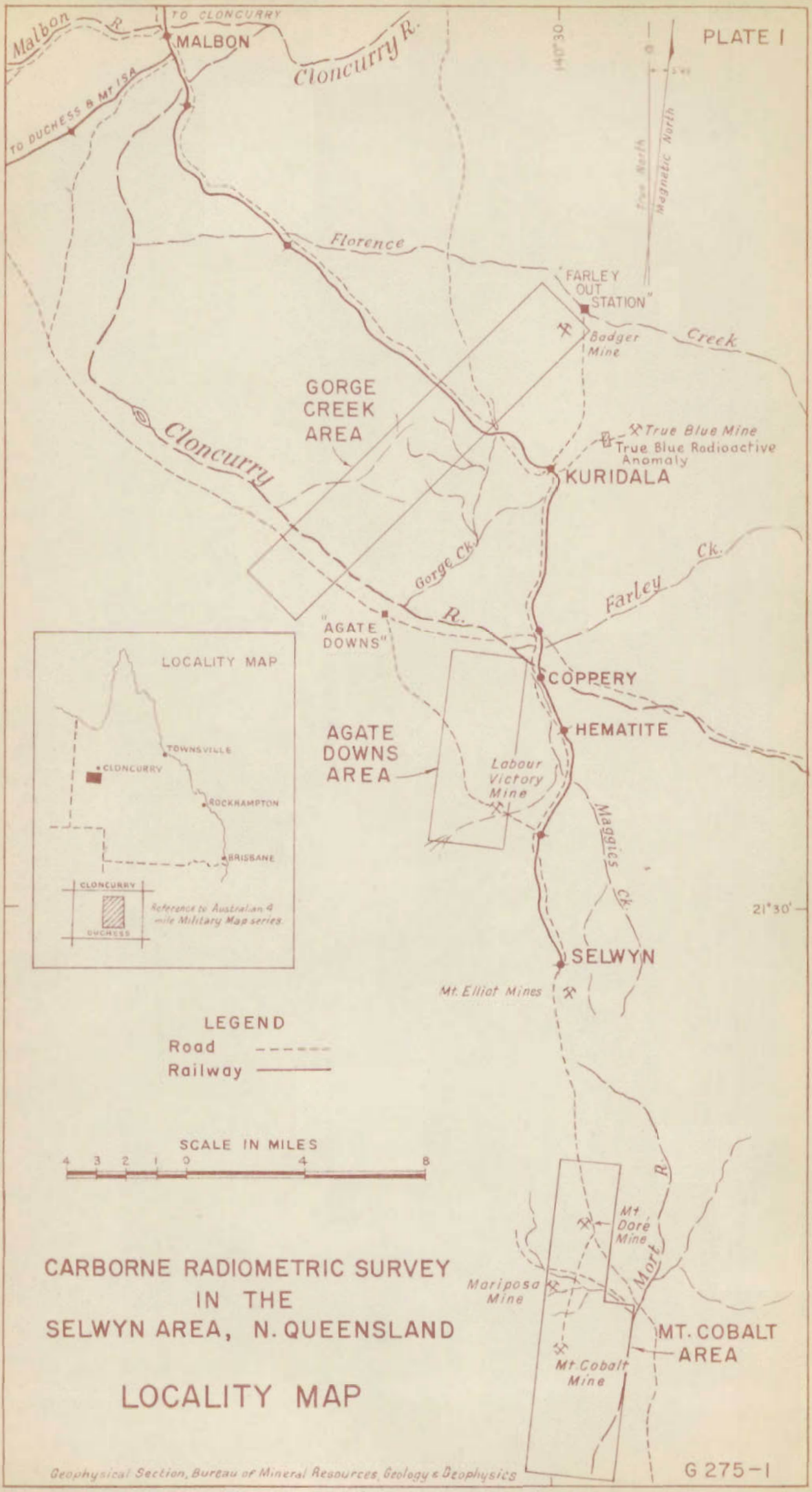
Due to lack of time this area was only partially completed. No anomalies were located other than those found whilst traversing the tracks passing through this area.

5. CONCLUSIONS.

Almost all the anomalies detected in this survey had been discovered in previous surveys. Further investigation is probably not warranted, except perhaps for the anomaly along the True Blue track.

The areas were not very suitable for traversing by vehicle, because of fences and rough terrain. An aircraft flying at 100 feet along the same traverse lines would have detected all the anomalies detected by the carborne instrument.

PLATE I



CARBORNE RADIOMETRIC SURVEY IN THE SELWYN AREA, N. QUEENSLAND

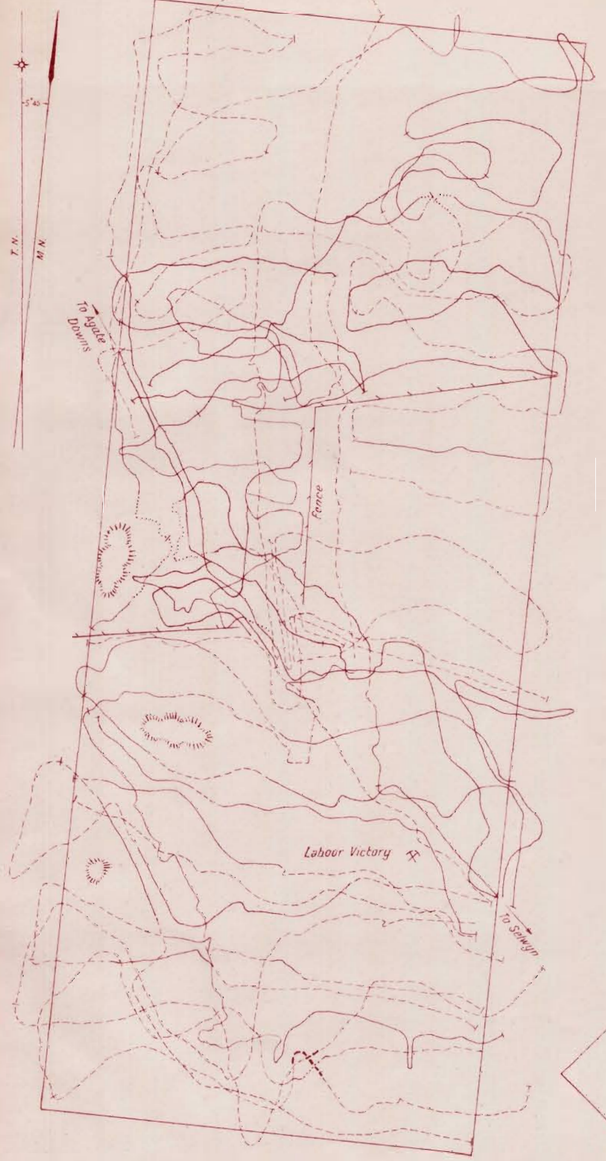
LOCALITY MAP

Geophysical Section, Bureau of Mineral Resources, Geology & Geophysics

G 275-1

To accompany Records 1960 No. 50

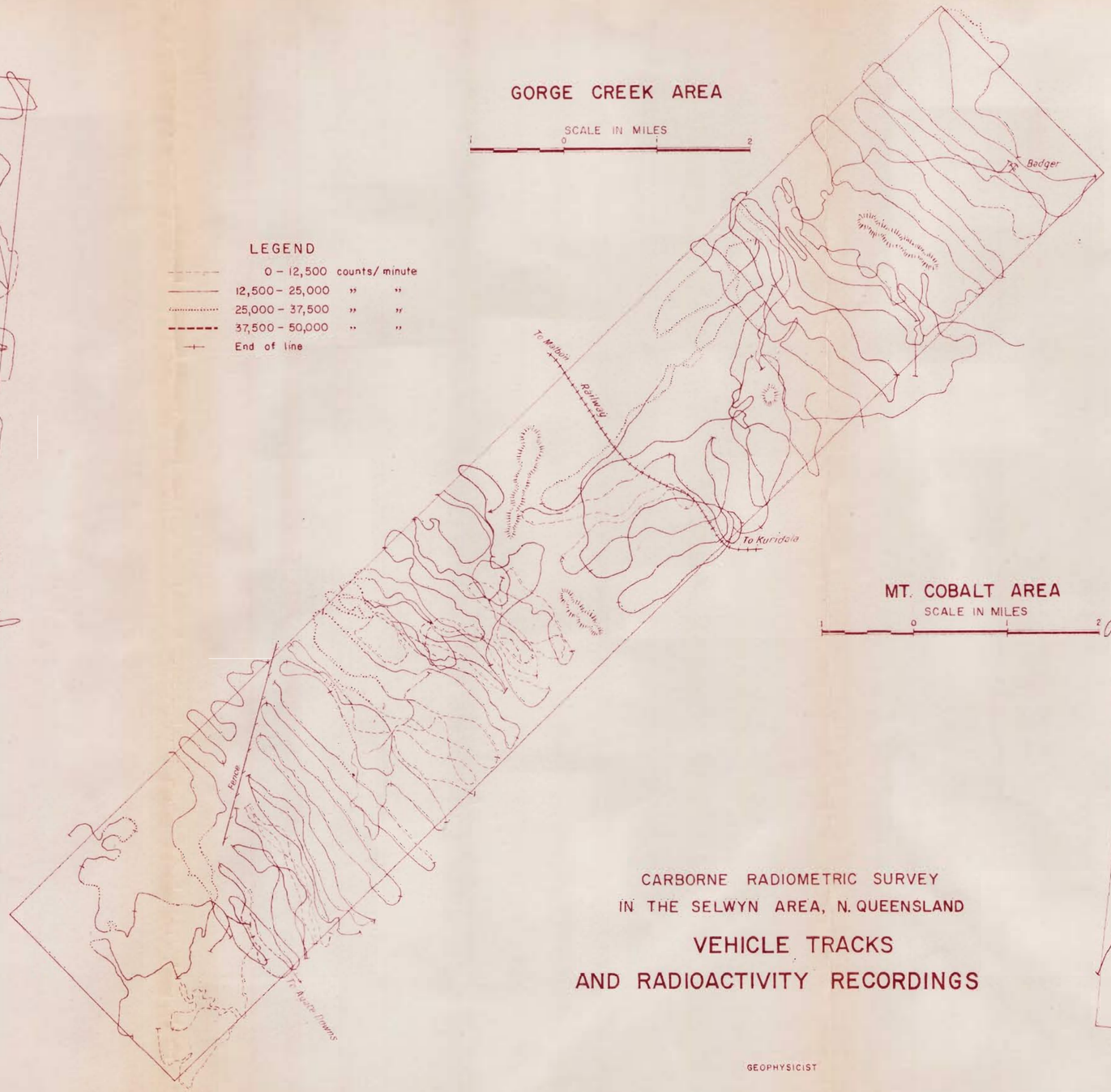
PLATE 2

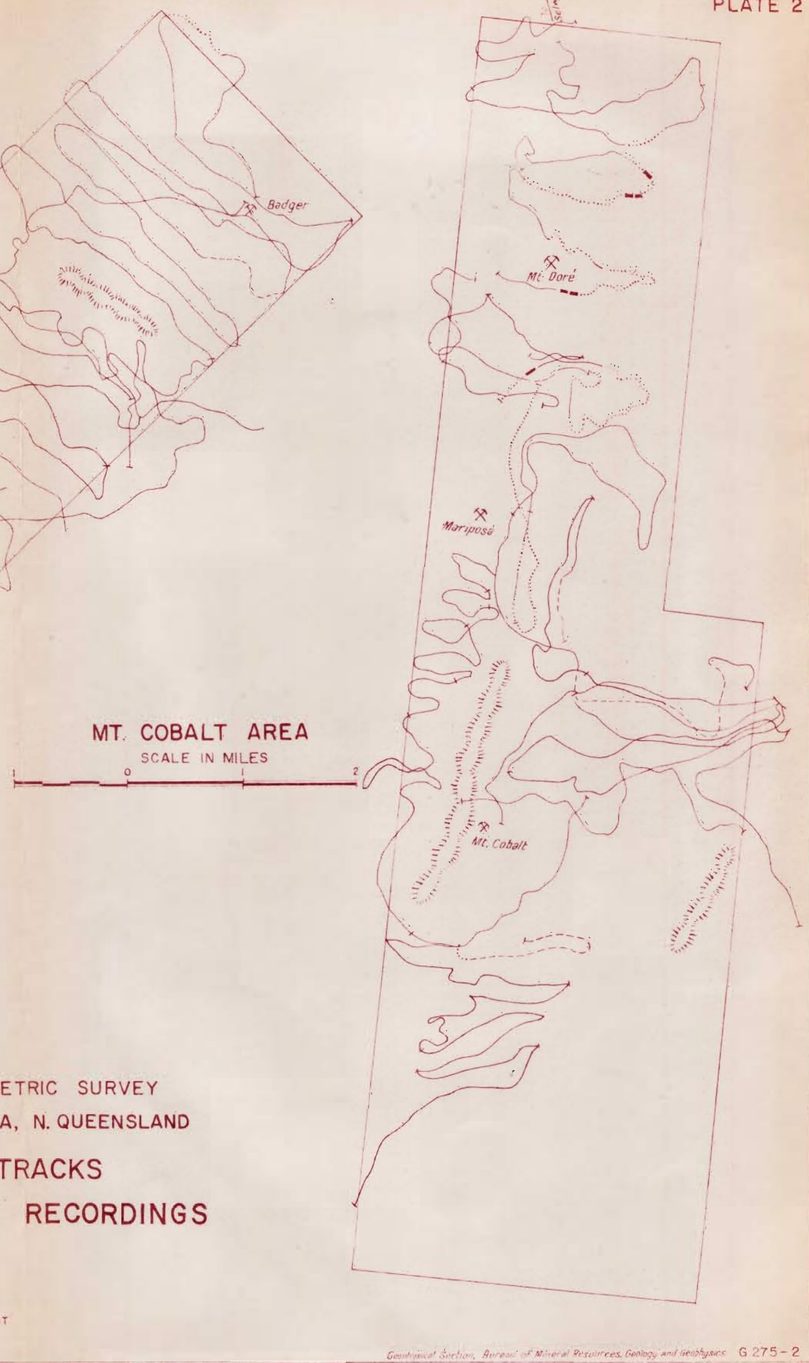


AGATE DOWNS AREA

SCALE IN MILES

1 0 1





MT. COBALT AREA

SCALE IN MILES

1 0 1 2

CARBORNE RADIOMETRIC SURVEY

IN THE SELWYN AREA, N. QUEENSLAND

VEHICLE TRACKS AND RADIOACTIVITY RECORDINGS

GEOPHYSICIST

Geophysical Section, Bureau of Mineral Resources, Geology and Geophysics G 275 – 2

To accompany Records 1960, No 50