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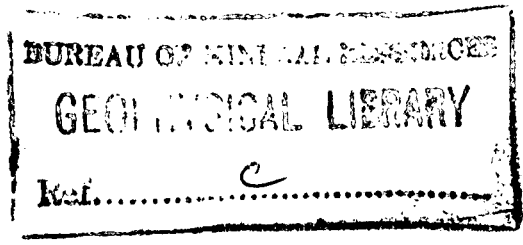
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

001604⁺

RECORD No. 1964/146



MOUNT CUTHBERT/DOBBYN

AEROMAGNETIC SURVEY,

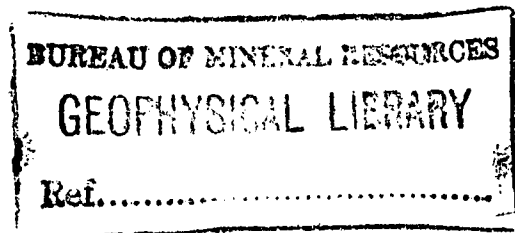
QUEENSLAND 1963



by

B.A. DOCKERY and D.B. TIPPER

The information contained in this report has been obtained by the Department of National Development as part of the policy of the Commonwealth Government to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.



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SUMMARY

An aeromagnetic survey was made over the Mount Cuthbert/Dobbyn mineral field, the survey area being bounded by latitudes 19°22'S and 20°08'S, and by longitudes 139°46'E and 140°16'E. The survey consisted of two parts : (a) coverage of the whole area with east-west traverses at half-mile spacing, and (b) detailed coverage of a much smaller area around Dobbyn with east-west traverses spaced at one-tenth of a mile. The object of the survey was to determine the geological structure of the area, particularly that part covered by soil and alluvium.

Copper mineralisation occurs in a meridional belt of Precambrian formations, namely the Leichhardt Metamorphics (?Archaean) and the Argylla and Corrella Formations (Lower Proterozoic). At least one-third of the area is covered by Cainozoic alluvium, and it was thought that the meridional trend of the Precambrian formations might continue beneath the alluvium to the north of the region of outcrop.

The results of the survey indicate that the meridional trend of the Precambrian formations continues beneath the alluvium. Five magnetic zones have been delineated as a result of examining the magnetic profiles for the whole area. Interpretation of the contoured magnetic data for the detailed area around Dobbyn was not done because of its complexity and because the fine geological structure is not readily related to the contour pattern. More geological information is required before an interpretation is attempted; further detailed surveying is recommended immediately to the north of the Dobbyn detailed area.

1. INTRODUCTION

During the period 28th August to 9th November 1963, an aeromagnetic survey was carried out over the Mount Cuthbert/Dobbyn mineral field, the approximate boundaries of the survey area being latitudes $19^{\circ}22'S$ and $20^{\circ}08'S$, and longitudes $139^{\circ}46'E$ and $140^{\circ}16'E$. The survey comprised two parts : (a) coverage of the whole area with east-west traverses spaced at half a mile, and (b) detailed coverage of a relatively small area around Dobbyn with east-west traverses spaced at one-tenth of a mile. The object of the survey was to determine the geological structure of the area, particularly that part covered by soil and alluvium.

The survey area measured about 50 miles north-south by 30 miles east-west. Its position is shown in Plate 1, which also shows the four sub-divisions of the area, and the position of the detailed area around Dobbyn.

Mining activity took place in the survey area between about 1910 and 1930, but it was mainly concerned with rich secondary ores of copper. Usually the mines closed down when low grade primary ore was reached.

Prior to 1963 only two geophysical surveys were conducted within the survey area (Rayner & Nye, 1936a and 1936b). In 1963, the Metalliferous Group of the Bureau of Mineral Resources undertook a geophysical survey using electromagnetic, induced polarisation, self-potential, and gravity methods. The aeromagnetic survey described in this Record complemented the ground geophysical survey.

At least one-third of the survey area is covered by Cainozoic alluvium. The mineralisation is contained in a meridional belt of Precambrian formations, namely the Leichhardt Metamorphics (?Archaean) and the Argylla and Corella Formations (Lower Proterozoic). It appears that the trend of these formations continues underneath the alluvium to the north of the region of their outcrop, and it is in this region in particular that it was hoped that the aeromagnetic survey would be of value in determining the structure. It was not expected that the reconnaissance survey would detect any mineralisation directly although this possibility was not ruled out.

2. GEOLOGY

The following is a summary of the geology of the area as described by Carter, Brooks, and Walker (1961).

General

The survey area (Plates 1 & 3) lies on the eastern flank of a highly mineralised Precambrian belt, which extends nearly 400 miles in a north-north-westerly direction, and which has a maximum breadth of 100 miles. The rock types of this belt include granite, metamorphics, and little-altered sediments and lavas, which range in age from probably Archaean to late Upper Proterozoic. Along the eastern flank of this belt, lying unconformably upon it, are Cainozoic soil and alluvium, in which there are Mesozoic inliers. Mesozoic outliers lie unconformably upon the Precambrian.

4

Two depositional basins developed in the belt during early Proterozoic time, and two major orogenic compressive phases then caused strong folding and faulting along approximately meridional axes and were probably associated with granite emplacement. Mineralisation generally appears to be epigenetic and was possibly due to the granite emplacement.

A mining industry has developed in the belt to exploit copper, silver-lead-zinc, and uranium deposits. Other minerals have been found, but are not of such economic importance.

The stratigraphic succession of the Precambrian rocks is illustrated in Plate 2. The relatively undisturbed Mesozoic overlies the Precambrian with complete unconformity on the north-eastern flank, and the Cainozoic overlaps the Mesozoic to rest directly on the Precambrian, also with complete unconformity. No Upper Proterozoic or Palaeozoic rocks have been found in the survey area.

Notes on the individual formations

The Leichhardt Metamorphics. This formation outcrops as a belt, of maximum width nine miles, trending north-north-east from the south-western corner of the survey area. It consists of highly to moderately metamorphosed acid lavas with some metamorphosed sediments, metabasalt, and rare tuff. The acid lavas have a fairly wide range of composition but the main lava is metadacite; they have been subdivided into four groups, only one of which has ferromagnesian minerals in an amount greater than subordinate. However, all specimens microscopically examined by Walker have shown some un-named opaque iron mineral.

The Dobbyn 4-mile geological map shows the Leichhardt Metamorphics to be the host rocks for a considerable number of metadolerite dykes and sills.

The Argylla Formation. The Argylla Formation crops out mainly as a meridional belt to the east of, and adjacent to, the Leichhardt Metamorphics, with several isolated areas of outcrops to the west and north-west. In addition, in the south of the area, there are two outliers, lying conformably on the Leichhardt Metamorphics.

The lithology is described as metamorphosed rhyolite and metadacite, with smaller quantities of metabasalt, tuff, agglomerate, quartzite, arkose, calc-silicate rocks, conglomerate, slate, schist, and gneiss. The grade and type of metamorphism varies considerably from place to place.

The main lava is typically coarsely porphyritic, being mostly metarhyolite. Ferromagnesian minerals are not common, but some biotite occurs in the flows. Iron oxide grains are evenly distributed through the red brown flows. The metamorphosed sediments include conglomerate, quartzite, schist, including dark red-brown mica schist, crystalline limestone, and calc-silicate rocks.

The relation between the Argylla Formation and the Leichhardt Metamorphics has not been satisfactorily established. No unconformity has been observed between them; they have been differentiated because of an apparent disparity in the overall grade of metamorphism.

The Myally Beds. These beds form a belt trending north-north-east, to the west of the Kalkadoon Granite. They are essentially of quartz arenite, generally medium-grained to coarse-grained sandstone and quartzite, with conglomerate and pebble beds near the base. The top of the succession is defined by several hundred feet of acid and basic volcanics outside the survey area to the north-west.

The Corella Formation. This formation forms two belts trending north-south, one through the centre of the survey area and the other along the eastern boundary. The two belts are separated by Cainozoic soil and alluvium.

The rocks are characteristically thin-bedded and consist dominantly of fine to coarse-grained calc-silicate hornfels, gneiss, and granulite, with thinly interbedded pelitic and psammitic rocks. Lenses of amphibolite and of white or pink calcite are common, and in local zones of intense metasomatism 'red rocks' have been formed by the precipitation of haematite during alteration. Within the succession are a number of lenses of slate and schist, including carbonaceous slate and graphitic schist, up to about ten miles long and several hundred feet thick.

Surprise Creek Beds. These beds form a meridional band on the western limit of the survey area. They consist of siltstone, sandy shale and slate, sandstone, quartzite, and dolomite. The characteristic lithology is impure interbedded arenaceous and argillaceous beds.

Igneous rocks. Two bodies of granite, the Kalkadoon Granite and the Naraku Granite, both Precambrian, have been mapped within the survey area.

The Kalkadoon Granite intrudes the Leichhardt Metamorphics and the Argylla Formation in the central part of the survey area. It is a composite body, the greater part being granodiorite. Near the Crusader Mine an adamellite has invaded the Argylla Formation and a granite has been observed in the Dobbryn area. A specimen of Kalkadoon Granite taken 10 miles north of Dobbryn has been analysed and showed no ferromagnetic minerals.

The Naraku Granite exists as isolated masses, all within the eastern belt of the Corella Formation. The main body is probably adamellite. Opaque iron mineral occurs in small amounts

Metadolerite dyke swarms and anastomosing dykes are contained in the Leichhardt Metamorphics and Argylla Formation and are most conspicuous in the survey area along the near-meridional zones from north of Dobbryn south through Mount Cuthbert (along the axis of the tectonic welt). They contain small amounts of ilmenite.

A body of Ewen Granite overlaps the western boundary of the survey area.

The geological structure

The structural interpretation given below is mainly due to Dr J. Horvath, Senior Geophysicist with the Bureau of Mineral Resources.

Folding is generally simple in the survey area, and there is no evidence of the overturning found elsewhere in the Precambrian belt. The Leichhardt Metamorphics and Argylla Formation, intruded by the Kalkadoon Granite, appear to be folded into a major anticline whose

axis is near-meridional. The Argylla Formation crops out on the eastern flank of the Leichhardt Metamorphics and also on the west as isolated outcrops. The contact between the western outcrops of the Argylla Formation and the Myally Beds on the one side and the Metamorphics and Granite on the other, is probably a fault plane. The south-eastern boundary of the Argylla Formation is delineated by the Mount Remarkable Fault, which strikes north-north-east. This fault is one of the major features of the area; it is thought possible that it extends northwards, from where it is shown to terminate on the geological map (Plate 3) across the Argylla Formation and Leichhardt Metamorphics, having an association with the shear zones responsible for copper mineralisation in these formations. It is also suggested that these shear zones, together with these formations, extend northwards beneath the cover of the Cainozoic. To the west of this central block, the Myally Beds and the Surprise Creek Beds are folded into a major syncline with a meridional axis.

The Mesozoic which abuts the Precambrian in the north-east is comparatively flat lying. The Cainozoic overlaps the Mesozoic on to the Precambrian, forming a thin veneer, thickening northwards.

Mineralisation

Copper is the only mineral that has been mined extensively in the survey area, although other metals are known to occur. Metallic mineralisation is confined to the Precambrian. The copper is very wide-spread and has been mined in every Precambrian formation with the exception of the Myally Beds. The principal mines were Mount Cuthbert and Kalkadoon but numerous others have produced copper in smaller quantities. In all cases mining was from the zone of secondary enrichment, and ceased in depth when the primary ore was reached.

The deposits are within or very close to fault zones or shears, and this fact, together with the variable distribution in a variety of host rocks, indicates that the deposits are epigenetic.

3. RESULTS

The interpretation of the magnetic data has been confined to relating the profiles for the whole survey area to known geology and to making observations on the general magnetic pattern formed by these profiles. The profiles are shown in Plates 5, 6, 7, and 8 for areas 1, 2, 3, and 4 respectively. The north-south scale on these plates has been expanded with relation to the east-west scale in order to space the profiles sufficiently to avoid confusion. In Plate 4 every fifth profile is shown superimposed on the geological map at normal scales.

The contoured magnetic data for the small detailed area around Dobbyn are shown in Plate 9. An interpretation of this data has not been made because of its complexity and because it is clear from geological traverses, carried out for the Metalliferous Group, that the geological structure is fine and not readily related to the contour pattern. The area is faulted across the regional strike, resulting in strong magnetic features that tend to obscure the north-south trend and make correlation difficult between the magnetic and geological data. Further geological information is required before an interpretation is attempted.

Difficulties with the magnetometer caused noise to be recorded on some of the profiles and this is particularly evident in the north-western part of the area (Plates 5 & 6). It did not seriously handicap the interpretation work described in this Record.

Concerning the profiles for the whole survey area, it is possible to delineate five major magnetic zones, as shown in Plate 4, although in some places the delineation is doubtful. These zones trend north-south in conformity with the known geological structure. Zone 1 correlates well with the outcropping Myally Beds and Surprise Creek Beds, on the western side of the survey area, and with their hypothetical extension northwards beneath the Cainozoic blanket. This zone is almost featureless magnetically, except for a few low-amplitude anomalies on the western border. The faults within this zone were not detected magnetically, with the single exception of the larger of the two faults four miles east-north-east of the White Hills Homestead, which gives a magnetic 'low'. The magnetic pattern of this zone is what was to be expected from a consideration of the petrography of the Myally and Surprise Creek Beds. Infaulted blocks of Argylla Formation cannot be distinguished from the Myally Beds, in marked contrast to the outliers of Argylla Formation in the Leichhardt Metamorphics.

Zone 2 is approximately coincident with outcrops of Kalkadoon Granite, Leichhardt Metamorphics, Argylla Formation, and Corella Formation west and south of the Leichhardt River. The magnetic pattern is complex, with anomalies of many shapes and with amplitudes of up to 2000 gammas. No clear distinction between the Kalkadoon Granite and Leichhardt Metamorphics can be made. Two blocks of Argylla Formation occur as outliers in the Leichhardt Metamorphics at about longitude $139^{\circ}56'E$, latitude $20^{\circ}7'S$. These are distinct and show up as large-amplitude anomalies, attributed to either calc-silicate or metabasalt rocks, both of which occur within the Formation. The zone has been subdivided in its northern part, the division passing in a generally southerly direction from the Four Mile Creek; it is postulated to extend to the region between the Dinkum Digger and Crusader Mines. This division should represent a difference in rock types; for example, the western subdivision may represent Kalkadoon Granite and Leichhardt Metamorphics while the eastern subdivision may represent Argylla Formation or Corella Formation or both.

Depth estimates indicate that the Precambrian formations slope down very gradually under the soil cover, being at a depth of approximately 400 feet below the surface along latitude $19^{\circ}30'S$. The depth estimates were made using the method of Peters, (1949) with a factor of 1.6. The western subzone appears to be about 100 to 200 feet deeper than the eastern subzone but this may be due to a greater depth of weathering.

Zone 3 includes the Cainozoic sediments drained by the Pinnacle and Cabbage Tree Creeks and extends northwards beyond Coolullah. The Corella Formation, adjacent to this zone on the east and west, causes considerable magnetic disturbance whereas the zone itself is magnetically undisturbed. This suggests that if the Corella Formation underlies the zone then it is at a considerable depth.

The northern boundary of Zone 3, and hence the southern boundary of Zone 4, is indefinite in Plate 4. The magnetic profiles do not contain sufficient information to enable the junction of magnetic Zones 3 and 4 to be determined.

6.

Zone 4, also over Cainozoic sediments, extends in the form of a rough triangle from a point about six miles north of Coolullah to the northern boundary of the survey. The anomalies in this zone indicate a deep magnetic basement.

Zone 5 is on the eastern side of the survey area, from about longitude 140°09'E to the eastern boundary, and includes Corella Formation and Naraku Granite. This zone has a variety of magnetic patterns owing to the presence of several rock types, including granite, metamorphosed limestone, calc-silicate and amphibolite rocks, and a magnetite-bearing quartzite. Some major anomalies in this zone have been indicated as meridional trends roughly along longitude 140°16'E, and may mark the eastern boundary of Zone 5. Most of the flight-lines did not, however, extend far enough east to enable this boundary to be delineated. Calculations on these anomalies indicate a source depth of about 500 ft below ground level. The anomalies are thought to be due either to Corella Formation beneath the alluvium or to Soldiers Gap Formation, which crops out to the south outside the survey area.

4. CONCLUSIONS AND RECOMMENDATIONS

Five major magnetic zones were delineated from the reconnaissance magnetic profiles. A more detailed examination of the profile data shows other magnetic trends and zones but these cannot be related to the geology without additional detailed geological data.

It is recommended that a detailed area, less faulted than the 1963 detailed area, be flown to enable correlations between magnetic and geological data to be made. A suitable area extends for three miles to the north of the 1963 area; it should be bounded on the east by the Leichhardt River, and on the west by a line at least half a mile west of the contact between the Myally Beds and the Kalkadoon Granite. This area will provide information on the structure at the Kohinoor Mine and on the Kalkadoon Granite. Generally it will provide information on magnetic Zone 2 and, together with the 1963 detailed area data, should provide a good basis for the structural interpretation of this zone. Most of the known ore deposits of the survey area are in this zone. The flight pattern and altitude for the recommended survey should be as for 1963.

It is also recommended that four east-west geological traverses, spaced one mile apart, be surveyed over the recommended detailed survey area.

5. REFERENCES

- | | | |
|---|------|--|
| CARTER, E.K., BROOKS, J.N. and WALKER, K.R. | 1961 | The Precambrian mineral belt of north-western Queensland.
<u>Bur. Min. Res. Aust. Bull.</u> 51 |
| PETERS, L.J. | 1949 | The direct approach to magnetic interpretation and its practical application.
<u>Geophysics</u> 14 (3), 290-320. |

7.

RAYNER, J.M. and
NYE, P.B.

1936a Geophysical report on the
Dobbyn area.
Aer. Surv. N. Aust., Qld Rep. 6

RAYNER, J.M. and
NYE, P.B.

1936b Geophysical report on the
Silver Ridge auriferous lodes
Cloncurry district.
Aer. Surv. N. Aust., Qld Rep. 11

APPENDIX

Operational details

Equipment

- (i) MNZ1 proton precession magnetometer: This instrument had a cycle time of two seconds, i.e. a reading of the magnetic field was recorded once every two seconds. The output of the magnetometer was recorded on a Westronix recorder and on one channel of a TIC recorder.
- (ii) CTP1 power supply unit
- (iii) AN/APN-1 radio altimeter: The height of the aircraft above ground level was indicated on a dial in the cockpit and was recorded on one channel of a TIC recorder.
- (iv) Modified Vinten frame camera: Mounted vertically in the aircraft, this 35-mm camera recorded a 186° field of view below the aircraft once every four seconds, in conjunction with every second cycle of the MNZ1 magnetometer.
- (v) MFD3 storm warning magnetometer: This transistorised fluxgate magnetometer was mounted inside a tent at the Mount Isa aerodrome. It recorded continuously, on an Esterline-Angus recorder, the variation in the Earth's magnetic field in one fixed direction, viz., the direction of the maximum field at the time of setting up the instrument.

Specifications

- (i) Aircraft altitude: Detailed area, 280 ft above ground level; remainder, 400 ft above ground level. The magnetometer detector coil was approximately 30 ft below the aircraft.
- (ii) Line spacing: Detailed area 1/10th mile, remainder $\frac{1}{2}$ mile.
- (iii) Line orientation: East.
- (iv) Storm warning magnetometer: Operated continuously throughout the survey. Criteria before take-off: changes in field greater than three gammas in any three-minute period prevented take-off. Criteria during flight: changes in field greater than three gammas in any three-minute period required recorded data to be studied for decision on re-flying survey line.
- (v) Sensitivity: 370 gammas full scale deflection in detailed work, 500 gammas full scale deflection elsewhere.

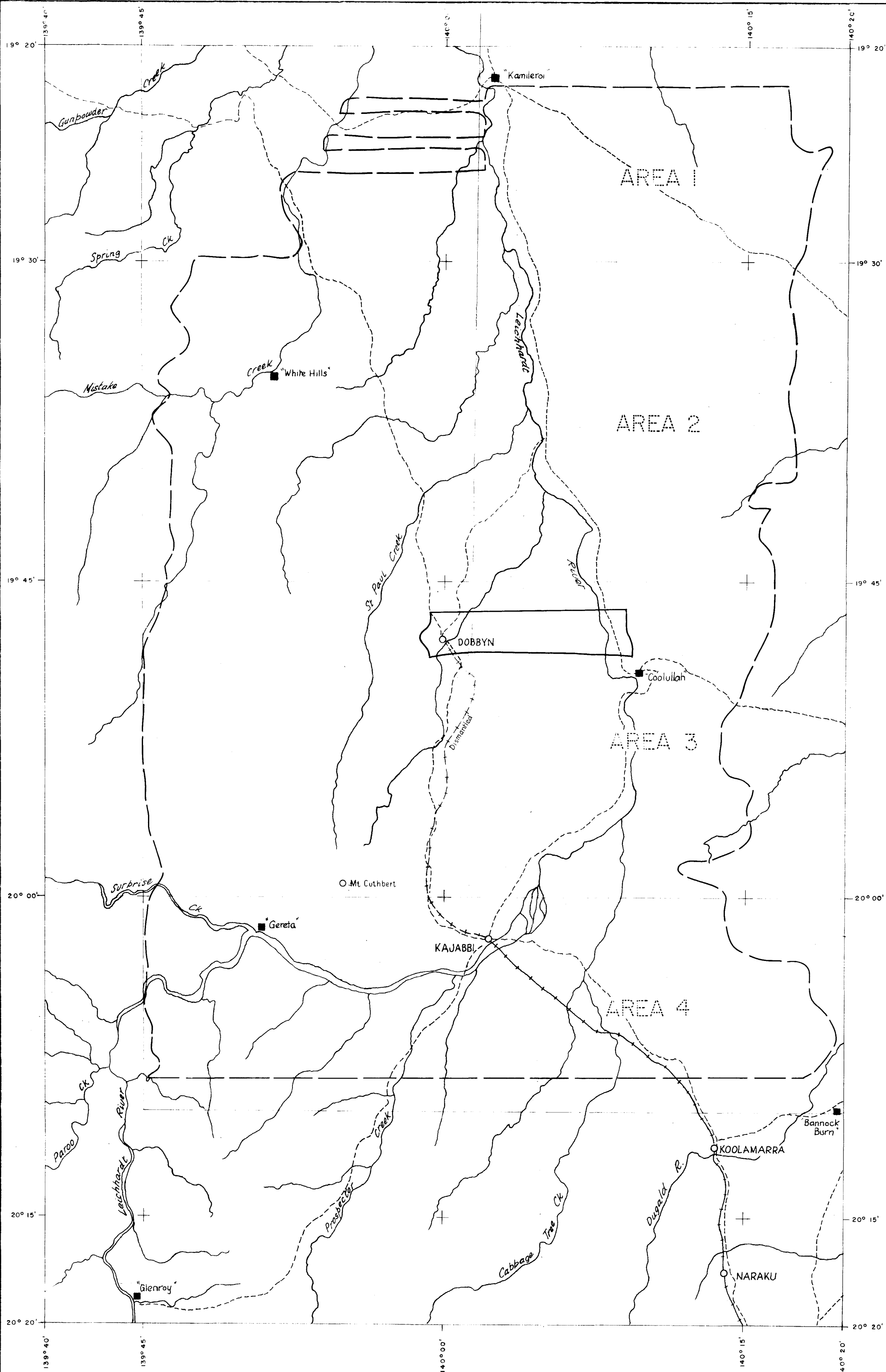
Staff

B.M.R. Geophysicists: B.A. Dockery (Party Leader),
D.B. Tipper, J.S. Milsom

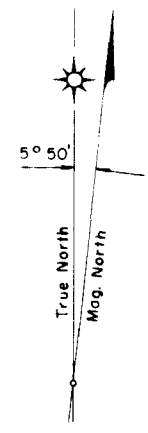
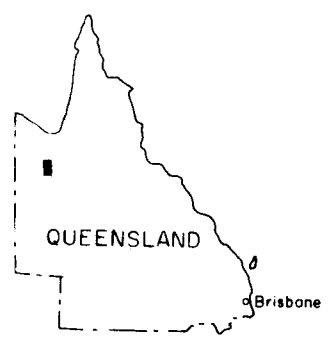
Draftsmen: A. Crowder, P. Zerial

Senior Radio Technician: A.S. Scherl

T.A.A. Pilot: First Officer G.B. Litchfield

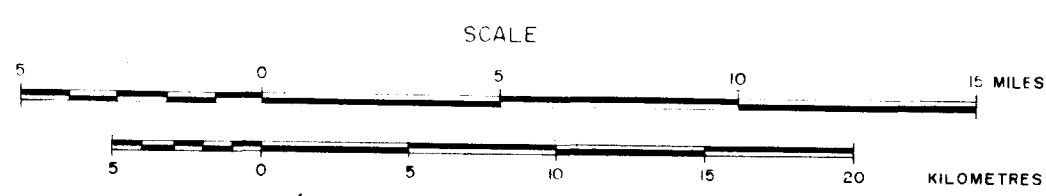


LOCATION DIAGRAM



AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

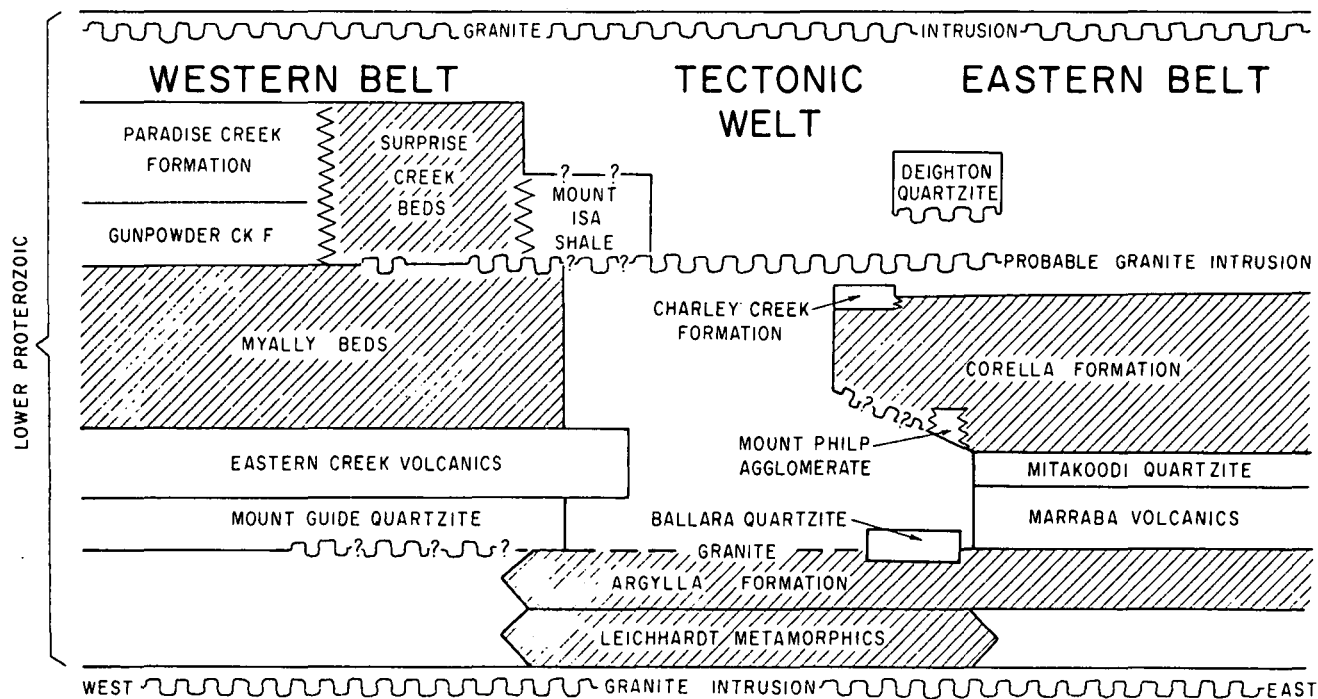
LOCALITY MAP



- LEGEND
- River or creek
 - Railway
 - Road or track
 - Named place
 - Homestead
 - Detailed survey area boundary
 - Reconnaissance survey area boundary

INDEX TO ADJOINING SHEETS

LAWN HILL	HONORS HILL	GROEDON
LAMOOD-NEAL	DOBBYN	MILLUNGERA
MT IC4	CLON-CURRY	JULIA CREEK



LEGEND

- Unconformity
- Local unconformity only
- Disconformity
- Transitional or arbitrary boundary between contemporaneous units
- Units cropping out in survey area

AEROMAGNETIC SURVEY,
MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

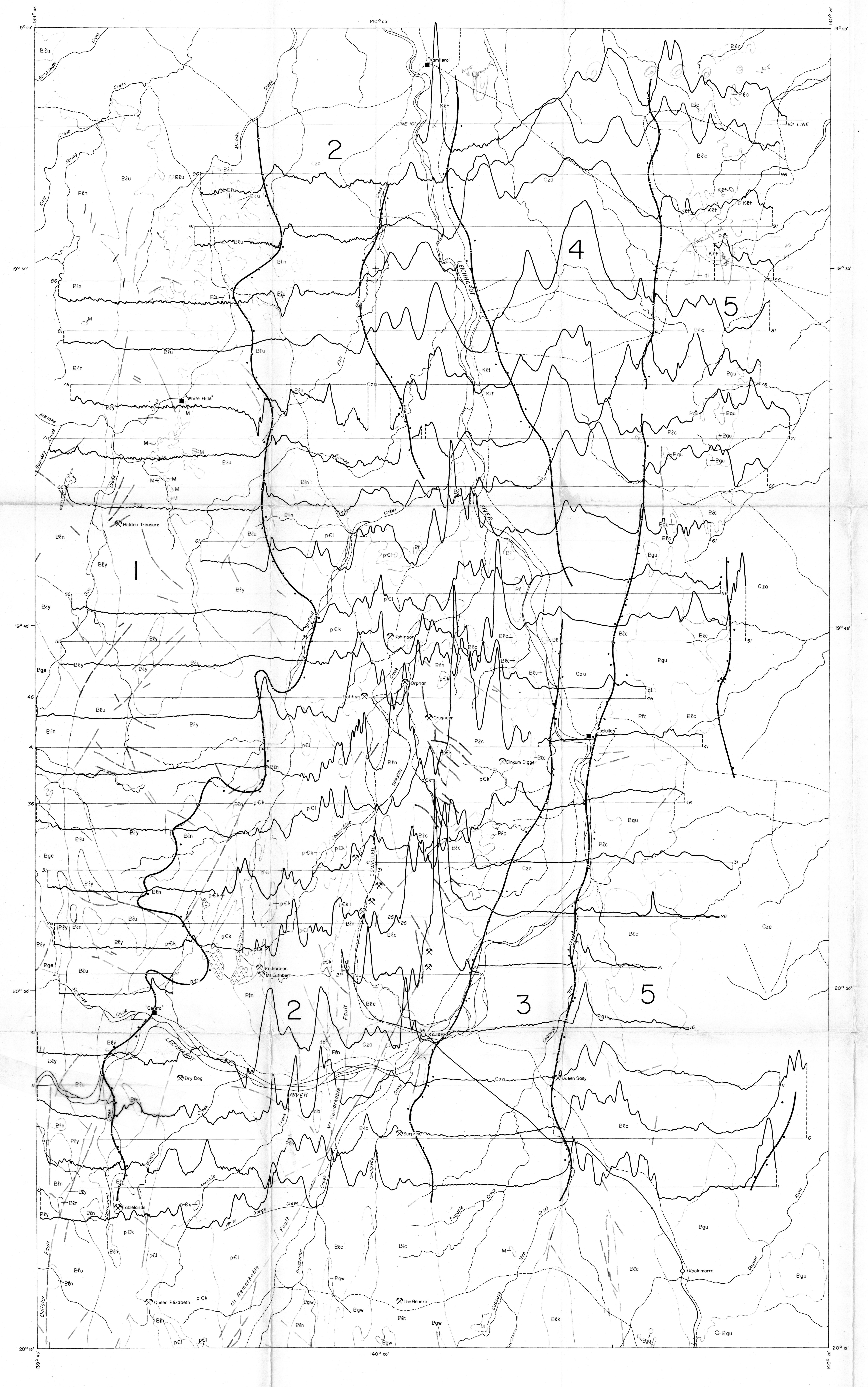
SCHEMATIC REPRESENTATION OF RELATIONSHIPS
OF PRECAMBRIAN STRATIGRAPHIC UNITS

(AFTER CARTER, BROOKS AND WALKER, 1961, FIGURE 8)

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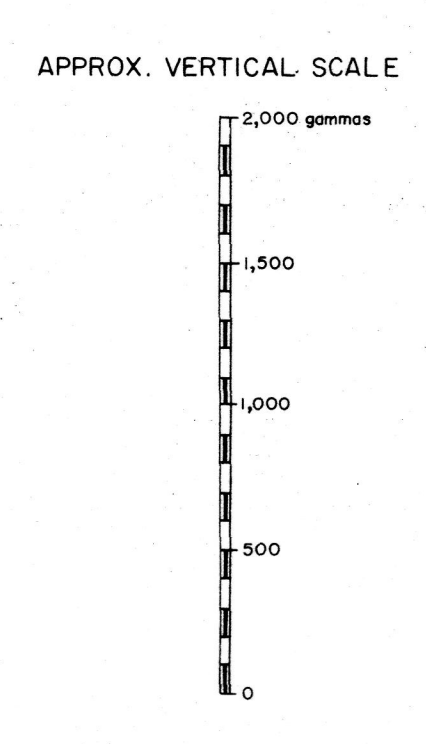
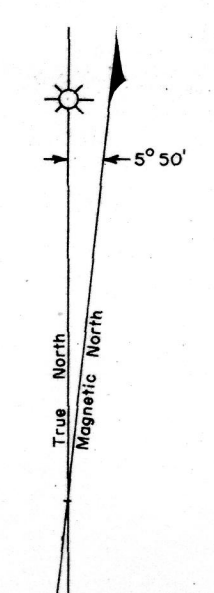
Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics E54/BI-15
To Accompany Records No 1964/146



- REFERENCE
- CAINOZOIC
- Cza Soil and alluvium
- MESOZOIC
- LOWER CRETACEOUS
- Kzt Tambo Formation
 - M Terrestrial sediments
- LOWER PROTEROZOIC
- dl Metadolerite and gabbroic intrusives
 - Eel Stratigraphic position unknown
 - Ebu Surprise Creek Beds
 - Eky Myall Beds
 - Eek Knapdale Quartzite
 - Ebc Corella Formation
 - Metadolerite sills
 - db Altered dolerite dykes and basalt
 - Eln Argilla Formation
- ? ARCHAEOAN
- pcl Leichhardt Metamorphics
 - Egu Naraku Granite
 - Ege Ewen Granite
 - Egw Wang Gumbies
 - pek Kalkadood Granite
- Geological boundary
- Fault
- River or creek
- Railway
- Road or track
- Named place
- Homestead
- Mine or quarry
- Estimated position of magnetic zone boundary on flight line
- Magnetic zone boundary

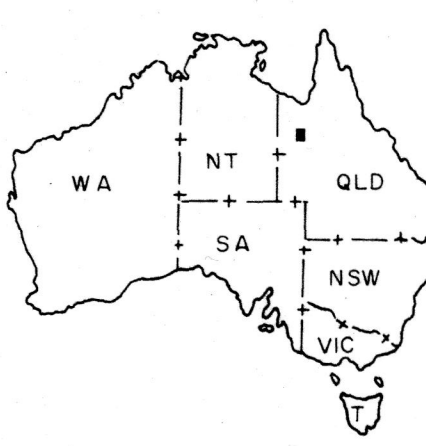
Geology and planimetric detail after 1:50,000 photo-scale compilation by Geological Branch, Bureau of Mineral Resources, Geology and Geophysics

Transverse Mercator Projection



LOCATION DIAGRAM

INDEX TO ADJOINING SHEETS



LAWN HILL	DONORS HILL	OROVON
GANDOWAL	DOBBYN	MILLINBERA
MT ISA	CLONCURRY	JULIA CREEK

AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY PROFILES

MAGNETIC ZONES

AND GEOLOGY

SCALE

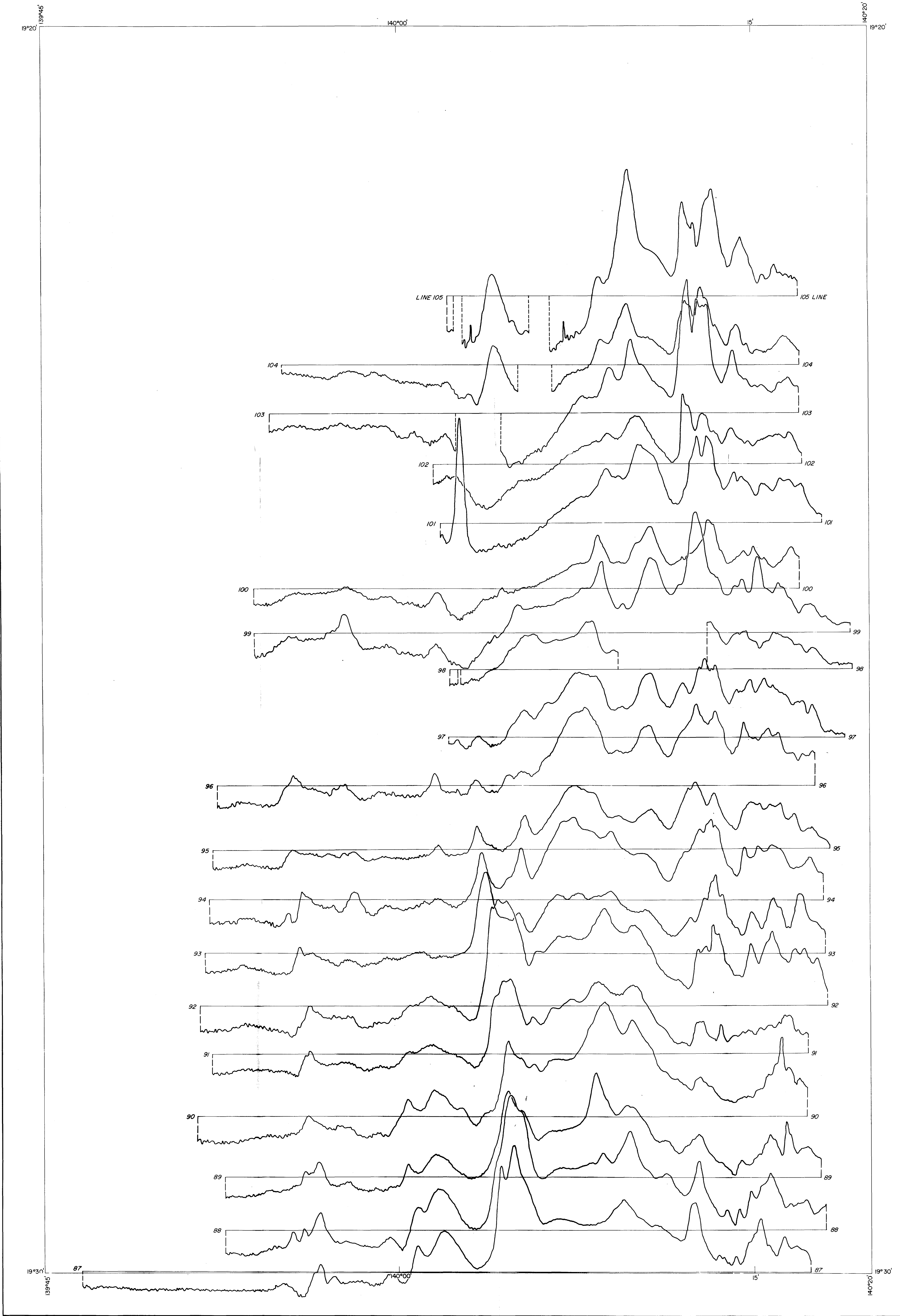
EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A CESSNA AIRCRAFT WITH THE DETECTOR AT A MEAN HEIGHT OF 370 FEET ABOVE GROUND LEVEL ALONG LINES SPACED 1/2 MILE APART.

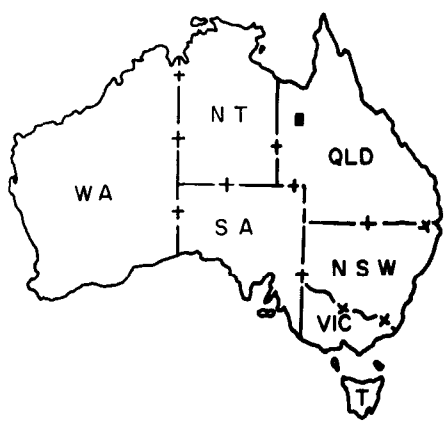
THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER AND HAVE BEEN CORRECTED FOR A SOUTH COMPONENT OF 11.4 GAMMAS PER MILE OF THE REGIONAL GRADIENT.

THE FLIGHT LINES, WHICH ALSO SERVE AS BASE LINES TO THE PROFILES, HAVE BEEN POSITIONED ON THE BASE MAP WITH A MAXIMUM ERROR OF 1/4 MILE.

THE PROFILES WERE RECORDED AT INTERVALS OF APPROXIMATELY 2.5 MILES AS SHOWN ON THE MAP.



LOCATION DIAGRAM

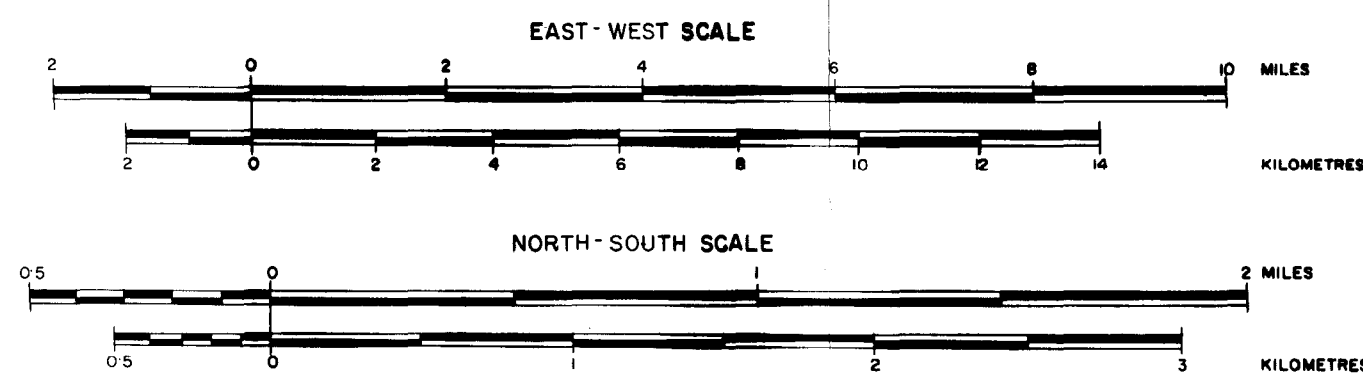


INDEX TO ADJOINING SHEETS

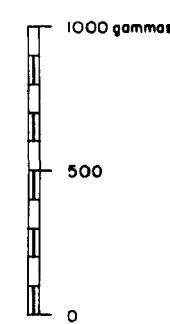
LAWN HILL	DONORS HILL	CROYDON
CAMDOWEAL	DOBBYN	MILLUNGERRA
MT ISA	CLONCURRY	JULIA CREEK

AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY PROFILES
AREA I



APPROX. PROFILE SCALE

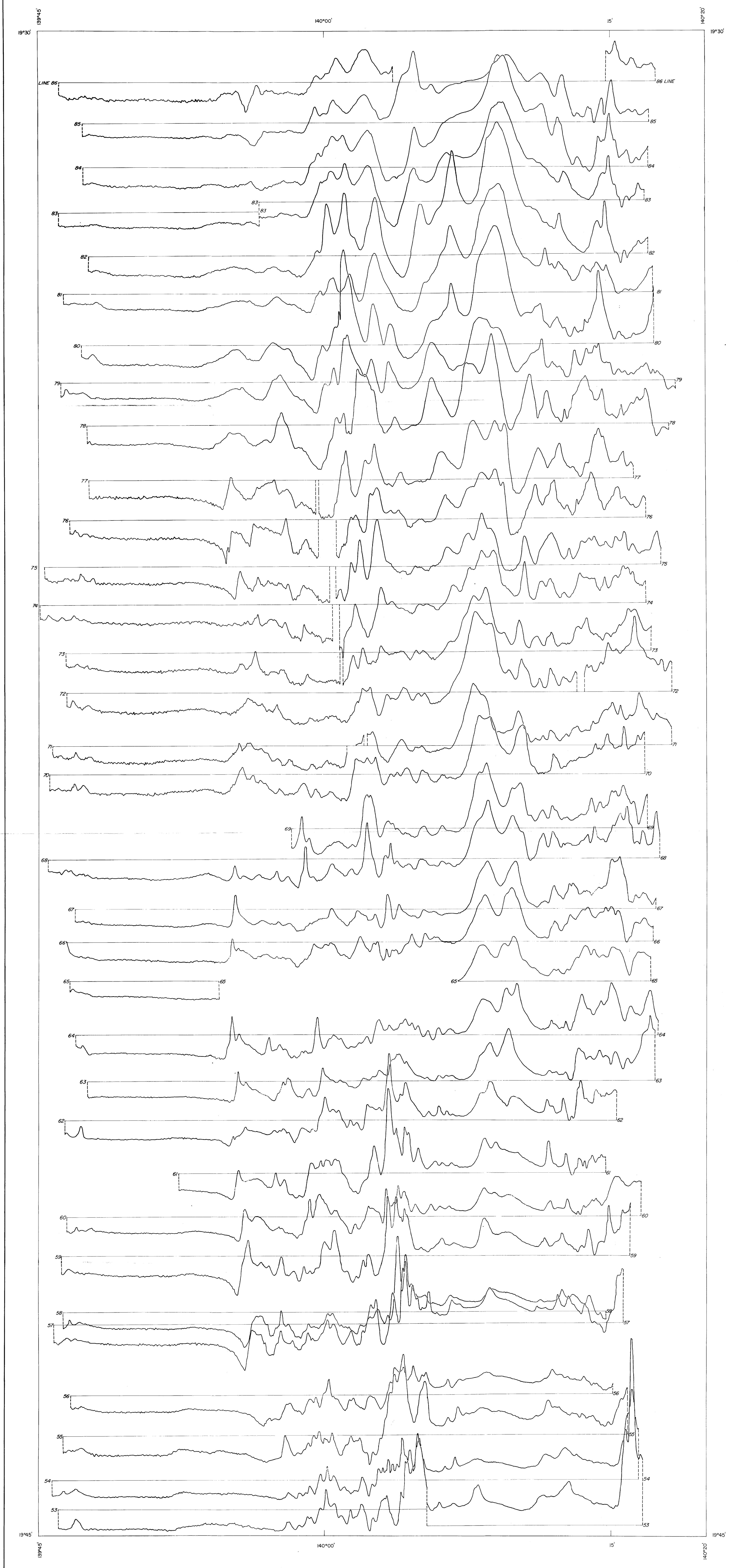


EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A CESSNA AIRCRAFT WITH THE DETECTOR AT A MEAN HEIGHT OF 370 FEET ABOVE GROUND LEVEL ALONG LINES SPACED 1/2 MILE APART.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER AND HAVE BEEN CORRECTED FOR A SOUTH COMPONENT OF 11.4 GAMMAS PER MILE OF THE REGIONAL GRADIENT.

THE FLIGHT LINES, WHICH ALSO SERVE AS BASE-LINES TO THE PROFILES, HAVE BEEN POSITIONED ON THE BASE MAP WITH A MAXIMUM ERROR OF ± 1/4 MILE.



LOCATION DIAGRAM

INDEX TO ADJOINING SHEETS

LAWN HILL	DONORS HILL	CRIDDON
CANDOWAL	DOBBYN	MILLUNDERS
MT ISA	CLOONCURRY	JULIA CREEK

AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY PROFILES

AREA 2

EAST-WEST SCALE

NORTH-SOUTH SCALE

APPROX. PROFILE SCALE

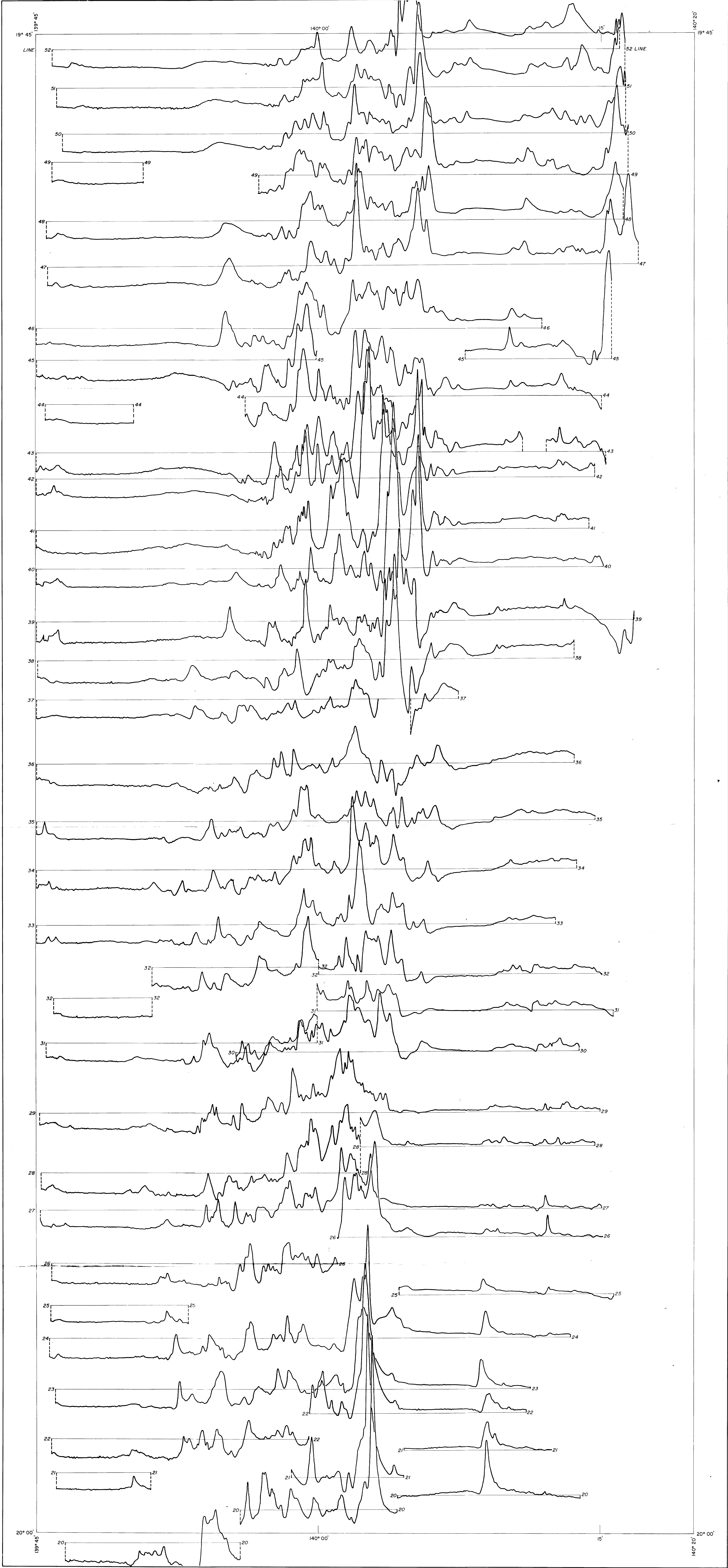
EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A CESSNA AIRCRAFT WITH THE DETECTOR AT A MEAN HEIGHT OF 370 FEET ABOVE GROUND LEVEL, ALONG LINES SPACED 1/2 MILE APART.

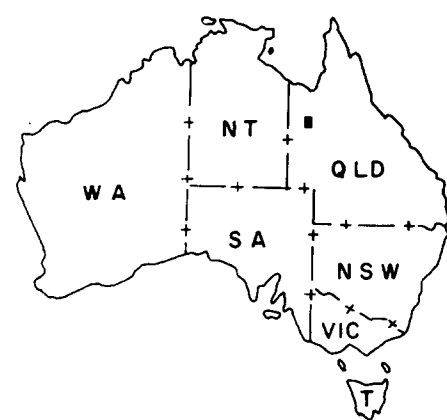
THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER AND HAVE BEEN CORRECTED FOR A SOUTH COMPONENT OF 11.4 GAMMAS PER MILE OF THE REGIONAL GRADIENT.

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Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics.
To Accompany Record No 1964/40



LOCATION DIAGRAM

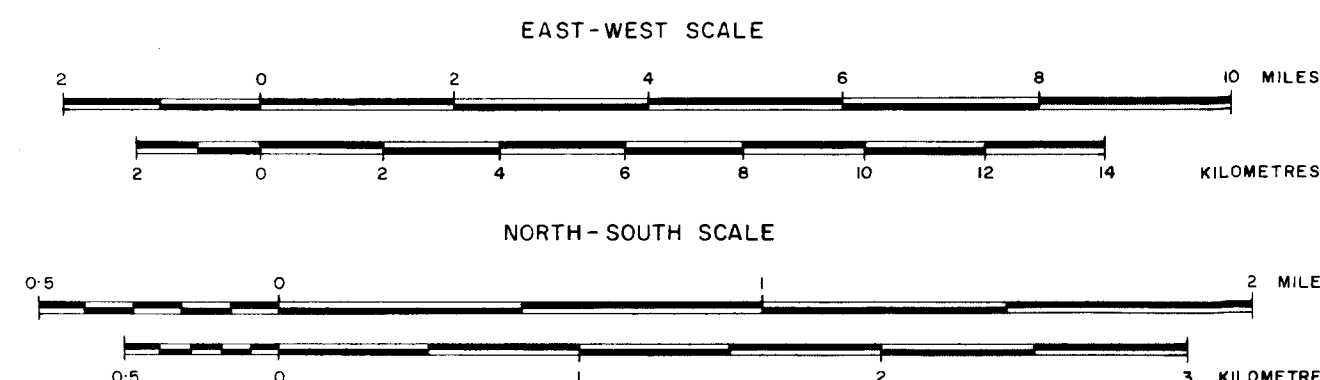


INDEX TO ADJOINING SHEETS

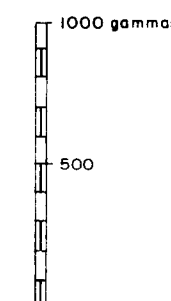
LAWN HILL	DONORS HILL	CROYDON
CANDOWEAL	DOBBYN	MILLINGERA
MT ISA	CLONCURRY	JULIA CREEK

AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY PROFILES
AREA 3



APPROX. PROFILE SCALE

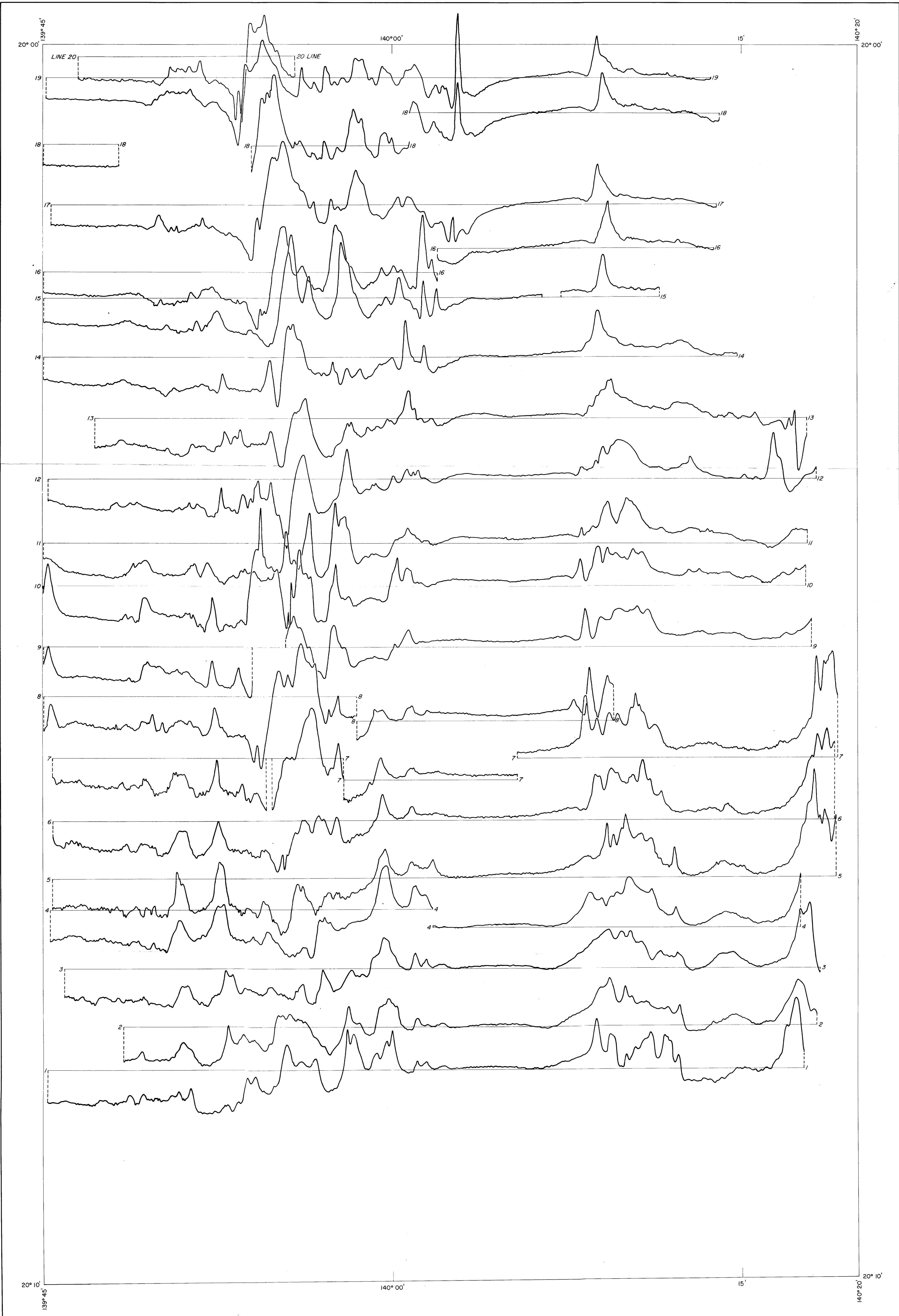


EXPLANATORY NOTES

THE SURVEY WAS MADE WITH A CESSNA AIRCRAFT WITH THE DETECTOR AT A MEAN HEIGHT OF 370 FEET ABOVE GROUND LEVEL ALONG LINES SPACED 1/2 MILE APART.

THE TOTAL MAGNETIC INTENSITY PROFILES WERE RECORDED BY A RECTILINEAR RECORDER AND HAVE BEEN CORRECTED FOR A SOUTH COMPONENT OF 4.4 GAMMAS PER MILE OF THE REGIONAL GRADIENT.

THE FLIGHT LINES, WHICH ALSO SERVE AS BASE LINES TO THE PROFILES, HAVE BEEN POSITIONED ON THE BASE MAP WITH A MAXIMUM ERROR OF 1/2 MILE.



LOCATION DIAGRAM

INDEX TO ADJOINING SHEETS

LAWN HILL	DONORS HILL	CROYDON
CAMOOWEAL	DOBBYN	MILLUNGERA
MT ISA	CLONCURRY	JULIA CREEK

AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY PROFILES

AREA 4

EAST-WEST SCALE

NORTH-SOUTH SCALE

APPROX. PROFILE SCALE

EXPLANATORY NOTES

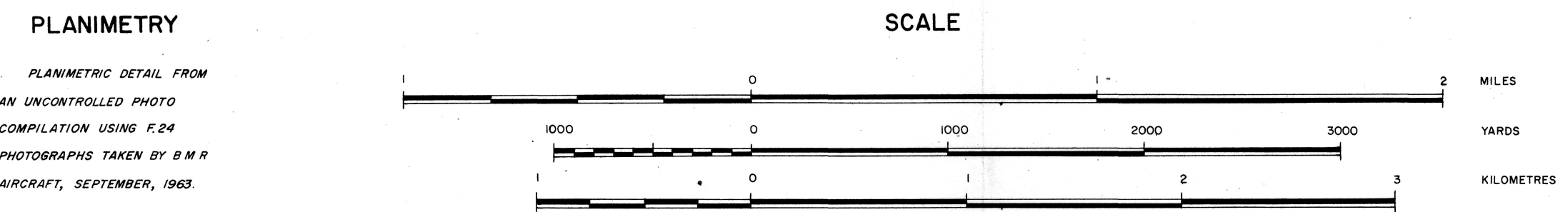
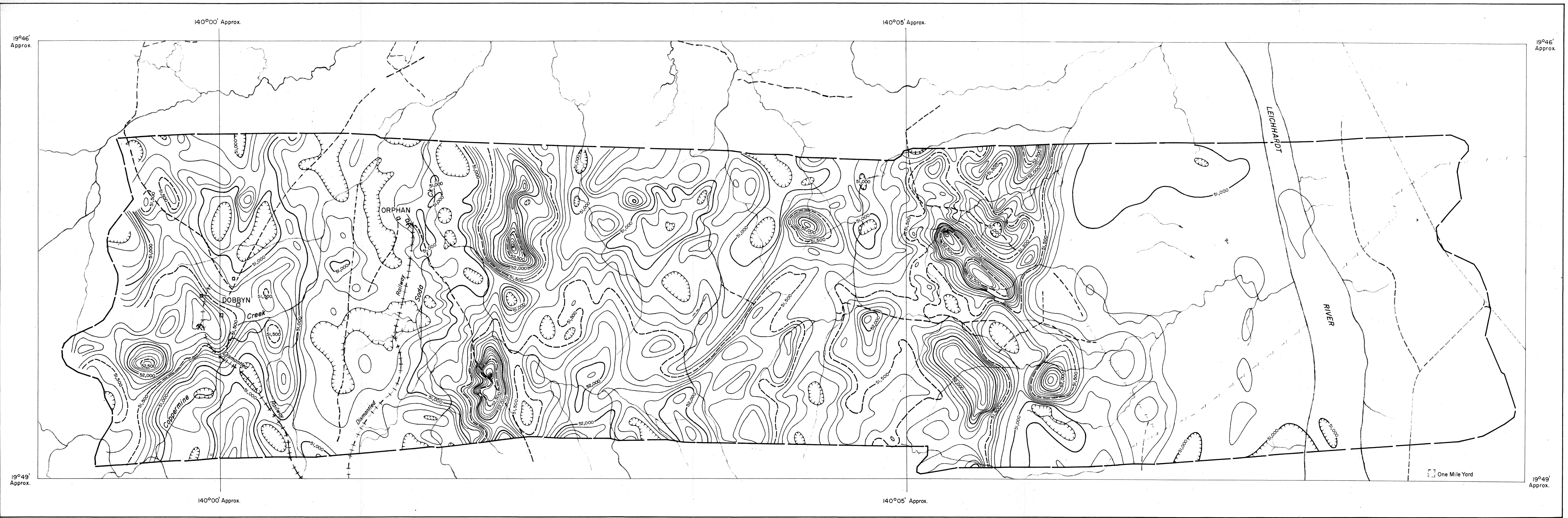
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Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics
To Accompany Record No 1964/146

E54/BI-13

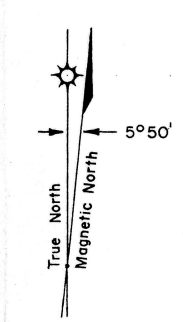


AEROMAGNETIC SURVEY, MOUNT CUTHBERT/DOBBYN AREA, QLD, 1963

TOTAL MAGNETIC INTENSITY CONTOURS

DETAILED AREA

CONTOUR INTERVAL 100 GAMMAS



TOPOGRAPHICAL LEGEND

- River or creek
- Road or track
- Railway
- Fence
- Building or shed
- Mine

GEOPHYSICAL LEGEND

- Magnetic contours
- Magnetic "Low"
- Limit of survey of detailed area

NOTE

THE TOTAL MAGNETIC INTENSITY HAS NOT BEEN CORRECTED FOR THE REGIONAL MAGNETIC GRADIENT.

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics.
To Accompany Record No 1964/146

E 54/BI-14