

DEPARTMENT OF MINES  
SOUTH AUSTRALIA

RB 52/22.

Report on

GRAVITY & MAGNETIC SURVEYS OVER AEROMAGNETIC  
ANOMALY, HUNDRED OF RIPON, COUNTY ROBINSON  
EYRE PENINSULA

by

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GEOLOGICAL SURVEY

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Department of Mines  
South Australia

Report on

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SUMMARY

An anomaly revealed by an aeromagnetic survey was investigated by vertical force magnetic and gravity surveys. After consideration of the results three test holes were drilled to bedrock. Several interpretations are suggested by the survey results while the drilling indicated an uplift in bedrock as one factor contributing to the anomaly.

INTRODUCTION

The airborne magnetic survey of Northern Eyre Peninsula flown by the Bureau of Mineral Resources in 1953-5 revealed numerous anomalous areas in the north-west section of the Peninsula. Three of these areas were chosen for ground investigation by magnetic and gravity surveys. This report covers the group located in the hundred of Ripon, County Robinson, while reports G.S. 1378 and G.S. 1405 cover the anomalies on Hundreds Ripon and Chandada of the same county.

Of the two anomalies in the Hundred of Ripon, only the northern was suitable for full investigation as the other was centred out to sea. The area is located approximately 5 miles due west of the township of Streaky Bay with access by means of a good unsealed road.

The field work was started in November 1958 by J. E. Webb and completed in January 1959 by D. R. Dowling and A. Paddick.

PREVIOUS GEOPHYSICAL WORK:

The airborne magnetic survey mentioned in the introduction is the only geophysical work in the area.

GEOLOGY:

The area is undulating with calc-aeolianite dunes. There are not any bedrock outcrops in the vicinity of the anomalies although the cliffs along the coast are 150 feet high. Most of area is under crops and pasture, while the rest is covered by light scrub.

METHODS USED:

Gravity and vertical magnetic intensity readings were made at 200 ft. intervals along 10 east-west and two north south lines. The lines were surveyed by tape and theodolite and the elevations of the stations were established with staff and level. All levels are relative to station 10,000N, 10,000E. Scrub clearing was avoided wherever possible by bending the traverse lines.

Drift was determined by repeating stations at frequent intervals (approx. 2 hours) and relating the repeat stations to the base station (10,000N 10,000E) by short time interval tie runs. A tie traverse (8,800E-8,600E) was established as an additional check.

Worden Gravity No. 204 and Watts Vertical Variometers Nos. 61938 & 60565 were used for the survey.

RESULTS:

The profiles of vertical magnetic intensity and Bouguer gravity anomaly are shown on plan No. 59-276 while the results are shown as contours on plans Nos. 59-274 and 59-275.

All values are relative to the base station at 10,000N, 10,000E as an arbitrary datum.

A combined free air and Bouguer Correction of 0.6 gravity units/foot was used (corresponding to a mean density of

2.67 grams/cc).

Although it has not been possible to close the gravity contours on the Western side because of the sea it can be assumed with reasonable certainty from a study of the gravity and magnetic profiles that the centre of the disturbing body has been covered.

#### INTERPRETATION

The highest gravity reading occurs on traverse 10,000N at 7,200E while the highest magnetic reading on this line occurs at 8,600E suggesting that the magnetic pole is not coincident with the top of the body causing the gravity anomaly. This can be explained in several ways:-

1. There is dense non magnetic material above and to the west of the magnetic pole (i.e. to the west of the top of the magnetic material in the anomalous body).
2. The disturbing body is dipping to the east and as the magnetic pole is normally some distance in from the end of the magnetic material the magnetic peak occurs to the east of the gravity anomaly.
3. The disturbing body has interbedded magnetic and non magnetic strata (as suggested by the slightly serrated form of the magnetic profile) with the strata to the west being more dense, i.e. the bed centred about 7,200 E is slightly less magnetic but more dense than beds centred at 8,000E and 8,600E.

The magnetic anomaly of 4000 gammas represents a relatively low magnetite content so that if the anomaly is to represent an economic body of iron a high hematite content must be postulated. The interpretation of the gravity anomaly cannot be unique without other control so that in the absence of outcrops in the area a drilling programme is necessary to test the area.

# RECOMMENDATIONS:

A drilling programme was recommended consisting of three vertical rotary drill (Conrod) holes to establish the depth of cover and to obtain a 5 ft. length of core of the underlying rock.

Similar programmes were set out for the Carina and Chandada areas.

The vertical test holes were located at 10,000N, 7,200E; 9,900N, 8,600E and 10,000N, 17,400E, and were designed to test the gravity and magnetic peaks and the off anomaly areas respectively.

# RESULTS OF DRILLING:

The programme recommended above was executed during 1959 and 1960 with the following summarised results:-

<u>Hole No.</u>	<u>Coordinates</u>	<u>Log</u>	
RR1	9900N 8600E	0 - 305'	Calc-aeolianite
		305 - 323'1"	Gabbro.
RR2	10000N 17400E	0 - 95'	Calc-aeolianite
		95 - 424'7"	No samples - presumed Calc-aeolianite.
RR3	10000N 7200E	0 - 59'	Calc-aeolianite
		59 - 205'11"	No samples
		205'11"- 211'4"	Diorite S.G. 2.89

The diorite of RR3 contained 3-5% of accessories mainly magnetite and pyrite with possibly other iron oxides.

From these results it must be interpreted that the anomaly is most likely due to a large body of low density contrast with a small magnetite content. The depth of the holes and therefore the depth of bedrock increases to the east. The shallowness of the bedrock under the centre of the gravity high is a contributing factor to the gravity anomaly and could be responsible for the shift of the peak to the west of the magnetic centre.

Considering the low iron content at the bedrock surface and the depth of overburden further testing is not recommended at present.

J. E. WEBB  
Senior Geophysicist,  
Exploration Section.

REFERENCES

- DOWLING, D. & MOORCROFT, E. Gravity Surveys over Aeromagnetic Anomaly, Hundred of Chandada, County Robinson.  
G.S. 1405, Report Bk. No. 49/13
- McMUTRIE, I. & MOORCROFT, E. Gravity & Magnetic Traverses over Aeromagnetic Anomaly, Hd. Carina, Near Minnipa, Eyre Peninsula.
- WHITTEN, G.F. The Investigation of Aeromagnetic Anomalies on Eyre Peninsula & The Search for Iron Ore There.  
Report Book 50/173, G.S. 1734.

CORVISART BAY

Z

Schlink's Landing

STREAKY BAY

Sec 151

A

SCALE

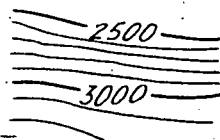
Miles

1/2

0

Miles

Contours of total magnetic intensity  
(interval 1000 gamma.)



To accompany report by J.E. Webb.

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	AERO MAGNETIC ANOMALY HD. RIPON LOCALITY PLAN SHOWING CONTOURS OF TOTAL MAGNETIC INTENSITY	D.M.	Scale 1 Mile to 1 in.
		Tcd. MBL		Req.	S 2159
		Ckd.			Date 29-7-59
Director		Exd.			Dg. lo

[illegible]

Reg. No.  
D.M.  
Compiled from

**S.A. DEPT. OF MINES**

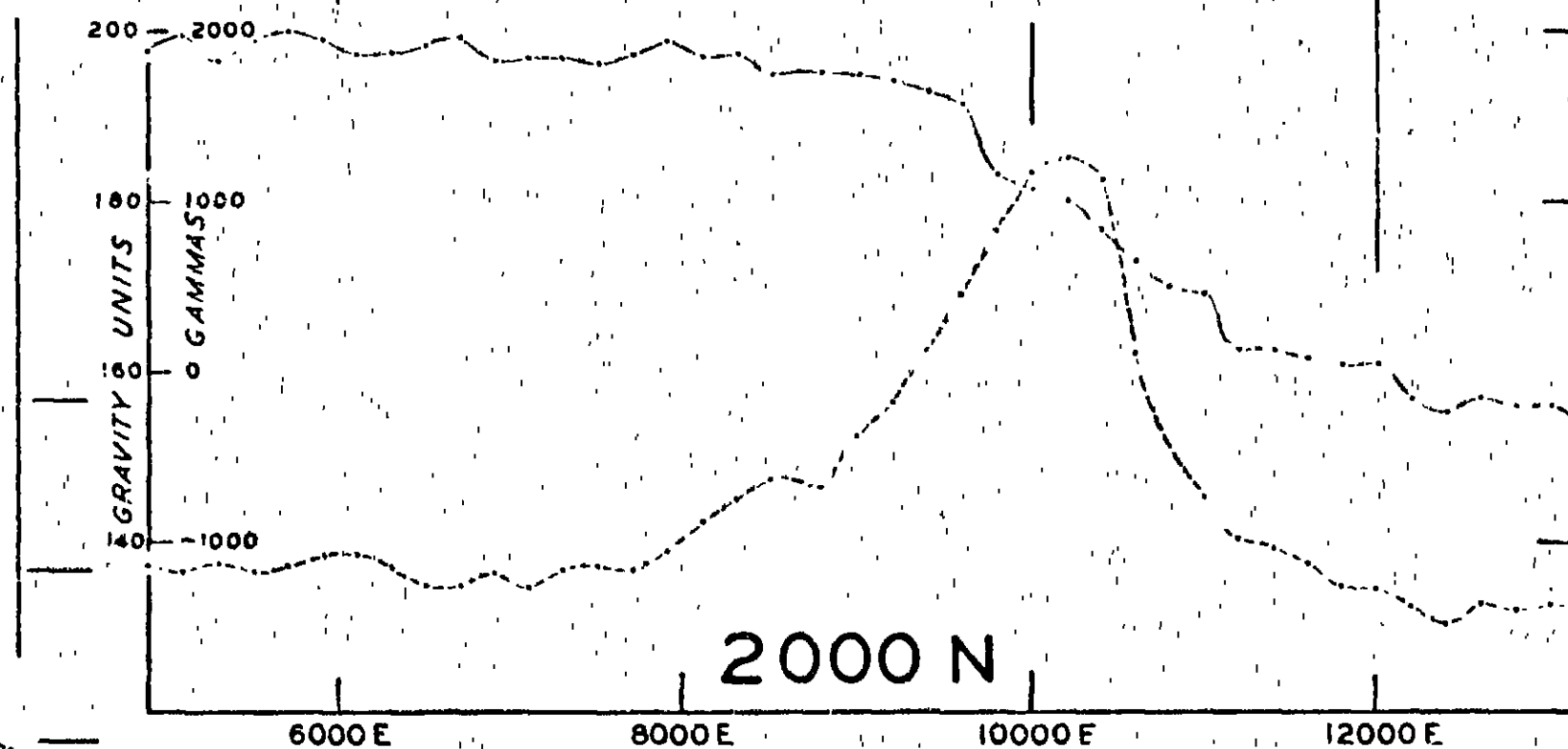
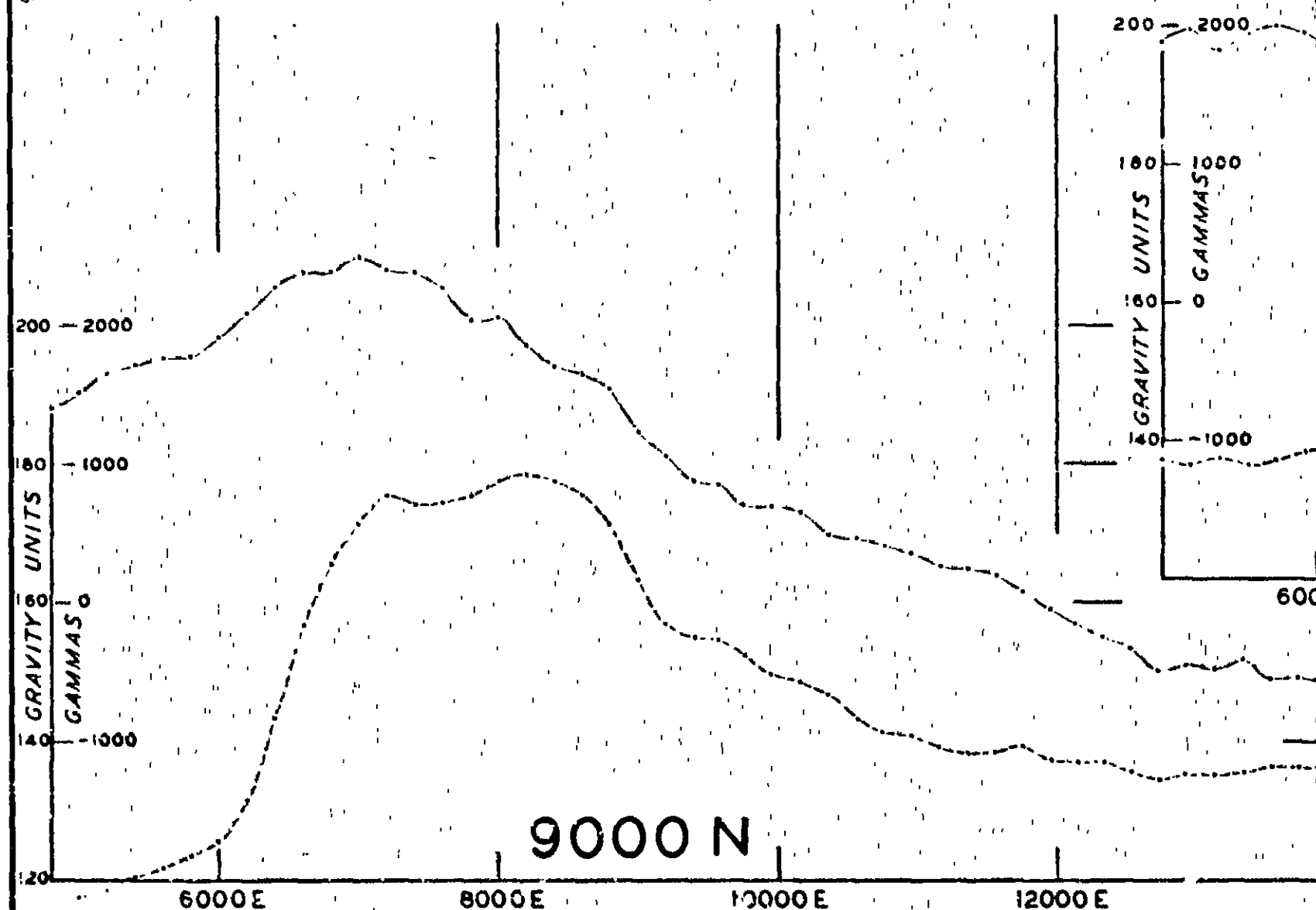
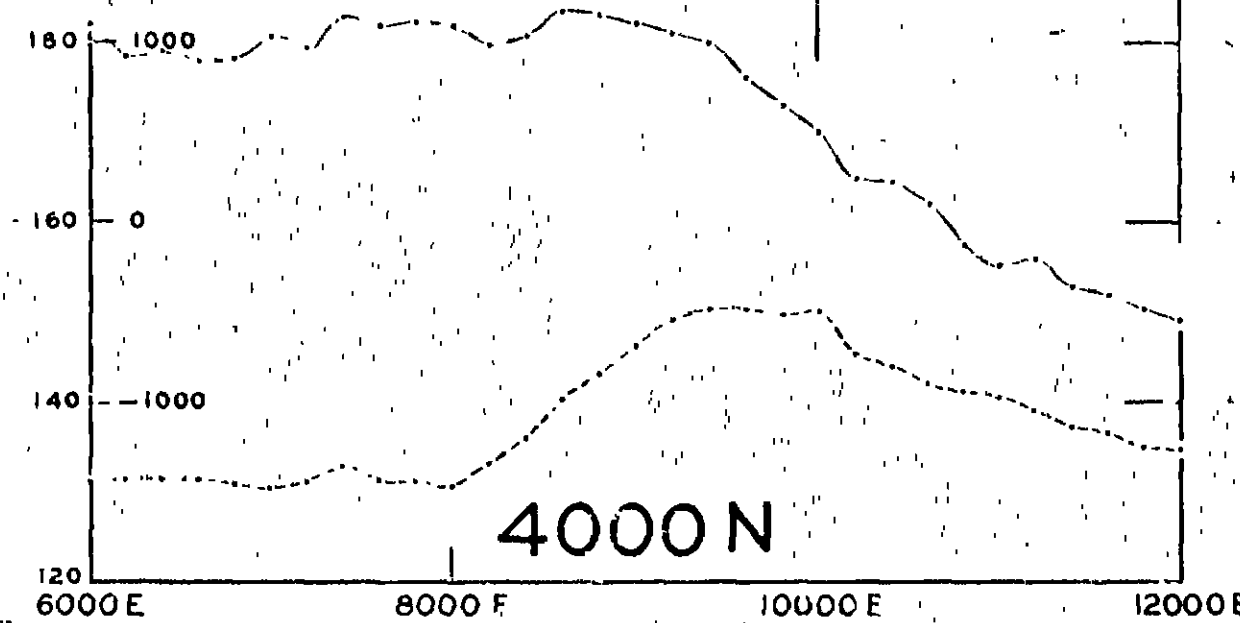
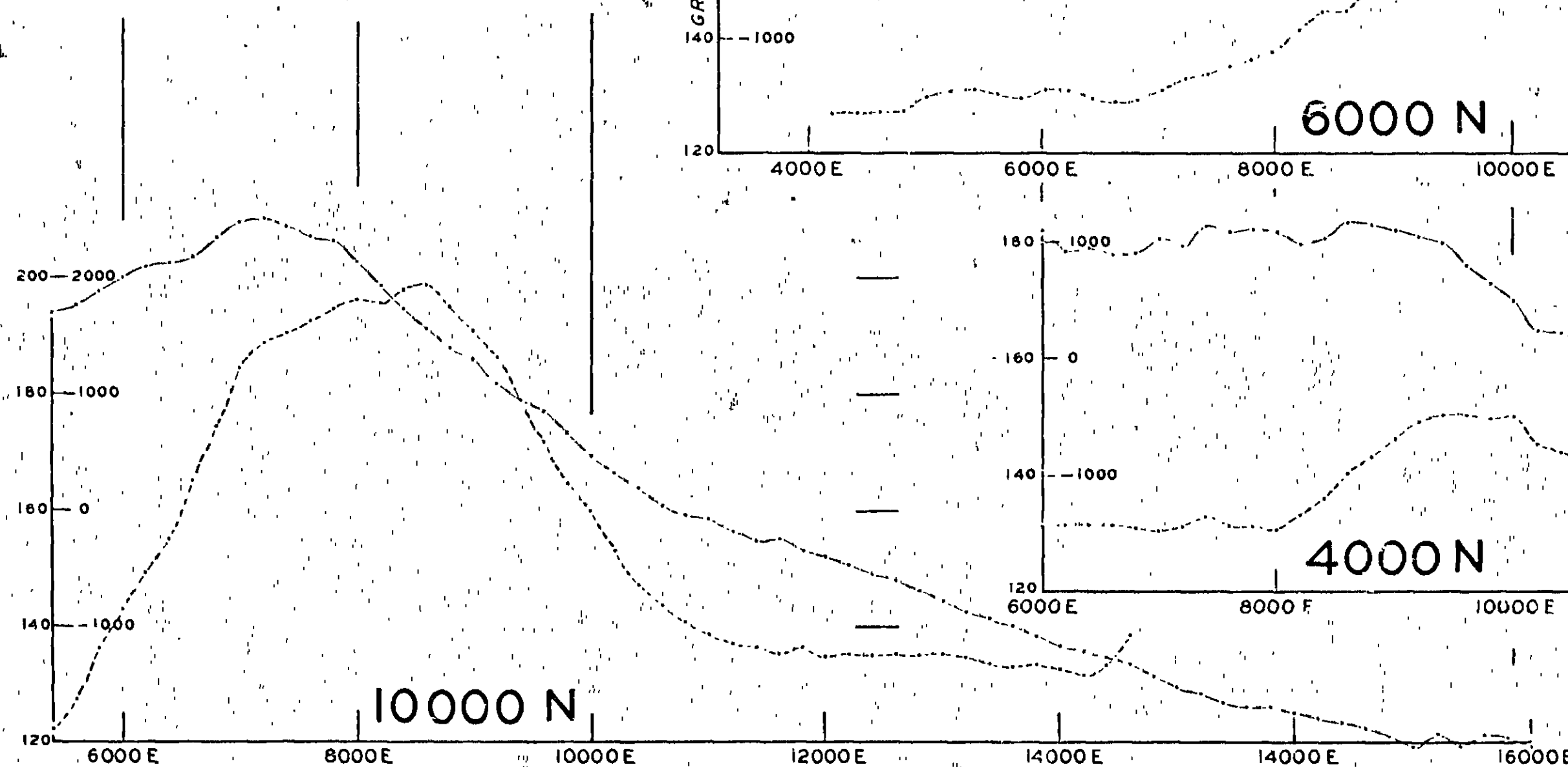
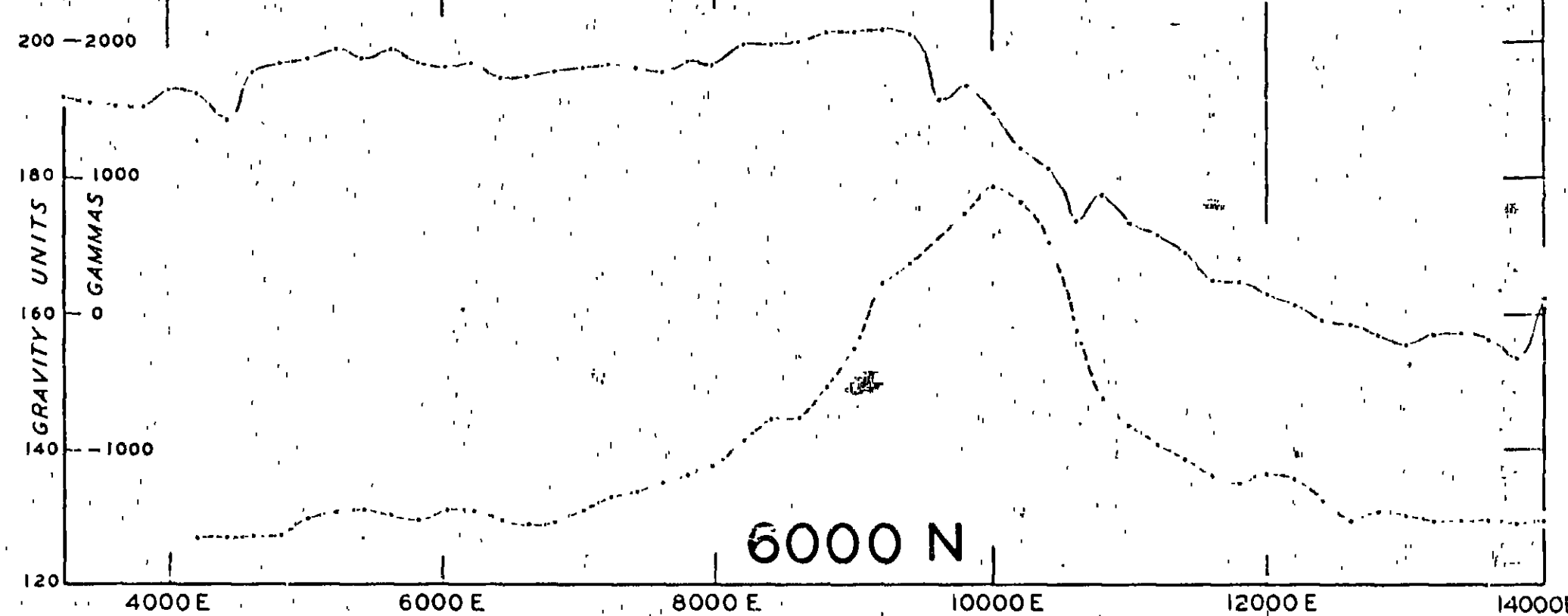
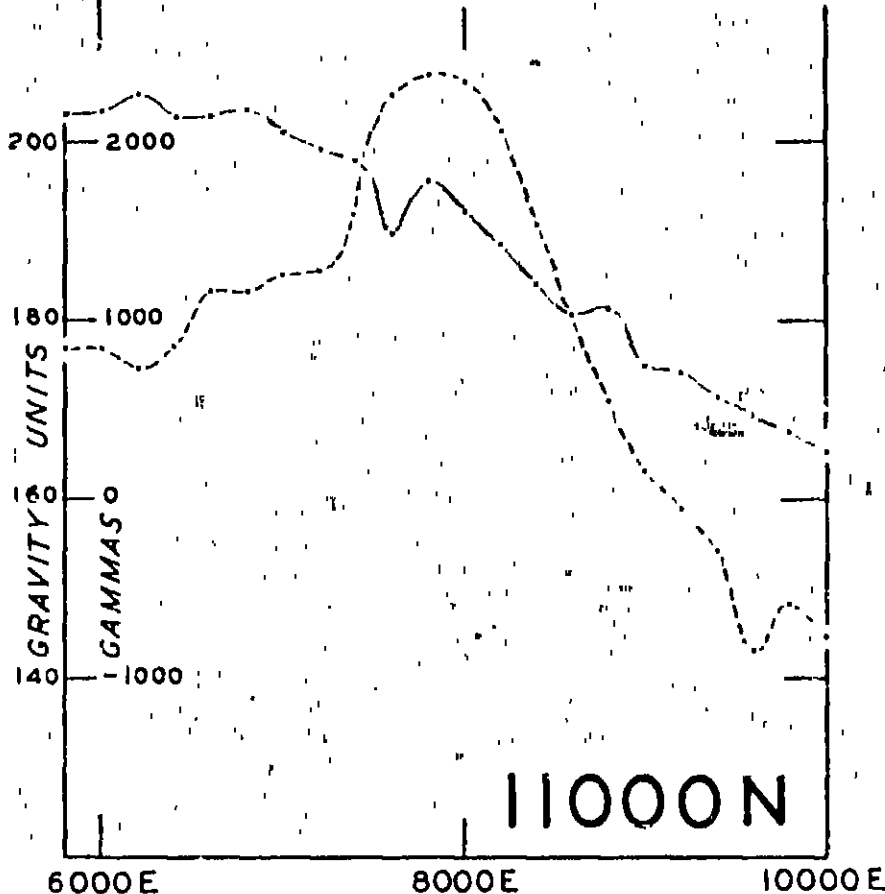
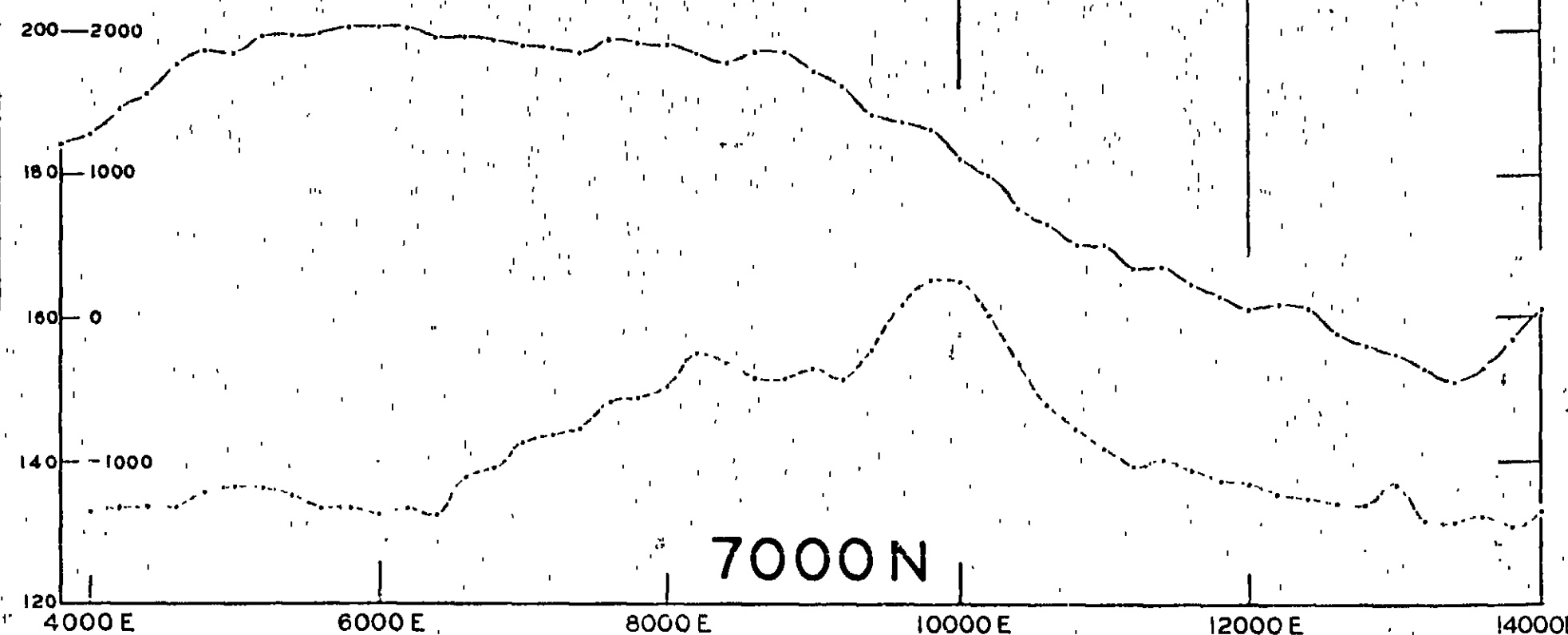
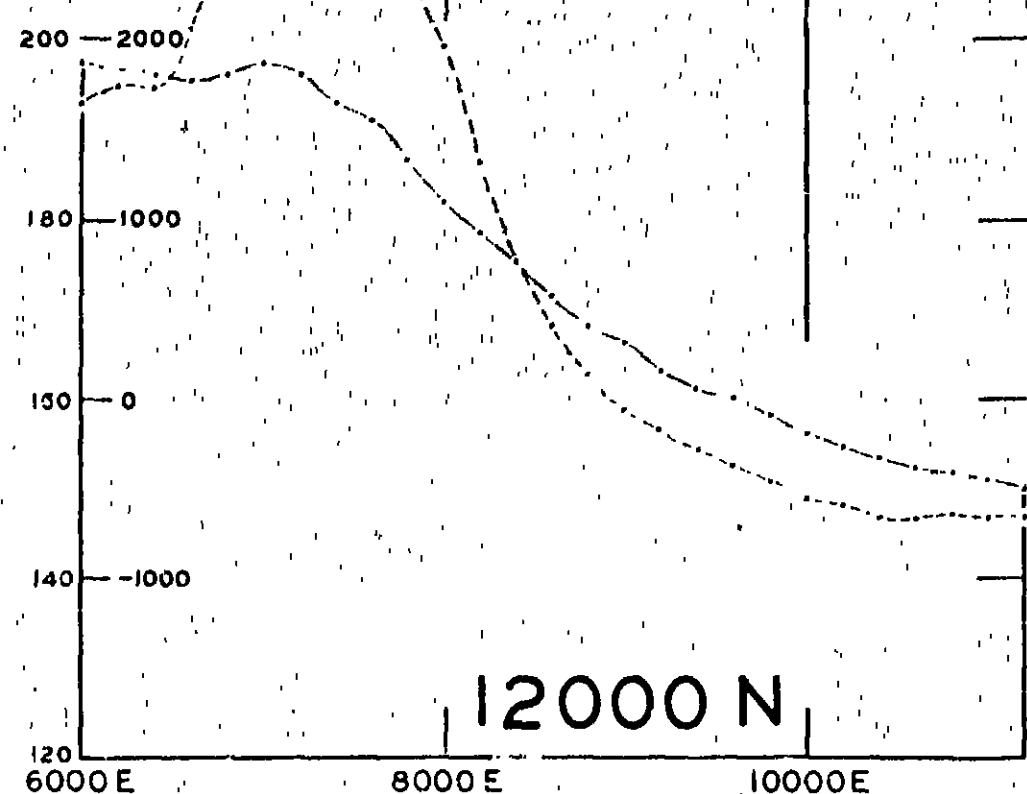
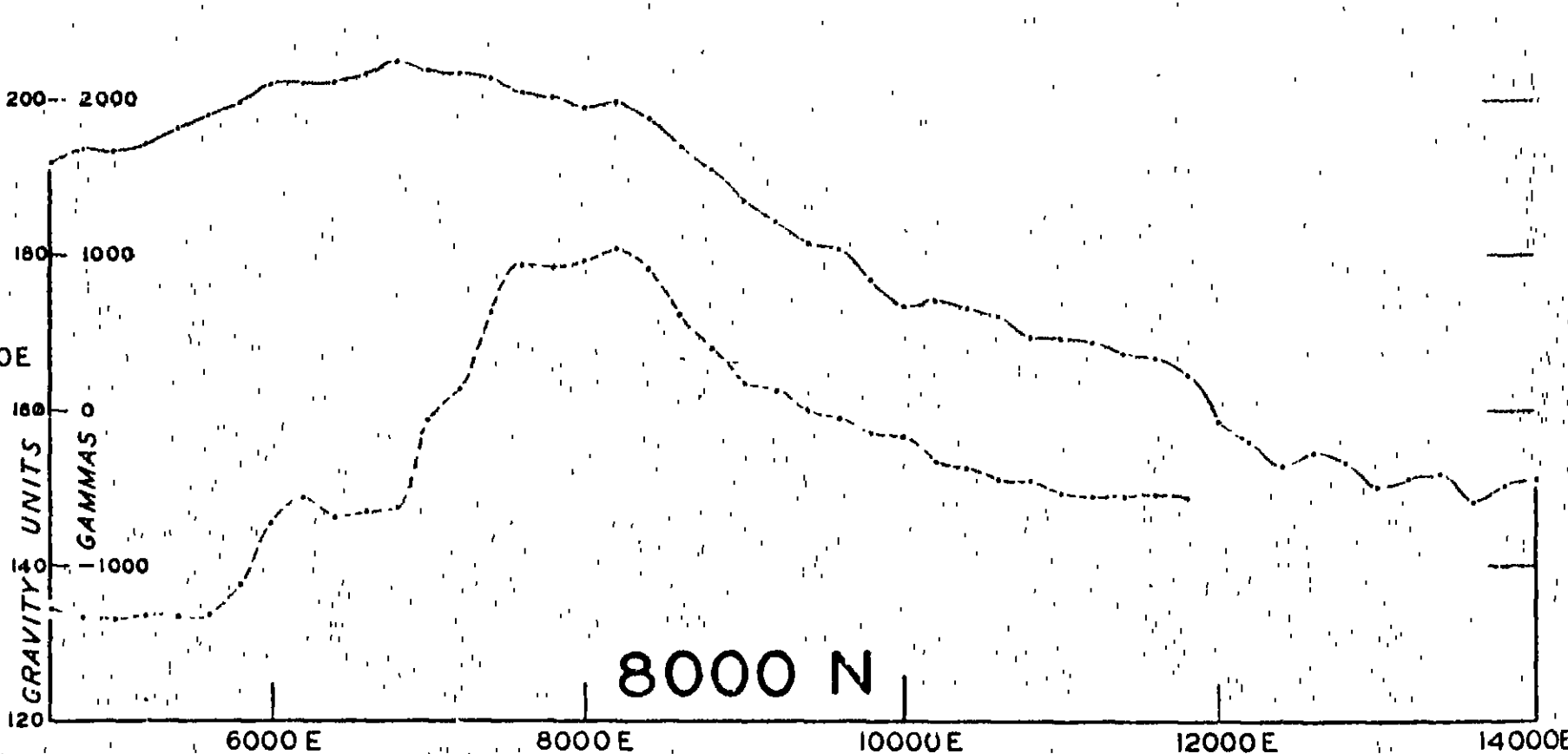
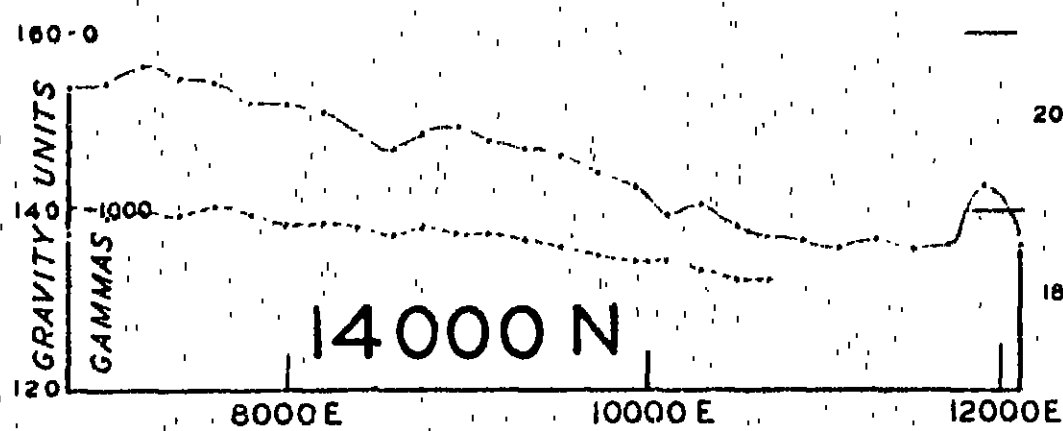
# AERO-MAGNETIC ANOMALY - HD. RIPON GRAVITY & VERTICAL MAGNETIC INTENSITY PROFILES

Approved	Passed	
		Dirn. <i>M.B.L.</i>
		Ted. <i>M.B.L.</i>
		Cld.
Director of Mines		Exd.

Scale: 1000 ft to 1 inch

59-276

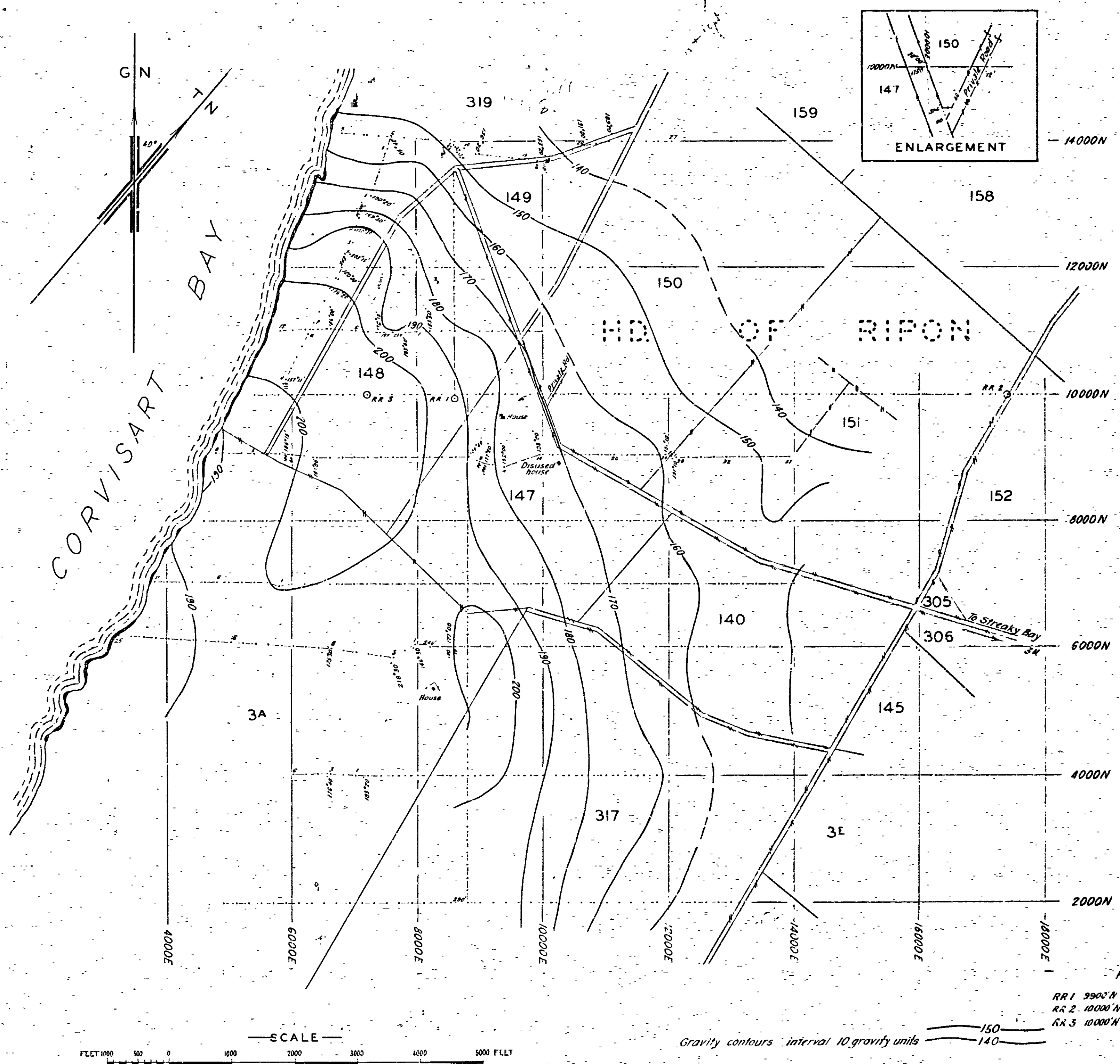
Date 28-7-59. 17510



# GRAVITY

MAGNETIC





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## AERO-MAGNETIC ANOMALY - HD. RIFON PLAN SHOWING GRAVITY CONTOURS

Locality Plan	5-246					Req. No.	
Magnetic Contours	59-274					D.M.	
Drilling Section						Compiled from	
Aeromagnetic Anomaly	54-791						
Associated Drawing	No.	No.	Amendment	Exd.	Date		

Approved	Passed	Drn.	
		Tcd. MBL	
		Ckd.	
Director of Mines		Exd.	

Scale: 1000 ft. to 1 in.	
59-275	
Date 7-3-59	Dg. 10

