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GEOLOGY AND GEOPHYSICS.

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RECORDS.

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THE URANIUM PROSPECTS OF THE BRODRIBB, ELLA CREEK, AND FRAZER AREA NORTHERN TERRITORY

by
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(Preliminary Report & Maps)

THE URANIUM PROSPECTS OF THE BRODRIBB, ELLA CREEK, AND FRAZER AREA, NORTHERN TERRITORY.

SUMMARY.

The area described in the report lies between latitudes 12°48' and 12°56' S., and longitudes 130°56' and 131°11'E. Most of the mapped region lies between the Stuart Highway and the North Australian Railway. The investigation of this area is still in the early stages and has consisted of general geological mapping, and detailed investigation (including drilling) of areas found to have been radioactive during airborne scintillometer surveys carried out in 1952.

At Brodribb and Ella Creek superficial hematite-rich deposits have been found to be radioactive to the extent of up to ten times background, but drilling of this type of deposit at Brodribb has not yet proved the existence of payable primary ore. Further drilling is proceeding.

A new discovery at Ella Creek in July this year gave high radioactivity over a length of about 300 ft. and two pits sunk to a depth of 3 ft. of this line have shown counts of 5,000 per minute and 10,000 per minute respectively. The field geologists recommend further testing here.

In the Frazer area, laterite, which contains a belt of radioactivity up to eight times background, is known to exist, but, apart from limited trenching, has not yet been adequately tested.

Summarizing: no important uranium deposits have yet been discovered in the Brodribb, Ella Creek, Frazer area and it is possible that some of the iron-rich masses are superficially enriched in uranium and do not overlie important primary deposits. However, testing and investigation are still proceeding and are in an early stage. A number of areas in which radioactivity is known to occur remain to be inspected.

GENERAL GEOLOGY.

The general geology of the area as known at present is shown on NT47-24, which represents field mapping during June and July of this year. The mapping is still proceeding and knowledge of the area is extending rapidly. Field plans are, therefore, of interest to anyone who contemplates further investigation of this region.

The mapping has not yet been linked with that in the Rum Jungle area, although this should be done in the near future. This will be important because it will show where the favourable formations known to contain ore at Rum Jungle are situated in the Brodribb area. It is known that the beds continue in this direction but they have not yet been fully traced.

As shown on the plan, the sediments in the Brodribb to Ella Creek Section trend east and west and mostly dip northward. They form the northern limb of a domal structure, the core of which is occupied by granite. Rum Jungle lies on the southern limb of this granite and the interesting Mt. Fitch Prospect lies on the western side of the dome.

Giants Reef Fault, which, it is thought, may be associated with the uranium mineralization at Rum Jungle, extends into the area covered by plan NT47-24, and a north-westerly trending branch fault extends off Giants Reef Fault from near the Stuart Highway to the northern limit of the map area. This fault marks a strong structural break; the beds to the east of it trend in a northerly direction and those to the west of it have an east-west trend. The interesting Ella Creek line of mineralization appears to lie on a third fault which occurs to the west of that described above but is parallel within it.

The sedimentary rocks so far mapped consist of quartzite, interbedded quartzite and slate, and a group of carbonaceous sericitic shales which contain casts after pyrite. The Brodribb and Ella Creek mineralization occurs in this formation. The graphitic shales are similar in appearance to those containing important ore deposits at Rum Jungle. The limestone which is associated with ore-bearing shale at Rum Jungle has not yet been found in the Brodribb to Ella Creek Section, but at Ella Creek, a quartzite breccia, similar to that occurring over ore at Rum Jungle, has been mapped.

URANIUM PROSPECTS.

Brodribb.

A geological and radiometric map of the Brodribb Prospect by F. J. Frankovich is shown in Plate NT47-12. This mapping was carried out in 1952; since that time some additional information has been obtained, but this has not yet been assembled.

The map shows that radioactivity in excess of five times background extends in an east-west direction over a length of approximately 1,700 ft. In detail, it is found that the areas of highest activity are confined to what Frankovich has called ferruginous laterite. This is not pisolitic laterite in the strict sense, but is a surface accumulation of iron oxides, some of them botryoidal and commonly quite massive. Trenching shows that the hematite-rich mass extends for only 2 to 5 ft. below the surface in most instances, although one bed about 8 ft. wide is still present at the bottom of a trench 7 ft. deep. It is not expected, however, that the iron oxide will continue indefinitely in depth, and it is regarded as being in the nature of a gossan, probably overlying pyritic mineralization.

The results of drilling carried out to date on the Brodribb /are Prospect/shown on Plate NT47-26. This shows that no important uranium mineralization has yet been discovered. The beds so far intersected in the primary zone contain about 5 per cent. pyrite and the radioactivity detected corresponds to less than 0.1 per cent U_3O_8. Drilling of the prospect is still proceeding and it is probable that the most radioactive anomaly known at the surface has not been tested in the primary zone. It is therefore impossible to be precise concerning the value of this deposit. Radiometric profiles of Drill Hole B1 and B3 are shown on Plate NT 47/22.

Ella Creek.

A geological and radiometric map of the Ella Creek area is shown on Plate NT47-25. The regional geological setting of the prospect is shown on the general map, Plate NT47-24, in which the deposit is seen to be situated on a north-westerly trending fault.

The detailed plan shows that the rocks in the area consist of hematite, quartzite breccia, hematite-bearing slates, and grey and purple slates which do not contain hematite.

A Zone of silification extends around the margin of the hematite quartzite-breccia, but no signs of radioactivity have been found in this silicified rock.

The radiometric investigation has shown that there are three anomalous areas which occur in a belt trending north-east, though the individual anomalies have a trend approximately at right angles to this direction.

The most westerly anomaly extends for a length of about 650 ft. and over a maximum width of 250 ft. Most of this area is soil-covered and no details are known concerning the material which underlies the anomalous area. Two shallow pits were sunk to a depth of about 3 ft. in areas where counts of 200 to 300 per minute were obtained at the surface; in these pits readings of 5,000 to

10,000 counts per minute were found. This amount of radioactivity is high for surface material and further investigation in this area is well warranted.

The central anomaly, in which an area of about 100 ft. long gives a count of approximately five times background, is believed to correspond in its central section with outcrops of hematite-rich slates which contain stringers of quartzite along the bedding planes. This material is similar in type to that which is being investigated at Brodribb.

The most easterly anomaly, which gives only small areas of three times background, lies over soil; trenching would be required to obtain some information on its possible significance.

In summary, the Ella Creek Prospect is generally similar in type to that at Brodribb and testing of the latter would give a good deal of information about the possible value of the Ella Creek deposit. However, the latest field reports indicate that the most westerly anomaly may not correspond to the iron-rich outcrops previously investigated at Ella Creek and Brodribb, and this appears to be the most promising anomaly for immediate investigation.

Frazer Anomaly.

During flying carried out in 1952, a first-order radiometric anomaly was found to exist about 1.5 miles west of the Frazer airstrip.

A geological and radiometric plan of this area is shown on Plate NT47-27. This plan shows that the anomalous area corresponds to an outcrop of ferruginous laterite, most of which gives a count of about two and a half times background. Within the eastern portion of the laterite body, a belt of rock trending north-west gives counts up to five times background. The trend of this belt of higher activity corresponds, as far as known, to the strike of the underlying sediments, and it is possible therefore that this laterite overlies a mineralized bed.

A trench has been extended through this deposit to a maximum depth of 5 ft. and the section through this is shown in NT47-28. The trenching has revealed a typical lateritic profile in which the iron-rich pisolitic laterite is underlain by leached material of lighter colour. The radiometric profile shows that it is the iron-rich portion of the laterite which is most radio-active. No definite signs of mineralization have been reported but a further investigation is warranted. It would be simple and inexpensive to carry out a self-potential geophysical survey over these anomalous areas, and should sulphides be present it would be possible to detect them. If a well-defined self potential anomaly is proved to exist, drilling would be warranted, as it is quite possible that the highly leached material underlying the ferruginous zone of the laterite is impoverished in uranium and other valuable metals.

Other Anomalies.

The airborne scintillometer has shown that other areas of anomalous radioactivity occur in the area. Most of these are thought to correspond to masses of rock of various types which do not represent payable uranium mineralization. Investigation of the area is still in an early stage and the airborne anomalies will need closer investigation than it has yet been possible to give them. It is quite possible that new discoveries will result from these investigations.

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PROVISIONAL GEOLOGICAL MAP
BRODRIBB·ELLA CK. AREA
N.T.
SCALE
1 3/4 1/2 1/4 0 1 2 MILES
Humpty Doo Track
39-M
FRAZER ANOMALY
FRAZER AIRFIELD
BRODRIBB CAMP
BRODRIBB PROSPECT
Interbedded quartzites and slates
Brodribb Track
Pyritic carbonaceous and sericite slates with thin quartzite lenses
Mainly hematite rich sandy slate
Interbedded quartzite and slates
Ella Ck.
ELLA CK. PROSPECT
Silicified Crush Zone
Crush Zone
Scattered outcrops quartzite and slate
Quartzites
Quartzites with thin interbedded graphitic slates
Quartz & Tourmaline
Quartz
DARWIN RIVER
North-west Track
Pumping Stn.
MANTON R.
MANTON DAM
Pyritic quartzites
Sheared and brecciated zone
Quartzite
Pebble Beds
Grits
Greywacke Grits
Graphitised Grits
HIGHWAY
STUART
Fault
Reef
Giants
Interbedded slate and quartzite
NORTH AUSTRALIAN RAILWAY
46-Mile Siding
Lagoon
Creek
Beetson
Reference
Alluvium
Soil cover
Pyritic, carbonaceous, sericitic and hematitic slates.
Interbedded quartzites and slates
Pyritic quartzites
Granite
Bureau of Mineral Resources Geology and Geophysics. Aug. 1953.
NT 47-24

GEOLOGICAL MAP

BRODRIBB DEPOSIT

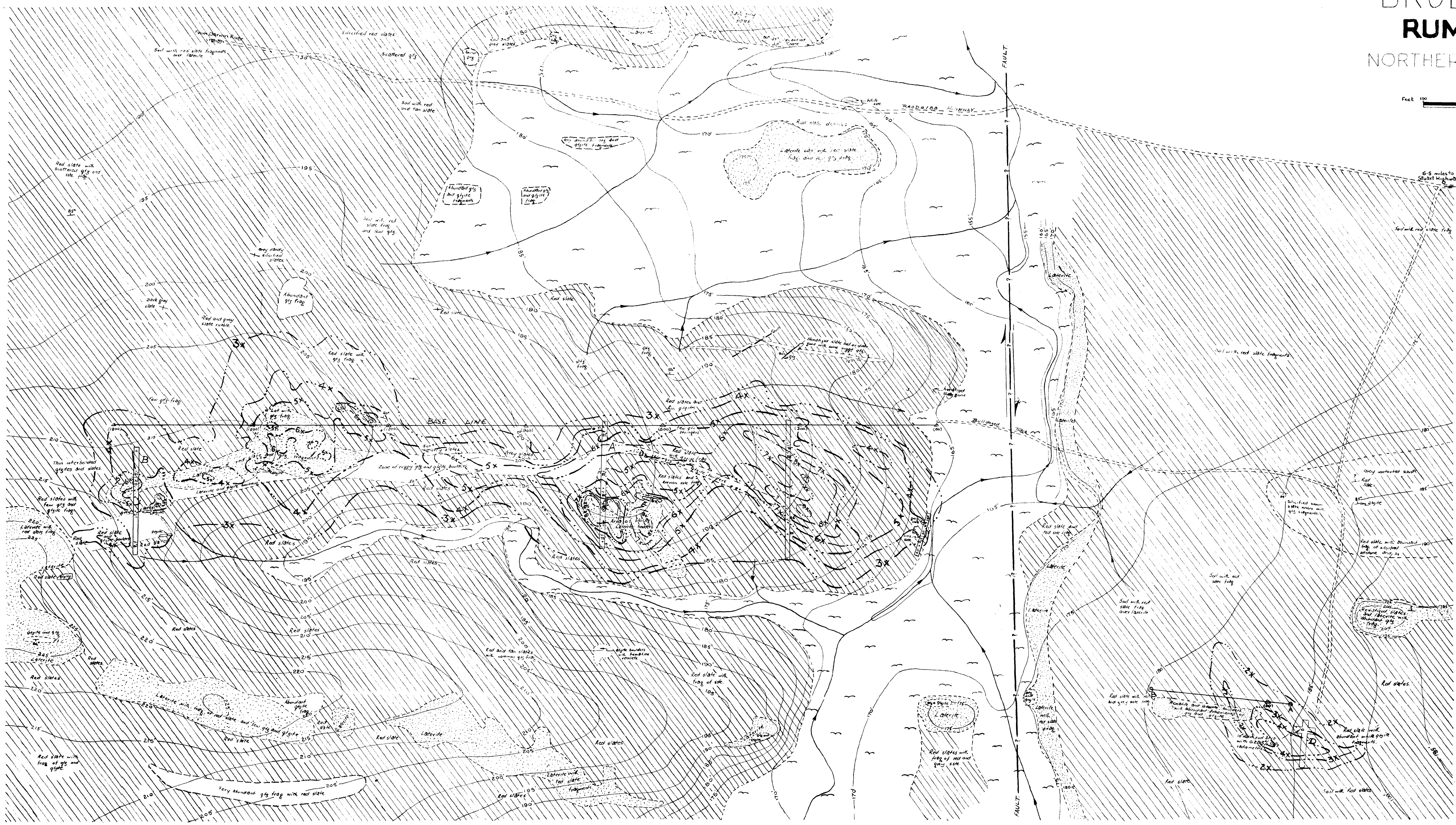
RUM JUNGLE AREA

NORTHERN TERRITORY, AUSTRALIA.

Plate 1

SCALE

Feet 100 0 100 200 300 400 Feet



Reference

QUATERNARY

Alluvium

TERTIARY

Ferruginous Laterite

PRE-CAMBRIAN

Lower Proterozoic — Brocks Creek Gp.

Quartzite

Grey and red Slates

INTRUSIVES

Quartz veins.

Geological boundaries (approximate)

Faults - inferred

A Costeans

45° Strike and dip

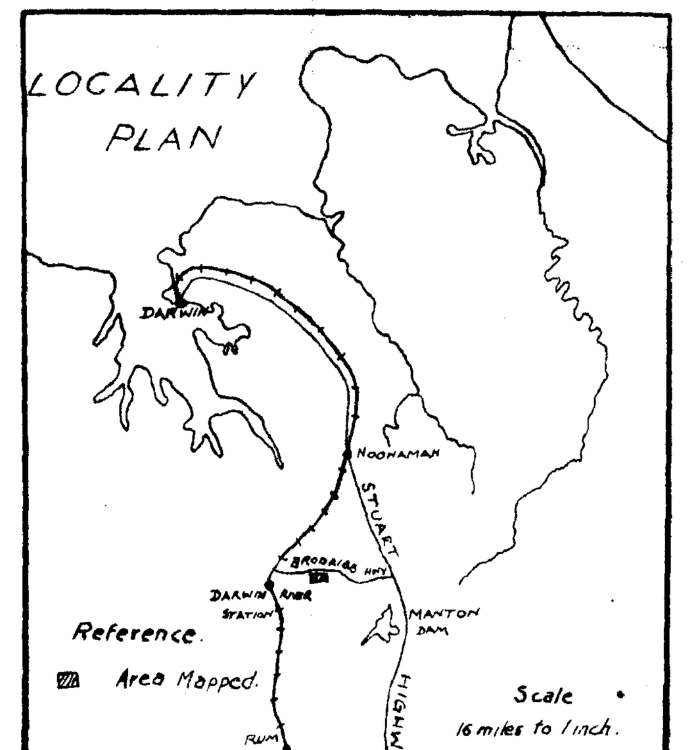
Roads and highways

Drainage channels

100 Contours at 5 ft intervals.

5x Radiometric contours (showing multiple background effect)

M.N.

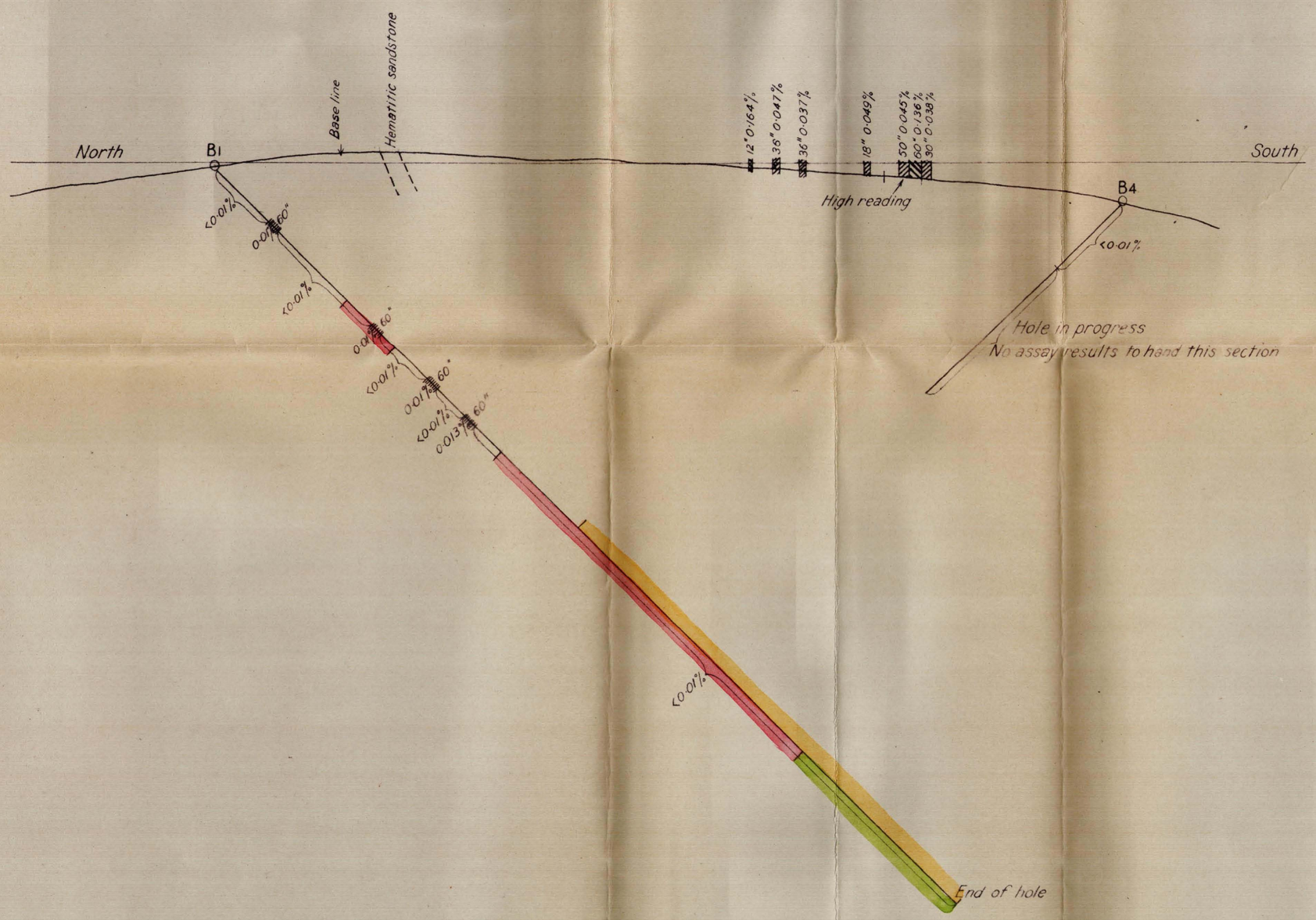


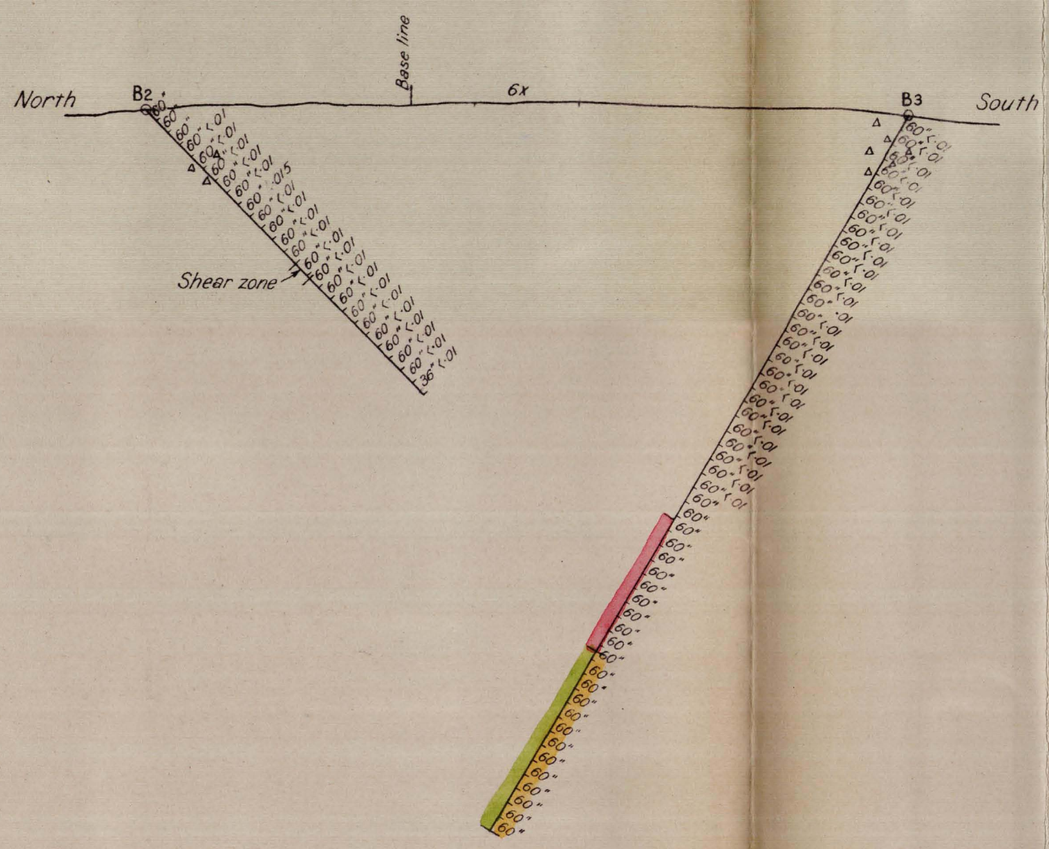
Plane table and telescopic alidade survey and geology by

F. J. FRANKOVICH.

Oct - Nov 1952.

NT 47-12





BRODRIBB PROSPECT

ASSAY AND GEOLOGICAL SECTIONS IN PLANES D.D.H. B1–B4 AND B2–B3

SCALE

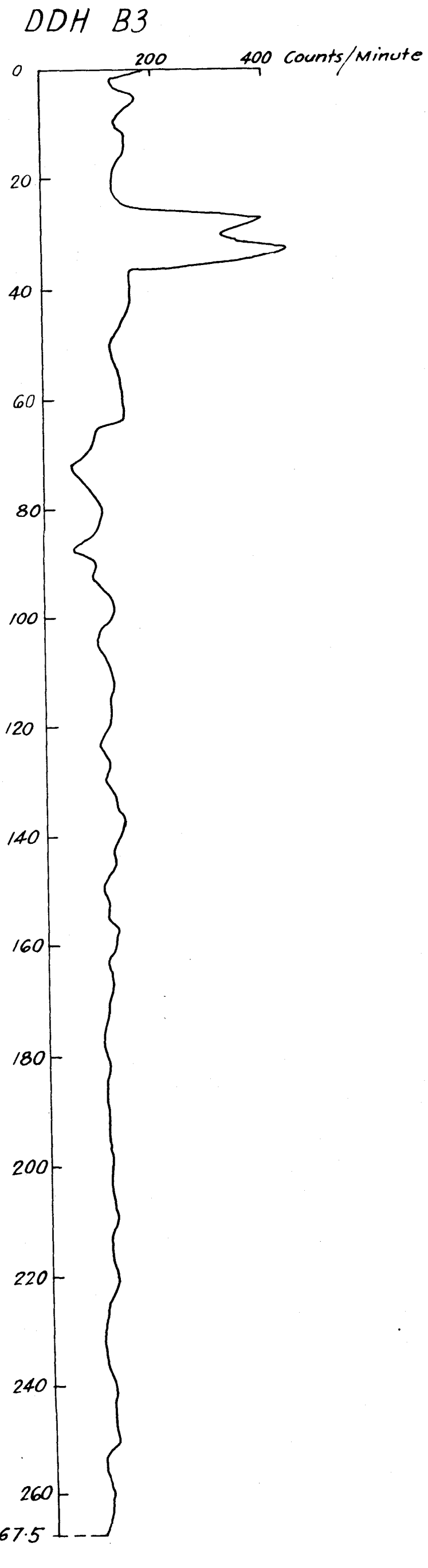
40 0 40 80 120 160 FEET

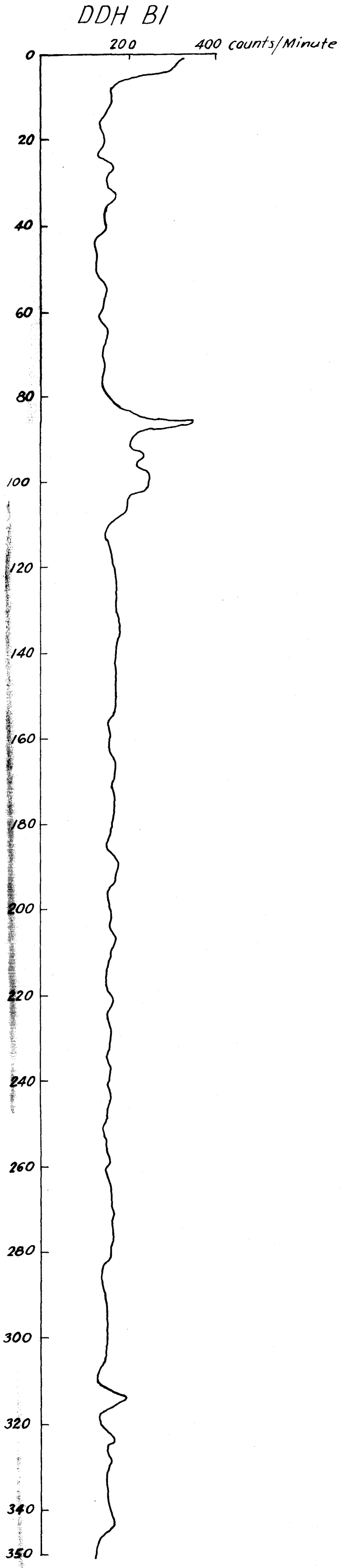
REFERENCE

- 0·5–0·1%
- 0·1–0·05%
- 0·05–0·01%
- Graphitic & carbonaceous slate
- Sericitic slate with pyrite
- Brecciated Hematised slate

Bureau of Mineral Resources, Geology & Geophysics July 1953

NT 47-26





RADIOMETRIC LOGS

DRILL HOLES
BRODRIBB AREA

VERTICAL SCALE
0 10 20 30 40 50 60 FEET

HORIZONTAL SCALE
0 200 400 600 COUNTS/MINUTE

J. A. Munro

NT 47-22

GEOLOGICAL PLAN
ELLA CREEK ANOMALY
BRODRIBB AREA
NORTHERN TERRITORY

SCALE

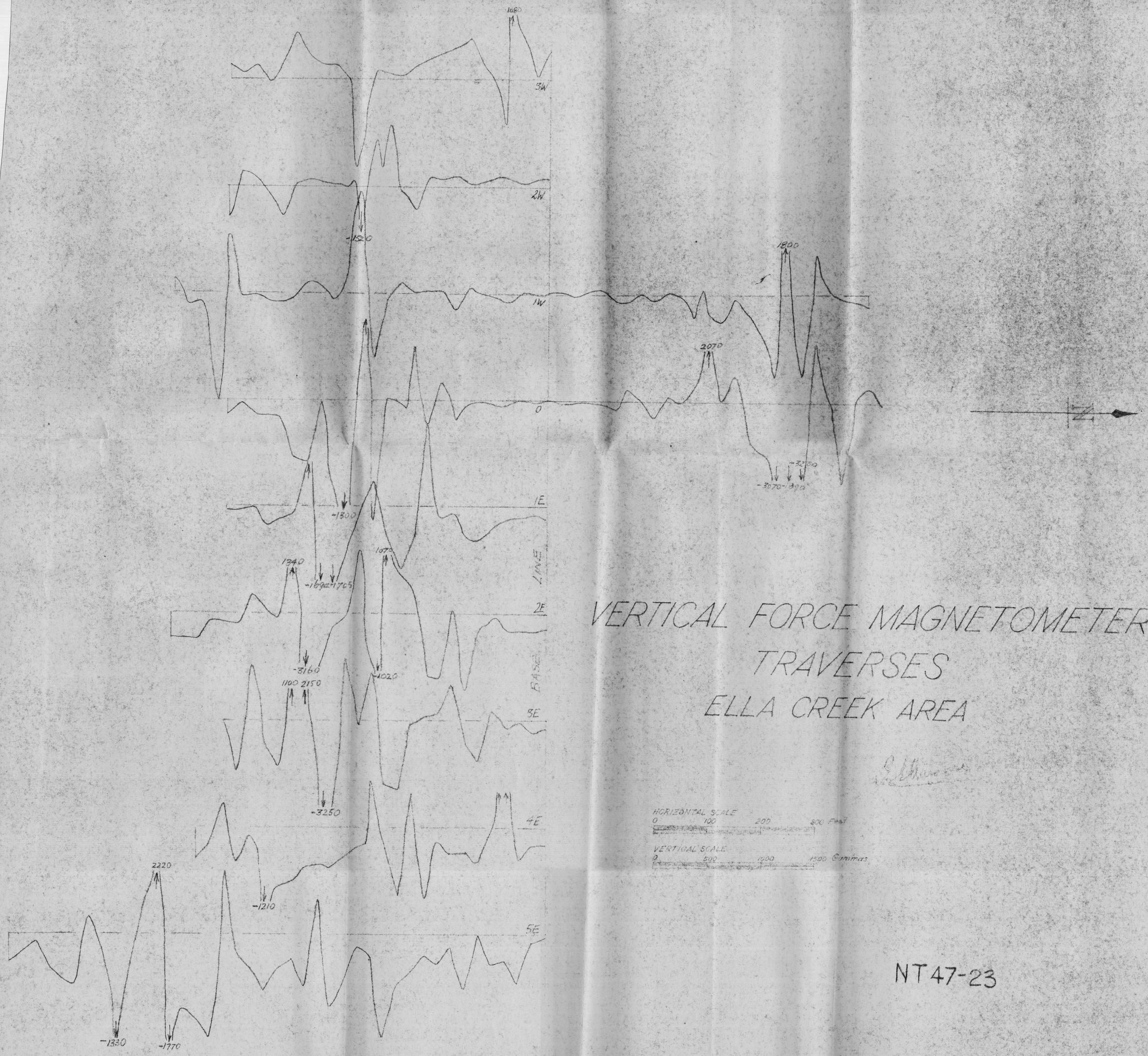
0 100 200 300 400 FEET

REFERENCE

- Established geological boundary.
- " " " : Position approximate.
- Indefinite geological boundary.
- Vertical bedding.
- 70 Strike and dip of strata.
- Grey and purple slates without Hematite.
- Hematised slates, with some Quartz stringers along bedding.
- Zone of silicification, with some Hematite veinlets.
- Hematite-quartzite-breccia.
- Watercourse.
- 610 Topographic contours.
- X2 Radiometric contours compiled by use of Ratemeter Type 1011. (Radiometric survey by I. A. Mumme)

NT 47-25

J.M.M.



VERTICAL FORCE MAGNETOMETER TRAVERSES

ELLA CREEK AREA

HORIZONTAL SCALE
0 100 200 300 Feet

VERTICAL SCALE
0 500 1000 1500 Gammas

NT47-23

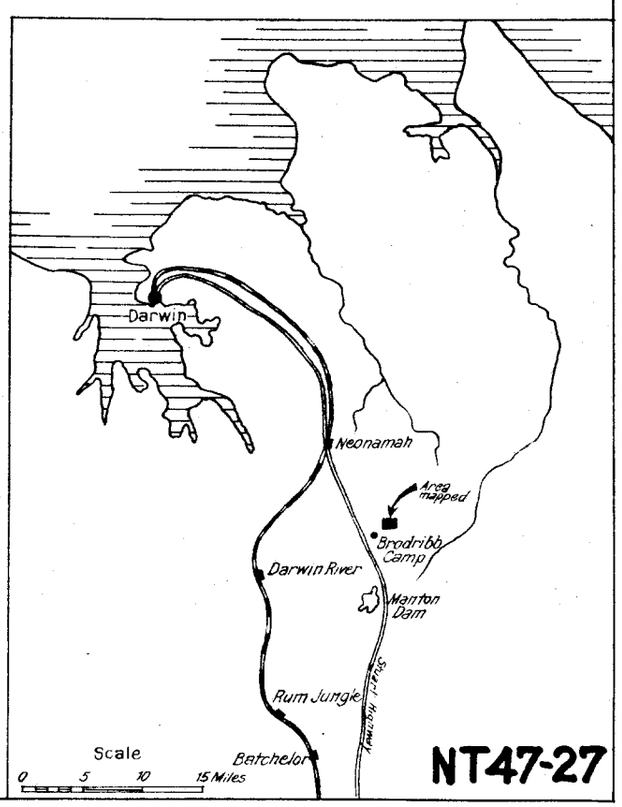
Frazer Anomaly

Scale

100 0 100 200 Feet

Legend

- Soil cover
- Laterite gravel and soil
- Alluvium
- Quartz vein
- 8' Costean
- 3x Radiometric contours (Multiple of background)
- .3S2W Survey pegs



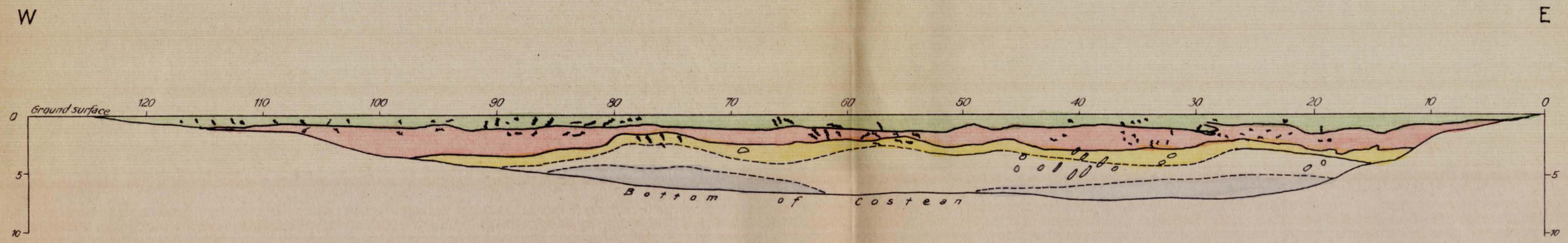
NT47-27

Mag North

Geology & Radiometric Work by K. Crank

Plate 2

Section of Costean



Radiometric Profile

Scale

10 5 0 10 20 Feet

Legend

Geology & Radiometric Work by K. Crank

- Quartz
- Silicified slate fragments
- Soil cover
- Ferrugineous zone
- Mottled zone
- Pallid zone
- Grey clay

NT 47-28