

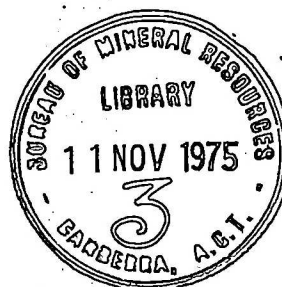
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MINERALS AND ENERGY 056283



BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS

Record 1975/68



SOIL SAMPLING AT THE JUBILEE PLUNGER GOLD PROSPECT, FORSAYTH,

NORTH QUEENSLAND

by

K.J. Armstrong

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SUMMARY

Extensive silver, gold, copper, lead, and zinc anomalies associated with the Jubilee Plunger reef suggest that soil sampling is a useful technique for gold exploration in the Forsyth area of north Queensland. The old workings at Jubilee Plunger are all very shallow, and the deposit has been only superficially tested. Although indications are that the lode is of low grade, it is of considerable size (1100 m long and averaging 40 m wide), and drilling is recommended.

INTRODUCTION

During the 1973 and 1974 field seasons a geochemical soil sampling program was undertaken at the Jubilee Plunger reef, the site of abandoned gold workings about 30 km south-southeast of Forsayth, north Queensland (Fig. 1). The lode was chosen for detailed study because of its substantial size.

The major objective of the survey was to determine the geochemical expression of the deposit, and thereby assess the usefulness of soil sampling as an exploration technique for gold in the Forsayth region.

PHYSIOGRAPHY AND CLIMATE

Relief over the survey area is not great. The highest hilltop (Fig. 1) is about 30 m above the general level of the countryside. A smaller hill of about 8 m relief occurs in the southern central part of the grid area. The land to the north, east, and south is relatively flat; sandstone ridges are prominent to the west.

The climate is hot with average daily maximum temperatures exceeding 32°C during both December and January. The mean winter temperature (June-August) is 15°C to 21°C. Average annual rainfall is about 650 mm, most of which falls during summer storms.

GEOLOGY

The country rock is a biotite granodiorite (Robin Hood Granodiorite) of probable early Palaeozoic age. The gold mineralization is associated with lead and zinc sulphides and occurs in a quartz-veined greisen. The greisen is about 1200 m long, averages 40 m wide, and dips east at between 35° and 60°. At the surface it is commonly ferruginous (Bain, Oversby, & Withnall, in prep.).

MINING HISTORY

Mining records for the area are insufficiently detailed to position old mines accurately; as many as three gold mines may have been within the limits of the soil grid - the Jubilee Plunger, Lady Mary, and Better Luck. Documented production from these is listed below:

	Ore Crushed (tonnes)	Gold Bullion (grams)
Jubilee Plunger	996.3	10096
Lady Mary	669.6	15642
Better Luck	737.1	20611

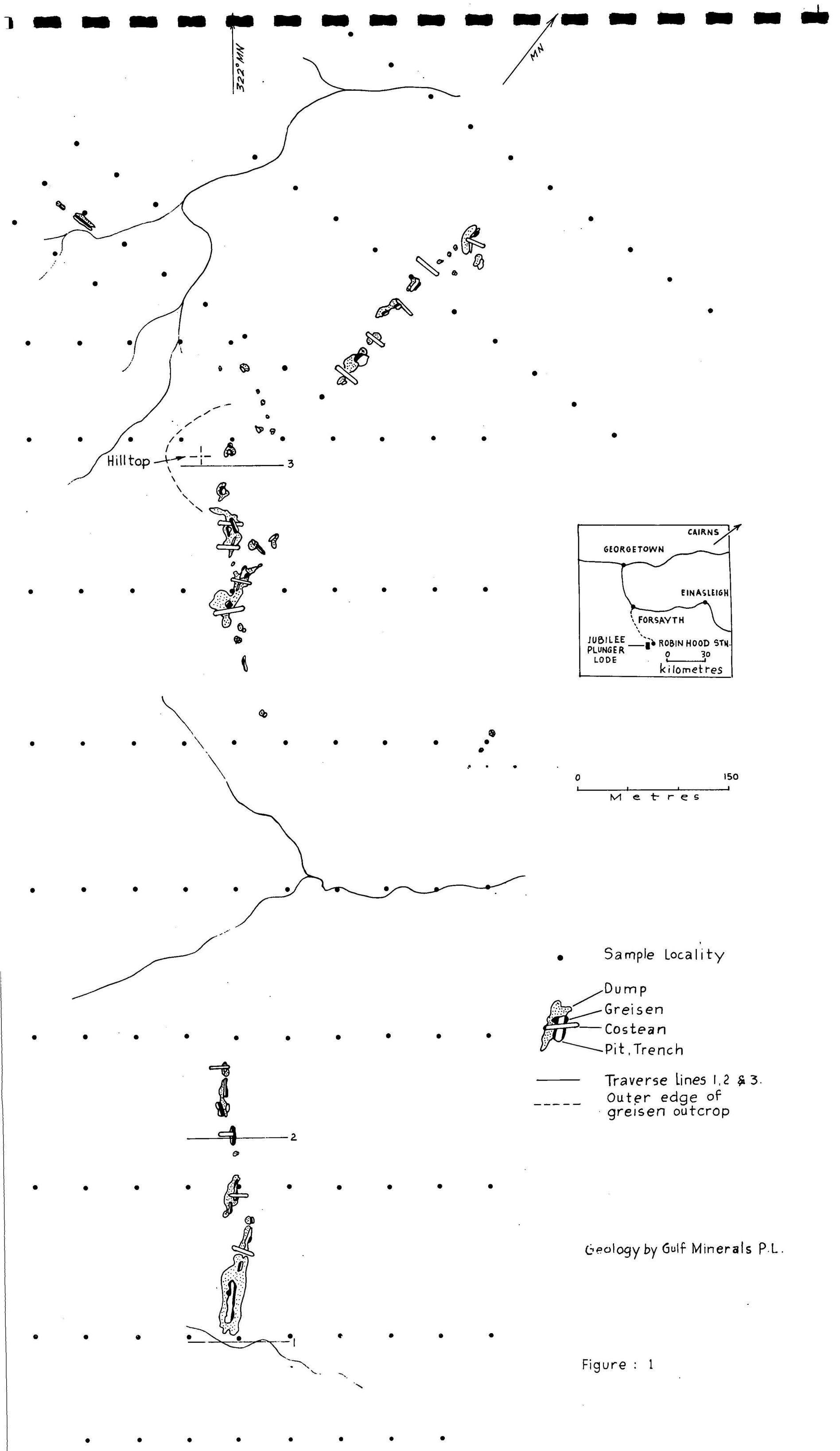
The mines were worked between 1894 and 1897 (Withnall, in prep.).

PREVIOUS INVESTIGATIONS

Exploration during 1970 by Gulf Minerals Pty Ltd consisted of detailed mapping of the workings, and the bulldozing of 13 shallow costeans across the lode. The poor gold values (average 1 g/tonne (0.04oz/ton), maximum 4.4g/tonne (0.14oz/ton)) encountered in rock-chip samples from the area discouraged further work (Gulf Minerals Pty Ltd, 1970).

SAMPLING TECHNIQUES

A rectilinear grid (Fig. 1) was surveyed using a prismatic compass and measuring tape. Samples were taken every 150 m parallel to the reef and every 50 m at right-angles to it. The central site on each cross-line was marked with a star picket and numbered tag. Three detailed traverses across the lode with sample spacings of 5 and 10 m were also made. A total of 162 'B'-horizon soil samples were collected using a miners' pick. Each sample consisted of about 200 g of material, and was taken from a depth of 15-20 cm.



Geology by Gulf Minerals P.L.

Figure : 1

ANALYTICAL TECHNIQUES

All sample preparation and analytical work excluding gold determinations were carried out in the BMR laboratories.

Sample preparation

The soil samples were moist and required drying in an air oven at 60°C for 24 hours. The dry material was sieved to minus 500 micron (30 mesh BSS).

Digestion

Perchloric (6ml, 1:1) and hydrofluoric (10ml, 40%) acids were added to a platinum basin containing the sample ($1.000 \pm .003$ g). Hydrochloric acid (5ml, 1:1) was then added and residue was dissolved by gentle heating. On cooling, the contents of the basin were made up to 25 ml in a volumetric flask.

Analysis

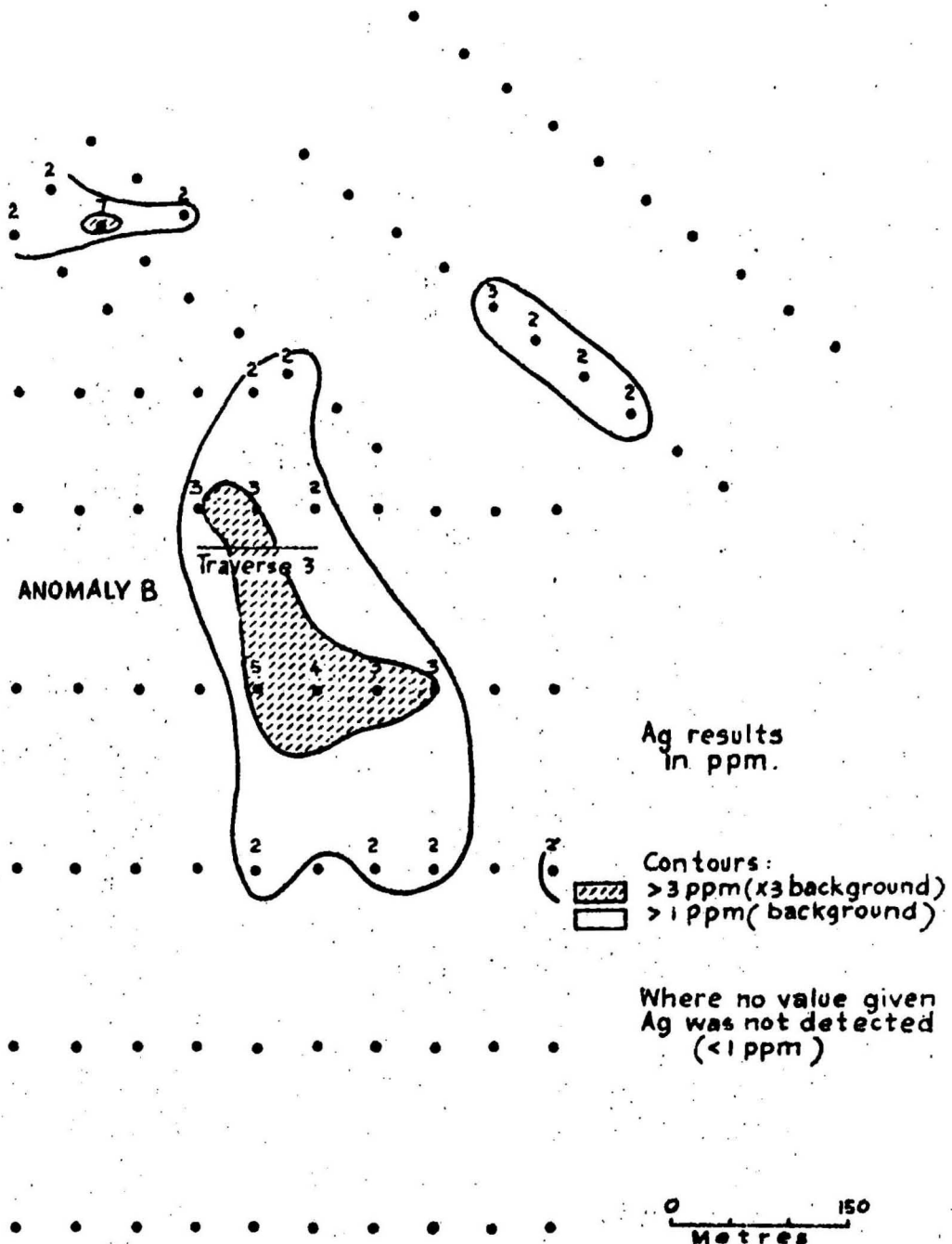
The samples were analysed for silver, copper, lead, and zinc using a Varian AA4 atomic absorption spectrophotometer. Non-atomic absorption corrections were made for low concentrations of lead and zinc.

Gold was determined at AMDEL by atomic absorption following 'aqua regia' (hydrochloric and nitric acids) digestion and organic (DIBK) extraction.

DISCUSSION OF RESULTS

The silver, gold, copper, lead, and zinc contents of the soils of the area are shown in Figures 2-6. Anomalies appear to be adequately delineated by contour values of 1 ppm Ag, 0.1 ppm Au, 30 ppm Cu, 140 ppm Pb, 140 ppm Zn. The two larger anomalies (A and B) are separated by a zone of alluvium but geophysical work (Hone, pers. comm., 1975) suggests that mineralization is continuous between them at depth. Together, anomalies A and B are over 1100 m long and up to about 250 m wide.

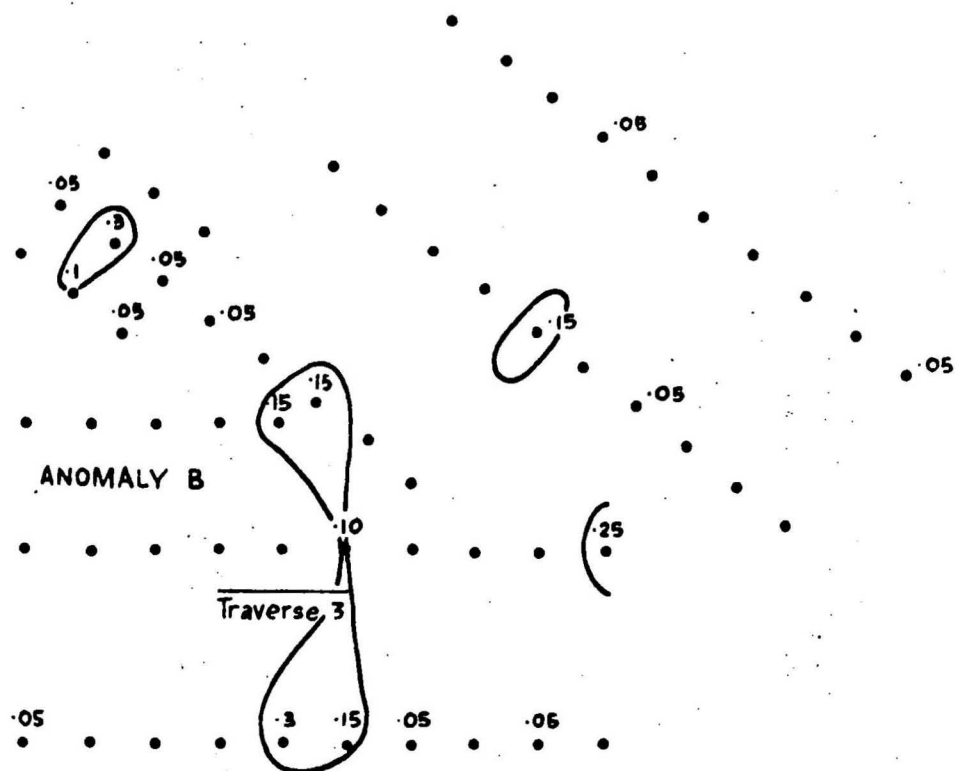
Ag



Silver anomalies in soils surrounding the Jubilee Plunger lode

Figure 2

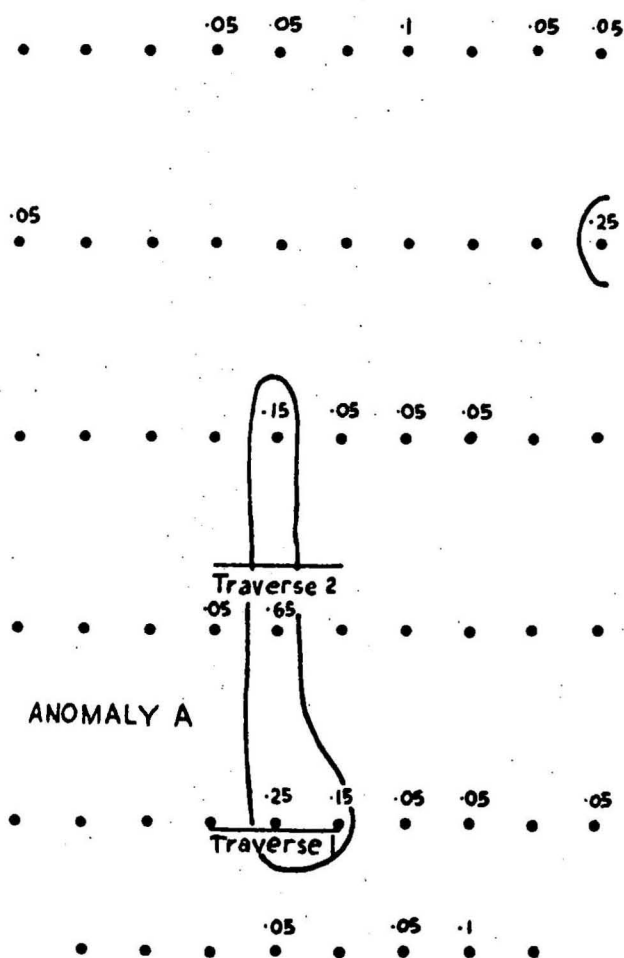
Au



Au results
in ppm.

Contour : > 0.1 ppm

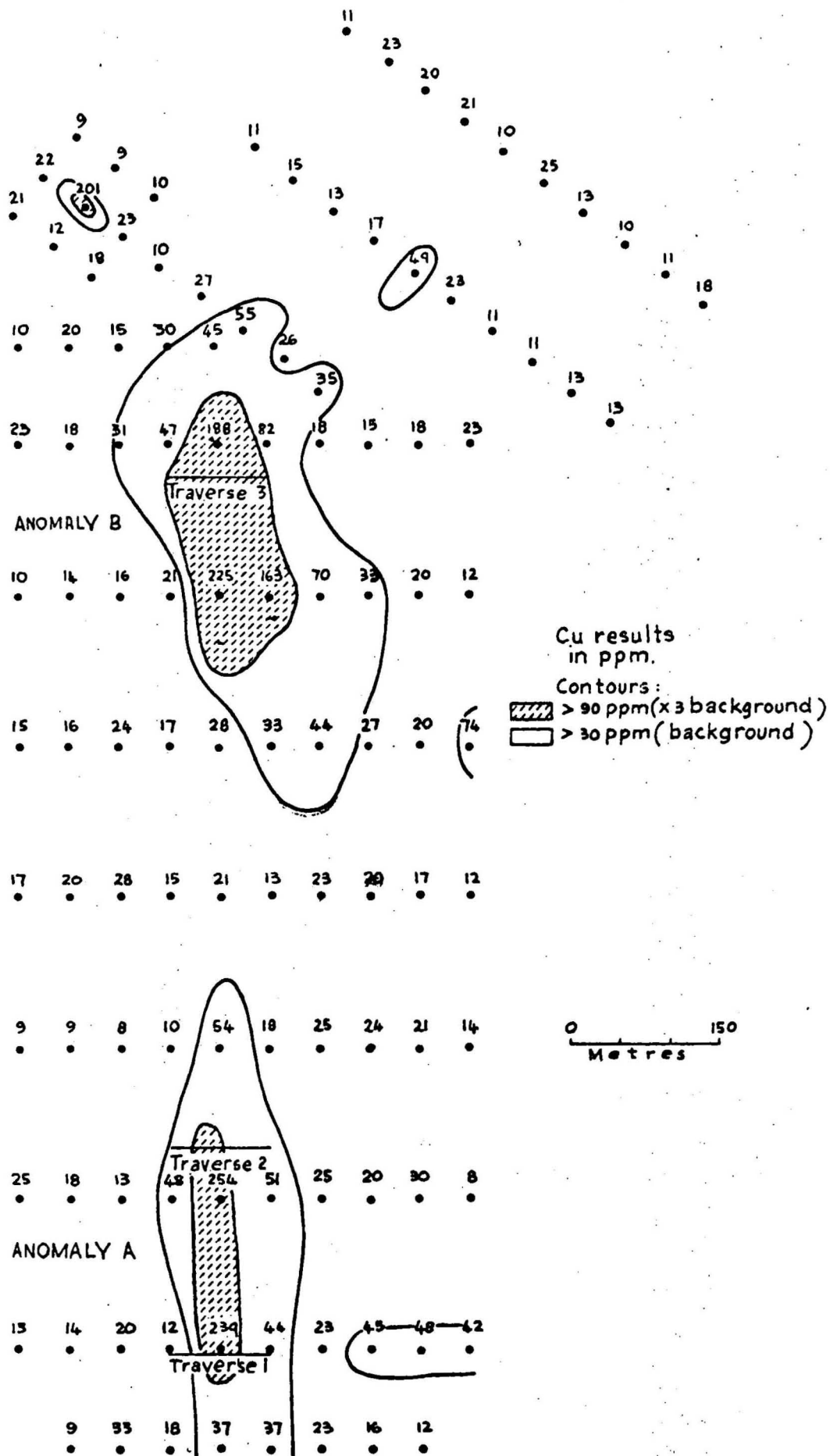
Where no value given
Au was not detected
(< 0.05 ppm)



0 150
Metres

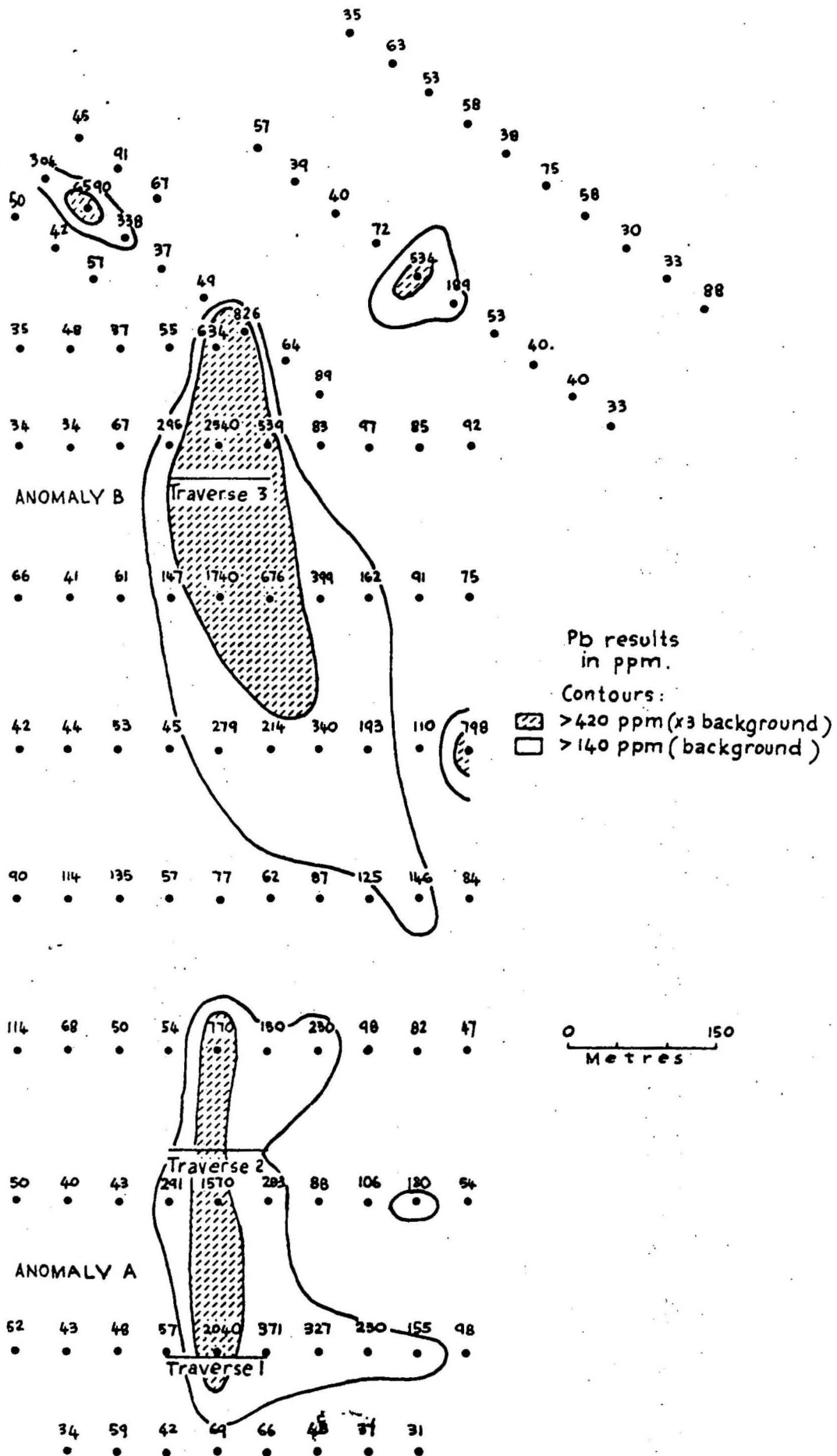
Gold anomalies in soils surrounding the Jubilee Plunger lode

Cu



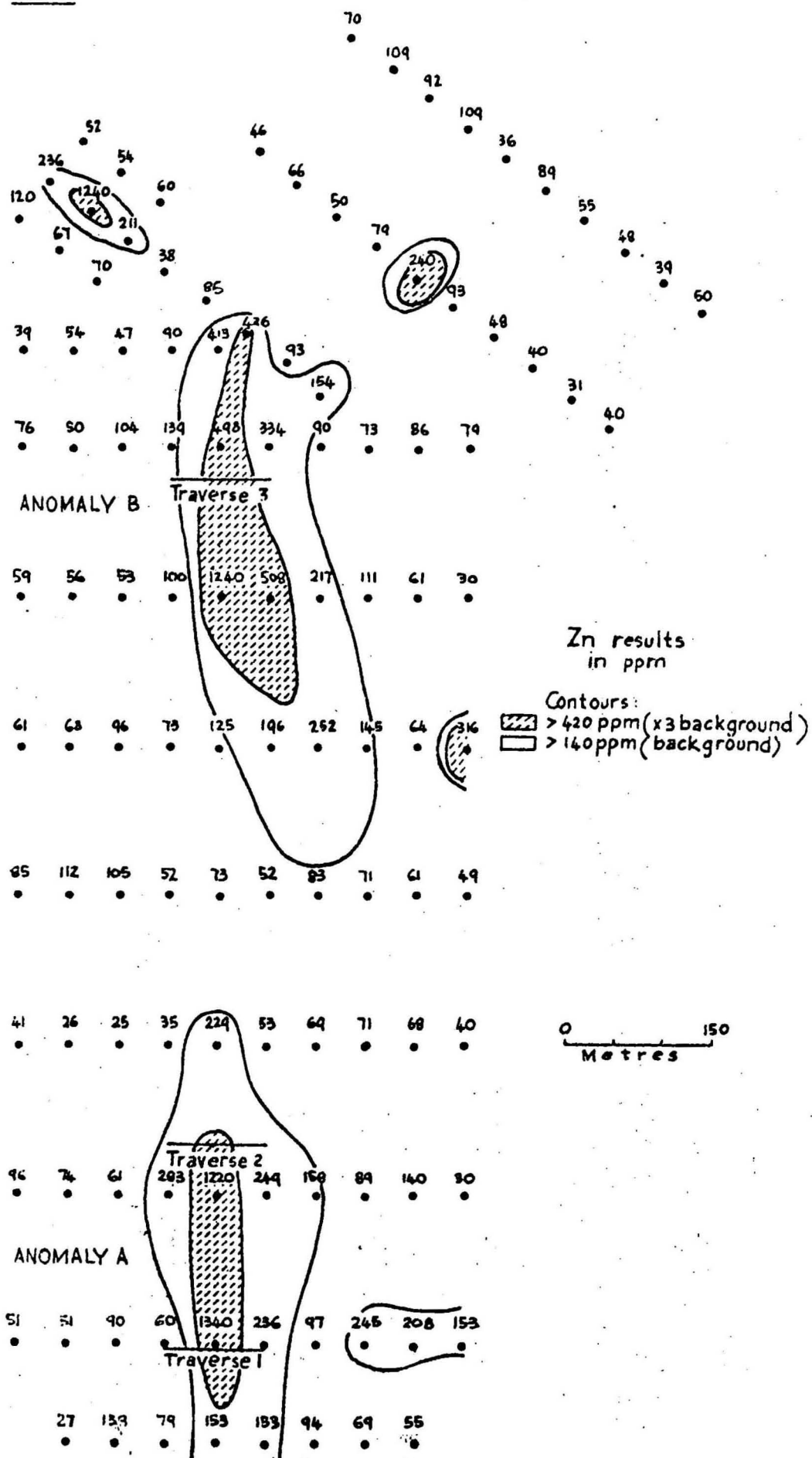
Copper anomalies in soils surrounding the Jubilee Plunger lode.

Pb



Lead anomalies in soils surrounding the Jubilee Plunger lode.

Zn



Zinc anomalies in soils surrounding the Jubilee Plunger lode.

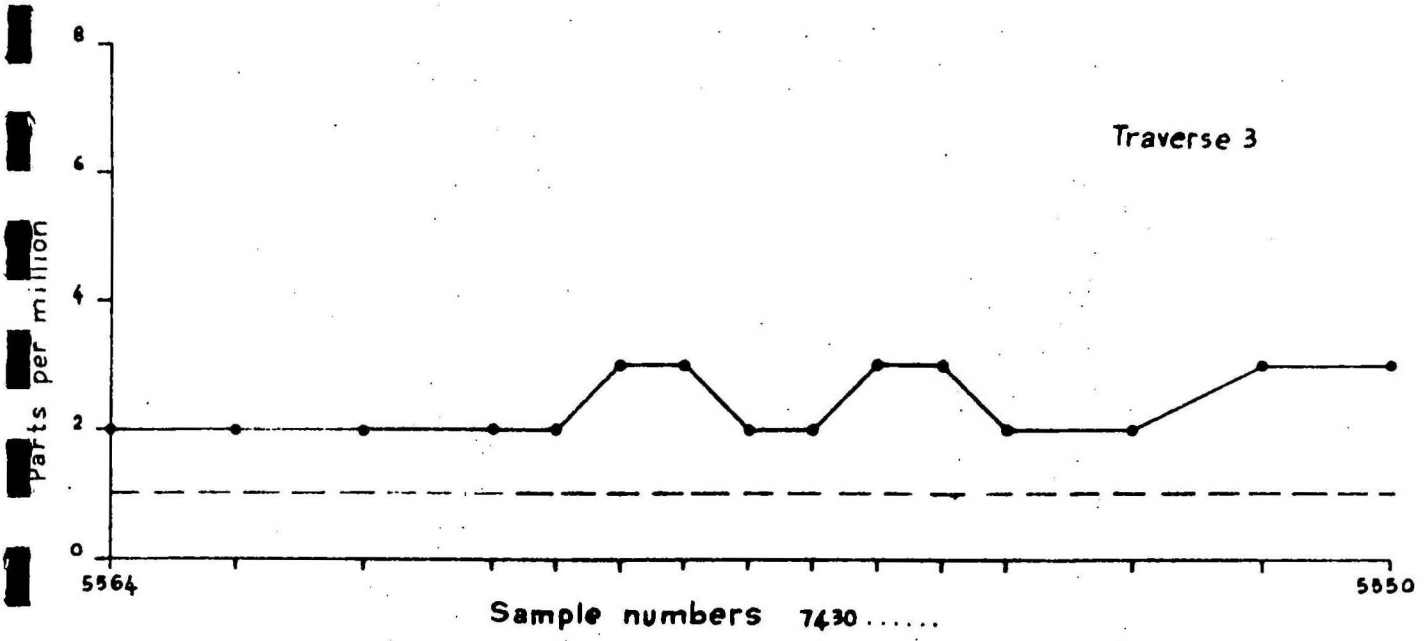
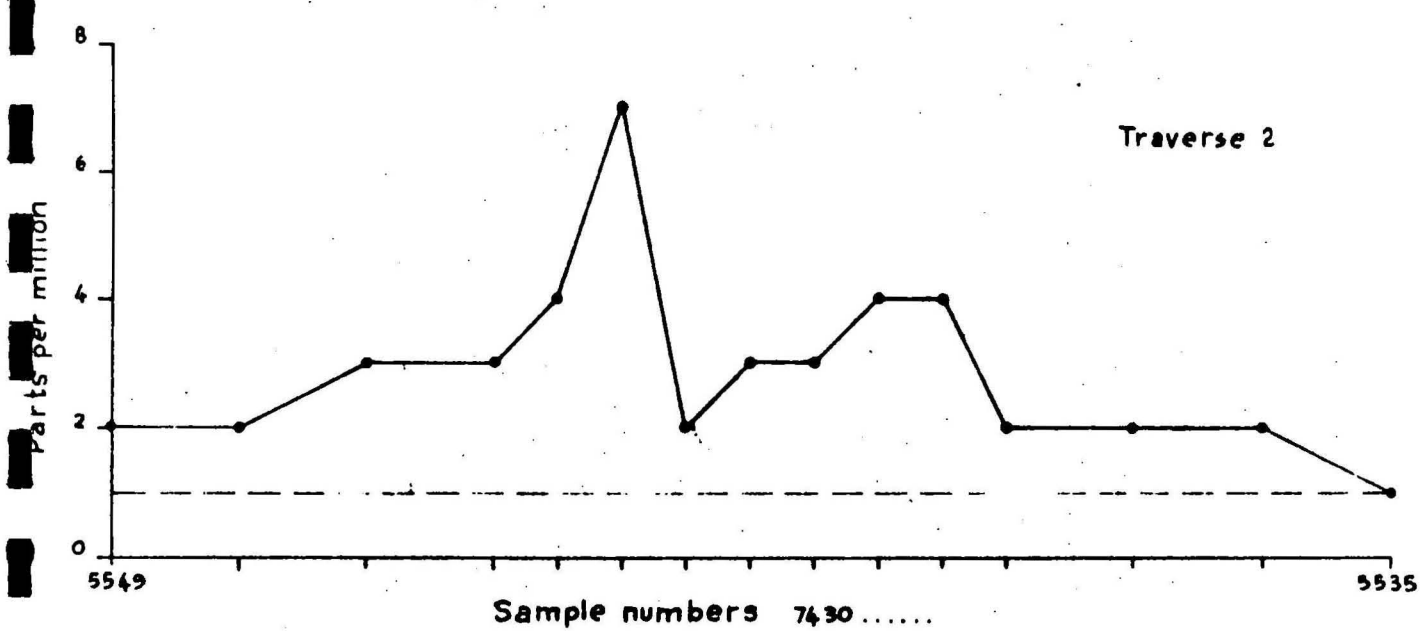
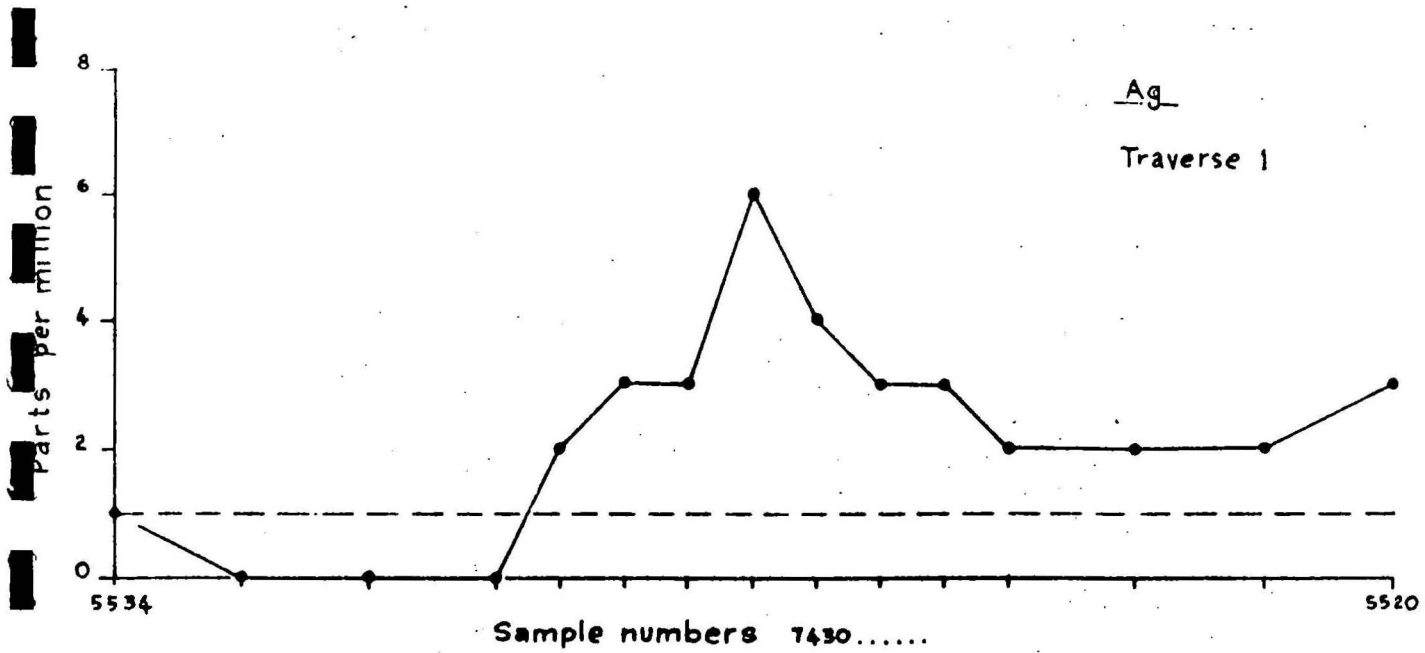
Figure : 6

Traverses 1, 2, and 3 were run across these larger anomalies in areas least disturbed by mining activity (Fig. 1). The results are shown in Figures 7-10. Along traverses 1 and 2 the elements generally show very high values in a zone about 30-40 m wide, on either side of which levels decrease sharply but still remain anomalous. The extremities of this peak appear to correspond with the edges of the greisen zone, suggesting that the greisen is mineralized across its entire width. Traverse 3 lies where the greisen is over 100 m wide.

CONCLUSIONS AND RECOMMENDATIONS

The geological mapping and the geochemical work indicates that the mineralized zone is of sufficient size (i.e., of the order of 1100 m long by 40 m wide) to warrant further study. All the significant anomalies occur within the areas of previous mining activity, but the old workings are only very shallow (less than 3 m deep), indicating that the deposit has only been superficially tested. Hence it is recommended that drilling be carried out. The first hole should be sited on anomaly B, which gives the strongest IP response (Hone, pers. comm., 1975); also it is here that the lode attains its maximum thickness. Geophysical investigations (Hone, op. cit.) suggest that the presence of a massive sulphide body is unlikely and the Jubilee Plunger reef should be regarded primarily as a low-grade large tonnage gold prospect.

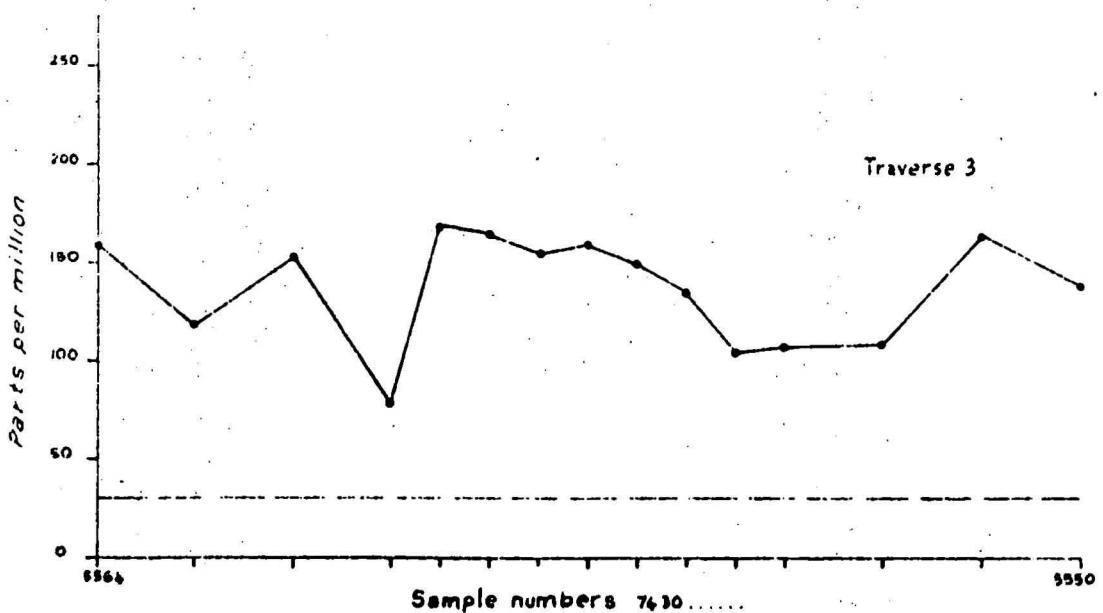
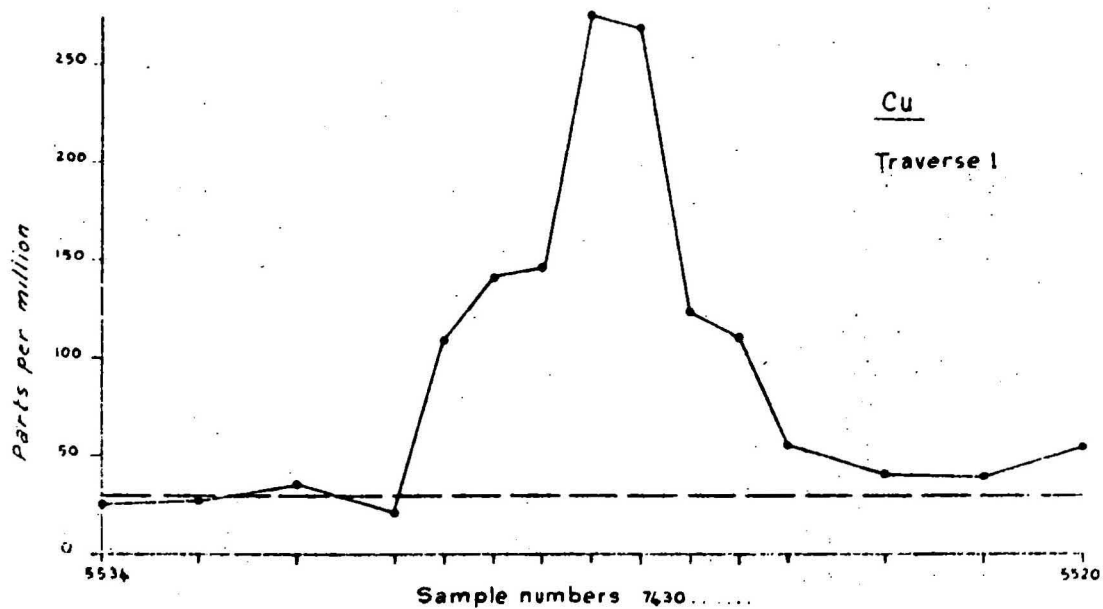
The extensive geochemical anomalies associated with the Jubilee Plunger lode show that soil sampling and analysis for silver, gold, copper, lead, and zinc can be a useful technique for gold exploration in the Forsyth area.



(Traverse lines - 100 metres long)

Figure : 7

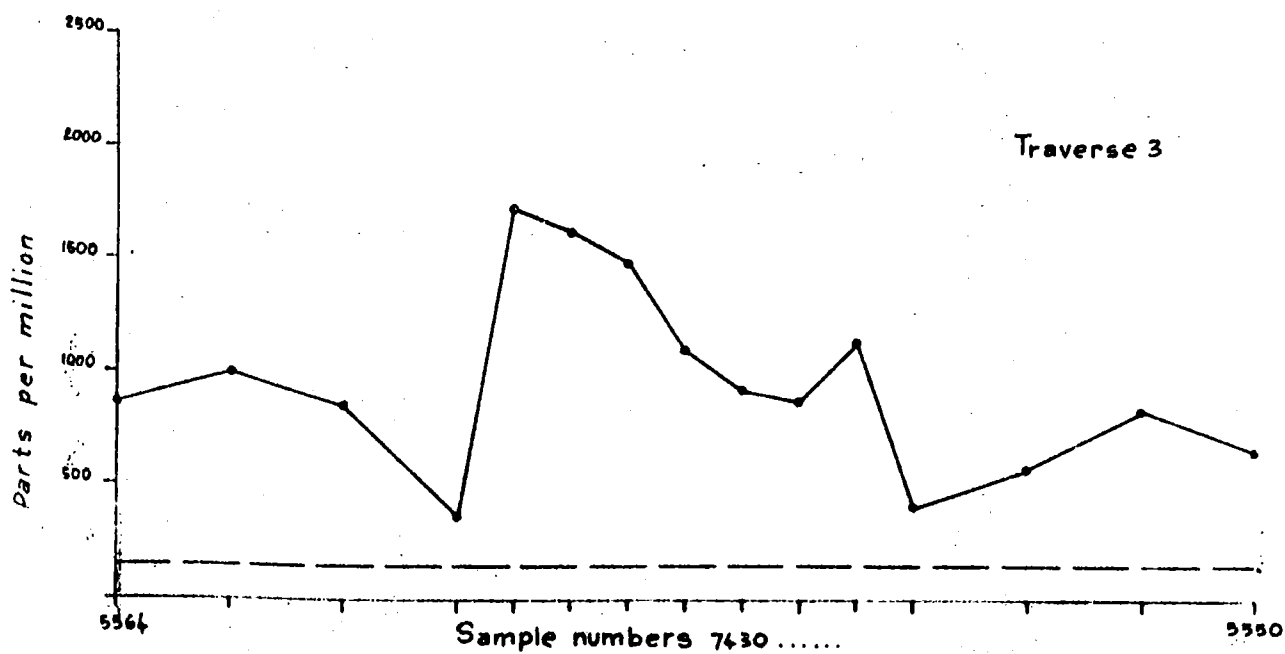
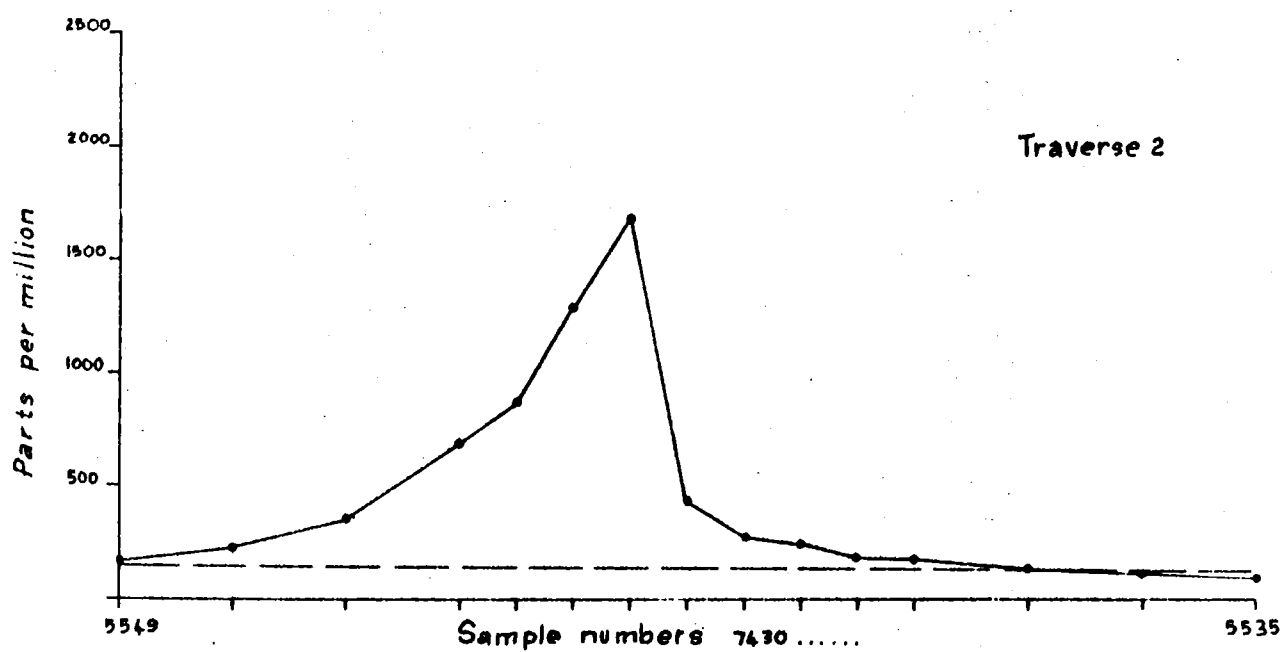
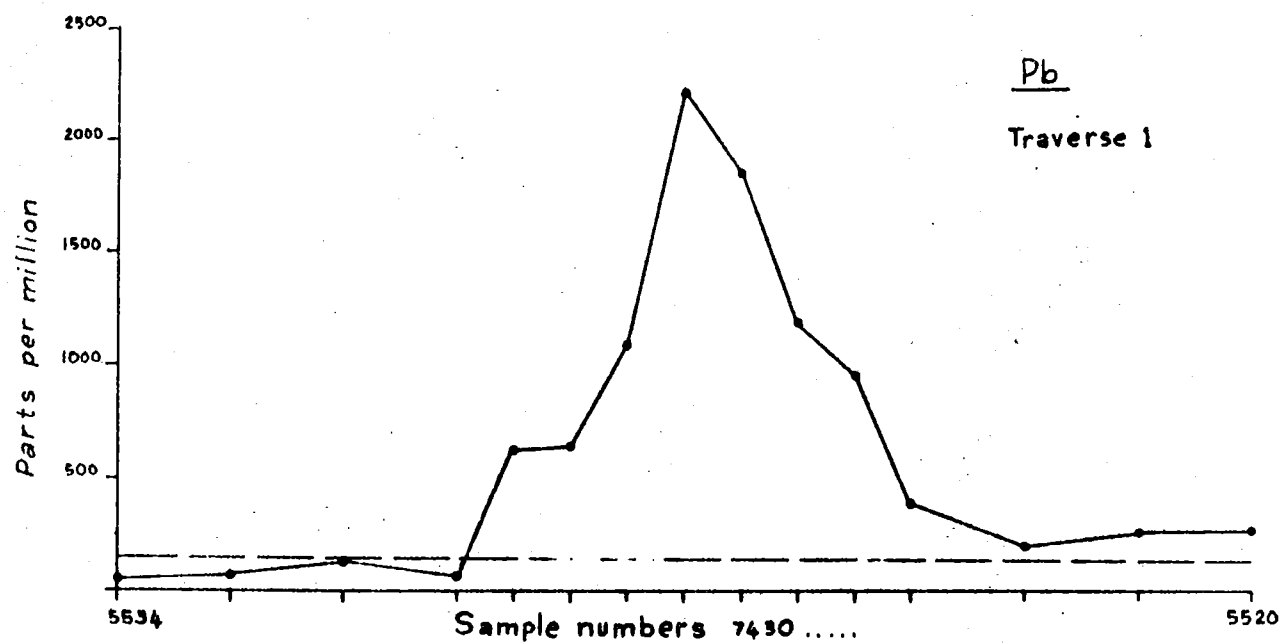
Silver values on detailed traverses across the lode. The horizontal broken line in each case represents the upper limit of background (1 ppm)



(Traverse lines - 100metres long)

Figure : 8

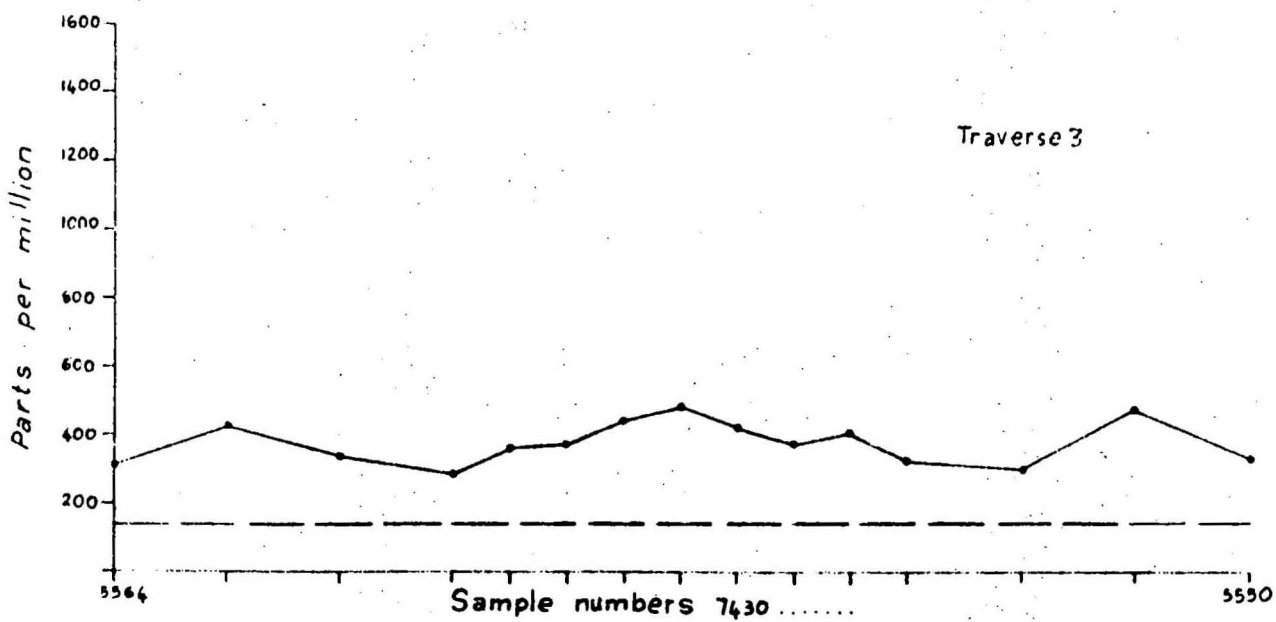
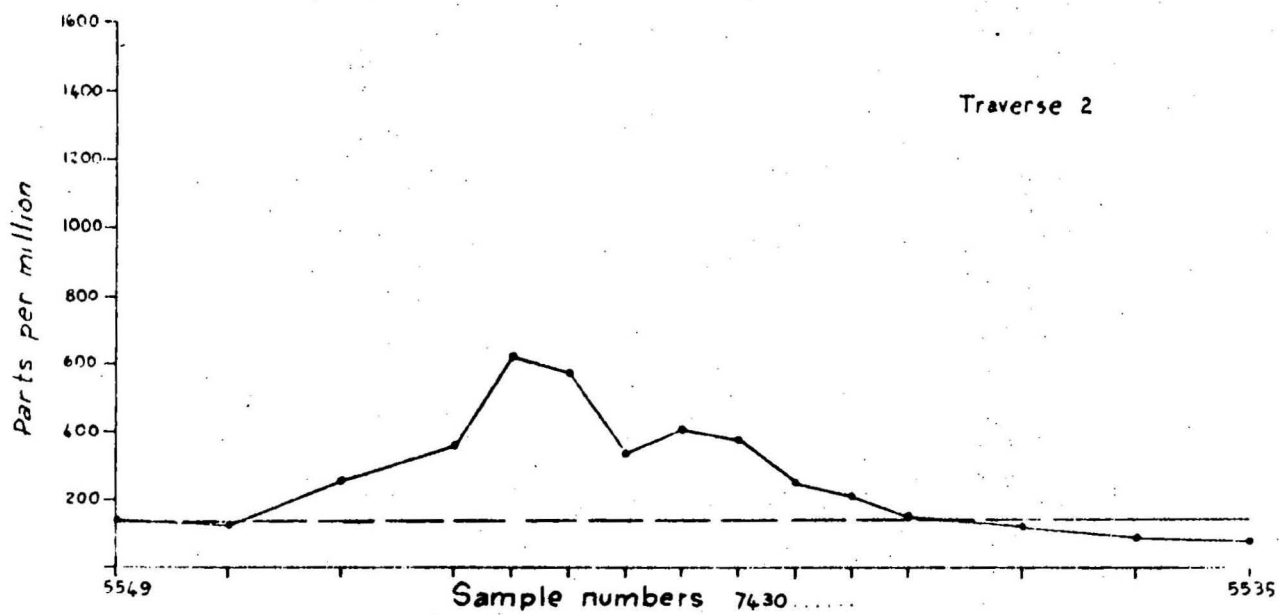
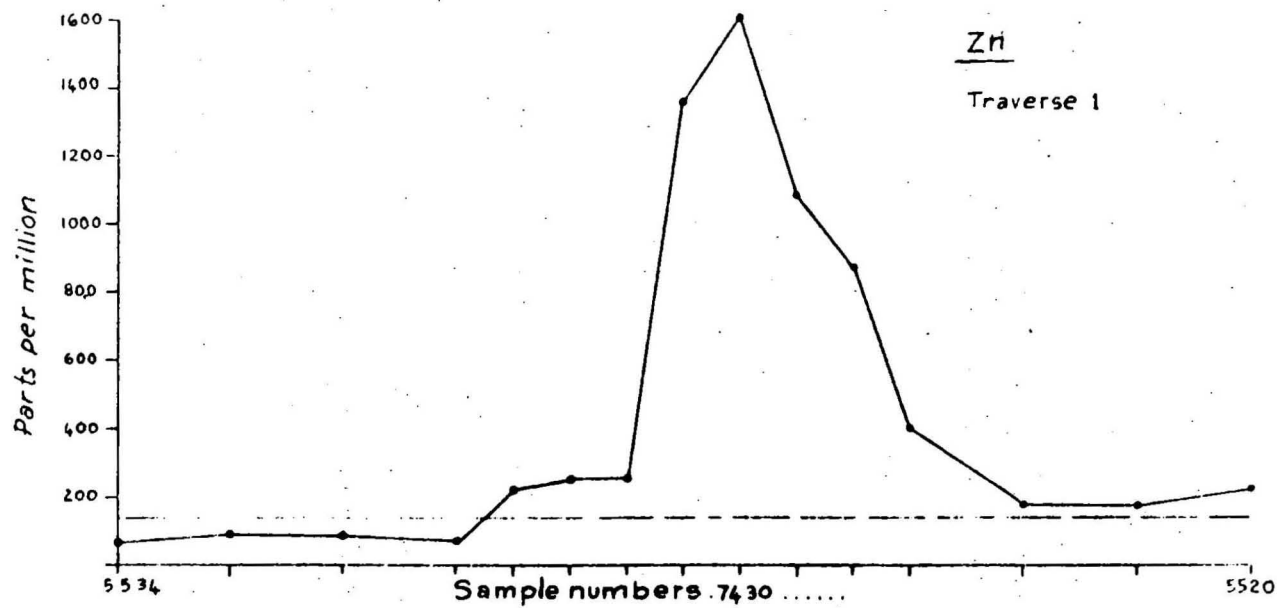
Copper values on detailed traverses across the lode. The horizontal broken line in each case represents the upper limit of background (30 ppm).



(Traverse lines - 100 metres long)

Figure 9

Lead values on detailed traverses across the lode. The horizontal broken line in each case represents the upper limit of background (140 ppm).



(Traverse lines - 100 metres long)

Figure : 10

Zinc values on detailed traverses across the lode. The horizontal broken line in each case represents the upper limit of background (140 ppm).

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