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MERCURY AND OTHER TRACE ELEMENTS IN SOIL, FLUVIOGLACIAL SEDIMENTS AND SULFIDE-RICH ROCKS FROM FOUR BASE METAL PROSPECTS IN THE TYNDALL-DARWIN AREA, WESTERN TASMANIA

G.R. CARR, W.R. RYALL AND J.R. WILMSHURST

**MICROFILMED**

PO Box 136  
NORTH RYDE, NSW  
AUSTRALIA 2113

FEBRUARY, 1982

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The Mount Lyell Mining and Railway Company Ltd  
Mr I.E. Newnham, Director, Institute of Earth Resources  
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SUMMARY

The Beatrice, Howard's anomaly, Lake Selina and Henty fault zone prospects occur within the Cambrian Mount read Volcanics and are examples of shallowly oxidized stratabound and stratiform base metal mineralization in a wet temperate environment. Whereas at the Beatrice, Howard's anomaly and Lake Selina prospects, felsic rocks containing disseminated and veinlet sulfides outcrop, at the Henty fault zone prospect a small stratiform massive sulfide lens is concealed by fluvioglacial overburden.

At all localities a well developed A soil horizon overlies a variably developed B horizon and either a leached C horizon or fluvioglacial sediment.

The lead, mercury, zinc, arsenic and to a lesser extent the copper contents of soils at Beatrice indicate the presence of disseminated and veinlet sulfides within the outcropping acid volcanics. A shallow weathering profile, with active near-surface oxidation of sulfides results in the above elements showing similar distribution patterns over the survey area, without evidence of the differential mobility more usually observed.

At Howard's anomaly mineralization is indicated by the high mercury, copper, lead, zinc and arsenic soil contents. The distribution patterns of all these elements along the line sampled is similar, again indicating a lack of differential dispersion in this juvenile weathering environment.

At Lake Selina, mercury in the B horizon delineates the sulfide-rich rocks (no other elements were analysed).

Three soil sample lines at the Henty fault zone fail to give clear geochemical indication of the buried sulfide lens, while profiles through the fluvioglacial overburden above the sulfide lens shows no clear evidence of a vapour generated halo. The slightly anomalous concentration of mercury, copper, lead, arsenic and iron in permeable tills adjacent to the bedrock-till contact indicates that these metals were flushed away in solution, a small proportion however being fixed within the till matrix.

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Results from the three prospects in which mineralisation outcrops indicate that although mercury is enriched in the A<sub>1</sub> horizon, anomalies of higher contrast are achieved by sampling deeper into the soil profile.

## 1. INTRODUCTION

Under the sponsorship of AMIRA, the CSIRO Division of Mineralogy at North Ryde is undertaking case history studies of the distribution of mercury in relation to other metals in different weathering environments and for a range of sulfide deposit types.

In early 1980 a number of sulphide occurrences in northwestern Tasmania were sampled for case history studies in the wet, temperate environment category. The deposits described in this report represent outcropping base metal sulfides (Beatrice, Howards anomaly, Lake Selina) and a buried deposit (Henty fault zone). Their locations and relationship to the regional geology is shown in Figure 1.

## 2. GEOLOGY AND MINERALIZATION

The four deposits occur within the Cambrian Mount Read Volcanics which outcrop in a belt from South Darwin Peak (25 km south of Queenstown) north to the Que River mine. The volcanics are of acid to intermediate composition and consist of a central belt of massive rhyolites and dacites (together with minor andesites) flanked to the west by a volcano-sedimentary sequence and to the southeast by mixed volcanics and volcaniclastic conglomerates of the Tyndall Group (Corbett, 1981). Whereas the Lake Selina, Henty fault zone and Howards-anomaly prospects occur within the central belt of volcanics, the Beatrice prospect is east of this in volcaniclastics of the Tyndall Group (Figure 1). The Mount Read Volcanics are host to the Mount Lyell, Rosebery and Que River base metal sulfide deposits.

The following brief descriptions of the style of mineralization at the several prospects are taken from Reid and Meares (1981). At the Beatrice prospect, mineralization occurs as disseminated and veinlet sphalerite, galena and pyrite within chloritized felsic, vitric and lithic tuffs. Sulfide mineralization at Howard's anomaly consists of disseminated pyrite, and vein chalcopryrite, galena and sphalerite in felsic to intermediate agglomerates, tuffs and ash flows. A stratiform massive sulfide lens about 1m in thickness occurs beneath the thin fluvio-glacial overburden at Henty fault zone. Major

sulfides in this lens are pyrite, sphalerite and galena. Pyrite and sphalerite also occur as disseminations and veinlets in the felsic to intermediate tuffs and lavas. At Lake Selina an extensive zone of disseminated and veinlet pyrite (700 x 150m) occurs in strongly chloritized and sheared felsic lavas and tuffs.

### 3. TOPOGRAPHY

The deposits studied occur within the West Coast Range which rises to an elevation of 1275m and is characterised by steep gorges and valleys which dissect a glacially modified plateau surface (Reid and Meares, 1981).

The exposed mineralization at Beatrice occurs in a steep sided valley with surrounding hills rising to about 250m above the valley floor. The line sampled at Howard's anomaly slopes moderately steeply to a creek at about 1100ft W (the company grid is non-metric; see Figure 4) and the Henty fault zone mineralization occurs on the gentle-to-moderate western slope of a low ridge. The Lake Selina sulfide-rich rocks occur of the western margin of a buttongrass upland marsh on ground sloping gently eastwards.

### 4. CLIMATE

The climate is typical of west-coast cool-temperate regions with year-round rainfall (winter maximum) averaging over 2500mm in the lower regions and about 3000mm along the range. Mean maximum and minimum temperatures range from about 7° and 1°C in July to about 18° and 7°C in January.

### 5. OUTCROP

The Beatrice prospect was not visited by the authors and no information is available as to the outcrop in the area. However, mineralization is known to be exposed in the valley (Figures 2 and 3). At Howard's anomaly there is no outcrop along the line sampled, although shallow pits bottomed in manganese-stained ironstone. A thin cover of fluvioglacial sediment blankets the mineralization at the Henty fault zone (Plates 1 and 2) and at Lake Selina significant outcrop occurs above the level of the marsh.

## 6. WEATHERING

Pleistocene glaciation stripped the oxidised profile from much of the higher ground of the West Coast Range and rapid weathering and erosion in the steep terrain of the river valleys and gorges results in fresh sulphides occurring at or within a few centimetres of the surface.

## 7. SOIL DEVELOPMENT

The soils of all prospects consist of well developed A<sub>0</sub> and A<sub>1</sub> horizons and variably developed A<sub>2</sub> and B horizons overlying the C horizon. Except for the swamps at Lake Selina, all are residual. No detailed information is available from the Beatrice prospect. At Howard's anomaly, the B horizon is well developed and the soils could be classified as peaty podzols. At the Henty fault zone alpine humus soils consist of A<sub>0</sub> and A<sub>1</sub> horizons resting on leached fluvioglacial overburden or a thin B horizon (Plates 1 and 2) and at Lake Selina, acid peats occur over fluvioglacial sediment within the buttongrass swamps (Plate 3), and brown-to-peaty podzols are found on the higher areas over acid volcanic rocks.

## 8. VEGETATION

The high rainfall and variable topography of the areas studied result in a wide range of vegetation types. In the steeper, high areas rainforest species predominate (Beatrice prospect); at the Henty fault zone and Howard's anomaly 'horizontal scrub' occurs together with rainforest trees (Plates 1, 2, and 4) and at Lake Selina buttongrass predominates in the swampy areas and over fluvioglacial moraine with eucalypt forest over the acid volcanic sequences to the west of the marsh (Plate 5).

## 9. METHODS

### 9.1 Sample collection

The soil and rock chip samples from the Beatrice prospect were collected by employees of the Mount Lyell Mining and Railway Co. Ltd. On lines 14N and 16N A<sub>1</sub> soils were sampled from immediately beneath the A<sub>0</sub> horizon usually at a

depth of 5 to 10 cm. B horizon samples were taken at a depth of 30 cm, except where the soil profile was too shallow when the sample was taken as deep as possible (never less than 20 cm). The rock chips are typical of the exposed mineralization but not representative of the rock units as a whole.

At Howard's anomaly soils were collected along a single line crossing a known geochemical anomaly. At each site samples were taken with hand auger from both the A<sub>1</sub> horizon and the upper part of the B horizon (generally at about 20 to 30 cm depth).

Three lines across the stratiform lens at the Henty fault zone followed grid lines cut through the horizontal scrub during a previous company survey. Again A<sub>1</sub> and B (or leached fluvioglacial overburden) samples were taken. A costean cutting the sulfide lens and the overlying fluvioglacial cover and soil (Plates 1 and 2) was also systematically sampled.

At Lake Selina soils along a single line crossing the known mineralization were sampled from both the A<sub>1</sub> and, where present, the B horizon. In addition sulfide-rich rock was grab-sampled from a costean dump (Plate 5).

## 9.2 Sample preparation

Soil samples were collected under wet weather conditions and arrived in the laboratory very moist. They were dried at room temperature for several days, lightly crushed, sieved, and the -180  $\mu\text{m}$  fraction stored in plastic vials. Rock samples were crushed to -180  $\mu\text{m}$  in an agate mortar.

## 9.3 Sample analysis

9.3.1 Mercury - The samples were analysed by a method modified from that described by Ryall (1979). The modified technique involves pyrolysis of the sample at a temperature sufficient to release the mercury. The evolved volatiles are then passed in an oxygen stream over a gold collector. In soil analysis, the oxygen stream is passed through a second furnace at 800°C to oxidize organic gases and smoke. The collector, which consists of gold-coated diatomaceous earth (SIROSORB, see Wilmshurst and Ryall, 1980), is then placed

in a slot heater at 350°C and the desorbed mercury carried in a constant-flow airstream through the optical cell of a flameless atomic absorption analyser (SIROMAN, for CSIRO Mercury Analyser).

An orientation survey determined the following optimum analytical conditions for soil and sulfide-rich samples:

	<u>Soil</u>	<u>Rock Samples</u>
Sample weight	50-100mg	100mg
Pyrolysis time	3 min	3 min
Furnace temp - primary	450°C	750°C
Furnace temp - secondary	750°C	300°C
Buffer	K <sub>2</sub> CO <sub>3</sub>	CaO

In soil analyses, absorbance due to background was always less than 10% of total absorbance and generally less than 5%. The limit of detection for the method as described is 1 ppb and the precision in the range 10 to 2000 ppb is ±10%.

9.3.2 *Copper, lead, zinc, arsenic, silver and iron* - Samples were allowed to stand in HNO<sub>3</sub>(15M) at room temperature till reaction ceased and were then extracted with HCl (3M) at 70°C for 18 hrs. Determinations were by AAS. A hydride generation method, devised by Dr J.R. Wilmshurst, was used with a radiofrequency A.A.S. lamp for increased sensitivity and precision for arsenic.

The precision for all determinations is better than ±10% and detection limits are as follows:

Ag, 1 ppm; As, 0.5 ppm; Cu, 2 ppm; Pb, 10 ppm, Zn, 1 ppm and Fe, 2ppm.

## 10. RESULTS

### 10.1 Beatrice

#### 10.1.1 *Mercury contents of sulfides.*

Sphalerite concentrated from a vitric tuff at 1440N, 830W contained over 10ppm mercury. Rock samples containing disseminated sulfides (pyrite, sphalerite and galena) contain in the range 100 to 500 ppb mercury.

10.1.2 *Mercury contents of soils.* It is probable that the mean of the background values for mercury in the B horizon soils is < 50 ppb and for the A<sub>1</sub> soils between 50 and 100 ppb (Figs 2 and 3). However the lines do not extend sufficiently far from the area of mineralisation nor is there adequate data from within the zone sampled to allow a more accurate assessment.

On Line 14N a high contrast anomaly occurs in the B horizon just east of the known mineralization, decreasing gradually eastwards and sharply to the west (Figure 2). A more complex lower contrast anomaly occurs in the A<sub>1</sub> horizon. Lower intensity anomalies in both horizons are displaced relative to one another at the eastern end of the line over the hematitic lapilli vitric tuffs.

On line 16N (Figure 3) two discrete anomalies occur in the B horizon; one over the outcropping mineralization in the valley and one upslope to the east close to the contact of the vitric tuffs and the lapilli vitric tuffs. A broad anomaly peaking over the centre of the valley and decreasing gradually in magnitude upslope to the east occurs in the A<sub>1</sub> horizon.

10.1.3 *Copper, lead, zinc, arsenic and silver contents of soils.* The data show the expected differential dispersion of the several elements around the known mineralization and within this constraint all show a general coincidence with the major mercury anomaly. It is notable that copper exhibits only a weak anomaly in the B horizon. It is apparent also that geochemically significant concentrations of arsenic, copper, (mercury) and (?) lead occur elsewhere in the sequence giving rise, to the more easterly 'high's'. With the exception of copper the resolution and contrast of the anomalies is high in the B horizon soils but tends to be 'smeared' in the A horizon data. Silver was nowhere detected.

## 10.2 Howard's anomaly

10.2.1 - *Mercury content of soils* - The mercury levels in the B horizon peak in a high contrast two station anomaly which reflects the underlying sulfides. However in the A horizon, the anomaly is broader and there is also a high value at the western extremity of the line which is not related to known underlying mineralisation.

10.2.2 *Copper, zinc, arsenic, and silver in soils* - The two soil horizons sampled show strong anomalies in lead and arsenic coincident with the B horizon mercury 'high'. The maxima in the A horizon are however of lower intensity and show a westerly displacement although this is less pronounced than in the case of mercury. Zinc and copper in the B horizon parallel the behaviour of lead arsenic and mercury although intensities and contrasts are lower. The data for the A horizon is less definitive. Silver was not detected.

### 10.3 Henty fault zone

10.3.1 *Mercury contents of sulfide-rich rocks* - Three sulfide-rich rocks from the pit dug across the stratiform sulfide lens contained the relatively low mercury contents of 220, 750 and 590 ppb.

10.3.2 *Mercury, copper, lead, zinc, silver, arsenic and iron in soil to bed-rock profiles* - Two soil to bed-rock profiles were examined, taken from over the sulfide lens, Plates 1 and 2. The limited degree of oxidation is evident in these illustrations.

In both profiles, (Figs 6 and 7) the levels of mercury are near the estimated background in the A horizon soil zones but are somewhat elevated lower in the profiles suggesting a contribution from the underlying sulfides. In profile '2' silver is present at a significant level close to the bedrock but it was not detected in profile '1'. The remaining elements are present at only low concentration through the profile but show maximal values in the lower part of the fluvio-glacial zone.

10.3.3 *Mercury in soils* - Along each of the lines sampled, mercury levels are significantly high in the A horizon soils, but with a generally sympathetic variation between the two horizons. Lines 48.5N and 48.9N (figs 6 and 7) show generally elevated mercury levels in both horizons, but without localised anomalies which could be related to the buried sulfides. On line 49.9N, the mercury level in A<sub>1</sub> soil over the position of the sulfides is distinctly anomalous although this feature is not reproduced in the B zone. A notable characteristic of each of the three lines is the occurrence of distinct mercury 'highs' which are not directly related to known mineralisation.

#### 10.3.4 *Copper, lead, zinc, silver, arsenic and iron in soils*

There are strong interelement correlations (Table 1) in the A<sub>1</sub> horizon soils, inclusive of mercury. However with the exception of the mercury - zinc pair the relationships in the B horizon are very subdued or cryptic. Along each of the lines, the B horizon has been strongly leached and only low concentrations of the trace elements are present.

On line 48.5 N (Figure 6) the buried sulfide lens is not indicated by the soil trace element contents. Anomalous copper, zinc and mercury in the A<sub>1</sub> horizon upslope from the lens cannot be directly related to hydromorphic or mechanical dispersion from the mineralization, although a low intensity copper anomaly in the B horizon occurs directly above it.

Line 48.9 N (Figure 7) ends directly over the buried sulfide lens and was not continued downslope due to surface contamination resulting from bulldozing. Copper and zinc levels in the B horizon are low and show no significant variation along the line. Lead and iron values in the B horizon are more variable with single point anomalies towards both ends of the line. A<sub>1</sub> horizon soils show much less variation in copper, lead, zinc and iron content than in mercury and no obvious association with the massive sulfide lens.

On line 49.1 N (Figure 8) the three zones of elevated A<sub>1</sub> horizon mercury contents (at either end of the line and near the centre of the line) show sympathetic variation in the copper, lead, zinc and iron contents. Except for a single lead value at 1470 ft E, the trace element contents of B horizon soil is everywhere low.

#### 10.4 Lake Selina

10.4.1 *Mercury contents of sulfide bearing rock* - The mercury contents of four pyritic rock samples were 50, 135, and 1925 ppb.

10.4.2 *Mercury content of soils* - A high contrast B horizon mercury anomaly occurs within the residual soils over the zone of outcrop of the sulfide-bearing felsic lavas. The mercury content of the A horizon soils is generally higher than that of the B horizon, but, while tending to reflect

the underlying sulfides, is marked by the marked mercury accumulation in the button-grass marsh.

## 11. DISCUSSION

### 11.1 Variation in trace element content through the fluvioglacial overburden profile

The results of profiles through the fluvioglacial overburden above the sulfide lens at the Henty fault zone do not evidence the formation of observable vapour-generated mercury haloes.

The sets of data for the two profiles show essentially similar behaviour for the several trace elements. It would seem that the soluble species generated during the oxidation of the sulfides remain in solution and are removed by aqueous flow through the permeable till. Only small proportions are retained within the profile presumably largely within iron oxides. However, the oxidation profile is very juvenile and this has meant that only limited quantities of the target and indicator elements have been released to the secondary environment.

### 11.2 Variation in trace element content through the soil profile

The problem of selecting the most useful soil horizon for geochemical sampling in western Tasmania has been addressed recently by Skey and Young (1980), Farrell and Orr (1980), Reid and Meares (1981) and Russell and van Moort (1981). Skey and Young (1980) show in a series of soil profiles over the Que River deposit (soils up to 60 cm thick) a gradual decrease in the copper, lead, zinc and iron contents from bedrock to the base of the A<sub>1</sub> horizon and a reversal of this trend in the A<sub>0</sub> and A<sub>1</sub> horizons. The zone of depletion beneath the A horizon, due to leaching by organic acids, is also noted by Farrell and Orr (1980) who conclude that at the Pinnacle prospect the A<sub>1</sub> horizon is the most satisfactory sampling medium for most base metals. Russell and van Moort (1981) show similar enrichment in the A horizon at the White Spur area although, in a "typical" soil profile base metal values increase progressively from bedrock to the base of the A horizon for all

elements except nickel in what must be classed as an atypical leaching profile.

The present study, together with case histories of other western Tasmanian base metal deposits, indicates that although mercury is enriched in the A<sub>1</sub> horizon, greater contrast anomalies are achieved by deeper soil sampling. This arises from the overall high background levels of mercury which occur in 'A' horizon soils. For example, at Que River, A<sub>1</sub> soils over acid volcanics devoid of sulfides contain between 80 and 280 ppb mercury (Carr and Ryall, 1980), at Chester, and Pinnacles background A<sub>1</sub> mercury levels vary from 50 to 250 ppb (Carr et al., 1981) and five samples of organic-rich soils (acid peat) from the Tasmanian Central Plateau overlying massive Jurassic dolerites range from 70 to 160 ppb mercury, indicating that the high background is not restricted to provinces containing known zinc-copper-lead mineralization. In contrast, background thresholds in low-organic soils associated with sulfide deposits in dryer terrains, rarely exceed 50 ppb.

This picture of enhanced mercury anomaly contrasts in the B and C horizons is also apparent for lead at Beatrice and copper, lead, zinc and arsenic at Howard's anomaly. The contrast in arsenic and zinc values (peak-to-background) in A<sub>1</sub> and B horizon soils at Beatrice is essentially the same, although the A<sub>1</sub> horizon data tends to be less variable. At Beatrice the A<sub>1</sub> horizon is apparently a better sampling medium than the B horizon only for copper.

### 11.3 Distribution of mercury and other trace metals along traverse lines

At Beatrice, the presence of outcropping sulfide-bearing acid volcanics is indicated by the high lead, mercury, zinc, arsenic and to a lesser extent the copper soil contents. The extension of the anomalies upslope from the main mineralization probably indicates the presence of disseminated sulfides in the underlying vitric tuffs. Similar distributions of the elements along the line from the highly mobile zinc to the relatively immobile arsenic is a result of the shallow weathering profile and the active, near surface oxidation of sulfides.

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At Howards anomaly, also, the presence of mineralization is indicated by the lead, arsenic, mercury, zinc and copper soil geochemistry. The distribution of each of these elements along the line is similar, again indicating the lack of differential dispersion in this juvenile weathering environment.

The three lines at the Henty fault zone fail to give a clear geochemical indication of the buried sulfide lens. The theory that vapour generated mercury haloes might exist in such a wet environment has already been shown to be invalid in relation to profiles through the fluvio-glacial sediments and except for an  $A_1$  horizon mercury anomaly above the sulfides on line 49.1 (Figure 8) no possible direct indication of vapour-generated haloes exist in the soils. Along line 49.1 N, the higher  $A_1$  soil mercury is coincident with higher zinc and copper which strongly suggests a mechanism of enrichment other than vapour transport.

Reid and Meares (1981, p. 363 Figure 11) presented the results of an  $A_1$  horizon geochemical survey at the Henty fault zone which showed copper, lead and zinc anomalies downslope from the projected outcrop of the sulfide lens. These anomalies are probably represented in the present study by the high levels of mercury, copper, lead, zinc and iron in the  $A_1$  horizon at 1300 ft E, line 49.1 N. Such anomalies could possibly occur in the A horizon and not the B horizon or underlying near-surface glacials, as a result of the vegetation root systems drawing on metal-charged waters draining from the oxidising sulfides upslope. This explanation could also apply to the mercury, zinc and copper anomalies at 1420 ft E.

The apparent usefulness of the  $A_1$  horizon at the Henty fault zone, is however, thrown into doubt by the unexplained anomalies that exist upslope from the known mineralization on all three lines.

At Lake Selina, mercury in the B horizon delineates the sulfide-rich rocks. The very high background in the  $A_1$  horizon shows it to be an unsuitable sampling medium.

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12. CONCLUSIONS

1. The organic-rich A horizon soils of western Tasmania contain high background levels of mercury which result in diminished contrast between background and anomaly.
2. In terrains of moderate-to-steep relief the A<sub>1</sub> and B or C horizons are acceptable sampling media for mercury although the less organic-rich (B/C) horizons generally give better contrast between anomaly and background. In low relief button grass areas the A<sub>1</sub> horizon is not an acceptable sampling media for mercury.
3. Over the buried sulfide-rich rocks at the Henty Fault zone no anomalies attributable to the movement of mercury as a vapour are present. A proportion of the mercury released from the weathering of sulfides is fixed within the permeable till matrix, and the rest is transported away in solution together with other trace metals.
4. Mercury as a pathfinder element has no distinct indicative advantage over the target elements in exploration for sulfide mineralization in this wet terrain. However, in the present case histories as well as in others from the western Tasmania region, it commonly exhibits anomaly contrasts as good as or better than the target elements.

13. ACKNOWLEDGEMENTS

We are grateful to the Mount Lyell Mining and Railway Company Ltd for allowing us to carry out the studies of these prospects. A number of their staff were of assistance, but we particularly thank Andy Walter for field guidance in wet and miserable conditions.

Miss Lydia Dogger showed great devotion to duty in carrying out the often tedious chemical analyses.

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TABLE 1 Correlation coefficient matrices between copper, iron, lead, zinc and mercury in A<sub>1</sub> horizon soils and B horizon soils (underlined) from the Henty fault zone (n = 37; r = 0.38 represents the lowest significant correlation at the 99% confidence level).

	Cu	Fe	Pb	Zn	Hg
Cu	1.00 <u>1.00</u>				
Fe	0.45 <u>0.43</u>	1.00 <u>1.00</u>			
Pb	0.54 <u>0.52</u>	0.39 <u>0.25</u>	1.00 <u>1.00</u>		
Zn	0.76 <u>0.81</u>	0.71 <u>0.54</u>	0.64 <u>0.57</u>	1.00 <u>1.00</u>	
Hg	0.58 <u>0.33</u>	0.68 <u>0.37</u>	0.58 <u>0.37</u>	0.81 <u>0.48</u>	1.00 <u>1.00</u>

5 cm

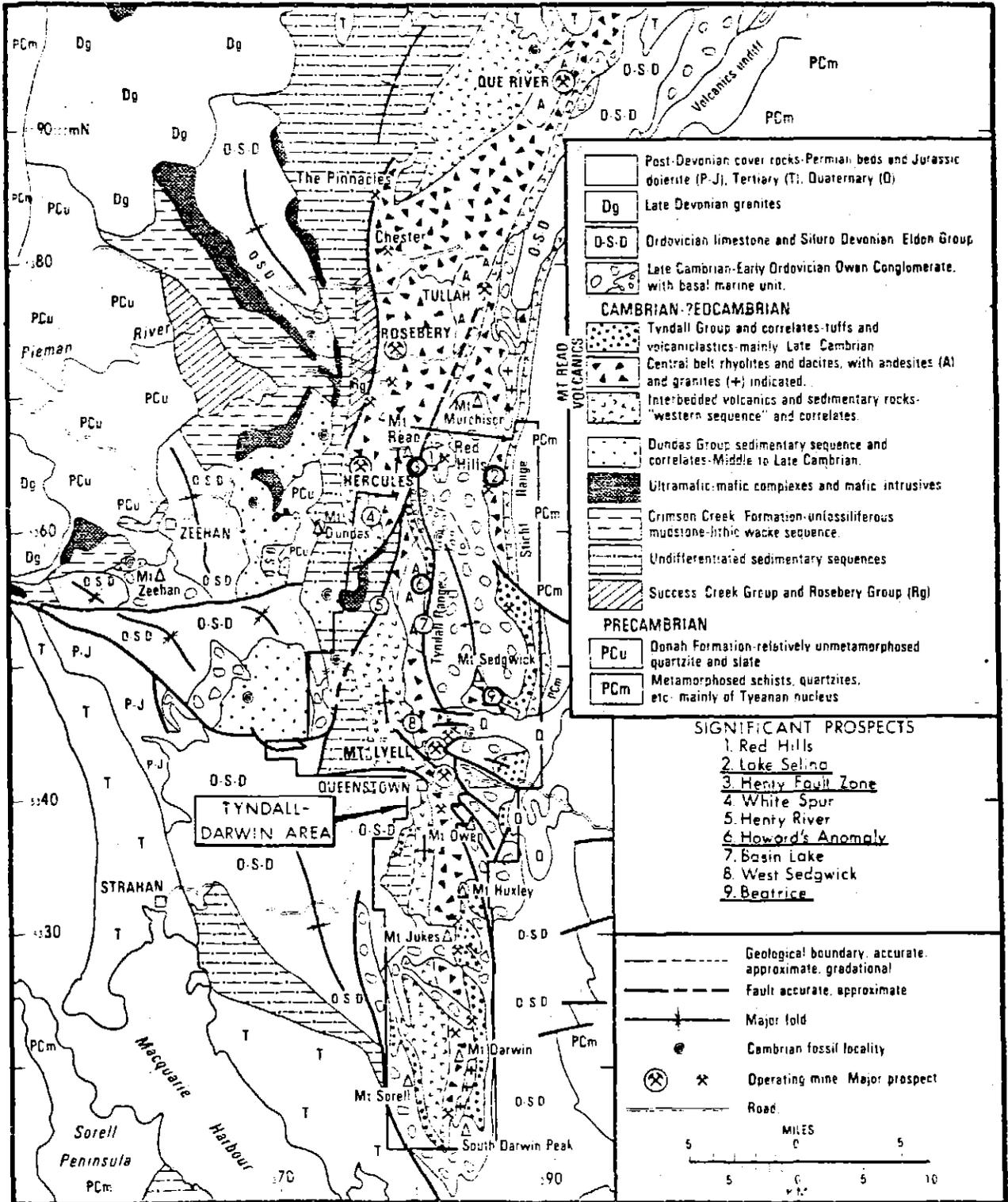


FIG. 1 Location of prospects described in this study in relation to the geology of the Tyndall-Darwin area, Western Tasmania. (after Read and Mearns, 1981).

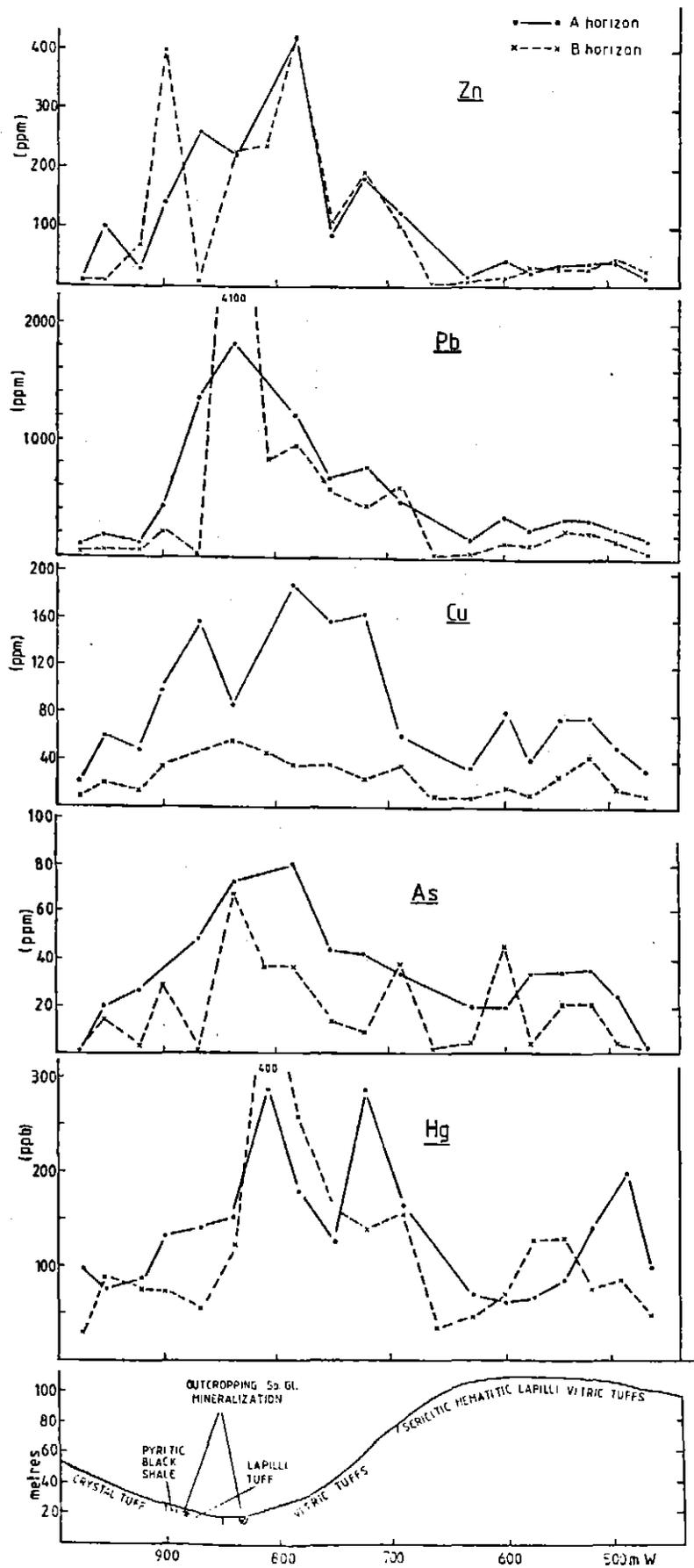


FIG. 2 Mercury, copper, lead, zinc and arsenic contents of A<sub>1</sub> and B horizon soils along Line 14N Beatrice, shown in relation to topography and geology

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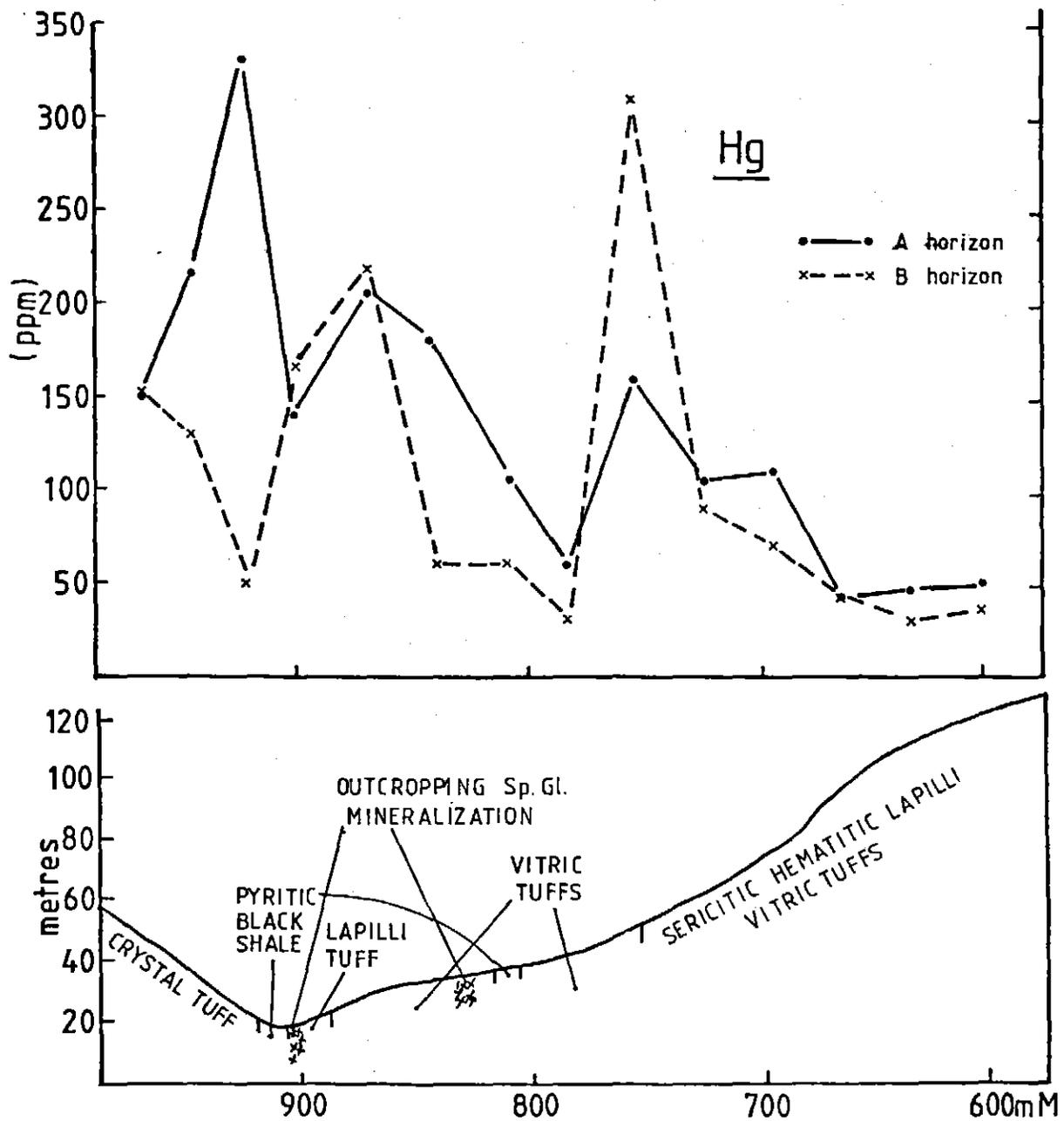
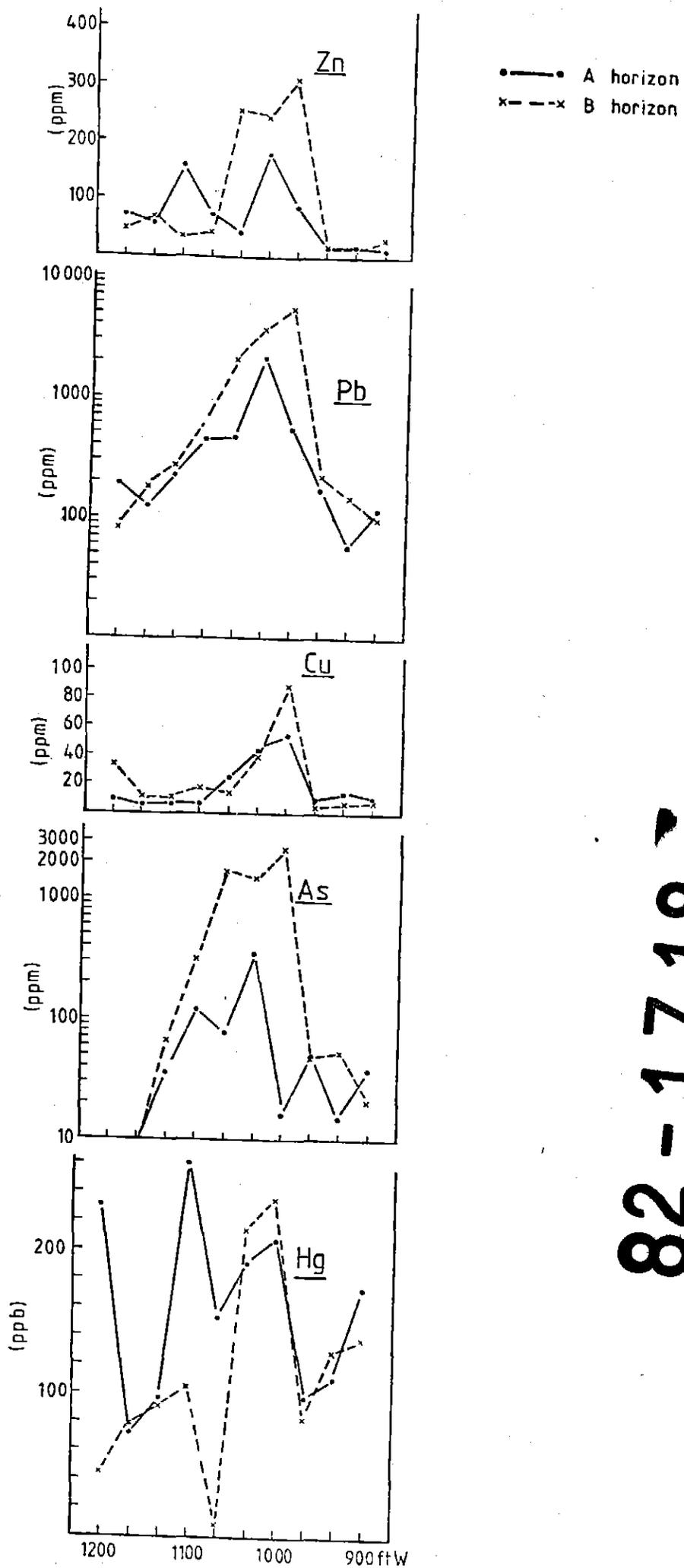


FIG. 3 Mercury contents of A<sub>1</sub> and B horizon soils along Line 16N Beatrice, in relation to topography and geology

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FIG. 4 Mercury, copper, lead, zinc, and arsenic contents of A<sub>1</sub> and B horizon soils along Line 20.2N, Howard's anomaly

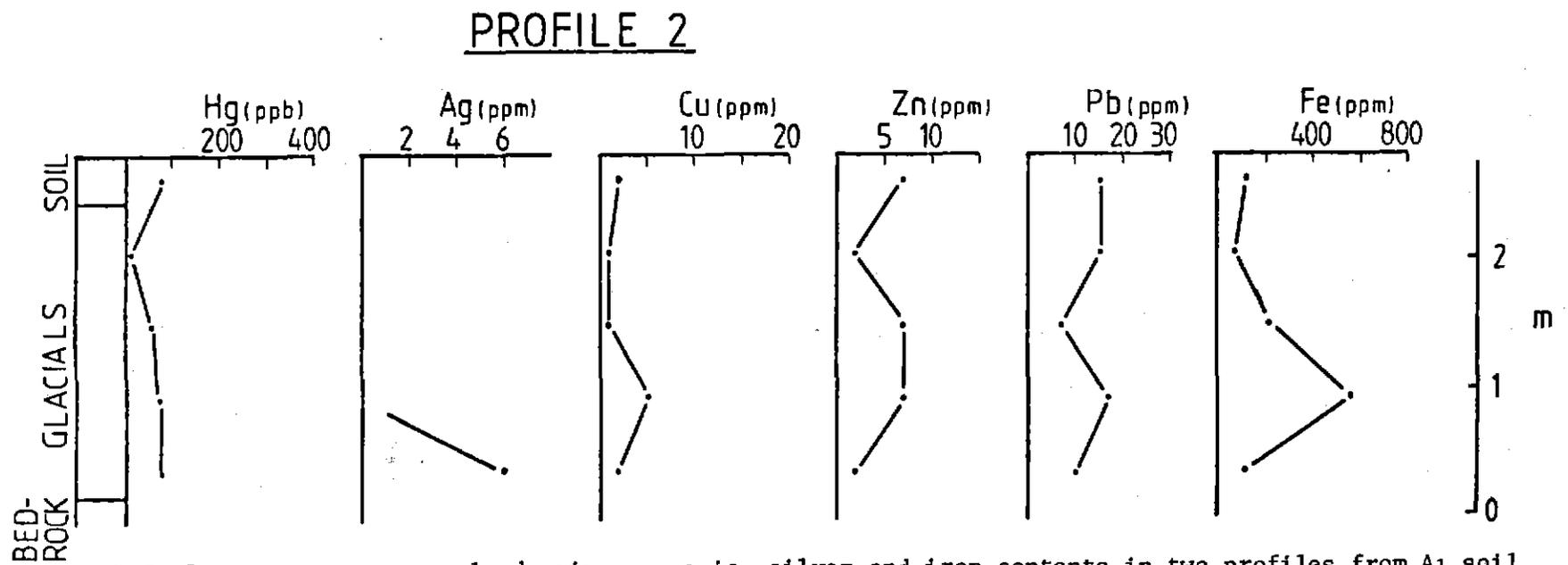
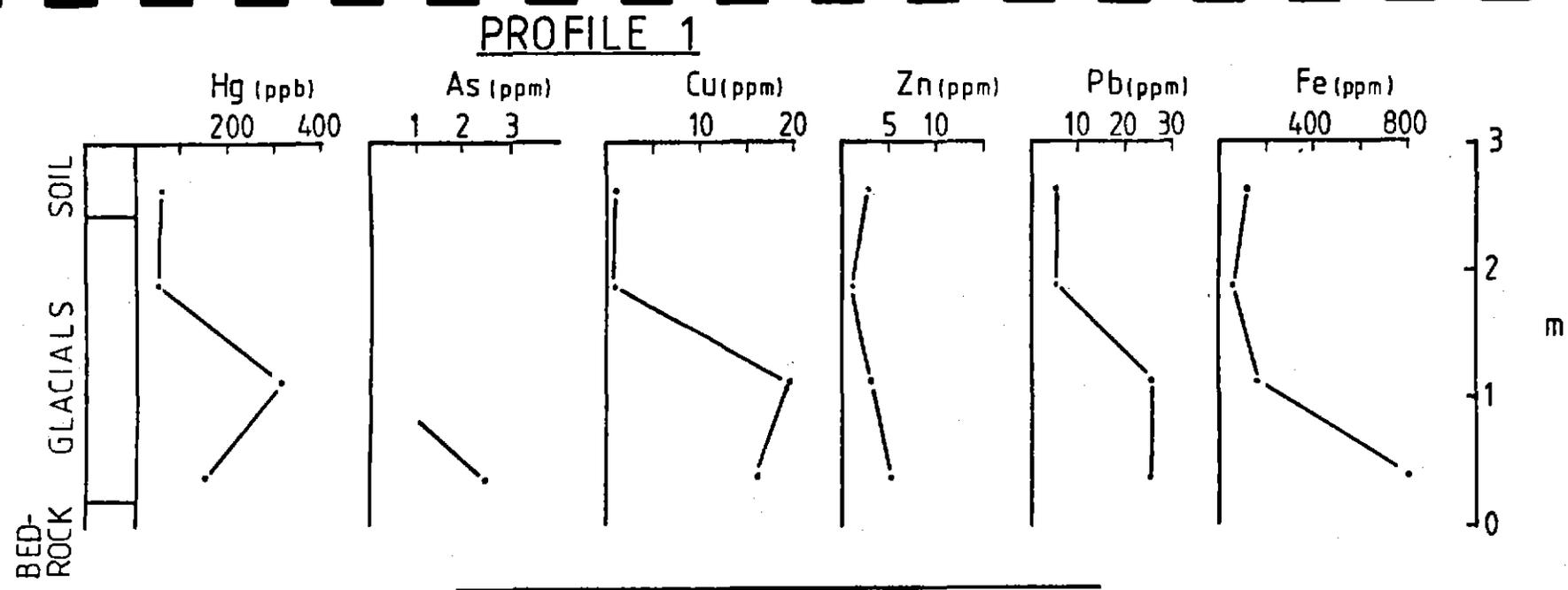


FIG. 5 Mercury, copper, lead, zinc, arsenic, silver and iron contents in two profiles from A<sub>1</sub> soil through to bedrock in a costean across the stratiform sulfide lens at the Henty fault zone. In profile 1 silver is below the detection limit and in profile 2 arsenic is below the detection limit

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LINE 48.5 N

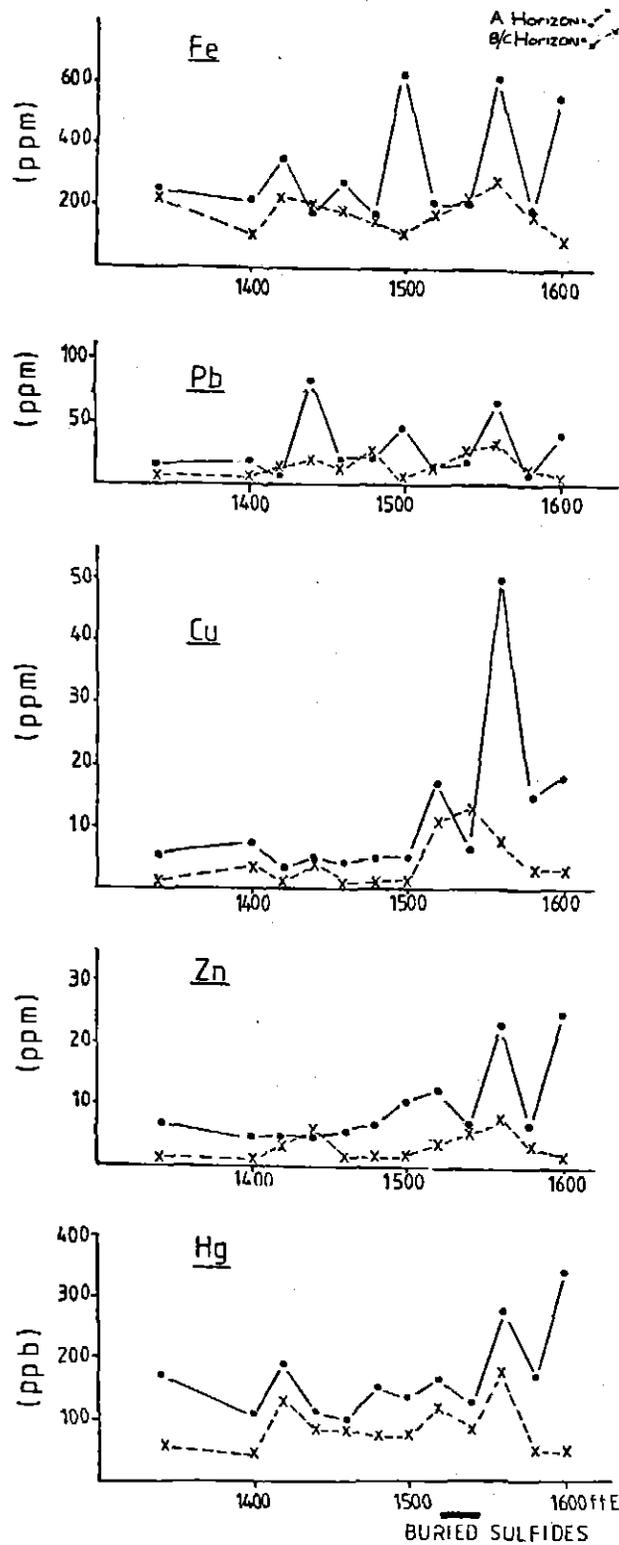


FIG. 6 Mercury, copper, lead, zinc and iron contents of A<sub>1</sub> and B horizon soils along Line 48.5N, Henty fault zone. The land surface slopes gently from east to west.

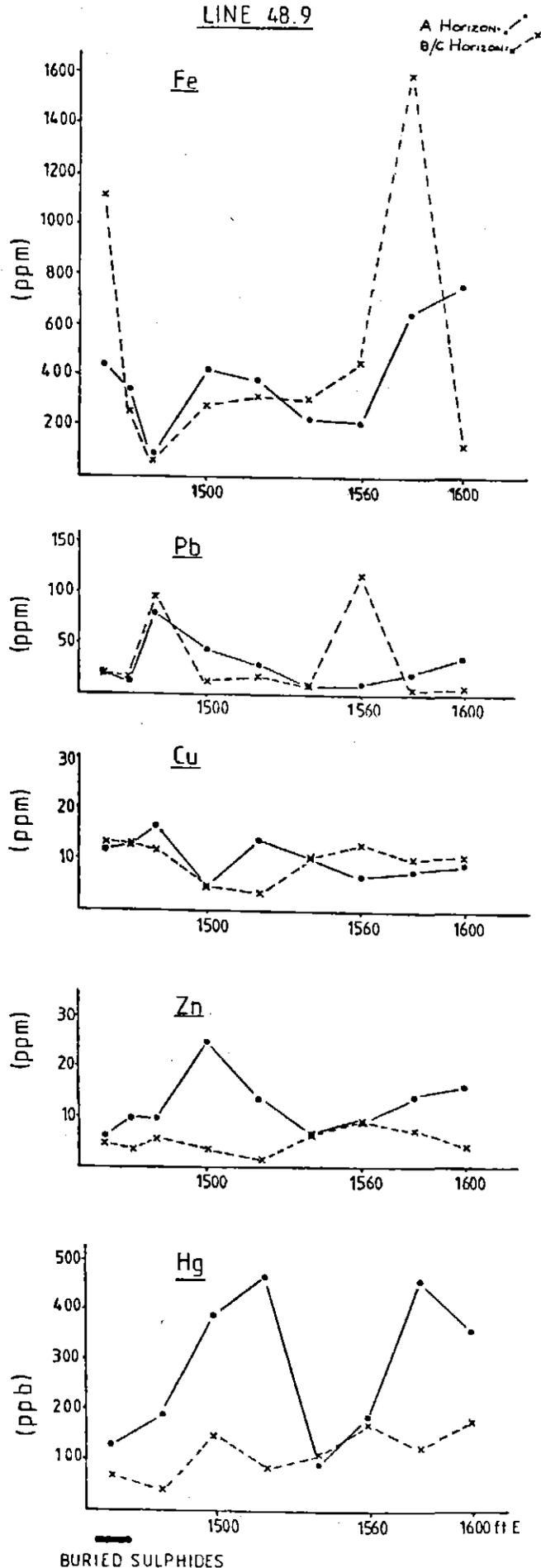
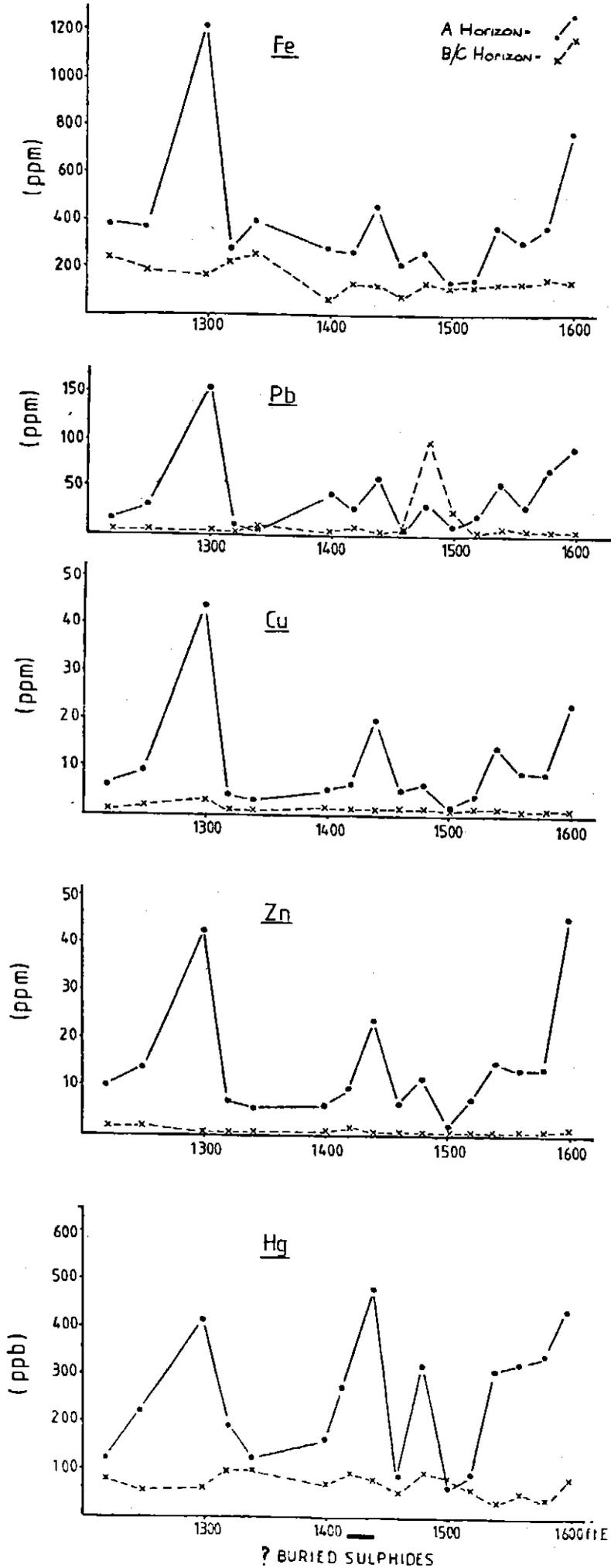


FIG. 7 Mercury, copper, lead, zinc and iron contents of A<sub>1</sub> and B horizon soils along Line 48.9N, Henty fault zone. The land surface slopes gently from east to west

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FIG. 8 Mercury, copper, lead, zinc and iron contents of A<sub>1</sub> and B horizon soils along Line 49.1N, Henty fault zone. The land

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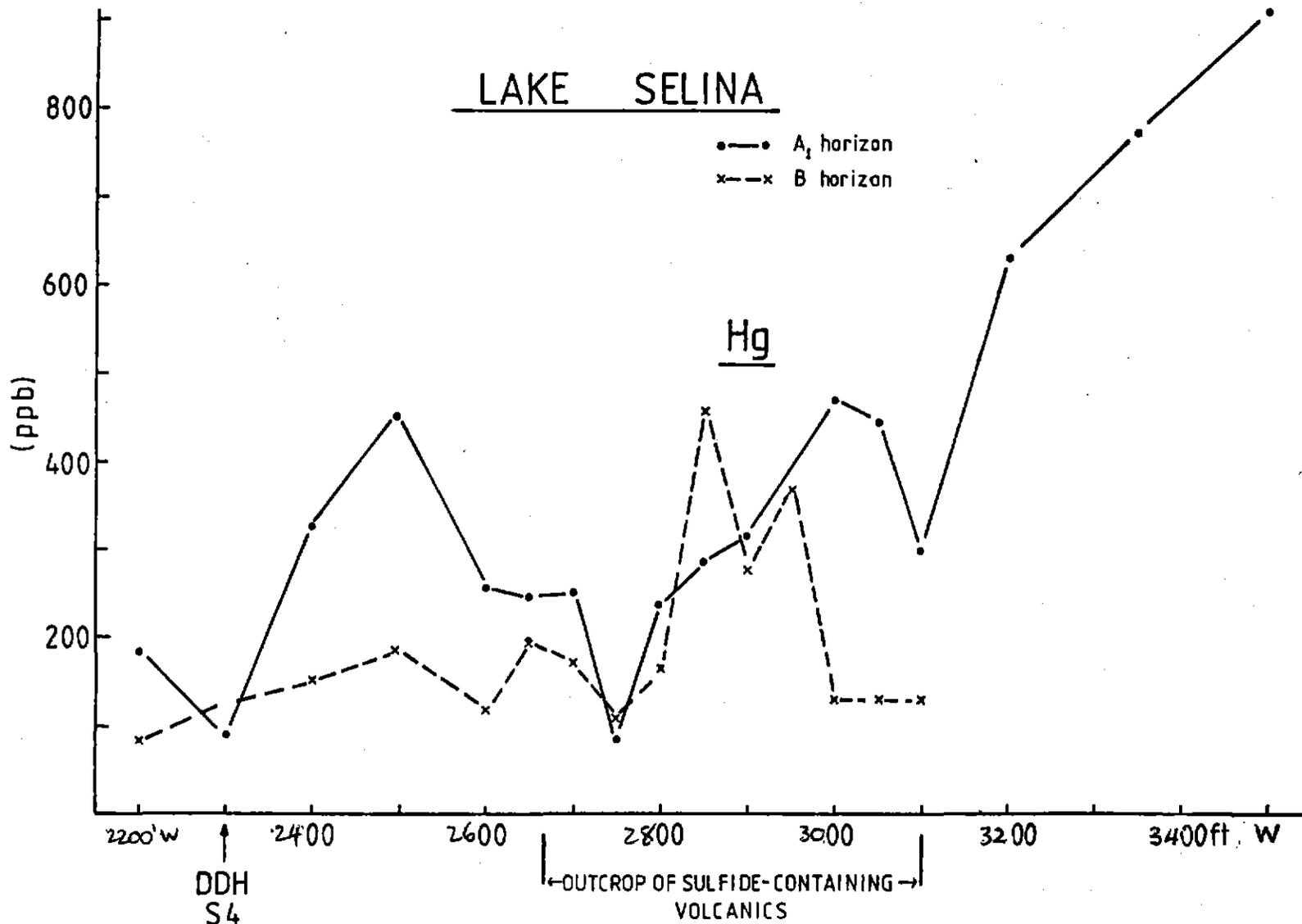


FIG. 9 Mercury contents of A<sub>1</sub> and B horizon soils along Line 120N, Lake Selina. Buttongrass extends westwards from about 2700 ft W, becoming a waterlogged bog from 3100 ft W. The ground slopes westwards from the eastern end of the line to the swamp at 3100 ft W

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Plate 1

Stratiform sulfide lens  
(black) within acid  
volcanic rocks exposed  
in a costean at the Henty  
fault zone

Plate 2

Closeup of sulfide lens  
at the Henty fault zone





Plate 3

Thick A<sub>1</sub> horizon of acid peat soil overlying fluvioglacial sediment near Lake Selina

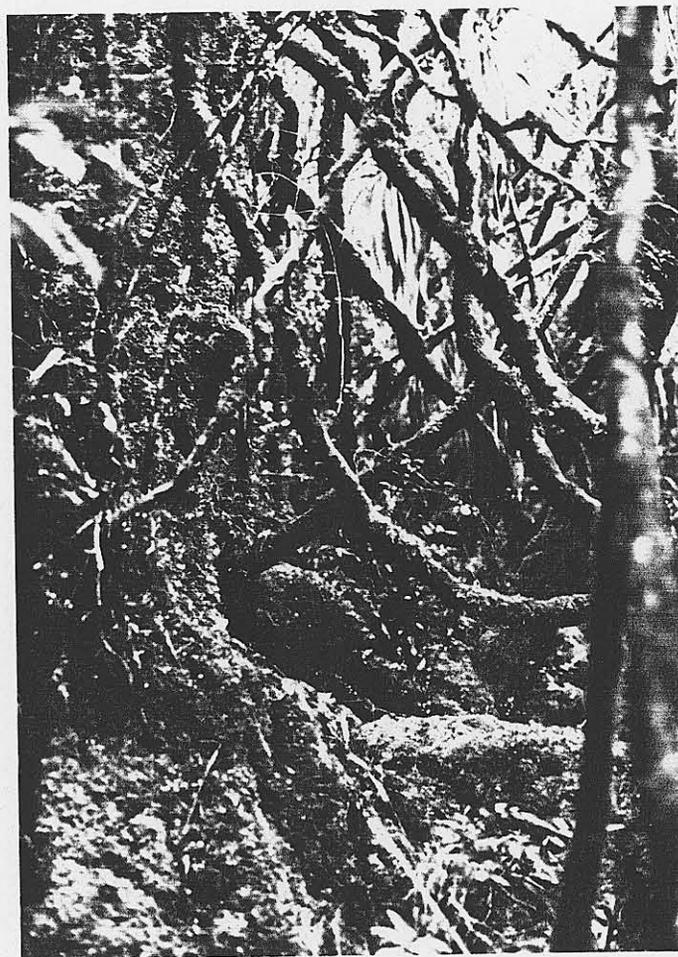


Plate 4 Horizontal scrub at Henty fault zone



Plate 5

Costean through acid volcanic rocks containing disseminated sulfides on the western side of Lake Selina. In this area eucalypt forest predominates and the soils are brown-to-peaty podzols.