COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RESTRICTED

Record No. 1970 / 102

Mount Blundell Mineral Deposit, A.C.T. - N.S.W.

by

E.K. Carter

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SUMMARY

At the request of the Department of the Interior an area of previously recorded base-metal mineralization about 5 kilometres north-east of Mount Coree, on the A.C.T. - N.S.W. border, was inspected. The area is the subject of an application for an Authority-to-Prospect and lies within the Cotter Reservoir catchment.

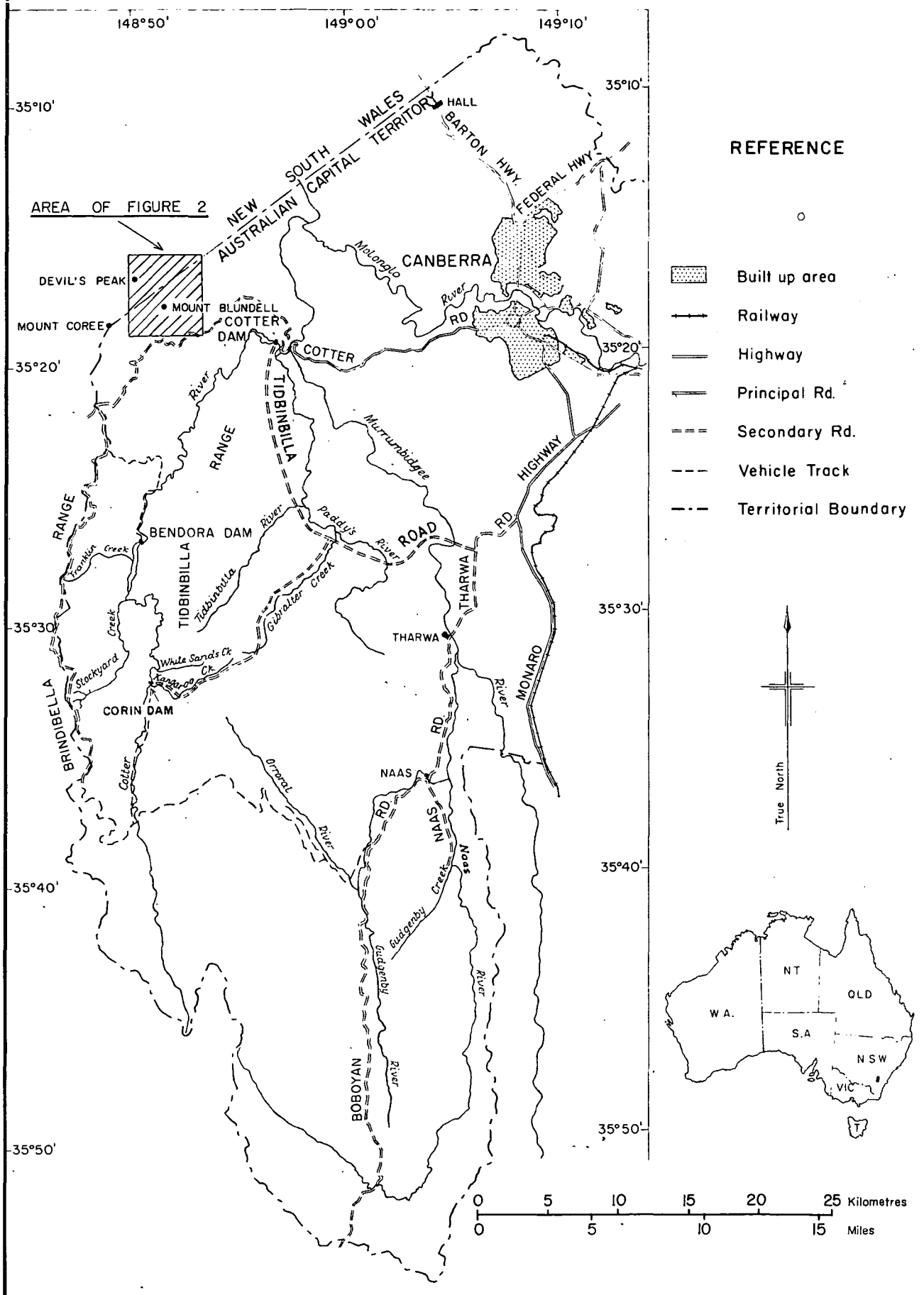
The area has extensive, but scattered, indications of mineralization but no ore-grade exposures were found. A geochemical survey by an exploration company in 1967 shows anomalous copper, lead and zinc values of an intensity and extent which would appear to warrant further exploration, but no indications can be given on the evidence available as to whether mineable grades and quantities of ore occur below the surface.

Tests of surface water show that the water leaving the area is not polluted or contaminated by the naturally occurring base-metal mineralization or the old workings associated with it.

FIGURE 1.

MOUNT BLUNDELL MINERAL PROSPECT

LOCALITY MAP



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MOUNT BLUNDELL MINERAL DEPOSIT, A.C.T.-N.S.W.

INTRODUCTION

Two applications have been made to the N.S.W. Department of Mines for Authority to Prospect for copper, lead and zinc, over an area of known base metal mineralization in the Mount Blundell-Devil's Peak area, about 5 kilometres* north-east of Mount Coree (Figure 1). The applications, covering a total of 160 hectares (400 acres), were made by Messrs N.G. Silk and J.T. Moorby, who believed the area to be in New South Wales.

The applications were referred to the Commonwealth Department of the Interior for comment, as the areas concerned were believed to lie, in part at least, within that part of the Cotter River catchment area, at the head of the Coree Creek catchment, that lies within N.S.W. and is under lease to the Commonwealth.** In fact, it has subsequently been found, by location on air photographs and by accurate tacheometric survey, that most (about 6/7ths) of the ground applied for lies in the A.C.T.

As the granting of an Authority to Prospect carries the implied agreement, on the part of the granting authority, to the exploitation of any mineral deposit found under the terms of the Authority to Prospect, the Department of the Interior (Land Co-ordination Branch) verbally sought the advice of the Bureau on the following aspects:

(a) Is there evidence of significant mineralization in the ground applied for?

(b) Could exploration of the area, and exploitation of any mineral deposit found, be carried out without contamination or pollution of the surface waters of the Cotter River water supply catchment area?

(c) If the answer to (b) is yes, what conditions should be attached to the Departmental concurrence in the granting of an Authority to Prospect?

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* For conversion of kilometres to miles and metres to feet, see Appendix.

** The northern part of the Coree Creek catchment is the only part of the Cotter River catchment which lies outside the A.C.T. It was leased from N.S.W. by the Commonwealth in 1927 to give the Commonwealth control over the whole catchment for the Cotter Reservoir.

((c) becomes, in respect of the area within the A.C.T., "What conditions should the Department impose in the granting of an Authority to Prospect, should one be applied for?").ø

Arising from the Department of the Interior's request, discussions, field inspections and one formal conference have been held. These have involved officers of the Departments of the Interior, and Works, and the Bureau. On 18 August, 1970, the Department of the Interior requested the Bureau, by letter, * to report on the results of its investigations and to advise on the feasibility of conducting further investigations to evaluate the mineralization in the area.

PREVIOUS WORK

The first published record of the mineralization in the area is Jaquet& (1897). The area was prospected and worked for gold and silver, but lead and zinc were recorded. Jaquet describes a "wide lode" 120 metres long on the western side of Mount Blundell, 76 metres below the summit. At its northern end the exposure is "a more or less spongy gossan, mainly composed of limonite, but also containing variable quantities of quartz, oxidized lead ores and in places a little gold". Farther south the gossan and lead ores give way to "compact white quartz with which is associated a little auriferous pyrites". About 36 metres west of the main lode there is a quartz lode containing galena, sphalerite and a little gold.

At the time of Jaquet's inspection a tunnel had been driven 43 metres into the hill beneath an outcrop of quartz and had just encountered the footwall of the quartz lode, which contained a little gold. The tunnel is described as 500 metres south of the camp. A second tunnel north of the camp had been started 33 metres below an outcrop of spongy gossan, and a large amount of trenching had been carried out at various places.

The N.S.W. Department of Mines Annual Report for 1897 records an expenditure of a further £600 ($1200) on development but gives no details.

The 1896 report gives a total of 18 assays of samples of gossan and quartz from both the surface and the tunnel (none collected by Jaquet). Results were very variable; the highest gold value was 10 dwt per ton; silver content was generally a few ounces or a few pennyweight but one assay yielded 118 oz. 15 dwt per ton and another 17 oz. per ton; one lead assay gave 13.4% lead and another is recorded as "lead present, less than 50%".

ø An A.C.T. ordinance specifically exempts the whole of the Cotter catchment within the A.C.T. from mining or prospecting, but contains provisions for the exemption to be waived, in respect of specific areas, by the Minister.

B.M.R. file number 1970/688.

Further mining is believed to have taken place probably in the 1920's, but no published reference to work done, or results obtained, has been found.

In 1967 an Authority to Prospect the area was sought from the Department of the Interior. It subsequently lapsed, but extensive exploratory work was carried out by Atlas Explorations (Australia) Pty Ltd. The exploratory work consisted of the laying out of a grid pattern of pegs to which geological mapping, geochemical sampling and a magnetometer survey were tied. Plans, at scale 1:1200, showing the results of the work, have been made available to the Department of the Interior and the Bureau by the present applicants for Authorities to Prospect. The geochemical samples were apparently of surface soil, and not sub-soil samples, as no evidence of augering was seen in the course of the present investigation. Figure 3 is a graphical presentation by the Bureau of the results obtained by the company.

The geochemical work shows anomalous copper, lead and zinc values over practically the whole area tested - a north-south strip nearly 800 metres long and 150 metres wide. Lead values exceeded 1000 parts per million discontinuously over a zone 530 metres long. A zone of low magnetic intensity lies along part of the western edge of the zone tested geochemically. The geological interpretation by the company or syndicate geologist accorded fairly closely with that of Jaquet but the main exposed gossans are generally interpreted as being associated with cross-fractures within the lode zone. The interpretation that the gossans are associated with cross-fractures is consistent with observations made in the course of Bureau observations in July, 1970.

CURRENT INVESTIGATIONS

The present investigations consisted of foot traverses across the area of recorded and suspected mineralization on four days. Most of the work was done by M.J. Jackson, the author and H.L. Davies also took part. Colour air-photographs, at approximate scale 1:22,000, were used as a map (see Figure 2). The purposes of the work were to:

1. Locate the area to which the applications for Authority to Prospect applied and determine its relation to the Cotter catchment and the Australian Capital Territory.

2. Make a preliminary appraisal of the surface indications of mineralization.

3. Collect samples of stream water to ascertain whether water draining naturally from the mineralized areas is contaminated by base metals.

Six water samples and thirteen rock samples (mainly obviously mineralized specimens) were collected and chemically determined (see Table 1).

RESULTS

Geology

The mineralized zones are in Lower Devonian acid volcanics- probably largely rhyolitic tuff but with some lavas and thin interbedded sediments. The Canberra 1:250,000 geological map sheet shows a major north-trending fault a short distance to the east which forms the boundary between the volcanics and Ordovician metasediments. The Ordovician metasediments also crop out south of the area, about 1.6 kilometres south of the A.C.T.-N.S.W. border. They may also occur between the mineralized area and Devil's Peak (as shown by hatching in Fig.2), where steeply west-dipping siltstone and sandstone crops out. A small granite mass - the Condor Granite - occurs about five kilometres south of Devil's Peak.

Mineralization

The notes on surface indications of mineralization given below record only observations by Bureau geologists; the work done was not sufficiently detailed or extensive to have necessarily located either limits of surface indications of mineralization or all exposures within the area traversed. For example, the southern (43 metres) adit referred to by Jaquet (1897) was not located.

The northernmost mineralization observed is gossanous material south of the bare rock mass west of the lease peg. Samples 1-6 were taken from the gossan and adjoining country rock (see Fig. 2). The gossan generally is a cellular limonite with some boxwork in places; an eastwest width of 33 metres was measured. The bare rock mass to the north appears to be devoid of mineralization, apart possibly from stringers and veinlets along joints and shears. The gossanous zone is strongly fractured, including prominent east-west joints or faults; possibly the mineralization is controlled by some roughly east-west structure, rather than being representative of a north-south lode. An adit (presumably No. 2 adit referred to in the N.S.W. Mines Department report for 1896) has been driven northwards from below and south of the exposed gossanous material. It was inaccessible but at least 10 metres of adit could be seen from the mouth. Spoil from the adit consists of acid volcanics, black slate and possibly a fine-grained intrusive igneous rock. It appears to be barren to weakly mineralized. Sample 7 is a specimen of the possible intrusive igneous rock.

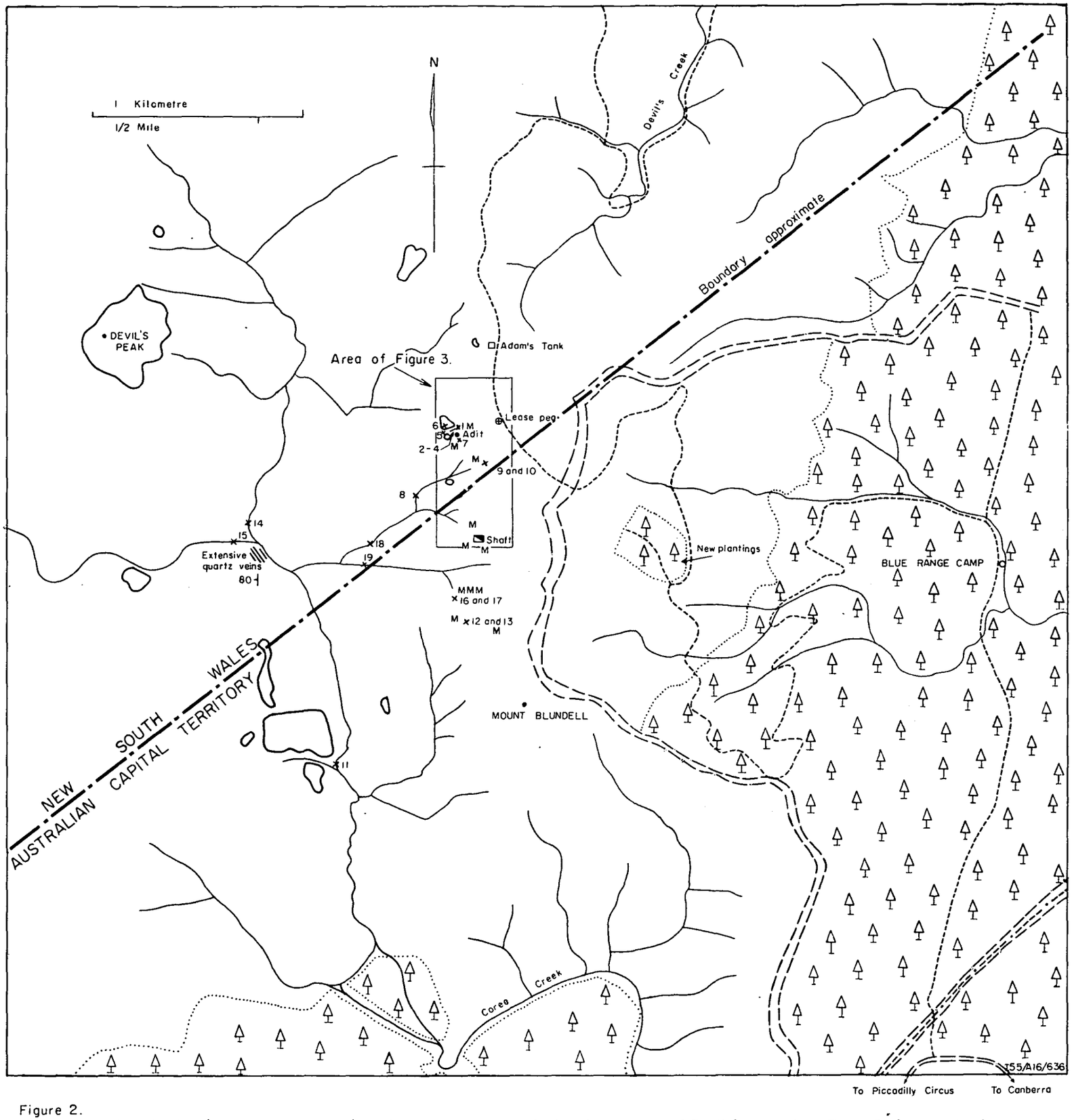

Figure 2.

Mineralization (lead–zinc and copper) in the Mount Blundell – Devil's Peak area A.C.T. – N.S.W. See Figure 3 for geochemical indications of mineralization, based on work by Atlas Explorations (Australia) Pty. Ltd.

Note:
Drawing traced directly from Aerial Photograph.
Scale is not corrected for radial distortion.

80 ⟍	Bedding, dip	M	Observed mineralization (generally gossan, some quartz and base metal minerals.)
---------	Vehicular track		Pine forest
	Expanse of bare rock	═══	Wide, cleared firebreak
×8	Sample location	-·-·-·-	High voltage power transmission line

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A further gossanous zone, with minor workings, was recorded south-east of the adit, across a shallow gully from the adit and along the northern side of a ridge. There is a quartz vein at its western margin. The east-west length is approximately 36 metres. Sample 9 is from the eastern edge of the gossanous zone and sample 10 from downslope, north of the main gossan.

Approximately 330 metres south of the ridge referred to in the preceding paragraph a shaft has been sunk in a gossanous mineralized zone. Standing water in the shaft was at a depth of about 20 feet.

Further mineralization, consisting of several gossan zones about one metre wide, were noted about 240 metres south of the shaft. The gossan zones strike north and north-west.

Farther south again, at the locality indicated by samples 12 and 13 (Fig. 2), minor workings were found on a narrow zone of mineralization. Sample 12 was taken from the north wall of a small pit in a hard siliceous rock showing staining by oxidation products of metallic sulphides. A similar occurrence, with minor workings, was found farther east, a short distance from the firebreak. Extensive quartz "float" was found in the general area.

A traverse south-west from Mount Blundell to a point a couple of hundred metres south of water sample 11 revealed barren volcanics, siltstone and shale; however extensive quartz "float", derived from a nearby source, was found on the flank of Mount Blundell.

The copper, lead, zinc, cobalt and nickel contents of the rock samples collected were determined by Bureau chemists, under the direction of A.D. Haldane. The results are given in Table 1. They confirm the existence of copper-lead-zinc mineralization, as all the samples tested, including specimens of country rock adjoining gossanous outcrops, contained anomalous amounts of one or more of the base metals copper, lead and zinc, and some contained crystals of base-metal minerals.

Figure 3 is a geochemical contour plan produced by the author. It is based on the plotted results of a geochemical survey carried out by Atlas Explorations (Australia) Pty Ltd.

Surface Water

The area is one of high relief. No permanent water courses run within the mineralized area, but a perennial stream (part of the Coree Creek system) drains south through the area covered by the applications for Authority to Prospect (based on the transposition of the plot shown on Application No. 22 to the correctly marked lease peg).

Most of the samples were taken within a few days of moderate falls of rain and snow, after an abnormally dry June and July.

Sample No. 8 was taken after a snowfall; it was collected from a small pool amongst ferns downslope from the northern part of the mineralized zone. The sample had an electrical conductivity akin to rainwater and may possibly represent an accumulation of snow-melt which had little contact with the ground.

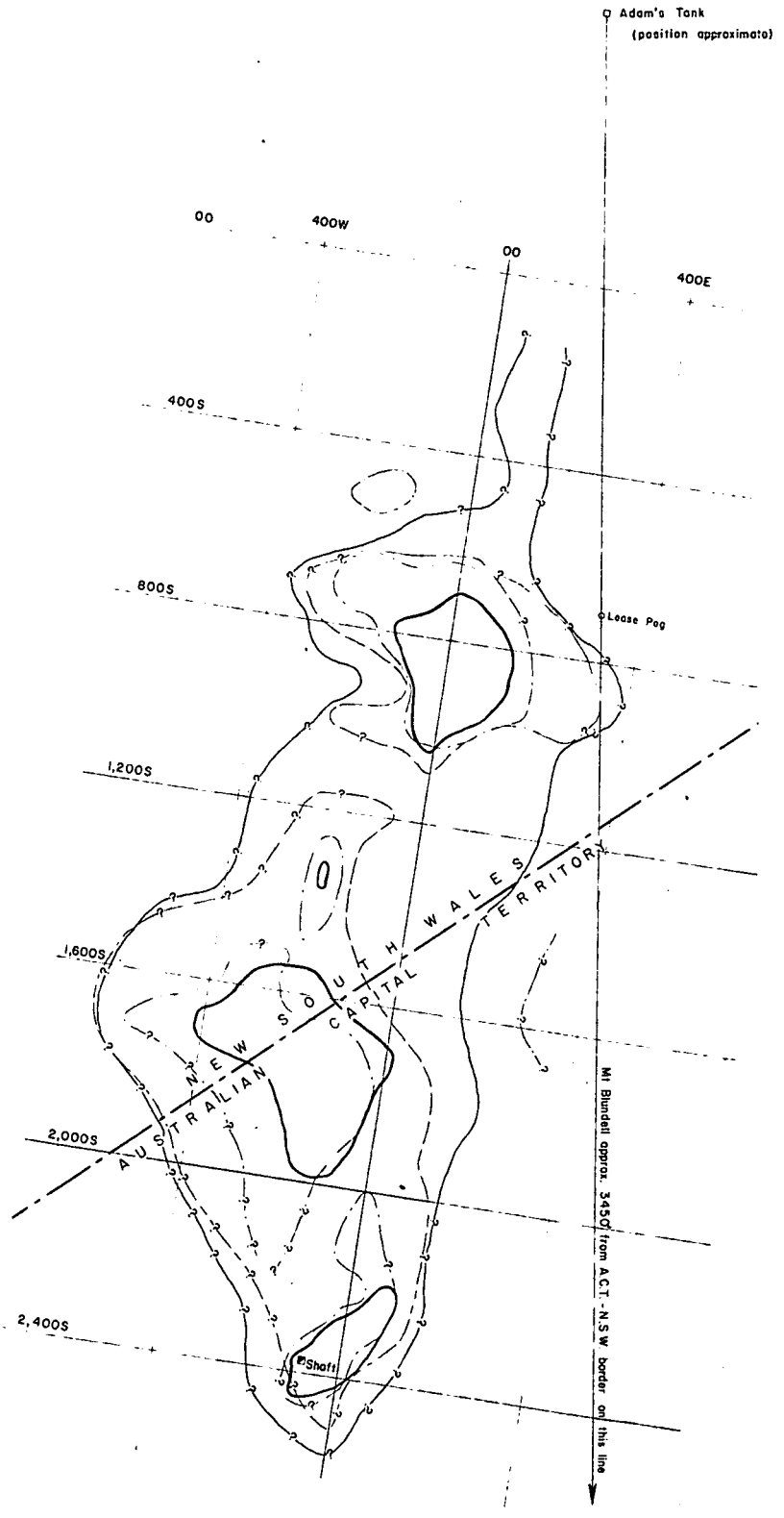
ASSESSMENT

The geochemical anomaly obtained by Atlas Explorations (Australia) Pty Ltd appears to be real (although methods of sampling and analysis have not been ascertained) and to be indicative of an area and intensity of mineralization that, from the prospecting viewpoint, would justify extensive additional exploration. The areal extent of the deposit at the surface is, of course, almost certainly considerably less than the area of geochemical anomaly and the mineralization is not necessarily continuous within the area of the anomaly. However, the limits of the anomalous copper, lead and zinc values in the soil have not been fully established in any direction except, perhaps, northwards.

Inconclusive geological evidence suggests that, although there is secondary mineralization, apparently derived from base metal sulphides and pyrite, over a north-south length of about 520 metres and a width in places of 36 metres, the highest grades may occur in shoots or lenses at various angles to the line of lode. No prediction can be made as to whether mineable grades and quantities of ore would be encountered below the surface by systematic exploration. If base-metal mineralization of economic grade extends continuously, or nearly so, over the north-south length of 520 metres, an important orebody is probably present. Although thin veins of weakly auriferous quartz apparently continue west and south-west of Mount Blundell, no surface evidence of base-metal mineralization was found in this area.

The significance of the zone of low magnetic values obtained by Atlas Explorations (Australia) Pty Ltd along part of the western side of the area tested geochemically is not apparent.

Figure 3



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Geochemical contours based on soil samples and chemical determinations by Atlas Explorations (Aust.) Pty. Ltd. September 1967

Scale

0 100 200 300 400 500 Feet

0 30 60 90 120 150 Metres

Reference

Geochemical Contours

- Lead 1000 p.p.m.
- Lead 100 p.p.m.
- Zinc 100 p.p.m.
- Copper 100 p.p.m.

Question marks indicate position of contour is uncertain, as it was not established by interpolation

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Although the water samples collected are probably not indicative of the highest concentrations of base metals to be found in water draining naturally from the area, the very low zinc contents obtained show that the waters entering and leaving the area covered by the applications for Authority to Prospect are not contaminated or polluted by naturally occurring minerals; that is, the following contents are not exceeded:

Lead	0.05 parts per million
Zinc	1.0 " " "
Copper	1.0 " " "

REFERENCE

Jaquet, J.B., 1897 - Report on Mount Blundell, Uriarra, Queanbeyan district. Ann. Rep. New South Wales Mines Dep. For. 1896, pp 139-141.

TABLE 1 : RESULTS OF CHEMICAL DETERMINATIONS OF SAMPLES (for locations see Figure 2)

Sample No. Field	Registered	Description	Copper	Lead	Zinc	Cobalt	Nickel
			(in parts per million)				
DP 1	70270046	Acid volcanics at eastern edge of ironstone gossan.	20	158	145	3	6
" 2	47	Speciment of gossan from 4.5 metres west of 1.	311	548	1,105	5	4
" 3	48	Selection of gossan over 20 metres from E. edge of gossan.	650	13,400	730	10	4
			check analysis (b) 678	13,500	680	15	13
" 4	49	Gossan (some boxwork) at western edge of gossan.	85	2,125	7,300	9	9
" 5	50	Grey volcanic rock 18 metres west of 4 .	13	30	455	8	13
" 6	51	Grey volcanic rock forming S. face of bold rock mass N. of gossan; specimen from NW of 5 has possible stringers of mineralized material.	28	20	485	10	11
" 7	52	Fine-grained igneous intrusive rock(?) from adit dump.	9	588	798	10	16

Table 1.

DP 8	-	(a) Water sample from pool amongst ferns (possibly snow-melt which has had little contact with ground). Gully drains mineralized area.			Nil		
" 9	53	Limonitic gossan with cellular and boxwork structure and some visible secondary lead minerals from near eastern edge of gossan.	(c) (check analysis (b)	179	17,300	935	4	4
				180	20,000	1,010	13	10
" 10	54	Limonitic gossan N. of (downslope from) gossan from which 9 collected.		109	1,875	820	10	4
" 11	-	(a) Water sample from running stream just above minor tributary watercourses.				Nil		
" 12	55	Gossanous hard siliceous rock from N. wall of pit, some boxwork.		293	875	34	6	15
" 13	56	Hard siliceous iron-stained rock from same workings as 12. Sulphide crystals present.	(check analysis (b)	28	140	55	0	13
			(	28	165	1,660(d)	13	23
" 14	-	(a) Water sample from creek draining area north of known mineralized area.				Nil		
" 15	-	(a) Water sample from creek draining E. from area west of know mineralized area.				Nil		
" 16	57	Cellular limonitic gossan.		2,825	3,000	1,620	10	0

Table 1.

DP 17	58	Ironstained country rock (acid volcanic?) with some cellular gossan.	1,175	625	105	4	8
" 18	-	(a) Water sample at foot of dry waterfall. Watercourse drains mineralized area.			< 0.1		
" 19	-	(a) Water sample from pool at foot of scree slope. Watercourse drains mineralized area.			< 0.1		

Notes (a) Water samples determined for zinc and electrical conductivity only. The conductivity results indicate that none of the samples were significantly mineralized.

(b) For check analyses the sample was dissolved more thoroughly than for the initial determination by using hydrochloric perchloric acid instead of hydrochloric acid; hence the generally higher results.

(c) After solution a white residue, which is believed to contain lead sulphate, remained. The lead content of the sample was probably, therefore, substantially greater than 2%.

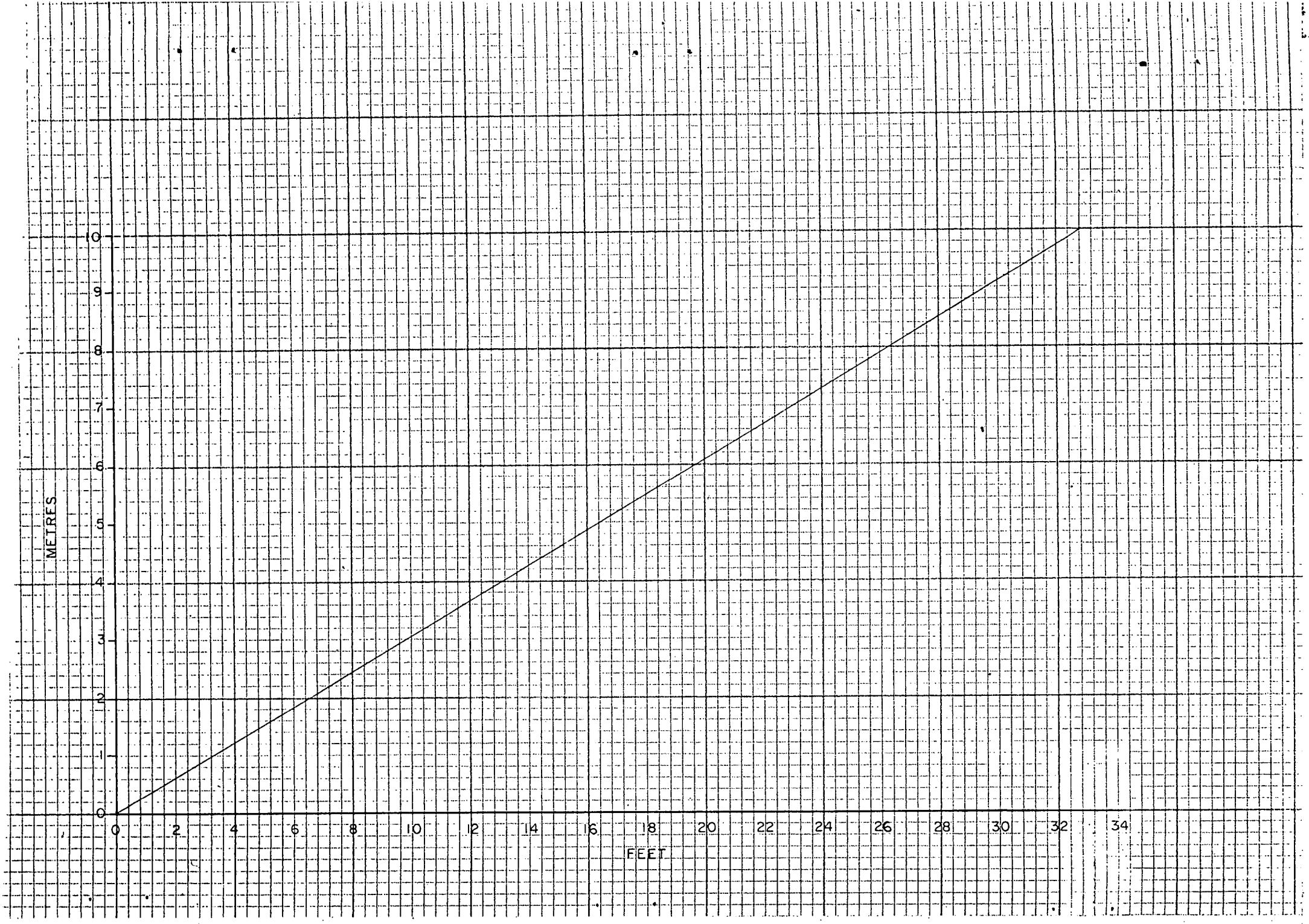
(d) After the initial determination pyrite was visible in the residues. In the subsequent test, using hydrochloric perchloric acid as solvent, the pyrite was dissolved. The larger increase in the result for zinc indicates that the zinc was probably contained in the pyrite crystals.

APPENDIX

Metric Conversion Graphs

1. Metres to feet

2. Kilometres to miles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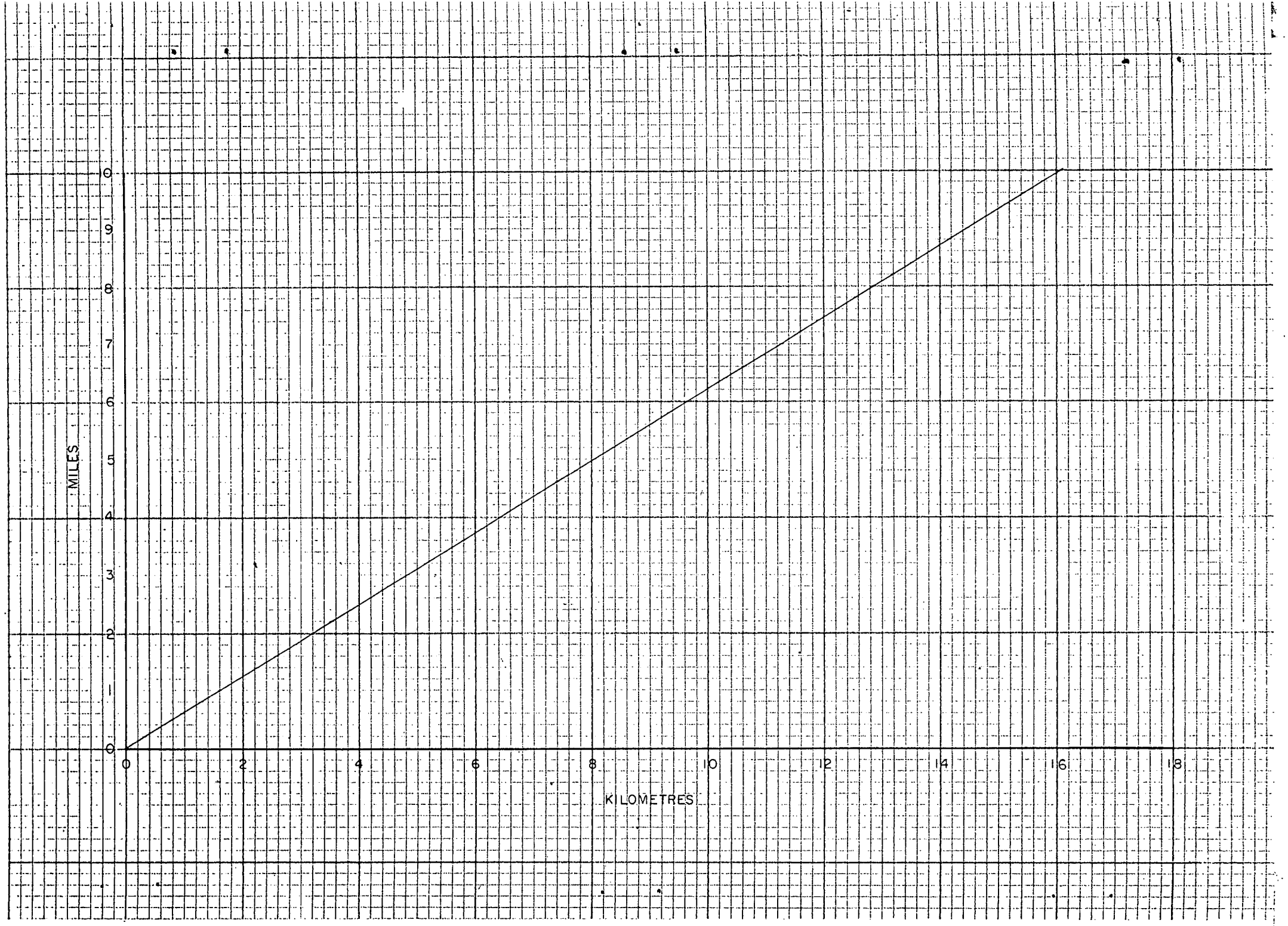
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