Rept. Bk. No. 59/56
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DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
METALLIC MINERALS SECTION

DIAMOND DRILLING AT THE PINNACLES MINE

Outside Counties, Pastoral Block No. 797 Pastoral Lease No. 1724
Pastoral Sheet No. 11 S. Mineral Section 183

by

L.G. Nixon
Senior Geologist

D.M. 541/46

1st September, 1964

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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CONTENTS

Map No.	Title	Scale
S. 3842	Pinnacles Mine Locality plan	1 mile = 1 in
S. 3827	Cross Section through Diamond Drill Hole Y.1 and P.2, The Pinnacles Yudnamutana Mining Field Outside Counties. Pastoral Block 797 Pastoral Sheet 11.S Mineral Section 183.	50 ft. = 1 inc

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DEPARTMENT OF MINES
SOUTH AUSTRALIA

DIAMOND DRILLING AT THE PINNACLES MINE

Outside Counties, Pastoral Block No. 797, Pastoral Lease No. 172

Pastoral Sheet No. 11.S Mineral Section 183

ABSTRACT

Diamond drilling at the Pinnacles Mine has failed to intersect significant copper mineralisation at depth, beneath the mine workings. Chalcopyrite, pyrite, magnetite and haematite are scattered along the entire length of the core. The highest values occur in relatively finer grained actinolites marbles near the surface, these averaged 0.22% Cu between 20 ft. - 40 ft. from the collar. Spectrographic analysis of the core for eight elements, shows metal distributions similar to copper, except at the bottom of the drill hole.

Garnet and allanite have been identified in thin section from diamond drill core, these minerals, which have not previously been recorded from the area, are of the hornblende-hornfels facies of contact metamorphism.

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INTRODUCTION

The date of discovery of the Pinnacles Mine is unknown. It was probably found at the same time as the Yudnamutana deposits which are reputed to have been discovered by a "Blackfellow" who referred to them as "Big one old man copper" (Austin 1863 ~~op. cit.~~).

The existing workings are similar to those mapped by Ward and Jack (1916 ~~op. cit.~~). Most of them appear to be of an exploratory nature, and very little mining for ore has been done. Ridgway (1948 ~~op. cit.~~) examined the mine in 1948 and classified it as a replacement type deposit which offered the best chances for moderate tonnages of low grade ore. Following Ridgway's report, Dickinson recommended diamond drilling to determine the nature of the mineralisation at depth. A diamond drill site was selected on the southern side of the outcropping lode, and drilling, which commenced on 2nd September 1954, was completed on 24th September 1954, at a depth of 303'6", no significant mineralisation was intersected.

In 1963 an exploration programme covering the area between the Daly and Yudnamutana mines was initiated. The Pinnacles mine was re-examined, the results of previous drilling re-evaluated, and a second hole was recommended to explore beneath the mine workings, and to test the grade of mineralisation across a favourable stratigraphic zone. Drilling commenced on 25th March, 1964 and was completed on 10th April, 1964 at a depth of 402'.

GEOLOGY

The regional geology of the area is outlined by Campana et al. on the Umberatana Sheet in the Geological Atlas, 1 mile series.

The oldest rocks in the region are sediments probably of older Pre-Cambrian age, intruded by granites of two ages and named the Younger Granite Suite and the Older Granite Suite by Campana (1958 ~~op. cit.~~). Unconformably overlying the oldest

sediments is a sequence of quartzites, actinolite marbles, schists and volcanics, named the Callanna beds by Thomson and Coats (op. cit. 1964), and units of the Burra Group defined by Mirams & Forbes (op. cit. 1964). These sediments belong to the Adelaide System. Unconformably overlying the Callanna beds and the Burra Group is a sequence of tillites, shales, silts and grits of the Yudnamutana Sub-Group in the Umberatana Group. This Sub-Group in turn, is unconformably overlain by conglomerates, arkosic lenses and black shales of the Umberatana Group.

The Pinnacles Mine is located in the Callanna beds in a sequence of fine, medium and coarse grained biotite-actinolite marbles, with interbedded medium grained hornfels. Mineralisation at the mine is mainly chalcopyrite, malachite and chrysocolla, associated with pyrite, magnetite and haematite derived from magnetite. The lode outcrops as a massive ferruginous siliceous capping. Mawson (op. cit. 1923) has recorded fine specimens of scheelite in association with copper ores at the smelters site which is approximately 660 yards to the north east of the Pinnacles.

The bedding strikes south of west and dips steeply towards the north. Ridgway's map shows many lodes of the replacement type occurring between sediments mapped as slates. It is probable that these slate like rocks are medium grained quartz-tremolite hornfels or feldspar-biotite-chlorite hornfels.

The mineral assemblage in the mine area is of the hornblende-hornfels facies of contact metamorphism. Garnet and allanite have been recognised in thin section from drill core from hole P.2.

The variety of garnet has not been identified, but it is thought to be of the ugrandite sub-group (Winchell op. cit. 1959), which is characteristic of contact metamorphic zones. Allanite is most characteristically found as an accessory mineral in deep seated igneous rocks, but it also occurs in limestones as a

contact metamorphic mineral. Neither of these minerals have been previously recorded from the area.

Nowhere in the area does granite intrude the Callanna beds, the nearest granite being approximately 2½ miles to the east of the mine. It is suggested that the contact metamorphic effect may be due to the presence of a subsurface granite cupola.

DIAMOND DRILLING

The first hole at the Pinnacles Mine, designated Y. 1, was constructed to test the lode at depth. It was orientated along a bearing of 356°, depressed at 45° and drilled to a depth of 303 ft. 6 ins. Core recovery averaged 91%. No significant mineralisation was intersected in this hole. A section of mineralised core between 191 ft. - 191 ft. 6 ins. which assayed 0.17% Cu, was logged as the downward extension of the lode worked at the surface.

In connection with the present investigations, a second hole designated P. 2, was recommended to test across a favourable zone, within the actinolite marbles, between two horizons mapped as slates by Ridgway. The hole was drilled along a bearing of 176°, depressed at 45° to a depth of 402ft. Core recovery averaged 99.7%. Copper mineralisation is disseminated along the whole length of the core as scattered crystals and bunches of sulphides chiefly chalcopyrite. Slightly higher concentrations occur in some thin quartz calcite veins which traverse the rock.

Pyrite is more abundant than the chalcopyrite and also occurs as scattered crystals or irregular bunches. Magnetite and associated haematite are much more abundant than the sulphides. They may be disseminated in the core as small crystals, in narrow veins, as irregular concentrations or as thin blades in coarse calcite.

Although the mineralisation is found along the whole length of the core, some zones are relatively richer than others,

and these are usually associated with the finer grained actinolite marble or the medium grained hornfels.

The highest copper values occur between 20ft.-40ft. from the collar averaging 0.22% Cu. Copper carbonates in this zone probably contributed to the higher values.

In view of Mawson's identification of scheelite at the smelters site, the entire core from hole P. 2 was examined under ultra-violet light. One small crystal, which fluoresced a blue white colour, is believed to be calcite. No scheelite was found.

About 100ft. to the south east of the drill site a coarse grained calcite vein cuts across the bedding at an oblique angle and dips steeply towards the north. A similar coarse quartz calcite vein was intersected by the diamond drill between 148ft. 4 ins. and 150ft. 8 ins.; this may be the downward extension of the vein worked on the surface. Mineralisation in the vein is insignificant although relatively higher values occur in its vicinity.

Intrusive coarse grained calcite veins are not rare, they occur at the Mt. Fitton talc deposits immediately north of No. 5 deposit, at No. 4 deposit and at Leslies claim, and are common near diapirs.

CONCLUSIONS

The presence of garnet and allanite indicate a contact metamorphic facies of hornblende-hornfels grade. Since the nearest granite is approximately 2½ miles to the south-east it is possible that a subsurface granite cupola produced the metamorphic effect.

Low grade copper sulphide mineralisation is widespread in the actinolite-biotite sequence in the Callanna Beds in the Willouran Series in this area. There is no marked increase in metal values in the zone between the medium grained hornfels horizons.

The higher grades of mineralisation are found in and near the finer grained rocks. Eight elements other than copper were analysed by spectrograph. These showed a general distribution similar to copper.

No useful copper mineralisation was intersected in the diamond drill hole and no further testing of this prospect is recommended.

L. G. NIXON
SENIOR GEOLOGIST
METALLIC MINERALS SECTION

LGN:AVR:AGK
28/8/64

APPENDIX A

PETROLOGICAL REPORTS

(Australian Mineral Development Laboratories)

Locality: Yudnamutana, Umberatana 1 mile sheet.

Material: Rock specimens (6)

P843/64: LN80/64: D2, 25 ft. 8 in.: TS13913

This is a medium-grained hornblende-microcline rock. Quartz and calcite are in minor amount and sericite, biotite and opaques occur sparsely. Sphene and tourmaline are accessory minerals. The coexistence of hornblende and microcline indicates that the rock is probably metamorphic and not igneous.

Hornblende, pleochroic from pale-green to blue-green, occurs as interlocking prismatic grains. Microcline is commonly anhedral and occurs interstitially to the hornblende. Some microcline is partially sericitised. Quartz, calcite, microcline and opaques occur in veins transgressing the rock. Opaques are also interstitial to the transparent minerals.

P844/64: LN81/64: D2, 108 ft. 10 in: TS13914: PS8155

This is a spotted garnet-quartz-biotite hornfels. The spots have been produced by porphyroblastic growth of garnet. The texture of the rock is quite hornfelsic and there is no lineation of micas or amphiboles. A rough banding is observable in the specimen and there is a transition from quartz-biotite hornfels with clots (incipient porphyroblasts?) of tremolite-actinolite to quartz-biotite hornfels with very ragged garnet porphyroblasts and then to a coarser-grained biotite-garnet-quartz-hornfels. Opaques scattered through the rock are magnetite, partially altered to hematite. Pyrite and tremolite-actinolite are major constituents of a transgressive vein.

P845/64: LN82/64: D2, 133 ft. 3 in: TS 13915

This is a porous aggregate of brecciated feldspars, quartz, chlorite, a carbonate mineral and an iron oxide, probably goethite. The feldspar is commonly untwinned and chemical staining proved it to be potash feldspar. The goethite has penetrated cavities in the rock and has formed a thin coating in them.

P846/64: LN83/64: D2, 151 ft: TS13916: PS8156

This is an aggregate of coarse-grained crystalline carbonate with interstitial chlorite laths and occasional pyrite and magnetite grains. The carbonate mineral was determined as dolomite by its refractive index. A positive X-ray identification is being made. The nature of the dolomite suggests that this aggregate is an openspace fracture filling.

Locality: Yudnamutana, Umberatana 1 mile sheet

Material: Rock specimens (6)

P847/64: LN 84/64: D2. 159 ft. 6 in: TS 13917: PS8156

This is a fine-grained quartz-tremolite hornfels. Green biotite, potash feldspar, chlorite and opaques are minor constituents. Accessories are allanite, apatite and carbonate. The texture is generally hornfelsic although there is a tendency for tremolite, potash feldspar and micas to occur together in rather decussate aggregates separate from the hornfelsic, quartz-rich aggregates.

Potash feldspar has optical properties which indicate that it is probably microcline. Opaques are common throughout and are mainly magnetite with some pyrite and chalcopyrite. Allanite is strongly coloured and pleochroic. A carbonate mineral and microcline occur with some chlorite in transgressive veins.

P848/64: LN85/64: D2. 272ft. 8 in. TS13918

This is a medium-grained potash feldspar-biotite-chlorite hornfels. Biotite and chlorite are irregularly distributed through the coarser, anhedral potash feldspar grains. Biotite is pleochroic from yellow-green to brown-green and chlorite is colourless or pale-green. Later, coarser-grained microcline, sodic plagioclase and chlorite are present in transgressive vein-like bodies. Sphene is a common accessory constituent.

Investigated by: D.E. AYRES

APPENDIX B & C

REPORT 86 to 105/64

Analyses by A.B. Timms and D. McPharlin

SPECTROGRAPHIC ANALYSES OF ROCK SAMPLES

Sample Mark	Depth	Lead Pb	Zinc Zn	Silver Ag	Cobalt Co	Nickel Ni	Molybdenum Mo	Chromium Cr	Vanadium V	CHEMICAL ANALYSES Copper Cu %
A1955/64	0 - 20	6	20	0.2	25	15	10	2000	80	0.046
A1956	20 - 40	8	20	0.3	30	20	30	2000	50	0.02
A1957	40 - 60	25	40	0.2	30	15	40	500	50	0.175
A1958	60 - 80	8	20	0.3	40	18	10	2000	20	0.115
A1959	80 -100	10	30	0.2	15	18	4	1000	30	0.016
A1960	100 -120	8	40	0.2	25	20	6	2500	60	0.014
A1961	120 -145	4	x 20	0.3	8	10	x 1	800	30	0.002
A1962	145 -165	3	x 20	0.2	12	10	2	500	5	0.027
A1963	165 -190	5	x 20	0.2	10	6	x 1	300	7	0.025
A1964	190 -210	5	20	0.1	10	6	x 1	100	7	0.002
A1965	210 -230	5	x 20	0.2	8	7	3	80	7	0.003
A1966	230 -250	6	x 20	0.1	7	6	10	50	8	0.005
A1967	250 -265	6	20	0.1	10	6	10	40	3	0.057

CHEMICAL ANALYSES

Sample Mark	Depth	Lead Pb	Zinc Zn	Silver Ag	Cobalt Co	Nickel Ni	Molybdenum Mo	Chromium Cr	Vanadium V	Copper Cu %
A1968/64	265 - 277	7	x 20	x 0.1	3	6	10	500	40	0.073
A1969	277 - 300	2	x 20	x 0.1	10	5	x 1	40	10	0.002
A1970	300 - 320	6	20	0.1	10	6	x 1	50	5	0.002
A1971	320 - 340	5	20	x 0.1	10	6	2	50	7	0.013
A1972	340 - 360	7	x 20	0.1	8	6	5	60	15	0.010
A1973	360 - 380	10	40	0.2	12	7	x 1	20	2	0.021
A1974	380 - 402	15	40	0.2	15	20	50	100	40	0.013

Gold-Au All samplesless than 3 ppm.
Bismuth-Bi All samples less than 1 ppm
Arsenic-As All samples less than 100 ppm
x indicates less than.

DEPARTMENT OF MINES, SOUTH AUSTRALIA

LOG OF DIAMOND DRILL HOLE NO. P/64

Project: Pinnacles Mine. Yudnamutana Mining Field. **D.M.:** 541/46

Sec.: - **Hd.:** Outside Hundreds **Co.:** Outside Counties **Hole Ser. No.:** 108/64

Collar Co-ords: **R.L.:** 1700' **Grid:**

Direction: 175° **Angle:** 46° **Depth:** 402' **Plan Ref.:** 490159

Date Hole Commenced: 25.3.64 **Completed:** 10.4.64 **Driller:** K.Kruze

Hole Logged by: L.G. Nixon **On:** 29.4.64 **Hirer:** Mines Dept.

OBJECT: To test for the Pinnacles lode at depth and to obtain core from the actinolite marble.

RESULT: No significant copper mineralisation was intersected in this hole.

Log Comprises: Geological Log
Core recovery

Depth From	Depth To	Geological Log
0'0"	8'8"	Predominantly a fine to medium grained green calc-silicate rock consisting mainly of actinolite and calcite with dolomite veins occupying conjugate fractures 1/32-1/14" thick. Irregular masses of pink and white quartz veins occur in this part of the core. Mineralisation in the form of copper carbonates, pyrite, magnetite and haematite are scattered along the core with concentrations in the irregular quartz veins.
8'8"	22'10"	Dark grey and green calc-silicate rock composed mainly of actinolite and quartz with abundant magnetite and scattered pyrite. Narrow conjugate fractures near 18' as in the previous section of core. Rare flecks of chalcopyrite.
22'10"	25'	Silicified, pitted weathered zone with an increase in copper carbonates. Chalcopyrite and pyrite are also found in this zone with magnetite and haematite.
25'	26'5"	Medium grained hornblende-microcline rock.
26'5"	27'	Silicified calc-silicate with chalcopyrite.
27'	30'	Grey-green medium grained calc-silicate rock with actinolite the main mineral. Chalcopyrite, pyrite and magnetite are scattered along the length of the core.
30'	31'8"	Silicified zone making an angle of 30° to the length of the core. A relatively heavier concentration of the ore minerals, pyrite and magnetite occur in the silicified zone.
31'8"	38'6"	Dark grey-green, fractured, actinolite rock with irregular quartz veins. Chalcopyrite, pyrite, magnetite and some haematite are scattered along the core.

Depth From	Depth To	Geological Log
38'6"	41'	More massive dark grey-green, fractured, actinolite, rock with fewer veins. Chalcopyrite, pyrite, and magnetite in core.
41'	45'	Paler grey-green, actinolite rock with chalcopyrite, pyrite and magnetite in core. Narrow vein of carbonate and irregular veins of quartz.
45'	63'6"	Paler green calc-silicate rock mainly actinolite. Abundant magnetite with scattered pyrite, chalcopyrite, and haematite. The core zone is spotted with clusters of a dark green actinolite? Both quartz and calcite veins traverse the core. The quartz veins tend to be more diffuse than the calcite. There is usually a concentration of the metal sulphides and oxides in the veins.
63'6"	65'4"	Silicified zone of fractured actinolite rock with scattered pyrite and chalcopyrite clusters in the core and concentrated along veins. Here the narrow carbonate veins intersect the silicified zones indicating a relatively younger age. Calcite veins make an angle of 38° to length of core.
65'4"	74'6"	Spotted, grey-green, actinolite rock with scattered pyrite, chalcopyrite, magnetite and haematite. The spots are pea sized near the top of this length of core and diminish with depth.
74'6"	78'6"	Silicified zone of fractured actinolite rock traversed by later calcite veins. Pyrite is much more abundant than the chalcopyrite. The mineralisation is generally less than normal for a siliceous zone.
78'6"	93'6"	Dark grey-green, actinolite, marble, traversed by quartz and calcite veins. At 85' both quartz and calcite occupy the same fracture. Magnetite and associated haematite and pyrite occur as large blobs or crystals scattered along the length of the core. The actinolite rock is comprised of dark and lighter shades of green.
93'6"	102'8"	Predominantly a dark actinolite rock composed of dark green and relatively paler green contorted beds? veins? and lenses. The lenses appear to be parallel to the core. The "veins" dip at 30° to the core axis and "Beds" 60° to the core axis. Fractures between 100'6" and 102' show gangue and slickensides on fracture surfaces. Scattered pyrite, magnetite and haematite.
102'8"	104'	Silicified zone of fractured actinolite. Pyrite more abundant near the lower portion of the core.
104'	117'	Garnet-quartz-biotite hornfels (see appendix A) Dark grey-green actinolite with diffuse and scattered siliceous lenses along the length of the core. In places zoning can be seen

Depth From	Depth To	Geological Log
104'	117'	around pale green kernels. Pyrite, magnetite and haematite in the core. Veins make an angle of 30° to core axis, beds? make an angle of 60° to core axis.
117'	117'4"	Weathered iron stained zone.
117'4"	118'	Pale green partly weathered actinolite rock.
118'	120'4"	Siliceous zone in actinolite rock, mainly quartz with scattered pyrite, magnetite and haematite.
120'4"	133'	Relatively coarser grained actinolite marble with some chalcopyrite, pyrite and magnetite. Calcite veins and layering makes an angle of 50° to thecoreaxis.
133'	135'8"	Relatively coarser segregations of the calcite- and mafic minerals. Magnetite is common. Dark and light minerals occur in layers which make an angle of 45° to the core axis. In thin section the rock is revealed as a porous aggregate of brecciated feldspar, quartz and chlorite and a carbonate mineral.
135'8"	139'	Abundant calcite in actinolite? marble. Blades of haematite are scattered in the calcite with a preferred angle of about 30° to the core axis.
139'	142'4"	Dark grey rock with mafic minerals and calcite.
142'4"	146'9"	Siliceous and calcic zone in actinolite marble. This zone shows silicification of the calcite segregations intruded by later calcic veins. Magnetite and pyrite are sparse. Blades of haematite are scattered along the core.
146'9"	148'4"	Coarse grained calcite and chlorite or actinolite? with pyrite and magnetite segregations
148'4"	150'8"	Coarse quartz-calcite vein. Calcite shows zoning. This may be the downward extension of the vein worked at the surface.
150'8"	154'3"	Coarse granular calcite and chlorite rock.
154'3"	162'8"	Relatively finer grained grey quartz-tremolite hornfels? Rough layering, elongation and parallelism of mafic minerals making an angle of 60° to the core axis. Sample LN 84/64 at 159'6". Chalcopyrite and pyrite and magnetite.
162'8"	163'8"	Calcite zone.
163'8"	249'	Coarse grained green and grey actinolite and biotite marble with scattered laths of haematite, pyrite and rare chalcopyrite. Narrow zones of silicification occur at 168' and 170'6". At 190' layering of dark and

Depth From	Depth To	Geological Log
163'8"	249'	light zones and crystal elongation makes an angle of 60° to the core axis. Silicified zone 12" thick at 193'2". From 174' downwards the sulphides and oxides of the metals are very rare. At 213'3" siliceous zone strongly magnetic and containing pyrite and magnetite occurs. Layers of biotite at 229' make an angle of 60° to the core axis. Similar layers occur at 239' and make the same angle to the core axis. Away from these zones the core is coarsely granular and massive.
249'	260'2½"	Massive coarsely granular biotite-actinolite-calcite marble with increased magnetite and pyrite content.
260'2½"	265'4"	Very coarse actinolite crystals up to ¾" and frequently curved in actinolite - calcite marble. Magnetite, pyrite and chalcopyrite evident in the core. Actinolite content increase from 261' - 265'4".
265'4"	269'	Quartz-calcite lode carrying coarse crystals of magnetite. Octohedrons, laths of haematite, scattered pyrite and chalcopyrite. This may be the lode worked at the surface.
269'	277'6"	Silicified, dense, medium grained downward extension of the potash feldspar-biotite-chlorite hornfels, talcose in places. Beds make an angle of 55° to the core axis.
277'6"	353'3"	Coarse granular actinolite - biotite - calcite marble. Pyrite and magnetite are scattered along the length of the core. Between 329'8" - 330'4", and 332'8"- 333'4". fine grained beds of siltstone make an angle of 60° to core axis. Pyrite appears to increase with depth beneath 332'.
353'3"	367'	Coarse grained actinolite-biotite-calcite marble the rock is very much darker and the quantity of mafic minerals has increased appreciably, as also has the magnetite and iron sulphide. At 365'4" silicified zone of medium/grained dense hornfels occurs.
367'	398'	Generally a mafic rock of actinolite, biotite, some calcite with a noticeable increase in pyrite and magnetite. Some rare chalcopyrite clusters. The rock is slightly finer grained than the previous section of core. From 390'6" to 398' calcite veins intersect the core making an angle of 80° to the core

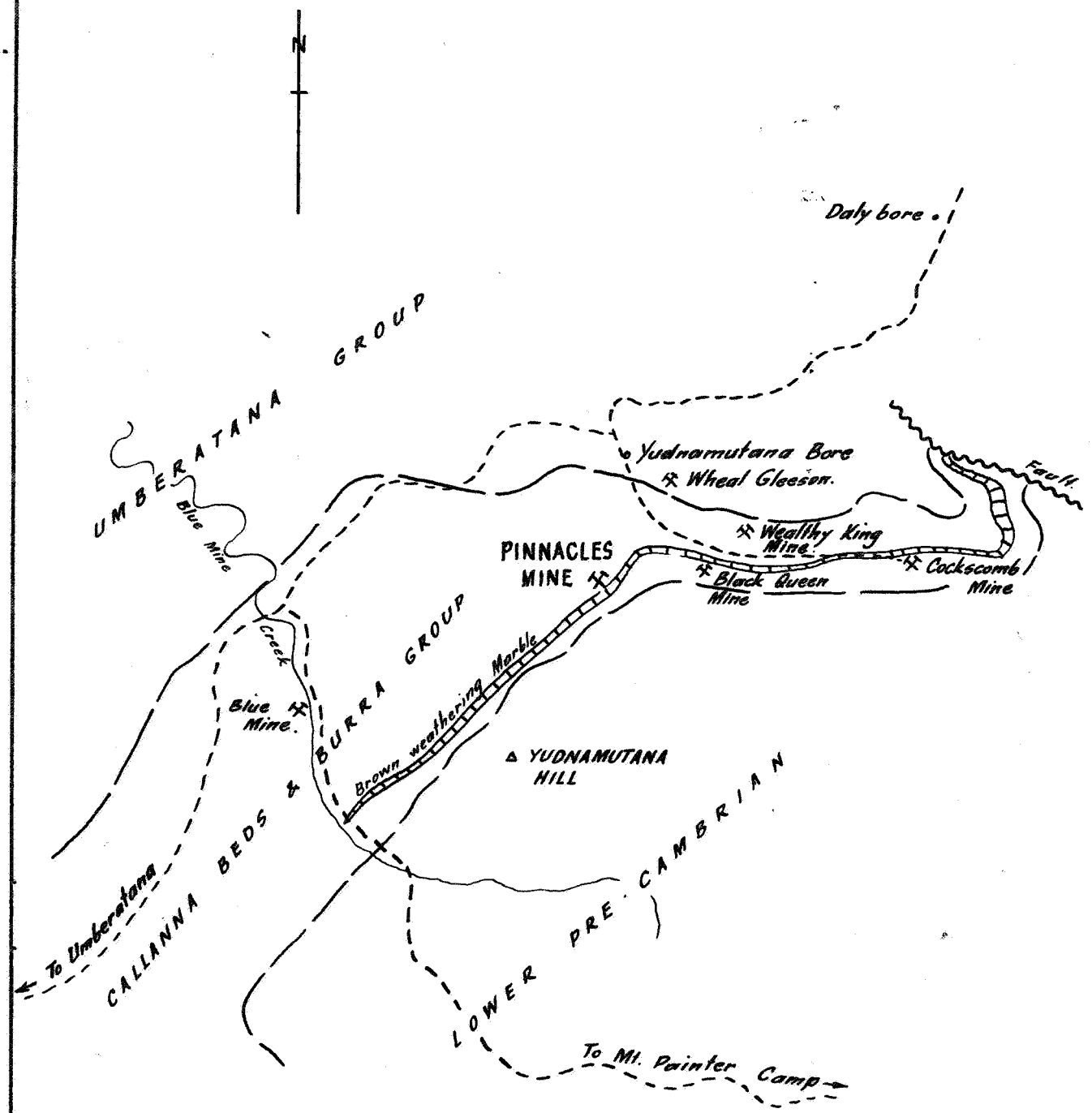
Depth From	Depth To	Geological Log
367'	398'	axis. The veins vary from a fraction of an inch up to 2". A second set makes an angle of 30° to the core axis. Laths of haematite occur along and parallel to the margins but may also be parallel to the core axis.
398'	402'	Dense medium grained hornfels interbedded with coarse grained biotite, actinolite, calcite beds. Chalcopyrite seen at bottom of hole. Haematite is associated with the sulphide.

END OF HOLE.

YUDNAMUTNA DIAMOND DRILL HOLE No.P2/64

Core Recovery

From Feet	From Ins.	To Feet	To Ins.	Footage Feet	Footage Ins.
0	0	5	0	4	8
5	0	8	8	3	6
8	8	13	8	Full core	
13	8	18	2	"	"
18	2	26	2	"	"
26	2	35	6	"	"
35	6	45	0	"	"
45	0	55	0	"	"
55	0	64	6	"	"
64	6	74	6	"	"
74	6	77	6	"	"
77	6	87	6	"	"
87	6	97	6	"	"
97	6	104	4	"	"
104	4	114	4	"	"
114	4	124	4	9	10
124	4	134	0	Full core	
134	0	138	4	"	"
138	4	148	0	"	"
148	0	149	0	"	"
149	0	159	0	9	4
159	0	169	0	Full core	
169	0	179	0	"	"
179	0	189	0	"	"
189	0	199	0	"	"
199	0	209	0	"	"
209	0	219	0	"	"
219	0	229	0	"	"
229	0	239	0	"	"
239	0	249	0	"	"
249	0	259	0	"	"
259	0	269	0	"	"
269	0	277	0	"	"
277	0	282	0	4	0
282	0	292	0	Full core	
292	0	302	0	"	"
302	0	312	0	9	11
312	0	322	0	Full core	
322	0	332	0	9	4
332	0	342	0	Full core	
342	0	352	0	"	"
352	0	362	0	Full core	
362	0	372	0	"	"
372	0	382	0	9	10
382	0	392	0	Full core	
392	0	402	0		



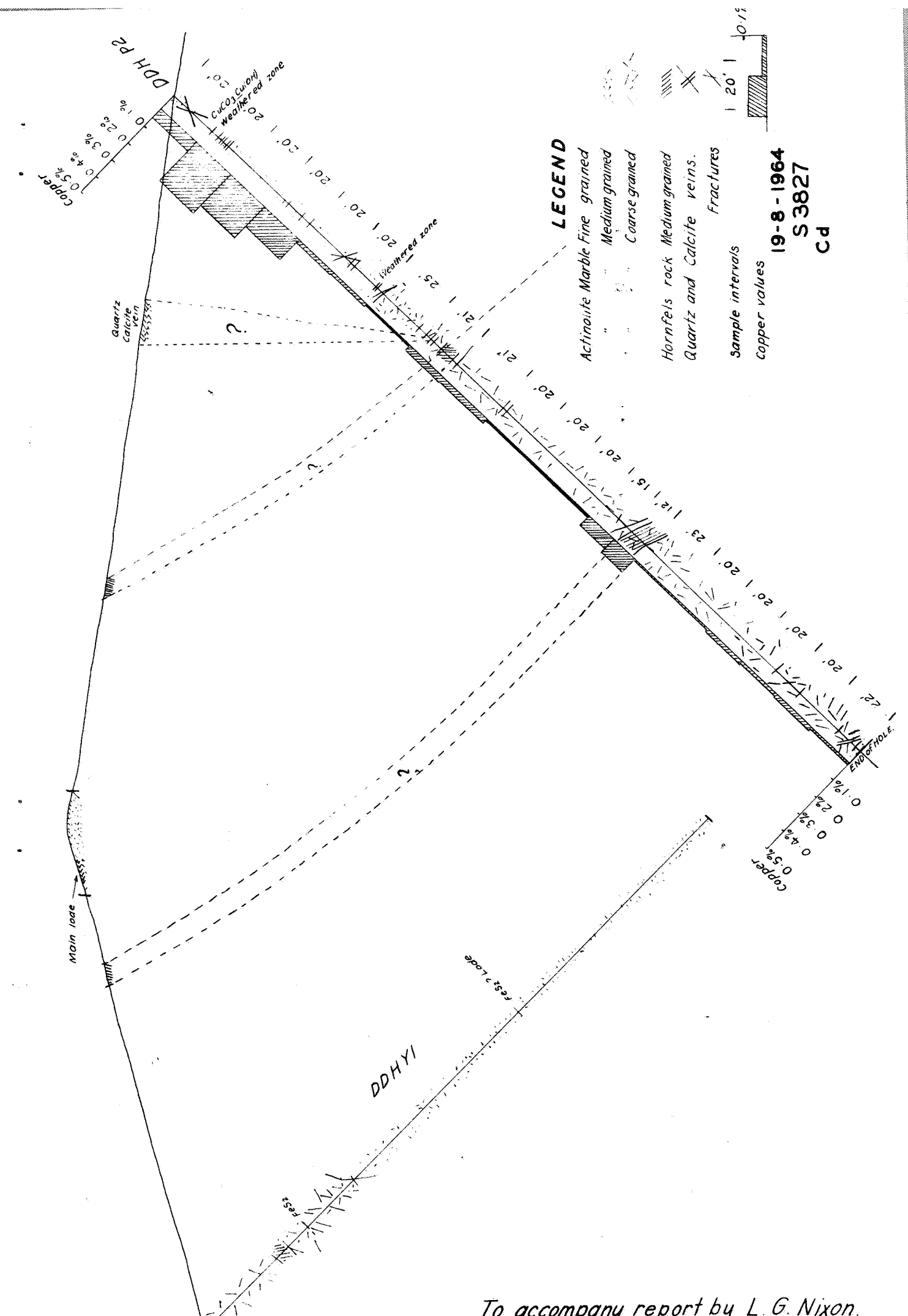
Geology generalized from Umberatana 1M. map

To accompany report by L. G. Nixon.

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	PINNACLES MINE LOCALITY PLAN	D.M.	Scale 1 mile to 1 in.
		Tcd.		Req.	S·3842
		Ckd.			
Director		Exd.			Date 27·8·64

400— 6.63 1423



To accompany report by L. G. Nixon.

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	CROSS SECTION through Diamond Drill Holes Y_1 and P_2 The Pinnacles Mine. Yudnamunta Mining Field Pastoral Block 797 Mineral Section 183	D.M.	Scale 50 ft to 1 inch
		Tcd.		Req.	S. 3827
		Ckd. D. E			
Director		Exd.			Date 21. 8. 64. Cd.