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880644

GEOLOGY OF THE BELL COPPER DEPOSIT

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to the Granisle Branch C.I.M.M.

LOCATION:

Bell Copper is a small copper deposit of the porphyry copper type situated in the Babine Lake porphyry belt. This belt extends from south of Fulton Lake to the NW arm of Takla Lake. There are two operating mines and some 5 subeconomic deposits in this belt.

DISCOVERY:

The first work done on the property was in 1927 when Charles Newman drove two adits on the shore of Babine Lake. He was apparently following some lead-zinc veins on the fringes of the alteration zones. Aside from some activity during the war, the property was dormant until 1962 when Noranda Exploration became interested in the area, and sent in a prospector, George Burdette to stake the property.

Burdette staked 11 claims for Noranda, two of which cover half the deposit. His report was followed up by soil sampling which was not too promising. The only anomalies were in a stream and near the lakeshore. Some E/M work was then done which revealed three conductors as drill targets. The third hole hit mineralization and the fourth was in 1% material. From then until 1968 a total of some 80 holes totalling 100,000 feet of diamond drilling were required to prove the orebody. Drilled geological reserves from 2580 to 1500 elevation were around 110,000,000 tons +.30% and mineable reserves at startup were 46,000,000 tons +.30%. Present reserves are indefinite because of some design changes.

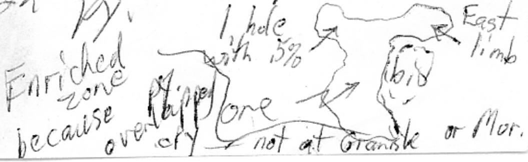
Very consistent Au ~~[illegible]~~ halo
av. 0.01% up to 0.03

Good Pb-Zn (Mo) prospecting halo

East limb - good grades but too much o/p

"took bite out of east side of dougnut"

Rainwater deposit chalcocite on py.



Trenching by ?
during World War time.
1927 - Newman - adits
1966 - Bardette - dls.

Intrusion came to surface
- found extrusive equiv. recently south of mine with fossil trees etc.
"similar today"

- Metals from marine seds?
- 1% pods

Trenching by ?
during World War time.
1927 - Newman - adits
1966 - Bodette - c/s.

Intrusion came to surface
- found extrusive equiv.
recently south of mine
with fossil trees etc.
" similar today.

- Metals from marine sols?
- Iz, ds

Gold is discrete particles
(but correlates directly with Cu)
- Recover av. 50% of Au

REGIONAL FRAMEWORK

The oldest rocks on the peninsula are Lower Jurassic volcanics and sediments, about 180 to 200 million years old. These rocks are part of the Hazelton group, and are primarily marine tuffs and siltstones. Overlying these are Cretaceous shales and siltstones with some volcanics, around 100 to 140 million years old. These sediments are usually a shallow water facies and have been included with the Skeena Group.

From Jurassic until Eocene time, these units have periodically undergone extensive block faulting on a large scale. These faults have given the Babine Lake region its dominent NW structural grain. At the minesite, the Cretaceous unit was downfaulted against the Jurassic volcanics during Eocene time. The vertical movement was in the order of 3000 feet. Along this fault rose a series of related intrusions of flowbanded rhyolite and dacitic breccias, acid plugs and a centrally located plug of biotite feldspar porphyry, all around 51 million years old. Post Eocene faulting appears to have protected surface equivalents of these intrusions south of the East barge landing. Glacial erosion has now exposed the roots of these intrusions along with the Bell Copper orebody.

PRESENT GEOLOGY

The dimensions of the EFP plug as now exposed is some 2400 feet by 1800 feet. Mineralization occurs primarily on the western and northern contacts. The structural break that localized the intrusion has been obscured by porphyrytic acid intrusions and is not visible in the pit.

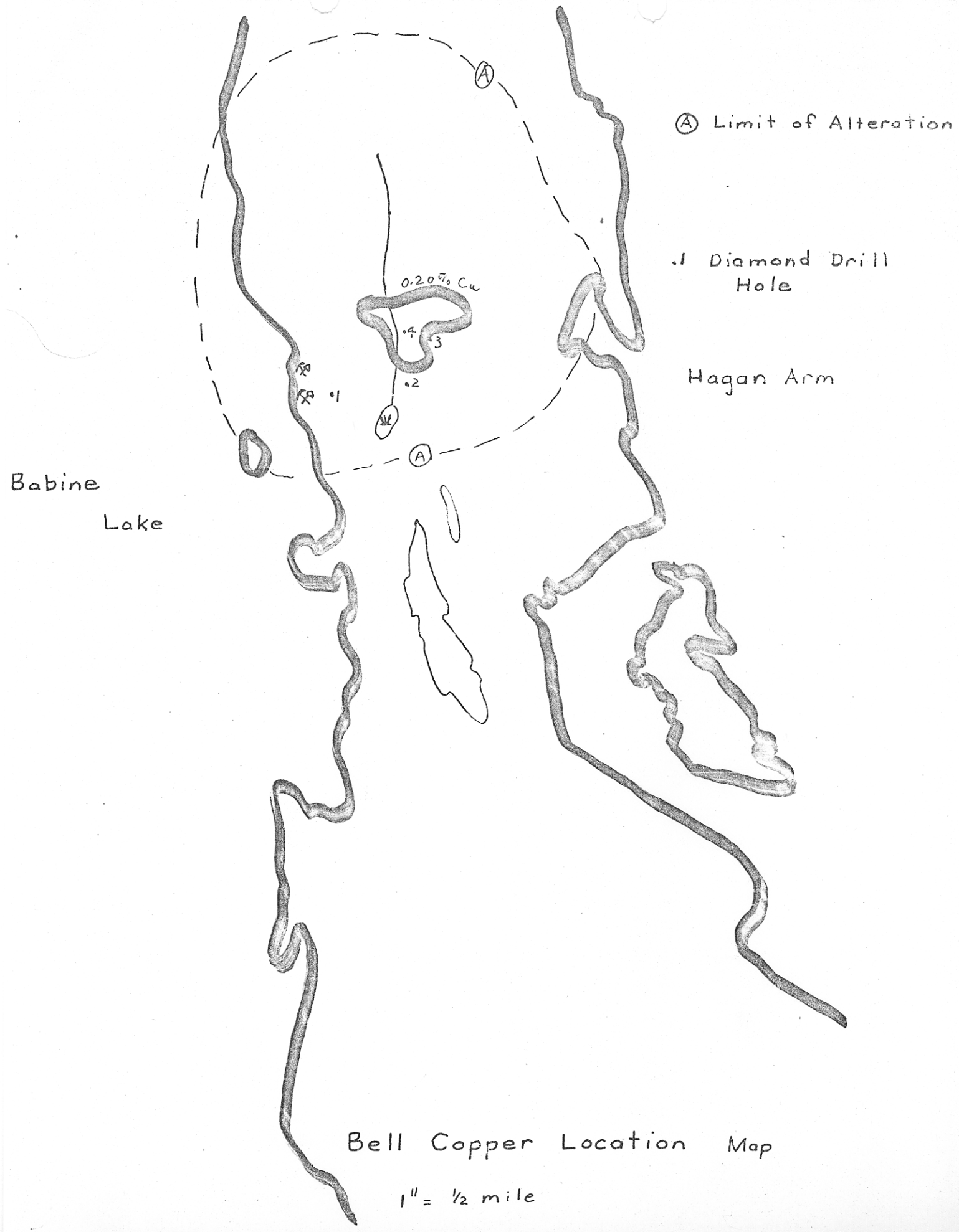
Mineralization and alteration are inseparable at Bell and should be discussed together. The ore and alteration zoning is classic porphyry copper zoning, with concentric haloes of mineralization around the axis of the intrusion. The innermost zone is essentially barren, with copper grades from 0.05 to 0.10%. Alteration is predominantly biotite with plagioclase altering to sericite. Next is a transitional halo of quartz and sericite with lettle pyrite, and copper grades up to 0.20%. There is an abrupt transition here to the next zone which is the ore zone. The intrusive has been shattered and filled with a finely developed quartz stockwork. Copper grades are from .30 to 1.00% and pyrite content is from 8 to 15 per cent. Ore mineralization is mostly finely divided chalcopyrite along with the pyrite in the quartz stockwork and disseminated into the rock. Alteration and grades then decrease uniformly through a chlorite carbonate zone to unaltered rock.

Metal zoning is as uniform as the alteration zoning. These are best represented visually. See Figure 7.

In contrast to the other Babine porphyryies, Bell has a well developed supergene zone of copper enrichment. This enrichment usually consists of thin skins of chalcocite on pyrite. Grades were enriched from around .5 up to .7% Cu. This zone extends vertically up to 200 feet, and in places was overlapped by oxide zones.

CONCLUSION:

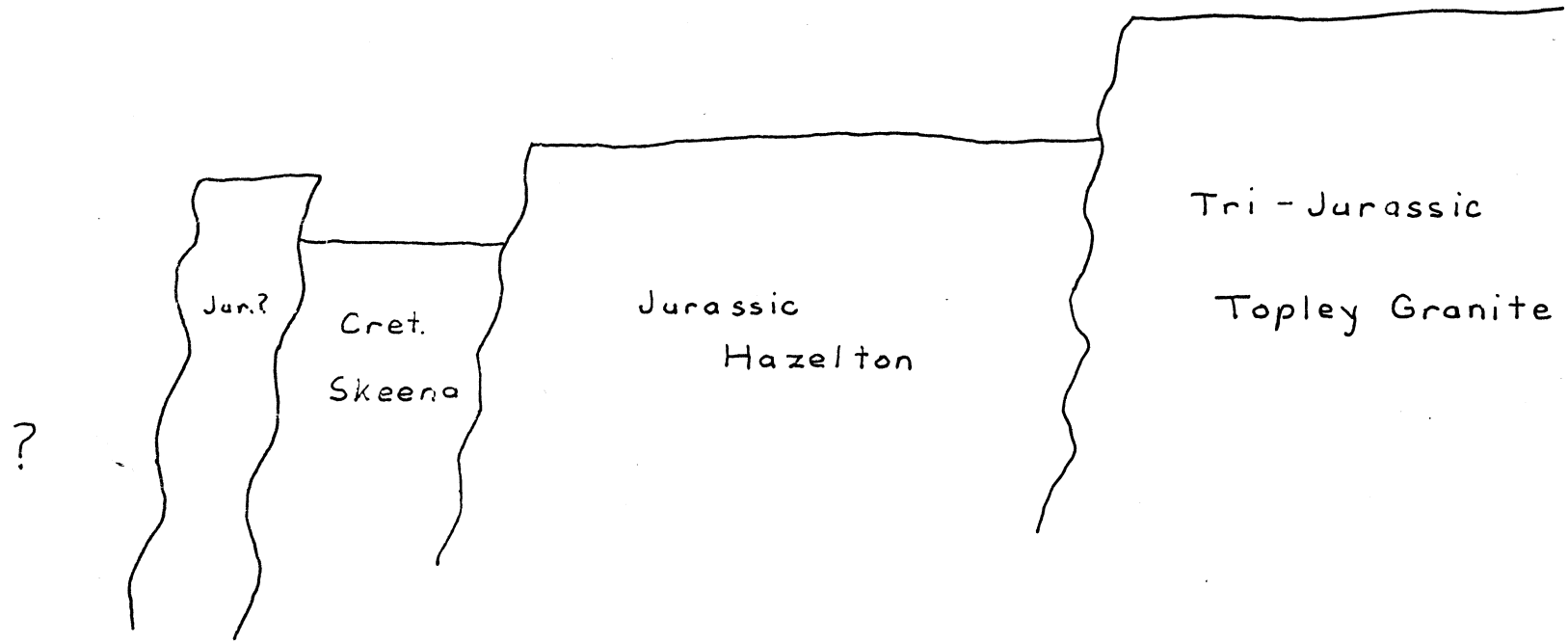
What do we learn from spending so much time studying one deposit? This can best be answered with a question - where is the next one? The deposits found in the Rebine region so far were relatively easy. By accumulating detail on the region fault systems we can hopefully one day understand why they occur where they do. Alteration studies will give us insights into the genetic mechanisms of porphyry copper deposit and may serve as an invaluable exploration tool.



Bell Copper Location Map

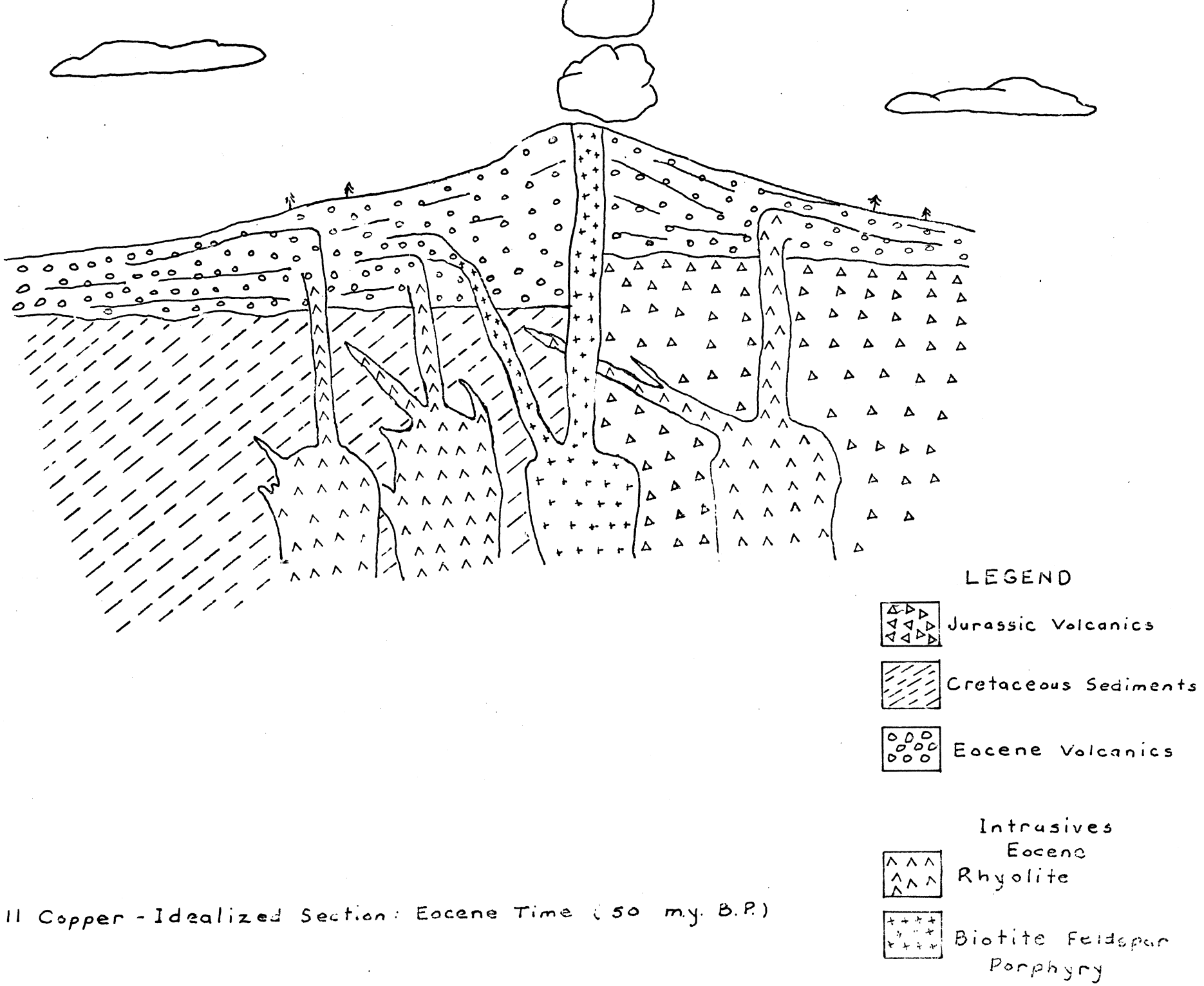
1" = ½ mile

Fig. 1



Bell Copper - Pre-Intrusive Fault System

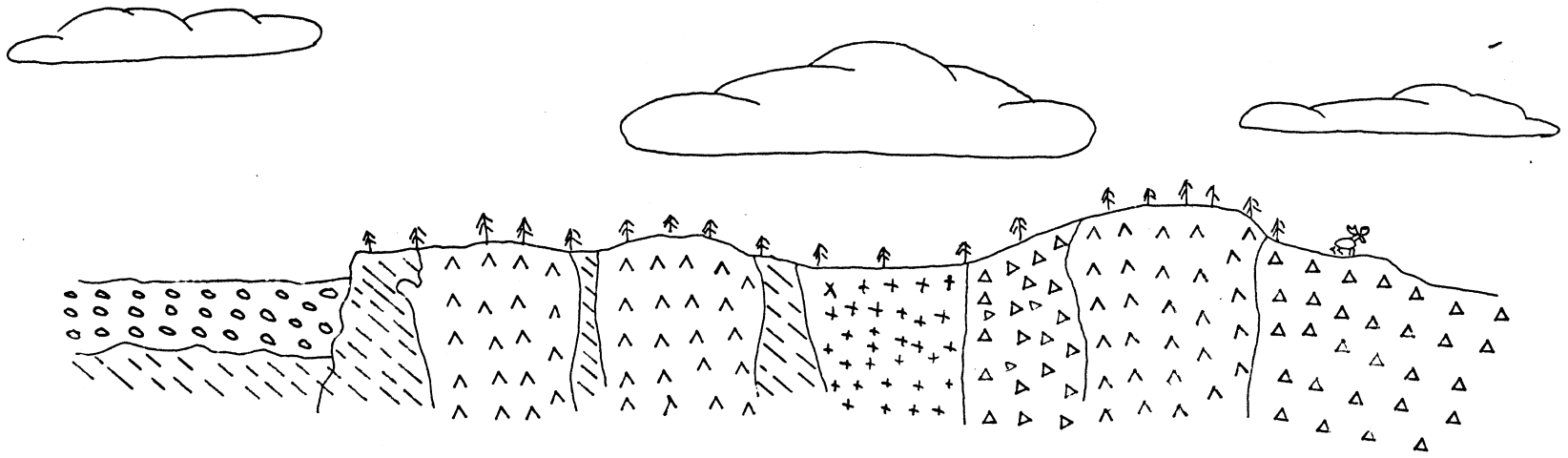
Figure 2



Bell Copper - Idealized Section: Eocene Time (50 m.y. B.P.)

Courtesy T. Richards

Fig. 3



LEGEND

Jurassic Volcanics

Cretaceous Sedime

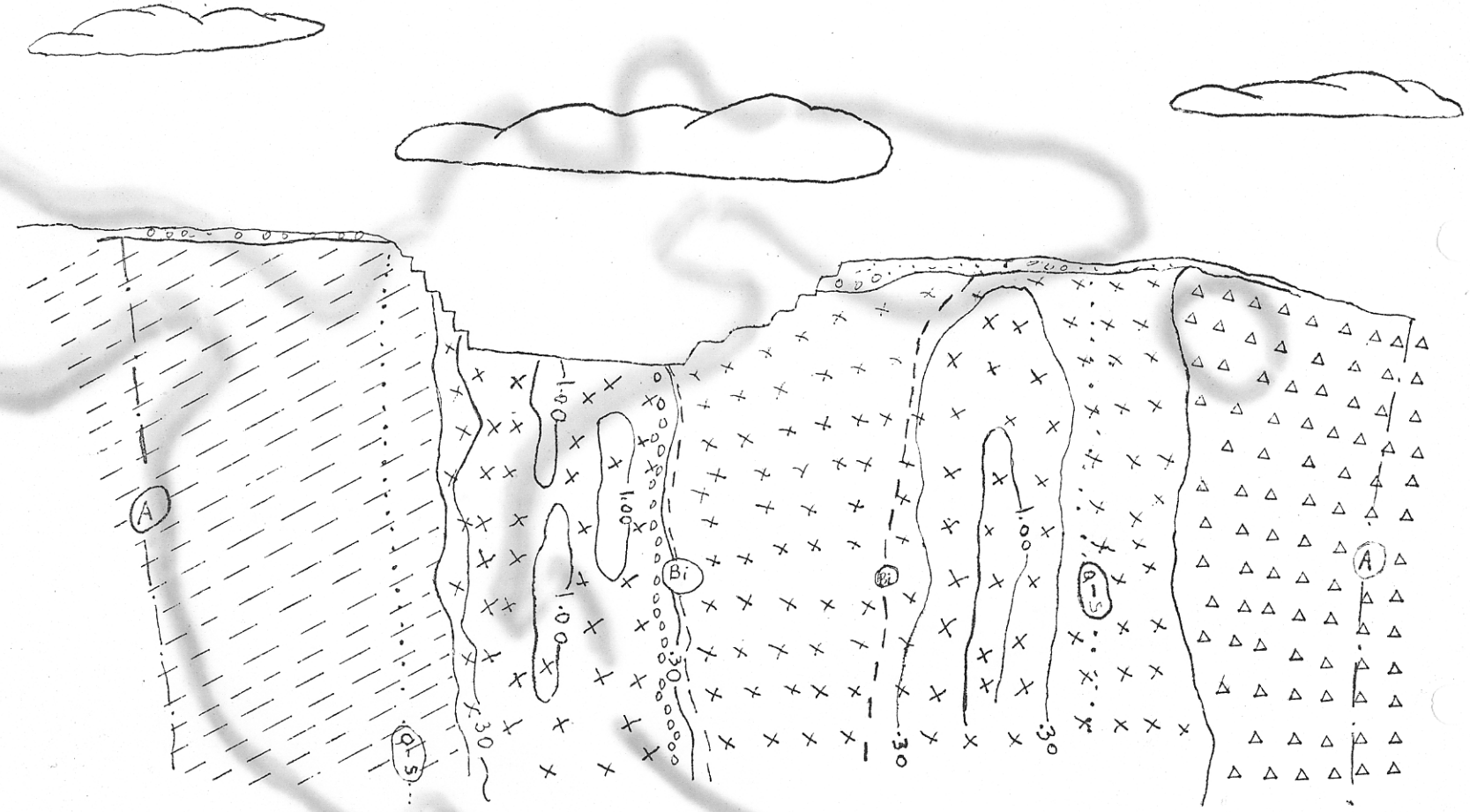
Eocene Volcanics

Intrusives
Eocene
Rhyolite

Biotite Feldspar
Porphyry

Bell Copper - Idealized Section: Present Time

Fig 4



Bell Copper - Geological Section with Distribution of Ore and Alteration Zones

LEGEND

Jurassic Volcanics

Cretaceous Sediments

Till

Intrusives Eocene

Rhyolite

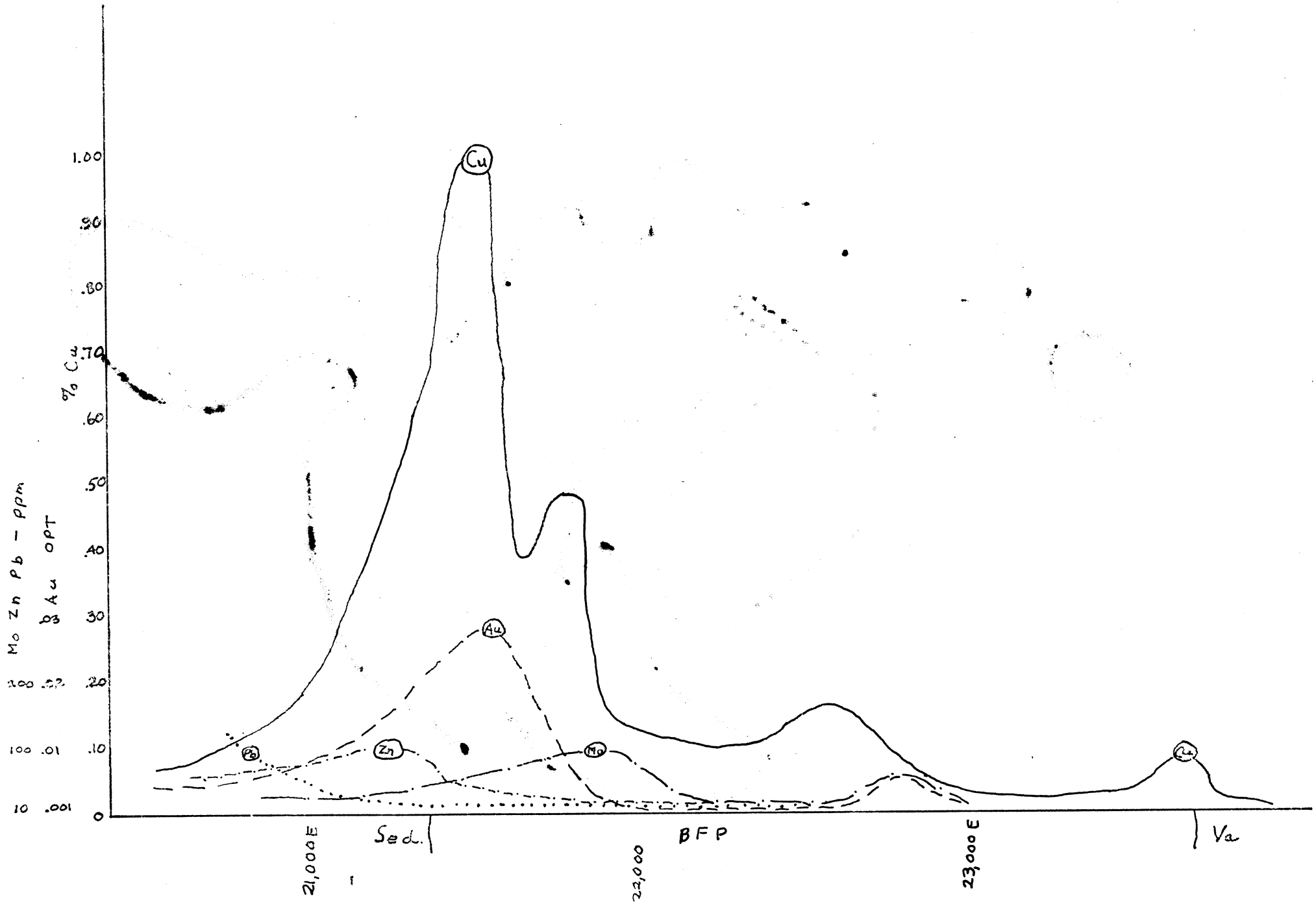
Biotite Feldspar Porphyry

Figure 5

Bell Copper - Geological Sketch with rock units and alteration zones

1" = 400'

Fig 6



Bell-Metal Zoning - Section 16,750 N

Fig. 7

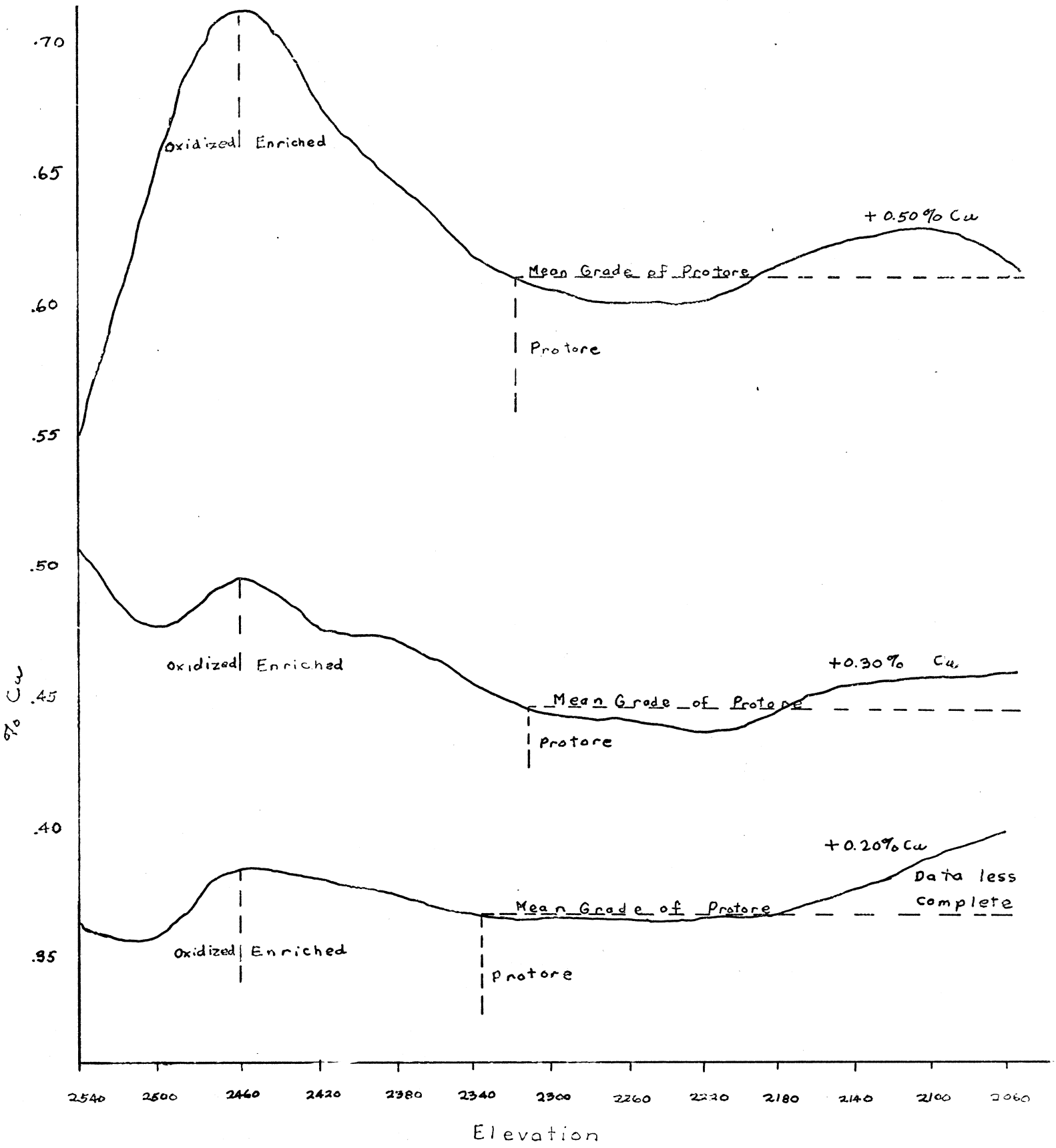

.70
.65
.60
.55
.50
.45
.40
.35
% Cu
Oxidized
Enriched
+0.50% Cu
Mean Grade of Protore
Protore
Oxidized
Enriched
+0.30% Cu
Mean Grade of Protore
Protore
+0.20% Cu
Data less complete
Mean Grade of Protore
Oxidized
Enriched
protore
2540
2500
2460
2420
2380
2340
2300
2260
2220
2180
2140
2100
2060
Elevation

Fig. 8