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GEOLOGY OF THE COPPER CANYON ORE DEPOSIT
LANDER COUNTY, NEVADA

by

David W. Blake

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The Copper Canyon deposit is located within the Battle Mountain mining district, approximately fifteen miles southwest of Battle Mountain. This mining district also contains Duval Corporation's Copper Basin deposit. Both deposits occur at the northwest end of the Battle Mountain - Eureka mineral belt.

Host for ore mineralization in the Copper Canyon deposit includes the following formations: upper Cambrian Harmony, middle Pennsylvanian Battle, and the Pennsylvanian (?) through Permain Pumpernickel. The source of primary metal values in these older formations is a Late Eocene to Early Oligocene (38 m.y.) granodorite intrusion, now considered to be a laccolith.

Primary sulfide introduction in all of the above rock units is represented by pyrite, pyrrhotite, chalcopyrite, marcasite, and minor galena, sphalerite, and molybdenite. Secondary copper minerals include chalcocite, covellite azurite, malachite, cuprite, and a cuperiferous manganese wad.

Major structural features include the late Permian Golconda thrust and Tertiary north-south normal faults, activated before and contemporaneously with sulfide mineralization. In some instances, these faults have served as barriers to mineralization and more importantly as avenues for percolating copper-bearing solutions to form supergene copper deposits. Leached capping limonite is not typical of other porphyry copper deposits. At the Copper Canyon deposit, various mixtures of goethite and jarosite occur above ore values with a deep goethitic brown prevalent over secondary copper mineralization.

Attached to this paper are reproduced maps from the 1967 publication by Sayers, Tippett, and Fields, showing the general geology and two cross-sections of the Copper Canyon ore deposit.

To minimize discussions of the above features during the field trip, a brief description of each stop is included.

STOP 1 Either the 6325 or 6350 Bench.

Exposed on this bench is siliceous conglomerate representing the lower member of the Battle Fm. Sulifide mineralization

consists of pyrite and chalcopyrite occuring in the matrix and with quartz-K-feldspar veinlets. The best and more uniform grade of copper, gold, and silver mineralization occurs in the lower 50 to 75 feet of this member.

STOP 2 6325 bench.

This stop illustrates the relationship between structure and secondary enrichment in the Harmony Fm. North is the Monitor fault. Rock units of the Harmony Fm. include feldspathic to quartzitic sandstones, and siltstone. Mineralization is primarily pyrite with partial replacement by covellite and chalcocite.

STOP 3 Copper Canyon intrusion

Generally, the rock is a granodiorite prophyry with phenocrysts of quartz, plagioclase, and biotite. Groundmass consists of quartz and K-feldspar. Age of the intrusion as determined by K/Ar dating method is 38 m.y. A similar K/Ar date on hydrothermal biotite in the Battle Fm. gave a date of 37.2 m.y. In comparison to the sedimentary rocks, the porphyry is weakly mineralized. Sulfide minerals observed in deeper drill holes include pyrite, pyrrhotite, and minor chalcopyrite and molybdenite. Near the north and east contacts, commercial values represented by secondary enrichment occur in the porphyry.

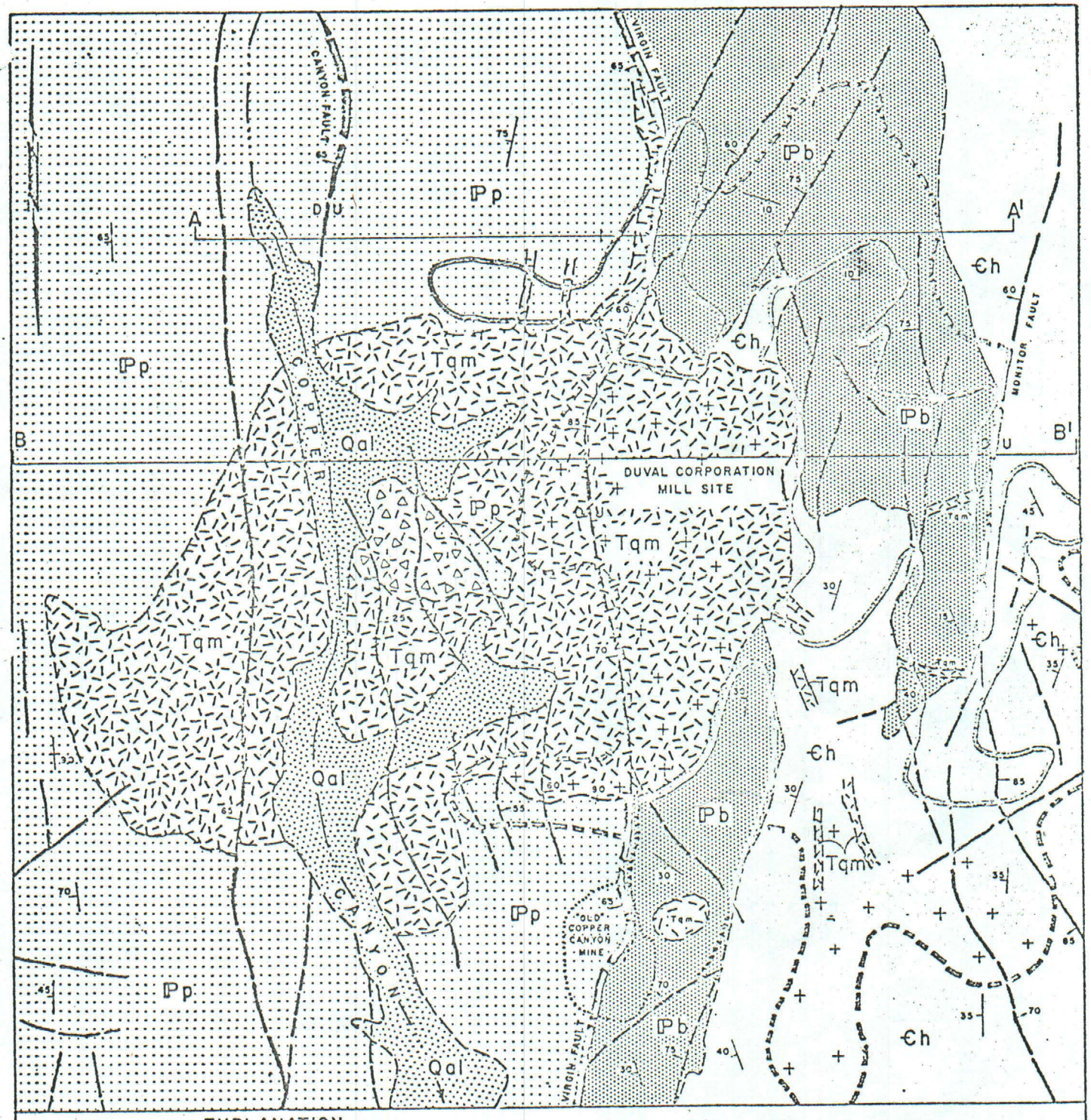
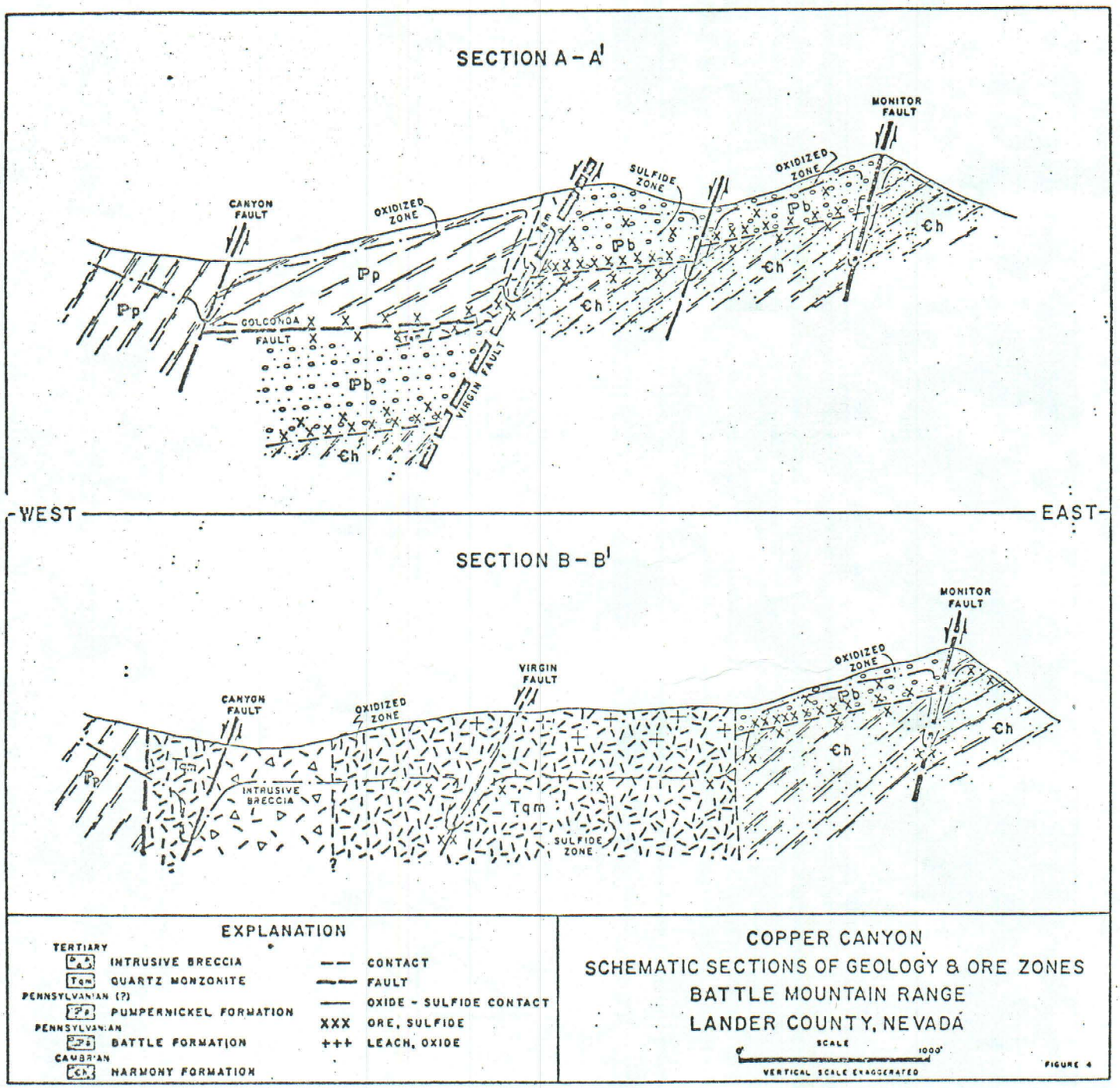

VIRGIN FAULT
CANYON FAULT
COPPER CANYON
MONITOR FAULT
DUVAL CORPORATION MILL SITE
OLD COPPER CANYON MINE
A
A'
B
B'
Pp
Pb
Tqm
Qal
Ch
EXPLANATION
QUATERNARY
Qal ALLUVIUM
TERTIARY
INTRUSIVE BRECCIA
Tqm QUARTZ MONZONITE
PENNSYLVANIAN (?)
Pp PUMPERNICKEL FORMATION
PENNSYLVANIAN
Pb BATTLE FORMATION
CAMBRIAN
Ch HARMONY FORMATION
CONTACT
FAULT
ORE, SULFIDE
LEACH, SULFIDE
++ LEACH, OXIDE
COPPER CANYON
GENERALIZED GEOLOGY & ORE ZONES
BATTLE MOUNTAIN RANGE
LANDER COUNTY, NEVADA
0 SCALE 1000'

FIGURE 3


SECTION A – A'
MONITOR FAULT
SULFIDE ZONE
OXIDIZED ZONE
OXIDIZED ZONE
CANYON FAULT
OXIDIZED ZONE
Tqm
Pb
Pp
Ch
Pp
Pb
Ch
Ch
COLCONDA FAULT
Tqm
VIRGIN FAULT
Pb
Ch
WEST
EAST
SECTION B – B'
MONITOR FAULT
VIRGIN FAULT
OXIDIZED ZONE
CANYON FAULT
OXIDIZED ZONE
Pb
Ch
Ch
Pp
Tqm
INTRUSIVE BRECCIA
Tqm
SULFIDE ZONE
?
EXPLANATION
TERTIARY
INTRUSIVE BRECCIA
QUARTZ MONZONITE
PENNSYLVANIAN (?)
PUMPERNICKEL FORMATION
PENNSYLVANIAN
BATTLE FORMATION
CAMBRIAN
HARMONY FORMATION
CONTACT
FAULT
OXIDE - SULFIDE CONTACT
ORE, SULFIDE
LEACH, OXIDE
COPPER CANYON
SCHEMATIC SECTIONS OF GEOLOGY & ORE ZONES
BATTLE MOUNTAIN RANGE
LANDER COUNTY, NEVADA
SCALE
1000'
VERTICAL SCALE EXAGGERATED
FIGURE 4