Structure

The fracture pattern for the deposits north of the dyke is illustrated by attitudes taken in the underground sampling adit. Two main fracture sets predominate, one striking southeast and dipping steeply northeast, the other striking northeast and dipping moderately northwest. The fractures are not evenly distributed but form local swarms of parallel fractures, and in these areas, ore grade is above average. South of the dyke ore controlling fractures probably dip toward the south.

Vein and Alteration Mineralogy

Principal ore minerals in the deposit are chalcopyrite, bornite, and molybdenite. Pyrite and specular hematite are the only other metallic minerals. The ore minerals occupy four types of veins or fracture fillings: (1) vuggy quartz-chalcopyrite-bornite-molybdenite veins 2 to 25 mm wide with tourmaline-sericite and potash feldspar envelopes, (2) massive quartz-chalcopyrite-pyrite-molybdenite veins up to 10 cm wide, (3) brecciated quartz-molybdenite-clay veins up to 1 metre wide, (4) sugary barren quartz veins. Ore minerals also occur as disseminations in altered country rock adjacent to fractures. Other vein minerals include calcite, siderite, epidote, zeolite, and gypsum. Locally chlorite and green sericite are pervasively developed.

Zoning

In the two mineralized zones which have been most clearly studied distinct mineral zoning has been found parallel with the dyke contact. Near the dyke chalcopyrite and bornite occur in roughly equal amounts; this zone grades outward to one with chalcopyrite, uncommon pyrite and rare bornite, and finally, to a pyritic zone in which pyrite locally amounts to 1 per cent of the rock. Molybdenite has no apparent systematic distribution pattern.

Oxidation of the ore is very limited except for local downward penetration along faults.

LORNEX 92I/6

OWNERSHIP: Lornex Mining Corporation Ltd. (controlled by Rio Algom Mines Limited).

The Lornex deposit has an elliptical outline 500 by 1,300 metres with the long axis oriented northwesterly. It lies

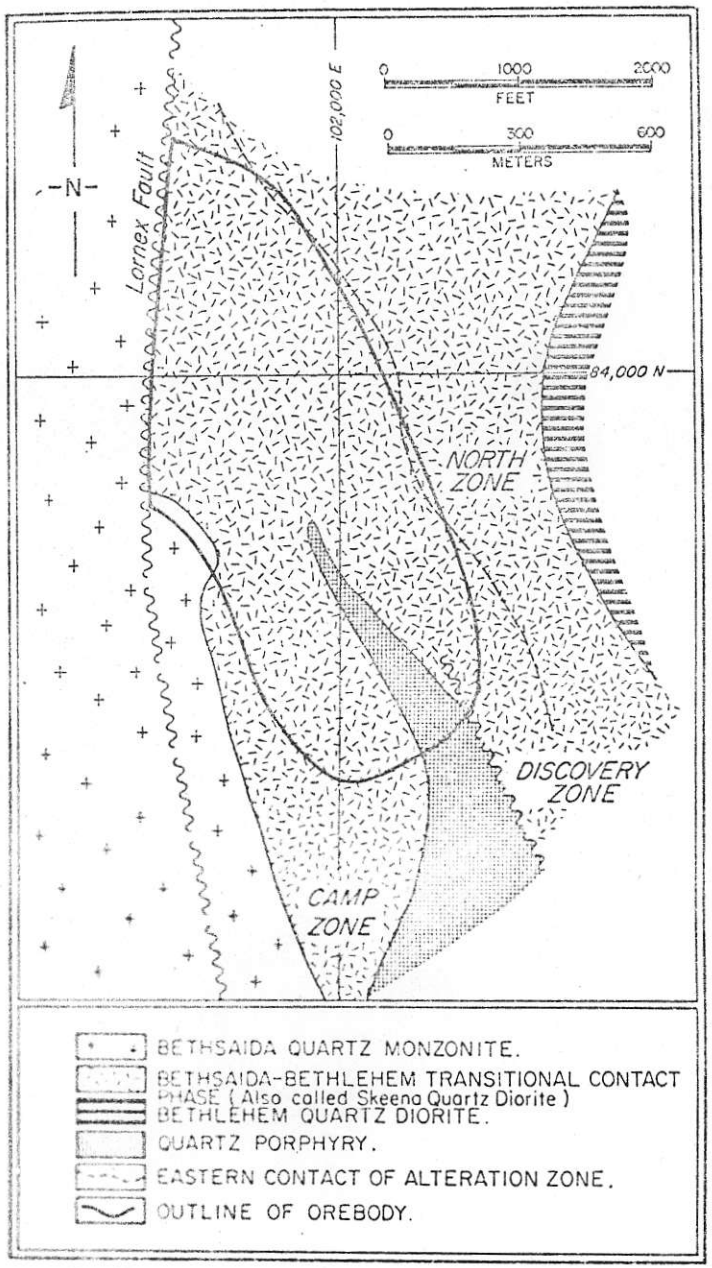

Fig. 21. Generalized Geology of the Lornex Property.

mainly within Bethlehem granodiorite adjacent to a contact with Bethsaida quartz monzonite (*see* Fig. 21), mineralization occurring in both rock phases. North and east of the contact grade is above average but mineralization dies out within the quartz monzonite less than 100 metres from the contact. The western boundary of the deposit is the Lornex fault, the major internal north-striking fault of the Guichon Batholith.

Dykes

Near the southern end of the deposit, leucocratic quartz porphyry intrudes the Bethlehem quartz diorite. The porphyry forms a tapering body which trends and pinches out northwestward. The porphyry is faulted, altered, and mineralized but is lower grade than the country rock. However, along the east border of the porphyry is a zone of above average grade ore. Other dykes are present but unimportant and volumetrically insignificant.

Structure

Faults at Lornex are very abundant and fall into three trends: north, east, and northwest. All have moderate to steep dips. Mapping of the underground sampling development workings revealed eight major faults with 15 to 30-metre zones of gouge and tectonic breccia. The faults strike north and six dip steeply eastward, the seventh dips steeply westward.

Alteration

Alteration in the Lornex deposit is controlled by faults and fractures. Alteration borders and extends outward from fractures and veins in envelopes of variable width. At its weakest, biotite and hornblende are converted to chlorite. Where it is more intense biotite breaks down to sericite, siderite, and clay minerals. Feldspars become progressively more completely sericitized until finally twins and complex zoning in plagioclase are completely destroyed so that the mineral is only recognizable by crystal shapes. Fault-gouge zones commonly contain sericite, chlorite, and calcite and may also contain siderite, hematite, secondary biotite, gypsum, pyrite, epidote, hematite, zeolites, and ore sulphides. Sulphide mineralization is most abundant where faults and fractures are most closely spaced and consequently where alteration is also most intense.

Veins and Ore Mineralogy

Principal ore minerals in the unweathered part of the deposit are chalcopyrite, bornite, and molybdenite. Minor amounts of chalcocite and covellite occur. Sparsely distributed pyrite, magnetite, and hematite compose less than 1 per cent of the rocks.

The ore minerals occur mainly as fracture fillings. They occur either in quartz-carbonate veins which are commonly enveloped by sericite-chlorite alteration zones or along dry joints, slips, and fractures. Locally, ore minerals are sparsely disseminated through the host rock. Molybdenite occurs in veins and veinlets of quartz and in fault-gouge. Late-stage barren quartz veins occur locally. Post-mineral movement is evident on many faults.

Zoning

By estimating pyrite, bornite, and chalcopyrite ratios Lornex geologists found a rough pattern of sulphide zoning. A central core in which bornite exceeds chalcopyrite is mantled by an annulus in which chalcopyrite exceeds bornite and this in turn by a halo around the orebody of sparsely disseminated pyrite.

Oxidation Zone

The oxide zone reaches a maximum depth of 60 metres along the east side of the deposit where overburden is thin. Westward, overburden progressively thickens and the oxide zone progressively thins. Malachite and azurite along with minor amounts of native copper, cuprite, and possibly tenorite and secondary chalcocite occur in the oxide zone. Sulphide minerals are present throughout the oxidized zone. Oxidation has not led to any appreciable supergene enrichment.

end

VALLEY COPPER

OWNERSHIP: Controlled by Cominco Ltd.

The Valley Copper deposit has a somewhat elliptical plan approximately 1,000 by 1,300 metres with the long axis oriented northwesterly (*see* Fig. 22). It is situated entirely in Bethsaida quartz monzonite and is bounded on the east by the north-trending Lornex fault.