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GEOLOGIST'S REPORT

PRELIMINARY REPORT ON COPPER BASIN PROPERTY

OF THE COPPER CANYON MINING CO.

At the present stage of my examination of the Copper Basin claims it is only possible to give a very general discussion of the major features so far determined and such statements as are made must be understood to be tentative only and subject to revision as further information is added. The sedimentary rocks occuring on the property include a thick lower series of quartzites, brown sandstones, and fine grained argillaceous sandstones and shales. Above this series and occuring to the north beyond the boundaries of the property is a thick series of limestones that include sandy layers towards the top. The sedimentary beds dip rather steeply to the east and strike nearly due north and south. This strike and dip is remarkably uniform wherever seen along the western borders of the property, the only exception so far noted being in the open cut on the Carrissa claim.

Intruded into the sediments is a quartz monzonite which presents two phases. One is a granitoid rock evidently representing the main mass of the body which is most typically shown in the long tunnel run into the hill on the Copper Queen and Elvira Claims. The other type is a porphyry with large crystals of quartz and feldspar embedded in a fine grained ground mass and is identical with the porphyry occuring at Copper Canyon. The porphyry occurs as a broad dyke running northerly through the Raven claim, as a large irregular mass at the southern end of the Sparrow, and as numerous small dykes in the quartzites in the glory hole on the Sweet Marie and elsewhere.

The only effects of the intrusion of the Monzonite in the form of contact metamorphism seems to be limited to the Surprize, Copper Queen, and Copper King claims at the northern end of the property. Here certain calcareous beds included in the quartzite series have been changed to garnet-epidote rock with a small amount of chalcopyrite associated. The more sandy elements of the series have been given a greenish cast through the introduction of chlorite. On these claims the weathering of the chalcopyrite has formed copper carbonates and silicate which have been the small amount of ore developed on the shallow workings near the top of the Surprize hill. Elsewhere the porphyry does not seem to have introduced copper into the sediments and has no relation to the copper ores. It is possible that only the granitoid phase of the monzonite produced typical contact metamorphic deposits containing copper but as it apparently did not reach the limestone series it is improbable that any such deposits of any considerable size occur in the vininity.

As at Copper Canyon the bulk of the copper ore was originally deposited by solutions following the intrusion of the monzonite. The more typical veins of this period of mineralization are shown at the Goss and Chase leases near the common end line of the Raven and Daley claims. Here veins of quartz, massive chalcocite, and cuprite up to a foot in width, striking about south

60° east, dipping 80° to the southwest, cut across the steeply inclined beds of the quartzite at a 45° angle. Polished sections of this ore show fragments of pyrite remaining that were replaced by the chalcocite. The secondary carbonates and silicate of copper have migrated out into the quartzite beds and wherever the intersecting bed was of a clayey nature the copper has been absorbed to such an extent that it forms a shipping grade of ore. This selective action of the clay is especially well shown in the altered porphyry at the shaft at the southern end of the Sparrow claim where the kaolinized feldspars are impregnated with copper carbonates although the remainder of the minerals are barren.

At the glory hole on the Sweet Marie the situation is more complicated and further study is necessary before the riddle will be unraveled. The massive chalcocite ore found in the northern opening or Tunnel is identical with the massive chalcocite found in the walls of the veins at Copper Canyon and as the quartzite frequently shows the same chlorite greenish color in many places it is probable that we have similar conditions here. The glory hole is surrounded to the west and north by the porphyry and small dikes occur in the walls. It is probable that at the time of the intrusion of the porphyry large masses of pyrite were introduced that have been replaced by chalcocite deposited by later solutions. The polished sections of the ore show that pyrite was the original mineral and from the irregular form of the bodies in the quartzite I am of the opinion that we may safely assume that the primary ore has a similar origin to that at Copper Canyon.

In addition the limited amount of metamorphism of the quartzite has allowed the selective action of the clayey beds to have full sway and much of the ore being shipped at present comes from these beds that have been impregnated with the copper carbonates resulting from the weathering of the primary ore.

At the bottom of the incline a large mass of highly altered quartzite impregnated with pyrite has been encountered. Apparently the same body is exposed in the foot wall of the Tunnel cut. At the bottom of the shaft the surfaces of the individual grains of pyrite are coated with sooty chalcocite and the ore has a similar appearance to the porphyry ores mined at Ely and Bingham Canyon. There are two possibilities as to the origin of this ore, either the pyrite was introduced by solutions later than the chalcocite veins and the copper has been deposited on the pyrite from the surface waters passing through the ores above; or the pyrite is earlier than the copper veins and there is a possibility that a general replacement of the pyrite by the ascending copperbearing solutions took place. In the latter case the chances that a large deposit remains to be developed are much better.

Unfortunately my present data is insufficient to decide whether one or the other or both have taken place. There is a fifty foot crushed zone passing south along the gully to the west of the Surprize claim through the portal of the long tunnel on the Copper Queen and apparently intersected at the face of the long tunnel on the Raven that marks a fault through which heated solutions have passed. A similar zone is encountered in the tunnel on the Buena Ventura that is apparently parallel. The Widow incline is on a branch fault dipping to the west that probably connects with the Buena

Ventura fault. Associated with the Raven-Surprize fault there is a broad zone in which the rocks both sedimentaries and porphyry have been altered and impregnated with pyrite. The long MacDonald tunnel west of the Carissa Claim is in silicified quartzite highly impregnated with pyrite and including numerous bunches of pure sulphide. It is probable that the desseminated pyrite encountered in the bottom of the incline at the glory hole is similarly associated with the Buena Ventura fault.

While the relative age of the solutions that deposited the pyrite remain to be determined yet I believe it will be well to do further development work at the bottom of the incline in order to determine the amount of desseminated ore present. Whatever its origin if the size of the body warrants it there is a possibility of largely increased assets.

The development of the ore at the surface will necessitate following the veins and bunches of chalcocite ore to their intersection with the finer grained argillaceous beds. The bulk of the ore will be found there. There are doubtless many other places on the property where similar bodies of ore may be found and I trust that when I have had the opportunity to cover the entire property I can give you a better idea of their occurence.

Respectfully submitted

(Signed) J. C. JONES

Geologist.