HIGHLAND DISTRICT

LOCATION

The Highland district is located in the northern Highland range and southern Bristol range and generally includes the area from near Arizona Peak to north of Stampede Gap. The Highland district is sometimes included with the Pioche district to the east and some properties are shared with the Comet district to the south. The Pioche district lies across a valley to the east, a natural boundary, but the boundary with the Comet district is given as latitude 37°55', an entirely artificial boundary. Most of the mines in the district are clustered about Arizona Peak on the east side of the Highland range and around Stampede and Manhattan Gap on the range crest near the Junction of the Highland and Bristol ranges. Several mines and prospects are scattered along the western side of the district between Manhattan Gap and the Comet district boundary.

HISTORY

Silver discoveries were made on the eastern side of the Highland range in 1868 and a camp was built near Highland spring the next year (Paher, 1970). Ore was transported from the mines by wagon to a smelter at Bristol Well. Iron ore from the Manhattan mine at Manhattan Gap and oxidized lead-silver ores from the Mandha mine were used as fluxing ores at the smelter. A mill at Floral spring, south of Highland spring, was used to concentrate other silver ores from the district and these concentrates were also sent to the Bristol smelter. Accurate production figures for the Highland district have not been kept and, after 1935, production has been generally lumped with the Pioche district. Tschanz and Pampeyan (1970) estimate a gross production value of about $2,000,000 from the district, mainly in lead, silver, gold, copper, and manganese. The major production years were 1872 to 1932.

At the time of our examination (fall, 1983, summer, 1984) the only activity noted in the Highland district was in the vicinity of the Forlorn Hope - Mountain Lion mines on the western side of the district. Many areas here had been recently sampled, and new drill sites were seen south of the Mountain Lion mine.

GEOLOGIC SETTING

The Highland district is underlain principally by Cambrian rocks which have been locally intruded by small stocks and dikles of quartz monzonite and granite porphyry. The main part of the Highland and Bristol ranges is made up of an east-tilted block of Pioche Shale, Lyndon Limestone, Chisholm Shale, and limestone of the Highland Peak Formation which has been overriden by thrust plates of Upper Cambrian rocks. This thrust, termed the Highland thrust plate, is thought to underlie Arizona Peak and to have overriden the Pioche Hills to the east as well. The thrust sheet is highly faulted and is now eroded from large portions of the Highland range.

ORE DEPOSITS

Three general types of ore occurrences are present within the limits of the Highland district. The principal ore deposits are siliceous replacement veins in the thrust plate of Upper Cambrian rocks on Arizona Peak and bedded replacement deposits related to them. The second type of occurrence consist of skarn and quartz vein deposits related to the small intrusive center near Manhattan Gap. The third type of occurrence is limited to one property, the Forlorn Hope mine on the southeastern margin of the district. The Forlorn Hope is a manganese rich zinc-lead replacement deposit formed in the Pioche Shale. It is similar to deposits found to the south in the Comet district and to the replacement deposits in the Pioche district.

The replacement veins follow N70°-85°W fissures and ore formed both along the fissures and in limestones adjacent to the fissures. Siliceous gossans with jasperoid and iron and manganese oxides form the surface expressions of these veins, and the ores were lead carbonate which contained values in both silver and gold. The skarn ore from the Manhattan mine at Manhattan Gap consisted of massive iron gossans in garnet skarn. Thick quartz veins cut the skarn and continue to the southwest for about two thousand feet. The manganese-zinc-lead replacement orebody at the Forlorn Hope mine appears to be similar to deposits to the south in the Comet district. The ore consisted of quartz-manganosiderite-sphalerite-galena lenses which occured in a member of the Cambrian Pioche Shale.

It does not appear that the Pioche Shale has been extensively explored for replacement ore to the north of the Forlorn Hope where the Pioche Shale is partially covered (the lower porion) by the Highland thrust. Replacement bodies could exist in this area in favorable horizons which do not outcrop.

GEOCHEMICAL RELATIONSHIPS

All of the ore samples analyzed from the Highland district showed certain similarities; most were high in zinc, lead, copper, arsenic and manganese. Silver was reported from all samples, but the values were not exceptionally high. The vein-replacement ores contained low but consistent antimony values and reported anomalous tin and tungsten in about half of the samples. Samples taken from the Manhattan Gap area were high in molybdenum and tungsten but contained no antimony and only low lead-zinc. The one sample from the manganese replacement deposit (Forlorn Hope) reported high manganese, zinc, lead with moderate arsenic, no antimony, and low tin. This element association is seen again in samples from the Comet district to the immediate south of the Forlorn Hope.

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