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PRELIMINARY REPORT OF THE RED DEVIL GROUP
(QUICKSILVER PROSPECT) KUSKOKWIM DISTRICT, ALASKA
August 5, 1939

Location and Accessibility:

The Red Devil group of four lode claims is located on the south bank of the Kuskokwim River eight miles below Sleetmute and three miles above Parks. The group; namely, the Red Devil Nos. 1 to 4, inclusive, parallels the river bank extending northwest and southeast, 3,000 feet long and 1,200 feet wide. The showings on the claim group are easily reached via trail along the west bank of a small unnamed creek 600 feet south of the Kuskokwim River. The latter offers a very accessible means of transportation to the property, as regular river steamers navigate the river past this point during the summer season.

Owners:

The claims are held by Messrs. Nick Millick and Hans Halverson of Sleetmute, Alaska.

History:

The presence of cinnabar was discovered by panning in the small creek which cuts across the claim group by Hans Halverson in 1933. The property was staked upon the discovery of several float pieces of mercury ore in the creek bed in the fall of the above year. Several pits to bedrock on the west bank of the creek revealed a mineralized zone carrying cinnabar with some stibnite. Since the bedrock is covered with several feet of river deposit consisting of silt and sand, Halverson constructed a ditch and began groundsluicing into the bank. This operation is still carried on during the short summer season and has uncovered the vein for a distance of 170 feet along its strike. A tunnel 95 feet in length was driven along the footwall of the vein with a short crosscut across the vein. This season the retort from the Parks property is to be moved and rebuilt on the Red Devil group and the float ore gathered from the groundsluicing is to be retorted.

Geology and Showings:

The formation surrounding this prospect and for a considerable distance up and down the Kuskokwim River consists of Mesozoic sandstones and shales, which are termed probably of upper Cretaceous.* These sediments consist of various phases of sandstones varying from thinly bedded to bands up to 100 feet wide, ranging from fine grained to coarse

*U. S. G. S. Bull. 655, "The Lake Clark-Central Kuskokwim Region, Alaska" by P. S. Smith, p. 140.

concretionary types and various colored shales, ranging from greenish and brownish to black. These sediments have been subject to intense folding and in many places close-folded with both strike and dips variable, with the general trend N. 20 to 30° W., and mainly steep dips both north and south. Injected into the sediments along bedding and fault planes are sills, lenses, and dikes. These are numerous, irregular, and apparently all from the same magma. These intrusive injections range from narrow stringers to lenses up to 50 feet wide. They were apparently injected during the folding and distortion of the sediments. They are acidic in composition, porphyritic in texture, light in color, contain glass and fine metallic sulphides, quartz, calcium and various other minerals. These igneous masses, locally called porphyries, were determined megascopically as andesite lava dikes and masses. Small faulted and altered blocks of this material were found along the vein in the tunnel on the Red Devil group.

The ore showing has been uncovered the length of the cut and has been traced with shafts another 300 feet. The vein, which consists of a shear zone 6 to 10 feet wide, strikes N. 40° W. and dips 54° SW. This zone, as exposed in the cut, has a schisted concretionary sandstone footwall and a black shale hanging wall. The ore lies mainly in the shale.

The tunnel was driven along the sandstone band and the 9-foot crosscut cuts across the shear, exposing 6 feet of ore. At a point 66 feet in from the portal a small block of dike material was encountered which is also impregnated with cinnabar and small amounts of stibnite.

The outcroppings of the vein in the cut shows considerable cinnabar distributed as loose and unattached pieces. The stibnite has weathered considerably from this surface ore, but is readily seen upon breaking a large float piece. Sampling of the vein over its entire length in the cut would give a higher mercury content due to the weathered and leached conditions. A rough estimate of the mercury content of this shear, taken from the few samples that were obtained,* shows an average content over one per cent.

The shafts and cuts above the tunnel were filled to the extent that samples were not obtainable. The dumps contain porphyry, shale and sandstone showing a scattering of impregnated cinnabar and stibnite.

Mineralization:

The two ore minerals in this vein are cinnabar and stibnite, which are associated and contain small amounts of gold and silver. The weathered ore on the surface has a higher mercury content, due to the leaching of the stibnite, than the ore in the crosscut of the tunnel. The highest grade ore is confined to small lenses in the center of the shear consisting of nearly massive cinnabar and stibnite. The content gradually diminishes into the walls and increases in the parallel shears. Small amounts of realgar and orpiment were noted in spots.

*Note sketch for assays.

On the footwall the ore solutions have in spots penetrated the sandstone for a few inches, forming in the cracks of the concretions of the sandstone. Generally the ore is more abundant in the fractures and brecciated masses of the shales.

The associated gangue minerals consist of quartz, calcite, clay, sand, altered dike material, graphite and various altered products in earthy gouge form. Pyrite in very small crystals was observed in the dike material.

Problems and General Aspects Regarding the Mining of Mercury in this Region:

Further development on this vein is warranted to determine the length of the mineralized section and the general tenor of the ore. Since the vein is covered with fine sediment to a depth of 20 to 30 feet, surface development is expensive. The method used in groundsluicing has been satisfactory in exposing the lower portion of the vein, but at higher elevations this method would necessitate the construction of long ditches and would not be advisable. The only logical method is to continue underground development in the tunnel, following the vein. The present tunnel work has been done by hand and portable machinery is recommended.

The cost of operating machinery, labor and transportation is high in this region. While the property is easily accessible to river transportation, the rates are $55 a ton from Seattle. This is by salt water to Bethel at the rate of $22 per ton, and $23 per ton via Santa Anna Steamship to Sleetmute via the river. While cinnabar is very easily reduced in low cost retorts to mercury in most ores, this ore, with the abundance of stibnite, which melts at approximately the same temperature and redeposits on the walls of the retort, is rather difficult to reduce and obtain a clean product.

Another factor which applies to this deposit and also the other deposits observed in the area, and to those that will possibly be discovered in the future in the much contorted sandstone and shales of this upper Cretaceous (?) age, is the mode of occurrence and its relation to mining. The mode of occurrence has for its relationships, the origin of the minerals and their source.

> Lindgren* on "Geneses of Quicksilver Deposits" states:
> "When it is noted that hot springs and volcanic surface flows are present in almost all regions of importance (except at Almaden and Idria), and that cinnabar in considerable quantities is associated with hot spring deposits, or is actually found deposited by hot springs, the argument becomes very strong indeed that such solutions have formed the majority of the deposits."

*Mineral Deposits, p. 548.

In the vicinity of Barometer Mountain, an elongated elevated ridge that is reported to consist of intrusive rock*, located a few miles south of these cinnabar deposits, hot springs were reported in evidence at the present time.

Directly beneath the shell of the shallow Cretaceous (?) sediments in the vicinity of the deposits, is to be found the lavas from which the numerous lava dikes and the hot solutions that formed the deposits, had their source. In other words, the underlying lavas are the outer phases of the Barometer Mountain Laccolith, from which these deposits have originated. The sediments during the period of igneous activity were folded, contorted and open spaces were filled with the igneous magma now represented by the numerous dikes, etc. Cooling of the underlying mass caused further distortion, developed shear zones, jointing, and small openings, through which the hot thermal water ascended to the surface and formed the deposits.

The sediments are thinly bedded, and with their present distortion, offer no single competent bed for deposition and as a result the deposits occur in all the formations, including the dikes themselves, according to the developed structures. Thus, these structures are shallow, irregular and irregularly distributed.

Further prospecting would no doubt reveal many more occurrences of these deposits in this vicinity. They would, however, be confronted with the usual problems. Prospecting in closer proximity to Barometer Mountain along the margins of the larger dikes is suggested. Also, the ends of the elongated intrusives should afford larger and more suitable structure for cinnabar deposits.

*U. S. G. S. Bull. 622, "Quicksilver Deposits of the Kuskokwim Region" by P. S. Smith & A. G. Maddren, p. 288.

MERCURY CROSS REFERENCE KUSKOKWIM PRECINCT

21 November 1946

For memorandum by Bruce Thomas

on Kuskokwim Mining Company operations during 1946 and present conditions at RED DEVIL and Decoursey properties:

SEE Letter dated November 18,1946

in BDS file Correspondence — Thomas