All of these claims are collectively known as the Lost Packer Mine.

(c) Enclosed are five copies of the Lien and Subordination Agreement properly executed by officers of the owner corporation.

3. PHYSICAL DESCRIPTION

(a) The Lost Packer lode was discovered in 1902 at the outcrop of the principle shoot, one thousand feet above the valley floor of Canyon Creek, a tributary of Loon Creek. Enough ore was developed within the next two years to merit the construction of 28 miles of wagon road from Bonanza to the lode and the erection of a 100 ton matte smelter at the mine site. During the next few years, the ore was rapidly developed by a series of six adits and one blind level driven progressively down the slope of the canyon wall, sixtyt to 200 feet vertically apart. At the Number Seven level the principle shoot in the lode was intersected by an intrusive sill. The operators did not attempt to search for the continuation of the ore immediately below this sill but instead started a new adit, designated the Number Ten, three hundred feet vertically farther down the slope. This lowermost adit was driven 2400 feet toward the supposed projection of the ore at the horizon but failed to encounter it to date and the continuation of the principle shoot has not been found below the number Seven level.

Two other shoots in the lode had been intersected by early exploration work but the ore of each was too low grade to be used without mixing, as direct feed to the smelter. The shoot 300 feet north of the major ore body was too high in silica to be smelted directly. It was developed on the third and fourth levels and only a token amount extracted. The shoot found 700 feet south of the major ore body

contained large amounts of siderite as well as some chalcopyrite and was mined to the level of # Ten adit to provide a needed flux mix for the smelter.

By 1912 it was concluded that sufficient high silica and other unmined low grade ores had been developed in the mine to justify the construction of a concentrator designed to upgrade these ores and render them amendable to smelting.

This plant was designed for a 50 ton per day capacity and its construction completed in 1916. Reputedly the first flotation mill to be built in Idaho, the plant was beset by troubles from the beginning. The builder, as an 'economy measure,' eliminated the intermediate crusher and installed the primary jaw crusher to feed directly to the Marcy ball mill. This reduced the crushing capacity from 50 tons as designed to 10 to 20 tons realized. The original mullers in the flotation cells were too heavy for the power transmission system and after many breakdowns were replaced. Except in early summer there was insufficient water for power to drive the plant. Little was then known of flotation principles and although the ore was not complex the concentrates and tailings were retreated over and over with pine oil as the only reagent. It was believed that the flotation water had to be heated and a large number of men kept busy cutting cordwood for the boilers.

The cost of the long # Ten adit and the investment tied up in the uneconomical mill exhausted the available funds of the company which had been depleted by a poorly timed dividend and in 1918 all operations were suspended, presumedly for a short time. During the 1920s some effort was made, for the most part without technical guidance, to explore for the principle ore body from the # Ten Adit, but without success.

In 1931, a forest fire destroyed the old smelter, the mill and all of the important surface buildings, and burned and caved the portal of Number Ten Adit. The fire and timber rot have caved the rest of the portals and since the fire none of the mine workings has been accessible.

(b) In 1959, the applicant leased the claims from the company now owning the property. For the purpose of determining the practicality of reopening the old workings he cleared away the surface material from the portal of the Number Ten Adit and reopened the adit for a distance of five hundred feet. Here the adit is closed by a cave of which ten or twenty feet must bespiled to open.

The applicant's grandfather and father were principles in the ownership and operation of the property from 1904 to 1931.

(c) The original smelter settlement sheets have been lost and the custom smelter records were destroyed following the transfer of the Salt Lake A S & R smelter to the Kennecott Co.

A summary made from original records which are not now available is quoted. ~~There~~ This is presumed to be complete record of shipment.

	Tons of Crude Ore	Net to Smelter
1904 to 1909	5,500	$ 325,597.71
1909 to 1916	3,680	216,326.04
1916	9 00	15,165. 40
Total	10,080	$ 557,089.15

(d) ORE RESERVES. Present inaccessibility of the mine workings preclude verification of reported ore reserves. ~~This~~ There is, however, substantial reason to believe that much chalcopyrite was left in the mine because of grade or the difficulty of processing with the facilities available.

We know that the mill was constructed only after it was determined that sufficient ore was available to justify its financing. Had the mill been successful,

this ore most likely would have been mined. It was through no deficiency of the ore that the mill was not successful.

We know that the north shoot was developed on the third and fourth levels and that only a small amount of this ore was mined. This ore is described in considerable detail in USGS Bulletin 539, Page 97.

We know that the south shoot on the lode ~~was~~ has mineralization continuing below the Number Ten adit where it was last mined.

USGS Bulletin 539, Page 98, reports with regard to the center shoot, "Thus the ends of stopes <u>temporarily</u> abandoned are generally in ore running about $25.00 to the ton, whereas the portion removed averaged between $70.00 and $90.00 to the ton. "It also reports, with regard to the mine as a whole, Page 90, "..... for every ton of ore ... running $70.00 to $90.00 a ton there are estimated to be 2 1/2 tons which will average $25.00."

However, even at today's metal prices, such bodies cannot be considered as 'ore' unless backed by a modern benefication plant, and 'per se' the reported 'ore bodies' are not sufficiently in evidence to economically justify such a plant.

On the other hand, if this plant can be justified by the discovery and development of the higher grade ores of the center shoot continuing below the #7 level, then these known lower grade ores become of considerable economic significance.

(e) <u>GEOLOGIC FEATURES</u>. The earliest available description of the Lost Packer lode was provided by E. P. Jennings who visited the mine in 1904 and described his obeervations in The Journal of the Canadian ;Mining Institute, 1906, Volume IX. Copies of this Report are attached.

In 1911, Joseph P. Umpleby visited the mine while it was in operation and reported fully on its production, current ore reserves, and geology in USGS Bulletin 539, "Some Ore Deposits in Northwestern Custer County, Idaho.

In 1927, Clyde P. Ross visited the mine in the course of geologizing the Casto Quadrangle and, although the old stopes were no longer accessible, he did examine the Number Ten adit and portions of the other adits still open. In his USGS Bulletin Number 854, Geology and Ore Deposits of the Casto Quadrangle, Idaho, he presents the most erudite interpretation available of the geology both of the general area and of the mine.

In preparing the proposed plans for the exploration of the property, the applicant has relied heavily on Jennings and Umpleby's reporting on the nature of the ore bodies, since they observed the ore while in the process of being mined, and on Ross's later intrepretation of the geology of the area.

All of the mine maps and records still extant are in the applicant's possession. These are complete as to the extent of the adit levels but little has been recorded pertaining to mineral occurrence and ore extraction.

The applicant will not attempt to repeat in full detail herein all of the geological information available since this is well presented in Ross's Bulletin #854, pages 119 through 123, and Umpleby's Bulletin #539, pages 90 through 98. It should suffice to describe these features bearing directly on the possible rediscovery of the lost center shoot.

The ore occurs as a massive chalcopyrite containing variable proportions of gold and associated with quartz and siderite as principle gangue minerals. It has been found in three steeply pitching parallel shoots along the plane of a twenty foot and wider shear zone occurring in micaceous schist. The schist appears to be a large

block of Algonkian sedimentaries flanked on east and west by, metamorphosed by, and intruded by plutonic rocks of both Jurassic and Tertiary age. The schist block is covered to the north just beyond the outcrop of the center shoot by a capping of Challis (Oligocene?) Volcanics. Within the schist block, the igneous rocks of Jurassic age appear as dikes and sills of applite and lamprophyre, late stages of the intrusive cycle of the nearby Idaho Batholith. The ore mineralization appears to be a final phase of this intrusion and is later than the applite and the lamprophyre.

The igneous rocks of Tertiary (Miocene) time are identified by Ross as being dikes and sills of granophyre and dacite porphry, a late phase in the intrusion of a body of 'pink granite' considerably to the north and east of the mine area.

The ore mineralization is probably the result of hydrothermal filling of open channels which were produced by the matching of concave walls during premineral faulting.

Generally the lode strikes N 5^0 E and dips 75^0 to the NW.

The center shoot was frequently intersected by a number of variedly dipping sills which appear to have shoved apart the points of ore contact. The operators interpreted the resulting apparent displacement as a product of faulting and they developed a rule of thumb whereby they sought the ore beneath an intruding sill to the east a distance equal to the thickness of the sill. They followed the shoot successfully in this manner to the level of # Seven Adit. Although the true dip of the lode was 75^0 Nw (striking N 5^0 E)

The effect of these intrusive sills was to align the adits driven in ore so that each would be almost immediately below the one above, thus demonstrating little apparent dip.

At the level of the # Seven Adit, the ore was again intruded by a sill. Instead of seeking the ore immediately below this sill where it could be simply projected (this would have required 'underhand' work) the operators confidently started a new adit (the # 10) three hundred feet vertically below the # Seven. To reach the ore zone as projected to that level it was necessary to drive this adit from the surface two thousand feet parallel to the strike of the lode.

Maps dating to 1912 show the face of this adit as immediately underneath the # Seven level where the ore was last seen and in the area where the ore might be expected if intersecting dikes continued to offeet the vein dip. This is the adit position as shown on the maps contained in Umpleby's Report. A survey made by the operators in 1914, while attempting to connect a raise through to the Number Seven level, disclosed that the drift was actually 54 feet farther east than previously mapped. In this area, a minor mineralized zone had been encountered, and this zone appears to have continued to decoy the operators in almost all subsequent exploration. Other zones similar to this have been noted in exploration on the upper levels parallel to the main ore body and it is now presumed that the minerals found in Number Ten are of a similar relationship.

(f) <u>REASONS FOR THE PROPOSED EXPLORATION</u>. If allowance is made for the true dip of the vein, N. 75^0 W, and for the error contained in the surveys made prior to 1914, the projection of the lost ore body is then into an area west of the exploration work done from the Number Ten Adit. This area has been

entered only partially by one short crosscut and here an intruding sill could well mask any possible ore occurrence.

The area recommended for exploration is a zone 450 feet by 85 feet in cross section immediately to the west of the Number Ten Adit workings. The zone was delineated by the projection of the true 75^0 dip of the lode downward from the Number Seven level workings where the ore was last mined. To define the westward border of the possible zone, it was assumed that no compensating offset of the lode dip has been brought about by intersecting dikes. To define the eastern most border of the zone it was assumed that any such possible displacement might have offset and eliminated the effect of the true lode dip to the west. Since the pitch of the shoot along the strike has been somewhat irregular, provision is made to drill from three stations along the strike of the lode. At each of these points, three to four holes at different angles to the horizontal are suggested to be certain that the ever present sills do not conceal the presence of the ore and to further outline the ore body if found.

It is a portion of this zone that Ross has recommended for exploration (Bulletin 854, Page 122) His recommendations involve the use of raising and crosscutting techniques as a means of looking for the ore. It must be remembered, however, that diamond drilling techniques were not developed for such applications at that time. It is believed that these diamond drilling techniques can now be used much more exhaustively and economically to probe almost all possibilities.

Photographed from ' The Journal of the Canadian Mining Institute, 1906, Vol IX.

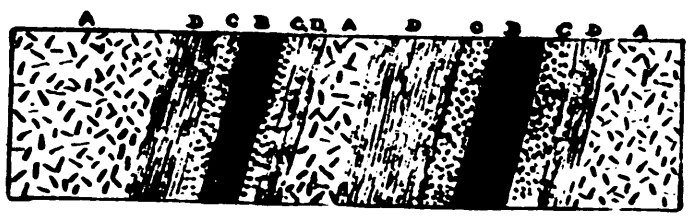
THE LOST PACKER COPPER GOLD LODE.

By E. P. Jennings, Salt Lake City, Utah.

This remarkable lode is located in Loon Creek Mining District, Custer County, Idaho, 25 miles north west of the town of Custer, and 120 miles west of Mackay, a station on a branch of the Oregon Short Line Railroad.

The District was a noted placer camp 35 years ago, then abandoned until 1902, when the lode was discovered and bodies of chalcopyrite, containing 2 to 10 ozs., of gold were opened and shipped by pack train and wagon to the railroad at Mackay, thence to the Salt Lake City smelters.

Sufficient ore was produced in two years to pay all the cost of development, which placed large bodies of chalcopyrite in sight.



SECTION LOST PACKER LODE
A. GRANITE. B. COMPACT CHALCOPYRITE.
C. LEAN ORE. D. SERICITE-CHLORITE SCHIST

The mine is situated on the southern slope of Packer Mountain, which rises 2,000 feet above Canyon Creek, a small tributary of Loon Creek. giving ample opportunity for development by adits, six of which have been driven, the lowest exposing the ore 750 feet below the outcrop.

Packer Mountain is a complex of mica schists, knobs and bosses of granite and dikes of felsite and aplite, with its summit covered by a heavy sheet of rhyolite.

This portion of Idaho is extremely rugged; the mountains having an elevation of over 10,000 feet, with deep valleys and canyons.

The lode occupies a shear zone, which has been traced from near the bed of Canyon Creek to the rhyolite sheet capping the summit of the hill, a distance of 5,000 feet. The zone has a minimum width of 30 feet, and strikes N. 5° E., with a dip of 77° W., and cuts both the granite and mica schist, but is intersected and faulted by the intrusive aplite and felsite dykes.

The ore is chalcopyrite containing from 2 to 20 ozs. of gold and a small amount of silver. The high grade ore is compact and massive, occurring in well defined shoots, 100 feet long and 6 feet maximum width, near the foot wall, continuous in depth to the lowest workings; another body of ore occurs near the hanging wall of the lode and separated from the foot wall shoots by 25 feet of mixed ore, schists and partially altered granite. These high grade ore bodies, averaging 15 per cent. copper, are enclosed in bodies of lean ore that are practically continuous for the full length of the tunnels and are mixtures of chalcopyrite, granular quartz and chlorite-sericite schists; the amount of chalcopyrite becoming less as the walls are approached.

A narrow band of sericitic granite is intercalated between bands of schist near the centre of the lode. These schist bands contain granular quartz, sericite and chlorite with small amounts of chalcopyrite.

The lode has been subjected to movements subsequent to its mineralization, both along its strike, as evidenced by the many "slips" and slickenside surfaces. particularly at the contact of the solid chalcopyrite and the low grade ore, and also by transverse faults. A nearly horizontal felsite dike 20 feet thick displaces the ore 5 feet to the west, between the 2nd and 3rd levels; a short distance below this dike two faults occur nearly parallel to it and also displace the lode a few feet to the west. The lode is also faulted by two aplite dikes; one near its north end with an E-W strike, displacing it 20 feet to the west and the second, several hundred feet south of the first dike, that has a strike of N. 20° E. This latter dike faults both the lode and the horizontal felsite dike 5 or 6 feet.

The following minerals have been recognized in the lode: Gold and silver bearing chalcopyrite, bornite, native copper, quartz, sericite, chlorite, barite, calcite, with malachite stains, hematite and limonite in the zone of oxidation. Pyrite, an almost universal lode mineral, is absent.

The zone of oxidation is 30 to 40 feet thick, resting directly on the unaltered sulphides that present no evidence of secondary enrichment more than the occurrence of thin coatings of bornite in a few places and metallic copper in the quartz ore near the crossing of the aplite dike. Erosion has closely followed the weathering of the lode on this precipitious hill side; this in connection with the compact nature of the ore and lode filling, is unfavorable for secondary enrichment.

The axes of the ore shoots coincide with the principal shear planes; the ore completely replacing the original granite, which may have been crushed by the formation of the shearing fractures, forming deposits of compact chalcopyrite. On either side of these shoots and separated from them by post-mineral slip-planes, the rock is more or less impregnated with chalcopyrite. Thin sections of this material show grains of quartz enclosed in sericite with chalcopyrite in irregular masses disseminated through the sericite and penetrating seams in the quartz. The quartz is evidently an original mineral of the granite and the sericite an alternation product of the feldspar. Thin sections from different portions of the lode and the granite walls exhibit abundant sericite and small amounts of chalcopyrite, the amount of the latter depending on its position in regard to the principal fractures.

The action of the mineralization processes was of too short duration to completely mineralize the shear zone and a complex vein resulted with the principal mineralization along those fractures that offered the least resistance to the solution.

There is no evidence that any portion of the lode was an open fissure, but it is rather a replacement of the more highly brecciated portions of [illegible] zone with an abundant formation of sericite replacing the feldspar and ferro-magnesian

minerals. It can be classed with those metasomatic deposits of the sericitic, copper-gold type as described by Lindgren.*

I infer that the formation of the shear zone and its mineralization followed closely the granite intrusion, and that thermal waters as the last phase of the vulcanism producing the intrusions of granite, were the mineralizing agents. The nature of these solutions is doubtful, but from the amount of sericite formed, they must have been rich in potassium salts, and contained gold, silver, copper, iron and sulphur, but were deficient in silica unless this substance was held in solution by an excess of potassium carbonate and deposited in the upper portions of the lode which are now eroded.

The remarkable features of the lode are: the absence of all primary sulphides but chalcopyrite which is everywhere present; the scarcity of secondary or vein quartz and all common gangue minerals that are directly precipitated from mineralizing solutions. The quartz present was undoubtedly a constituent of the original granite and the chlorite and sericite are derived from the hornblende and feldspar of the same rock.

The later eruptives had no known effect on the mineralization beyond an increase in the gold content of the ore near the felsite dike, but their mechanical effects are shown by the numerous faults and slips and schistose structure of portions of the lode.

My deductions are based on observations made during a brief visit in 1904, supplemented by information concerning later developments furnished me by John P. Boyle, Superintendent of the mine and L. Webster Wickes, Mining Engineer, and I also extend my thanks to both gentlemen for samples of ore and lode material.

* W. Lindgren: Metasomatic Processes in Fissure Veins. Trans. Am. Inst. Mining Engrs. Vol. XXX, p. 676.