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Yak Mill & Tunnel
Lake Co., Colorado

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C O L O R A D O, U. S. A.

(From Our Own Correspondent)

Denver, February, 1909.

THE YAK TUNNEL, LEADVILLE.

A brief description of the Yak Tunnel, Leadville- one of the most important and up to date mining enterprises in Colorado at the present time- will doubtless interest the world-wide readers of "THE MINING JOURNAL," as showing the latest phase of the evolution of the perennial Leadville mining district.

The special characteristics of the Tunnel are :-

- (1) It furnishes an economical method for the transportation of ore and waste from a large territory in the heart of the mineralized cone.
- (2) It drains the same area at a very much less cost than the pumping previously necessary.
- (3) It admits of exploring the various mineralized zones of the district at depth, in the least expensive and most effective manner.

The writer took the opportunity afforded, when attending the recent 30th anniversary of Leadville on the 28th ult., to spend the forenoon of the 29th ult., in the Yak Tunnel.

The Yak Mining, Milling & Tunnel Company is a close corporation composed of a few Colorado men and some of their personal friends in other States. There is no stock for sale.

The Yak Tunnel was commenced in the late "eighties", primarily to tap the Cord Group (half a mile from the portal) at depth, thereby affording drainage and transportation facilities. For various reasons, not necessary to mention here, the original Company was re-organised twice, the Colorado men continuing to furnish the necessary capital, having absolute confidence in the merits of the enterprise and the ore-producing possibilities of the area to be tapped by the Tunnel at depth.

NEARLY FIVE MILES OF TUNNEL AND LATERALS.

The Tunnel starts in California Gulch (famous in the "sixties" for its gold placers), a short distance south of the town of Leadville and runs in an Easterly direction, its present breast, about 15,000 feet, or nearly three miles from the portal, being in the Resurrection Group. In addition, there are a number of laterals, aggregating about 10,000 feet, of nearly two miles, branching right and left from the main Tunnel, tapping adjacent properties at depth.

The Tunnel itself taps a number of mining properties, among others, the No. 4 shaft of the Ibez Mining Company, commonly known as the "Little Johnny," at nearly two miles from the portal and 1,200 feet vertically below the surface, thus affording gravity drainage to the Ibez Group, and terminating the great annual cost of pumping to which the Company had been previously subjected.

The Ibez Group has produced \$18,000,000. of mineral since 1893 gold being the principal item in the ore.

The Ibez Group is now operated by numerous sets of lessees, subject to royalties, each set of lessees having a block of ground, the Company doing the hoisting and keeping close supervision over the operations of the lessees. Under such circumstances it is found better by the Ibez Company to hoist most of the ore to the surface through its ore shafts (which are reached by railroad "sidings") rather than ship the ore through the Yak Tunnel.

The Leadville Exploration & Mining Company, an auxiliary of the Yak Mining, Milling & Tunnel Company, is now the principal factor in the extension of the Tunnel. This Company also mostly represents Colorado capital, but includes among its shareholders ex-Governor Herrick of Ohio and capitalists in Paris, represented by Mr. John H. Harges, the business associate there of Mr. J. P. Morgan. The object of the Company is the developing and draining of what is known as the Evans Amphitheatre, bringing within the range of profitable operation a comparatively vast mineralised territory which, if depending on pumping and hoisting through shafts to the surface would probably never be exploited.

The Leadville Exploration & Mining Company has obtained from the owners of numerous properties in the Evans Amphitheatre ten-year leases, subject to royalties on the ore extracted, and the Yak Mining, Milling & Tunnel Company receives five percent drainage royalty, under 99 year tunnel agreements, on all ore mined below 500 feet from the surface.

A TYPICAL LEADVILLE GROUP.

As an illustration of the character of the area to be tapped by the Yak tunnel, we will take the property of the Resurrection Gold Mining Company, a close corporation composed of two Colorado men and the Estate of a third recently deceased. The Company owns 240 acres of patented ground on Little Ellen Hill.

The writer visited the property in 1900, at which time only 33 acres had been opened up. The property was acquired in 1894, and the subsequent ore shipments were 1895, 5,000 tons; 1896, 2,000 tons; 1897, 16,000 tons; 1898, 24,000 tons; 1899, 36,000 tons.

Up to the time of the writer's visit in 1900, the ore had averaged \$20.27 per ton, 50 percent of the value being contributed by the gold, 32 percent by the lead and 18 percent by the silver.

Subsequent to 1900, owing to increased cost of pumping, somewhat lower grade of ore, and lower price of lead and silver, operations were discontinued, and the extensive workings allowed to fill with water.

On 10th ult. a 50 ft. horizontal drill hole from the then breast of the Yak Tunnel reached one of the lower workings of the Resurrection, at a vertical depth below the surface of 1,065 ft., followed by three other drill holes (the four drill holes ranging from one and a half to three inches in diameter), and at the time of the writer's visit, on 29th ult., the Yak Tunnel was moderately flooded by the water still escaping from the Resurrection workings, which, however, would soon be sufficiently unwatered to admit of the further driving of the Tunnel into and through the Resurrection ground.

Speaking generally, and of that part of the district known as the Leadville Basin, including the Cord Group and the first portion of the Yak Tunnel, the rocks lie flat and the ore is found in blanket veins. The formations occur in the following order downwards: (1) Surface wash; (2) White porphyry; (3) Blue limestone; (4) A quartzite parting; (5) white limestone; (6) Cambrian quartzite; (7) Granite. The largest bodies of ore are found in chutes or channels having a north easterly and southwesterly direction lying on the planes of contact or stratification of the different rocks and often to a large extent replacing the rocks themselves.

It is not unusual to find the ore bodies of great thickness and extent. For instance, years ago in the A. Y. & Minnie Mine, on Iron Hill, a short distance south of the line of the Yak Tunnel, a solid body of carbonate ore, free from waste, was blocked out 941 feet long, 176 feet wide, average thickness 67 feet, such ore averaging 48 ounces of silver per ton and 15 percent lead.

TYPICAL LEADVILLE ORE BODY.

At the time of my visit to the Yak Tunnel (29th ult.) in the Cord Group, operated through the Yak Tunnel, mining was being prosecuted on a similar body, but of sulphide ore, and not always solid ore. This ore body is being, or has been, worked on seven levels, including a depth of 585 feet below the level of the Yak Tunnel.

From this and other properties along the line of the Tunnel about 8,000 tons of ore per month are shipped, as yet very low grade only, averaging about \$7 per ton, the values consisting of lead, silver, zinc, copper, and iron, with a little gold. This class of ore could not be mined except by means of the Tunnel. Of course, higher grade ore is one of the probabilities, especially of the area further east reached, or to be reached, by or from the tunnel.

THE YAK MILL.

Ore sufficiently free from zinc as to escape "penalty" is shipped to the zinc-separating mill (capacity 200 tons) of the American Zinc Extraction Company within 200 yards from the portal of the Tunnel, which mill also purchases and treats zinciferous ores from the Iron-Silver and other adjacent mines, as well as those from the tunnel.

The gold bearing ores in the "gold belt" in such properties as the Ibex Group, already traversed by the Tunnel, and the Resurrection Group, just reached by the Tunnel, are in continuation of the same lead-silver ore bodies previously discovered further west, and are a part of the system in which ore shoots have evidently been enriched in their gold contents by the influence of the porphyry dykes. In 1900 the ores of the "gold belt" were considered as found at the contact plane of the blue limestone with the eruptive rocks, and in lower horizons, and also in the porphyry dykes.

The ores in the "gold belt" are silicious, carrying gold and silver and a small percentage of lead and sulphide ores, also a small percentage of copper.

THE DISCLOSING OF VERTICAL FISSURE VEINS.

As mentioned in my last letter, formerly the Leadville ore deposits were regarded as occurring almost entirely in horizontal formations. Development work in recent years has disclosed vertical fissure veins, which are coming to be regarded as the original source of the horizontal ore deposits. As also mentioned in my previous letter, The Ibex Group, traversed by the Tunnel at a vertical depth of 1,200 feet, is said to have yielded practically one half of its output of \$18,000, since 1893 from vertical fissure veins.

As to the formations easterly on the "gold belt" on the line of the Tunnel, at the time of the writer's visit in 1900 to the Resurrection Group, No. 2 shaft of that group had passed through the following strata, 400 feet Webber grit; 150 feet Webber shale; 100 feet white porphyry; 125 feet blue limestone; 25 feet parting quartzite; then white limestone. The ore was struck at 650 feet from the surface, just below the white porphyry and above the blue limestone, and again in the white limestone beneath the parting quartzite.

The development of the Resurrection Group and adjoining area from the Tunnel, at a vertical depth of more than 1,000 feet, is fraught with great probabilities. For instance, the New Monarch Group, representing Ohio capital, a very short distance north of the present further portion of the Tunnel, has sufficient ore blocked out, averaging \$20 per ton, the values mostly in gold, to admit of shipments of 200 tons per day for several years.

The further extension of the tunnel beyond the Evans Amphitheatre into and through the Mosquito Range, emerging to daylight in Park County, is one of the possibilities of the future; and as the entire route is known to be more or less mineralised, any prediction at this time as to the mineral producing, results of such further extension might savor of exaggeration.

MADE POSSIBLE BY ELECTRICAL POWER:

The Yak Tunnel and its laterals to-day are largely the result of the utilization of electrical power and the more economical operations thereby rendered possible, as compared with the cost of previous steam power. There is not a steam power plant on or in connection with the

enterprise. The equipment consists of four 30 H. P. electric locomotives, several of less power, and an ample number of mine cars. There are two electric pumps for raising the water from the lower levels of the Cord to the Tunnel level; five electric hoists, ranging from 10 H.P. to 75 H.P. each; two electric air compressors; a 150 H.P. electric motor (about to be replaced by one of 200 H.P.) and another of 100 H.P. There is an electric lighting system throughout the Tunnel and in the various winzes, interior shafts and stations. There is also a telephone system through the tunnel, the office, store rooms and workshops at the portal, aggregating 26 instruments, effecting great saving of time. The Tunnel is also equipped with a block system of signals, precluding collisions. At the time of my visit there were 120 men on the pay-roll.

THE PERSONNEL OF THE MANAGEMENT:

The success and credit of the enterprise are largely due to Mr. W. S. Davis, the Vice-President and General Manager of both the Yak Mining, Milling & Tunnel Company and the Leadville Exploration & Mining Company, but for whose exertions the Tunnel would not have been extended to the Ibez Group and certainly not beyond that. Within a radius of a mile from the present breast of the Tunnel there are five shafts, ranging from 1,000 to 1,100 feet deep, all on different properties, heretofore under different managements and largely in litigation with each other, the surface equipments of which aggregate over \$1,000,000. By Mr. Davis's efforts all these properties are now under the management of the Leadville Exploration & Mining Co. Through Mr. Davis's personal efforts also, notwithstanding the financial slump in New York City in October 1907, and the resulting dulness throughout 1908, the Company increased its operations during last year, having driven the tunnel two-thirds of a mile in 1908.

The Superintendent, Mr. John R. Champion, is a progressive Cornishman, and is regarded as one of the most competent mine-superintendents in Colorado. The details of the workings, such as timbering, handling of ore, labor saving devices etc., show that minimum cost of production, combined with safety and efficiency, is the one principle adopted. He is a credit to his native County.

It will be seen from the foregoing what an important factor the Yak Tunnel already is and is destined to be in the future extension; laterally and vertically, of the Leadville ore producing district, especially having regard to the reduced cost of production effected by the Tunnel in obviating pumping and hoisting, and by using electrical instead of steam power.