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MT-100
Exhibit 3

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LEADVILLE LEAD CORPORATION

AND THE

HILLTOP CONSOLIDATION

APRIL 30, 1947

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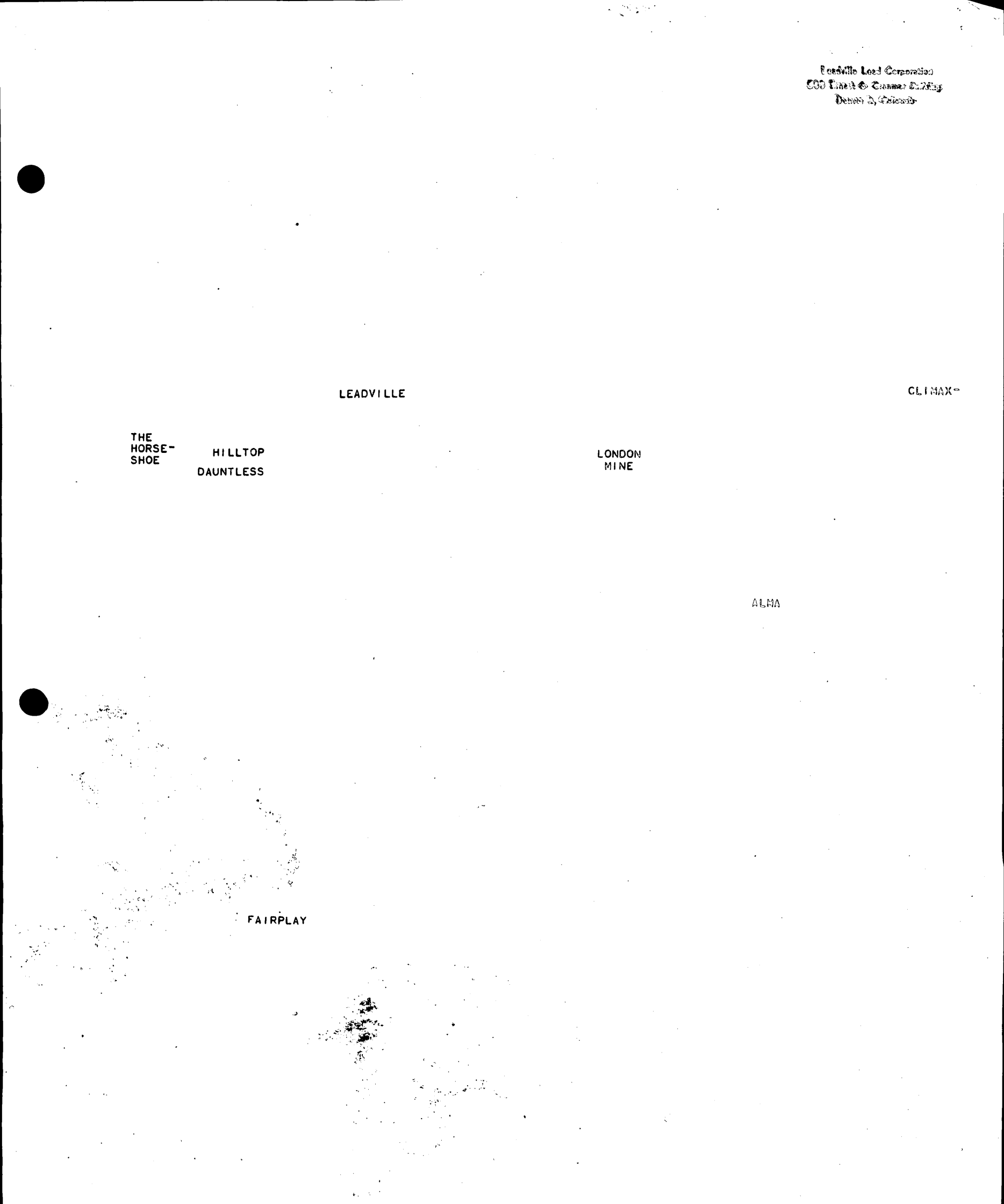

AERIAL PHOTOGRAPH OF THE MOSQUITO RANGE.

PHOTOGRAPHED BY THE U.S. RECLAMATION SERVICE, JANUARY, 1946 FROM 28,000 FT.

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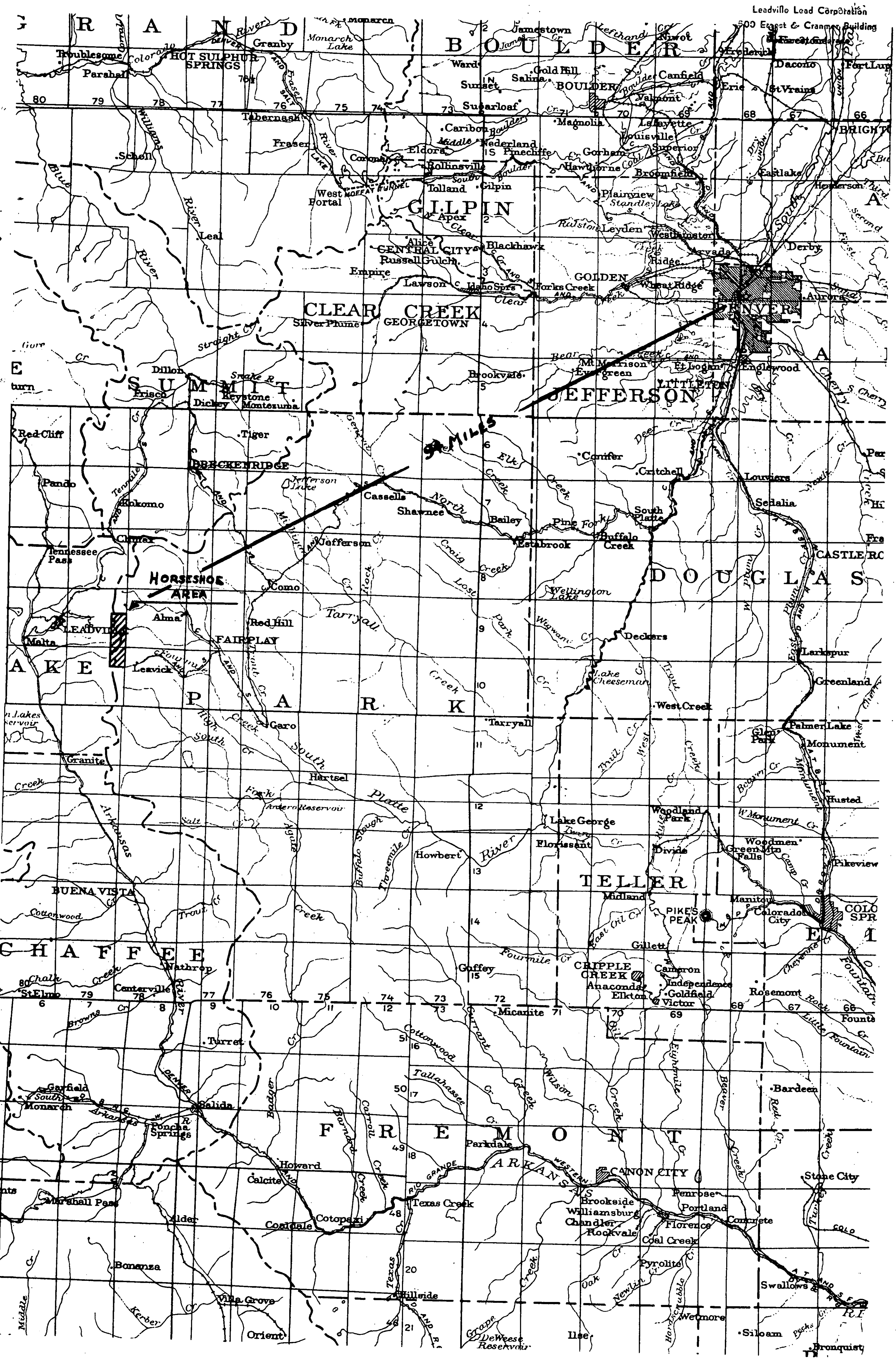

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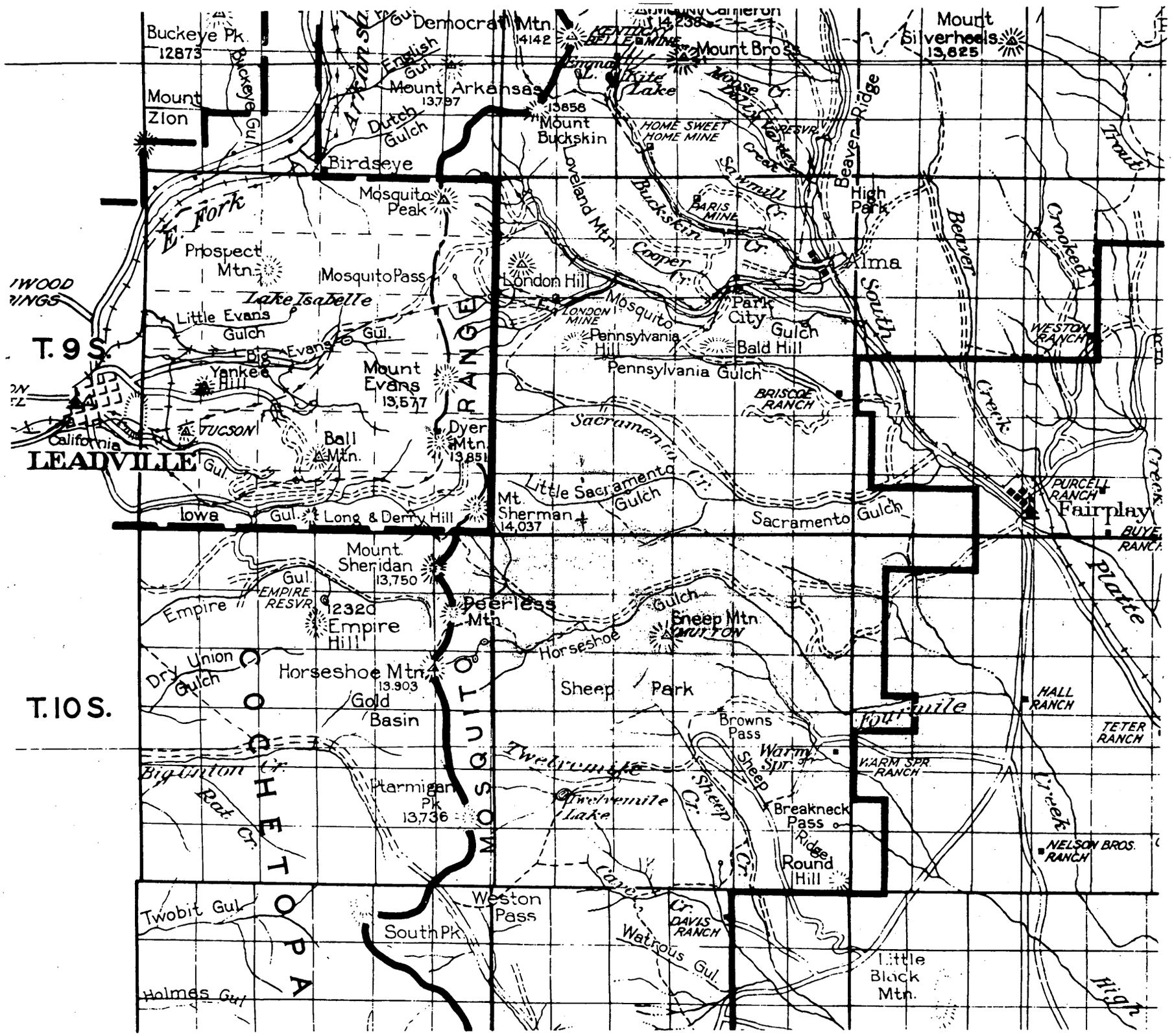
Buckeye Pk.
12873
Mount Zion
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Democrat Mtn.
14142
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13797
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English Gul.
Dutch Gulch
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13858
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13,825
Beaver Ridge
Mosquito Peak
E. Fork
Prospect Mtn.
Mosquito Pass
Lake Isabelle
Little Evans Gulch
Big Evans Gul.
Yankee Hill
Mount Evans
13,577
Dyer Mtn.
13,851
Ball Mtn.
California
LEADVILLE
Gul.
Iowa Gul.
Long & Derby Hill
Mt. Sherman
14,037
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13,750
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EMPIRE RESVR.
Empire
12320
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Sheep Cr.
Breakneck Pass
Ridge
Round Hill
Ptarmigan Pk.
13,736
Bigunion Cr.
Rat Cr.
Twobit Gul.
Weston Pass
South Pk.
Cave Cr.
DAVIS RANCH
Walrous Gul.
Little Black Mtn.
Holmes Gul.
Alma
Park City
Gulch
Pennsylvania Hill
Pennsylvania Gulch
Bald Hill
London Hill
LONDON MINE
Mosquito
Cooper Cr.
Buckskin Cr.
Sawmill Cr.
BARIS MINE
Moose Cr.
Kite Lake
Engman L.
KENTUCKY BELLE MINE
Mount Cameron
14,238
High Park
Beaver
South
Crooked
Trout
WESTON RANCH
BRISCOE RANCH
Sacramento Cr.
Little Sacramento Gulch
Sacramento Gulch
PURCELL RANCH
Fairplay
BUYER RANCH
Platte
Four Mile
HALL RANCH
TETER RANCH
WARM SPR. RANCH
NELSON BROS. RANCH
High
Creek
Creek
T. 9 S.
T. 10 S.
MOSQUITO
CHEYENNE
OPA

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LEADVILLE LEAD CORPORATION

INTRODUCTION and SUMMARY

LEADVILLE LEAD CORPORATION controls the HILLTOP CONSOLIDATION of lead-silver-zinc mines, the largest and most continuous ore deposit so far discovered in Park County, Colorado.

These mines are in the HORSESHOE AREA sometimes called EAST LEADVILLE, the eastern extension and last frontier of the LEADVILLE DISTRICT, 7 miles from the town of Leadville, and 94 miles southwest of Denver. They were never previously assembled under one control. The titles are sound.

The Horseshoe geology is identical with that of Leadville. This area is separated from Leadville proper by a high mountain range.

Due to its isolation from markets and to the fact that its probable ore deposits are concealed by barren outcropping formations and by thick talus accumulations, HORSESHOE is today the least developed and most promising area of the Leadville district, and probably represents Colorado's largest potential source of lead ore.

The mines controlled by LEADVILLE LEAD CORPORATION have been the largest producers of the HORSESHOE AREA and have yielded more than 4 millions of dollars by hand mining through shafts, with primitive operating facilities and with excessive marketing costs.

The most productive ore shoot so far mined averaged 30 feet in width for 2000 feet in length, with average stoping height of 70 feet. Two other occurrences were mined for 800 and 1800 feet, respectively, with average width of 15 feet. The fourth ore body was quarried from the surface to a depth of 20 feet for 30 feet in width and 100 feet in length.

The average grade of all ore marketed was probably 25 oz silver, 20% lead and 10% zinc.

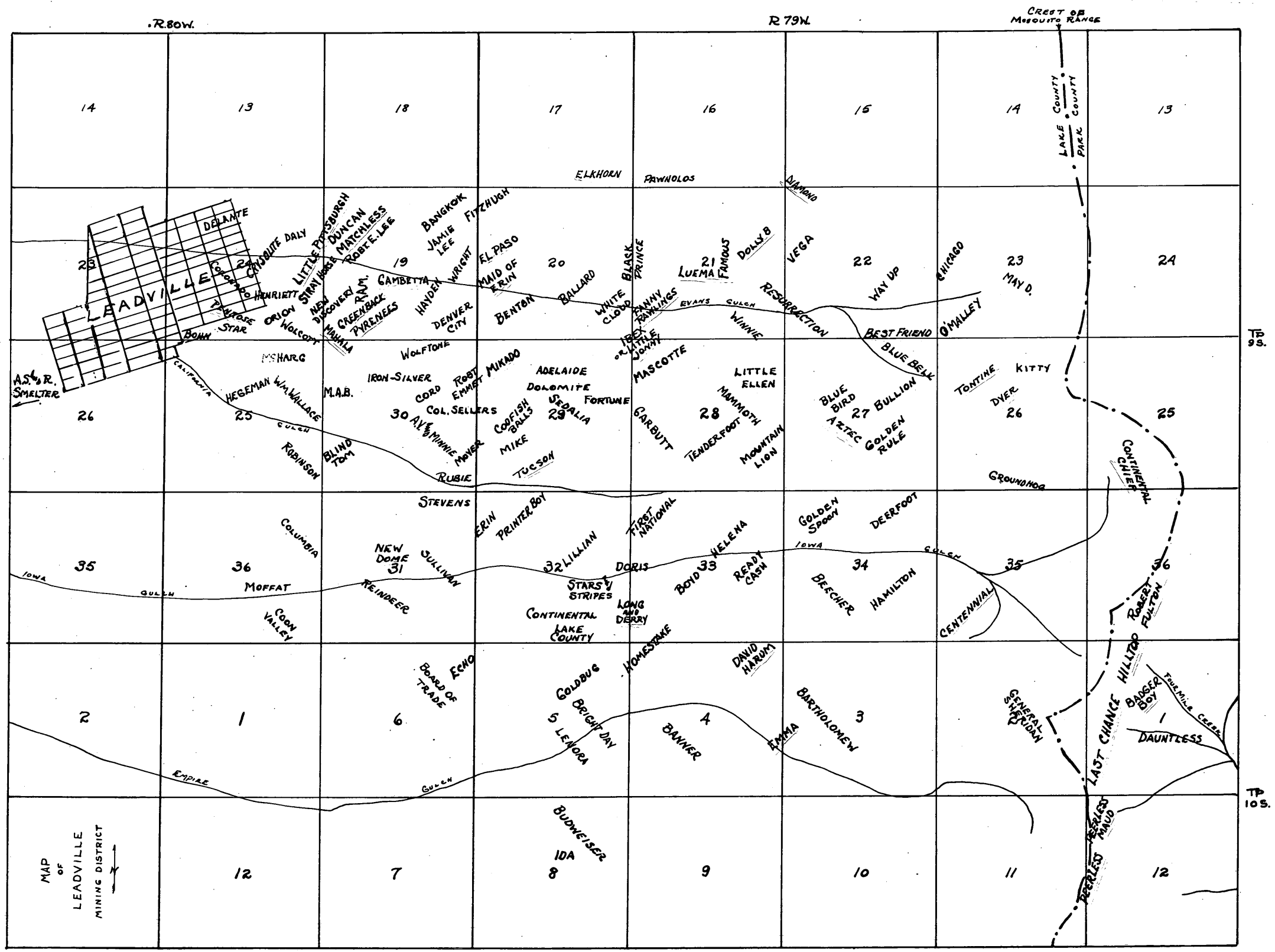
This 4 million dollar output, if made under April 1947 metal prices, would have grossed more than 8 millions. The production costs of the operation now planned would be lower than those of the period (1873-1921) wherein this production was made, in spite of the low wages of the early days.

Because the Blue Limestone country rock, wherein much of the ore occurs, stands without timbering, and because tunnel haulage and drainage will eliminate hoisting and pumping, Horseshoe mining costs are lower than average.

Most of the Horseshoe mines were never re-opened after the silver decline of 1893. The Hilltop proper has been idle since the silver drop of 1923. The mine openings have been sealed with ice since 1923.

Much of the ore now exposed could not be mined profitably when discovered because of a 4¢ price for lead and a 56¢ price for silver between 1893 and World War I.

Four mining engineers, Murray F. Crossette, Herbert C. Enos, Walter S. Larsh, and Carl O. Lindberg, reported on the HILLTOP MINE during the last two years of its operating life. All agreed that the possibilities were excellent for the development of sizable new ore occurrences, as well as for the extension of old ore bodies, both downward below old workings and on the strike beyond both ends of these occurrences.


R.80W.
R 79W.
CREST OF MOSQUITO RANGE
LAKE COUNTY
PARK COUNTY
TP 9S.
TP 10S.
LEADVILLE
DELANTE
CRESCENT
CRYSOLITE DALY
LITTLE POTTSBURGH
DUNCAN
MATCHLESS
ROBT E. LEE
BANGKOK
JAMIE LEE
FITZHUGH
EL PASO
MAID OF ERIN
HAYDEN
WRIGHT
GAMBETTA
RAM
NEW DISCOVERY
GREENBACK
PYRENEES
MAHALA
ORION
WOLCOTT
HENRIETT
PRIMROSE
STAR
BOHN
DENVER CITY
BENTON
BALLARD
WHITE CLOUD
BLACK PRINCE
ELKHORN
PAWNOLOS
DIAMOND
LUEMA
FAMOUS
DOLLY B
VEGA
WAY UP
CHICAGO
MAY D.
O'MALLEY
FANNY RAWLINGS
EVANS GULCH
RESURRECTION
WINNIE
BEST FRIEND
BLUE BELL
BOX OR LITTLE JOHNY
MASCOTTE
LITTLE ELLEN
MAMMOTH
BLUE BIRD
AZTEC
BULLION
GOLDEN RULE
TONTINE
KITTY
DYER
GROUNDHOG
CONTINENTAL CHIEF
A.S.&R. SMELTER
CALIFORNIA
HEGEMAN
WM. WALLACE
M.S. HARG
M.A.B.
GULCH
ROBINSON
BLIND TOM
WOLFTONE
IRON-SILVER
CORD
ROBT EMMET
MIKADO
ADELAIDE
DOLOMITE
FORTUNE
SEDALIA
COL. SELLERS
COD FISH BALLS
MIKE
TUCSON
30 AVE & MINNIE
MEYER
RUBIE
GARBUTT
TENDERFOOT
MOUNTAIN LION
STEVENS
ERIN
PRINTER BOY
FIRST NATIONAL
GOLDEN SPOON
DEERFOOT
COLUMBIA
NEW DOME
SULLIVAN
LILLIAN
DORIS
HELENA
BOYD
READY CASH
BEECHER
HAMILTON
CENTENNIAL
IOWA GULCH
MOFFAT
REINDEER
COON VALLEY
STARS & STRIPES
CONTINENTAL
LAKE COUNTY
LONG AND DERRY
HOMESTAKE
DAVID HARUM
ROBERT FULTON
ECHO
BOARD OF TRADE
GOLDBUG
BRIGHT DAY
LENORA
BANNER
EMMA
BARTHOLOMEW
GENERAL SHERIDAN
LAST CHANCE
HILLTOP
BADGER BOY
FOUR MILE CREEK
DAUNTLESS
EMPIRE GULCH
PEERLESS MAID
BUDWEISER
IDA
MAP OF LEADVILLE MINING DISTRICT

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Presently commercial ore is exposed in many places on these properties. The volume and value of positive ore cannot be determined until old workings are re-opened and ventilated.

The net profits from screening dumps and hauling the product 67 miles around the Mosquito Range to Leadville, should exceed the cost of re-opening and equipping the mine and of the preliminary exploration work, including core-drilling.

Few mining districts have been as thoroughly geologized as the Leadville District and few Leadville mines have been as thoroughly documented as the properties included in the Hilltop Consolidation.

The program outlined is expected to equip and open the property to the point where the major operating program can be undertaken and to get into production in the process. This program might confidently be expected to be self-liquidating with considerable profit, and with its completion any major financing required should be assured on favorable terms.

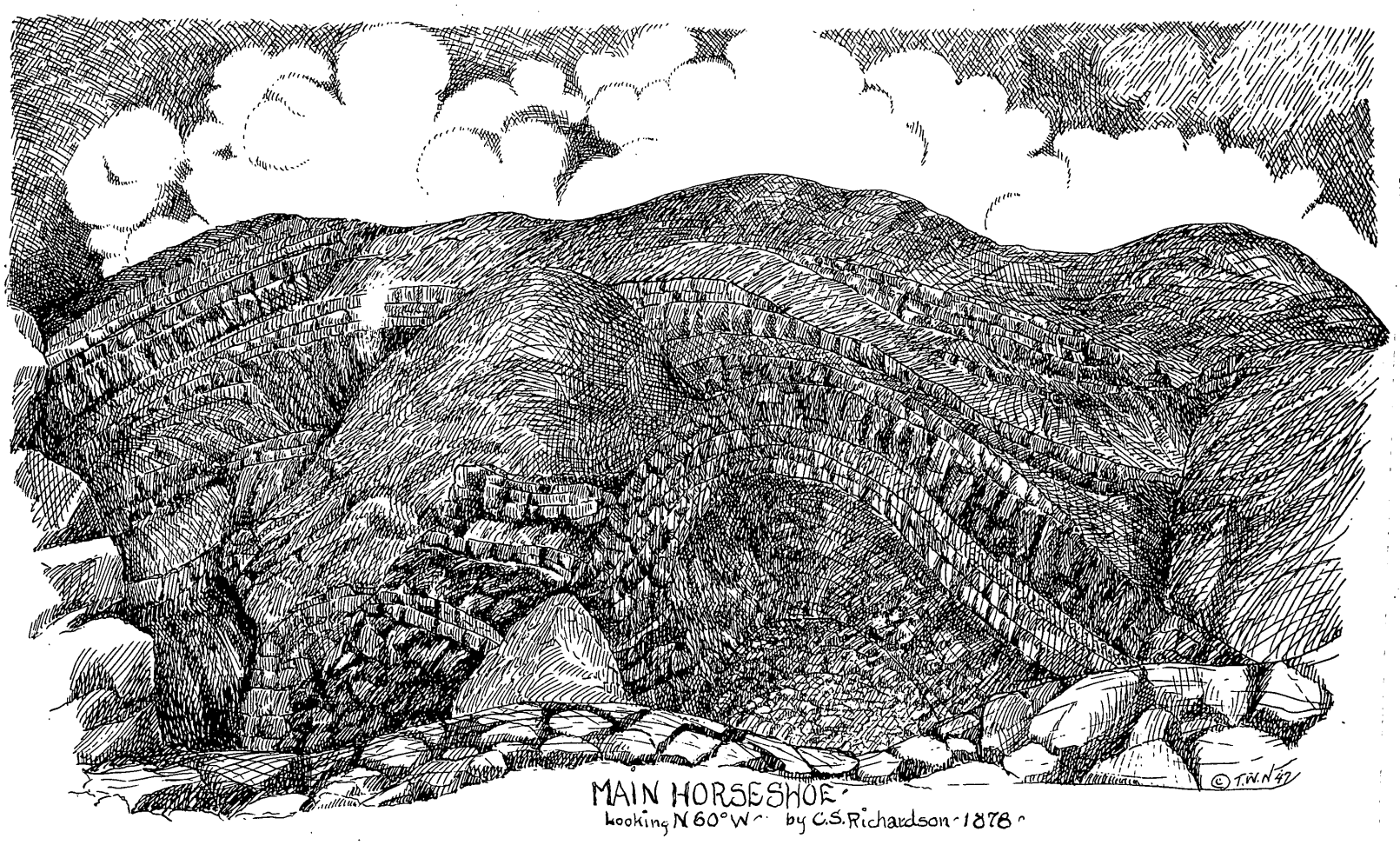
While the first stages of the program are expected to result in profitable production, the potentialities of the Consolidation are such that every effort should be made to take advantage of the present metal markets. If the Hilltop Consolidation is intensively developed under present favorable conditions, it should weather any future metal price recessions.

A perusal of the following pages will disclose a project of exceptional merit with each step beyond the original installation more than paying its way.

COST OF PROGRAM OUTLINED HEREIN

FIRST STAGE		
1. Acquisition of remaining territory necessary and completing title determination	$ 9,000.00	
2. Outright purchase of approximately one-half of Consolidation	14,571.33	
		$ 23,571.33
SECOND STAGE		
Preliminary installations, including transportation facilities		7,919.00
THIRD & FOURTH STAGES		
Preliminary exploration, including re-opening of all main workings and pilot core-drilling believed capable of disclosing ore exposures, which, when developed, should yield net returns exceeding total cost of development and of ultimate acquisition of fee titles to entire Consolidation		28,059.67
FIFTH STAGE		
Advance of Dauntless Tunnel 360' to BADGER BOY	9,000.00	
Ditto 1258' from Badger Boy to connection with Hilltop workings	31,450.00	
		40,450.00
		$100,000.00

THE HORSESHOE CIRQUE FROM RAILHEAD AT LEAVICK



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THE HILLTOP CONSOLIDATION

The HORSESHOE AREA, sometimes called EAST LEADVILLE, is probably the most promising source of lead ore of the LEADVILLE DISTRICT. The HILLTOP CONSOLIDATION is the most important portion of the Horseshoe Area.

The 4 units of this Consolidation, the HILLTOP, LAST CHANCE, FULTON and DAUNTLESS, were Park County's largest lead-silver-zinc producers, with an estimated gross production of 4 millions of dollars, all mined by hand, under difficult conditions, between 1879 and 1921, and marketed at high transportation and treatment costs.

The territory included in the Consolidation has never been previously assembled under one control.

LOCATION

These mines are located at the head of FOUR MILE GULCH, on MOUNT SHERMAN and MOUNT SHERIDAN of the Mosquito Range, in the HORSESHOE AREA of the LEADVILLE DISTRICT, near the boundary of Park and Lake Counties, Colorado, at an elevation of 12,059' to 13,000' above sea level; by airline distance, 7 miles east of Leadville, and by motor road, 14 miles west of Fairplay.

Although both Sherman and Sheridan peaks break into sheer cliffs and steep slopes at the head of IOWA GULCH on the Leadville or western side of the range, the approach to the mines is gradual from the eastern or Fairplay side.

The HORSESHOE AREA is so styled because of the resemblance to a horseshoe of the glacial cirque at the head of HORSESHOE AMPHITHEATER.

The territory is the least developed section of the Leadville District. The probably mineralized area extends 3 miles from north to south; northerly from LAST CHANCE-HILLTOP, approximately 1 mile to the formerly productive CONTINENTAL CHIEF and southerly from LAST CHANCE nearly 2 miles to the PEERLESS mines. The area includes at least 6 roughly paralleling north-south vein systems.

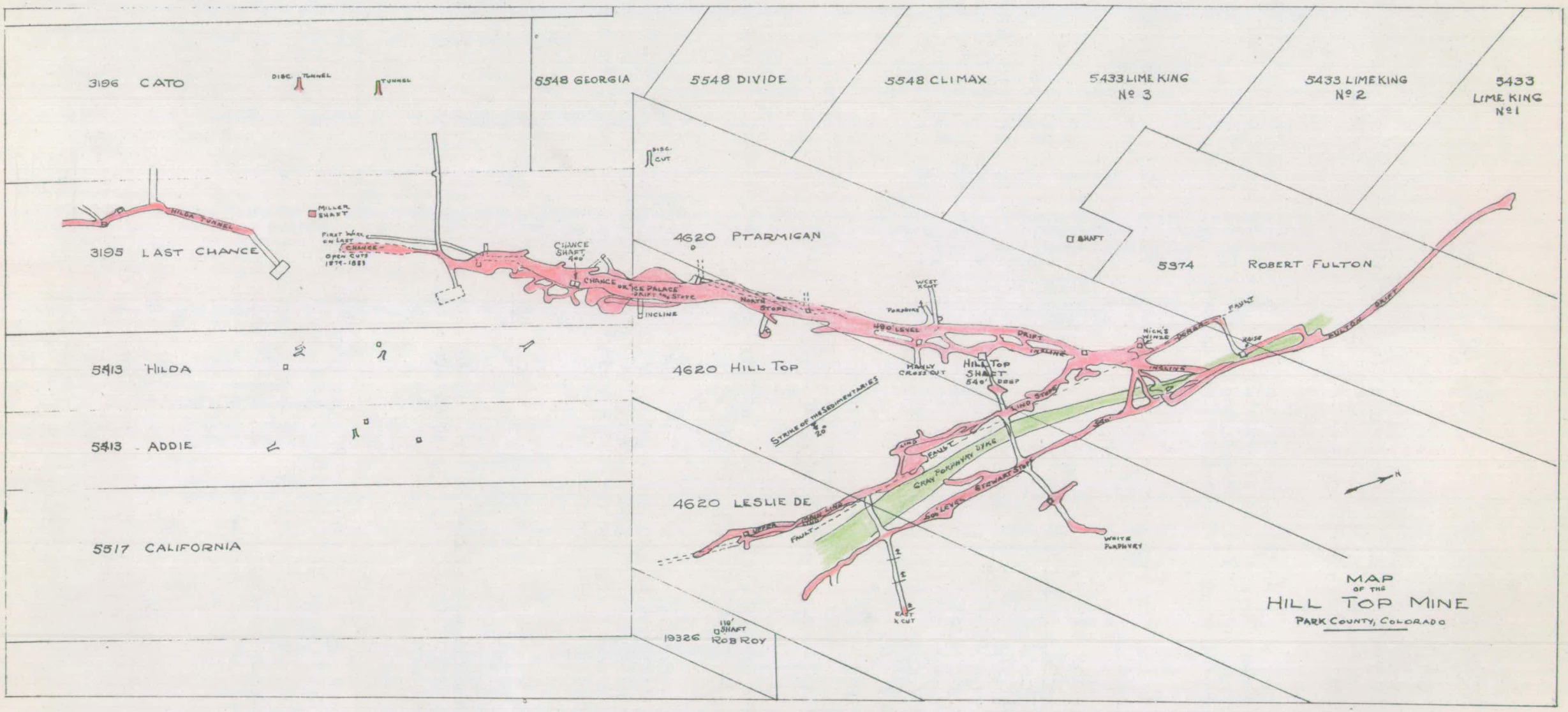
PREVIOUS DEVELOPMENT

Development to date has been made by open cuts, and through 4 shafts and laterals therefrom. MAIN HILLTOP 540'; LAST CHANCE 400'; HILLTOP INCLINE 122'; and DAUNTLESS 116' deep, respectively.

The extensive underground LAST CHANCE-HILLTOP workings consist almost entirely of continuous stopes, as the mineralization along the main fracture systems was constant, except for a few interruptions by cross-faultings.

Except for small scale lessee operations, the mines were last worked in 1921. All of the shaft collars have been sealed with ice since 1923.

--oOo--


3196 CATO
DISC.
TUNNEL
TUNNEL
5548 GEORGIA
5548 DIVIDE
5548 CLIMAX
5433 LIME KING Nº 3
5433 LIME KING Nº 2
5433 LIME KING Nº 1
DISC. CUT
HILDA TUNNEL
MILLER SHAFT
FIRST WORK ON LAST CHANCE
OPEN CUTS 1879-1883
3195 LAST CHANCE
CHANCE SHAFT 400
CHANCE
PRICE PALACE DRIFT IN STOPE
INCLINE
4620 PTARMIGAN
NORTH STOPE
WEST X CUT
PORPHYRY
400' LEVEL
MANLY CROSS CUT
HILL TOP SHAFT 540' DEEP
DRIFT
INCLINE
SHAFT
5374 ROBERT FULTON
NICK'S WINZE
TRACK
FAULT
RAISE
SULTAN DRIFT
INCLINE
5413 HILDA
4620 HILL TOP
STRIKE OF THE SEDIMENTARIES
20°
5413 ADDIE
BLIND STOPE
BLIND FAULT
GRAY PORPHYRY DYKE
STEWART STOPE
500' LEVEL
4620 LESLIE DE
UPPER MAIN LINE
FAULT
5517 CALIFORNIA
WHITE PORPHYRY
EAST X CUT
110' SHAFT
19326 ROB ROY
N
MAP OF THE HILL TOP MINE
PARK COUNTY, COLORADO

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GEOLOGY

The horizons hitherto productive in these mines are in the upper beds of the LEADVILLE or BLUE LIMESTONE of the Carboniferous, which formation here has a thickness of from 170' to 200'.

The Blue Limestone is overlain by an extrusive flow of rhyolite porphyry from 400' to 1000' thick, known as WHITE PORPHYRY. The limestone outcrops only where glaciation and stream erosion have removed the porphyry flow, partially explaining the fact that this eastern extension and last frontier of the LEADVILLE DISTRICT has remained largely unexplored to this date.

Apparently the Parting Quartzite is absent in most of this area, so that the Blue Limestone is underlain directly by the WHITE LIMESTONE of the ORDOVICIAN, estimated at 160' in thickness.

The latter formation is in turn underlain by CAMBRIAN QUARTZITE, probably 180' thick in this locality.

These sedimentary beds strike north 20 degrees west and dip 16 to 20 degrees north of east. Below the Cambrian Quartzite occur Pre-Cambrian schists and gneisses, with occasional intrusions and small batholiths of granite. A dike of monzonite porphyry, locally known as GRAY PORPHYRY, and styled the HILLTOP PORPHYRY DIKE, strikes north-south across most of the area of the Consolidation. The two main fracture systems, LIND and STEWART, occur on either side of the dike.

The post-mineral LIND FAULT occurs between LIND ORE SHOOT and HILLTOP PORPHYRY DIKE, with strike parallel to that of the dike. The third vein system, the LAST CHANCE, was cut off on the Lind fault.

This Consolidation is situated in an angle formed by the junction of two of the major pre-mineral faults of the Leadville District, the SHERIDAN and SHERMAN. True to Leadville pattern, mineralization occurs along fracture systems, sympathetic to the movement of these two faults.

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ENOS, HERBERT O. - do June 22, 1919;

FRANKLIN, W. G. - Hilltop Mines, April 11, 1892;

LARSH, WALTER S. - Hilltop Mine, Dauntless Tunnel Drive, etc. July 14, 1910 and October 22, 1921;

LINDBERG, CARL O. - Hilltop and Last Chance Mines and Dauntless Tunnel Drive, August 16, 1920;

HUGH C. WATSON - Hilltop Mine, May 6, 1913.

TITLE

Titles to the LAST CHANCE, HILLTOP and FULTON, and to the most important units of the DAUNTLESS are good, and have been in the continuous and undisputed possession of the same families and corporations for more than 50 years. No conflicts of interest are apparent in the titles to the remaining units of the Dauntless Group.

CONTROL

The Groups comprising the Consolidation are presently controlled by LEADVILLE LEAD CORPORATION, incorporated in 1945, under Colorado law, with authorized capital of 750,000 shares, all common, $1.00 par value. 600,000 shares are issued, of which 400,000 are in the corporation's treasury.

LEADVILLE LEAD CORPORATION now holds the following properties:

(1) The LAST CHANCE Group of 14 claims under 10-year lease and option from The Big Chief Mining Company;

(2) The DAUNTLESS properties, consisting of 21 claims, by 10-year leases and leases and options from Leo Wells et al, or by fee ownership;

(3) The HILLTOP Group of 9 claims, under lease and option to the HORSESHOE ZINC COMPANY from the Cohen and Trumbull heirs, running 3½ years. Leadville Lead Corporation owns 80% of the authorized stock of The Horseshoe Zinc Company.

(4) The FULTON assemblage of 10 claims, by 6-year lease and option from the Cohen and DeCoursey heirs;

(5) The WEST HILLTOP AREA, consisting of interests in the GEORGIA and other claims.

All but 7 of the 66 claims of the Consolidation are patented.

The aggregate of options to purchase the more important units of the Consolidation is $173,500.00. The estimate of total outlay required to buy the remaining units is $50,000.00, so that the grand total of option prices of the entire Consolidation would be $223,500.00

The Corporation has a separate short term option to purchase fee title to the FULTON and to 40% of the HILLTOP properties, for $14,500.00. If these units are purchased under this option, the grand aggregate of option prices would be $189,000.00.

Chinese Maps

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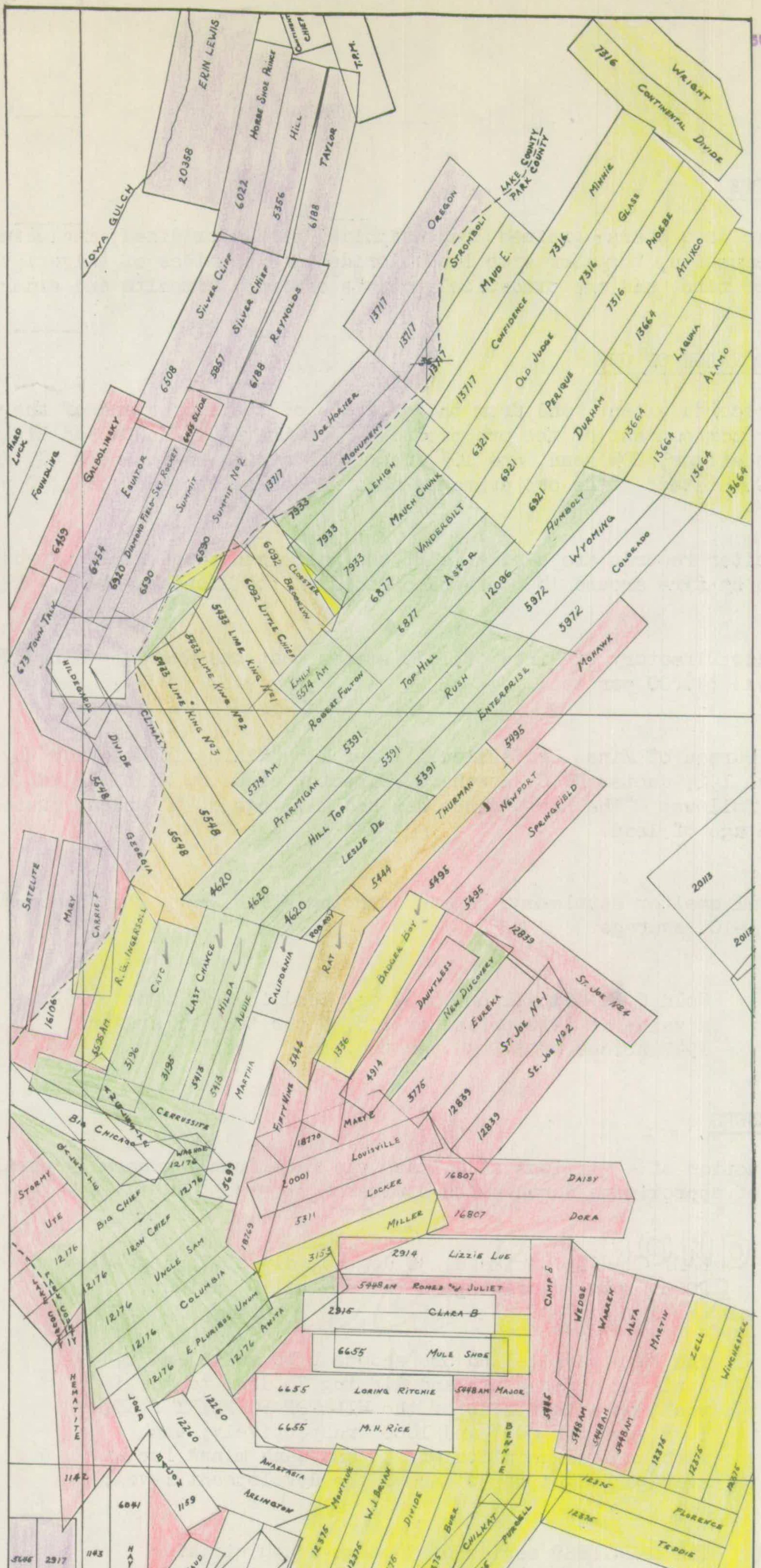

ORE

NATURE OF ORE

The ore is a coarse-grained lead sulphide, partly oxidized, including the oxidation product, cerussite, together with the chlorides and bromides of silver; the carbonates and silicates of zinc, and the oxidation products of iron, limonite and siderite.

CONTENT AND VALUE OF ORE

From records extant, and from the evidence of the stopes and of the dump materials, the average per ton content of the ore produced from the LAST CHANCE and HILLTOP mines was probably 25 oz silver, 20% lead, and 10% zinc. The mining engineer, W. G. Franklin, in his report of 1892 stated: "the ore averages about 20 oz silver and about 30 percent lead."

No smelter records are available of the Last Chance and Hilltop production prior to the destruction by fire around 1896 of the offices of the Globe Smelter.

Colorado Directory of Mines of 1879 states that the average value of Last Chance ore at that time was $40.00 per ton.

U. S. Bureau of Mines Professional Paper 138 "Mining in Colorado" by Charles W. Henderson, on page 192, quotes H. C. Burchard, Director of U. S. Mint, in latter's report of 1883-4, as follows: "The Last Chance has had millings of 50 and 65 ounces of silver and a fair percentage of lead."

Original smelter settlement sheets covering W.F.B. Berger's Chance-Hilltop Lease production of 1910, average:

> Gold 0.042 oz;silver 15.69 oz; lead 15.72%; zinc 5.16%;
> a value at 1910 prices of $15.05 per ton, or at April
> 1947 prices of $49.37 per ton.

ORE OCCURRENCES

A production of 4 millions of dollars was made from 4 generally paralleling systems of ore shoots of approximate north-south strike:

> LAST CHANCE, strike N. 30 deg E., dip 65-75 deg. W.
> 2000' long, averaging 30' width and 70' height;
>
> The twin paralleling ore shoots LIND and STEWART,
> striking north-south and dipping 75 deg. to the
> west, on either side of the HILLTOP PORPHYRY DIKE,
> developed for 800' and 1800' respectively; each
> with an average width of 15' and each mined for an
> average height of 30' above the development level;
>
> The DAUNTLESS series of 3 north-south striking
> fracture systems, mined in early days by surface
> pits and shallow shafts, with average width esti-
> mated at 10'.

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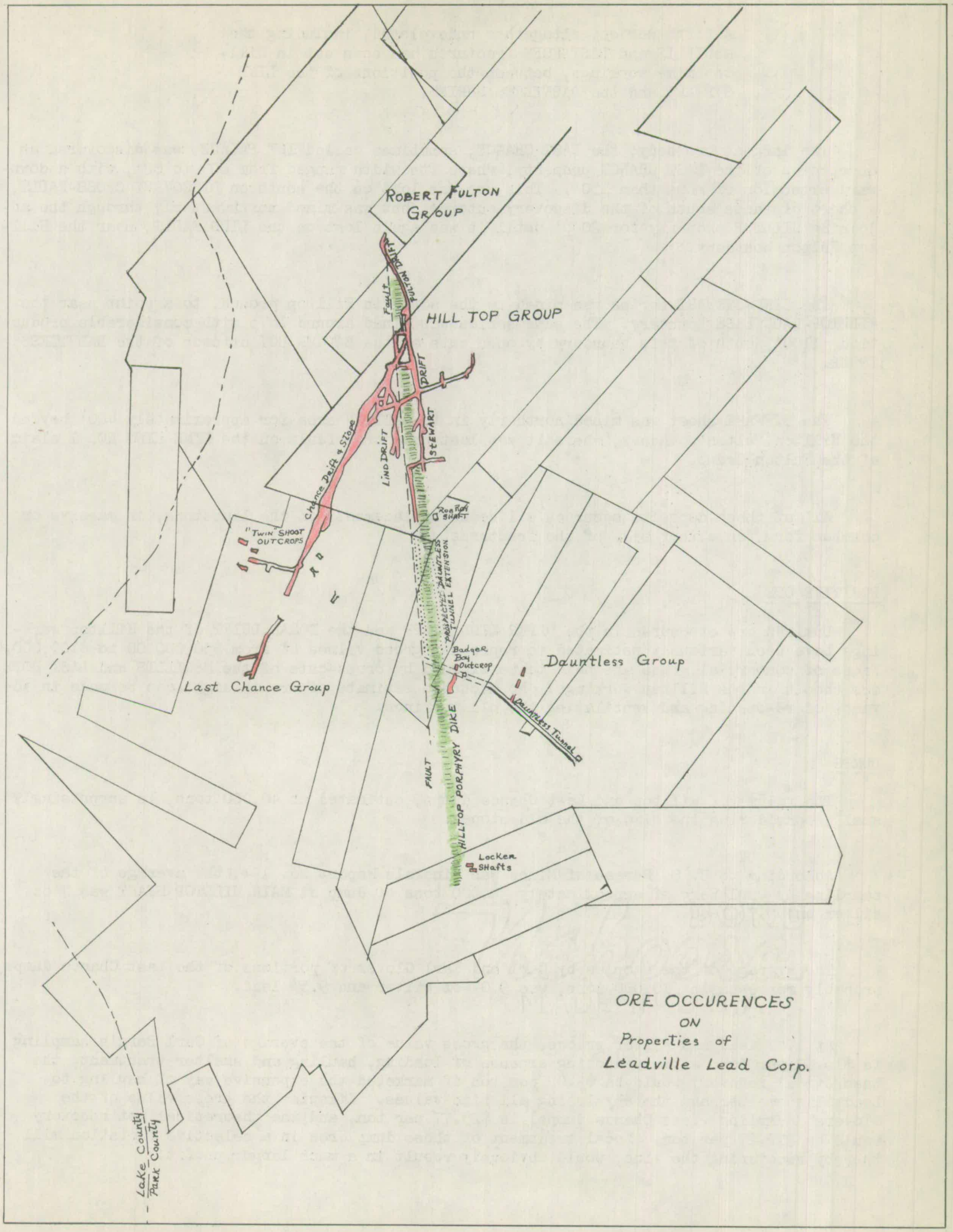

ORE OCCURRENCES - Cont'd

A fifth series, altogether undeveloped, including the McGILLIS and LAST HOPE fractures has been cut in Hilltop mine workings, between the positions of the LIND-STEWART and the DAUNTLESS SERIES.

The largest ore body, the LAST CHANCE, sometimes called ICE PALACE, was discovered as an outcrop of the LAST CHANCE property, where its width ranged from 60' to 80', with a downward extension of more than 150'. This ore was lost on the south on DISCOVERY CROSS-FAULT, a short distance south of the discovery outcrop, but was mined northwesterly through the adjoining HILLTOP property for 2000' until it was again lost on the LIND FAULT, near the Hilltop-Fulton boundary.

The LIND-STEWART series was mined to the south in Hilltop ground, to a point near the HILLTOP-DAUNTLESS boundary. The same series was mined around 1875 with considerable production, 1100' south of this boundary by open cuts on the BADGER BOY outcrop of the DAUNTLESS GROUP.

The STEWART shoot was mined northerly in the FULTON area for approximately 400' beyond the Hilltop-Fulton boundary, where it was lost on a crossfault on the LIME KING NO. 1 claim of the Fulton Group.

All of these deposits occur as siliceous replacements of the limestone, in massive or chamber form, on either side of the fractures.

POSITIVE ORE

Unmined ore exposures in the UPPER LIND STOPE and the DORAN DRIFT of the Hilltop workings have been variously estimated to represent gross values of from $50,000.00 to $100,000.00. Faces of commercial grade are said to be exposed by cross-cuts of the McGILLIS and LAST HOPE ore shoots in the Hilltop workings. No accurate estimate of ore in sight can be made in advance of re-opening and ventilating the old workings.

DUMPS

The volume of Hilltop and Last Chance dumps, estimated at 40,000 tons, is surprisingly small, considering the size of the old stopes.

According to U. S. Bureau of Mines War Minerals Report No. 194, the average of the sampling by Carl Berg of approximately 30,000 tons of dump at MAIN HILLTOP SHAFT was 7 oz. silver and 5.7% lead.

The average of the samples by Carl and Earl Glover of portions of the Last Chance dumps, probably representing 10,000 tons, was 9.07 oz silver and 9.5% lead.

At 1947 lead and silver prices, the gross value of the average of Carl Berg's sampling is $16.53 per ton; after deducting expense of loading, hauling and smelter treatment, the theoretical recovery would be $3.02 per ton if marketed the expensive way of hauling to Leadville smelter and thereby losing all zinc values. Likewise the gross value of the Glovers' sampling (Last Chance dumps) is $25.77 per ton, and the theoretical net recovery would be $12.27 per ton. Local treatment of these dump ores in a selective flotation mill, thereby recovering the zinc, would obviously result in a much larger profit.

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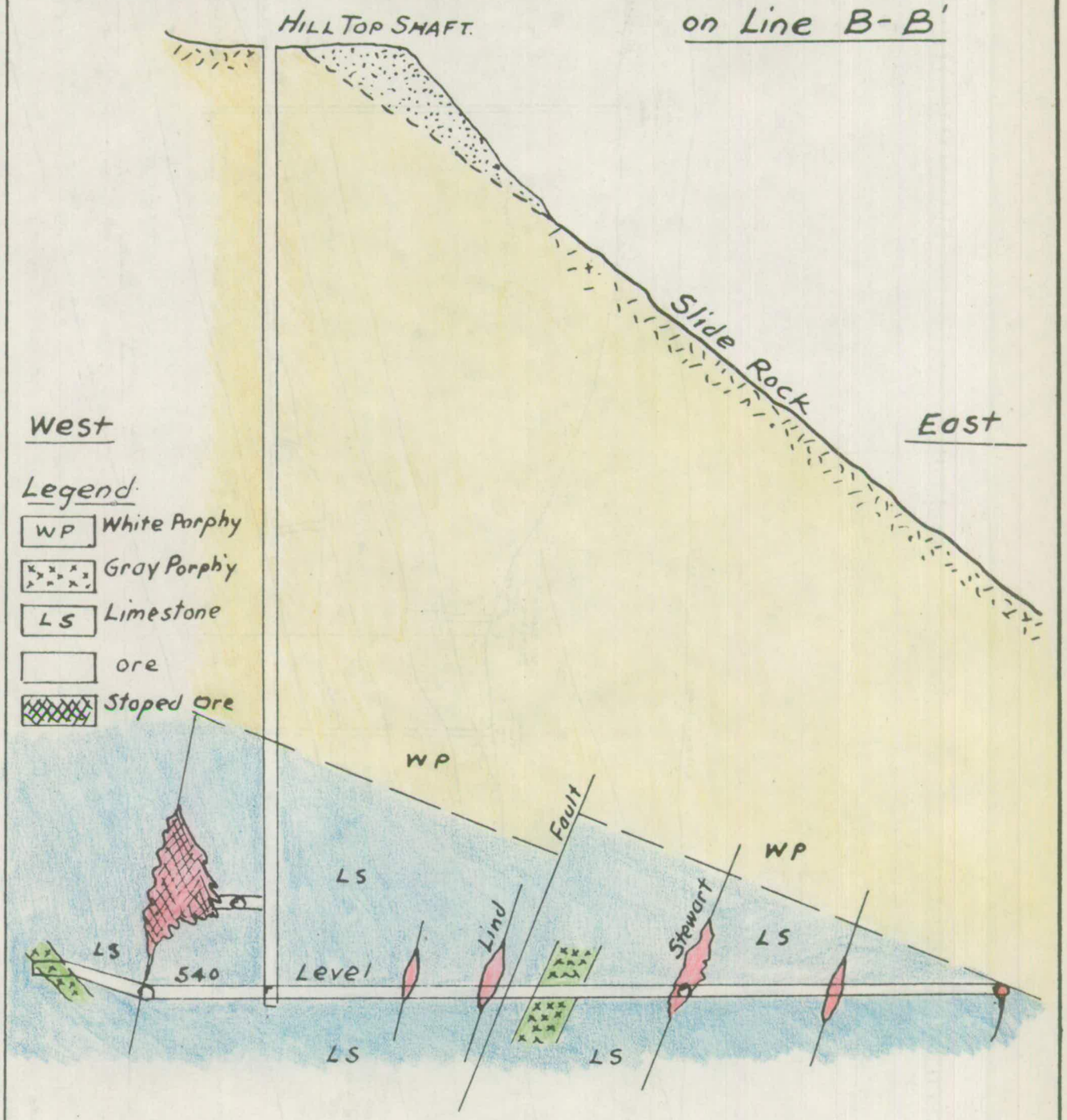
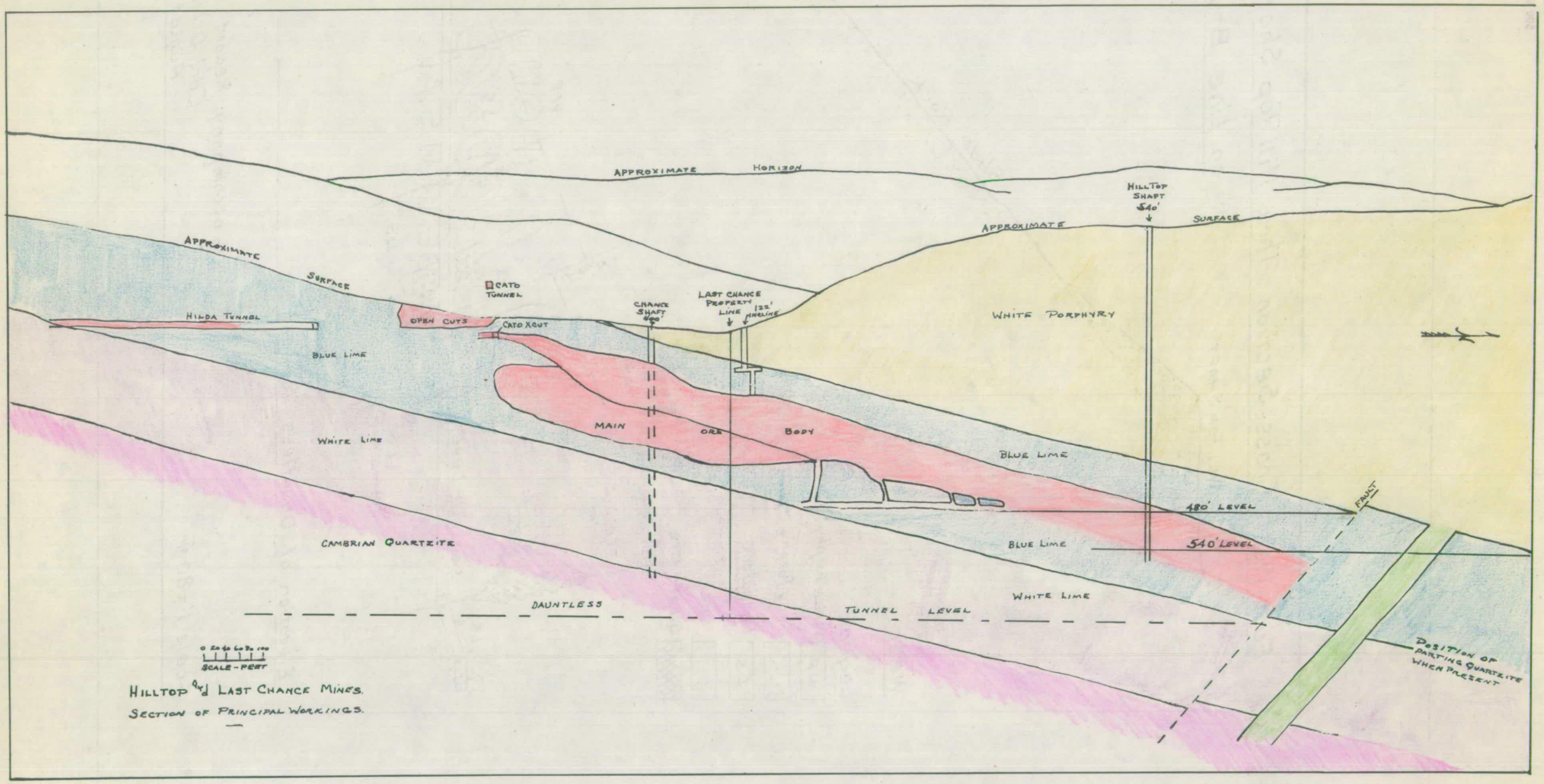
East-West Cross-Section Thru Hill Top Shaft on Line B-B'



Elevation of Dauntless Tunnel

Scale 1" = 80 ft

To accompany Report by
Carl O. Lindberg
August 1920



HILLTOP and LAST CHANCE MINES.
SECTION OF PRINCIPAL WORKINGS.

DUMPS, Cont'd

Sampling of the LAST CHANCE and HILLTOP INCLINE dumps by Ellis Webster in 1945, shows the following results:

	Gold	Silver	Lead	Copper	Silica	Iron	Zinc	Sulphur
#1 Last Chance Dump	0.001	6.9	5.8	-	52.	0.2	3.	.1
#2 Hilltop Incline Shaft	0.02	5.3	15.9	.5	40.	7.6	8.5	.1
#3 Specimen	.02	3.	5.2	1.	26.6	5.8	36.4	.1

Webster stated that AS&R advised that the Horner Mill net, exclusive of bonus, was $3.78. With a bonus of $2.97, the net would be $6.75.

By the same formula, smelter net would be $11.69.

The 1947 prices of lead and silver content of this sampling would show a gross value of $26.27 per ton, and a probable net value (deducting loading, hauling, and mill and smelter treatment costs) of $12.77 per ton.

Estimating the volume of the material sampled by Webster at 6000 tons, the gross value would be $157,620.00, and the net value of the ore if hauled to Leadville, would be $76,620.00.

PROBABLE ORE

The future of the Consolidation consists, in order of importance, of:

1. Development of the LIND-STEWART HILLTOP PORPHYRY DIKE series to the south for 2000' in Dauntless ground, where, with the exception of the BADGER BOY, these ore shoots are undeveloped on all horizons;

2. Mining and development of the LAST CHANCE ore shoot in Last Chance ground by extending old workings, and, more important, by new work to the south of the DISCOVERY FAULT;

3. Mining of the partially developed extension of the LIND-STEWART Series northerly in the FULTON property; also exploring the position of this series northwest of the LIME KING FAULT;

4. Exploration and development of ore shoots hitherto mined in HILLTOP and LAST CHANCE (Last Chance and Lind-Stewart shoots) downward, below old workings, through remainder of Blue Limestone and on down through the underlying White Limestone and Cambrian Quartzite;

5. Exploration of a probable twin ore shoot paralleling the LAST CHANCE shoot on the west, in LAST CHANCE ground, in GEORGIA, DIVIDE and CLIMAX claims, and in HILLTOP and FULTON territory;

6. Exploration of McGILLIS and LAST HOPE ore shoots and to search for unexposed possible fracture systems between LAST CHANCE and LIND-STEWART and between latter fractures and DAUNTLESS SERIES.

LAST CHANCE CREW - 1875

Leadville Lead Corporation
833 Ernest & Cranmer Building
Denver 2, Colorado

HISTORY

Mineral discoveries of the HORSESHOE AREA antedate those of Leadville proper. The first discovery in the Horseshoe was that of the Last Chance outcrop of Samuel McMillan in 1873. The BADGER BOY outcrop of the LIND-STEWART Series was discovered in the same year.

Between 1872 and 1875 the important lead-silver deposits of the PEERLESS MOUNTAIN south of the Last Chance, were opened and mined profitably by McFerran, Brownlow, McNab and others. The principal mines of the PEERLESS SECTION of the Horseshoe Area, the PEERLESS and PEERLESS MAUD are considered to be extensions of the LAST CHANCE Series, although 1-1/2 miles to the south of the Last Chance Discovery.

During this period, the town of Horseshoe (sometimes called Old Town) was established in the Four Mile Valley, 4 miles downstream from Leavick. Around 1878, Horseshoe Town boasted a population in excess of 1000 and was the site of a smelter. All of these discoveries were mined by surface pits and shallow shafts until the Leadville excitement in 1879 when the Horseshoe miners abandoned their finds and flocked to the new camp.

Charles S. Richardson, a native of Cornwall, England, was one of the first mining engineers to visit the HORSESHOE AREA. In Richardson's field book and diary for the year 1878 appears a series of pencil sketches of the Horseshoe cirque, a panorama of the eastern slope of Mosquito Range covering the Horseshoe Area from Peerless to Last Chance and of several outcrops and cliff faces on both slopes of Mount Sheridan. The sketches include a picture of the Last Chance surface pits and buildings.

Quoting from Richardson's diary, entry of June 26, 1878: "We climbed over into the right hand fork (of Four Mile Creek) passing two gray porphyry dikes and came to some recent workings, on a strong outcrop of Gozzan*** Next up to the GALENA, SEDGWICK and TREASURE. These belong to The Horseshoe Mining Company.

"The best one is the Sedgwick (present day BADGER BOY) from which a large amount of ore has been taken out, consisting of sulphide lead, carbonates of lead, gold bearing gozzan, some zinc and brown oxide of iron. Many tons are now in the dump ready for sampling*** There is a lode of over 20 feet wide, with 3-1/2 feet of solid lead ore in place running across the valley at north 20 deg. east. There is one shaft about 40 feet deep. All of the other works are open cuts, some 20' deep. This deposit of ore can be easily worked on an extensive scale. I am told the ore runs 40 oz silver and 50% lead. I have no account of the gold. A deep adit may be brought up from the gulch."

"The next mine above this, at the foot of the snowslide, is the LAST CHANCE. Here are 2 or 3 buildings. There is a fine deposit of ore here. One of the ledges is 2 feet of solid lead*** The formation is a greenish gray crystalline limestone of the Devonian Series. Lower down the valley blue limestone tilts up in pretty regular beds. The mountain ridge on the north side of this valley is very different. The rocks are nearly vertical, so there might be a heavy downthrow or else an upheaval along this east-west line."

U. S. Geological Survey (Geology and Mining Industry of Leadville by Samuel Franklin Emmons 1886) refers to the Horseshoe District and states that this portion of the survey was made in the summer of 1879. On page 533 Emmons states: "At the head of Horseshoe Gulch are a number of claims, two of which have developed a considerable amount of ore. Of these the BADGER BOY is in the Blue Limestone which is exposed in the bed of the north fork of Four Mile Creek. The PEERLESS Mine is at the very crest of the ridge*** its ore is found to be 20' below the top of the limestone in irregular lenticular bodies."

HISTORY, Cont'd

Mining of the Last Chance was resumed in 1885 when a shaft was sunk on the outcrop near the north endline. The shaft attained a depth of 400'.

In 1886, a mine cook, discharged by Last Chance operators, located, with a grubstake provided by a Leadville partner, 3 claims called HILLTOP, PTARMIGAN and LESLIE DE, just north of the Last Chance endline, representing the beginning of the Hilltop Mine. In the same year, while the Last Chance production was at its peak, the cook and his partners sunk the HILLTOP INCLINE SHAFT through the LAST CHANCE ORE SHOOT, to a depth of 122', resulting in a highly profitable production.

Later, 6 claims: TOP HILL, RUSH, ENTERPRISE, VANDERBILT, ASTOR and HUMBOLDT were staked at the north of the original locations and added to the Hilltop Group.

The LAST CHANCE operated at a considerable profit from 1885 to 1893.

In 1887, a promoter named Simpson, acquired the Last Chance, organized the Only Chance Mining Company, and undertook a large scale operation, including construction of an expensive but poorly designed mill located several miles downhill from the mine in the present ghost town of Leavick. The mill was a failure. Simpson became deeply involved, and in 1890 the property passed to his creditors, Kountze, Sheedy and Chanute, who, as the Cato Mining Company, operated profitably until 1893, when the mine was closed because of the drop in silver prices.

In 1896, Samuel Cohen, owner of 10 claims of the present LAST CHANCE Group, extending south of the original Last Chance locations, merged his holdings with those of the Cato Mining Company, resulting in the formation of the Hilda Mining Company. From 1896 to 1908 the Last Chance was worked entirely be leasers, usually at a profit.

The Hilda stockholders successively re-organized to form the New Chance Mining Company and the Big Chief Mining Company. The latter corporation, organized in 1913, is the present owner of the 14 claim LAST CHANCE Group.

Strangely, all of the Last Chance production, estimated as exceeding 1-3/4 millions of dollars, was made entirely from the northern half of the original Last Chance location, abutting the Hilltop endline, or from the 700' of the strike of the LAST CHANCE ORE SHOOT, between the Discovery Cross-fault and the northern end of the property.

Except for a few open cuts, the mile long southern projection of LAST CHANCE series between the DISCOVERY OUTCROP and the PEERLESS MAUD is entirely unprospected.

The HILLTOP produced heavily and profitably from 1886 to the silver decline of 1893. In 1892, Felix Leavick and associates acquired control of the property, built a narrow gauge railway spur from the Colorado and Southern station of Fairplay, to the newly established company town of Leavick. They also constructed a 3-mile aerial tramway from Leavick to the Main Hilltop shaft, and a concentration mill at the lower tram terminal.

In the light of these large expenditures, the silver drop of 1893 was disastrous to the Leavick group and operations were suspended.

HISTORY, Cont'd

Later, Frank Trumbull, then President of the Colorado and Southern, acquired control of the Hilltop. Between 1896 and 1905, the mine was operated profitably by several lessees.

In 1908, the mining engineer, W.F.B. Berger, leased both the Hilltop and Last Chance, and operated until 1913, mainly on Hilltop, as CHANCE-HILLTOP MINING COMPANY. A considerable production was made by this company, principally from LIND-STEWART ore bodies. Most of the original smelter settlement sheets of this production are available. Other lessees operated between 1913 and 1916.

From 1919 to 1921, the mine was operated by a lessee, the HILLTOP SILVER MINING COMPANY. Under this operation extensive development work was done, and some production was made from the upper Lind Stope of the Lind-Stewart, near Dauntless boundary.

In 1923, a lease was granted to Sam Doran, superintendent under both of the last two lessee companies. Doran did no work as the price of silver dropped upon cessation of the Pittman Silver Purchase Act, shortly after his lease was granted.

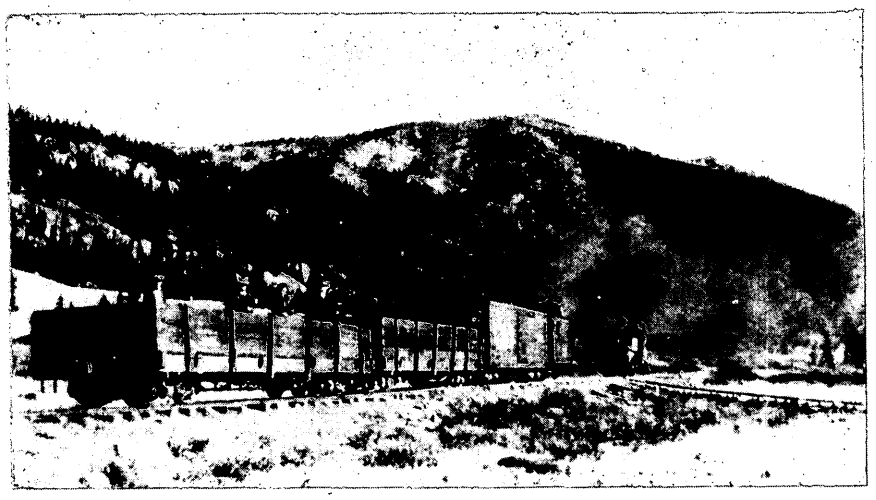
Both Hilltop and Last Chance were inactive between 1923 and the beginning of the operations of THE HORSESHOE ZINC COMPANY in 1943.

No work of consequence was done on the Dauntless properties from the 1893 silver drop until 1910, when the DAUNTLESS TUNNEL was started by the Belvidere Syndicate, controlled by Thomas G. Marshall, as a drive westerly to cross-cut the several north-south fracture systems of the present Consolidation.

The immediate objective of the Dauntless drive was to undercut the BADGER BOY outcrop of the LIND-STEWART Series, and its ultimate goal was the LAST CHANCE ore shoot, and a connection with the bottom of the 400' LAST CHANCE shaft.

The tunnel was advanced 650' to a connection with the bottom of the formerly productive DAUNTLESS SHAFT, 116' deep. Dauntless values were high in lead but low in silver, so the ore was not profitable as of 1912, and the work was accordingly stopped.

From 1943 to 1946 THE HORSESHOE ZINC COMPANY, as a lessee, re-opened the upper stopes of the HILLTOP through the INCLINE SHAFT and constructed a motor haulage road to all of the mine openings of the Consolidation.



1922 PHOTO OF C&SRR IN FOUR MILE CANYON

Form 1—12-10—7m

ORE SETTLEMENT
AMERICAN SMELTING AND REFINING CO.

Bought of Chance Hill Top Mining Co. CLOSE PLANT

Denver, Colo., 19 11

LOT NO. Smelter	LOT NO. Mine	Car No.	Name of Ore	Gross Pounds	Moisture Per Cent.	Net Pounds	ASSAY Ounces Gold	ASSAY Ounces Silver	ASSAY Per Cent Lead	ASSAY Per Cent Copper Dry	BASIS OF SETTLEMENT Per Oz. Gold	BASIS OF SETTLEMENT Per Cent Silver	BASIS OF SETTLEMENT Per Unit Lead	BASIS OF SETTLEMENT Per Unit Copper	Treatment per Ton	Net Value per Ton	Total Value	Freight Deducted	Net Value
[illegible]	[illegible]	[illegible]	Ore	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Ore	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	Ore	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

N. Y. QUOTATIONS OUR LOT	DATE	SILVER	LEAD	COPPER	ANALYSIS SiO2	Fe	Mn	CaO	Zn	BaSO4	S
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			[illegible]		[illegible]

CORRECT: [illegible]

CHECKED:

PLANT
AMERICAN SMELTING AND REFINING COMPANY

Form 18—8.11—5000.

THE EMPIRE ZINC COMPANY

Bought of Chance Hilltop Mining Co.,
Leavick, Colo.

Mill Lot No.

Denver, Colo., Febry.13th-1912.

Mine Lot No.	Car No.	Gross Pounds	Moisture Per Cent	Net Pounds	ASSAY EZnCo	ASSAY Hilltop	ASSAY Settle	Net Value per Ton	Total Value	Freight Deducted	Net Value
77	5468	41,373	13.0	35,995	42.8	43.6	42.8	$32.45	$584.02	$72.45	$511.57
				L&Root umpire 42.4% Zn.							
78	12002	53,365	9.5	46,295	43.9	44.85	43.9	$33.55	$810.15	$93.40	$716.75
				VS&Low umpire 43.73% Zn.							
79	5308	37,800	10.2	33,944	44.0	44.7	44.7	$34.35	$582.99	$70.00	$512.99
				J.W.Richards umpire 44.73% Zinc.							
											$1741.31
				15% Royalty on lots #77 & 78 = = $184.25							
				20% Royalty on lot #79 = = = = = 102.60							286.85
											$1454.46
				Less Umpire charge on lots #77 & 78 = = = = =							6.00
											$1448.46

QUOTATIONS	BASIS OF SETTLEMENT	Correct	Checked
Spelter 1/4-10=$6.275	Purchase #166-KA = CLOSED.		

THE EMPIRE ZINC COMPANY

TYPICAL SMELTER - SETTLEMENT SHEETS

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

PRODUCTION

Complete production records of these mines are not available. Study of old records and engineers' reports and examination of old stopes, render probable an estimate of a 4 million dollar production, all smelter grade.

In 1892, the engineer, W. G. Franklin, recited the following production:

From the Hilltop mine alone (without reference to the contemporaneous production of Last Chance, as follows:

February 18	to October 13, 1888	4,539 tons,	netting	$ 98,340.45
December 3,1888	to Aug. 1, 1889	5,365 tons,	netting	78,551.02
March 21,1890	to Feb. 25, 1892	7,658 tons,	netting	186,799.19
		17,562		$363,690.66

Franklin stated that the 17,562 tons were produced and marketed at the following per ton costs:

Mining	1.50
Hauling, mine to railhead	4.50

He stated that the net return on this ore was $250,004.66, or an average of $14.23 per ton.

- - -

The Mining engineer, Russell Paul, in 1912, estimated the output from LAST CHANCE SHOOT on LAST CHANCE ground at more than 1 million dollars, and that of the first 800' of this shoot mined across endline in Hilltop territory, at $750,000.00

Paul estimated production of HILLTOP alone, between 1894 and 1904, at $950,000.00, including zinc ore mined by the lessee, McDonald, worth $70,000.00.

He also stated that production of Chance-Hilltop Mining Company, from October, 1908 to December, 1910 was $201,565.79; that this company produced $60,694.40 in 1911, and $14,080.19 in 1912, or a total of $276,340.38 for a 4 year period.

Records of the Denver office of U. S. Bureau of Mines show smelter shipments in 1910 from Hilltop, of 7,210 tons.

PRODUCTION, Cont'd

U. S. Geological Survey, Professional Paper No. 138 (Mining in Colorado By Charles W. Henderson) credits HILLTOP MINE with the following production:

Year	Silver	Lead	Total Value
1888	$323,225.00	$352,000.00	$ 675,225.00
1889	153,858.00	148,960.00	302,818.00
1890	82,272.00	67,947.00	150,219.00
	$559,355.00	$568,907.00	$1,128,262.00

The above figure of $1,128,262.00 apparently represents a total of LAST CHANCE and HILLTOP output for a period 1888-1890 inclusive.

All of this production came from the LAST CHANCE ore shoot on HILLTOP ground, and does not include production from LAST CHANCE ore shoot in LAST CHANCE ground.

- - -

The engineer, W. S. Larsh, in his 1921 report, stated that Hilltop Silver Mining Company, in 1920 and 1921, produced $31,642.56.

Excluding estimates, the authenticated production of the LAST CHANCE and HILLTOP can be summarized as follows:

Source of Information	Period	Production
U.S. Geological Survey	1888-1890	$1,128,262.00
Russell Paul	1908-1912	276,340.38
W. S. Larsh	1920-1921	31,642.56
		$1,436,244.94

The HILLTOP is known to have produced in the years 1886 and 1887; during 1891-94; from 1896 to 1906 and during 1908 to 1916. The addition of above authenticated total of Paul's estimate of $950,000.00 for the period 1894 to 1904, would represent a grand total of $2,386,244.91, for the HILLTOP and LAST CHANCE, subsequent to 1887. The Last Chance is known to have produced heavily between 1873 and 1879.

The LAST CHANCE, FULTON and BADGER BOY probably produced an aggregate of 2 millions. It appears that the local and generally accepted estimate of 4 millions of dollars total production for the Consolidation is conservative.

Leadville Lead Corporation
500 Ernest & Cronmer Building
Denver 2, Colorado

PARTIAL LIST OF SETTLEMENT SHEETS

HILLTOP MINE - FAIRPLAY, COLO.
by

Chance-Hilltop Mining Company

Date	Buyer	Oz.AU	Oz.AG	%PB	%ZN	NET VALUE PER TON WHEN SHIPPED	DRY TONS	NET VALUE PER LOT
1910								
1-8	Ohio & Colo. S&R Co.	.04	16.8	17.5		$16.54	36.770	$ 492.06
1-8	Amer.Smelt. & Ref.Co.	.045	14.35	20.25	4.6*	18.43	56.675	924.70
1-11	do	.04	20.5	51.6	9.8*	40.82	23.304	866.39
1-12	do	.04	10.95	12.9	4.8*	9.88	37.397	288.63
1-13	do	.045	17.1	20.9	5.6*	20.12	76.578	1,357.65
1-28	American Metal Co.Ltd.				35.7	23.12	15.858	296.54
1-28	Amer.Smelt. & Ref.Co.	.045	6.3	9.3	10.8*	3.89	15.168	111.22
1-28	do	.04	7.75	10.05		6.92	33.802	167.44
2-1	do	.045	16.5	22.2	4.2*	20.42	39.016	704.31
2-5	do	.045	13.75	22.55	3.2*	21.53	23.365	447.33
4-14	do	.045	11.75	14.40	6.5*	10.57	38.134	330.54
4-19	do	.045	11.25	15.2	7.8*	12.76	74.191	785.22
4-14	do	.045	9.15	10.85	6.5*	7.74	20.258	115.05
4-20	do	.04	8.25	12.95	10.3*	7.97	76.914	464.60
4-20	do	.04	9.6	13.45	8.5*	9.01	74.822	530.19
4-22	American Metal Co.Ltd.				34.85	22.42	15.338	243.13
4-22	do				32.8	20.78	14.08	195.58
4-22	do				30.05	18.58	32.116	428.13
4-27	Amer.Smelt. & Ref.Co.	.04	7.35	12.00	10.6*	7.00	71.726	363.69
4-27	do	.04	7.35	11.50	10.2*	7.01	72.109	368.62
4-27	do	.045	10.05	14.70	8.5*	9.86	68.798	546.57
4-29	do	.04	11.4	14.05	8.3*	10.24	74.911	623.03
4-30	do	.04	9.65	12.10	8.6*	8.55	78.708	523.40
5-3	do	.04	6.80	10.85	10.7*	6.25	85.562	396.17
5-5	do	.04	10.15	12.40	8.5*	8.94	84.342	597.17
5-9	do	.04	9.2	10.55	8.5*	7.69	77.584	448.87
5-9	do	.04	10.5	11.6	8.5*	8.77	81.527	559.07
5-9	do	.04	8.95	11.4	7.3*	7.90	78.333	469.01
5-9	do	.04	9.4	10.25	9. *	7.67	87.262	503.31
5-9	do	.04	10.5	10.7	8.2*	8.41	80.885	525.04
5-9	do	.04	9.15	10.05	9.2*	7.46	80.073	444.53
5-12	do	.04	16.7	21.9	4.2*	19.55	90.789	1,559.38
5-13	do	.045	19.15	23.50	2.4*	21.57	67.854	1,673.48
5-14	do	.04	12.25	13.25	6.8*	10.22	82.500	688.78
5-14	do	.04	10.0	15.5	7.2*	12.08	57.174	585.11
5-14	do	.04	10.05	11.25	7.5*	8.48	84.045	533.70
5-17	do	.04	10.55	15.05	6.8*	12.19	80.063	860.44
5-17	do	.045	9.45	14.2	8.3*	9.28	66.138	491.55
5-18	do	.04	8.55	9.35	10.8*	4.52	40.550	119.06
5-18	do	.045	17.2	19.8	3.5*	17.75	42.147	655.91
5-20	do	.045	12.24	15.20	5.4*	13.01	48.966	535.25
5-20	do	.045	10.80	16.25	5.3*	12.71	21.385	450.60
5-26	do	.045	14.55	15.1	5.3*	14.14	68.191	816.90
5-26	do	.04	13.55	15.15	4.8*	13.56	43.639	500.07
6-1	do	.045	10.50	13.0	9.4*	9.14	70.832	514.40
6-1	do	.045	13.6	14.1	7.3*	11.14	18.795	168.96
6-4	do	.04	30.0	11.75	4.6*	18.47	43.909	707.00
6-7	do	.045	32.70	11.7	2.2*	19.88	64.871	1,139.48
6-8	do	.045	32.05	11.85	2.3*	19.61	64.678	1,117.76
6-16	do	.04	13.55	16.05	7.8*	13.87	21.622	254.38
6-16	do	.04	8.4	14.85	8.7*	8.66	36.053	245.45
6-17	do	.04	18.4	18.1	5.5*	17.16	63.844	1,095.19
6-23	do	.04	10.5	16.35	16.0*	9.49	16.751	125.13
6-23	do	.04	9.05	16.70	16.8*	8.75	18.038	115.32
6-23	do	.045	21.9	18.6	2.8*	19.35	63.990	1,091.00
6-30	do	.045	17.65	20.75	2.5*	19.25	43.083	656.58

Hilltop Mine - Fairplay, Colo. - 2.

Date	Buyer	Oz.AU	Oz.AG	%PB	%ZN	NET VALUE PER TON WHEN SHIPPED	DRY TONS	NET VALUE PER LOT
1910								
7-6	Amer.Smelt. & Ref. Co.	.04	17.45	18.55	1.2*	$16.88	83.680	$ 943.63
7-7	do	.045	18.0	15.35	2.3*	16.01	46.474	647.93
7-12	do	.045	20.3	14.6	1.5*	14.99	62.313	869.23
7-13	do	.045	20.5	14.5		15.05	64.026	829.54
7-14	do	.045	20.6	14.3	1.0*	14.86	38.416	491.25
7-14	do	.045	20.95	11.2	1.2*	13.86	56.345	663.92
7-14	do	.045	20.95	14.15	1.5*	15.00	44.041	572.20
7-14	do	.045	20.3	11.35	1.0*	13.65	56.434	653.97
7-15	do	.045	19.75	15.30	1.0*	16.98	44.207	659.67
7-30	do	.045	20.7	17.0	5.3*	17.97	45.831	718.03
7-30	do	.04	19.3	16.75	4.5*	17.13	41.048	618.94
7-30	do	.045	16.7	13.9	3.8*	12.58	49.386	467.03
8-2	do	.045	16.6	14.0	3.3*	12.57	73.878	776.95
8-6	do	.045	16.25	14.10	4.8*	12.36	43.495	447.64
8-6	do	.04	14.75	14.	4.2*	11.47	73.390	687.77
8-10	do	.045	15.55	13.90	5.0*	11.93	66.052	649.96
8-10	do	.045	14.75	11.25	4.5*	10.52	46.421	392.49
8-13	do	.045	17.6	15.3	2.4*	15.66	72.145	980.71
8-13	do	.045	18.35	14.75	2.2*	13.72	45.523	530.97
8-13	do	.045	16.1	17.55	4.5*	15.85	51.284	706.23
8-16	do	.04	14.55	17.95	3.5*	15.16	76.556	1,001.43
8-19	do	.045	16.45	18.40	2.0*	16.37	78.117	1,117.38
8-19	do	.045	15.80	16.15	2.3*	15.09	41.267	537.29
8-23	do	.04	16.80	17.35	2.3*	15.99	71.077	990.73
8-23	do	.04	17.85	18.70	2.3*	17.08	41.249	619.83
8-29	do	.045	18.4	17.1	2.4*	16.78	53.506	788.42
8-29	do	.04	17.55	15.15	1.9*	11.75	76.147	1,019.19
8-31	do	.045	18.95	15.10	2.3*	16.17	60.884	859.48
8-31	do	.045	18.40	14.70	1.8*	13.62	48.496	561.04
9-8	do	.045	15.15	14.10	1.5*	11.82	48.400	472.92
9-12	do	.045	14.05	13.65	1.2*	11.13	46.641	440.35
9-13	do	.04	15.4	14.35	1.3*	11.95	69.748	689.53
9-14	do	.045	14.8	17.7	1.8*	15.24	79.952	1,054.12
9-14	do	.045	17.15	16.65	2.2*	15.98	20.260	282.50
9-16	do	.045	17.0	18.85	1.3*	16.87	46.485	689.05
9-20	do	.045	18.55	18.35	2.8*	17.45	50.066	770.95
9-27	do	.04	18.2	19.5	2.2*	17.74	63.794	1,000.85
9-29	do	.045	20.0	19.5	2.6*	18.76	41.843	687.41
9-29	do	.045	18.6	19.35	2.7*	17.97	54.048	860.25
9-30	do	.04	16.15	17.00	3.8*	15.66	49.411	671.16
9-30	do	.045	18.1	19.4	3.4*	17.77	75.408	1,184.99
10-1	do	.045	16.35	18.55	5.2*	16.53	72.020	1,041.08
10-7	do	.04	24.95	25.4	2.8*	26.20	75.761	1,811.36
10-10	do	.045	20.9	21.3	2.3*	21.31	49.751	945.73
10-17	do	.045	22.4	18.9	3.3*	20.13	41.258	735.79
10-19	do	.045	22.55	16.7	4.2*	19.39	66.025	1,128.17
10-21	do	.045	17.15	17.95	3.0*	17.04	54.687	819.70
10-25	do	.045	20.15	15.4	2.5*	17.80	44.805	706.10
10-27	do	.04	22.3	22.25	4.4*	22.74	71.107	1,452.19
10-28	do	.045	21.1	17.95	4.9*	19.14	49.778	828.53
11-1	do	.045	20.8	20.05	4.3*	21.07	50.247	942.98
11-3	do	.04	17.2	12.25	7.3*	12.57	40.409	424.98
11-11	do	.045	22.9	15.9	3.2*	19.19	79.717	1,346.37
11-19	do	.045	22.0	13.3	3.8*	15.48	18.488	248.07
11-23	do	.045	12.45	15.85	15.0*	13.67	27.652	321.22
12-23	do	.04	10.00	19.2	9.0*	13.87	49.008	575.97
10-22	do				36.75	20.67	17.932	294.45
10-22	Empire Zinc Co.				33.4	17.24	20.148	278.48
10-17	do				27.15	10.99	18.251	130.58
10-17	do				28.5	12.34	29.977	224.58
11-7	do				35.46	19.40	23.950	376.15
11-7	do				35.20	19.14	26.467	412.53
11-7	do				34.4	18.34	27.820	336.53

Leadville Lead Corporation
900 Ernest & Cranmer Building
Denver 2, Colorado

Hilltop Mine - Fairplay, Colo. - 3.

Date	Buyer	Oz.AU	Oz.AG	%PB	%ZN	NET VALUE PER TON WHEN SHIPPED	DRY TONS	NET VALUE PER LOT
1910								
12-22	Empire Zinc Co.				37.82	$21.91	20.302	$ 373.05
12-22	do				36.6	21.48	22.096	394.47
12-22	do				34.8	19.57	22.632	359.09
12-22	do				35.55	21.61	23.887	430.46
12-22	do				35.25	21.31	20.309	359.12
12-22	do				35.75	22.04	20.204	370.47
12-23	do				36.78	23.00	27.918	444.87
12-22	do				36.8	23.26	23.628	463.44
12-22	do				36.8	23.26	24.334	477.28
12-22	do				37.5	24.12	20.872	428.11
12-22	do				35.8	22.08	23.496	434.01

S u m m a r y

Numerical Averages Lead Smelter	.042	15.69	15.72	5.16			
Numerical Average Zinc Smelter				33.25			
Average and total value of Lead smelter shipments-1910					(a)$12.19	6,051.08	$73,807.55
Average and total value of zinc smelter shipments-1910					$16.15	478.95	7,749.05
Total Value 1910							$81,556.60
Average and total values, same assays, as of 1947 would be: Lead smelter:					(b)$39.27		$238,625.91
Zinc Smelter:					33.47		16,030.56
Total value as of 1947,							$254,656.47

(a) Average net lead smelter value as of 1910 calculated from
Treatment charges: Varied from bonus of 50¢ per ton to charge of $3.50 per ton (Average $2.80 charge) moisture deductions of from 5% to 10%.

Settlement Basis:
Gold: $19.00 per ounce.
Silver: 95% of average price of 52.5 cents per ounce.
Lead: 41¢ per unit, or 1.05 cents per pound.
Zinc: No payment, no penalty.

(b) Lead smelter settlement for same net smelter assay as of 1947 calculated:
Treatment charges: Maximum of $7.50 per ton
Moisture deductions accounted for in 1910 sheets.

Settlement Basis:
Gold: $31.81825 per ounce.
Silver: 95% of 90¢ per ounce.
Lead: 90% of wet assay less 1.5% @ 11.26 per pound.
Zinc: No payment, no penalty.

COMMENT

If present prices had been in effect in 1910 for period covered by these settlement sheets, the Chance-Hilltop Company, the then operators, would have received more than three times the amount realized from their operation or an increase of $173,099.87.

LAST CHANCE-HILLTOP - METAL PRODUCTION
Recapitulation of Bureau of Mines Data

		Dry Tons ore	Gold, ounces	Silver, ounces	Lead, pounds	Zinc, pounds	Copper, pounds
1903		944	31.03	4,428	238,584	-	-
1904		350	5.30	2,350	70,588	-	-
1905	No Production	-	-	-	-	-	-
1906	do	-	-	-	-	-	-
1907		20	-	-	-	16,800	-
1908	Production may be included in Hilltop	-	-	-	-	-	-
1909		6,190	206.89	81,913	2,108,215	410,400	22,932
1910		7,289	264.70	96,274	2,032,944	793,228	33,062
1911		4,073	159.70	54,036	1,009,931	479,730	17,695
1912		1,188	47.25	19,395	96,298	103,232	3,222
1913		4,580	209.14	79,942	426,694	20,904	25,522
1914		940	38.74	12,164	142,791	68,147	3,367
1915		980	3.05	1,545	30,328	591,240	249
1916		77	-	-	-	47,254	-
1917		213	8.27	2,398	17,255	-	65
1918		195	8.80	2,955	17,930	-	5
1919	No Production	-	-	-	-	-	-
1920		2,349	60.30	27,650	922,371	-	-
1921		1,761	50.41	23,703	603,085	-	581
1922		533	2.09	6,683	125,658	-	-
1923	No Production	-	-	-	-	-	-
	TOTALS	31,682	1095.67	415,436	7,842,672	2,530,935	106,700
April 1947 Value			$20,817.73	$355,197.78	$883,084.87	$253,093.50	$15,226.09

	$20,817.73
	355,197.78
	883,084.87
	253,093.50
	15,226.09
Total Value of Production Reported to Bureau of Mines	$1,541,463.82

At April, 1947 Metal Prices.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

PROGRAM

FIRST STAGE

Although it is desirable to acquire now fee ownership of the FULTON and 40% of the HILL-TOP by completing purchase, under present short term option, the combination of the LAST CHANCE and DAUNTLESS represents a mining unit of sufficient size and promise to justify the program outlined below, independent of the acquisition of the other two properties.

The most important development is the advance of DAUNTLESS TUNNEL to explore the extension of Hilltop ore shoots in DAUNTLESS and LAST CHANCE ground, as well as to provide access and haulage facilities for Hilltop proper and for Fulton.

The first work to be undertaken in the spring of 1947 will be, with the aid of Park County, converting 10 miles of the old railroad right-of-way between Fairplay highway and Leavick, into a motor haulage road. During the same period, the road between old railhead at Leavick and Dauntless portal will be improved and partially re-routed.

Thereafter a Quonset hut to house contractor's equipment, and structural lining plates to cover tunnel mouth will be installed at Dauntless portal, and contractor's equipment will be placed on the ground.

Simultaneously, with the drive of Dauntless Tunnel, the CATO CROSSCUT of the Last Chance would be de-iced to the connection of the south end of the Last Chance or Ice Palace stope. A blower would be installed at Cato Crosscut portal and approximately 2800' of ventilating pipe would be carried through this crosscut and through the principal workings to provide ventilation so as to permit sampling and underground core-drilling at points mentioned herein.

Underground core-drilling would then be started. At the same time with a separate drill rig, core-drilling from surface would be undertaken at the locations described below.

A second crew, operating with machine drills, powered by a portable gasoline compressor, would start mining ore on BADGER BOY outcrops where ore assaying 0.12 oz gold, 6.8 oz silver and 2.70% lead, or $15.00 per ton value is now exposed.

A third crew would clean out MAIN DAUNTLESS SHAFT, and equipped with a portable compressor to be installed at Dauntless Tunnel portal, would develop and mine ore left in laterals from the shaft above Dauntless Tunnel level.

Bulldozer trenching would be undertaken at points near Twin Shoot outcrop on Cato claim near Last Chance outcrop and at various places along projection of Last Chance strike southerly toward the Peerless Maud.

After CATO CROSSCUT is opened and Ice Palace Stope is thereby made accessible, the crew employed in this work would re-open the old workings on Twin Shoot outcrops near Cato portal.

SECOND STAGE
EXPLORATION PLANNED

CORE DRILLING

Core-drilling will prove or disprove the continuity of the LAST CHANCE and LIND-STEWART ore shoots in altogether virgin horizons, both to the north and south of the old workings, as well as the downward extension of these deposits below the old Hilltop and Last Chance stopes.

DRILLING FROM SURFACE

(1) Along the projected course of DAUNTLESS TUNNEL between present face and the point where its advance would cut the LIND-STEWART series under the BADGER BOY outcrop;

(2) Thence along projected course of Dauntless, northerly on the LIND-STEWART strike to south end of Hilltop workings;

(3) South of Last Chance workings, along strike of Last Chance series toward Peerless Maud;

(4) To west of old workings, along supposed strike of western twin ore shoot of LAST CHANCE series.

DRILLING FROM UNDER-GROUND LOCATIONS

(1) To explore possible extension of LAST CHANCE and LIND-STEWART downward below the pinch at the bottom of the old stopes;

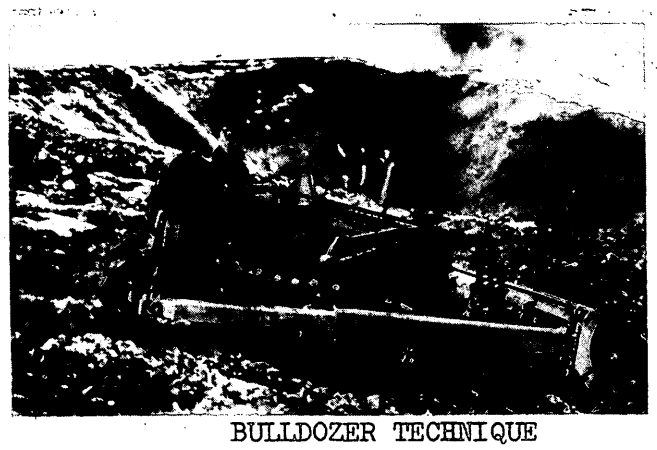
(2) To locate extension of LAST CHANCE ore shoot, east of LIND FAULT;

(3) To ascertain position of probable twin LAST CHANCE shoot west of old workings;

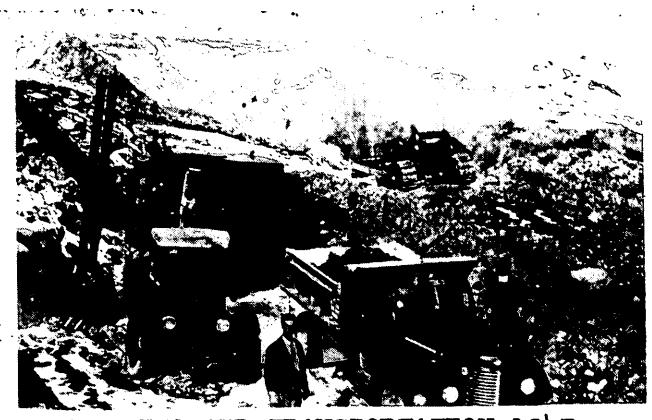
(4) To search for so far undiscovered ore occurrences to east and west of LIND-STEWART.

BULLDOZER TRENCHING

Several trenches will be made by bulldozer through talus on LAST CHANCE ground, near DISCOVERY FAULT and at location between that fault and the PEERLESS MAUD to expose outcrops of LAST CHANCE shoot; also around old CATO workings west of LAST CHANCE in attempt to expose outcrop of supposed "twin ore shoot."



BULLDOZER TECHNIQUE



HANDLING AND TRANSPORTATION 1947

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Denver 2, Colorado

DEVELOPMENT PLANNED

Leadville Lead Corporation
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DAUNTLESS TUNNEL

The Consolidation can be most cheaply and expeditiously explored and developed by continuation of the DAUNTLESS TUNNEL (now driven 650') as a crosscut for 400' to the LIND-STEWART-HILLTOP DIKE series, under the BADGER BOY outcrop on DAUNTLESS ground, then drifting northwesterly for 1100' on either or both the LIND and STEWART shoots into Hilltop ground, and raising 118' to a connection with old Hilltop workings on the Lind shoot at a point where the last production was made in 1921, and where a block of presently commercial ore is said to be exposed.

The DAUNTLESS TUNNEL is now in ore on Dauntless ground and would crosscut 3 known ore shoots between its present face and the LIND-STEWART series. This tunnel would provide:

1. A main working site which could be served by trucks 12 months of the year;
2. The elimination of hoisting;
3. The elimination of pumping by providing drainage for all workings;
4. Rapid and informative exploration of all probable ore-bearing horizons;

and, most important, it is probable that most of the proposed drive would be in or below commercial ore.

This tunnel is 700' lower than the collar of the Main Hilltop Shaft, and is below the bottom of the perpetually frozen zone, in which all of the old Hilltop workings are located. The Dauntless Tunnel, therefore, presents no ice problem.

The Dauntless Tunnel would be in Cambrian Quartzite when it reached a point under LAST CHANCE Discovery outcrop and under old Hilltop stopes, so that all of the promising White Limestone bed and the unexplored remainder of the Blue Limestone would be above the working level.

Ultimately Dauntless Tunnel would be advanced through the Mosquito Range to a point at the head of Iowa Gulch on the Leadville side, 4 miles from railhead at Resurrection Mill, and 6 miles from AS&R smelter.

An aerial tramway could connect the western portal with the motor haulage road in the floor of Iowa Gulch.

This 5' x 8' tunnel can be contracted for the first 1500' at $25.00 per foot, the contractor furnishing the equipment, timbers, pipe and rail. The contractor would operate with a Diesel-powered air compressor. The contract will provide that company may purchase from contractor all pipe and rail installed under the contract at cost plus 10%.

DAUNTLESS TUNNEL, Cont'd

The company would, at its expense, improve and maintain road to Dauntless Tunnel portal and would provide housing for men and machinery. The company would also, at its expense, re-open one or more shafts on Dauntless property, one of which, MAIN DAUNTLESS, 116' deep, connects with the tunnel. It is believed that the Main Dauntless shaft could rapidly be put in production. This shaft connection will also provide ventilation for tunnel drive.

By contracting the Dauntless drive, the company will have no outlay for machinery and equipment in the FIRST STAGE of proposed operation.

The contractor will operate on a 2-shift daily basis, and can probably advance from 7 to 10 feet per shift, using modern jumbo-mounted drifters, mechanical mucking machine and electric tram.

Sizable ore may be expected when the tunnel has been advanced 400' to cut Lind-Stewart series under BADGER BOY cuts. Thereafter the drive would be in or below ore from this point to a connection with the Hilltop workings.

The expense of Dauntless drive to expected ore on LIND-STEWART shoot under BADGER BOY outcrop is estimated at $15,000.00, including the provision of housing, as aforesaid.

The next 1100' of the drive, on Lind-Stewart series, to connection with old Hilltop workings,will cost $27,500.00.

By road and highway, Dauntless Tunnel portal is 51 miles from nearest railroad station, Buena Vista, on Denver & Rio Grande, and 80 miles from Leadville.

RE-OPENING OLD WORKINGS

Simultaneously, with advance of Dauntless, the company plans to spend between $5000.00 and $8000.00 in making accessible the Hilltop and Last Chance workings by removing ice from Cato crosscut and installing ventilating pipe through a portion of the workings.

Later, after Dauntless Tunnel connects with Hilltop workings, circulation between Cato Tunnel Portal and Dauntless openings would adequately ventilate all of the workings.

Last Chance Cabin & Ore House
1878 - by C.S. Richardson.

HOUSING

The buildings near Dauntless portal can be repaired at small expense and made adequate for the housing of contractor's crew.

The company plans to purchase a Quonset hut to be set up at portal for housing contractor's machinery, also to cover portal with corrugated steel lining plates.

A sizable set of buildings, including bunkhouse capable of housing 20 men, mess-hall, shop, etc. was constructed in 1937 at BARCOE MINE, 3 miles down the Four Mile from Dauntless portal, at an elevation of 11,000'.

LEADVILLE LEAD CORPORATION has the right to use these buildings with no expense except payment of fire insurance premiums. The Barcoe buildings can serve both for the immediate housing of men during the preliminary operations and as a permanent company headquarters.

TRANSPORTATION FACILITIES

In 1892, the Colorado and Southern Railway Company constructed the 11.2 mile narrow gauge spur previously referred to from Fairplay to the now deserted town of Leavick, at the foot of Mount Sheridan, approximately 2 miles from Dauntless portal. This right-of-way has been abandoned and title to its course across fee owned land can be obtained in the name of Park County. The County can obtain permits for the course of the right-of-way across public domain and state lands.

The County is willing to construct a new road to Leavick on the route of this right-of-way. In the interest of time it is planned that the company will assist Park County in this work.

The company's predecessors had previously constructed a road from Leavick to Hilltop, passing the Dauntless portal. It is planned to re-route portions of the new road between Leavick and Dauntless, so that haulage can be maintained continuously throughout the winter.

POWER

The nearest electric transmission line is that of the Public Service Company of Colorado at the First National Mine in Iowa Gulch, on the Leadville side, approximately 4 miles from Dauntless portal. Public Service estimated costs of extension of this line to Dauntless at $9,500.00.

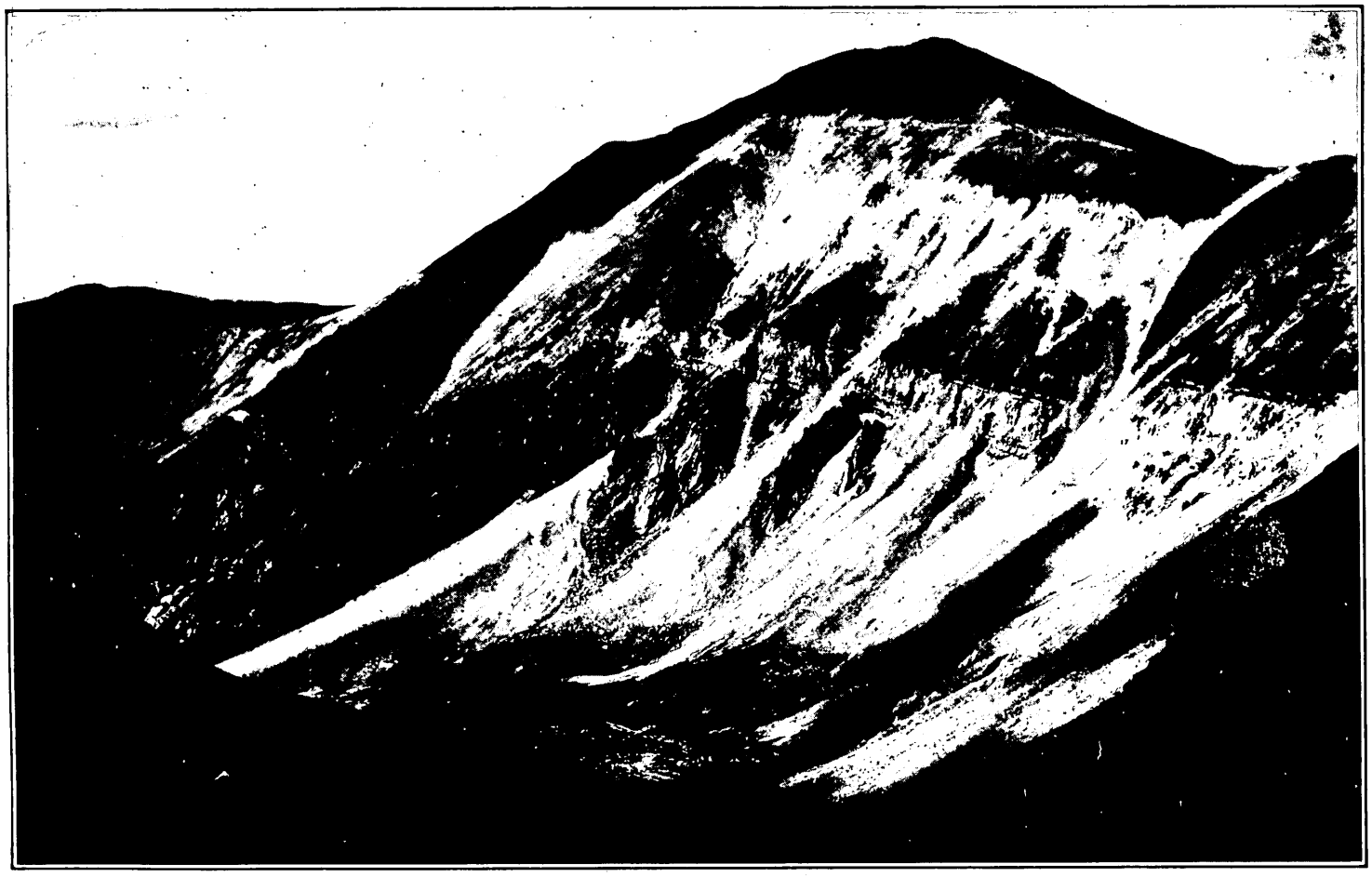
This extension is not contemplated at this stage as the Dauntless Tunnel will be advanced by Diesel-power, as aforesaid.

Later, when this tunnel has connected with Last Chance workings, a transmission line can be extended from Leadville side over the range to the CATO PORTAL at cost of $8,500.00.

Still later, when Dauntless has advanced through Mosquito Range to a western portal in Iowa Gulch, the terminus of transmission line and the power plant would be located at latter portal.

As stated, a tramway could be constructed from this opening down to road in Iowa Gulch, with a downhill haul from that point to Resurrection Mill, to railroad and to smelter.

HEAD OF IOWA GULCH FROM LEADVILLE SIDE



A. SHERIDAN MOUNTAIN FROM HEAD OF EMPIRE GULCH

Showing uniformity of contact between granite and overlying quartzite

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

MARKETING OF ORE

As previously stated, until such time as tunnel opening shall be provided on Leadville side of Mosquito Range, ore would be transported through present eastern portal of Dauntless Tunnel, and, by truck 13 miles over new road to be constructed in part along railroad grade to the paved highway near Fairplay, thence over this highway 67 miles to Leadville.

Ore of relatively low zinc content of a grade exceeding $25.00 per ton would be smelted in the Arkansas Valley Plant of American Smelting & Refining Company at Leadville, at a probable average treatment charge of $7.50 per ton.

Ore of a lower grade with high zinc content would be reduced in the AS&R selective flotation plant near Leadville, known as Horner Mill, in order to recover the zinc values in addition to the silver and lead.

Ore with a high zinc content would be trucked to D&RGW station, Buena Vista, for rail transportation to the zinc smelters at Amarillo, Texas, or at Salt Lake City, Utah.

LEADVILLE
Through Horseshoe - Head of Empire Gulch
1878 - by C.S. Richardson.

COST OF PROGRAM

FIRST STAGE - PROPERTY ACQUISITION

Purchase of Fulton and 40% of Hilltop		$14,571.33	
Acquisition of additional leases and fee titles, title determination, etc.		4,000.00	
Discharge of commitments of corporation		5,000.00	
			23,571.33

SECOND STAGE - PRELIMINARY INSTALLATIONS AND FACILITIES

TRANSPORTATION & HOUSING

Repairs to road between Leavick and Dauntless		900.00		
Establishment of interim main camp at Barcoe Tunnel (building now habitable); camp equipment and 60 days' supplies		1,200.00		
Ditto at Dauntless portal by repairs to existing buildings, camp equipment and 60 days' supplies		620.00		

AUTOMOTIVE EQUIPMENT

1 4 X 4 Carryall or Ambulance	1,200.00			
1 4 X 4-1½ton Flat Rack	1,500.00			
		2,700.00		
			5,420.00	

DAUNTLESS PORTAL FACILITIES

Installation of corrugated steel tunnel liner plates from portal to compressor house		625.00		
20' x 24' Quonset hut for shop and Compressor House, f.o.b. Denver $1,224.00 Cost of Transportation and erection $650.00		1,874.00		
			2,499.00	
				7,919.00

THIRD STAGE - PRELIMINARY EXPLORATION

RE-OPENING DAUNTLESS TUNNEL & SHAFT

Cleaning out tunnel and installation of 650' of track and air pipe through tunnel and up shaft		2,028.00		
Re-timbering of shaft collar and installation of ladderways		600.00		
Rental and transportation gasoline-powered Compressor and 2 Jackhammer machine drills 90 days		750.00		
Timbers, explosives and supplies - 90 days		900.00		
			Fwd. 4,278.00	
				$31,409.33 Fwd.

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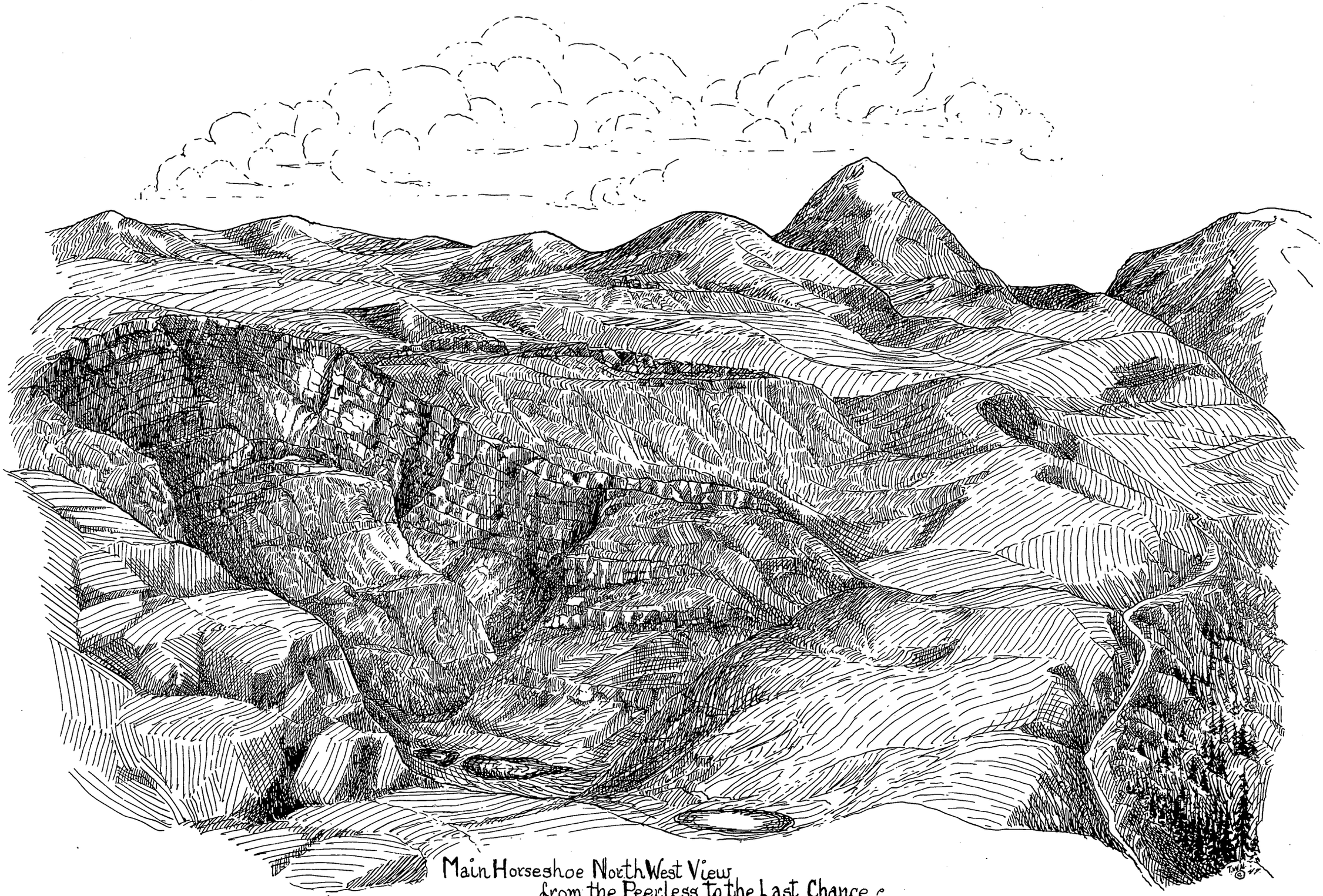
		Fwd. $4,278.00	Fwd. $ 31,490.33
EXPLORATION BADGER BOY OUTCROP			
Cleaning out open cut by open cut trenching through center of cut to each wall	800.00		
Rail, car and tools	350.00		
Supplies, explosives, etc.	480.00		
Labor, 60 shifts @ 9.00	540.00		
Supervision and miscellaneous	600.00		
		2,770.00	
ENTRY INTO LAST CHANCE and HILLTOP WORKINGS AND THROUGH CATO TUNNEL			
Housing at Cato Portal (12 X 20 Quonset hut $700.00 transportation and installation $350.00)	1,050.00		
Corrugated steel tunnel liner plates from portal to Chance stope	680.00		
Rental portable gas compressor and drills 30 days	300.00		
Rental hoist, etc. 30 days	150.00		
Camp equipment, small tools, mine cars	575.00		
Purchase of gas driven blower	250.00		
Purchase of 2800' ventilation pipe @ 50¢ per foot - plus transportation and installation	2,240.00		
Labor - 90 shifts @ 9.00	810.00		
Supervision - 30 days	300.00		
Tools, mine cars, etc.	200.00		
		6,555.00	
ENTRY INTO TWIN SHOOT WORKINGS ABOVE CATO TUNNEL			
Timbers	150.00		
Mine cars, rail and tools	350.00		
Labor, 60 shifts @ 9.00	540.00		
Supplies and explosives	133.00		
		1,173.00	
			14,776.00
FOURTH STAGE - PRELIMINARY CORE DRILLING			
BADGER BOY OUTCROP 800' @ 4.00 per foot		3,200.00	
BETWEEN DAUNTLESS & BADGER BOY 720' @ 4.00 per foot		2,880.00	
BETWEEN LAST CHANCE & HILLTOP WORKINGS 1800' @ 4.00 per foot		7,203.67	
			13,283.67
FIFTH STAGE - ADVANCE OF DAUNTLESS TUNNEL TO CONNECTION WITH HILLTOP-CHANCE WORKINGS			
Contract for 1618' @ 25.00 per foot (contractor to furnish everything)			40,450.00
			$100,000.00



Main Horseshoe North West View
from the Peerless to the Last Chance -

from sketch by C.S. Richardson - 1878 -

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SUPPORTING DATA

The operation of the HILLTOP has been unusually well documented, particularly for the period between 1908 and 1921.

Little data is available regarding the early operations and production of the LAST CHANCE and DAUNTLESS.

The company was fortunate in securing considerable valuable Hilltop data from the family of the late Sam Doran, superintendent of the mine during the period of 1910-1922, and the last lessee of the property when it closed down in 1923. The Doran data included 7 engineers' reports made during the period mentioned, some of them within the last year of the mine's operation, together with numerous mine maps, including the superintendent's last working maps, also many sampling records, and a mass of correspondence.

ENGINEERS' REPORTS

Copies of the following reports are attached hereto:

Date	Engineer	Employed by	Subject Matter
Apr. 11,1892	W.G. Franklin	Probably by owners (prior to sale to Leavick)	Contemporary Hilltop operation
July 14,1910	Walter S.Larsh	R.H.Trumbull (one of Hilltop owners)	Hilltop Mine and opn. Chance-Hilltop Mining Co. lease
May 6,1913	Hugh C. Watson	American Metal Company	Hilltop Mine
Feb. 15,1919	M.F. Crossette	Sun-Moon Lsg.Co.(Lessee)	Hilltop - Last Chance
June 22,1919	Herbert C.Enos	Hilltop Silver Min.Co."	do
Aug. 16,1920	Carl O.Lindberg	do	do
Oct. 22,1921	Walter S.Larsh	R. H. Trumbull	Hilltop: operation of lessee Hilltop Silver Mining Company

DIGEST OF REPORTS

W. G. FRANKLIN, a mining engineer, history unknown, covered the operation and production of the Hilltop proper for the period 1888-1892. Franklin recited the volume and costs of contemporary production and estimated ore reserves "in sight" of a net value of $1,282,500.00. He mentioned the discovery in 1892 of "another ore shoot of great value," evidently the "twin ore shoot" outcropping on Cato claim of Last Chance near southwestern Hilltop boundary, previously mentioned. This ore shoot is believed to lie west of and parallel to the Last Chance or Ice Palace ore body. Franklin believed this new ore shoot would extend into and through the Hilltop ground. His conclusions regarding future production and profits were highly favorable.

WALTER S. LARSH, formerly an engineer for the American Smelting & Refining Co., has been for many years associated with the Nevada Consolidated Copper Company. At last report he was Assistant General Manager of the Nevada Division of that company at Ruth, Nevada. Mr. Larsh made reports on the Hilltop on July 14, 1910, and on October 22, 1921, for the owners, R. H. Trumbull and associates.

LARSH'S 1910 REPORT was made during the lease of Chance-Hilltop Mining Company (W.F.B. Berger operation). The report recites contemporary production and costs of the Berger operation in considerable detail. Production of this period came entirely from Lind-Stewart series. The local geology is thoroughly covered.

Larsh stated further "I do not consider the Hilltop a dugout proposition by any means." He stated that under able management and with sufficient money, the Hilltop, if operated in behalf of the owners, could be expected to return at least 10% on the investment from year to year. He states that his conclusions are based on what the mine has produced in the past and the amount of virgin territory, rather than on ore in sight. He recommended operation through a tunnel at considerable depth below the old shaft openings, but did not specifically refer to the Dauntless Tunnel.

Larsh's 1921 Report Conclusions: "There yet remains much unexplored and favorable territory in Hilltop property... The possibilities in the Blue Lime are not by any means exhausted, but the best chance for finding ore in quantity is to prospect the White Lime beneath the main ore shoot... The possibilities for an extension to the north are good (Fulton ground) ... There is possibility of the continuation of this ore shoot (Last Chance) to the east of the fault (Lind fault)... The plane of the Dauntless Tunnel will intersect the bottom of the White Limestone vertically below the main ore shoot (Last Chance) at a point...about 615 feet below collar of shaft projected (Main Hilltop)... Three sections of the mine accompany this paper...the elevation of the Dauntless Tunnel portal is shown on all three because this tunnel is the most feasible one to gain some additional depth in the territory."

HUGH C. WATSON, in his 1913 report to American Metal Company, estimated total production of Chance-Hilltop at $2,976,339.00. He believed "the two previously unknown slips... (McGillis and Last Hope)... bid to equal the other ore shoots... Regarding an ore body directly above Stewart stope he states... it is in this body that I estimate enough ore to justify the price asked for this lease."

MURRAY F. CROSSETTE, formerly employed by United States Smelting, Refining and Mining Company, in his 1919 report, estimated total production of Hilltop at 4 millions of dollars and average grade of ore of 25 oz silver and 20% lead.

In his summary he states... "after my study of the origin and manner of ore occurrences on the property...I view the probable results of the present development campaign as most encouraging. Having satisfied myself that the porphyry dike cutting through the property served as a channel for the ore-bearing solutions which formed the ore bodies by replacement along fracture lines parallel to and angling from this dike, I can only feel that further development along the strike of this dike will result in exposing similar fracturing and ore deposition... it is my opinion that a sulphide ore body lies below the parting quartzite by a direct continuation of present known ore bodies...I suggest that Doran Drift will develop the west side of the dike to the north... I see no good reason for not expecting an ore body on the west side."

Crossette recommended development along LIND-STEWART to the South (Dauntless ground). He concludes "...if my present expectations are realized, new ore bodies will be encountered considerably before the completion of 1000' of development work."

HERBERT C. ENOS, formerly employed by U. S. Smelting, Refining and Mining Company and by American Smelting & Refining Company, and now residing in Chatsworth, California, in his 1919 report states "...recent development work indicates that other ore bodies will be found along the fissures which parallel and lie close to the main porphyry dike... The main Hilltop ore body...has never been picked up to the northeast of the fault (Lind fault); no doubt the bottom end of the ore body has nearly reached the parting quartzite where it was faulted, but I believe that there is a possibility that the northeastern extension may be picked up above the 540' level as the block of ground to the west was probably dropped... I think that the crosscut west from the main Hilltop ore body should be continued... A shaft should be sunk through the parting quartzite below the main Hilltop ore body in the hope of finding sulphide ore."

DIGEST OF REPORTS, Cont'd

Enos states in his summary: ..."I think that it is fair to assume that the possibilities for finding and developing more ore are extremely favorable."

He states further... "the geological conditions are quite similar to those found at Leadville where I have had considerable experience in mining. In Leadville, prospecting below the quartzite for sulphide ore bodies was almost a universal practice... There it so frequently happened that where there were carbonate ore bodies above the parting quartzite, sulphide ore bodies were found below the parting quartzite in nearly every instance having the same correspondence in size and trend to the carbonate ore bodies above. I believe prospecting for the sulphide can be done more quickly and economically by diamond drilling."

CARL O. LINDBERG last reported as head of engineering staff of Goldfield American Development Company, Ltd. New York City, in his 1921 report, estimated previous HILLTOP-LAST CHANCE production at between 4 and 5 millions of dollars, and average grade of ore as 25 oz of silver and 20% lead, and that LAST CHANCE ore shoot produced more than 100,000 tons. He estimated 15,000 tons averaging 13.5 oz silver and 17.5% lead was exposed, in UPPER LIND STOPE in 1920.

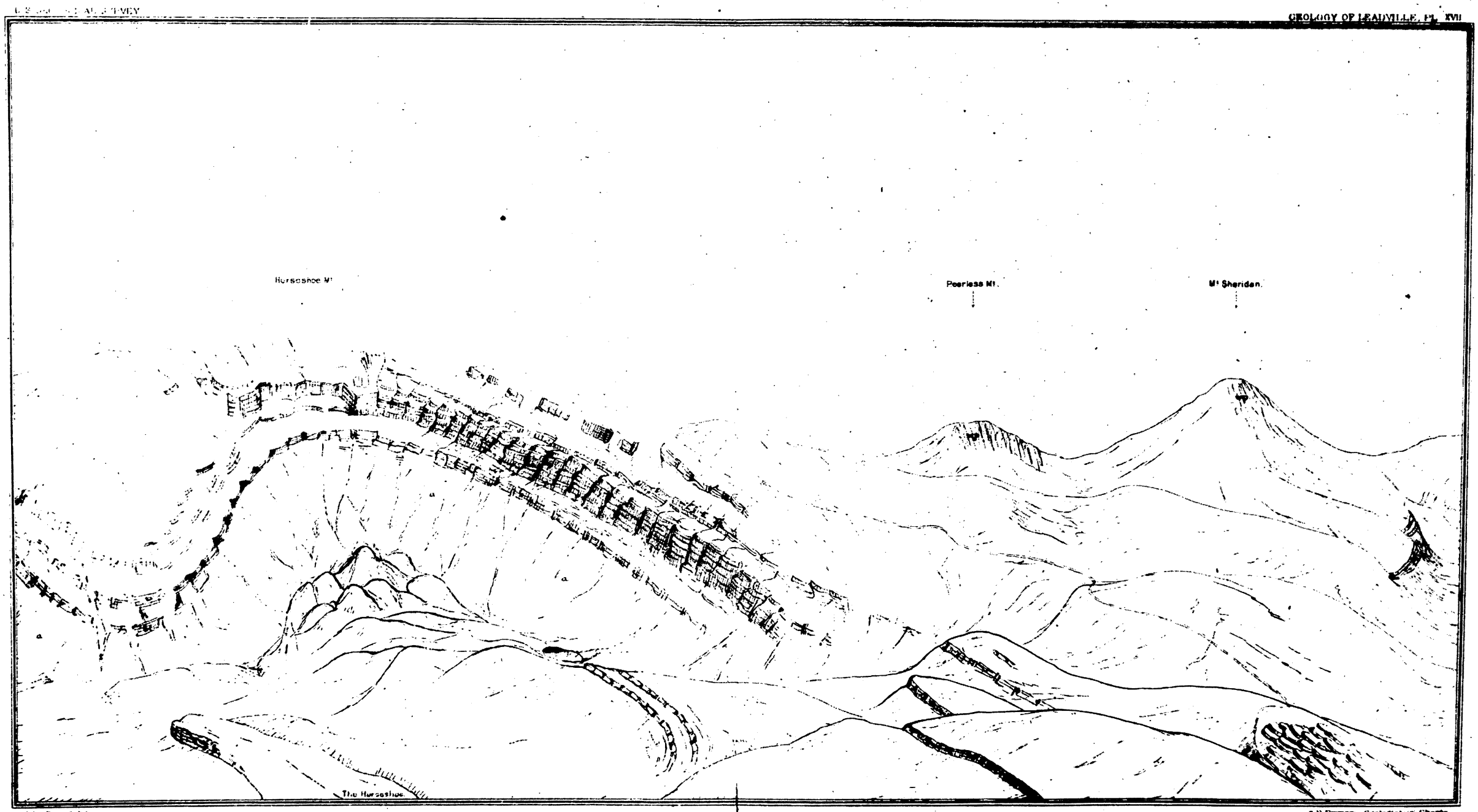
Lindberg believed that several new ore shoots could be found by additional development; that the territory to the south was the most promising area; that the mineralization of the fissures already developed would extend to greater depth; that the transition of the ores to sulphides at depth was highly probable; that core-drilling was the most economical form of exploration.

He considered DAUNTLESS TUNNEL the proper outlet for the mine and recommended abandonment of the old Hilltop shafts.

Lindberg's conclusions include the following statements:

"Geological conditions suggest the existence of several more ore bodies and that sulphide ore bodies may be found at greater depth than that explored. The risk of loss of investment is practically eliminated and the chance to find additional and profitable ore bodies is good."

LINDBERG recommends - "The future prospects are favorable to the development of profitable orebodies, and the conditions are such as to warrant an additional expenditure for about 5,000 feet of diamond drilling to cost approximately $25,000.00. Plans for future development should be made pending the results indicated by the recommended diamond drilling."



Julius Bien & Co. lith

S. F. Emmons, Geologist-in-Charge

HEAD OF FOUR-MILE CREEK.

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SUPPORTING DATA

U. S. GEOLOGICAL SURVEY

S. F. EMMONS - "GEOLOGY & MINING INDUSTRY OF LEADVILLE"

This monograph, published in 1886, on data compiled in 1878-79, devoted pages 153-163 to the HORSESHOE AREA. On page 154 Emmons states... "in the very bottom of the Four Mile Amphitheater... the Blue Limestone again outcrops in the bed of the gulch, and has been developed in the important BADGER BOY mine, and by numerous prospect holes." A copy of Emmons' reference to the Horseshoe territory is included in the data submitted.

U. S. BUREAU OF MINES

Included in the data submitted are copies of records of production furnished by the late Charles W. Henderson, Director of the Denver office of the Bureau, reporting on Hilltop and Last Chance for the years 1903-1904 and 1907-1922, inclusive, including production of CHANCE-HILLTOP LEASE of 31,682 dry tons, containing 1,095.67 recovered ounces of gold, 415,436 recovered ounces of silver, and 7,842,672 pounds of lead, worth at March 1947 prices, $1,541,463.82.

The Bureau's WAR MINERALS REPORT No. 194 to U. S. Department of Interior, "ALMA DISTRICT, PARK COUNTY, COLORADO" 1943, states on pages 25 and 26:

"THE HILLTOP MINE, the largest single producer of lead-zinc ores in Park County, and third in rank of total value of production, is close to the Lake County line, near the top of Mosquito Range, at an altitude of 12,800 to 13,000 feet. The value of its product has been locally estimated at $4,000,000.00. It is 14 miles west of Fairplay.

"The ore occurs in vertical siliceous replacement deposits in the Leadville limestone along fissures of general north-south strike. The principal deposit mined was the Ice Palace stope, some 1,500 feet long, 20 to 50 feet wide, and stoped above the main level for more than 100 feet in places. Four other smaller vertical deposits have been developed along the northwest-southeast fractures.

"About one-fourth of the Ice Palace stope is on Last Chance claims. Although little water is made in the mine, and the lift of 600 feet is not excessive, it is difficult to handle the water pumped from the mine because it freezes and ices the shaft at this altitude. For this reason, little exploration has been attempted below the water level, although it is said that ore was left in the bottom of the stope for its entire length. The bottom of the stope may extend more than 100 feet below the water level, as underlying White Limestone and Peerless shale also are favorable horizons for ore elsewhere in the district. There are also possibilities for ore below the bottom of the shaft in other parts of the Blue Limestone and the two lower formations.

"The Bureau of Mines has records of Hilltop production from 1903 to 1923. In 1910, approximately 7,200 tons was shipped to smelters, mainly the American Smelting and Refining Company's lead smelter. The average metal content of lead smelter shipments in 1923*, was 0.042 ounce gold; 15.69 ounces silver, 15.72% lead, and 5.16% zinc. In the same year 478 tons averaging 33.25 percent zinc was shipped to zinc smelters."

*Evidently 1910 instead of 1923.

SUPPORTING DATA

DORAN DATA

As previously stated, the corporation acquired from the Doran family an especially valuable mass of data collected by the former superintendent, Sam Doran, covering the last period within which the HILLTOP was operated. The engineers' reports so furnished have been discussed herein.

Particularly valuable is a set of mine maps made at various periods, including working maps used by Doran, showing the most recent development and assay values of samples taken shortly prior to the final suspension of operations.

This collection includes print of a survey of the HILLTOP and LAST CHANCE by George T. McDonald made July 27, 1920, showing surface and underground elevations above the datum line of the DAUNTLESS TUNNEL projection. A print of the Hilltop workings, with notes made by the engineer, Russell Paul, around 1913, is also included. Copies of considerable correspondence between Doran and others relating to the Hilltop, is also of interest.

In a letter to J. M. Knight of May 22, 1924, Doran stated... at 540 feet the Hilltop workings are dry, have to take water down for drilling purposes, except in the spring when there is little surface water... I am sorry I cannot give you the value of the ore shipped in dollars and cents, but I was only the superintendent and the books and settlements were kept and made in the Denver office... however, to give you the best idea I can, the ore averaged 22 ounces of silver, 20% lead per ton... There are no ore reserves left in the Hilltop, but there are several hundred tons that will run 12 ounces of silver and 8% lead, as well as some carbonate of zinc, undeveloped, that will run 36%. If the Hilltop were sunk 100 feet deeper it ought to reach the white lime. This would, no doubt, show up the sulphides, but not deep enough to get under it... Another producer in the district was the BADGER BOY. I do not know just how much tonnage they shipped, but it must have been quite a great deal by the looks of the open cut.

"I am just bringing these things to your attention... to show you what a big mining enterprise could be developed... as this district is the same formation as Leadville, and it hasn't even been scratched yet. In my opinion this is the best mining section there is to be found any place in the country. Not knocking Silverton, this section is a paradise for climate compared to Silverton, for it is void of snowslides, and can work and ship the year around... It will not be necessary to tell you that I am not a technical engineer, but I do think I am a practical mining man.

"I will venture to say there has been more ore come out of the Horseshoe District than came out of Leadville, in proportion to the amount of work that has been done. As you probably know, the PEERLESS MAUD was a big one; the LAST CHANCE furnished the lead ore for the Globe Smelter for 2 years when Sheedy and Kountze owned it; the HILLTOP has a record of 4 million dollars; the CONTINENTAL CHIEF paid 1 million dollars in dividends and they are the only places in the district that have been worked and they stand on their merits."

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DORAN DATA

In letter of March 12, 1923 to F. W. Bailey, Denver, Doran states: "We did some of the work outlined by Mr. Crossette and shipped 6,000 tons from the Lind ore body which averaged 12 oz silver and 17% lead. There was a displacement in the south end of this ore shoot when we quit, but I feel that it could be picked up again with very little expense as the apex of this shoot shows 500 feet further south where the surface is scored off to the blue lime. North in the Doran we encountered ore but never completed the work. In this drift at the present time there are 200 tons of carbonate zinc that will go 36%. With further development this might develop into a large ore body. I drove a drift east from the Doran drift and got under the Fulton drift 20 feet, but shipped only two cars out of it... this ore is 6 feet wide and I expect it to go out to the north end of the Lime King."

"There is a cross-cut out of the 480 foot level west where I always figured to cut another ore shoot. This has gone 100 feet and I expected to get ore there at any time but work was stopped on the pretense of completing it with diamond drill (but the cash run out)."

MISCELLANEOUS DATA

FRED J. McNAIR, U. S. Mineral Surveyor for Leadville District and County Surveyor for Lake County for the past 40 years, in a letter of June 21, 1945, stated: ..."I have made geological maps of this territory (Hilltop) and have found that the work in the bottom of the Ice Palace Stope had not reached the bottom of the first contact but that in one place we were able to get down a winze 38 feet below the floor of the stope to the bottom of the blue lime contact. Good silver ore showed in the bottom of this winze and I am convinced that they are still that far from the bottom of the blue lime, or first contact... this indicates that with 38 feet of the first contact left to be worked, and all of the second contact which would be about 200 feet thick, the mine has great possibilities."

A. E. MOYNAHAN, Mining Engineer, Colorado School of Mines of 1900, former Assayer of U. S. Mint, in a letter of June 21, 1945, states: "I was born and raised at Alma and am more or less familiar with most of the older mines of Park County. The Hilltop mine was working when I was a boy and to my personal knowledge has produced and shipped a very creditable tonnage of good silver-lead ore... I did have occasion to go through the workings several times about 1904... at the time of my first visit there was a breast of nearly solid galena 15 feet high and 30 feet wide showing... a sample of this ore was grabbed from a railroad car in the process of loading... from memory the assay was 0.10 gold, 30 plus ounces of silver, 62% lead. On a later trip to this property, I found this ore body had been faulted and lost. I do not believe the extension of it has ever been recovered, but I believe it could be... I did a little work and some sampling in the floor of the drift in the Fulton. We encountered carbonate ore all along, but decided it could not be marketed at a profit on account of the high zinc content and smelting penalty."

FILES OF THE FAIRPLAY FLUME, JUNE 24, 1880: "The claims owned by the Badger Boy Mining Company are 5 in number, the principal one being formerly known as the SEDGWICK mine... The vein upon the BADGER BOY is 20 feet in width and consists of a solid body of carbonates and crystallized lead, running well in copper... an immense ore dump has been created from an opening of not more than 15' in depth... 30 oz of silver per ton for the entire lot is not an over estimate. An iron carbonate also exists and runs as high as 90 oz silver per ton. The latest assays made from the bottom of the cut show a value of over 100 oz to the ton indicating rapid progress in the value of depth gained. A small force of men is employed cleaning up the vein, but now that the smelter has been arranged for, this mine and others owned by the company will be opened up on an extensive scale... From the small opening made upon this vein, about 1,800 tons of ore have been mined, 1,100 having been carried away and treated."

MISCELLANEOUS DATA

FILES OF FAIRPLAY FLUME NOVEMBER 18, 1880: "The Badger Boy has a large body of ore in sight, and during the last summer shipped from 5 to 10 tons daily to the East Leadville Smelter. It averaged 25 oz in silver and 5% lead."

June 24, 1880: "A short distance above the BADGER BOY and just below the eternal snow bank in the Horseshoe is Ben Graham's Last Chance mine. The ore contained in a 14' vein upon this claim is of a precisely similar character to that of the Badger Boy and the output could be very large if a good market was at hand. Mr. Graham has been offered $25.00 a ton for this ore in Leadville. It should be equally valuable to smelters on this side of the range. At the time of our visit, Messrs. Graham and Jones were taking out the last of the ice and snow from an open cut preparatory to taking out ore and doing development work."

November 18, 1880: "The Last Chance, lying just above the Badger Boy and at the head of the Gulch is developed by a shaft about 50' in depth, showing ore all the way. There are also two open cuts on the property, both in ore. A considerable amount of ore was shipped from this mine to the East Leadville Smelter, and a large amount is on the dump. The owners are Graham and Company.

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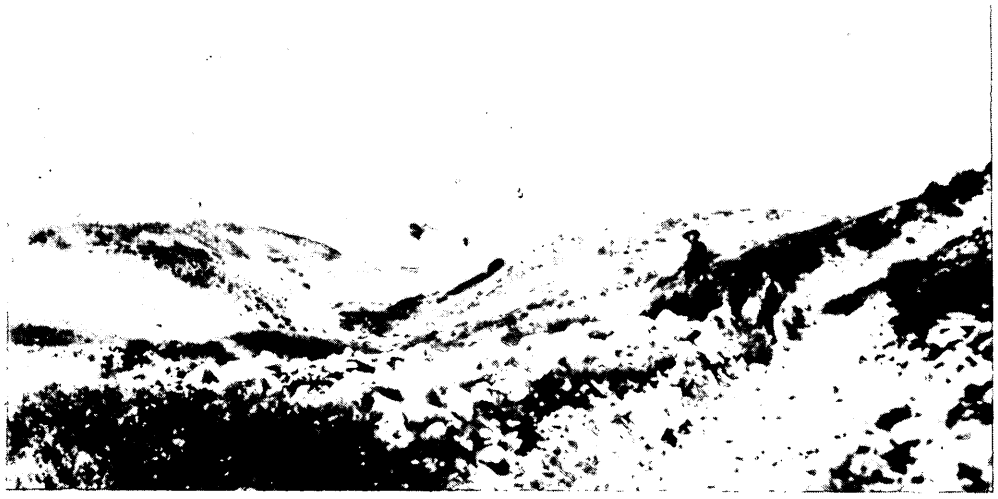

HILLTOP MINE FROM FOURMILE CREEK

HILLTOP SHAFT HOUSE
WITH LAST CHANCE WORKINGS IN FOREGROUND

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LEADVILLE LEAD CORPORATION

ENGINEERS' REPORTS

on

HILLTOP CONSOLIDATION PROPERTIES

by

MURRAY F. CROSSETTE	FEB. 15, 1919
HERBERT C. ENOS	JUNE 22, 1919
W. G. FRANKLIN	APR. 11, 1892
WALTER S. LARSH	JULY 14, 1910 OCT. 22, 1921
CARL O. LINDBERG	AUG. 16, 1920
HUGH C. WATSON	MAY 6, 1913

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on the

HILLTOP PROPERTY

Examined by M. F. Crossette,

for the

Directors

of

THE SUN-MOON LEASING COMPANY.

February, 1919.

MURRAY F. CROSSETTE

The attached report of February 15, 1919, was made by Mr. Crossette for The Sun-Moon Leasing Company covering the Hilltop Mine and numerous adjoining properties then held under lease by that company.

It was furnished by the heirs of Sam Doran, superintendent for the above leasing company.

Mr. Crossette, an Engineer of Mines, has practiced as a consulting and operating engineer for a long period.

He has been in the employ of the United States Smelting, Refining and Mining Company and other mining companies at various times and has done considerable work in Mexico. He has had extensive experience in the Leadville District.

--oOo--

Leadville Lead Corporation
900 Street & Cranmer Building
Denver 2, Colorado

Denver, Colorado
February 15, 1919

Mr. J. C. Hershey, President
The Sun-Moon Leasing Company
Denver, Colorado

Dear Sir:

As requested by you during the early part of this month, I have visited and examined the workings of the group of claims forming the Hilltop Property, now held under lease and bond and operated by the Sun-Moon Leasing Company, and herewith present my report for your consideration:

LOCATION:

The Hilltop property is located in the Horseshoe Mining District, on the southern slope of Mt. Sherman, Park County, Colorado. The mine is reached from either Fairplay, in Park County, or from Leadville, in Lake County. From Fairplay the trip is made during the summer season by wagon road over a distance of 12 miles. During the winter months, the last 3 miles of the trip must be made on foot. From Leadville, the summer trip is made by wagon road over a distance of 6-1/2 miles, thence by foot over the remaining distance of 1-1/2 miles. It is not advisable to make the trip through Leadville during the winter months.

CLAIMS AND AREA:

At the present time there are 27 patented claims, with an approximate area of 250 acres, held under five-year bonds and leases by your company. Negotiations are about to be completed by which, I am informed, an additional 7 patented claims, embracing some 70 acres, will be acquired under leases of similar period.

OWNERSHIP AND TITLE:

The various owners of the claims held by the Sun-Moon Leasing Company have subscribed to all legal requirements in granting leases and bonds to the above Company.

HISTORY:

The claims of this group were located between the years 1875 and 1886. In 1888 the Chance Group was acquired by Samuel Cohen, who in turn sold out to Kountze, Sheedy and Chanute, then controlling the Globe Smelter. Under this ownership the Smelter was supplied with its fluxing ore from the property.

The Hilltop claims were sold in 1892 to interests represented by Frank Trumbull, then President of the Colorado and Southern Railroad. During 10 years operation under this ownership the property was equipped with the present buildings, tramway, shaft, etc. Since suspension of their operations, the property has seen intermittent terms of idleness and leasing activity.

ADJOINING PROPERTIES:

No properties of importance have been developed immediately adjoining the Hilltop. About two miles to both the north and south, properties of excellent records were developed, the former known as the Continental Chief, the latter as the Peerless.

FACILITIES:

TRANSPORTATION: A branch of the Colorado & Southern R.R. from Fairplay has been constructed to a point called Leavick, about 3 miles from the Hilltop mine. An aerial tramway then connects the ore bins at the mine with those serving as the tramway terminal at Leavick. During the winter months the Leavick branch of the C.&S.R.R. has not been operated during late years, but there will be no difficulty in arranging for transportation, throughout the entire year when shipments so warrant.

POWER: The Colorado Power Company has a line that reaches a point within two miles of the Hilltop. At the present time steam power is developed at the mine.

WATER: Sufficient water for all mine and domestic purposes is obtained on the property.

TIMBER: An ample supply of timber for all purposes can be secured at Leavick and transported over the tramway to the mine.

LABOR CONDITIONS: This situation is directly governed by conditions at Leadville. At the present time there is no difficulty in meeting all requirements.

CLIMATE: The Hilltop Mine is situated at an altitude of about 13,000 feet, hence suffering severe climatic conditions with its attendant disadvantages.

TOPOGRAPHY:

Though the region is one of extreme altitude, it is not of the rugged and precipitious character that might be expected. This is best illustrated by a complete absence of the snow slides which usually present formidable problems in the mountainous districts of Colorado.

GEOLOGY:

Generally speaking, the ore bodies of this district occur as replacements in lime. A section cut through the Hilltop shaft discloses a capping of about 400 feet of slide rock and block porphyry. Immediately underlying this there occurs a relatively thin measure of shale which in turn is underlain by a strata of blue limestone, showing a thickness of about 170 feet. Though as yet not definitely established, it seems probable that deepest workings has reached what is known as the parting quartzite separating the blue lime from a lower strata of white lime.

The claims of the Hilltop group have been cut by a porphyry dike, which, in the underground workings, has been definitely located as shown on the accompanying plan. The occurrence of the ore bodies furnishes practically conclusive evidence that this dike constituted the main channel of the ore bearing solutions.

Contemporaneously with the intrusion of this porphyry dike, local fracturing and faulting took place in the area upon which these claims have been located. A triangular section of ground included between the strike of the main ore body and the porphyry dike seems to have been displaced horizontally and vertically through limited distances. Both horizontal and vertical movements are clearly shown by the striations on the main fault planes and the slips defined by secondary fracturing. A study of the contour of the surface, as related to the result of the dike intrusion, leads one to expect just such a faulting and fracturing as has now been clearly established underground.

After such faulting and fracturing, the ore-bearing solutions traveling along the dike as a channel and looking for outlets along lines of least resistance would naturally take up the course of such fault planes and fractures as are defined by the Hilltop ore bodies.

The ore values occur in silver, lead and zinc. The silver occurs as chlorides and bromides, the lead as carbonates and sulphides, and the zinc as carbonates and silicates. The zinc ore, which is of a relatively small tonnage, forms as an outer sheathing of the silver-lead bodies.

DEVELOPMENT:

The most productive ore body of the Hilltop mine was developed along the main fault fracture described above and shown on the accompanying plan as the 480 foot level. The ore body outcropped at a point in a basin some 300 feet below and 1200 feet south of the Hilltop shaft, where erosion had exposed the blue lime. The ore pitched to the north through the lime measure until at its southern limit the parting quartzite was apparently reached. This ore body has been completely exhausted.

Two other ore bodies were developed on the 540 foot level along fault fractures paralleling the porphyry dike and indicated on the plan as the Lind and Stewart stopes. These bodies have likewise been exhausted. A third ore body was developed to the north of the limits of the above bodies, apparently following very closely the course of the dike on its east side. This work is now inaccessible.

PRODUCTION:

Development and mining of the ore body of the 480 foot level resulted in a continuous stope through a length of over 1200 feet, showing widths varying from 15 to 40 feet and depths from 25 to 70 feet.

PRODUCTION: Cont'd

Of the two ore bodies mined on the 540' level, one was developed in a length of about 400 feet, and the other in a length of about 1100 feet, with widths varying from 10 to 20 feet and depths from 15 to 40 feet.

The Hilltop property is reported to have produced ore having a gross value of some $4,000,000. Shipment records show that the average silver content was 25 ozs. and the average lead content was 20%.

The present operations are directed toward the development of new ore bodies to the north and south along the strike of the porphyry dike.

ORE RESERVES AND SAMPLING:

Other than a limited amount of ore, mostly low grade material, the ore bodies have been exhausted, and hence no sampling was undertaken.

SUMMARY:

As it stands today, the Hilltop property illustrates the lack of well directed development effort on the part of former operators, which has so often caused suspension of work through failure to keep development ahead of extraction. With the exhaustion of ore reserves, no surplus in the form of a sinking fund was set aside and work was necessarily halted.

After my study of the origin and manner of ore occurrence on the property not held under lease by the Sun-Moon Leasing Company, I view the probable results of the present development campaign as most encouraging. Having satisfied myself that the porphyry dike cutting through the property served as the channel for the ore-bearing solutions which formed the ore bodies by replacement along fracture lines parallel to and angling from this dike, I can only feel that further development along the strike of the dike will result in exposing similar fracturing and ore deposition, such as has been defined in the workings of the Hilltop Mine heretofore described.

Though the weather conditions at this time of the year prevented my making a study of surface indications of this district, a study of locations and long range topography leads me to suspect that the same dike transversing the claims held by your Leasing Company will prove to have been responsible for the ore bodies successfully developed and mined in the properties to the north and south.

RECOMMENDATIONS:

I do not hesitate to recommend the expenditure of funds necessary to carry on the development campaign herewith outlined.

Referring to the accompanying plan, I have indicated thereon four points lettered A, B, C and D. By dotted lines at these points I have shown the manner in which I would suggest that the development be directed along the strike of the porphyry dike. At point "A" the Doran drift, with subsequent crosscutting, will develop the west side of the dike to the north. We have already seen an ore body developed to the east of the dike and I see no good reason for not expecting an ore body on the west side. Point "D" shows a possible manner of speeding up this work in case it proves feasible to open up the Fulton drift, now inaccessible. Drifts to the south from points "B" and "C" with subsequent cross-cutting, will cover the strike of the dike to the south. It is quite possible that raises and winzes in these proposed workings will be found necessary in order to do thorough prospecting. Close study of the character of the material through which the breasts are driven will afford a basis for judgment in directing the exploration work.

Were there a power line to the property I would strongly urge the immediate installation of diamond drill prospecting. With such equipment, the ground to the east and west of the main ore body, as well as to the east and west of the porphyry dike, could be explored in a manner entirely prohibited by the present hand drilling practice. It is my opinion that a sulphide ore body lies below the parting quartzite as a direct continuation of present known ore bodies. At such a depth the question of handling water will be encountered, and here again the use of the diamond drill will dispose of water troubles during exploration. However, the matter of prospecting for these sulphide bodies is not recommended for present work, as it is my belief that you will find new and profitable bodies by the development outlined above, which will definitely determine the future of the property.

CONCLUSION:

In the manner above indicated, it would seem to me necessary to carry out at least 1000 feet of development work. I would therefore recommend that the sum of $25,000.00 be made available for determining the merit of this enterprise. If my present expectations are realized, new ore bodies will be encountered considerably before the completion of 1000 feet of development work.

Respectfully submitted,

(Signed) M. F. CROSSETTE

Mining Engineer

Leadville Lead Corporation
Granmer Building
Denver 2, Colorado

SUPPLEMENTARY REPORT

on the

HILLTOP MINING COMPANY

Park County, Colorado

for the

DIRECTORS

of

THE HILLTOP SILVER MINING COMPANY

by

HERBERT C. ENOS

HERBERT C. ENOS

WHO'S WHO IN ENGINEERING makes the following mention of Mr. Enos:

> "ENOS, HERBERT CORY - Consulting Mining Engineer, Examination and Management, 929 Citizens National Bank Building, Los Angeles, California. Residence 20627 Chatsworth Street, Chatsworth, California. Born Jerseyville, Illinois, May 5, 1882. Columbia University, E.M. 1906. Sampler, Shift Boss, El Oro Mining and Railway Company, 1906-1907. Manager mine Oaxaca, Mexico, 1907-1910. Examiner of Mines for American Smelting and Refining Company, 1910-1918; United States Smelting, Refining and Mining Company; Manager of Buena Tierra Mine; Manager El Oro Mining and Railway Company 1918-1926; General Manager Lane-Rincon, Inc., Toluca, Mexico, 1934-1939. Consulting Mining Engineer, examination and management, Los Angeles, California, since 1939. Member A.I.M.E., Member Mining Committee of Los Angeles Chamber of Commerce."

The attached report was made as the result of an examination of the Hilltop Mine in 1919 in behalf of The Hilltop Silver Mining Company, a lessee, and was furnished by the heirs of Sam Doran, former superintendent and lessee of the property.

--oOo--

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

Denver, Colorado
June 30, 1919

Mr. J. C. Hershey, President
The Hilltop Silver Mining Company
Denver, Colorado

Dear Sir:

In compliance with your request I have examined the mine workings and surface of the Hilltop Property, now held under lease and bond and operated by the Hilltop Silver Mining Company, and I herewith submit my report, which is in the nature of a report supplementary to that of Mr. M. F. Crossette, dated February 15th, 1919.

For detailed description of the mine workings, geology, etc., I refer you to Mr. Crossette's report and maps accompanying same.

GEOLOGY:

This subject has been ably covered in some detail by Mr. Crossette in his report, but I wish to add that recent development work indicates that other ore bodies will be found along the fissures which parallel and lie close to the main porphyry dyke; the new Lind ore body is being developed at the south end of the mine, along a strong fissure which parallels and lies close to the dyke; this has been opened up for a length of about 90 feet by drifting, showing about five feet width, with ore in both the floor and roof. Car samples indicate that this ore will assay about 15 ounces of silver and 8% lead, being quite high in silica.

The main Hilltop ore body, which was mined out down to the point where it was cut by a fault on the 540 ft. level, has never been picked up to the northeast side of the fault; no doubt the bottom end of the ore body has nearly reached the Parting Quartzite at the point where it was faulted, but after a study of the ground, I believe that there is a possibility that the northeastern extension may by picked up above the 540 ft. level, as the block of ground to the west was probably dropped. If this ore body is picked up it may swing to the north and parallel the porphyry dyke on the west side.

DEVELOPMENT:

Since the time of Mr. Crossette's report, development work has been done in driving the Doran drift along the fault fracture lying on the west side of the porphyry dyke; no ore has been encountered, but I think that this work should be continued to the north for at least another 100 feet, and that cross-cutting should be done, both at the east and west, after the drift has been driven about 75 feet from the point of commencing the recent work; as it is now in about 50 feet, this will necessitate driving another 25 feet before cross-cutting. The cross-cut to the east should be driven to the porphyry dyke to prospect the intervening ground, and I strongly recommend that a raise be put up at some point in this cross-cut to prospect to a higher horizon for the possible extension of the main Hilltop ore body to the east of the fault.

At the southern end of the mine, on the 540 ft. level, drifting has been done to the south on both the east and west side of the porphyry dyke, following fissures which have courses nearly parallel with the dyke. The drift on the west side of the dyke is known as the Lind drift, and this has been driven south a length of 60 ft., opening up about 5 ft. width of ore along the fissure, with ore showing in both the floor and roof; car samples indicate that this ore will assay about 15 oz. silver and 8% lead, yielding a net smelter return of about $9.00 per ton, from which mining costs must be deducted.

The Lind drift to the north along the same fissures shows some ore, but it is narrower in width and more spotted in occurrence. This drift will be continued north to connect with the south end of the old Lind stope, thereby affording ventilation for this southern end of the mine.

As soon as the South Lind Drift reaches a point 100 feet from the cross-cut, raising and sinking should be done to develop and block out the ore opened up by the drift.

On the east side of the porphyry dyke, the drift south is now in over 125 feet, no ore of importance has been developed, but an ore-bearing fissure was cut at a point about 15 feet from the face and the last round of shots in the face opened up solid iron-stained quartz, a sample of which was taken and assay is being made. Work should be continued to the southeast at this point, either along the ore-bearing fissures or along the quartz vein or the ore body cut in the face.

When sufficient funds are in hand, I think that the cross-cut west from the main Hilltop ore body should be continued. A winze or shaft should also be sunk through the parting quartzite below the main Hilltop ore body and prospecting done at depth below it in the hope of finding sulphide ore bodies; this prospecting could be more economically done by diamond drilling, so if the power line is brought in to the property, I would recommend that this prospecting at depth be done by that method.

ESTIMATE OF EXPENDITURES:

In order to ship the ore being developed it will be necessary to repair the overhead tram line and railroad from Fairplay to Leavick. Judging from the present showing in the mine, I believe that at least enough ore will be developed to warrant this expenditure, which is estimated by Mr. Hershey to be as follows:

Repairs to tram line	$ 5,000.00
Repairs to railroad	10,000.00
	$15,000.00

The railroad work can be done under the supervision of the Railroad Company and money expended by the Company refunded on basis of a credit allowed on freight charges.

The power line of the Colorado Power Company is only distant about two miles from the mine, so that development and mining costs can be materially reduced if the line is extended to the mine and electrical equipment installed. I think that you should bear this in mind so that the change can be made as soon as sufficient tonnage of ore is developed to justify it.

Estimated cost will be about as follows:

Installation of power line to connect with line of the Colorado Power Company	$ 4,000.00
Compressor	3,000.00
Motor for same	1,000.00
Freight, hauling and installation	2,000.00
Motor and changes to hoist	1,500.00
T o t a l	$11,500.00

It may be advisable to install a new hoist of larger capacity, thus bringing this expense up to around $15,000.00, to which must be added another $2,000.00 for diamond drill equipment.

S U M M A R Y

The Hilltop property is reported to have produced ore having a gross value of over $4,000,000.00, a large part of which was mined from the Hilltop ore shoot. The balance was mined from two other important ore bodies on the 540 ft. level, one having a length of 1100 ft. and the other of 400 ft. These two ore bodies lie parallel to the porphyry dyke and are related to strong fissures formed contemporaneously or at a slightly later period than that of the porphyry intrusion.

Recent development work has opened up ore along one of these fissures or fractures lying parallel to the porphyry dyke, so that as the amount of development work done in the mine is comparatively small, I think that it is fair to assume that the possibilities for finding and developing more ore are extremely favorable, if judicious development work is done.

It is essential with ore bodies of this nature occurring in limestone, that the operators set aside at least $1.00 per ton for carrying on development while mining, but it is obvious that the former owners did not follow this rule, thereby making it necessary for later operators to provide the money which should have been set aside when the ore bodies were mined.

RECOMMENDATIONS:

The work being carried on is being done in an economical and miner-like way, but more money should be provided to carry on the work. After a study of the ore-occurrence and the results of recent development, I fully believe that your company will be justified in spending from $50,000 to $75,000 in repairing the railroad and tram line and in carrying out the plan of development work as outlined, the raising of additional money later on being contingent upon the results of the present campaign of development work.

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Denver 2, Colorado

If the work being done as outlined opens up an assured tonnage of ore, the power line should be brought into the mine, compressor, electric hoist and air drills installed, and a campaign of prospecting by diamond drilling inaugurated.

For fear that the recommendation which I made above, recommending prospecting work below the parting quartzite formation in search of sulphide ores, may not be sufficiently obvious to some of your stockholders who have never had experience in similar geological formations, I wish to state that the Hilltop Mine is but seven miles from Leadville, and that the geological conditions are quite similar if not identical with those found at Leadville, where I have had considerable experience in mining. There it has so frequently happened where there were carbonate ore bodies above the parting quartzite, that sulphide ore bodies were found below the parting quartzite; the sulphide bodies in nearly every instance having some correspondence in size and trend to the carbonate ore bodies above; consequently in Leadville prospecting below the quartzite for sulphide ore bodies was almost a universal practice. In the Leadville district the parting quartzite is from 20 to 60 feet in thickness. I have no data from which to determine the probable thickness of the parting quartzite of the Hilltop Mine. I believe prospecting for the sulphides can be done more quickly and economically by diamond drilling; hence my recommendation to that effect. Moreover, if diamond drill equipment is purchased by your company, it could be used also for prospecting the formations to the westward and elsewhere in search of additional carbonate ore bodies.

Respectfully submitted,

(Signed) H. C. ENOS

Mining Engineer

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on the

HILLTOP MINE

Park County, Colorado

by

W. G. FRANKLIN

Denver, Colorado

April 11, 1892

W. G. FRANKLIN

No data is available regarding W. G. Franklin, author of the attached report on the HILLTOP MINE made in 1892.

This report was furnished by the heirs of Samuel Cohen, deceased, one of the owners of the Hilltop property, and apparently was made just prior to the sale by Thomas and Phil Harnan of their Hilltop holdings to Felix Leavick and associates.

--oOo--

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Denver 2, Colorado

THE HILLTOP MINE

LOCATION

This property is located in the Horse Shoe Mining District, Park County, Colorado, about 12 miles from Fairplay, a station on the South Park branch of the Union Pacific Railway, and about 127 miles from Denver. Altitude about 13,000 feet.

THE PROPERTY

The property consists of three claims, LESLIE DE,HILLTOP AND PTARMIGAN. Each claim is 300 feet in width by 1500 feet in length, lying side by side, making a tract 900 feet wide by 1500 feet long.

TITLE

The title is perfect, each claim being covered by patent from the United States government.

IMPROVEMENTS

The improvements consist of a shaft house at the 180 foot shaft, 16 x 40 feet, with office attached and a 12 H.P. engine and hoister; shaft house and bunk house at the deep shaft, 30 x 60 feet, 24 H.P. engine and hoister; boarding house 20 x 60 feet, also blacksmith shop, ore bins, platforms, buckets, tools, &c.

DEVELOPMENT

The development is principally on the Hilltop (the center claim) and consists of a shaft, 22 feet from the West line, 180 feet deep, also a shaft in the center, 750 feet from the west end line, about 680 feet deep, with workings between the shafts as shown by the map herewith.

THE VEIN

The vein is continuous the entire length of the property (1500 feet) and is known as a true contact fissure formation. It is nearly perpendicular, pitching only about 15 degrees. The width or distance between walls varies but little. The vein averages about 23 feet in thickness, and grows thicker as depth is attained. A cross-cut runs across the vein at the bottom of the deep shaft - 25 feet is still in ore.

THE WALLS

The walls are well defined and substantial. No timber is required to support them after the ore is removed. The hanging wall is porphyry and lime, the foot wall is lime rock.

THE ORE

The ore is carbonate, carbonate sand and galena. In some places a little zinc, but the zinc is in such small quantity as to be hardly worthy of mention. Of the entire vein between walls (23 feet) less than 20 percent is waste, about 45 percent is shipping ore and, in milling, the ore concentrates about 4½ tons into one. The ore averages about 20 ounces in silver per ton and about 30 percent lead. It is free smelting ore and owing to its splendid fluxing qualities it is considered by smelting concerns very desirable. On a large percent no charge is made for smelting; on a part of it the smelting charges are from $2.50 to $3.50 per ton; on a very small portion as high as $5.00 per ton. At present about 35 percent of the vein is concentrated in a mill about two miles from the mine at an expense of $1.85 per ton. Owing to the nature of the ore it is easily concentrated.

MINING AND TRANSPORTATION

The expense of mining the ore at present is about $1.50 per ton; but if the property was worked systematically and on a larger scale, it could easily be mined for one dollar per ton. Hauling from the mine to railroad at Fairplay is $4.00 per ton and the freight from Fairplay to Denver is $4.00 per ton, making the total expense of mining and transporting the ore to Denver $9.50 at the present time. In the near future we expect a railroad to be built to a point two miles from the mine. Then by constructing a tramway from the mine the ore can be run from the mine into the cars on the railroad at a very small expense. Thus the transportation to Denver would be reduced nearly 50 percent.

CAPACITY

The present capacity of the mine is from 60 to 75 tons per day, but the output can be increased to a much greater extent by increased development of the vein. The character of the ore and vein is such that it is easily mined and broken. The vein is soft and much of it is broken with a pick.

TIMBER

No timber is required except in the shafts and levels, and when necessary can be had at a reasonable expense. Thus far the mine has been worked entirely by underhand stoping and has required but very little timber. The walls are self supporting.

WATER

No water has been encountered, and we anticipate no trouble with water above the 1000 foot level.

VENTILATION

At present the ventilation is good. Connections are made between both shafts affording an abundance of pure air.

PRODUCT

As no set of books has been kept by the owners, we can supply the results of past workings only by the actual smelter certificates now on hand, which represents about three and a quarter year's actual work. Following are the results or totals as taken from the smelter returns now on hand, and which can be seen and inspected at any time, if desired. They show that from February 18th, 1888 to October 13th, 1888, 4539 tons of ore were sold, which netted after deducting freight and smelting charges, $98,340.45, or an average of $21.65 per ton net. From December 3rd, 1888, to August 1st, 1889, 5365 tons of ore were sold, which netted after deducting freight and smelting charges, $78,551.02, or an average of $14.60 per ton net. (During this period much of the ore was from the top and newly opened portion of the vein and contained barren quartz, which should have been assorted from the ore.) From March 21st, 1890, to February 25th, 1892, 7658 tons of ore were sold, which netted after deducting freight and smelting charges, $186,799.19, or an average of $24.40 per ton net. Of this 7658 tons, about 1000 tons were concentrates. These returns also show that from February 18th, 1888, to February 25th, 1892, (4 years and 7 days) the mine was actually shipping about 39 months, and during that time there were sold 17,562 tons of ore, which netted after deducting freight and smelting charges $363,670.66. Of the last lot of 7658 tons, about 1,000 tons were concentrates (four and a half tons in one) which in crude was 4500 tons.

Now we will deduct as follows: For mining 17,560 tons at $1.50 per ton, $26,243.00; for hauling from mine to railway station at $4.00 per ton, $70,243.00; for concentrating 4500 tons at $1.85 per ton, $8,325.00; for mining and hauling from the mine to the concentrator 3500 tons (concentrated from the 4500 ton lot) at $2.50 per ton, $8,750.00; making $113,666.00, leaving a balance of $250,004.66 or an average of $14.23 per ton, net.

Counting the mine to have worked the full time (4 years) we have as a result a net profit of $62,501.16 per year. We will now deduct for taxes and miscellaneous expenses $501.16 per year; and we then have a net profit per annum of $62,000, equal to a dividend of 10 percent per annum on $620,000.

ORE RESERVES

As the mine has always been worked by underhand stoping and only a small portion of the vein developed (nearly the entire property being yet "virgin ground", we can place only a limited area of the vein under the head of "reserves", or "ore in sight" (See map "C"). The workings now show good ore on the East side of the center (680 foot) shaft for a distance of 60 feet from the bottom of the shaft. There is also good ore all along the bottom of the workings between the shafts. There is also a block of ground 60 x 275 feet at the bottom and on the West side of the center shaft, showing good ore on all sides. Now we think we are very conservative, in fact, underestimating (according to the usual method of estimating "ore in sight") when we make the limit 75 feet (the usual method being 100 feet). We will estimate the ore to extend 75 feet East from the center shaft below a point 60 feet above the bottom of the shaft; also 75 feet down from the bottom of the workings between the shafts; also through the block 60 x 275 feet (see map for "ore reserves"). Now we will estimate 45% of the 23 feet between walls, shipping ore, which will be 10.35 feet, and we will estimate 35

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ORE RESERVES (contd)

percent of the 23 feet between walls concentrating ore, which will be 8.05 feet; counting this four a half into one, it will be 1.80 feet, making 12.15 feet of shipping ore and concentrates. To make it even, we will estimate the ore in the vein to be 12 feet thick. Counting the ore to extend 75 feet beyond where it shows in the workings (see map for ore reserves) and estimating the ore 12 feet thick, we have 1,026,000 cubic feet of ore in reserve. We will allow 11 and a half cubic feet to the ton, and we have 89,274 tons of ore in sight. Estimating this at $14.00 per ton (which is less than the average of the ore already marketed) and we have in sight ore of the net value of $1,282,500.00.

FUTURE PROSPECTS

Judging from past working of the vein and the present showing throughout the mine, we are thoroughly convinced that it will prove a large and profitable producer in the future, and a "bonanza" to anyone who may secure it at the price at which it can be purchased at the present time. The principal owner and manager of this property has spent many years in the Rockies, and has passed a good majority of the milestones along his life's journey. He wants to retire from active business.

ANOTHER ORE CHUTE

From recent investigations another ore chute of great value has been opened up at a point 150 feet southwest of the West end line of the "Ptarmigan" claim in the "Hilltop" group. On the "Plato" (see map) and from its strike and general trend, it will no doubt run through the "Ptarmigan" claim. The ore is good and it appears promising for a valuable addition to the "Hilltop" property.

ADJOINING PROPERTIES

The "Last Chance" mine adjoins the "Hilltop" on the West (see map). This vein is the same as the "Hilltop" vein. The workings are connected and the vein is opened up for a distance of 800 feet from the "Hilltop", showing the vein to be strong and continuous. This property has produced largely for a number of years and is now controlled by one of the large smelting concerns of Denver.

A SUGGESTION

We would suggest that a tramway be built from the deep shaft to a point at the foot of the mountain, a distance of two miles from the mine, and on the line of the proposed railroad. At this point a concentrator should be constructed to handle the concentrating ore from the mine. There is an abundance of water here for concentrating purposes. The tramway would deliver the ore from the mine at a very small cost and save a large percent of the present hauling expenses. It would also take coal, timber and mining supplies from the foot of the mountain to the mine at little or no expense. The estimated cost of the tramway and a forty (40) ton concentrator is from $25,000 to $27,000. This is simply a suggestion. The mine has been worked profitably with its present facilities. With a tramway and concentrator it would be worked on a larger scale and at a greater profit.

INVESTIGATE

We invite a thorough investigation of smelting returns and the mine, by anyone who may desire proof of the statements in this report, relating to the past record and present condition of the "Hilltop" Mine.

(Signed) W. G. FRANKLIN

Denver, Colorado
April 11th, 1892

Leadville Lead Corporation
440 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on the

HILLTOP MINE

Park County, Colorado

by

W. S. LARSH, E. M.

Denver, Colorado

July 14, 1910

WALTER S. LARSH

Two reports by Mr. Larsh on the HILLTOP MINE are submitted herewith. Both reports were made for R. H. Trumbull one of the owners of the property.

The first report, dated July 14, 1910, covers the operation of the current lessee, Chance-Hilltop Mining Company. It was furnished by the widow of Sam Doran, former superintendent of the mine.

The second report, October 22, 1921, is the result of what is probably the most recent examination of the mine. The latter report was furnished by the agent of the Trumbull Estate.

Mr. Larsh is a graduate of Colorado School of Mines, 1904, and has been a member of the American Institute of Mining and Metallurgical Engineers since 1915.

He has been employed as an engineer by The American Smelting and Refining Company and The United States Smelting, Refining and Mining Company.

He is now Assistant General Manager of the Nevada Mines Division of Kennicott Copper Company, with headquarters at Ruth, Nevada.

--oOo--

Leadville Lead Corporation
5100 Ernest & Cranmer Building
Denver 2, Colorado

Denver, Colorado
July 14, 1910

MINING PROPERTY AND TITLE:

The Hilltop Company's Estate comprises certain interests in nine patented mining claims in the Horseshoe Mining District, Park County, Colorado; the following table shows the distribution of these interests, and those of your co-owners:

NAME OF CLAIM	HILLTOP CO.	MRS. ANNA M. DEREMER	JOS. & SAML. COHEN	TOTAL
Hilltop	3-4	1-4		1
Leslie De	3-4	1-4		1
Ptarmigan	3-4	1-4		1
Top Hill	1-4	1-4	1-2	1
Rush	1-4	1-4	1-2	1
Enterprise	1-4	1-4	1-2	1
Astor	1-2	1-4	1-4	1
Vanderbilt	1-2	1-4	1-4	1
Humboldt	Entire (1)			1
	5	2	2	9

An abstract of title made by Mr. John S. Macbeth, August, 1897, gives the Hilltop Company a clear title to these interests and I was unable to find that there have been any changes since that time which would affect it.

MILL SITE LEASE:

The mill, office, assay office, lower tram terminal and ore bin at the railway, all at Leavick, are situated on a Mill Site leased from William Mitchell and Orville A. Watrus, Bay City, Michigan, Burtis J. Bayless, Binghamtown, N. Y. William B. Felker and William L. Dayton, Denver, Colorado, on the 15th of November, 1897, expiring 15th of November, 1907. This lease has not been renewed by the Hilltop Company nor have the owners of the Mill Site served any notices to remove the buildings from it. It might be a poor move to bring the matter up with the owners, but on the other hand I do not like the idea of having several thousand dollars worth of buildings on another man's ground and no agreement as to how long they can stay there. If anything is done in the matter at all, I recommend the purchase of this mill site rather than another short term lease, if it can be obtained at a reasonable figure and the title is all right. The rental of this ground per the old lease was $1.00 per annum, so it does not appear to be very valuable to the owners; the mill site contains about 16½ acres and has a little timber on it, the only timber on Hilltop territory.

SURFACE PROPERTY, BUILDINGS, ETC.

The surface plant at the mine, consisting of the shaft house, connected with the upper tram terminal, ore bins, etc. two bunk houses, boarding house, office and small stable, I find to be in good repair. Powder is stored in a suitable magazine a safe distance from the buildings. Facilities for fighting fire here are unavoidably poor. About the only water available is that contained in the tanks used to supply the boiler (tank capacity about 3000 gallons). This is hauled in by wagon in the summer, snow being used in the winter; Recourse must be had to a non-freezing chemical fire extinguisher. I found four of these extinguishers (Swan Fire Extinguisher) in the shaft house, one in the ore house, one in the tram house and one in the office, but I may not have found them all. However, as these are about the only hope in case of fire, they should be conspicuously placed and at frequent intervals.

Fire insurance is carried on in these buildings as follows: divided equally between the National Fire Insurance Company, Hartford, Conn. and the Home Insurance Company, New York. Shaft house, $2700.00; Machinery, $1500.00; Bunk house, $500.00; Office, $300.00, Total, $5000.00.

This leaves one bunk house, the boarding house and stable unprotected. The shaft house, ore bins, upper tram terminal, etc. are virtually one building and I do not consider $2700.00 adequate insurance, nor is any of it sufficient. Under the terms of the lease the Chance Company agrees to "keep the said buildings and contents insured in such reasonable amount as shall be commensurate with the value thereof." This is probably an oversight on the part of the Chance company, and I think this matter should be taken up with them and adjusted.

MILL & BUILDINGS AT LEAVICK:

The mill, office, assay office and lower tram terminal building at Leavick are in good condition and repair; the mill was idle during my visit, and has been inoperative since December 5th, 1909.

The Chance Company's accounts show that $4529.43 has been spent on "Mill Equipment". I do not know the condition of the mill prior to this expenditure; Mr. Berger told me he had set up the rolls, installed three "Card" tables and a Classifier, (which he intends to remove) and had bought numerous fittings, etc. The six Wilfley tables which are the property of the Hilltop Company did not appear to be much good. The crusher, rolls, engines, boilers, etc. are apparently in good condition.

No insurance is carried on any of the buildings at Leavick. I am informed that the mill cannot be insured while it is idle, be that as it may, the other buildings are being used and should be protected. There is plenty of water here for all purposes.

The ore bin at the railway is in bad shape and can only be loaded about half capacity (50 tons). This is the only structure that is in poor condition and it is just naturally worn out.

THE AERIAL TRAMWAY:

The tram was in operation a part of three days during my visit at the mine and apparently ran satisfactorily. They had some trouble in operating this the first season but found that many of the trolley wheels had worn flat and were sliding instead of rolling on the Carrier tables. New wheels remedied this difficulty and they have had no serious trouble with it since.

Between towers No. 9 and 10 is a span of about 1200 feet, while most of the spans are about 400 feet. There is evidence of a tower having stood between these two and I believe one should be built on the site of the old one, or in the most advantageous place, to relieve the strain on the Carrier cable. As the economical operation of the mine depends on the successful operation of the tram, every precaution should be taken to prolong its life. The cables appear to be in pretty good condition and I can see no reason why, with intelligent handling, the present equipment shouldn't last for a few years yet. The capacity of the tram is about 75 tons in eight hours or 100 tons in 10 hours.

PRODUCTION, COSTS, ETC.:

The Hilltop Company's books do not show the production of the mine during this lease nor for some time previously. Mr. Berger arranged for me to get the Chance Company's figures, but Mr. Adams, Chance Company's accountant, could not give me tonnages in all instances. By compiling all the smelter settlement sheets which I could find relating to shipments made by the Chance Company from October 11, 1908, up to including lot No. 227, settled July 14, 1910, I have arrived at a fair check on the output. I am satisfied that some of the early settlement sheets are missing.

My results are as follows:

	Total Gross Tons Shipped	Total Dry Tons Shipped	Average Moisture	Net Returns	Avg. Value Per Ton
Zinc Ore	1135	1069.35		$ 12,098.12	$11.313
Lead Ore	8312	7834.58	5.76%	96,599.93	12.33
Concentr.	154	135.57		5,940.83	43.82
	9601	9039.50		$114,638.88	

NOTE: Royalties only, not deducted from net returns, 1298 tons of ore were milled to produce the concentrates.

Net returns in dollars given me by the Chance Company up to and including Lot No. 227, royalties only not deducted:

Lead ore, $98,769.40; Zinc ore, $14,601.09; Concentrates, $5,795.48

Leadville Lead Corporation
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Denver 2, Colorado

Taking the average results per ton as shown by my compilations, gives tonnage as follows:

	Total Wet Tons Mined	Total Dry Tons Shipped	Net Returns
Lead ore	8508	8018	$ 98,769.40
Zinc ore	1369	1290	14,601.09
Concentr.	1298	132	5,795.48
T o t a l	11,175	9440	$119,165.97

The lead ore was sold to the American Smelting & Refining Company and the Ohio & Colorado Smelting & Refining Company. Zinc ore was sold to various purchasers. Most of the settlements I saw were from the American Metal Company, Ltd.

The A.S. & R. Co. settles on the following basis:

Gold $19.00 per oz.- 0.04 oz. minimum
Silver 95% Quotation date of assay,
Lead as follows - quotation date of assay

Percent	Per unit	Treatment	
0-3	0		
3-5	25 flat		
5-10	37		
10-15	40	$2.00	
15-20	44	.50	
20-25	45	.50	bonus
25-30	46	1.50	"
30-35	47	2.00	"
35-40	49	2.00	"
40-45	50	2.00	"

Zinc over 10% 50¢ unit penalty
Sulphur over 5% 25¢ " "
Lead - $4.50 basis 1¢ per unit up or down for each 5¢.
Variation in N.Y. price.

Railroad freight rates are as follows, Leavick to Denver:

Gross Value per ton	Freight
$ 8.00	$1.50
8.00 - 12.00	1.75
12.00 - 18.00	2.00
18.00 - 25.00	2.25
25.00 - 50.00	3.50
Over 50.00	5.00

Royalties are paid by the Chance Company on the following basis:

Net Value after deducting freight and treatment	Royalty
Under $10.00	5%
10.00 and under $20.00	10%
20.00 " " $30.00	15%
30.00 " " $50.00	20%
50.00 " " $100.00	25%
100.00 " over	30%

CHANCE COMPANY EXPENSES are as follows, per Mr. Adams,

	Up to Feb. 1st, 1910	Feb. 1st to July 1st, 1910	Total
Development	$ 3,424.06	$ 4,230.91	$ 7,654.97
Mining	23,897.54	10,923.53	34,821.07
Tramming & Hoisting	10,111.83	3,110.50	13,222.33
Surface Work	2,163.00	4,230.91	6,393.91
Aerial Tramway	8,865.98	1,527.16	10,393.14
Milling	6,179.18		6,179.18
Mill Equipment	4,529.43		4,529.43
Maintenance of Plant	2,893.67	1,427.81	4,321.48
General	16,873.70	2,131.27	19,004.97
Office		1,604.29	1,604.29
Royalties	7,828.59	2,638.69	10,467.28
	$86,766.98	$31,825.07	$118,592.05

Total tons mined	11,175
Total Cost	$118,592.05
Total Cost per ton wet	$10.61

Total receipts	$119,165.97
Total expenses	$118,592.05
Total Profits	$ 573.92

(Per Chance Co. Accounts)

In the period February 28th to December 31st, 1909, the following results on cost were obtained, per Mr. Adams.

Total lead ore shipped	4494 tons
" zinc ore shipped	398 "
" milled	1298 "
Total Mined	6190 tons

Expenses	Total	Per ton
Ore breaking	$14,090.65	$2.27
Sorting	903.75	0.15
Lumber & Timber	1,154.37	0.19
Tramming & Hoisting	6,218.90	1.00
Dump	551.00	0.09
Repairs	1,499.90	0.24
Aerial Tramway	6,225.80	1.01
General Expenses	8,994.57	1.45
Insurance	214.17	0.03
Salaries	1,091.65	0.18
	$40,944.76	$6.61
Royalties on Crude Ore		$1.48
	Total	$8.09

The results from the operation of the mill are shown by Mr. Adams as follows:

	Total	Per ton
Mining Costs on 1298 tons	$ 8,[illegible]	$6.61
Milling Costs on 1298 tons	5,471.65	4.21
Mill equipment and repairs	4,529.43	3.49
Royalties	289.77	.22
Totals	$18,870.63	$14.53

Receipts on concentrates per ton ore milled 4.47

To analyze these accounts and see what results could be expected, let us exclude the mill expense and take the figure $6.60 per ton (Development charges are surely included in the General Expense account, for it is pretty large) which seems to me to be a pretty reasonable cost per ton, freight and royalties excluded:

Ores net (after deducting freight)		Per ton Royalty	Cost to Chance Co.	Net to Chance Co.
$ 6.95	5%	$ .35	$6.95	$ 0.00
10.00	5%	.50	7.10	2.90
15.00	10%	1.50	8.10	6.90
20.00	10%	2.00	8.60	11.40
11.31 zinc avg.	10%	1.13	7.73	3.58
12.32 lead avg.	10%	1.23	7.83	4.49

It would appear from this that ores netting over $7.00 per ton can be mined at a profit and that the Chance Company should show a profit of about $27,000.00 for their operations including the loss in milling. It has been my experience that it is a good plan to divide the most carefully calculated profits by about 2, but it seems that the royalties could be doubled without working a hardship on the leaser.

While mining in ore such as the Lind Stope, I estimate that it can be loaded on the cars at Leavick for $4.00 per ton. This leaves $2.60 per ton on the former cost for development purposes. It is impossible to estimate how much development will be required to find another ore body when one has played out. Development estimates are always an uncertain factor in this mine, and whether the above allowance is sufficient or not, is difficult to determine. $2.60 per ton on 11,175 tons gives nearly $30,000. which at $15.00 per foot would drive 2000 feet of drifts and cross-cuts.

MILLING

Apparently no economical process for concentrating the Hilltop ore has ever been found. The Chance Company's results are certainly not flattering. Rather than to experiment on the ore at a place like Leavick where one is handicapped by lack of equipment and high cost for materials, I believe the best plan would be to send a representative shipment of the ore to some good "ORE TESTING WORKS", of which there are several, in case it is deemed advisable to try and concentrate the ore at any future date. At present it seems more profitable to ship direct.

From the experiments of the Chance Company it appears that the silver values run with the quartz largely and not with the lead, and that while a high grade lead concentrate can be obtained, the value in silver does not rise proportionately. In all the zinc ore that I saw in the mine the zinc was contained as a silicate and possibly carbonate (not Sphalerite the Sulphide), and no good results were obtained from trying to produce a zinc-lead middling. I doubt if a satisfactory process will be obtained without considerable expenditure for equipment.

GEOLOGY AND ORE OCCURRENCE:

The Horseshoe Mining District is conceded by mining men to be a part or continuation of the Leadville district. The formations and ore occurrences are similar, except that here the parting quartzite is missing. With one exception, all the ore in the Hilltop Mine was found to lie wholly within the Blue Carboniferous Limestone, the most prolific ore horizon of Leadville. This lime is capped with white porphyry of variable thickness.

The main ore body, a silver lead ore, occurred in a shoot, channel or pipe, striking north 30 deg. east, dipping from vertical to about 75 deg. W. laterally, and dipping with the Blue Limestone along its strike about 16 deg. to the N.E. This shoot was first discovered on the Last Chance, the next property to the Southwest, where the Blue lime came near enough to surface to be exposed by erosion, and was followed into Hilltop ground. It was mined continuously from its outcrop for about 2000 feet in length, being apparently cut off by an intrusion of porphyry in the Hilltop ground.

Taken in its entirety it was a big strong ore shoot ranging in width from 5 to 40 feet and in height from 15 to 90 feet or more if one can judge by the size of the old stopes. Taken in small sections it was exceedingly irregular and pockety, both as to size and values as is usual with this type of ore deposit. I would class it as a massive or chamber deposit. From the data gathered in going over old reports and statements nearly one million dollars must have been taken from this shoot and it was considered exhausted.

A brown zinc ore, silicate largely, which occurs mainly as a casing to the lead ore, and in small pockets and stringers, discarded previously as brown lime which it resembles except in weight, was the next source of income. By cleaning down the walls of the old stopes, mining the larger pockets and sorting the dump, several hundred tons of this ore were obtained and shipped at a profit. There is a little of this ore left in the old stopes yet, and a small amount is obtained by sorting the ore being mined now. This zinc ore will undoubtedly be a source of income as long as mining operations are continued, but it is a by-product in mining the lead ore.

By following a small vein leading off the main stope the Chance Company discovered the ore body shown on the map as "The Lead Stope". This shoot lay approximate parallel to the main ore shoot and was probably a branch of it. It was about 300 feet long, from 2 to 10 feet wide and from nothing to 50 feet high, flattening out at the top to the east. The stope was cleaned up during my visit, and no men were employed in it when I left, July 13th. As far as can be seen it is exhausted. This ore as it was shipped averaged about $12.00.

The ore being mined at present occurs in a deposit of similar nature to the others, north of the shaft, and shown on the map as the "Lind Stope". Its strike is about N-S, approximately parallel to the porphyry dike which shows in the main incline, and about thirty feet west of it. This was discovered by following a small deposit leading off the main incline. Its width and height are exceedingly irregular and variable. Between the winze marked "A" on the section (see map) and the north breast of the stope marked "B", was an ore body (I say "was" for it is probably mined out now) forty feet long by five feet wide by about 9 feet deep, containing at 10 cubic feet per ton, 180 tons, but it would not surprise me at all if more or less than this amount was taken out of this place for it is almost impossible to get any average measurements.

I did not sample this ore, preferring to take the smelter settlement assays on what had previously extracted from this shoot. They show it to average about 0.04 oz. gold, 15 to 20% lead and 15 to 20 oz. in silver, or about $15.00 net. In the south breast of the stope was a mushroom shaped face of ore, 16 feet wide at the tope and 14 feet high and apparently widening out. This will produce about 10 tons per lineal foot, and allowing it 50 feet to run, gives 500 tons here. In reality the estimation of this ore is mainly conservative guess work, the shoot might run 500 or 1000 feet. 680 tons of ore at $15.00 per ton is $10,200.00.

From the south face of the Lind Stope along its strike to the eastern line of the Hilltop Company's property is about 700 feet. This shoot, if it continues, will cross the Hilltop and Leslie De Claims, in which the company owns three-quarters interest, and is undoubtedly the best prospect in the mine for immediate returns.

There are several places in the mine where little ore shows: both the "Batty's Places" (see map), some near the old stope west of the incline about opposite the drift leading into the"Batty's Place" furthest north and in small spots in many places. Most of the Chance Company's ore has been found by following stringers or small pipes and one can never tell what they will develop into. In my opinion, exclusive of the second contact, there are three good chances to get more ore and they all relate to this porphyry dike, which I believe has not been given enough consideration. I was exceedingly disappointed that the water in the bottom workings from the incline prevented me from going over into the Fulton drift and all those workings east of the dyke, but I was told (Mr. Berger) that there was an ore body lying next to this dyke on the east side, the hanging wall being the dyke, of different character from the rest of the Hilltop ore, and that it had been mined at a profit. This is the exception I spoke of previously. A cross-cut from some convenient point in the Lind stope, say continue the east drift 540 feet level through the dyke, would be a good prospect for this ore shoot.

Evidence that this dyke was intrusive is unmistakable, and I believe it has intercepted and faulted the main ore shoot and that the continuation of this shoot will be found to the east of it. The main ore shoot was 15 feet high and 12 feet wide when it struck the porphyry, it had been continuous for 2000 feet and it does not seem reasonable that the porphyry wall is its northern limit. Prof. S. F. Emmons, U.S.G.S. in his monograph on Leadville, says that the ore deposits were formed before the folding and faulting of the strata. The porphyry cap over the Hilltop ground is so thick that it is impossible to discern any displacements on the surface. The third chance is for an ore shoot west of the main shoot and in about a position relative to the dyke, that the Lind stope takes east of the main shoot.

There is always the possibility of finding ore in the strata below the blue lime and it has been demonstrated in Leadville that ore exists in all the formations; however, I do not consider that the blue lime on the Hilltop property has been fully exploited yet and believe that should receive the first attention. Sinking is expensive work and it looks as if water might be encountered with depth. About the best that can be done on a drainage tunnel is 600 feet depth for 2300 feet of tunnel. This tunnel would cost nearly $30,000.00.

CONDITION OF THE MINE, DEVELOPMENTS, ETC.

The mine physically is in good shape, timber is being used where necessary, though the ground generally is not heavy and not much but a few stulls and sprags are required. New timbers have been put in the main incline and it is now in excellent condition. I understand it was caved badly when the Chance Company took hold of it. The drifts are all large enough to meet the ordinary requirements. I can see no objections in dumping waste into stopes or holes that are better filled up, but requested Mr. Berger to place the openings on the map and mark them "filled", which he agreed to do. The underground workings all show that they have been done in a "good and workmanlike manner", and I could not see any instance where the Hilltop Company's equipment was being maltreated. I believe the Hilltop Company can feel that its mine is in good hands.

From June 26th to July 11th inclusive, 16 days, a total of 175 shifts labor were performed in the mine; 183 on surface and tramway or an average of about 22½ shifts per day. Wages for these shifts amount to about $1,135.00. During this time 567 mine cars of lead ore were hoisted, or about 500 tons. Mr. Berger informed me that he intended doubling the force in a short time.

I have endeavored to show on the accompanying map the work that has been done by the Chance Company, but it is almost impossible to depict all the workings on one plane surface. The shaft has been sunk to a depth of 542 feet, about 40 feet; this part of the shaft is not cribbed, guides being supported on stulls, nor is it carried down quite full size as far as length is concerned. I cannot see that it is necessary to enlarge it to size at this time, as the man-way above the 500 ft. level is full of ice anyway and there is no occasion for pumps as yet. If it was determined at any time to sink any distance, this 40 feet could be enlarged to more advantage at that time and it should be done. Now drifts and cross-cuts aggregating about 800 feet, as near as I can judge, have been driven. It was impossible to measure the amount of stoping done by the Chance Company.

Regarding the 100 foot shaft that is called for in the lease to be sunk by the 31st of October, 1909, Mr. Berger and Mr. Webb agreed that it would be better to employ the money in developments underground. I agree that this was a much better place to spend it as a shaft 100 feet deep on nearly any part of the Hilltop ground would be entirely within the white porphyry cap and would develop nothing. I do not see any necessity for another shaft at present. There was no way for me to determine whether this money was spent underground or where, but 40 feet additional depth of the main shaft is worth much more to the Company than any 100 feet shaft from the surface.

RECOMMENDATIONS AND REMARKS:

In considering the future policy of the Hilltop Company, due regard must be given the pockety and uncertain nature of its ore bodies. Mines of this kind are usually worked at a greater profit to the owners, in the long run, by leasing them on a fair and commensurate royalty basis, for leasers usually operate more economically than the average mining company. I do not consider that the royalties under the present lease are commensurate and think they should be doubled if another lease is granted anyone, though this is a matter for the directors of the Hilltop Company to decide.

If returns continue to come in in the future as they have in the past year and a half, the Hilltop Company should be about out of debt as the expiration of this lease in 1912, but with very little money in the Treasury. To operate Company account and insure against failure as far as possible, the treasury should contain $25,000.00, with $25,000.00 more available. The present lease has about two years and three months more to run and unless terms very favorable to the Hilltop Company can be obtained, I can see no reason for being in a hurry to extend it, as future developments may alter the valuation of the mine. I do not consider the Hilltop a dug-out proposition by any means.

The Chance Company has the advantage of its experience with the mine, and other things being equal, it would be better business for the Hilltop Company to lease to them again, rather than to new parties, but leaser or company must have enough capital to carry on considerable development in finding the ore.

The present lease is not a very good one and I wish to make a few suggestions to be embodied in the new one if one is made.

1. The Hilltop Company agree to furnish a good and sufficient deed to only their "right, title and interest" in the claims, etc. and not to "the whole of the above described mining property."

2. Lessee cannot sell, transfer or give the lease to anyone without the consent of the Hilltop Company.

3. Failure to work the premises with at least five men of 20 shifts each, 100 shifts, or more if the leaser will stand it, each month may be considered a violation, etc.

4. All machinery and improvements put in by lessee to become the property of the Hilltop Company.

5. No provision to extend the lease on account of strikes, fires, etc. except at the option of the Hilltop Company.

6. If ores of other companies are transported over the tram or hoisted through the shaft, or worked in the mill, some reasonable amount per ton should be paid the Hilltop Company.

It seems to me that your co-owners also, should be charged something out of their royalties or returns for the use of the Company's equipment. They receive the benefit of the tram line, hoist and other equipment but do not pay anything to offset depreciation, wear and tear, etc.

In conclusion I believe that under able management and with enough money to carry on the necessary prospecting and development that the Hilltop owners could reasonably expect a fair return on their investment, say 10% from year to year, operating Company account. I base this conclusion on what the mine has produced in the past and on the amount of virgin and unexplored territory and not on the ore in sight. A lease to responsible people that would pay the Company that much looks to me like the best thing for the leaser takes all the chances of finding the ore and the Company receives the benefit of his development and improvements if he fails.

A clause in the lease, such as suggestion No. 3, page 15 is, protects the Hilltop Company from having the mine idle, and is better than any stipulated amount of development to be performed. The Company can insure against having the mine spoiled for future work by having its agent inspect the lessee's operations and by proper provisions in the lease contract.

W. S. LARSH, E. M.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on the

HILLTOP MINING COMPANY

Park County, Colorado

by

W. S. LARSH

October, 1921

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

C O P Y

Ruth, Nevada
Oct. 22, 1921

Mr. R. H. Trumbull
Secy.-Treas. Hilltop Mining Co.
Cynwyd, Pa.

Dear Sir:

This report is the result of an examination of your Company's property in the Horseshoe Mining District, Park County, Colorado; interviews with yourself, Mr. George C. Barnard, the officers of the Lessee Company, and others.

For three days, viz; from noon of September 18th till noon of the 21st, I was guest of the Hilltop Silver Mining Co. (the Lessee Company) at the mine, with Mr. S. P. Doran, Superintendent as host, guide and general informant on local conditions. I am also indebted to Messrs. George C. Manly, and George L. Felt, President and General Manager, respectively, of the Lessee Company, for the information regarding their company's operations contained herein, as well as for many other courtesies extended me, for all of which I wish to express my sincere appreciation.

Yours very truly,

(Signed) W. S. LARSH

The property of the Hilltop Mining Company is being operated under lease and bond, by the Hilltop Silver Mining Company, which will be called hereafter the "Lease Company". The Lessee Company is a Colorado Corporation of 1,000,000 shares, par $1.00 - 900,000 issued, 100,000 in the treasury. Mr. George C. Manly and Mr. George L. Felt, both of Denver, Colorado, are the President and General Manager, respectively, Offices are maintained on the 6th floor of the Foster Building, Denver.

The lease runs for five years from September 1st, 1918, and was given to Mr. Geo.C.Manly and he assigned it to The Sun-Moon Leasing Company, after reorganized (as I understand it) and changed to The Hilltop Silver Mining Company. It is subject to forfeiture from the non-fulfillment of certain covenants and agreements, and may be extended an additional five year period if the total royalty payments during the first five years amount to $30,000.00. Total royalties paid to date amount to approximately $4,000.00, of which the Hilltop Company has received about $3,000.00, and Mr. Samuel Cohen, co-owner of the mining claims owned by your company, about $1,000.00. I believe the Lessee Company has faithfully endeavored to fully comply with all of the covenants and agreements of the lease, and that it cannot be justly criticized for non-fulfillment of them; hence the present lease still has about two years to run. The mine and equipment are in good condition and you may feel that your property has been well treated and is in good hands.

The Hilltop Company has bound itself in the sum of $200,000.00 to sell to Mr. George C. Manly, for the sum of $100,000.00 all of the right, title and interest in its mining property and improvements, as described in the bond, if payment of this sum is made on or before September 1st, 1923. If payment is made on or before September 1st, 1920, royalties paid on ore shipped prior to that time are credited as part payments on the total purchase price. To date the property has not been purchased.

PROSPECTING AND DEVELOPMENT

No maps were available showing the mine workings at the time the Chance Company ceased operations, so that the development work of the present Lessee Company is, in part, surmised. Those portions of the plan map shown in red are assumed to have been done by this company. There is no question but that most if it was done by them. The map is a combination of one accompanying a report by Crossette, surveys and maps by George T. McDonald and Brunton surveys by myself. Under these circumstances it cannot be strictly accurate, Brunton surveys especially are subject to all sorts of ailments. One map showed the Doran drift as lying entirely in Hilltop ground, while on the map which accompanies this paper a portion of it lies on the Robert Fulton. Frankly, I don't know which is correct, but the matter is not especially important until they start mining ore to the north of the Doran workings, at which time it will be advisable to have an accurate survey which will establish the position of the dividing line between the two properties.

Total developments in drifts and cross-cuts amount to about 1,600 feet. Raises about 500 feet (Second level of the Lind has been included in the drifts and cross-cuts, as I understand it was first opened up in this way). All of this was done by hand, and was slow and expensive.

Including overhead, the drifts and cross-cuts probably averaged about $20.00 per foot, and the raises say $15.00, hence between $40,000.00 and $50,000.00 has been spent on underground development. At the time of my visit, no development work, with a view of finding additional ore bodies, was in progress.

New ore shoots were opened up in two places - One on the Leslie De claim, shown on the map as the Main and Upper Lind; the other on the Ptarmigan claim and shown as the "Doran" workings. The former is similar in occurrence, position, character and values to the other "Lind" workings discovered and mined by the Chance Hilltop Company, though not as large. The Doran workings have exposed a shoot about 4 feet wide, lying immediately adjacent to the porphyry dyke, which forms the footwall. Most of the ore shipped by the Lessee Company has come from the Lind workings and has averaged about 12 to 13 ounces Ag.; 17% Pb; 50% Ins.; 8% Fe;1% S.; and 3.5% Zn. The Doran ore runs higher in silver, - 20-30 ozs.; lower in Pb. - 7-14% - and carries 6 to 8% Zn.

No attempt was made to estimate the tonnage of ore developed. Ore was being taken out of the Lind workings (one place 8 or 10 ft. wide) and from the "Larson", - 2 to 5 feet wide. The Larson may be considered an extension to the north of the Lind. South of raise No. 2 in the Lind, the ore has been mined out, leaving a stope, very irregular in outline, from 10 to 20 feet wide, and 18 to 30 feet high. The distance between the drift on the 540 level (Lower Lind) and the stope floor is about 40 ft. Most of the "Doran" was inaccessible on account of bad air, and no ore was being extracted from here at the time of my visit.

Due to the fact that the country south of the Doran on the west side of the dyke has been pretty well worked over, much cannot be expected from the discovery inside Hilltop lines. If it has not been mined through the Robert Fulton workings, the possibilities for an extension to the north are good, but very little benefit would accrue to the Hilltop Company in this case.

DATA ON ORE SHIPMENTS AND FINANCES:

The results of the Lessee Company's operations, which commenced in September, 1918, are given by its officers as follows:-

	Ore shipped	Net proceeds to Lessee Co.	Total Royalty Paid Owners
1918	76 tons	$ 330.98	$ 36.78
1919	(None)	- -	- -
1920	2,634 tons	25,902.62	2,916.42
1921 to Sept. 1st . . .	766	5,408.98	1,183.11
Total . . .	3,476 tons	$31,642.56	$4,136.31

In transit, or at smelter, but unsettled for, - 20 cars, of about 20 tons each, or about 400 tons, hence total 1921 tonnage to September 1st is about 1,170 tons, and total to date, about 3,800 tons.

RECEIPTS

From Stock Sales	$ 83,681.47
From Proceeds of Ore	31,642.56
Total	$115,324.03

EXPENDITURES

C. & S. Ry. Repairs	$12,484.00	
Tramming Repairs	4,037.25	
Building Repairs	1,861.08	
Equipment	798.02	
Furniture	1,329.93	
Power Line Survey	217.69	
Fire Insurance	654.17	
Taxes	1,054.39	
		$ 22,436.56
Pay Rolls		54,668.35
Supplies, Superintendence and General Expense . . .		38,219.12
Total		$115,324.03

Leadville Lead Corporation
300 Ernest & Cranmer Building
Denver 2, Colorado

These data are given in a letter, Mr. Manly to Mr. Barnard, attached hereto as appendix "A" and to which you are referred.

It is evident that their operations have not, as yet, been profitable; however, the first six items listed under Expenditures will probably not have to be repeated in the near future. Without doubt, there was practically no ore in sight when the Lessee Company commenced, hence they had to discover and develop the ores they have shipped.

The average grade of ore mined from the Lind was determined from the smelter returns on 51 lots, viz: Lots 6-9, inclusive: 11, 14, 17 to 61 inclusive. In this included are one lot from the Hilltop claim (No. 11) and three from the Ptarmigan, Nos. 58, 60 and 61, which I inferred were from the "Doran". These, of course, do not properly belong in the average, but they do not materially affect it. Lot No. 6 was settled on April 20, 1920 and No. 61 on August 31, 1921. The price of lead ranges from 9.25 per cwt. in 1920 to $4.40 in 1921. The lessees were unfortunate in having the price of lead drop at the time of their heaviest shipments. Excepting Lots 6 and 7, when silver was $1.20 and $1.02, respectively, all of the silver settlements were made on a price of 99-5/8¢ per oz.

The ore was shipped to the Arkansas Valley Plant of the A. S. & R. Co. and bought on the schedule shown in appendix "B".

This schedule is much more unfavorable to the miners than the one on which the Chance Company sold its ore. As the Lessees put it, it is the highest smelter rate ever paid in the history of the mine.

In reviewing the aforementioned settlements of ore shipments, some data developed which may be of interest:

Total wet tons shipped		3,123.6	
Total dry tons shipped		2,817.5	
Average moisture (about)		9.8%	
Av.Oz.Ag. per ton (dry)		12.685	
Avg.% PB per ton (dry)		17.276	
Avg.% Insoluble		49.1	
Avg.% Fe and Mn		7.9	
Avg.% S		1.1	
Avg.% Zn		3.5	
Total Lbs. Pb. (about)		973,550.	
Total Ozs. Ag.		35,740.	
Amt. Rec'd for lead content per ton ore (dry)		8.67	% Gross Value 41.4
Amt. Rec'd for silver content per ton ore (dry)		12.27	58.6
Total gross receipts per ton ore (dry)		20.94	
Treatment per ton ore (dry)	$6.09		29.1
Freight per ton ore (dry)	4.95		23.7
		11.04	52.8
Net value per ton ore (dry)		9.90	47.2
Royalty per ton ore (dry):			
To Hilltop Company	85.8¢		4.1
To Sam Cohen	28.6¢		1.3
T o t a l		$1.144	5.4
Net to Lessee Company per ton ore (dry)		$8.76	41.9

If we accept the smelter's contention that only 90% extraction is obtained on the lead content of an ore,

The average value of recoverable lead over the various selling price quotations was,-	5.87¢ per lb.
The average value of lead <u>in the ore</u>, was,-	5.38¢ per lb.
Average price paid by the Smelting Company:	
Per lb. of recoverable lead, ...	2.78¢
Per lb. of lead in the ore	2.50¢
Per Oz. of silver in the ore	96.7 ¢

(Silver is settled on the basis of 95% - (whether price or content makes no difference.) 95% of 99-5/8¢ is about 94.64¢. The above price for silver is due to the fact that at present the practice is to pay for 100% of the silver and deduct 5% as "treatment").

There follows a table showing the price per pound for lead paid under the present schedule by the Smelting Company on an ore corresponding the average of the shipments under consideration. Also a comparison with the Chance Company's schedule of 1910 and 1911:

	Amount paid per Lb. Lead by Smelting Company			
	Present Schedule		Chance Co's Schedule	
Per Lb. Lead N.Y. Selling Price	Base 4.00	% of Selling Price	Base 4.50	% of Selling Price
9¢	4.77¢	about 53%	6.7¢	74.5%
8¢	4.02¢	50.2%	5.7¢	71.3%
7¢	3.27¢	46.7%	4.7¢	67.2%
6¢	2.52¢	42. %	3.7¢	61.7%
5¢	1.87¢	37.4%	2.7¢	54. %
4¢	0.90¢	22.5%	1.7¢	42.5%
	Treatment	$3.00	.50¢	

MINING COSTS

No figures on this subject were given by the Lessee Company. The Chance Company's costs were about $6.60 per ton, but on a bigger tonnage. There is a certain amount of fixed overhead which is necessary and the cost per ton for this item depends entirely on the divisor, which is tonnage. Material, supplies, and wages are much higher now than in prewar times; and it is probable that the cost per ton for mining, taking into consideration all the expense properly chargeable to it over the time during which the ore was extracted, would equal and possibly exceed the "net per ton", - viz.: $8.76.

GENERAL

On September 21st, the crew at the mine consisted of 15 men, as follows: One each: superintendent, shift boss, hoist engineer, cook, waterman; 8 miners, 2 muckers. Wages of shift boss and hoist engineer are $4.00 per day, and board; for all other classes of labor, - $3.00 per day, and board, board costs about $1.25 per day. The mine was being operated day shift only.

The buildings and machinery, considering their age, are all in good operating condition. Between the upper terminal of the tramway, which adjoins the shaft house, and the first tower, is a span of about 1,200 feet, in which at one time there was at least one, and possibly two, towers. The greatest load on this span is six buckets of ore, plus their carriages, - any three tons maximum, plus an unknown wind load in windy weather. The track cable is $1\frac{1}{4}$ in. but it is old, its condition is an uncertain quantity, and it is probably advisable to not ask more of it than necessary. The amount of risk in running under present conditions, and the number of towers to give the best practical working conditions, can probably best be determined by the designers and builders of the tram. This matter should be put before them and their recommendations followed.

THE MINING PROBLEM AT HILLTOP

Mining is a business, and like all others, to be successful it must be conducted at a profit. The first requisite is to have ore in sufficient quantity and quality; the second is to so mine and treat it that the receipts from the sale of the products will pay the costs, amortize the investment, and yield a return commensurate with the hazard.

All of the known ore in the Hilltop ground will probably have been extracted before the expiration of the present lease, so that the principal concern of anyone wishing to operate the mine, or in the district for that matter, will be to find ore in sufficient quantity and quality to be profitable. No one is going to invest his money and time in an enterprise which has no favorable possibilities, hence the possibly favorable points of the property must first be considered.

The geological formations and ore bodies in the Horseshoe District are similar to those of the Leadville District, which has a great production record. The Hilltop mine is in a well mineralized area, has been highly productive in the past, and there yet

remains much undeveloped territory, favorably situated. The profitable ore bodies so far discovered in the district are due to the porphyry intrusions in the Hilltop ground, and it is the only property in the district equipped for operations. It is the key to the situation.

There are always reasons for ore deposits, therefore in the search for ore all the available facts and theories pertinent to the subject should be considered, the favorable localities explored first, and those portions in which the possibility of finding ore is remote, or practically none at all, discarded.

GEOLOGY AND ORE OCCURRENCES

The rocks of the region range in age from Archean to pre-Cretaceous, in stratigraphic arrangement as follows:-

Name of Formation	Age	Description	Thickness
White Porphyry	Pre-Cretaceous	White Rhyolite	800 feet
Blue Limestone	Lower Carboniferous	Blue Gray Dolomite	200 feet
Parting Quartzite	Devonian	Coarse Quartzite	30 feet
White Limestone	Silurian	Drab.Sil.Dol.La.	160 feet
Lower Quartzite	Cambrian	Mostly White Qtzite	160 feet
Granite Basement Complex		Granite & Gneiss	? feet

Intrusive in the other formations in the form of dykes, sills and sheets, is a gray monzonite porphyry, known locally as the "Gray Porphyry". Its most common position when in a single sheet is about the middle of the Blue Limestone, average thickness 50 feet, but it may lie anywhere and cut any formation. It is younger than the White Porphyry.

The uplift of the Mosquito Range was not until the close of the Cretaceous.

Prior to the uplift various porphyry bodies intruded into the sedimentaries, sometimes between the beds, and sometimes crossing them.

The original deposition of ores must have taken place after the porphyry intrusions, and before the uplift of the range.

It follows then, that in the uplift of the range both eruptive sheets and sedimentaries, with included ore deposits, were plicated and faulted.

The Blue Limestone is an exceptionally favorable ore horizon but ore is found in the White Limestone, in the Parting Quartzite, and on the upper side of the Cambrian Quartzite.

The present views on the genesis of the ores are that they were deposited,-

(1) From aqueous solutions.
(2) Originally in the form of sulphides.
(3) By metasomatic replacement of the country rock.

The ores are closely associated with the gray prophyry sheets and dykes.

To Mr. S. F. Emmons, principally, we are indebted for the preceding information on the geology of the Leadville District, which is also applicable to the Horseshoe District.

Mr. W. F. B. Berger is my authority for the statement that the Parting Quartzite is missing in the Horseshoe District. This member has been left out in the sections which accompany this paper. If subsequent developments disclose its presence, the position of the white lime will necessarily be dropped a distance equal to the thickness of this quartzite member.

All of the ore bodies so far discovered in Hilltop ground have lain in the Blue Lime, and may be divided into two general systems. The main ore shoot, which outcropped on the Last Chance ground and was followed into Hilltop, and the Stewart-Lind ore bodies, which lie to the east and west, respectively of the Gray Porphyry dyke, and generally parallel its course.

The main ore shoot strikes N-30 deg. E., dips longitudinally to the N.E. about 13 deg., and in cross section generally about 70 deg. to the N.W. The Stewart-Lind ore bodies strike about N*S., dip 60-70 deg. to the cross section, and about 15 deg. to the N. longitudinally. Both systems cross the bedding planes of the limestone. In plan, their longitudinal axes intersect in an angle of about 30 deg.

Apparently, all of the ore bodies are replacement deposits along fissures in the limestone. This is the natural result of their mode of deposition, since the aqueous ore-bearing solutions would follow the lines of the least resistance.

It is probable that the fissuring is not confined solely to the Blue Limestone, but that it extends throughout the sedimentary series. If this be the case, there is a possibility, and perhaps a probability, that ore will be found in the other formations, along the fissures which were prolific in the Blue Limestone, and if it occurs in any of them the most probable is the White Limestone. One phase of the problem then, is to prospect these localities in the most economical way.

Further possibilities in the Blue Lime are not by any means exhausted. The most accessible ore has been mined, it is true, and in those claims in which the Hilltop Company has the largest interest, viz: the Ptarmigan, Hilltop, and Leslie De, the proportion of unexplored territory is small. Ore bodies, however, do not concern themselves with claim lines, and in laying out a development campaign provisions must be made for the acquisition of any additional ground which operations from the Hilltop might prove to be valuable and necessary. The main ore shoot terminated at its north and against a fault, which may have produced a vertical separation of a few feet, but whose greatest movement was horizontal. There is a possibility of a continuation of this ore shoot to the east of the fault. No exploratory work has ever been done to the west of the main ore shoot, with the exception of one short crosscut. In this crosscut, and in the drift driven by the Chance Company, there appears to be an intrusive porphyry, but so little of it is exposed that this cannot be definitely asserted. It may be a sheet, sill or dyke, and may be the reason for the main ore shoot. Unfortunately the surface is so deeply buried in White Porphyry that no information is obtainable from this source, nor is this intrusive exposed in any of the other underground workings. Twin ore bodies, the Stewart and Lind, accompanied the only dyke exposed in the property, - why isn't there a chance for a parallel shoot to the main one? The triangle of Blue Lime between the main ore shoot and the Lind is another portion of unexplored territory with possibilities.

Three sections of the mine accompany this paper. They are based on all of the available data, but are in reality pictures; maybe they should be called "Ideal Sections". At any rate they serve to show the general relations of the formations, ore bodies, and intrusions. The data on which they are constructed are: the general dip and strike of the sedimentaries; their thickness; the maps of the underground workings; the position of the top of the Blue Lime in three places, the Hilltop shaft, the top of the Stewart stope, and the drift the furthest east of the mine. Section A-A' is a longitudinal thru the main ore body: B-B' is taken at right angles to the Stewart-Lind ore bodies, shows the true dip of the sedimentaries, the fault, and the porphyry dyke; C-C' is taken at right angles to the main ore shoot to show its probable dip and to give a general idea of the location of the possible ore-bearing area in the White Limestone below. The elevation of the Dauntless tunnel portal is shown on all three, because this tunnel is the most feasible one to gain some additional depth in the territory, and further, because it is mentioned in the lessee's letter.

A study of the sections discloses the following:-

(1) That if the Parting Quartzite is missing, the Hilltop Shaft will have to be sunk an additional 70 feet to reach the top of the White Lime, and 230 feet to reach the bottom of it.

(2) That the bottom of the White Lime is about 225 feet below the bottom of the Main ore shoot stope.

(3) That the triangle between the Lind and Main ore shoots can be prospected by one or two drill holes, 180 to 200 feet long, each, or by a crosscut.

(4) That the plane of the Dauntless tunnel will intersect the bottom of the White Lime vertically below the Main ore shoot at a point about 150 feet north of the Hilltop south end line, and will intersect the Hilltop shaft projection at a point about 615 feet from its collar, and 120 feet above the bottom of the White Limestone.

In the order of their importance, the localities which should be prospected for additional ore bodies are as follows:-

(1) The White Lime below the Main ore shoot and along the fissures of this shoot projected downward.

(2) The Blue Lime to the west of the Main ore shoot.

(3) The Blue Lime between the Main ore shoot and the Stewart-Lind system.

(4) The White Lime below the Stewart-Lind system along fissures of that system.

(5) The Blue Lime east of the N-S Gray Porphyry dyke.

Since the offset of the fault paralleling the dyke is an unknown quantity, item five would not be worth while until the mine was operating on a profitable basis on ore discovered elsewhere

METHOD OF PROSPECTING

Possibly the most economical way to prospect these localities is by diamond drills. If the ore bodies are big enough to be profitably mined, a few drill holes properly placed will enable a tentative estimate of their size and value, and a very few scout holes will serve to prove the existence or non-existence of any ore.

The greater portion of the holes should be drilled from the underground workings. For instance, it would be a comparatively simple matter to run a crosscut 40 or 50 feet west from the main stope at almost any point, but preferably first at the widest and formerly richest portion, cut out a station, and drill two or three holes downward, and one or two to the west, more or less as indicated in Section C-C'. The down holes would be short, about 250 feet each, and the horizontal ones 500 feet at first. This process could be repeated at points two or three hundred feet north or south of the first location. If no ore was encountered in the first 4,000 feet say, of holes drilled, the prospective value of the mine would take a considerable drop. Before ceasing operations, however, inasmuch as the necessary equipment would all be installed and in working order, it would be advisable to point a couple of holes across the triangle of Blue Lime between the main stope and the Lind stopes, from any point most convenient in the mine, which would cut across about the middle of the N-S axis of the triangle.

The development program would depend on the results of these holes. If ore was discovered in the drilling campaign as outlined above, it would be advisable to do more drilling to block it out and locate its limits, for on its position would depend the location of the shafts or tunnels and whatever workings would be necessary for its most economical extraction. It might be that it would be advisable to drive the Dauntless tunnel to mine the ore tributary to it and at the same time to start a longer and more expensive one from the Lake County side of the range for the ore lying below the Dauntless level. Several other ways would undoubtedly present themselves and each would be considered on its merits. The final analysis is always one of costs and profits.

COST OF PROSPECTING AND DEVELOPMENT

The most important single item, next to capital, is more power. Hand work is too slow and expensive and doesn't get anywhere, and aside from this, more power is necessary for drilling alone, if this is to be done. Three ways to acquire more power may be considered; more steam, internal combustion engines, and electric power from the Colorado Power Company at Leadville. The last named is the most feasible and economical. The Colorado Power Company informed me that they intend to build a power line from the Leadville District to Alma, for the dredges in the vicinity of the latter place, which would come through the saddle between Mts. Sherman and Sheridan and go down Horseshoe Gulch, and that they would be glad to sell power to the Hilltop, or any other mine whose credit was good. Their rates depend on the amount of power used, but do not exceed 4¢ a kilowatt hour. Further, that they would furnish the transformers and lightning arrestors. Dependent on the demand from the dredges, this line may be built next summer, or may be postponed until 1923. The project may, of course, fall through entirely, but this does not appear probable at present. In case it does, the Lessee Company has estimated that they can put power into Hilltop for $8,000.00.

If the through power line is abandoned, and the diamond drilling decided upon, it might be more economical for this work only, to enlarge the steam plant at the mine and bring in electric power after ore of sufficient quantity has been developed to justify it.

The diamond drill holes can be contracted to the Sullivan people, and maybe others, and at a cost of between $2.00 and $4.00 per foot, certainly not over $5.00 per foot. Power would have to be available. The cost of power installation cannot be estimated until various other contingencies are determined, but it would seem that $25,000.00 would be sufficient to equip the mine and complete a scout drilling campaign. This amount of money would be gambled outright. Aside from this there should be an additional $25,000.00 available, to further block

out the ore, and then an additional greater sum in prospect, at least, for development and mining.

It must be appreciated that the cream is gone. Future mining at Hilltop is going to require operations on a comparatively large scale, and plans must be made accordingly. Most of the prospective ore will lie below the present water level of the mine and the water must be pumped or drained by a tunnel. Fortunately the topography is such that a drain tunnel can be put in. Additional transportation problems or milling, will arise, and must be met, and they will all cost money.

TIME REQUIRED

Six months after the power is in, enough drill holes can have been put in to decide the matter, if ore is discovered in quantity, the Dauntless tunnel, additional drilling and other work can be carried on contemporaneously.

If the results of the preliminary drilling justified this work, there would be ore bodies in prospect big enough to plan on several years operations.

ADDITIONAL GROUND TO BE OPTIONED

So far consideration has been given to Hilltop ground only, but it would be poor business to run all the risk in developing this ground and let the owners of adjacent territory benefit therefrom at no cost whatever to themselves. Before going ahead on Hilltop ground, leases and options should be obtained, at the lowest figure possible of course, on Sam Cohen's interest; on the Last Chance property; on the ground necessary for the Dauntless tunnel, and operations from it; on the Georgia, Divide, Climax, Lime King Group, Robert Fulton, etc. and enough ground over the divide, and on the Leadville side of the range, for a drainage and transportation tunnel, and such areas on the surface in Iowa Gulch as are necessary for its operation, the transportation of ores to the smelters, and to take care of any other operations that may be in view.

DISCUSSION OF THE LESSEE COMPANY'S LETTER: (See Appendix "A")

Essentially, this letter is a request for an extension of the present lease, or a new one for a long term of years: and a brief on the reasons why it should be granted. The results of their operations to date have not been satisfactory. They have spent their money in good faith, quite a sum of it on Hilltop Company's equipment, and have complied with all the covenants of the lease. Naturally they want the mine to pay back what has been spent on it, if there is a chance for it to do so, and they should be given every consideration by the Hilltop Company.

If ore occurs in the White Lime below the main ore shoot, there is probability that the ore body will be large, - what its grade will be no one knows, so that its value now is a matter of guess work. This is the big attraction, however, and it is the locality in which the Lessees hope to not only repay themselves, but to make a nice profit as well.

The first portion of their letter is a review of their operations. They are quite right in contending that to attempt to sink the shaft without means to handle water would be a useless expenditure. Also they are correct in their contention that a considerable of both time and money are necessary to develop the mine.

I can't agree that driving the Dauntless tunnel is the most feasible way to prospect the White Lime, and would defer this project pending results from the diamond drill holes suggested previously. If there were any encouraging results from diamond drilling, then it would be proper to drive the tunnel, as it undoubtedly would then be of great use as a transportation and drainage tunnel, etc. but it would not be at the proper elevation to finish the job, and another, we hope, would be warranted. However, if the Hilltop Company grants a new lease, the people who advance the money for the exploration work will have their own ideas on the way it should be spent, and unless it conflicts seriously with your company's interests, there should be no restrictions.

To grant a twenty-year lease without knowing what the lessees are going to try to do, and some kind of assurances that they will try to do it, would be a very poor move on the Hilltop's part. Your lessees state that they cannot give any assurances, but do they mean just that? Isn't it rather that they don't want to be tied to any specific program, so that they can have all the latitude possible in raising the necessary capital? Undoubtedly there is no reason why anyone should want to tie up the mine for twenty years, unless they intend to operate it, and thought that much time was needed.

If the Hilltop Company wishes to lease the property, the following terms are tentatively suggested:-

(1) That the present lease remain in full force and effect until its expiration, unless electric power is available before that time.

(2) After electric power is installed at the mine, a five year lease will be granted on the old royalty basis for shipping ore and the following royalty basis on concentrates, provided the lessees will drill at least 3,000 feet of diamond drill holes in accord with the plan already outlined, within the first year.

ROYALTY TABLE ON CONCENTRATES:

Up to $50.00 per ton	10%
$50.00 to $80.00 per ton	15%
$80.00 to $160.00 per ton	25%
$160.00 per ton and over	35%

(3) After the first year, or at any previous time it is warranted, to proceed to drive the Dauntless tunnel into Hilltop property by drilling, (it is obvious that if no ore is discovered they probably will relinquish the lease anyway); or to sink the Hilltop shaft, or some other shaft, adit, or working suitable for the same purpose, with all diligence; but at least upon the following minimum expenditure of labor: Six men, twenty-five shifts each per month, for seven months in the year.

(4) That upon the completion of the tunnel, shaft or working to the point necessary to begin the extraction of ore, the ore will be taken out as fast as conditions will permit, but at least at the expenditure of twelve men, twenty-five shifts each per month for seven months in the year, on Hilltop ground.

(5) That if the royalties paid in the first five-year period to the Hilltop Company amount to $10,000.00 an additional five-year extension will be granted. In the second five year period, if the royalties to the Hilltop Company amount to $20,000.00, an additional five-year period will be granted, and that the lease will continue to be extended in five year periods upon payment to the Hilltop Company of royalties amounting to $20,000.00 for the preceding five-year period.

(6) All royalties to apply on the purchase price of the mine.

(7) If the royalties paid from the sale of ore do not equal the royalty stipulations for lease extension, the Lessees may, if they so elect, pay the difference in cash. Such cash payments to be considered as advance royalty.

The other terms and provisions of the lease to be patterned after the lease now in effect, and a good lawyer can draw it up to fully protect Hilltop interests.

A lease drawn on these or similar lines would protect the Hilltop Company against having its property indefinitely tied up, no beneficial work done on it, and no income from it, and at the same time give the lessees all the elbow room they want.

The scale of royalties on concentrates have the same base as that for smelting ore, and are figured on a 4 to 1 ratio, 80% extraction. It seems proper to make some provision to take care of sulphide ores, which can be more economically concentrated than shipped direct. What the ratio of concentration will be is not known, but it is reasonable to assume that the ore as originally deposited was a low ratio ore, containing pyrite, at least, in considerable quantity, together with galena and zinc blende.

GENERAL OBSERVATIONS AND INFORMATION:

Leadville is apparently on the decline. Only two properties were working in September, 1921, - the Yak and the Penrose. This condition may be, and probably is, due to the present depression in all industry, the low price of lead and zinc, and the exhaustion of many of the mines, but unless more tonnage is found for the Arkansas Valley smelter, there is no good reason for it to continue to operate. Ore is now being brought in from outside points and hauled up hill to Leadville. What the policy of the AS&R is, I have no idea, perhaps they will operate only the Pueblo plant, in which case it ought to be enlarged and modernized. This might be of great benefit to the Leadville District generally, as there would be a possibility of a reduction in smelting rates.

Silver will remain at $1.00 per ounce until the U. S. Government buys the quota called for in the Pittman Act. This is 271,000,000 ounces. On August 25, 1921, the total amount of silver purchased under the Pittman Act was 69,170,430 ounces, or about one-fourth of the total. What will happen to the price of the metal after our government has bought its requirements is a problem that many of the best brains of the country are wrestling with. I don't know.

The average price of lead, New York, for several years past is as follows:

1910	$4.426	1916	$6.85
1911	4.420	1917	8.787
1912	4.471	1918	7.413
1913	4.370	1919	5.759
1914	3.862	1920	7.957
1915	4.628	1921	4.70

Persons conversant with the situation anticipate a rise in the price of lead in the future, say within a year or so, to between 5¢ and 6¢ a pound. It is improbable that lead, for many years to come, will range as low in price as in pre-war days.

CONCLUSIONS

(1) There yet remains much unexplored and favorable territory in Hilltop property.

(2) The possibilities in the Blue Lime are not exhausted, but the best chance for finding ore in quantity is to prospect the White Lime beneath the main ore shoot.

(3) The best method of prospecting is with diamond drills.

(4) The development campaign should be laid out from the results obtained in drilling.

(5) No one should undertake to operate the mine without sufficient capital on hand or in view.

(6) A number of years will be necessary to develop the mine and extract the ore if ore is found in quantity and quality sufficient for any sizable operations.

RECOMMENDATIONS

(1) That if the Hilltop Company does not want to operate the mine itself, it be leased to responsible people.

(2) That if it is decided to lease the mine, the present lessees be given first consideration.

(3) That in the event it is leased, the Hilltop Company co-operate with the lessee in every way possible to obtain a modification of the present smelter and freight rates, which are exorbitant.

Yours very truly,

WSL-f. W. S. LARSH

...lead Corporation
... & Cronmor Building
Denver 2, Colorado

APPENDIX "A"

THE HILLTOP SILVER MINING COMPANY
Foster Building

George L. Felt
General Manager

Mr. George C. Barnard, Vice-Pres.
The Hilltop Mining Company
Denver, Colorado

Dear Sir:

Referring to the matters discussed in various conversations and conferences between yourself and Mr. Walter Larsh on the one hand, and the officers of the Hilltop Silver Mining Company on the other, since the return of Mr. Larsh from the mine and your request that the company set forth its position in writing, I have the honor to submit the following:

Operations commenced in September, 1918, and during that year, we shipped 76 tons, yielding the owners a royalty of $36.78; net proceeds to the company being $330.98. This was the only ore we found in the mine when we took possession and was shipped more to clean up than from any expectation of substantial profit.

From there on until the summer of 1919, the lessee expended about $15,000.00 before getting any showing of ore; when ore was discovered we were met with the startling declaration of the C. & S. Railway that it would not, or could not, operate the Leavick Branch until it was placed in repair; and that under the then financial condition of the road it had not and could not obtain funds to repair the road. Under the rulings of the federal administration the entire expense of such repairs had to be advanced by us, as the one industry on that branch. Consequently we were able to make no shipments during the year 1919. This unforeseen contingency together with the report of our consulting engineer that expensive repairs must be made upon the aerial wire rope tramway swamped us financially, although we had already increased our finances threefold over original estimate of expense.

This unexpected situation necessitated the reorganization of our company and the collection of $50,000.00 additional capital.

During the year 1920, our shipments amounted to 2634 tons, paid royalties to the owner of $2,916.42, and had smelter proceeds to the lessees of $25,902.62. This result was accomplished under a very high scale of wages at about 25% efficiency of labor - and with the exception of a few men who stayed with us steadily the labor turnover sometimes amounted to nearly 100% per month - each man changed costing us an average of about $20.00 in cash per man. No full crew could be obtained until November, and by that time the price of lead had slumped and we caught a low price on some of our heaviest shipments.

During 1921, we shipped up to September 1st, 766 tons plus, paid royalty to the owners $1,183.11 and the lessees received net smelter proceeds of $5,408.96. There are 20 cars of about 20 tons each in transit or in the smelter unsettled for. (NOTE: to be strictly accurate the royalties above are given as per year of payment - a considerable portion of 1920 shipments not being settled for until January or February, 1921).

The 1921 shipments have been made at a very low price for lead, and under the highest smelter rate ever paid in the history of this mine.

We trust that the following summary of receipts and expenditures are sufficient proof of the fact that we have prosecuted this lease in good faith even under the adverse conditions above mentioned.

RECEIPTS

From stock sales		$ 83,681.47
From proceeds of ore		
1918	$ 330.98	
1920	25,902.62	
1921	5,408.96	31,642.56
		$115,324.03

EXPENDITURES

For the benefit of the mine and owners:		
C. & S. Ry. Repairs	$12,484.00	
Tramway Repairs	4,037.28	
Building Repairs	1,861.08	
Equipment	798.02	
Furniture	1,329.93	
Power Line Survey	217.69	
Fire Insurance	654.17	
Taxes	1,054.39	
Total		$ 22,436.56
Payrolls		54,668.35
Supplies, timber, coal, superintendence, wagon haul, general expense, etc.		38,219.12
		$115,324.03

We contend that the repair items, taxes, insurance and power line survey are expenditures which permanently improve, or temporarily protect the property for the benefit of the owners, and that the first general item totaling $22,436.56 represents no benefit to the lessees, as such, but rather to the owners; and that this expenditure is a strong equitable argument for such modifications of existing lease as will give the lessee some reasonable chance to recover this expenditure.

Viewing this statement from another angle, it is apparent that the payroll expense alone of producing 3,477 tons has been $54,668.35; and that the total expense of the development and mining of that quantity of ore has been $92,887.37, neglecting possibly $3,000.00 for corporate expense, engineer's reports, etc. No commission was paid for the subscription and collection of the capital sum, the overhead has been exceedingly light in respect to salaries and office expense. This is instanced to show you that the enterprise has economically expended all of the capital raised for the venture without any promotion expense or profits.

We consider that the ore disclosed by our past and present development has been largely exhausted and can be utterly exhausted by a few months intensive activity, unless new ore bodies are encountered.

The certainty of encountering considerable water naturally deters us from any attempt to sink the main shaft until electrical power is available. Definite information as to the plans of the placer operation at Fairplay indicate that the stub power line from Alma will not be installed until 1922, and even then we would have to bring the line up from Fairplay. Consequently, if we want electrical power we will have to advance to the power company from $8,000.00 to $12,000.00. It will be a year after putting up the money before we get power service.

Our present idea is that there is no hope for this property except by the exploration and development of the white lime formation beneath the parting quartzite, in the search for sulphide ore bodies. The most feasible way to do this is by driving the Dauntless Tunnel, which would penetrate the white lime formation south of or near the south line of the Hilltop Group. We figure that the installation of a steam power plant and compressor, the necessary buildings and the mine work would cost $25,000.00 to $30,000.00; that it would then be necessary to drift back northward to get under present Hilltop workings and upraise to make a connection therewith. Considerable exploration would have to be accomplished both in the Hilltop and Last Chance ground (in the happy event that sulphide ores were there discovered); to block out a sufficient tonnage to justify the erection of a new aerial wire rope tramway from the mouth of the Dauntless tunnel to the railroad station at Leavick. We estimate the tram to cost $50,000.00. Quite possible the sulphide ores would be of a grade which would require milling and we estimate that it would require from $20,000.00 to $25,000.00 to put the mill in shape to handle this class of ore. With good fortune the accomplishment of all this would put us in a position to maintain permanent shipments of a large tonnage for a number of years, and ultimately demonstrate a value for the property which would enable us to make a sale of both owners' and Lessees' interest.

We see no feasibility in prospecting the blue lime formation at this time by diamond drilling as we have no hope that such exploitations would develop ore bodies comparable in size with those already mined out; the contract of our payrolls with proceeds of the

ore mined by us also destroys any illusion that the same would be profitable at the present price of lead, and the present scale of wages and other costs.

After the connection with the tunnel was made, however, and as incidental to larger operations in the sulphide, undoubtedly some practical method might be devised for coming back and exploring for new ore bodies in the blue lime.

Tentative overtures have been made and negotiations had with a large mining corporation of ample capital, long established personnel and a record of successful performances, to furnish $130,000.00 additional capital and to join us in this enterprise.

To secure their co-operation the lease from the Hilltop Mining Company, and from our other lessors will have to be extended for a period which will give several years for the accomplishment of a major exploitation and development plan, and sufficient additional period following the same to give opportunity of sufficient return to justify the investment, with such profits as are usual in so risky a venture.

The longer the period of extension the greater the probability of enlisting this new capital.

We feel constrained, therefore, to ask that the existing lease (with such modifications as are hereinafter suggested) be extended to the first day of September, A. D. 1941).

You may think that a twenty year extension is too long a period. The answer to that is that the most important thing for the future of the mine is the enlisting of sufficient capital to adequately develop the property. There is no hope that anybody would pay the purchase price fixed by existing contracts until the amount of ore disclosed justifies such payment. Moreover in considering the term of a lease on this property, it must be remembered that the altitude and winter conditions are such that any surface operations are confined to about six months of the year, and that consequently about twice as long a period must be allowed as in the case of mines at a lower altitude. The owners can scarcely expect in fairness to receive more from the mine that the mine shows or produces, and the leaser who develops must be given a good gamble to compensate him for the risk taken. This is especially true as the royalties are high considering the altitude and isolation of this property, and the natural difficulties of operation. Royalties exacted in the existing leases might have been appropriately asked had the property been in condition for immediate working as an equipped mine. As shown above we have been put to expenditure of $22,436.56 to put the mine in that condition.

Both you and Mr. Larsh have asked us what assurances we can give as future accomplishments provided this new twenty year term is given us. Our answer is that we can give no positive assurances until our company is reorganized and sufficient capital obtained. However, if a twenty year term is granted by your principals and other lessors, we are reasonably confident that we can enlist sufficient capital for some new major plan of exploration and development and prosecute the new lease under its terms and conditions. If not, we will gladly relinquish the property.

We are willing to concede that in the absence of definite assurance, some evidence of good faith may be reasonably required, and that some conditions may fairly be attached to the renewal of terms. As to the first point we submit that our past performances are sufficient. We have done during the past three years more development work into new territory and more exploration work off of ore than has heretofore been done during the whole history of the Hilltop mine. Whatever ore has been disclosed, or value established for the mine as a going concern, is due to our efforts and our expenditures. We found nothing there when we commenced.

We think it only reasonable that the new contract might be written for a five year term from September 1, 1921, with the remaining 15 years conditional either upon the payment of an aggregate specified royalty during the first five year term, or the performance of a minimum amount of labor, or the execution of a certain specified development work, or perhaps a combination of the three kinds of conditions. We submit, however, that these conditions should be made quite flexible because we are in the uncertain game of searching for something which is not definitely known to exist; also, because all mining experience proves the continual recurrence of unforeseen contingencies -- such as unusual weather, labor troubles, fall down on the part of the railroad or smelter, fluctuating market of metals, and a dozen other contingencies.

The people from whom we hope to procure new capital may have their own ideas as to what the plan of development should be. We, therefore, hesitate to tie ourselves down definitely

to the driving of the Dauntless tunnel, or any other specified work. The contract might be drawn on the theory that we would drive the Dauntless tunnel (or some other crosscut tunnel from the Park County side of the property), commencing next summer, or any equivalent work decided upon after competent advice. That this should be done upon the following minimum expenditure of labor to-wit; 6 men, 25 shifts each per month for 7 months in the year, or 1050 shifts per calendar year, commencing with the year 1922: that after the completion of said tunnel or other work to the Hilltop ore shoot, or other pay body of ore in the Hilltop ground - then 2 additional men 25 days each per month for 7 months, or 350 shifts additional per calendar year be required in driving northward in the Hilltop property until connection is made with the underground workings on the Hilltop property, or until the exploration work on the Hilltop in white lime or other mineral zone has reached a point under the big stopes, or has been connected with the Hilltop shaft. (Until this is accomplished the performance of said specified minimum labor should be permitted outside the territorial limits of the Hilltop group).

Past experience has demonstrated that the condition of the present contract providing that $30,000.00 royalty must be produced within the first five year term, in order to give the renewal term of five years additional, is too high. We think, therefore, that if the new contract is written for a five year term, and a condition is affixed to the fifteen year renewal, that this condition of maximum royalty should be written at $10,000.00. This is on the theory that the first two years will probably be consumed in exploration, and that the lessee ought not be expected to earn over $3,333.33 royalty per year during the next three years. That condition be upon a further alternative that if so much royalty was not earned by ore actually extracted, that we might pay the difference in cash, and the said difference so paid shall be treated as an "advance royalty", to be credited to us on future accruing royalties at any time that the royalties paid exceed $5,000.00 per year.

We think that the condition of the fifteen year renewal should be either the performance of the maximum labor above suggested, or the earning (or prepayment) of $10,000.00 minimum royalty; as we elect. The writing of this condition in such alternative ought to give sufficient elasticity to our choice of procedure. Written in that way the condition ought not to frighten off an intending investor.

The advantages of the Dauntless Tunnel (or similar tunnel) would be: automatic drainage of the Hilltop mine to that level, better ventilation and an adequate second safety outlet required by the State mining laws; it would permit the location of bunk houses or boarding houses at an altitude 600 feet lower than the present camp, and afford much better climatic conditions. It would also give a chance to keep a number of men employed on development work during the winter without heavy overhead expense of maintaining the hoisting plant at the Hilltop shaft. The greatest advantage, however, is that it would give a chance for the economical exploration of the white lime below the parting quartzite.

The future of the mine depends upon the discovery of an adequate tonnage of sulphide ore in the white lime, of sufficient value to permit of either milling or direct shipment to the smelter. We believe our development work in the blue lime above already proves the substantial exhaustion of the mineral possibilities of that part of the mine. Whoever, therefore, undertakes the expense of the development of the lower part of the mine should be given sufficient time to get his money back with profit.

It may be that the ore now in sight is more valuable to us as an "exhibit" in our financial campaign, than it is if we ship it under present market price of lead. We, therefore, desire immediately a definite modification of the existing lease, to the effect that we may immediately suspend all further operations, if we so elect; until the first day of June, 1922. This request is not unreasonable as we have worked seven winter months not required by the terms of the lease.

We desire that this waiver of existing conditions as to operation shall be put into effect as soon as possible, and we suggest that you request Mr. Trumbull to telegraph you authority to do so, at the earliest possible moment after the receipt by him of this communication and the report of Mr. Larsh, if this action meets with his approval. The desirability of getting engineers representing our prospective new stockholders on the ground before a heavy snow, reinforces our request for a speedy answer.

If the above main points are approved, we will immediately submit a draft of the proposed extension, fixing all details and modifications definitely. The sooner this is executed the better as we must go through similar negotiations with several other ownerships, before being ready to start on any definite financing. The early reply of your principals is earnestly requested.

Respectfully submitted,
THE HILLTOP SILVER MINING COMPANY
By (Signed) GEORGE C. MANLY, President

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

APPENDIX "B"

AMERICAN SMELTING & REFINING COMPANY
Arkansas Valley Plant

OPEN SCHEDULE - LEAD CARBONATES
March - 1920

GOLD: .05 oz. and over $19.00 an oz.

SILVER: 1 oz. and over 95% New York quotations date of assay.

LEAD: Wet loss 10%. Minimum 1 unit: maximum 1-1/2 units to obtain dry assay. Price paid per unit for lead in all ores and concentrates and based upon a quotation of $4.00 per 100 lbs., 1¢ up or down for each change of 5¢ in quotation. The quotation used as a basis settlement shall be figured as follows: From New York sales price of American S. & R. Co. on date of assay deduct 77½¢ per 100 lbs. from said sales price. When the net price thus obtained does not exceed $4.00 take 90% of it; when it does exceed $4.00, add to $3.60 per 100 lbs. 3/4ths of the excess of said net price above $4.00 per 100 lbs.

COPPER: 1% off wet determination. 7 cents off electrolytic wire bar.

	Dry Lead Contents	Price per unit $4.00 basis	Neutral Treatment Charges, F.O.B. Leadville District
	5% to 10%	35¢	$7.00
From- - -	10% to 15%	35¢	5.00
Over- - -	15% to 20%	40¢	3.00
	20% to 25%	42¢	2.00
	25% to 30%	43¢	1.00
	30% to 35%	45¢	.00
	35% to 40%	47¢	.00
	40%	50¢	.00

Over $ 8.00 to $12.00 gross value, not including iron, add 25¢ to treatment.
Over $12.00 to $16.00 gross value, not including iron, add 50¢ to treatment.
Over $16.00 to $20.00 gross value, not including iron, add 75¢ to treatment.
Over $20.00 gross value, not including iron, add $1.50 to treatment.

15 cents will be paid per unit for iron in excess of insoluble, 15 cents will be charged per unit for insoluble in excess of iron up to the maximum treatment.

ALL ORES IRON OR SILICIOUS

3% to 5% Dry Lead

Gross Value	Maximum Treatment F.O.B. A.V.Plant
Under $10.00	$5.00
$10 to $15	5.50

5% to 10% Dry Lead

Gross Value	Maximum Treatment F.O.B. A.V.Plant
Under $15.00	$4.50
$15 to $20	50% of the excess over $15 added to $4.50 to max. of $7.00
$20 to $25	8.00
$25 to $30	9.00
$30 and over	10.00

10% Dry Lead and over

Dry Lead Contents	Maximum Treatment Chgs. F.O.B. A.V.Plant Under $12.00	$12 - $15	$15 and over
10% to 15%	$5.00	$5.50	$6.00
15% to 20%	4.50	5.00	5.50
Over 20%	4.00	4.50	5.00

3% sulphur limit, 25¢ per unit penalty for excess over 3%.
5% zinc limit, 50¢ per unit penalty for excess over 5%.

Gross Value does not include value of iron.
Equalize treatment charges at all turning points.

APPENDIX "C"

DIVISION OF OWNERSHIP IN THE MINING CLAIMS

July - 1910	Hilltop Co.	Sam Cohen	Anna M. DeRemer
(1) Ptarmigan	3/4	---	1/4
(2) Hilltop	3/4	---	1/4
(3) Leslie De	3/4	---	1/4
(4) Top Hill	1/4	1/2	1/4
(5) Rush	1/4	1/2	1/4
(6) Enterprise	1/4	1/2	1/4
(7) Astor	1/2	1/4	1/4
(8) Vanderbilt	1/2	1/4	1/4
(9) Humboldt	All	---	---
October - 1921			
(1) Ptarmigan	3/4	1/4	---
(2) Hilltop	3/4	1/4	---
(3) Leslie De	3/4	1/4	---
(4) Top Hill	1/4	3/4	---
(5) Rush	1/4	3/4	---
(6) Enterprise	1/4	3/4	---
(7) Astor	1/2	1/2	---
(8) Vanderbilt	1/2	1/2	---
(9) Humboldt	All	---	---

CORRECTION OF DATA ON SILVER, GIVEN ON PAGE 23 OF HILLTOP REPORT OF OCTOBER 22ND, 1921.

Mr. H. R. Trumbull,
Secy. - Hilltop Mining Co.,
Cynwyd, Pa.

Dear Sir:

Since this report was written an article entitled "Position of Silver under the Pittman Act," by Cornelius F. Kelley, President of the Anaconda Copper Mining Company, has been published in "Mines and Metallurgy". The figures given in this article are at variance with those of the report, and as I believe that Mr. Kelley is in a position to know the facts, and that they are as published in the article above mentioned, I wish to correct my report to correspond with them.

Mr. Kelley states, -- "From the date of the passage of the Act (April 23, 1918), to the fulfillment of sales under its provisions to Great Britain, the United States Mint melted a total of 270,121,554 silver dollars, the equivalent of about 208,000,000 ozs. of fine silver. On May 17th, 1920, the Director of the Mint announced the readiness of the Government to purchase silver at $1.00 per oz. 1000 fine, delivered at the option of the Director, to the Assay Office at New York or to the Mints in Philadelphia, Denver or San Francisco, up to an aggregate amount of 207,000,000 ozs."

The report of the Secretary of the Treasury, fiscal year 1920, P. 538 gives the purchases to October 1, 1921, at a total of 73,679,866 ozs.

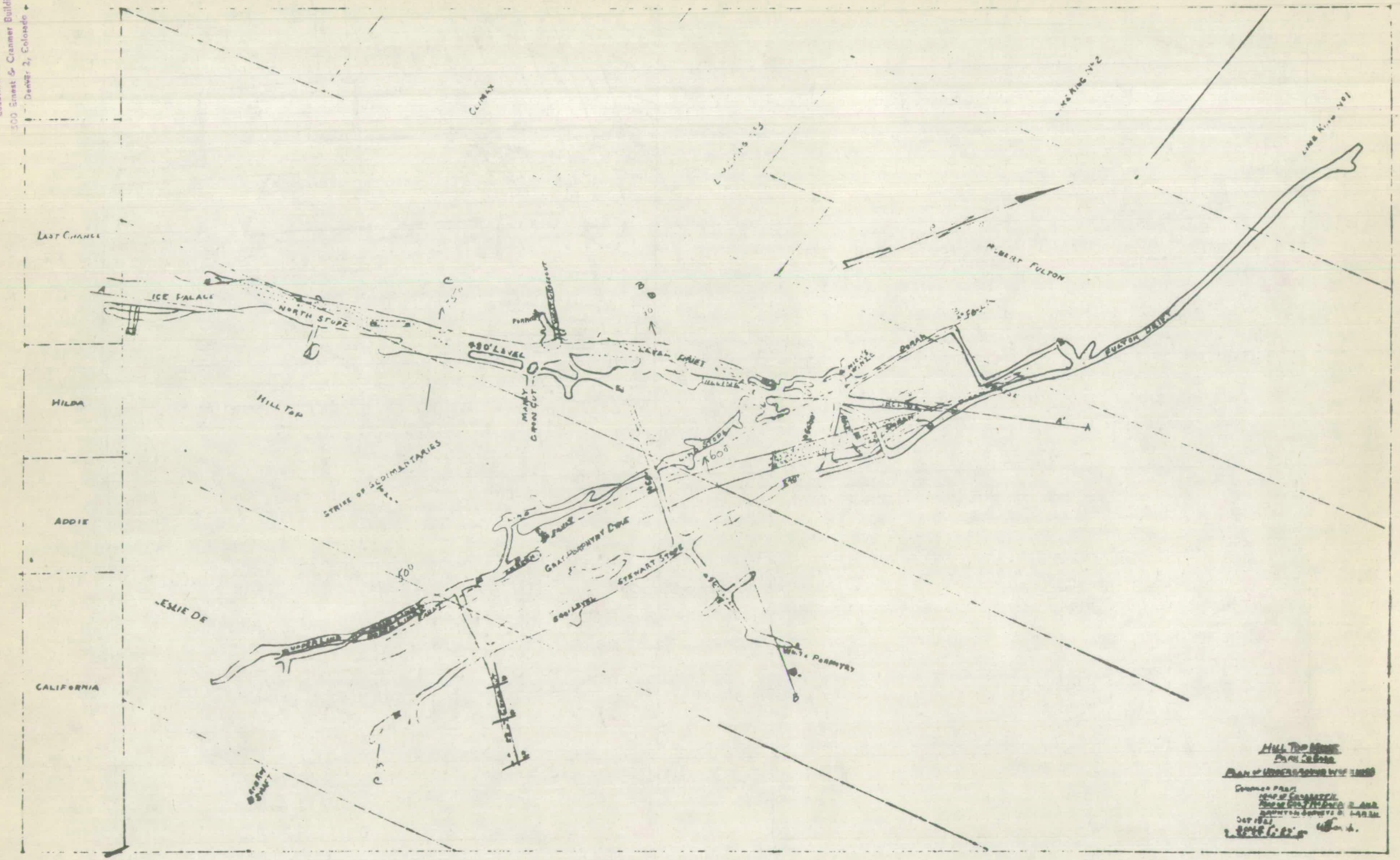
The Engineering & Mining Journal of November 12, 1921, states the total purchased to November 5th, 1921, amounted to 79,803,863 ozs.

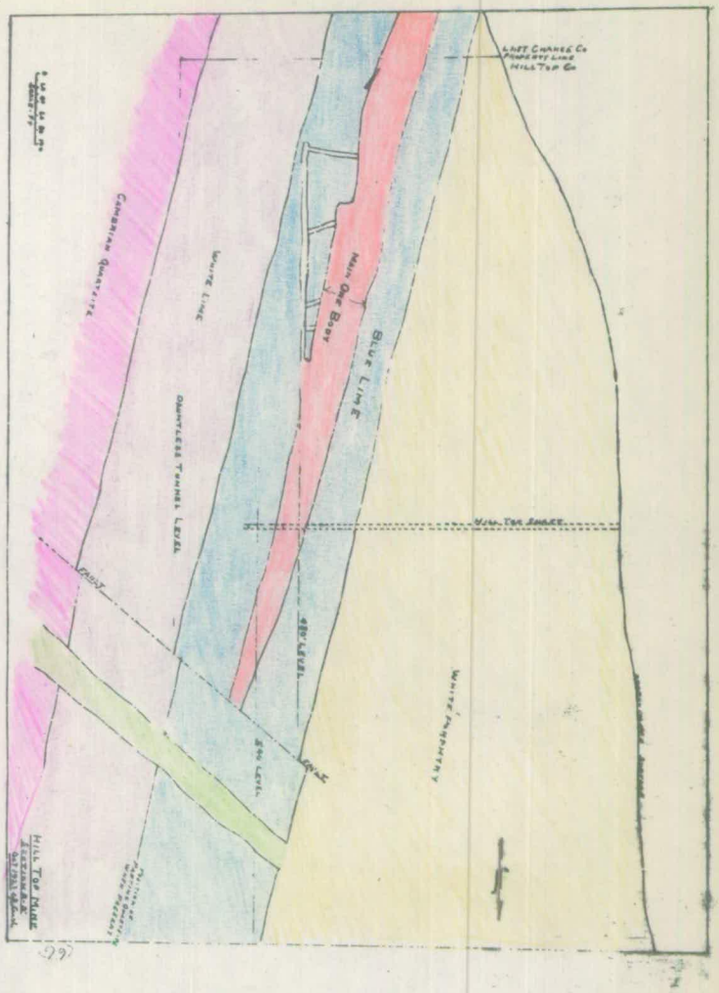
Yours very truly,

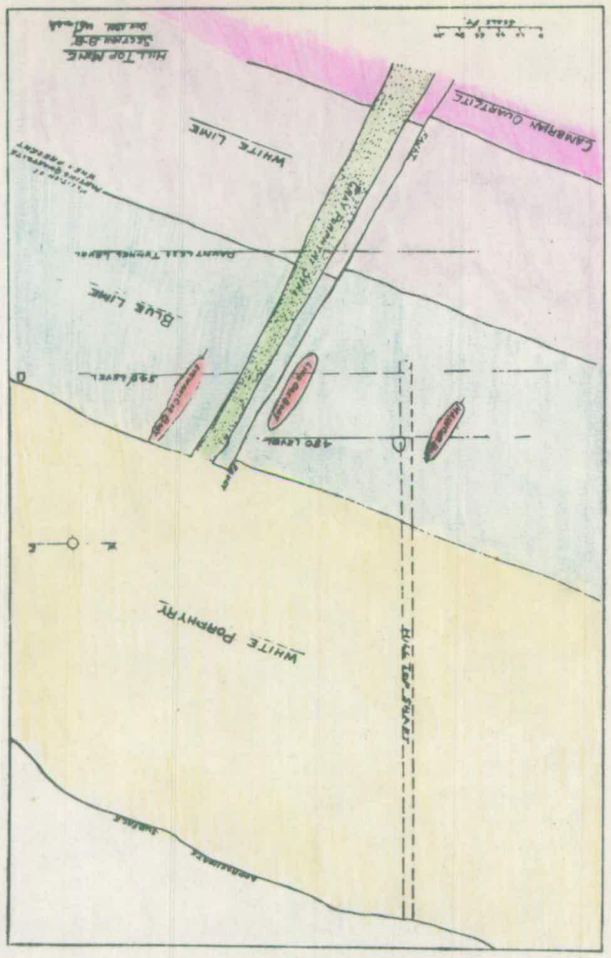
(Signed) W. S. LARSH

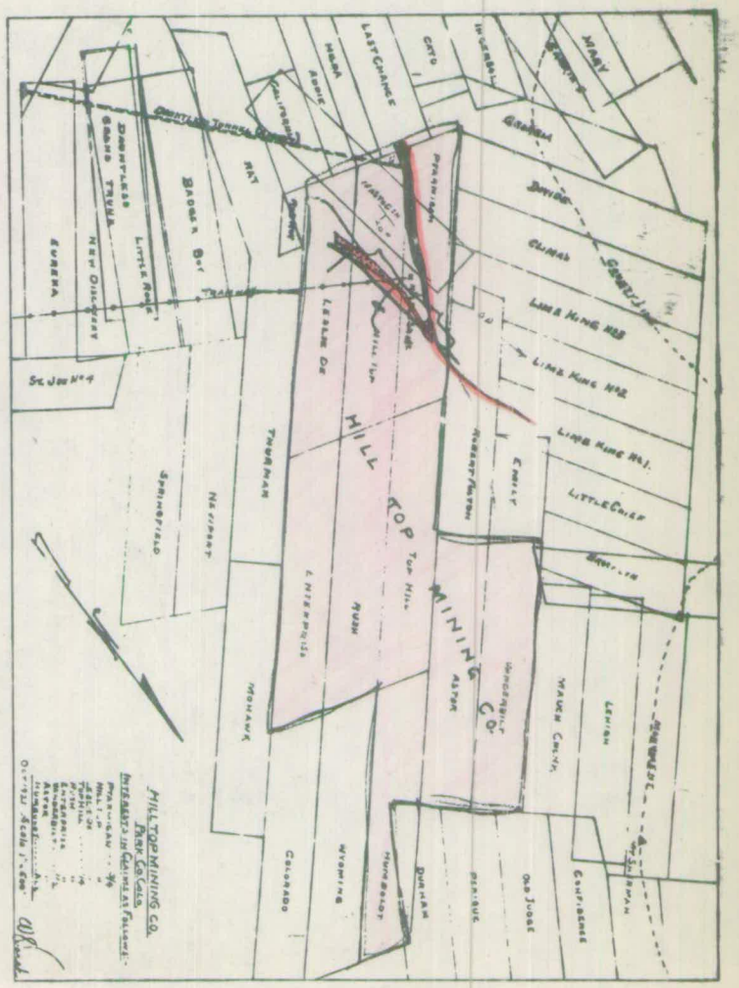
Ruth, Nevada
November 29, 1921.

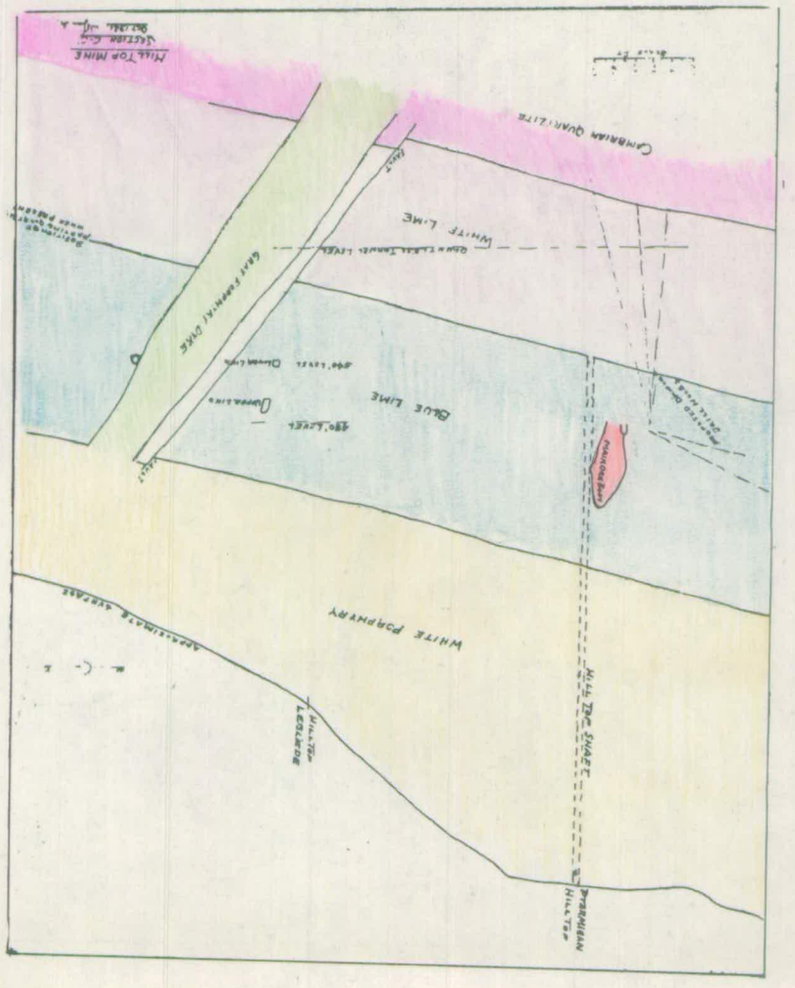
Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado




Hill Top Mine
Eastern Div.
Section 8-9
Canadian Quartzite
White Lime
Blue Lime
Dunnstable Tunnel Level
White Porphyry
Hill Top Shaft
Approximate Surface
Scale Ft.


Hill Top Mine
Eastern Div.
Section 8-9
Canadian Quartzite
White Lime
Dunnstable Tunnel Level
Blue Lime
Dunnstable
480' Level
Hill Top Shaft
White Porphyry
Approximate Surface
Scale Ft.


Hill Top Mining Co.
Park Co. Colo.
Hill Top Mine
Eastern Div.
Section 8-9
Canadian Quartzite
White Lime
Dunnstable Tunnel Level
Blue Lime
Main Ore Body
480' Level
Water Table Surface
White Porphyry
Scale Ft.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Dunnstable Tunnel Level
Blue Lime
480' Level
Dunnstable
Hill Top Shaft
White Porphyry
Approximate Surface
Scale Ft.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

REPORT

on the

Property of

THE HILLTOP SILVER MINING COMPANY

Park County,

Colorado

by

CARL O. LINDBERG

CARL O. LINDBERG

The report on Hilltop Mine by Carl O. Lindberg, dated August 16, 1920, was made at the instance of The Hilltop Silver Mining Company, lessee of the property.

It was obtained from the heirs of Sam Doran, superintendent for above company, and later lessee of the mine.

Mr. Lindberg now heads the engineering staff of the New York office of Goldfield American Development Company, Ltd.

--oOo--

Leadville Lead Corporation
300 Ernest & Cranmor Building
Denver 2, Colorado

Carl O. Lindberg
Engineer of Mines
1211 Hollingsworth Bldg.
Los Angeles, California

August 16, 1920

The Board of Directors
The Hilltop Silver Mining Company
934 Equitable Bldg.
Denver, Colorado

Gentlemen:

Herewith is submitted my report on the property of the Hilltop Silver Mining Company, near Leadville, in Park County, Colorado, in accordance with instructions from Mr. George L. Felt, dated July 23rd, and August 10th, 1920.

This report is accompanied by the following Maps:

Map No. 1 - Claims held under leases
2 - Underground Workings in the Hilltop Mine
3 - East-West Cross-section, 400 ft. North of Hilltop Shaft
4 - " " through Hilltop Shaft
5 - " " 300 ft. South of Hilltop Shaft
6 - " " 600 ft. South of Hilltop Shaft

SUMMARY:

The determining features, as brought out by this examination, are:

(1) - The Hilltop Silver Mining Company's title consists of leases, which expire in 3 to 4 years, on 460 acres of mining claims, located 7 miles east from Leadville, at an elevation of 13,000 feet above sea level.

(2) - Exhausted stopes indicate that 150,000 to 200,000 tons of partly oxidized silver-lead ore has been mined in the past. Rumors place the gross production between four and five million dollars.

(3) - Geological conditions are generally similar to those of the Leadville ore deposits, and more particularly like those of Breece Hill, 3 miles east of Leadville, and 4 miles west of the Hilltop Mine.

(4) - Several approximately parallel fissures in limestone are mineralized, and the adjoining limestone has been replaced through the action of nearby intrusions of monzonite porphyry.

(5) - Oreshoots exploited in the past, and now exhausted, vary in length from 400 feet to 1500 feet; in width from 10 to 50 feet; in height from 30 ft. to 75 feet.

(6) - An oreshoot, containing about 15,000 tons, now being developed, indicates a value before operating costs of about $200,000. Additional tonnage is probable with further development of its extension to south.

(7) - Geological conditions suggest the existence of additional ore bodies in undeveloped territory, and the possibility of finding sulphide ores with further depth.

CONCLUSIONS

The expected yield from the ore at present under development should cover the invested capital. The future possibilities are encouraging and sufficiently promising to warrant the expenditure of an additional $25,000 for diamond drilling to locate additional ore shoots, and to intelligently direct the more expensive work, and equipment it is expected will be required and justified by favorable results from the diamond drilling.

RECOMMENDATIONS

It is considered to be well justified, and it is recommended that provisions for further development of the property be undertaken along the lines discussed in this report.

Yours very truly,
C. O. LINDBERG

REPORT ON THE PROPERTY OF THE HILLTOP SILVER MINING COMPANY NEAR LEADVILLE, IN PARK COUNTY, COLORADO

LOCATION

The Hilltop Silver Mining Company's claims are located at the head of Four-Mile Gulch, in Park County, Colorado, on the east slope of Mount Sherman and the high divide which diverts the drainage, easterly, into Four-Mile Gulch, and westerly, into Iowa Gulch. In a straight line with direction a little south of east, the distance from Leadville is seven miles.

ACCESSIBILITY

The mine is most conveniently reached from Leavick, the terminal of a branch line of the narrow gauge Colorado & Southern Railway from Fairplay. There is a wagon road from Leavick to the Hilltop Shaft, about three miles long, involving a rise in elevation of about 2,000 feet.

TOPOGRAPHY AND CLIMATE

The Claims cover the sides and steep slopes of a basin formed at the head of an easterly trending gulch. The elevation at the Hilltop shaft collar is about 13,200 feet above sea level, and the maximum difference in elevation within the group of claims is about 800 feet.

Climatic conditions are governed by the high altitude, with low temperature and snow-storms during winter months, and moderate temperatures and occasional electric storms during the summer months. No snow-slides are known in the immediate vicinity. The surrounding country is above timber-line, and barren of vegetation. Timber-line is at 11,500 feet elevation.

AREA AND OWNERSHIP

The Hilltop Silver Mining Company has an authorized capital of 1,000,000 shares, of which 900,000 are issued. The Company's titles consist of leases, with options to purchase, on the groups of claims shown on Map 1, accompanying this report. The area includes 58 patented claims aggregating 460 acres, a millsite of 7 acres, and timberlands embracing 80 acres.

The leases cover the following general conditions:

Reference Map No. 1	Nos.	Acres	Date of Expiration	Maximum Purchase Price	Remarks
B-C	9	89.21	Sept.1,1923	$170,000	Condition for five year renewal
D	14	103.01	"	200,000	
E	21	150.11	May 15,1922	75,000	Incl.80 acre timber
F	1	0.44	Mch.24,1924	3,000	
G-I	3	26.29	Mch.31,1924	20,000	
H	Fr.	8.87	Mch. 6,1922	15,000	
J	1	4.35	Mch.31,1924	5,000	
K	1	8.29	Jul.10,1920	5,000	Renewed?
L	2	20.66	Nov. 1,1924	40,000	
M	2	18.77	Nov. 1,1924	40,000	
N	3	30.29	Dec.18,1924	15,000	
Totals	58	460.29		$588,000	

In most cases royalties or smelter liquidations apply on future purchase prices, which, in some instances are scaled down to lesser amounts with earlier dates of purchase. The titles have not been investigated, and are assumed to be as represented.

The claims are located in the Horseshoe Mining District within which the mineral rights are governed by vertical boundary planes, by agreement.

HISTORY AND PAST PRODUCTION

The claims were located during the period 1875-1886. There are no reliable records available regarding past production, most of which took place during the period 1886-1899. The past production is variously reported to have reached four to five million dollars in

silver, lead and zinc. The remaining large stopes evidence that a large tonnage has been removed in the past, and indicate that somewhere between 150,000 and 200,000 tons have been extracted. The grade is reported to have been about 25 ounces silver, and 20 percent of lead.

The Continental Chief mine, 2 miles to the north, and the Peerless mine, 1 mile to the south, have also been large producers.

The present Company has operated the Hilltop during the past two years.

GEOLOGY

The geological formation in the vicinity of the Hilltop mine is generally similar to that of the Leadville district. The surface is covered by an extrusive flow of rhyolite porphyry, known in the district as White Porphyry. In the vicinity of the Hilltop mine this rock attains a maximum thickness of more than one thousand feet, in the western part of the claims, while to the east it is eroded to an edge, and beyond which the underlying limestone forms the surface. There are no known ore deposits in the White Porphyry.

Underlying the White Porphyry is a blue-gray dolomitic limestone, locally known as the Blue Limestone. The strike of this limestone is North 15 to 20 degrees West, and the dip 16 to 20 degrees to the North-East. The bottom of this limestone is not exposed within the workings, but exposures in some of the nearby gulches suggest its thickness to be in the neighborhood of 200 feet. Important ore deposits have found in this limestone both in Leadville, and the vicinity of the Hilltop mine.

Below the Blue Limestone, and laid down conformably, are: The Parting Quartzite, about 30 feet thick; the White Limestone, about 160 feet thick; and the Lower Quartzite, 160 feet thick; all resting on the underlying basal granite. None of the last mentioned four rocks are exposed in the Hilltop workings, but exposures along faulted sections, and the sides of nearby gulches indicate their presence below the mine workings.

Intruded through the granite, and the superimposed sedimentary beds, but not through the White Porphyry, is a monzonite porphyry, locally known as Gray Porphyry. The Gray Porphyry takes the form of dikes and sills spreading from the dikes between the bedding planes of the sedimentary beds. In the Hilltop ground the Gray Porphyry occurs as dikes, and only in one instance is there a suggestion of a tabular mass. In the Leadville district most of the orebodies have been found in connection with tabular masses of this porphyry intrusion, often directly under the White Porphyry. In several cases, however, the ore is directly connected with the dike shaped masses of the Gray Porphyry.

The Gray Porphyry is intimately connected with the genesis of the orebodies. In the east portion of the Leadville district, numerous fissure veins, carrying valuable ores and generally associated with nearly vertical dikes of the Gray Porphyry, have been opened along a distance of several miles. Their courses are in all instances nearly north and south, and their dip from 70 to 80 degrees east or west. The occurrence suggests that the ore deposits have their origin in depth through channels of fissure veins and dikes of eruptive rock.

The following idealized section of the ore occurrences in Breece Hill, 3 miles east of Leadville, is adopted from Max Boehmer in the Transactions of the American Institute of Mining Engineers, Volume XLI, and gives a clear conception of the ore occurrence in that section of the Leadville district, which is four miles west from the Hilltop mine.

The orebodies as exposed by the underground workings of the Hilltop mine are very similar in their occurrences. Present development in the Hilltop mine does not penetrate the thickness of the Blue Limestone, and all the ore found to the present time has been developed within the confines of this rock. The Hilltop ore occurs as filling in fissures, and as replacement in the limestone from these fissures, near, and in direct contact with dikes of Gray Porphyry. No tabular masses, or sills of the porphyry have so far been found within the mine workings.

The ore-bearing fissures have two directions: one set strikes North 30 deg. East, and another North-South, all dipping at 65-75 deg. to the West. The occurrence of the fissures and the porphyry dikes are best seen on the accompanying cross-sections, Maps 3 to 6 inclusive.

Faulting has taken place subsequent to ore deposition. The Last Chance ore shoot terminates northerly against such a fault, which has a probable normal throw of about 30 feet, but which involves also a horizontal movement, the direction and distance of which cannot now be determined. This fault, and its probable vertical displacement is indicated on Map 4.

The oreshoots in these fissures sometimes have fairly well defined walls, but more frequently the replacement by ore extends to irregular distances out into the limestone. The line of demarkation between ore and limestone is distinct. Where one wall is formed by porphyry, as shown on Map 6, the contact between the ore and the porphyry is sharp, and resembles that of the wall of a fissure vein. The ore shoots are of variable dimensions, but usually of important sizes. The Last Chance ore shoot has been stoped for a length of 1500 feet, an average height of 50 feet, and a width of from 10 to 50 feet. It seems probable that this ore shoot yielded more than 100,000 tons. The Stewart stope is 500 feet long, 10 to 20 feet wide, and averages 50 feet in height. The Lind stope is 400 feet long, 10 to 20 feet wide, and averages 40 feet in height. The stopes are shown in plan on Map 2, and also in sections on Maps 3 to 6, inclusive.

The ore consists of partly oxidized, coarse-grained lead sulphide, with its oxidation products, cerussite (lead carbonate), the chlorides and bromides of silver, and lesser quantities of carbonates and silicates of zinc at the margins of the orebodies. There are also considerable oxidation products of iron in the form of limonite and siderite. There is a scant gangue of quartz and jasper, and some mangano-siderite spreading from the orebodies.

All the ore exposures in the Hilltop mine are oxidized; there are no sulphides exposed. As the ore was originally deposited in the sulphide form and has been oxidized and probably enriched by descending, meteoric waters; there is every reason to expect, first: secondarily enriched sulphides, and, at further depths, primary and unaltered sulphides. Whether these will be of sufficiently high grade to permit of profitable exploitation remains to be determined by deeper exploration. In the Leadville district the sulphides have been found to be profitable, and there is therefore some reason to expect them to be similar in the Hilltop ground.

A unique feature of the orebodies in the Hilltop is that the water contained in the ore is frozen all the year round, which fact assists in keeping open the workings in ore without many supporting timbers.

OPERATING FACILITIES

WATER: A limited quantity is obtained from some springs directly above the Hilltop shaft. The quantity becomes inadequate, due to freezing, during the winter months, and the melting of snow is depended on to furnish boiler water. The mine does not make any water at the present depth. There is usually an accumulation of water in the 540 level, after the summer rains. To keep the mine clear of this it will be necessary to provide drainage or pumping facilities.

LABOR: The present crew numbers about 15 men. In common with other mining camps, labor has been scarce, but there is apparently no adversion on part of the men to work and live at this altitude. The altitude does interfere with the efficiency of labor to a material extent. Miners are paid $5.00 per 8-hour shift, and board is charged for at $1.35 per day. There are adequate housing facilities for present needs, which, with some improvements, can be made to serve present requirements very well.

POWER: Power is used for hoisting only. Steam is generated in coal burning boilers. A line for electric power has been surveyed to the mine from the Leadville side of the mountains. It is stated to be $3\frac{1}{2}$ miles long, and to have been estimated, a year ago, to cost $8,000.00, exclusive of transformers and switchboards. The transmission of electric power at this altitude is not altogether satisfactory, owing to frequent electric storms during the summer, and the strong winds during the winter, which may interfere with the continuous delivery of power required for hoisting and pumping.

FUEL: Coal is brought in by the railroad and over the aerial tramway, and costs from $8.50 to $10.00 per ton at the railroad. There is no adjacent wood supply for fuel.

TIMBER AND LUMBER: Mine timber can be brought in from around Leavick and Fairplay on the Colorado and Southern Railway, and is obtained for moderate costs.

TRANSPORTATION: The Colorado and Southern Railway terminal at Leavick is connected to the Hilltop shaft house by an aerial tramway, built in 1898, and lately repaired. It is apparently in fair condition. Track cable: $1\frac{1}{4}$ inches, and traction rope 3/4 inches. The line is about 14,000 feet long, and the difference in elevation between terminals is about 2,000 feet. There are 125 buckets of 400 pounds capacity, each, for ore. A 4 H.P. steam engine is provided for starting. The railroad and tramway furnish a comparatively easy means of freighting from and to the mine.

EQUIPMENT: The equipment is limited to a steam plant for the hoist, and blacksmith shop with the necessary tools. There are also bunkhouse, boarding house, office and stable. There is an old concentrating mill at Leavick, which the writer has not seen.

Leadville Lead Corporation
500 Ernest & Cranmor Building
Denver 2, Colorado

DEVELOPMENT

The extent of the accessible underground workings is shown on Map 2. The workings shown on this map are on what is known as the 540 Level, which is reached by the Hilltop shaft, at a vertical depth of 507 feet. The Hilltop shaft consists of a single hoisting compartment, and a small ladder way compartment.

The Last Chance ore shoot strikes N. 30 deg. E. and dips steeply to the west. It outcrops on the limestone surface, 1250 feet southwest of the shaft at an elevation of 325 feet above the 540 Level. It ends on the 540 Level, 250 feet northeast from the bottom of the shaft. The ore-shoot is therefore about 1500 feet long, and inclined to the northeast at about 13 degrees. This orebody has probably yielded in the neighborhood of 150,000 tons.

The Stewart ore shoot strikes north and south and dips steeply to the west. It is accessible for 600 feet, and, according to old maps, extends northerly for another 500 feet. This shoot has probably yielded 40,000 to 50,000 tons.

The Lind stope parallels the Stewart shoot, between it, and the Last Chance shoot. It is 400 feet long in a north and south direction, and has probably yielded 15,000 to 20,000 tons.

The ore in these shoots has been practically all removed; there remains a small tonnage of zinc carbonates around the edges of the stopes.

Another ore shoot is at present being developed to the south of the Lind stope, and in practically direct southern continuation of the old Lind shoot. Present extent of development work indicates this shoot to be at least 400 feet long, with good ore in the south face, about 30 feet high, and 15 feet wide. There is therefore about 15,000 tons now indicated in this shoot, and it seems reasonable to expect this tonnage to be increased as the work proceeds to the south.

The writer did not sample this ore showing, but the following data bearing on the average grade of the ore, are available:

22 cut samples, averaged	13.2 ounces silver	16.1 percent lead
35 grab samples, averaged	14.1 " "	23.6 "
14 lots shipped, averaged	11.3 " "	17.5 "

The cut samples were taken by a reliable engineer when the shoot was first opened, and one-half of the samples were taken in the bottom of the shoot showing low metal contents. The grab samples were taken by the superintendent from each hoisted car, and 25 of these combined into one sample for assay. The shipment assays are smelter returns and constitute in part ore from the bottom of the shoot, and will probably fall slightly below the general average of the ore as it will be stoped in the future from the richer portions of the shoot. It seems probable that the average of the shoot and the 15,000 tons now indicated will be about: 13.5 ounces silver, and 17.5 percent of lead.

The ground stands well, and very little timbering is required. The frozen condition of the ground assists in keeping the workings open.

NET VALUE OF THE ORE

The ore is shipped to the Arkansas Valley plant of the American Smelting and Refining Company at Leadville. According to this Company's "Open Schedule" of March, 1920 the net value of the ore now indicated in the Hilltop mine would be, with silver at $1.00 per ounce, and lead at 8½ cents per pound:

Payments:	13.5 ozs. silver @ 95% @ $1.		$12.83
	17.5 - 1.5 units of lead @ $0.92		14.72
Deductions:	Treatment charge	$5.50	27.55
	Railroad freight plus 10% for moisture . . .	5.39	10.89
Net Value before Royalty and Operating Costs			$16.66
	15 percent royalty		2.50
Net Value before Operating Costs			$14.16

15,000 tons @ $14.16 . . . . . $212,400.00

The cost of developing this ore has undoubtedly been high, - higher than would be the case if regular and economical capacity operations were established, so that present costs do not furnish a reliable criteria of what can be done. It seems probable that, if the cost of development be deferred, the cost of delivery of this ore to the railroad at Leavick would not exceed

$5.00 per ton, indicating an operating profit, exclusive of development of about $9.00 per ton. The present development work is largely in the nature of exploration work and preparatory expenses, and cannot fairly be taken to represent costs of development as may be obtained after the mine has been developed. The deferred expenses will of course have to come out of the mine in the end.

FUTURE POSSIBILITIES

The occurrence of the ore in approximately parallel fissures in limestone, in connection with intrusions of Gray Porphyry, and the suggested presence of these ore making conditions in the territory to the south included between the general direction of the Last Chance shoot, and the general direction of the Lind and Stewart ore shoots, leads the writer to believe that several ore shoots can be found by additional development. The immediate future possibilities for finding ore to the north are uncertain, and depend largely on the horizontal displacement made by the fault. The amount of this displacement cannot now be ascertained with any degree of certainty, and it is advisable to defer development in that direction for that more promising to the south.

The present development to the south is in ore and promises to develop additional tonnage as the distance to the south is increased.

There is little doubt that the mineralization of the fissures extends to greater depth than now reached, and with this probability the existence of sulphides below the oxidized ores becomes also highly probable.

The possibilities could most economically and speedily be ascertained by diamond drilling at convenient points located on sections south of the most southerly cross-section line D-D (Maps 2 and 6). In this locality the Blue Limestone forms the surface, and east and west cross-sections could conveniently be obtained by diamond drilling from points located about midway between the diverging strikes of the Last Chance and Lind ore shoots.

While diamond drilling is not entirely satisfactory to definitely locate and determine the assay value of any existing ore shoots, it is considered to be the most economical means to secure the necessary information required to justify more extensive operations and equipment. The holes can be conveniently drilled from one, or possibly two setups on each east-west section, spaced about 300 feet apart north and south. It is not probable that any holes will be required to exceed 500 feet in length. The cost of drilling may be estimated at $5. per foot. The work should be contracted, and the contractor should assume the responsibility for the risk of loss of diamonds.

The present means of development by underground drifts and crosscuts drilled by hand is too slow and costly to yield satisfactory results. The present work in ore to the south from the Lind drift, 540 Level, is justified, but any attempt to explore unknown territory is too costly to justify the involved risk of loss, and not likely to be productive unless attended by unexpected luck. The results expected from diamond drilling will furnish information by which the more costly underground work may be justified.

Should the diamond drilling indicate the existence of other parallel oreshoots, as can reasonably be expected, plans should be made to utilize the Dauntless tunnel for future work. The approximate direction and length of this tunnel is indicated on Map 2. An extension of 1,400 to 1,500 feet would bring it into the Hilltop ground, where it would cross-cut the general direction of the oreshoots at 100 feet below the present workings, which is considered a favorable geological horizon. There are no means of judging the depth of permanent water-level; but it is probably below the Dauntless tunnel. Should exploitation through the Dauntless tunnel prove to be justified, the Hilltop shaft could be abandoned for extraction purposes, and the camp and power equipment centered at the tunnel, 600 feet below the collar of the shaft. The shaft is limited in capacity and it would not be advisable to equip it for pumping purposes and power drilling purposes. The utilization of the Dauntless tunnel would involve also the acquisition of additional leases, or at least easements through some of the ground which must be passed through to reach the present leases. Extension of present leases will also be required to justify the work. This scheme of operation is, of course, subject to the success attending the diamond drilling.

CONCLUSIONS

The Hilltop Silver Mining Company's leases cover ground in which some 150,000 to 200,000 tons of oxidized ore has been mined in the past, and which had undoubtedly returned substantial profits above the expenses.

Geological conditions suggest the existence of several more such orebodies, and also that sulphide orebodies may be found at greater depths than that explored.

The size and grade of an orebody at present under development is indicated to yield returns sufficient to cover the present investment, and that recommended for diamond drilling. The risk of loss of investment is practically eliminated, and the chance to find additional and profitable orebodies is good.

RECOMMENDATIONS

The future prospects are favorable to the development of profitable orebodies, and the conditions are such as to warrant an additional expenditure for about 5,000 feet of diamond drilling to cost approximately $25,000.

Plans for future development should be made pending the results indicated by the recommended diamond drilling.

Yours very truly,

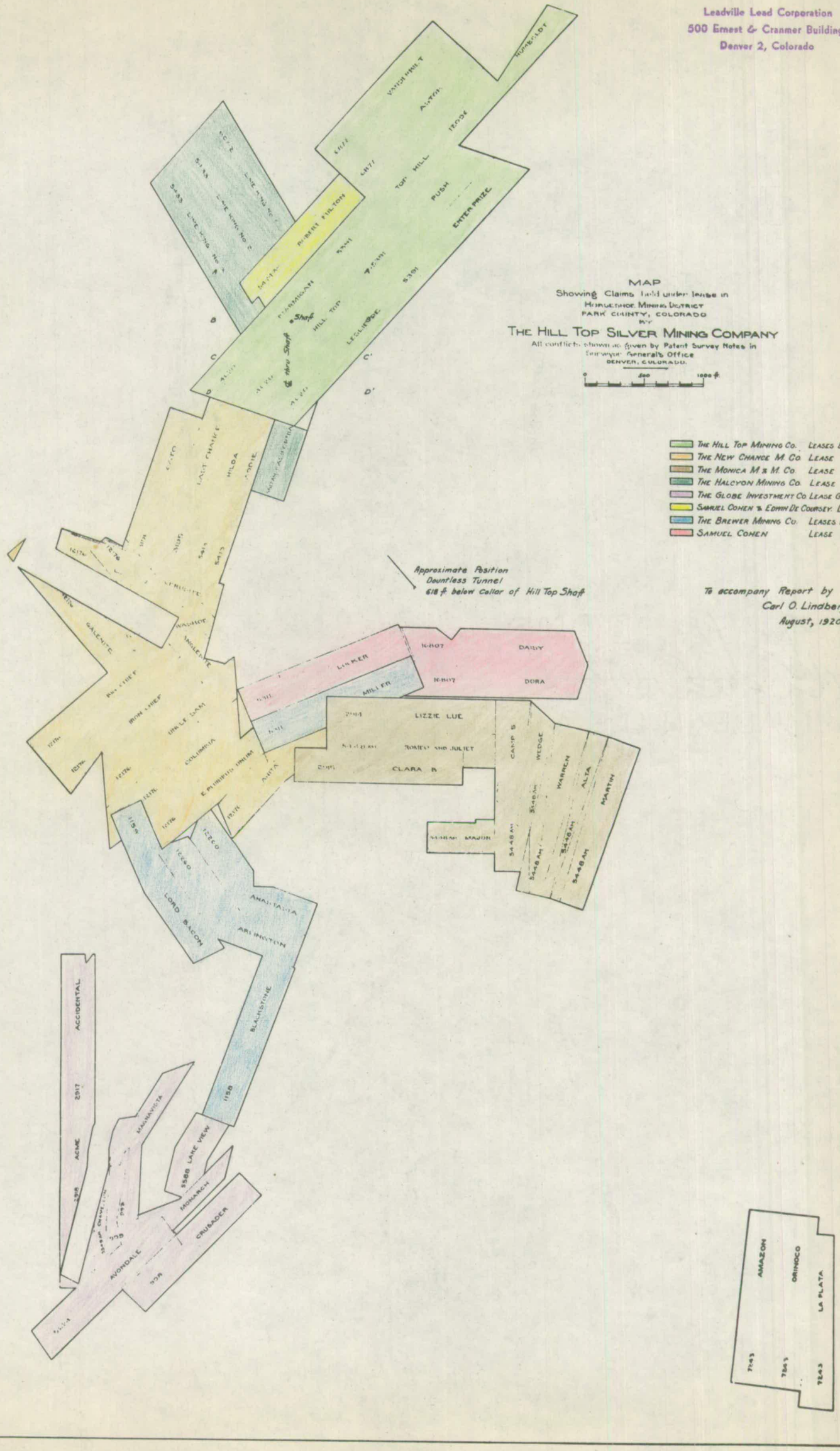
C. O. LINDBERG

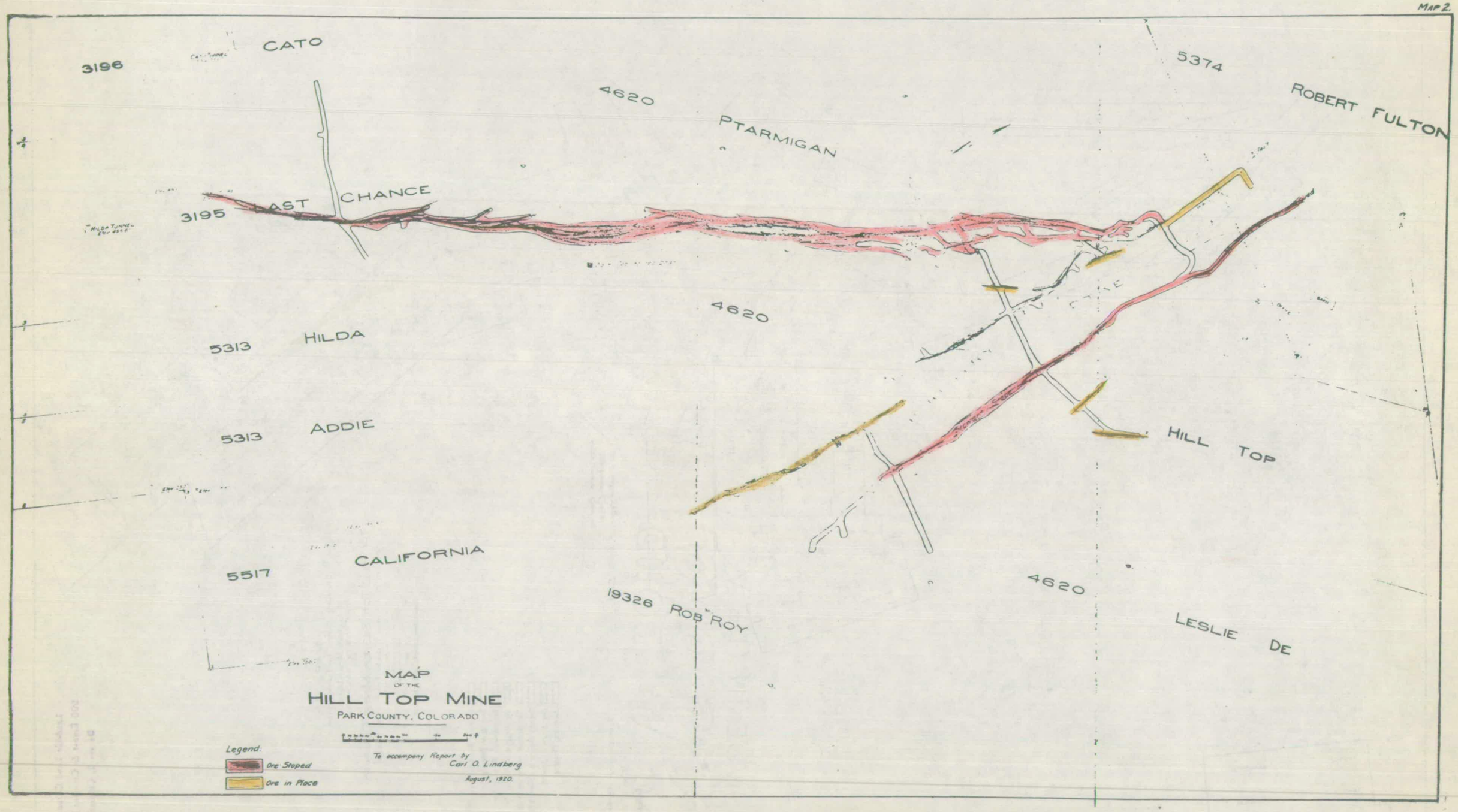
Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

Los Angeles,
August 16, 1920.

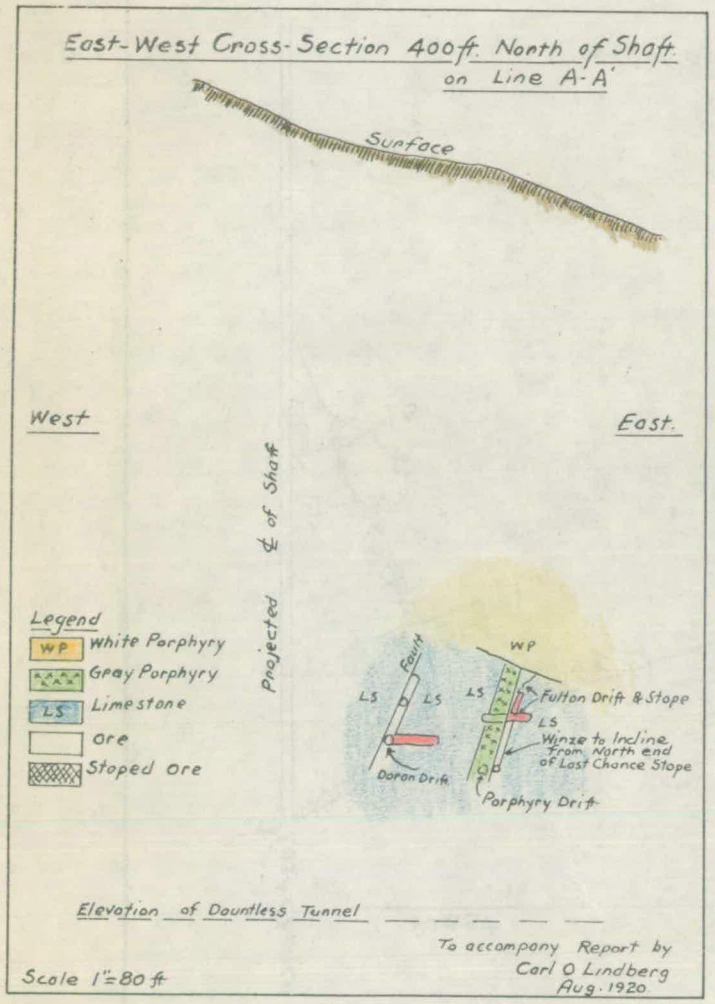
MAP 1.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

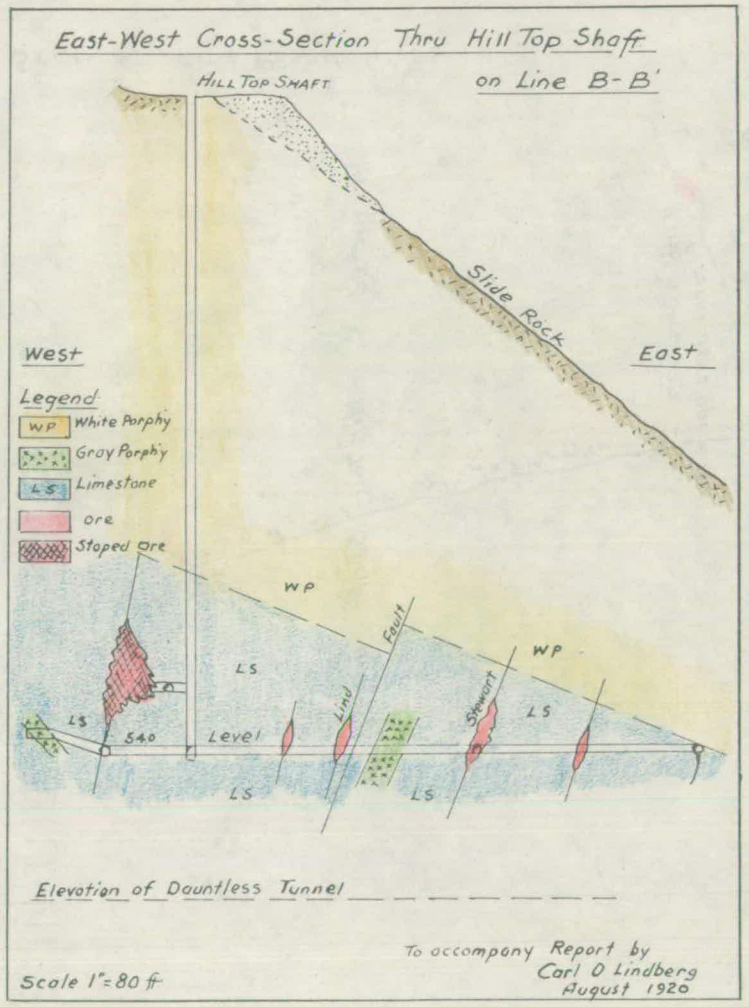



3196
CATO
4620
PTARMIGAN
5374
ROBERT FULTON
3195
LAST CHANCE
4620
5313
HILDA
5313
ADDIE
HILL TOP
5517
CALIFORNIA
19326
ROB ROY
4620
LESLIE DE
MAP
OF THE
HILL TOP MINE
PARK COUNTY, COLORADO
Legend:
Ore Stoped
Ore in Place
To accompany Report by
Carl O. Lindberg
August, 1920.

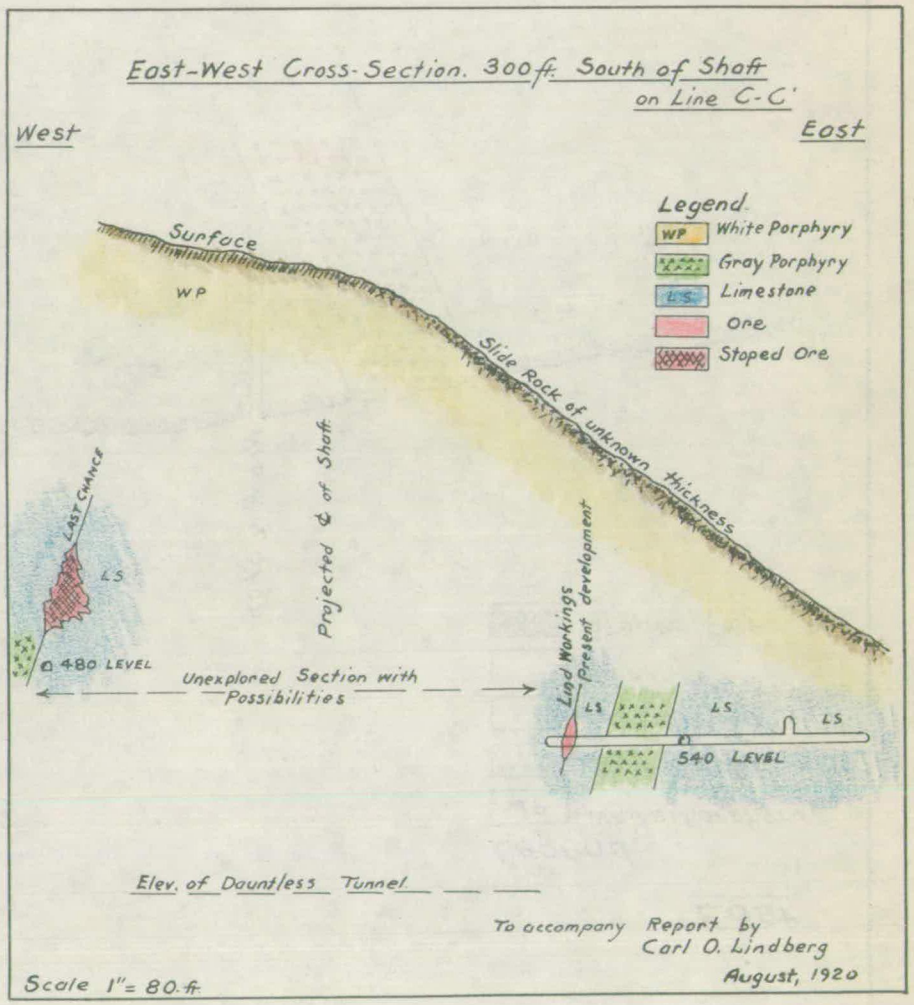
Map 3.



Map 4

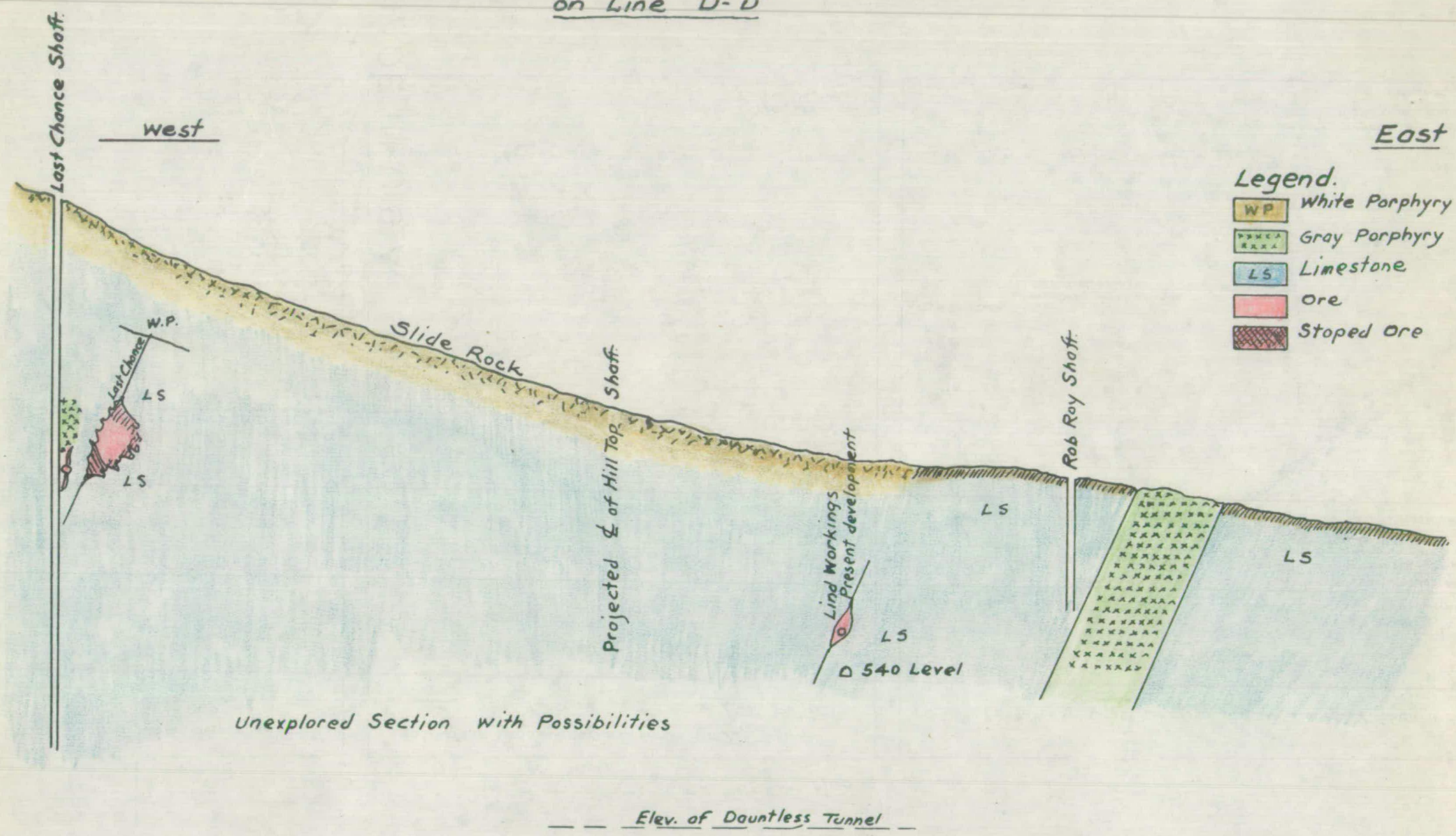


Map 5



Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

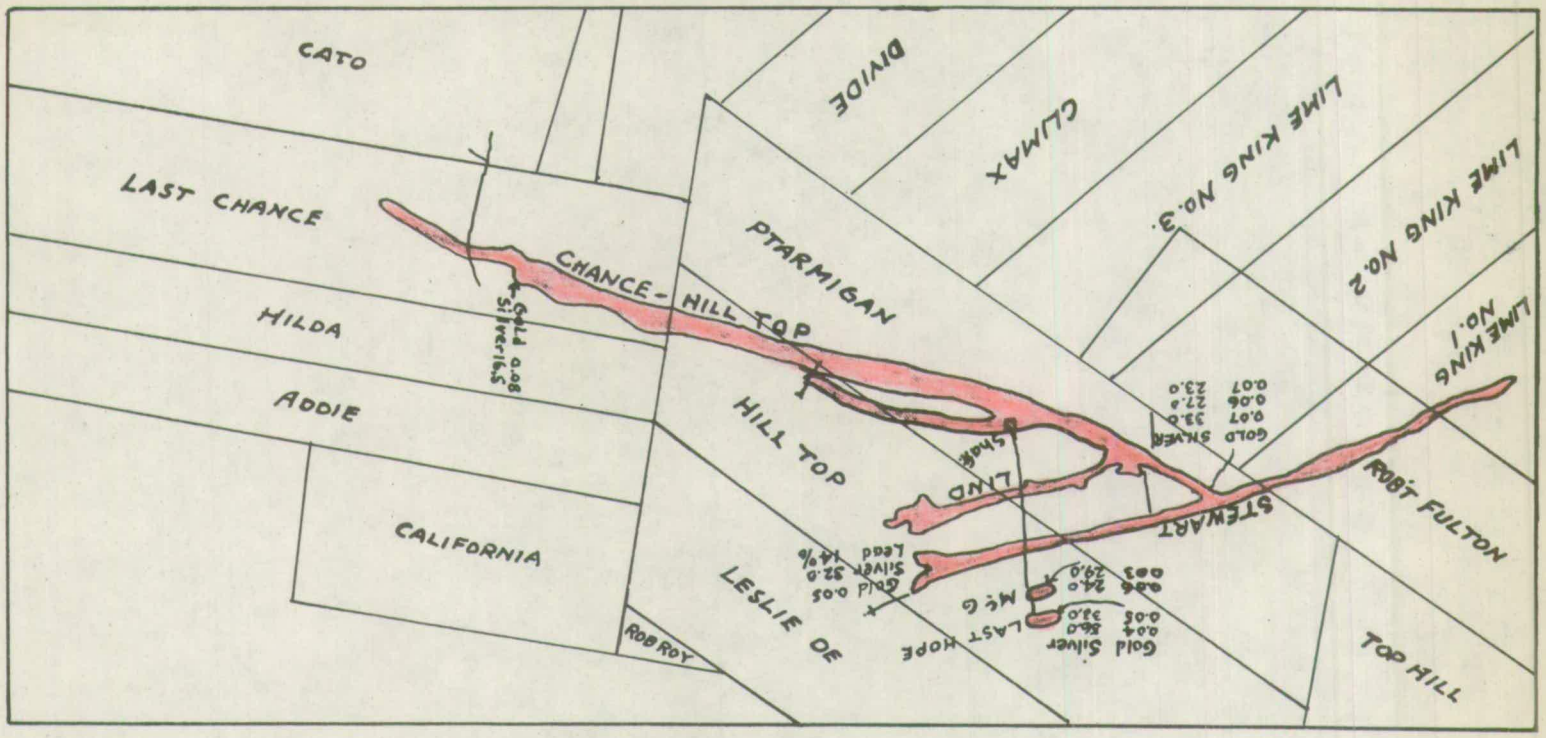
East-West Cross-Section 600 ft. South of Shaft on Line D-D'

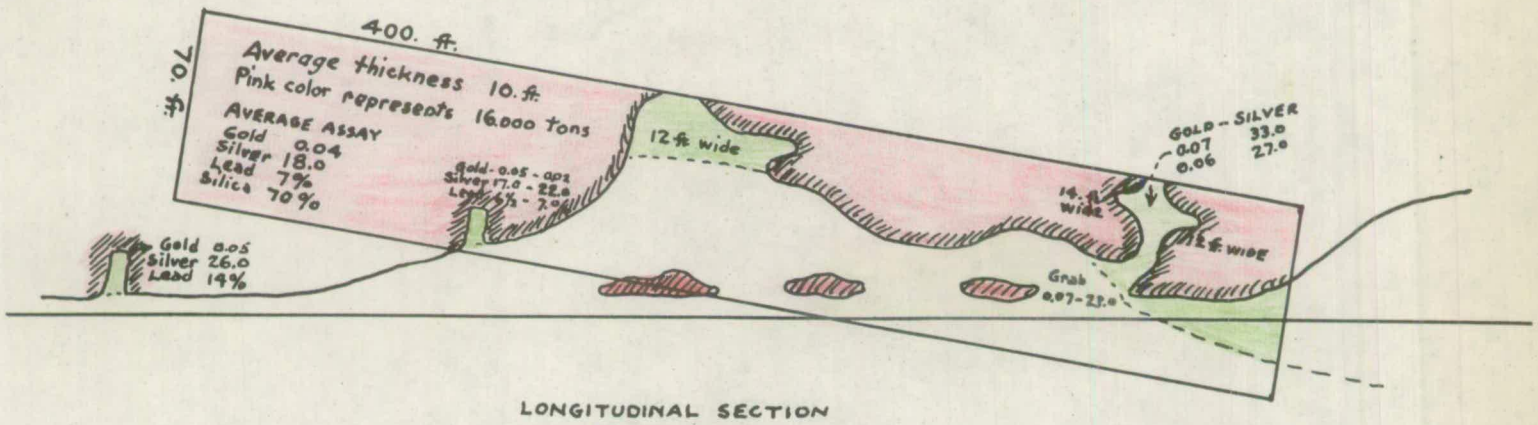


Scale 1" = 80 ft.

To accompany Report by
Carl O. Lindberg
August 1920

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado





LONGITUDINAL SECTION
OF A PORTION OF
THE STEWART STOPE
HILL TOP MINE

Pink shows solid ore
Red Crosshatch – Visible ore
Green – Stoped since Oct.-1912.
Producing 1000 tons of
$9.00 net smelter value.

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

THE CHANCE HILLTOP

Park County,

Colorado

May 6, 1913

HUGH C. WATSON

HUGH C. WATSON

Mr. Watson, now deceased, was a graduate of Colorado School of Mines, 1901. He acted as a consulting engineer with headquarters in Denver for a considerable period.

He was best known as an operator and was at one period in charge of the Yak Tunnel operation at Leadville for the American Smelting and Refining Company.

He was employed on the New York-Honduras-Rosario operation, and later on the Penones project of American Metal Company in Mexico.

At the time of his death he was in charge of the Terrible Mine, Chaffee County, Colorado.

He examined the Hilltop property in 1913 for American Metal Company and his report of that examination is submitted herewith.

--oOo--

Leadville Lead Corporation
500 Ernest & Cranmer Building
Denver 2, Colorado

Leadville, Colorado
May 6, 1913

American Metal Company
Foster Building
Denver, Colorado

Gentlemen:

I beg to submit the following report on the Chance-Hilltop Mining Company's Lease and Bond:

The property is known as the Chance-Hilltop, and is situated on the top of Mosquito Range, some twelve miles south-east of Leadville, at an elevation of about 13,000 ft.

There is a wagon road from Leadville to within two miles of the property, which is open to light traffic for nine months a year. From the end of this wagon road it is necessary to go on foot or horseback the remaining two miles. This includes a climb of 2,000 vertical feet over the range.

On the eastern slope, there is a tramway connecting the mine to the C.&S.R.R. at Leavick. There is also a wagon road from Fairplay to the mine, which was formerly used to haul ore, and it is still in fair condition. All ore is shipped by this route and all supplies brought in by way of Leavick, although passengers usually come by way of Leadville.

Labor is abundant most of the year, because of the character of accommodations set at the mine. Many miners prefer to live here rather than walk or drive four or five miles to work in Leadville.

The scale of wages is $3.00 for eight hours, and the men are charged $28.00 a month for board and room.

Due to the eastern exposure and the velocity of the wind, there is very little snow here, compared to places of the same elevation along the range, or to similar mines in the San Juan.

There is no reason that this mine could not work the year around if the ore is taken away. It was worked all year formerly.

The railroad, however, objects to keeping the track open for a small tonnage.

The mine is well equipped, and although improvements could be made, there is sufficient equipment, and accommodations for men to handle 100 tons a day.

Mr. Berger gives the following as the production of the Chance-Hilltop Mine:

Previous to 1894 (estimated)	$1,750,000.00
1894 to 1904	950,000.00
1908 to 1910	201,565.00
1911	60,694.00
1912	14,080.00
Total	$2,976,339.00

Of the total production, $125,663.00 was from high-grade carbonate of zinc.

The remainder of the production was a siliceous lead, silver, oxide ore.

The ore occurs along fissures in the limestone. These fissures are of remarkable uniformity and persistence. The ore solution working along these fissures made caverns in the lime and deposited the ore in these caverns. The Chance Hilltop ore body was, roughly, 70 feet high, 40 feet wide and was mined for 1400 continuous feet.

Such is the peculiar hardness of this lime that the stopes are as open today as when they mined them. They do not require any timber to hold them open. The zinc ore that was shipped from here was gleaned from the walls of these old stopes, after they had been abandoned ten years.

At 1400 feet along its length the Chance Hilltop ore slip, encountered the Stewart ore slip, which has been mined about 600 feet each way from the intersection.

One hundred feet back along the Chance slip and parallel to the Stewart is the Lind slip, which had ore for 400 feet.

To the East of the Stewart slip, recent work has uncovered two previously unknown slips, which bid fair to equal the others mentioned. There is not enough work done on these slips to tell exactly how long they will be, and in this report they are only considered as prospects.

While working the Stewart stope a small streak of ore was left in the back of the stope as worthless. That is it was considered too narrow to mine at a profit. Recent raises driven along this streak have uncovered a similar and parallel ore body directly above it. It is in this body that I estimate there is enough ore to justify the price asked for the Lease, without considering the new prospects nor the gleanings along and below the old stopes.

I estimate that there are partially exposed along the back of the Stewart stope 16,000 tons of ore that will assay:

0.04	ozs.	Gold
18.0	"	Silver
7.0%		Lead

This estimate of the value is the average of 1000 tons of ore shipped from the back of this stope since last October.

I estimate the following costs and values from the results of the last few months work and from what I saw in two days:

Net smelter value	9.00	
Freight		2.00 to Salida
Royalties		0.40
Total Mining Cost		3.00
Net Profit		3.60 per ton

The highest valued lot shipped from this stope assayed 18 tons: 0.052 ozs. Gold; 22.8 ozs. Silver; 35.2% Lead.

The lowest was: 24 tons: 0.047 ozs. Gold; 10.84 ozs. Silver; No Lead.

On a basis of $4.35 a ton and 16,000 tons, there is sufficient ore to pay $69,000.00 profit, in the back of the Stewart stope alone.

The claims comprised in this option are owned entirely by three persons, namely Frank Trumbull, Samuel Cohen and Anna M. de Remer.

The option on the lease is signed by W. Fred Berger for the Chance Hilltop Mining Company, and is made out to S. P. Doran and R. B. Paul.

A copy of the essential papers, together with a claim map, a reduced drawing of the mine map and a section of the Stewart stope accompany this report.

Sincerely yours,

HUGH C. WATSON

Leadville Land Corporation
200 Forest & Cranmer Building
Denver 2, Colorado