

R E P O R T

on the

B L A C K C L O U D M I N E

Property of

THE BLACK CLOUD MINING & MILLING CORPORATION

MAGDALENA, SOCORRO COUNTY

NEW MEXICO.

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By

John F Duling
Consulting Mining Engineer,
Los Angeles, Calif.

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THE BLACK CLOUD MINE
Property of the
BLACK CLOUD MINING & MILLING CORPORATION

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FOREWORD

In the development of any mining project, two considerations are paramount to its success: The first is to find a property of merit, either in an attractive prospect, with favorable geological conditions for the formation of commercial ore bodies, a partially developed mine, or a fully developed property. The second is to outline a campaign of development commensurate with the merits of the property.

If the same degree of judgement is used in this matter as is ordinarily used in other lines of business, there is no reason why an equal degree of success cannot be expected, provided sufficient capital and competent management are provided.

Previous to the early nineties it was the custom to employ practical miners, with a limited knowledge of technical branches of mining and metallurgy, and with little or no previous executive or general business experience, as managers to operate mines. In many cases a wayward son or relative who had failed to make a success in other lines of business was placed in charge of a property pur-



BLACK CLOUD MILL

chased by eastern capitalists. As was to be expected this method of operating caused a very high percentage of failures and brought mining investment into disrepute.

Since that time technically trained men have been brought more and more into the management of properties, until today practically all of the successful properties are under the management of highly trained technical executives, assisted by large technical staffs. This condition has brought forth tremendous advances in operating methods and has completely revolutionized metallurgical practice.

Mines too low grade to be of value a few years ago are now being operated at a very satisfactory return on the investment under revolutionized methods.

However, the mining industry, because of the gambling spirit associated with it, has been and will continue to be a great sufferer from the lack of proper intelligence used in this direction. There are, and ever will be, many persons of no training and little or no experience in the business of mining, ready to enter the mining field. On account of the rather wide gap between this and other lines of business, coupled with the mysterious lure surrounding the industry and the lack of general knowledge of mining, many investors are ready to follow those would-be captains of the industry, and mining failures are sure to follow.

Herbert Hoover, in his book entitled "The Principles

of Mining", states that the mining industry, under proper conditions, is less precarious than the average of other lines of business.

In the Black Cloud, described in the following pages, we have a property that twenty years ago would only have been considered of minor importance, because the deep sulphide-lead-zinc ores were then complex and difficult of separation. If you shipped your ore to a lead smelter, you were penalized for the zinc content, and if you shipped to a zinc smelter you were not paid for the lead.

Through modern metallurgical development we can readily separate these metals by oil flotation at the mine and ship our zinc and lead to separate smelters.

Furthermore, it was originally impossible to concentrate the oxidized lower grade surface ores, and they were left unmined in the old properties. Today we are profitably concentrating and shipping these ores. Even under these early handicaps the mines of this district were very profitable.

Today the Black Cloud mine with its adjacent large holdings is the most attractive virgin property in the district.

LOCATION

The Black Cloud Mine is located three-quarters of a mile east of Camp Kelly, and some three and one-half miles southeast of the town of Magdalena, in the State of New

Mexico.

A branch railroad belonging to the Santa Fe System runs from the main line at the town of Socorro, through Magdalena to a point within two and one-half miles, by wagon road, of the mine.

Camp Kelly is a small village, but the town of Magdalena is of much more importance, being the supply point for quite a large mining, cattle and sheep raising section of western New Mexico.

The nearest lead smelter is located at El Paso, two hundred miles distant, although we are now shipping to the Phelps-Dodge smelter at Douglas, Arizona, because we were offered a better contract by them. El Paso is also a good supply point for mining machinery and supplies.

The Black Cloud Mining and Milling Corporation was incorporated in 1926 under the laws of Arizona, with a capitalization of 175,000 shares par value one dollar, and at that time had no option to purchase the Black Cloud Group of claims, consisting of four mining claims and one fraction. The original holdings were first increased to ten claims and by recent negotiations to twenty-three mining claims and fraction. Arrangements are now under way to increase the capitalization to 1,000,000 shares par value one dollar, including the entire holdings of the Mistletoe Mining Company and the

Magdalena Tunnel Company, totaling approximately 400 acres of mineral area.

The Black Cloud Group includes the following unpatented mining claims:

Black Cloud Lode
Black Cloud North Lode
Valley View No 2 Lode
Valley View No 3 Lode
Crystal Fraction

held under lease and option to purchase for a total purchase price of \$24,500.00.

The Mistletoe Mining Company and Magdalena Tunnel Company groups include the following patented mining claims:

Apex Lode	Survey No 1456
Enterprise Lode	Survey No 1456
Treasurer Lode	Survey No 1456
Last Chance Fraction Lode	Survey No 1456
Lion Lode	Survey No 1457
Helen Cross Lode	Survey No 862D
Jupiter Lode	Survey No 1457
Saturn Lode	Survey No 1457
Venus Lode	Survey No 1457
Mars Lode	Survey No 1457
Capricorn Lode	Survey No 1457
Utica No 1 Lode	Survey No 1457
Utica No 2 Lode	Survey No 1457
Utica No 3 Lode	Survey No 1457
Forester Lode	Survey No 862A
Forester Extension Lode	Survey No 862 B
Birthday Lode	Survey No 862C
Silverwave Lode	Survey No 862E

held under lease and option to purchase for a total purchase price of \$125,000.00 running until July 1st, 1933.

HISTORY

The following extract is taken from Professional Paper No 68, Reports of the U S Geological Survey dated 1910.

"The discovery of ore in the Magdalena Mountains is said to have been made in 1866 by Col J S Hutchason. The first claim to be staked out was the Juanita, and three weeks later the Graphic was located. The first ores to be mined were the 'sand carbonates', or lead ores, which were smelted in an adobe furnace, the product being hauled to Kansas City by ox teams. In 1881 Gustav Billings, then in control of the Kelly mine, erected a smelting plant at Socorro, where the product of the mine, as well as custom ore, was treated. This plant remained in operation until 1893. The Graphic smelter at Magdalena was built in 1896 and ran intermittently until the exhaustion of the red-lead ores.

"Between 1894 and 1902 the Kelly and Graphic mines were worked in a desultory fashion by lessees or owners. In 1903 C T Brown and J B Fitch, lessees of the Graphic mine, sent some smithsonite to Missouri, and the ore proved so satisfactory that more was asked for. Shortly afterwards the Shwerwin Williams Paint Company purchased the Graphic mine, and in 1904 the Kelly mine was sold by Mrs Billings to the Tri-Bullion Mining and Smelting Company. The production of the Kelly and Graphic mines up to that time is said to have been approximately \$5,800,000, and for the whole district the production is said to have been \$8,700,000. Brinsmade gives the figures of total production as \$6,600,000, of which the Kelly and Graphic mines yielded ninety per cent.

"The deeper workings have revealed and presence of large bodies of zinc blende along with galena and chalcopryrite. With the beginning of the utilization of zinc ores in Cordilleran States mining in the district revived, and it is now the chief zinc-producing district in New Mexico."

During the past ten years, practically all operations in the camp, with the exception of those of the Ozark Company, have been confined to leasing. The Ozark Company ordinarily employ 200 to 300 men, but are closed at the present time.

GEOLOGY

The geology of this district has been covered quite thoroughly in the before mentioned Professional Paper No 68 of the U S Geological Survey, and will be only briefly described here.

This district was originally covered with beds of carboniferous limestone to a thickness of more than 1000 feet, underlain by Pre-Cambrian greenstone schists and granite. In the uplifting of the Magdalena Mountains, these limestones were very much faulted. Along the western slope of these mountains, step faulting along north and south lines is ^avery prominent feature of the district, and is an easily discernible feature of the topography.

This was later followed by the intrusion of rhyolite dikes in the limestone, and extensive rhyolite flows to the west. Quartz monzonite porphyry and Andesite intrusions are also found in the district.

The lowermost bed of limestone, about 120 feet in thickness, locally called the Kelly limestone, is gray in color and has a coarse crystalline structure. About the center of this bed occurs a bed of fine gray limestone five feet in thickness, known as the Silver Pipe.

The principal ore bodies of the district occur along the west side of what is known as the Kelly fault, extending in an northerly and southerly direction along the west-

ern slope of the Magdalena range of mountains.

In practically all cases the ore is formed by the replacement of the crystalline limestone, sometimes near the top of the Kelly lime, but more often in contact with the impervious beds of Silver Pipe, and at times is found in contact with the greenstones.

It is generally conceded that the mineralization process was closely related to the greenstone limestone contact and to the porphyritic intrusion in the district.

The principal ores are lead and zinc, carrying some silver and in some places in the camp, copper has also been found in commercial quantities. In the upper workings, large bodies of carbonate ores were found, persisting in some cases to a depth of 300 feet. In this zone the lead and zinc ores are usually found in separated shoots, so placed by secondary concentration. In the deeper workings, the zinc and lead are found associated together in the sulphide ores.

The following paragraph is taken from a report on the district by Robert B Brinsmade, E M, and published in Volume 27, page 53, Mines and Minerals, 1906.

"Ores. The mineral profitable to ship, or 'pay ore' has varied, as in other camps, with changing prices for mining, transportation, and metals. The primary or sulphide ore, which has only been shipped since 1903, runs usually 12% Pb, 21 to 26% Zn, 15% Fe, 1 to 3% Cu, 1 to 5 ounces Ag, and 10% SiO₂, with a trace of gold. As a rule, the cerussite was shipped when going 20% lead, and the smithson-

ite now sent out is usually 25% zinc, or more. The copper in the oxides is often higher in the zinc than in the lead ores, but only locally does it exceed its tenor in the sulphides.

"The silver in the lead-oxide ores ran usually two to five ounces; the zinc oxides were often poorer. In the Juanita Mine quartz ore shipments from the west bed sometimes have fifteen to thirty ounces of Ag. The gold contents are small, seldom exceeding \$1 a ton in the commercial ore; occasionally some local concentration has raised the gold, as in a carload sent out from the Young America that assayed one ounce per ton."

In the Ozark, Juanita and Linchburg properties, the zinc ores predominate, while in the Kelly, South Juanita, Black Cloud and Young America, the principal values are in lead.

The principal ore bodies in the district have been developed along the west side of the Kelly fault.

In the Black Cloud mine, practically all the development work thus far has been along and to the east side of the Kelly fault.

There is a large intrusion of andesite and rhyolite contacting and tilting the lime on the west side of this property, a condition particularly favorable to the formation of ore deposits.

DISTRICT

The Magdalena mining district is situated in Socorro County and comprises a portion of the north end of the Magdalena Range, from which it takes its name. Included within its limits are the two towns of Magdalena and Kelly.

The former is located in the plain near the north side of the district, about twenty -six miles a little north of west from Socorro, with which it is connected by the Magdalena branch of the Atchison, Topeka and Santa Fe Railway. Kelly lies at the west foot of the western slope of the main range, about three miles southeast of Magdalena, and at an altitude of a thousand feet above that town. It is near the head of a narrow plain with steep but uniform slope that opens northward into the plain upon which the town of Magdalena is situated.

The principal mines are the Graphic (Ozark), Kelly, Juanita, South Juanita, Black Cloud, Mistletoe, Magdalena Tunnel, Linchburg, Young America, Germany, Nit and Hard-scrabble.

DEVELOPMENT

The principal workings on the Black Cloud are a fifty foot shaft located near the west line of the property, and a drift 800 feet in length extending southerly into the Magdalena Tunnel Company's property. The greater portion of this drift was in zinc ore and about 12 feet above this drift a lead stope 600 feet in length has been opened up and stoped. On the north end of the property a tunnel 440 feet in length and 200 feet below the upper workings has been driven to the south. This tunnel has followed along

the main fault line, but is situated east of the main ore zone.

A second tunnel 170 feet in length and 40 feet below the latter tunnel has also been driven in from the north end. This tunnel has developed a small shoot of ore, but the immediate vicinity is very much broken and faulted, and this development is not considered important.

On the Magdalena Tunnel Company's lease, 350 feet south of the Black Cloud shaft, there is a large open pit, from which a good grade of milling ore to a width of more than six or seven feet has been stoped. About 250 feet southerly from this pit in Tunnel No 8, a good grade of milling ore is exposed and opened up by a drift some 50 or 60 feet in length.

Still further south there is a cropping of milling grade ore over 200 feet in length, exposed in Shaft No 9, and Cut No 10. See Plate III.

Beginning at the loading bins at the head of the aerial tram and extending southerly for a distance of more than 300 feet, there is a promising cropping of oxidized ore exposed in Tunnel No 11 and Shaft No 12.

The mouth of Mistletoe or Mill tunnel is located about 1800 feet west and 650 feet below the main Black Cloud workings. It has a length of 1150 feet.

About 80 feet from the present face of the Mistletoe tunnel, a fault carrying a 4-foot quartz vein assaying 3.16%

lead, 3.9% zinc and 62¢ in gold and silver was encountered. There is a 100 foot raise on this vein and some 300 feet of drifting which is partially caved at this time. This vein looks promising, and it is believed that when this vein encounters the Silver Pipe limestone on the west side of this fault that it will open up into a large body of high grade sulphide ore. In fact it is reported that two cars of such ore were shipped from an old winze at this point now caved in and filled.

One other very important development is what is known as Skunk Tunnel, some 250 feet above the Mistletoe tunnel. There are 650 feet of workings at this point, consisting in the main of drifting along the upper contact of the Kelly line. A short cross-cut from these workings will cut the SilverPipe limestone and ore zone with very favorable indications that a commercial ore body will be encountered.

PRODUCTION

Previous to the taking over of these properties by this corporation, the Black Cloud mine had been operated by lessees under the direction of Mr Moore, a local mining engineer. Mr Moore reports that 21 cars of zinc ore were shipped from the property, averaging from 28% to 42-1/2%, and that 2500 tons of 14-1/2% lead ore were hauled to the old company mill near Magdalena.

The zinc ore brought from \$32.00 to \$47.70 per ton.

The total production under these leasing operations is said to have been \$60,000.

I was unable to obtain figures for the former production of the Mistletoe and Magdalena Tunnel Company's properties, but it is probably equal to that of the Black Cloud.

Development of the property by the present corporation began June, 1926. It was continued until February, 1927, at which time the erection of a mill was undertaken.

Since the erection of the mill the following smelter returns have been received.

June 18, 1927	\$ 786.35
July 7, 1927	784.07
Sep 10, 1927	1,362.31
Nov 1, 1927	1,387.20
28, 1927	1,093.38
Dec 6, 1927	1,652.43
12, 1927	1,794.50
15, 1927	1,635.68
30, 1927	1,385.00
Jan 20, 1928	1,391.27
28, 1928	1,750.37
Feb 4, 1928	1,533.72
9, 1928	1,478.10
9, 1928 (ore)	263.34
28, 1928	1,184.30
Mar 9, 1928	1,472.32
Aug 7, 1928	1,089.50
8, 1928	1,482.34
10, 19 28	1,096.77
13, 1928	1,316.08
23, 1928	1,162.01
25, 1928	1,153.64
Sep 4, 1928	1,590.45
27, 1928	1,640.87
Oct 12, 1928	1,699.80
17, 1928	1,806.35
19, 1928	1,969.07
TOTAL	<u>\$37,251.22</u>



OLD AERIAL TRAM



MISTLETOE PIT



BLACK CLOUD SHAFT



OPEN STOPE - BLACK CLOUD



ORE BIN AND MILL

VALUE OF ORE

In March, 1926, a rather extensive sampling of the Black Cloud workings for a length of ore shoot of 460 feet, was made at intervals of 20 feet.

This sampling gave an average of 11.43% lead and \$2.31 in gold and silver, and should have an average when mined of approximately 20% less than this, or about 9.1% lead.

The deeper workings average, as shown in B samples, gave 13.45% lead and 2.64% gold and silver.

Samples B-10 and B-11, taken from the bottom of the winze, the deepest workings in the Black Cloud, ran 17.56% and 17.65% lead, indicating an improvement of the grade of the ore as a greater depth is attained.

The average mill head ran somewhat lower than the underground assays indicate, due probably to the mixing in a considerable amount of open pit ore which it was impossible to mine as clean as the underground ores.

The following is the monthly average of the mill heads and tons milled for 1928 operations:

January, 1928	-	1580 tons milled	-	heads 8.2% lead.
February	"	550 tons milled	-	heads 9.0% lead.
July	"	1275 tons milled	-	heads 7.7% lead.
August	"	920 tons milled	-	heads 7.3% lead.
September	"	1144 tons milled	-	heads 7.8% lead.

Owing to lack of funds to push development and keep a large tonnage of ore opened up in advance of the needs of the mill, we were unable to keep up the grade of the ore by selective mining. The bulk of the ore mined from July to September was from open pit surface ores running lower in grade than it is reasonable to expect from the deeper working.

It is believed that by further development of the deeper ores that by mixing the better grade oxide ore with the open pit ore that a mill heads average can be arrived at, maintained at 8% to 9% lead.

The value of the sulphide ore to be expected in the deeper workings is difficult to predict, as this ore is yet undeveloped. It is said two cars shipped from the old winze, now filled in, below the Mill tunnel, ran 45% in combined lead and zinc.

Sulphide ore mined in the South Juanita by Mr Walker from the Juanita adjoining this property on the north ran approximately 25% lead and zinc combined.

In Brinsmade's report on the district previously quoted, he states that the average of the sulphide ore ran 12% lead and 21% to 26% zinc. It is reasonable to expect that the sulphide ores from the Black Cloud mine will equal this figure.

ORE RESERVES

On taking over the property in June, 1926, a small

crew was put on spending about two and a half months cleaning out and prospecting lower workings through the Mill tunnel. This work was then suspended, and five months with a small crew of men were spent in opening up the surface ores.

A mill was then erected and the concentration of the milling ore began. Unforeseen difficulties arose in perfecting the mill process, covered more fully later in this report, which required all capital available in perfecting plant and milling process, so that no funds were available to continue the development program.

During this experimental period, the mill was operated eight months, and some 8,000 tons of fully blocked ore was mined. This work exhausted the blocked ore opened up and fully prepared for mining.

The ore in the Black Cloud stopes is exposed on the lower side or floor for a length of 400 feet. This ore has been penetrated to a depth of 50 feet by winze and can reasonably be expected to be continuous for that distance. This would come under the class of probable ore, or ore in sight, and the tonnage is estimated as follows:

$$\frac{400 \times 50 \times 3-1/2}{13} = 5,500 \text{ tons.}$$

This ore is estimated as averaging the same as B samples, 13.45% lead and \$2.69 gold and silver, total assay value at 6-1/2% lead \$20.18 per ton.

5,500 tons at \$20.18 per ton = \$111,000.

There is also a partially developed shoot of ore some 300 feet or more in length as exposed by croppings and opened up in Shaft No 9, assaying 8.1% lead, and in Cut No 10, assaying 12.6% lead, in addition to gold and silver values.

Another shoot is opened up and exposed in Tunnel No 8, where in one place thickness of more than 20 feet of mill ore is exposed. There is a drift 50 or 60 feet in length in ore at this point. No samples were taken, but ore has been shipped from these workings.

A third shoot, assaying from 6.65% to 8.76% lead, is exposed in Shaft No 12 and Tunnel No 11, as well as by croppings for a distance of 250 feet.

It is estimated that the probable ore reserve in these last ore shoots would amount to more than double that of the Black Cloud shoot, and make the value of the probable ore reserve in excess of \$300,000.

As to prospective ore, it is reasonable to anticipate, based upon the history and geology of the district, that these ore bodies will extend to great depth, and that a life for this property of more than twenty years may be reasonably expected.

CONCLUSIONS

The Black Cloud Mine herein described comprises a large holding of virgin mining ground laying on the main min-

eralized belt of the district with proven commercial properties on either side.

Outside of the Kelly, Ozark and northern portion of the Juanita properties, this property has the best geological indications favorable to extensive ore deposits of any other property in the district.

There has already been opened and mined near the surface a continuous shoot of ore 600 feet in length. This same ore belt while somewhat displaced by faulting is traceable by extensive cropping of ore which has been opened up by occasional shafts, tunnels and cuts for a further distance of 900 feet, making a distance of 1500 feet along the vein or mineral belt of more or less continuous ore.

This same mineral belt has been extensively worked a quarter mile further south in the Young America property, and a large tonnage of sulphide ore developed in its deeper workings through the Linchburg Tunnel. The South Juanita and Juanita adjoining the property on the north has had a large production.

Development in the district has proven beyond doubt that these ores are deep seated and that the deeper sulphide ores will be of better grade in that they carry both lead and zinc, as well as a small amount of gold and silver, whereas in the surface ores the zinc has been largely leached out.

The property being two miles from the railroad and 200 miles from the nearest lead smelter, and located in a cattle and sheep raising district, gives ideal conditions

for low cost mining and milling operation.

The nearness of the oxide ores to the surface, together with the steepness of the mountain side, allows much open pit and tunnel mining, both of which are favorable to low cost operation.

Results already obtained in the small amount of mining already done demonstrate that our lower grade ores can be mined at an attractive profit.

The deep sulphide ores, which there is every reason to believe will be much higher in value, are yet to be developed.

It is my opinion that this property, with the expenditure of a suitable amount of capital in a carefully planned development campaign, will develop into a mine of unusual merit, and that it will be a profitable producer for many years to come.

MILLING PROCESS

To determine the best method of treating oxidized ores large samples, representing the various classes of mill ore to be found in the mine and on the dumps were taken to the testing plant of the Southwestern Engineering Co, at Culver City, California, and a series of concentrating tests made.

This ore is chiefly cerussite, in a quartz gangue with some unaltered galena and a small amount of iron oxides. Anglesite is found occasionally in minor amounts. Owing to

the difficulties involved in sulphidizing and floating lead carbonate ores, it was decided to combine table concentration with flotation. With this in view samples were ground to pass 20 mesh and passed over a Wilfley table. Tailing and middling from this operation were then reground to pass 30 mesh and re-tabled, the tailing and middling from this second operation being then reground to pass 80 mesh and sent to flotation. This test was intended to approximate the operation of a ball mill in circuit with a rake classifier delivering minus 20 mesh product to tables and returning table middling and sand tailing to the ball mill for regrinding, with the table slime sent to flotation. The following tabulation gives the results of these tests:

HEAD ASSAYS

<u>Sample No</u>	<u>Gold Oz</u>	<u>Silver Oz</u>	<u>Lead %</u>
1 - Dump.....	0.02	3.2	11.2
2 - Mine average.....	0.03	5.0	16.3
3 - Mistletoe (red Ore)	0.06	3.4	15.4
4 - Yellow ore.....	0.02	2.6	13.7

TOTAL RECOVERY

<u>Sample No</u>	<u>Gold %</u>	<u>Silver %</u>	<u>Lead %</u>
1 -	52.2	77.8	94.0
2 -	42.4	81.2	90.0
3 -	72.1	87.9	92.9
4 -	88.1	81.3	89.8

The average recovery for the four tests was 91.7 per cent of the lead content, 73.9 per cent being saved on the tables and 17.8 per cent by flotation.

TAILING ASSAYS

<u>Sample No</u>	<u>Gold</u>	<u>Silver Oz</u>	<u>Lead %</u>
1 -	Trace	1.0	0.9
2 -	Trace	1.0	1.2
3 -	0.01 oz	0.4	1.1
4 -	Trace	0.6	0.9

The flotation middlings, averaging 6.65 per cent of the total feed, gave an average assay of 5.32 per cent lead. In actual practice these middlings are turned to the ball mill for regrinding.

In view of the high table recovery it was decided to make certain tests with the object of avoiding the necessity of regrinding all of the tailing after tabling, and also to lower the cost of reagents by reducing the tonnage sent to flotation. With this in view, tests were run on Sample No 2 by first grinding to pass 20 mesh, tabling and cutting out a sand tailing to waste. In this test 50 per cent of the total feed was discarded as a table tailing after desliming. The middlings were then reground as before and sent to flotation together with the dewatered slime.

The following tables give a comparison of the recoveries obtained, first by regrinding all the table discard and sending it to flotation, and second by cutting a table tailing to waste:

RECOVERIES FROM SAMPLE NO 2

	<u>Gold %</u>	<u>Silver %</u>	<u>Lead %</u>
First test: All table discard to flotation.....	42.4	81.2	90.0
Second test: 1/2 table discard to waste, remainder to flotation.....	59.0	76.4	87.2

TAILING ASSAYS, SAMPLE NO 2

	<u>Gold</u>	<u>Silver, oz</u>	<u>Lead %</u>
First Test:.....	Trace	1.0	1.2
Second Test: Table Tails	Trace	1.0	1.9
Flotation Tails	Trace	2.2	2.6

Reagents used in the above tests were sodium, sulphide, P E oil, xanthate and Yarmour pine oil. The combined tailing in this latter test was made up of two-thirds table and one-third flotation product, with an average assay of 2.13 per cent lead. This showed an increase of 0.93 per cent in lead content over the first test.

A careful analysis of the tests indicated that in the last named experiment a saving of 33-1/3% of the cost of grinding and 66-2/3% saving in flotation reagents would be made by adopting the last mentioned method of treatment. These savings in a plant of this size overbalance the increased tailing loss.

ORIGINAL FLOW SHEET

After further checking it was decided to adopt a flow sheet based upon the second test. The percentage of saving made by tabling being very high, it was deemed advisable to develop this portion of the plan to the maximum efficiency. Tests indicate that this could best be accomplished by a granular crushing to minus 15 mesh, by avoiding sliming,

and by classifying the table feed. A flow sheet embodying this plan was adopted for the first unit of the plan.

A jaw crusher is used to crush the mine-run ore to pass a one inch grizzly. The crusher product is fed directly to a 5 x 4 March ball mill in circuit with a Dorr rake classifier. The rake classifier overflow with a dilution of one to one is fed directly into a Fahrenwald hydraulic classifier, in order to classify the table feed and separate the slime for flotation. With a deslimed classified table feed, maximum table efficiency can be maintained, insuring minimum tailing loss.

Electrically driven Diester Plat-O sand tables are being used for table concentration. Middling from the sand table is returned by a bucket elevator to the ball mill circuit.

The slime from the Fahrenwald classifier was conveyed by a launder to a 5-ft agitator, where the sulphidizing of the lead carbonates takes place. Only a short time of contact is required for this purpose before sending to flotation. From the agitator the slime is passed to a four-cell Kraut flotation machine. A concentrate is taken from the first two cells of this machine. The middling from the last two cells is elevated by a 7-ft sand-wheel elevator and returned to the head of the machine, making a very satisfactory closed circuit. Approximately twenty-five tons is sent to flotation in the first unit.

The reagents selected after suitable tests as being best adapted to the Kraut machine with this ore were:

<u>Reagent</u>	<u>Pounds per ton ore</u>	<u>Reagent</u>	<u>Pounds per ton ore</u>
Sodium sulphide	5.0	T & T mixture.....	0.05
Xanthate-----	0.12	Yarmour pine oil.....	0.10

Flotation concentrate from the first unit passes into horizontal settling launders measuring 2 ft wide and 20 ft in length. This concentrate was shoveled from these launders onto a concrete drying floor, which is heated by passing the hot circulating water from the engine through a pipe grid embedded in the concrete that composes the floor.

PRESENT FLOW SHEET

Difficulties arose with the original flow sheet. First, in actual milling the percentage of slime became so large that it clogged the automatic valves of the Fahrenwald classifier, which was later replaced by a Dorr rake classifier.

This latter change proved unsatisfactory because the lead minerals were softer than the gangue, hence the principal values in lead went into the slimes.

Since the slimes went direct to flotation it overloaded the present flotation equipment, and the tailing loss became excessive and the grade of flotation concentrate low. Better results were obtained by crushing to

approximately 30 mesh and sending discharge from the rake classifier direct to the tables, returning the table middlings to the ball mill for regrinding, and all of the tailings to flotation.

A thickener and filter equipment have since been added for the purpose of dewatering the flotation concentrates.

During the first twenty days in September, 1,144 tons were milled.

Mill heads.....average.....	7.8% lead
Mill tailing.....average.....	2.1% lead
Mill concentrates.....average.....	55.3% lead
Mill recovery.....average.....	78.0% lead

At the beginning of operation at the mill recoveries were scarcely over fifty per cent. This has been increased to the above figure.

Shortage of water this season reduced the capacity of the mill to 57 tons daily average and lowered the percentage of recovery.

Most of the present losses are due to lack of sufficient flotation equipment.

The addition of additional flotation equipment, a small regrinding unit and more water should easily increase our percentage recovery ten per cent and bring plant up to full capacity.

It is now planned to make these changes and also to

prepare the mill so that it may alternately treat sulphide or oxidized ores. Treatment of the sulphides to be by differential flotation, concentrating and separating the lead and zinc. The lead product to be sold to a lead smelter and the zinc to a zinc plant.

WATER SUPPLY

The present water supply for the mill is taken under lease from the Linchburg Tunnel three quarters of a mile south of the mill.

At the time of installation of the water system this flow amounted to 20 gallons per minute, but during the last summer season, a very dry year all over New Mexico, this flow decreased to 12 gallons per minute.

The mill tunnel at the mine is practically at water level, in fact has a very small flow of water. It is believed that the development work now planned in sinking below the level of this tunnel will produce an ample additional supply of water for milling purposes.

There is a spring in Patterson Canyon producing about 5 gallons of water per minute that can be piped to this property by gravity should this latter supply prove insufficient.

By the installation of a large thickener below the mill much of the mill water can be recovered and returned for use in the mill. With these additional sources of water



MILL, AND AERIAL TRAM
TO MINE



SO JUANITA MINE
ADJOINING BLACK CLOUD



MILL TUNNEL - MISTLETOE MINE



MILL CONSTRUCTION CREW



OLD MISTLETOE WORKINGS

available, there is an ample supply assured for all purposes.

PLANT AND EQUIPMENT

The present plan, in addition to a 75-ton mill, includes the power and mine compressor units.

The buildings include a large mill building and engine room combined, and a two room office and assay office building. At the upper working of the mine, a blacksmith shop has been constructed.

The mill machinery includes:

- 1 - 9 x 15 jaw crusher.
- 1 - 5 x 4 Marcy Ball Mill
- 2 - Model C Dorr rake classifiers.
- 3 - Diester Plate-O motor driven concentrating tables.
- 1 - 4-cell Kraut flotation machine, motor driven.
- 1 - 10-foot Dorr thickener.
- 1 - American filter, complete.
- 1 - Belt elevator.
- 1 - 26 KVA Generator, together with miscellaneous pumping equipment, etc.

The power unit:

- 1 - 200 H P Fairbanks-Morse Y type semi-Diesel engine.

Compressor:

- 1 - Sullivan two stage compressor, 8 drill capacity.
- 1 - Chicago Pneumatic portable gasoline compressor

3 drill capacity.

2000' of 4" compressed air pipe line to mine.

Water system includes:

4400' of 3" and 2-1/2" pipe line.

1 - 10,000 gallon storage tank.

2 - 5,000 gallon storage tanks.

Blacksmith shop equipped with drill sharpener,
miscellaneous tools and equipment.

Aerial tramway:

1600' length.

2 - Bucket reversible type, with loading and receiving ore bins.

Mine equipment includes:

5 mine cars.

2 - machine drills, together with a large quantity of rail, pipe, steel, miscellaneous small tools and equipment.

Assay office, fully equipped, including button, analytical and pulp balances, assay furnaces, grinding and chemical equipment.

MINING, MILLING AND SMELTING COSTS

Mining costs are lower in New Mexico than in either Arizona or California. The following are standard wages for this district.

Machine miners	\$4.00	per day	
Muckers	3.00	"	"
Blacksmith	4.00	"	"
Stationary Engineer	5.00	"	"
Mill men	4.00	"	"
Mill foreman	6.00	"	"

Mining cost per ton of ore mined, for the month of September, 1928, which is considered a fair working average, ran as follows:

Actual mining:

Breaking ore	1.59	per ton	
Explosives	.32	"	"
Compressed air	.07	"	"
Timbering	.01	"	"
Tramming	.13	"	"

<u>Development:</u>	.06	"	"
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Overhead:

Superintendence	.11	"	"
Office	.07	"	"
Assaying	.03	"	"
Liability insurance	.07	"	"
Miscellaneous	.02	"	"

TOTAL	\$2.48	"	"
-------	--------	---	---

Practically no development was done during this period, and it is estimated that an allowance of 50 cents per ton should be made to cover this item, making total cost of \$3.00 per ton for mining.

The milling cost for the same period ran as follows:

Actual Milling:

Labor	\$0.80	per ton	
Supplies	.31	"	"
Power	.47	"	"
Chemicals	.49	"	"
Repairs	.04	"	"
Transportation of concentrates to railroad	.16	"	"

Overhead:

Superintendence	\$0.11	per ton
Office	.07	" "
Assaying	.10	" "
Miscellaneous	.10	" "
Total milling and transportation to railroad	\$2.65	" "

The overheads in these cases include all salaries for full month, whereas the mill ran only twenty days at three-fourths capacity. With increased water supply and an additional grinding unit, this cost will be reduced at least 40 cents per ton of ore for labor and overhead alone, leaving a cost per ton of \$2.25. The cost of chemicals and grinding balls can be further reduced by more advantageous buying.

Also a further saving in transportation can be made by buying and operating our own trucks instead of contracting our hauling.

Under our present smelter contract with the Phelps-Dodge Corporation at Douglas, Arizona, they pay us for 95% of lead content of concentrates at a price of 1-1/4 cents per pound of lead below New York quotations.

The smelting charges for September ran as follows:

Smelting	\$3.75	per ton concentrate.
R R freight	4.80	" " "

This gave the following results per ton of ore:

Smelting	\$0.66	per ton ore
R R freight	.46	" " "

Total smelter and freight charge	\$1.02	" " "
----------------------------------	--------	-------

The estimated combined cost per ton of mill ore running plant full capacity is as follows:

Mining	\$3.00
Milling	2.15
Smelting	<u>1.02</u>
Total Cost	\$6.17

Compared with cost of operating in other districts there are very favorable figures.

ASSETS

The appraisal of a mine such as the Black Cloud which is yet largely undeveloped and almost entirely virgin, is difficult to make. To quote again from Herbert Hoover's "Principles of Mining":

"No engineer can approach the prospective value of a mine with optimism, yet the mining industry would be non-existent today were it approached with pessimism."

From the standpoint of safety of investment, lead is one of the most satisfactory metals to mine, in that its deposits are so constant and dependable, whereas gold is spasmodic in occurrence and uncertain. A good lead mine once opened up can be depended upon for a long life.

In the appraisal of the Black Cloud mine, the following factors should be taken into consideration. This property is located on a mineralized zone more than three miles in length, in which every property on the main belt has been a producer.

The ore showings on the Black Cloud mine are very

extensive in the limited mine workings already completed. The geological conditions favoring the formation of large ore deposits are more favorable than in many of the other producing properties of the district. The development of the adjoining properties has proven beyond doubt that the Black Cloud mine can be expected to become a large producer when intelligently developed.

The assets will be listed as follows:

1. Appraisal of those mine workings of value in the future development of this property.
2. Value of plant and equipment.
3. Value of ore reserves.
4. Prospective future value of property.

Mine workings:

Mill tunnel	1700	feet	of	workings
Skunk tunnel	600	"	"	"
No 4 tunnel	250	"	"	"
Main Black Cloud drift	700	"	"	"
No 5 tunnel	100	"	"	"
No 8 tunnel	100	"	"	"
	<u>3450</u>			
Total	3450	"	"	"

Value, 3450 feet at \$12	\$41,400
Miscellaneous small workings	<u>8,600</u>

Total value	\$50,000
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Value of Plant and Equipment:

Mill and power and compressor plant	\$75,000	
Water system	2,500	
Compressed air line to mine	1,500	
Aerial tramway	5,000	
Assay office and equipment	1,500	
Blacksmith shop and equipment	1,000	
Miscellaneous cars, rail, machine drills, steel, etc.	<u>3,500</u>	90,000

Value of Ore Reserves:

The estimated value of the probable ore or ore in site as previously discussed	\$300,000
Total physical assets	\$440,000

Prospective future value of mine:

Under the head of operating cost, the yearly production of the property when in full operation is estimated to be \$248,000 per annum. Using this as a basis and allowing a ten per cent return on the investment and the amortization of capital in ten years with Hoover's factor we have $248,000 \times 5.45 = \$1,350,000$ as prospective value of the property.

This appraisal indicates that the proposed increase in capitalization to one million shares par value one dollar is fully justified.

It is my opinion that an extensive development of the property will greatly increase this value. The property is so large that it is scarcely scratched by the work thus far accomplished.

PROSPECTIVE PLAN OF DEVELOPMENT

In order to develop a large ore reserve insuring a continuous operation of the milling plant and assure the success of the property in the shortest possible time, it is recommended that the following development program be

undertaken at once.

1. The development of the deeper sulphide ore bodies.

Sink proposed shaft in Mistletoe or Mill tunnel as shown on Plate IV of Maps to the ore zone and drift 400 feet together with raises on ore, totaling 950 feet of workings.

Open Skunk tunnel and crosscut to ore zone and drift. If development proved advisable, connect by raise with Mistletoe Tunnel workings estimated 700 feet of underground workings.

2. Development of oxidized or surface bodies.

Continue drifting in No 4 tunnel for a distance of 300 feet under Black Cloud workings, including raises and intermediate drifts, total 900 feet of underground workings.

Develop surface ore bodies first by testing and sampling with machine and churn drilling from surface and then by opening up by tunnels and open pits and the installation of a suitable haulage system.

The following additions to the mill are necessary in order to insure the success of the operations.

1. To provide an additional water supply, a small regrinding unit, and an increase in the flotation equipment.

2. Additional mill equipment to provide for the treatment of sulphide ores which require a slight change

in treatment in order to recover both zinc and lead, whereas we recover lead only from the oxidized ores.

3. An additional power unit will be required in order to provide power for hoisting ores below the level of the mill tunnel. The following is an estimate of the funds required for all purposes:

1. Development of deeper sulphide ore bodies:

<u>Mill Tunnel</u>	- 950 feet of underground workings with required equipment	\$20,000
<u>Skunk Tunnel</u>	- 700 feet of underground workings	9,000

2. Development of oxidized or surface ores:

<u>No 4 Tunnel</u>	- 900 feet of underground workings	11,000
General Development of Magdalena Tunnel Company property		10,000

3. Additions to the mill for treatment of oxidized ores	15,000
Additions to the mill for treatment of sulphidized ores	15,000
Additional power unit 120 H P	10,000
Debts, payments on property and contingencies	<u>10,000</u>
TOTAL	<u>\$100,000</u>

With those funds available the property can easily but put on a dividend basis and will meet all property payments in addition.

It is estimated that with this amount of money

spent in developing the property that an ore reserve will be developed sufficient to supply the mill running full capacity for a period of five years or more.

This reserve to be then maintained thereafter by applying a small proportion of the monthly income to development work.

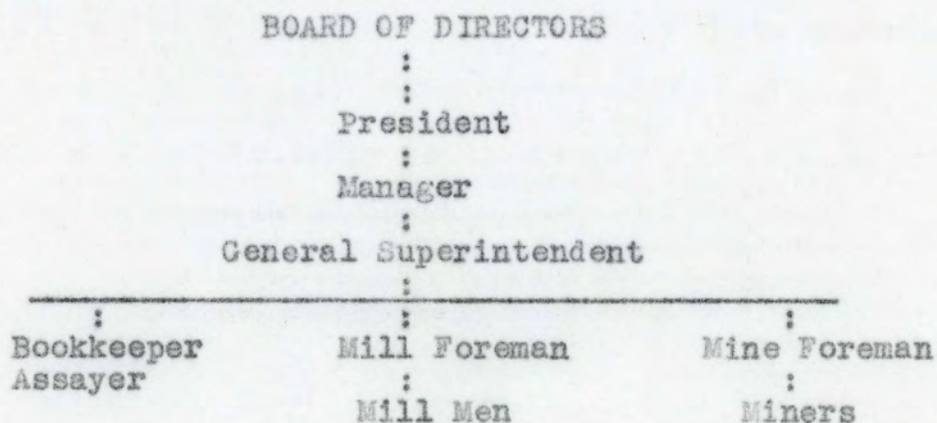
The above program to be carefully worked out after a further detailed geological study of the surface and underground workings have been made.

ORGANIZATION

In operating this property about twenty-five to thirty men are required when doing development work only, and forty to fifty men when the mill and mine are both operating.

In operation on this scale care must be used in order not to make the overhead expense too heavy in proportion to the size of the property.

The usual organization for a property of the size of the Black Cloud Mine is as follows:



The general superintendent should be a practical man of mature judgement and long mining and milling experience. He should be competent to select and manage men, also to purchase supplies and take active charge of all working operation on the property. He has absolute authority to hire and fire all men under him and is responsible to the manager only.

The manager should be, in addition to having the practical knowledge of the superintendent, a technically trained mining engineer, competent in laying out a development campaign conforming to geological indications of ore deposits on the property and the designing and working out of suitable mining and milling plants and processes of milling the ores mined.

As a competent manager of this type usually commands a high salary, it is not unusual in small properties, in order to save expense and at the same time acquire the best technical ability, to employ a consulting mining engineer to fill this position, giving as much intermittent time as may be required to the job.

The president's duties are largely in the financial direction of the property, and may or may not be a salaried position, according to the duties required, the size of the property and particularly as to whether the mine is on production or in a stage of development.

OPERATING COSTS AND PROFITS

As an example of past operations from September 1st to 20th, 1928, 1,144 tons were milled with the following returns:

Smelter return from concentrates.....	\$7,116.09
Mining and Milling Cost.....	<u>5,890.48</u>
Net return for twenty days.....	\$1,225.61
Monthly rate of return.....	\$1,838.40

This is on the basis of 57.2 tons milled daily.

The present plan with an increased water supply, the addition of a small regrinding unit and increased flotation equipment can be expected to handle 75 tons daily for an average of 24 days per month, or a monthly tonnage $24 \times 75 \text{ tons} = 1,800 \text{ tons}$.

This will increase capacity of the mill 24%, and the percentage of lead recovery at least 10%, with no additional labor cost in milling. Thus, our gross income, using September operations as a basis, would be as follows:

Gross monthly rate income for Sept.	\$10,674.13
Tonnage increase 24%	<u>2,561.79</u>
	\$13,235.92
Increased recoveries 10%	<u>1,323.59</u>
Total income	\$14,559.51

Present monthly cost	\$8,835.72
Additional mining cost	1,206.92
" milling "	<u>572.00</u>
	10,614.64

Net monthly return	\$ 3,944.87
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or an annual return of $3,945 \times 12 =$	\$47,338.00
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These results are considered minimum returns because the grade of ore was low, averaging 7.8% for this period, whereas the grade of ore during operation in January and February averaged practically 9%, also the price of lead at this time was practically at the bottom of the market,

6.2 cents per pound, whereas lead is now 6.65 cents per pound, and 8 cent lead is predicted for the near future, on high authority (President of St Joe Lead Products Co).

It is my opinion that with the new development campaign now proposed we can develop enough better grade ore to keep our mill heads from 8% to 9% lead from the low grade oxidized ores. This, together with the present price of lead will increase our yearly income approximately \$20,000, making the gross income for the low grade ore under the new plan, say \$65,000 per year.

Under the present program to develop the higher grade or sulphide ore, they will become available for milling in about nine months from the time of starting the development work. These ores can be expected to produce the following revenues:

Estimated average mill ore - 12% lead, 21% zinc.

12% lead, value per ton at 6.65 cents per lb	\$15.96
21% zinc, " " " 6.35 " " "	26.67
Gold and silver	<u>2.40</u>
Total assay value	\$44.03
Mill loss 10% on sulphide ores	<u>4.40</u>
	\$39.63
Smelter loss 5%	<u>1.98</u>
	\$37.65
Smelter deduction 20%	<u>7.53</u>
	\$30.12
Operating cost:	
Mining	\$3.00
Milling	2.15
Smelter and freight	<u>4.85</u>
	<u>10.00</u>
Estimated profit per ton	\$20.12

Estimated monthly profit on sulphide ores:

1800 tons at \$20 = \$36,000.

It is expected that enough sulphide ore can be developed to keep the mill operating at least one-half time on ore of this grade. The estimated yearly income from the present 75-ton plant after the sulphide ores become available would be:

Sulphide ore: 6 months at \$36,000	\$216,000
Oxidized ore: 6 months at \$ 5,400	<u>32,400</u>
Estimated yearly income	\$248,400

METAL PRICES, SOURCES AND USES

Metal prices slumped and hit the bottom of the market in July 1927, but last summer began an upward climb led by copper.

The following is a list of prices of the three principal metals in cents per pound covering the period of 1923 to date at six months intervals, taken from the quoted prices in the Engineering and Mining Journal:

	<u>COPPER</u>	<u>LEAD</u>	<u>ZINC</u>
1923			
Jan 1st	14.50	7.25	6.90
July	14.25	6.85	5.75
1924			
Jan	12.75	7.60	6.27
July	12.05	7.00	5.80
1925			
Jan	14.625	9.70	7.65
July	13.375	8.20	6.95

	<u>COPPER</u>	<u>LEAD</u>	<u>ZINC</u>
1926			
Jan	13.90	9.25	8.40
July	13.625	8.25	7.175
1927			
Jan	13.275	7.75	7.65
July	12.275	6.40	6.20
1928			
Jan	13.85	6.50	5.65
July	14.525	6.30	6.20
1929			
Jan	16.50	6.65	6.35

A price of 6 cents per pound is considered absolute minimum on lead, as many mines in this country have to close their properties at this price, not being able to produce lead at a profit.

It is predicted by the President of the St. Joe Lead Products Co that lead will reach a price of 8 cents per pound before January 1, 1930.

The present import duty on lead is 1-1/2¢ per pound, and pressure is being brought by producers to increase this rate at the coming readjustment of the tariff rates. The lead producers, particularly of the Missouri and Kansas fields, the largest producers in the United States, have suffered heavy losses due to the low price of lead in the past two years, because their ores are very low grade, averaging only about 3-1/2% lead with no gold or silver content, whereas the Magdalena ores run from 7% to 15% and 20% lead, and contain some gold and silver.

The United States, Australia, Spain, Germany and

Mexico produce 30% of the world's supply. The United States controls over 45% of the world's lead production.

The uses of lead previous to the war were 38% used in pigments, 30% used in alloys other than shot; 15% in pipe, 10% in shot and 7% in all other uses. Today the quantity used in automobile batteries has become a large factor in the market.

The consumption of lead in the United States is in excess of the production. As to zinc, the United States produces about one-third of the world's production, with Germany and Australia as the next largest producers. The United States has about forty per cent of the zinc smelting capacity of the world.

Of the zinc consumed in this country about sixty per cent is used in galvanizing iron and steel, 20% in the manufacture of brass and other alloys, 11% goes into sheet zinc roofing, plumbing, etc, and about 8% in pigments.

The future prospects for better prices, as well as a growing demand for lead, are especially good today, and good lead mines are now much in demand, being considered exceptionally attractive investments.

MAPS

Plate I is a map of the Magdalena Mining District showing the relative location of the Black Cloud Mining and Milling Corporation holdings in respect to the princi-

cipal properties of the district.

Plate II is a map of the mining claims included in the Black Cloud Group.

Plate III is a plan of the principal mine workings, showing proposed new development.

Plate IV is a geological section through the mine workings showing ore zone.

Plate V is an Assay Map of the Black Cloud main drift taken before this level was stoped out.

RESUME

In the mining business mines are grouped in three classes, depending upon the stage of development they have reached.

1.- A prospect in which the value of the mine is judged entirely by the geological conditions favorable to the foundation of ore deposits. In this case, the first money invested in the development of the property is entirely speculative, and the value of the property entirely prospective.

2.- A partially developed mine in which the former prospect has been proved to be a commercial mine. First, by the opening up of commercial ore bodies within its own boundaries, and second, by the development of adjoining properties into commercial mines.

The prospect has then become a mine with a certainty of a sufficient life as a working mine to return any reason-

able investment of capital with an attractive earning, but the length of life or full size and earning power of the property has not been demonstrated.

The mine at this stage is the most attractive investment, because in the first place it has a safe margin of profit for the money invested, and second, it still has a large speculative value in addition to this safety.

The Black Cloud mine is now in the second class at a period where the shares in the mine may still be purchased for a very reasonable value, and include safety with a large speculative value.

3. The third class is a fully developed mine in full production and with a large ore reserve blocked out, insuring a definite ore supply for its plant for many years to come. In this case the value of the mine has reached the maximum and the shares of stock have likewise advanced to their full value.

The Black Cloud mine from the point of view of the investor has now reached its most attractive stage.

Yours very truly,

Consulting Mining Engineer.

Los Angeles, Calif.

July 1, 1929.

SAMPLES TAKEN FROM
THE BLACK CLOUD MINE
KELLY, NEW MEXICO.

Taken by
John F. Duling
April 1926

Assay No	Width	% Lead	Gold Value	Silver Value
A-1	3.1	10.71		
A-2	3.3	14.05		
A-3	2.4	18.26		
A-4	3.8	13.87		
A-5	5.0	16.51	\$0.83	\$2.07
A-6	4.0	14.05		
A-7	5.0	13.26		
A-8	2.5	16.51		
A-9	3.0	6.06		
A-10	3.2	13.26	\$0.41	\$1.60
A-11	3.4 ?	16.68		
A-12	2.0	9.83		
A-13	5.5	8.25		
A-15	5.0 ?	7.73	\$0.41	\$1.18
A-16	5.2	17.82		
A-17	6.0	15.19		
A-18	4.0	3.60		
A-19	12.0	10.45		
A-20	8.0	8.69	\$0.41	\$1.81
A-21	8.0	8.60		
A-22	5.0	7.02		
A-23	5.5	10.71		

Average value of A samples in gold, silver and lead, at smelter prices - \$17.26 per ton. Average width 4' 9".

B-1	3.0	5.88			
B-2	8.5	10.10			
B-3	3.5	23.35			
B-4	3.3	2.02			
B-5	2.5	13.17			
B-6	4.0	19.49			
B-7	3.5	15.72			
B-8	3.8	3.16			
B-9	2.75	26.34			
B-10	2.0	17.56	\$1.03	\$3.19	In winze
B-11	1.33	17.65			" "
B-12	3.7	14.05			" "
B-13	6.5	8.96			
B-14	6.5	20.63			
B-15	1.5	16.33			
B-16	2.0	7.73			

Average value of B samples in gold, silver and lead at smelter prices - \$20.18 per ton. Average width 3' 8".

M-1	3.5	3.16	\$0.21	\$0.41	Mill Tunnel
C-1	2.5 Exp	12.64	0.62	1.95	Cut No 10
C-2	5.0 "	8.11	0.41	2.89	Shaft No 9
D-1	6.0	6.60	Trace	0.59	Tunnel No 11
D-2	9.0	8.76	0.41	1.37	Tunnel No 11
D-3	7.0	6.65	1.03	1.40	Shaft No 12
D-4	2.0	10.39	0.83	0.49	Cropping

Magdalena, N. M.

MONTH OF September 1928

MONTHLY COSTS

Account Number	Name of Account	Labor	Cost Per Ton	Supplies	Cost Per Ton	Totals	Cost Per Ton	TOTALS---Jan. 1st to end including this month	Cost Per Ton
OPERATION									
1	Breaking	1738 00		83 51		1821 51			
2	Tramming	144 00				144 00			
3	Timbering	12 00				12 00			
4	Explosives			362 68					
5	Air	70 00		10 00		80 00			
6									
Total		1964 00		456 19		2420 19	2 11		
DEVELOPMENT									
7	Breaking	72 00				72 00			
8	Tramming								
9	Timbering								
10	Explosives								
11									
Total									
Total Mining Expense									
OVERHEAD									
12	Superintendence	125 00				125 00			
13	Office	75 00				75 00			
14	Engineering								
15	Assaying	37 50				37 50			
16	Miscellaneous			20 10		20 10			
17	Miscellaneous								
18	Royalty			83 33		83 33			
19	Liability Insurance								
20									
21									
22									
Total Overhead Expense		237 50		103 43		340 93			
General Totals		2273 50		559 62		2833 12	2 48		
Tonnage Report		Milling per ton		Profit and Loss		2.66		Total per ton	
Blk. Cloud Lease 480 Tons						4340 87		Amount Recd.	
Wistletoe Lease 664 Tons				Income from Sale of Ore		\$ 2775.22		Due,	
Lease Tons				Miscellaneous Income					
TOTAL TONS 1144				TOTAL INCOME		7116.02			
				111		5057.36			
				TOTAL EXPENSE		5890.48			
				NET PROFIT		\$ 1225.61			

The Consolidated Production Works
Magdalena, N. M.

MONTH OF September 1928

MONTHLY COSTS

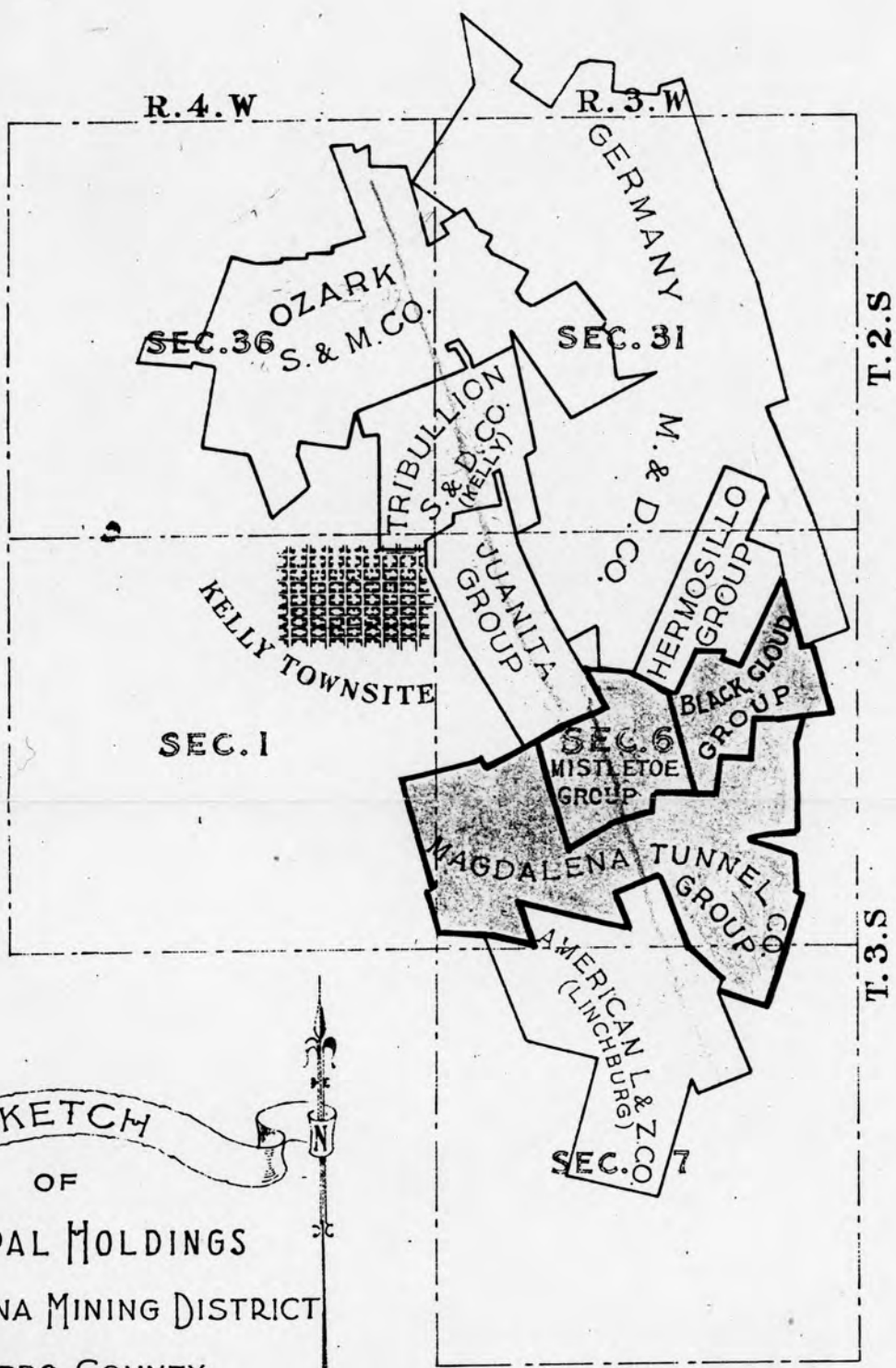
Account Number	Name of Account	Labor		Cost Per Ton	Supplies		Cost Per Ton	Totals		Cost Per Ton	TOTALS---Jan. 1st to and including this month	Cost Per Ton
	ACTUAL MILLING											
101	Milling	917	69		351	43		1269	12			
102	Power	141	00		396	36		538	36			
103	Chemicals				559	74		559	74			
104	Repairing				43	65		43	65			
105												
	Total Actual Milling Expense	1059	69		1351	18		2410	87	2	11	
	ORE TRANSPORTATION											
106	Transportation				183	52		183	52			
Total												
	OVERHEAD											
107	Superintendence	125	00					125	00			
108	Office	75	00					75	00			
109	Assaying	112	50					112	50			
110	Lighting Insurance				35	00		35	00			
111	Miscellaneous				64	22		64	22			
	Other expense				51	25		51	25			
	Total Overhead Expense	312	50		150	47		462	97			
	General Totals	1372	19		1685	17		3057	36	2	66	

Tonnage Report

Tons Milled 1144
155
Tons Conc. Shipped

Profit and Loss

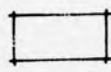
Income	Tons at \$	per ton	\$
Misc. Income	Sale of Air		80.00
TOTAL INCOME			\$
Less---			
General Expense			\$
Net Profit			\$

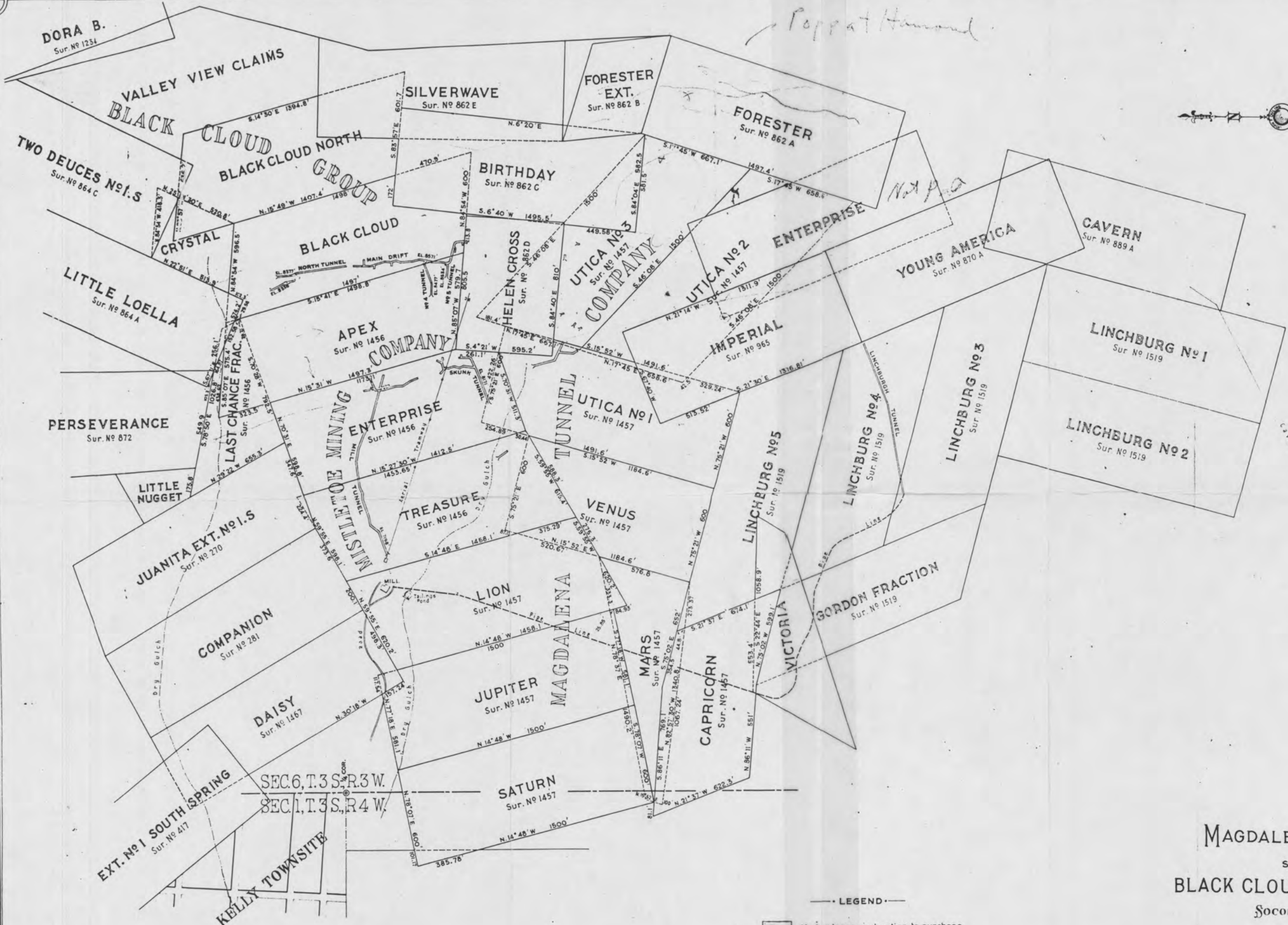


SKETCH
OF
PRINCIPAL HOLDINGS
MAGDALENA MINING DISTRICT

SOCORRO COUNTY
NEW MEXICO
1929

John F. Duling
Mining Engineer
Los Angeles, Calif.

 - PROPERTIES OF THE BLACK CLOUD MINING & MILLING CORP



MAP
OF PORTION OF
MAGDALENA MINING DISTRICT
SHOWING PROPERTIES OF
BLACK CLOUD MINING & MILLING CORP.
SOCORRO COUNTY, NEW MEXICO.

Scale: 1 inch = 300 feet.
JAN. 1929.
JOHN F. DULING,
MINING ENGINEER,
LOS ANGELES, CALIF.

BLACK CLOUD NORTH

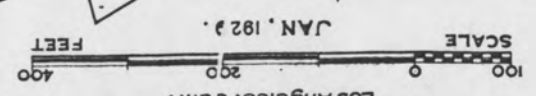
BLACK CLOUD

CRYSTAL

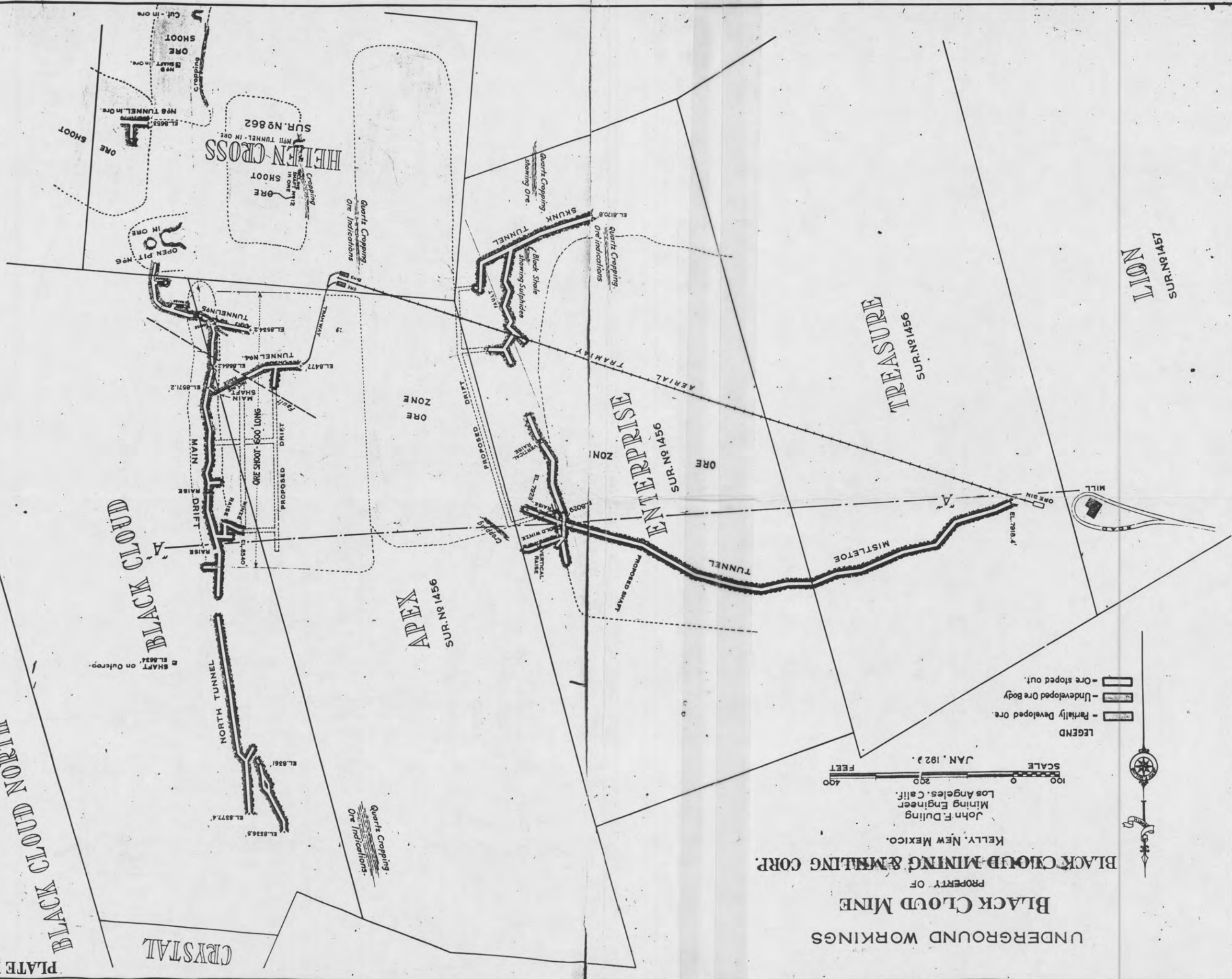
UNDERGROUND WORKINGS
BLACK CLOUD MINE
PROPERTY OF
BLACK CLOUD MINING & MILLING CORP.

Kelly, New Mexico.

John F. Duling
Mining Engineer
Los Angeles, Calif.



- LEGEND
- Partially Developed Ore.
 - Undeveloped Ore Body
 - Ore stoped out.



LION
SUR. No. 1457

TREASURE
SUR. No. 1456

ENTERPRISE
SUR. No. 1456

APEX
SUR. No. 1456

HELEN CROSS
SUR. No. 862

Elevations

8600

8500

8400

8300

8200

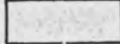
8100

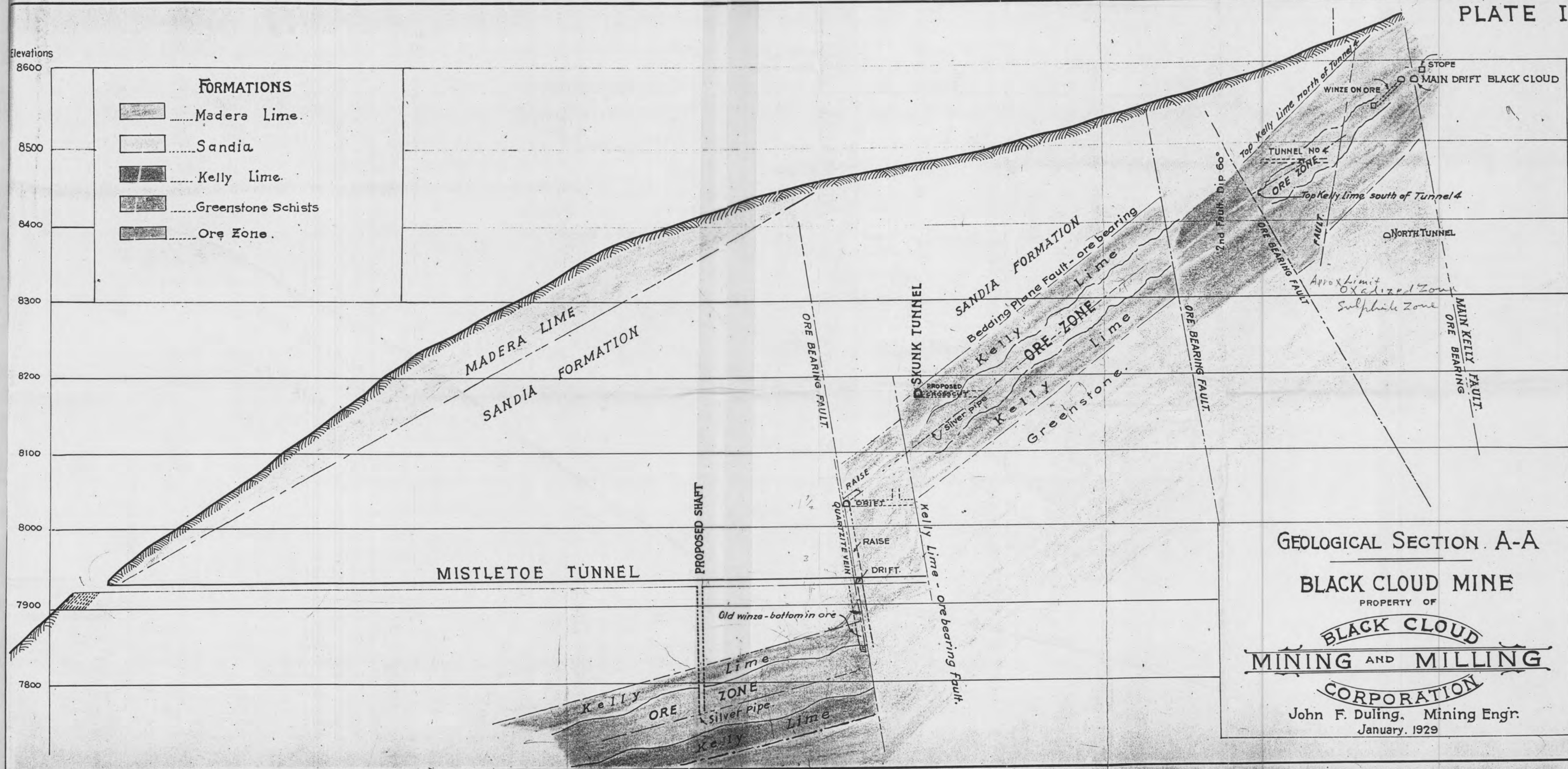
8000

7900

7800

FORMATIONS

-  Madera Lime.
-  Sandia
-  Kelly Lime.
-  Greenstone Schists
-  Ore Zone.



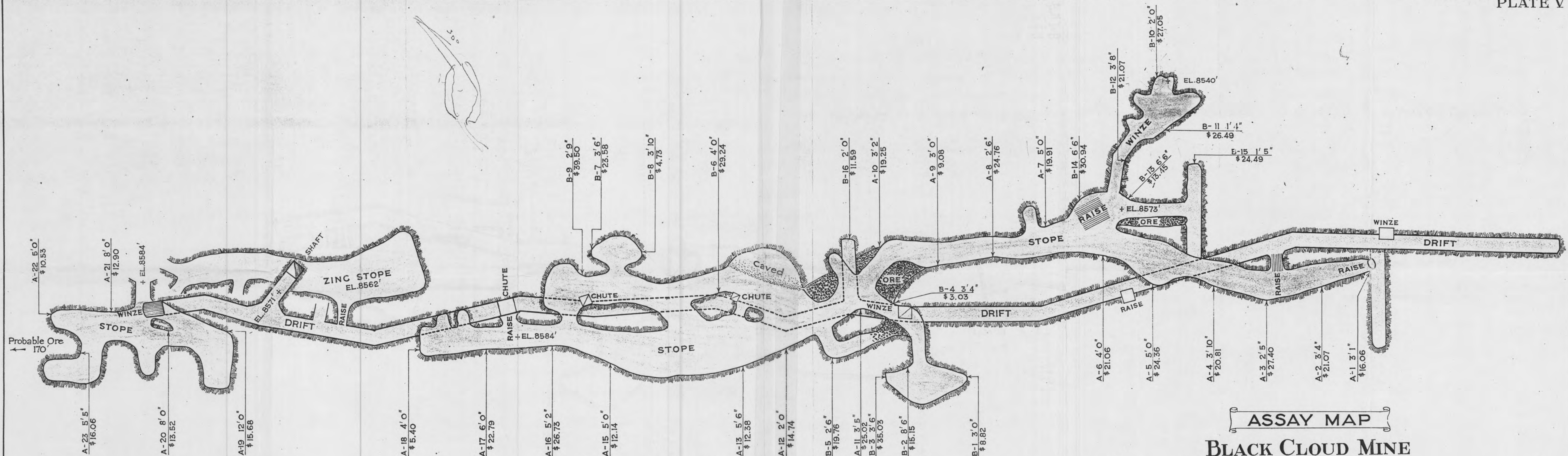
GEOLOGICAL SECTION A-A

BLACK CLOUD MINE

PROPERTY OF

BLACK CLOUD
MINING AND MILLING
CORPORATION

John F. Duling, Mining Engr.
January, 1929



KELLY, NEW MEXICO

Scale: 1 inch = 20 feet

John F. Duling
Mining Engineer
Los Angeles, Calif.

APRIL-1926

NOTE: Lead values are computed smelter
prices ($6\frac{1}{2}$ ¢ per lb.) $1\frac{1}{2}$ ¢ below
present market price. Silver
at 70¢ per oz. - April 1926

Jan. 1929: The ore on this level now practically all stoped.
ore shoot continues downward.