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NUCLEAR DYNAMICS

P. O. BOX 20766 PHOENIX, ARIZONA 85036 602/267-0581

2871 SKY HARBOR BLVD.

KELSEY L. BOLTZ EXECUTIVE VICE PRESIDENT

July 30, 1975

Mr. Gordon Neaves, President
Comstock Gold, Silver & Copper
Mines Incorporated
Chamber of Commerce Building
239 South Beverly Drive
Beverly Hills, California 90212

Dear Mr. Neaves:

My apologies for the belated response to your March 7, 1975 letter and submittal.

After reviewing all of the data submitted by you concerning the Lincoln, Rowley, and Crescent mines, I must conclude that they do not fit our needs at this time.

I appreciate your giving us the opportunity to review the data.

Sincerely,

NUCLEAR DYNAMICS, INC.

Kelsey L. Boltz
Executive Vice President

KLB/gfh

COMSTOCK GOLD, SILVER AND COPPER MINES, INC.
Chamber of Commerce Building
239 South Beverly Drive
BEVERLY HILLS, CALIFORNIA 90212
274-5527

GORDON NEAVES
President

JAMES A. MARSH
Vice President
General Manager
of Operations

March 7, 1975

Mr. Kelsey Boltz
Nucleur Dynamics
Skyline Drive
P. O. Box 20766
Phoenix, Arizona 85036

Dear Mr. Boltz:

Mr. Willis Burnside has asked me to forward you, the attached which is a package containing pertinent data relating to mining properties held by Comstock Gold, Silver & Copper Mines, Inc.

Mr. James A. Marsh is Vice President and General Manager of our company and is presently recuperating from surgery, but will be available after March 12 if you would care to talk with him via telephone.

In the meantime, if you have any questions, please call me at this office.

Sincerely yours,

COMSTOCK GOLD, SILVER & COPPER MINES
INCORPORATED

Gordon Neaves

GORDON NEAVES,
President

GN/bh

Encl:

RECEIVED
NUCLEAR DYNAMICS, INC.

MAR 10 1975

From the desk of

GORDON NEAVES

DATA ATTACHED
FOR
LINCOLN MINE
YAVAPAI COUNTY
ARIZONA

Mr. Willis E. Burnside
Willis E. Burnside & Co., Inc.
40 Exchange Place
New York, N.Y. 10005

September 2, 1971

Dear Mr. Burnside:

In accordance with your request, I have made a field examination of the property known as the Lincoln Mine, which is located in the Pine Grove District (better known as the Crown King District), Yavapai County, Arizona. It is approximately 2½ miles from Crown King and is reached by an unimproved road. The subject property consists of a contiguous group of seven patented mining claims covering 113 acres and two patented mill sites covering 12 acres.

Before making the subject examination, geologic reports and maps were made available for study. The reports show that the principle operations at the mine were carried on by Lincoln Gold Mining & Milling Company during 1905 to 1907. It is reported that the mine was closed down on Nov. 1, 1907 owing to the closing down of Humboldt Smelting plant, 40 miles distant. During the period of operation underground, work consisted of sinking a 200 ft. vertical shaft and several hundred feet of drifting. By reference to the longitudinal section along the vein structure, it will be noted that stoping operations were carried out on an ore shoot from the surface to a vertical depth of about 300 ft. This ore shoot varied from five ft. to 20 ft. in thickness over a strike length of about 400 ft. There is every reason to believe that this ore shoot should continue downward for another 300 ft. to 400 ft., possibly more.

All the old underground workings are inaccessible; however, it was possible to examine the surface of the subject claims which run about N. 25° E. for a distance of approximately 3500 ft., and cover the contact between Yavapai schist on the west and Bradshaw granite on the east. In the vicinity of the old workings there is a well-defined northeasterly trend and the parallellism of the schist-granite contact and intrusive dikes.

The best exposure of the Lincoln vein (chief ore producer) was found at the caved vertical shaft, the initial site of mining operations. At this location the vein is from six ft. to 15 ft. wide, having a strike of N. 25° E. and a dip of 65° N.W. The footwall is well-defined and shows a deposition of one ft. to five ft. of quartz and sulfides; other and narrower bands of quartz separated by gouge or clayey material. Ore minerals in the veine are pyrite, caklcopyrite and tetrahedrite. Other exposures of the vein were found at the portal of the caved South camp tunnel about 1500 ft. southwesterly from the

main vertical shaft and also surface exposure of an ore shoot 500 ft. northeasterly of the South tunnel. (See longitudinal section). These exposures also show a deposition of quartz with copper sulfides on the footwall of the vein.

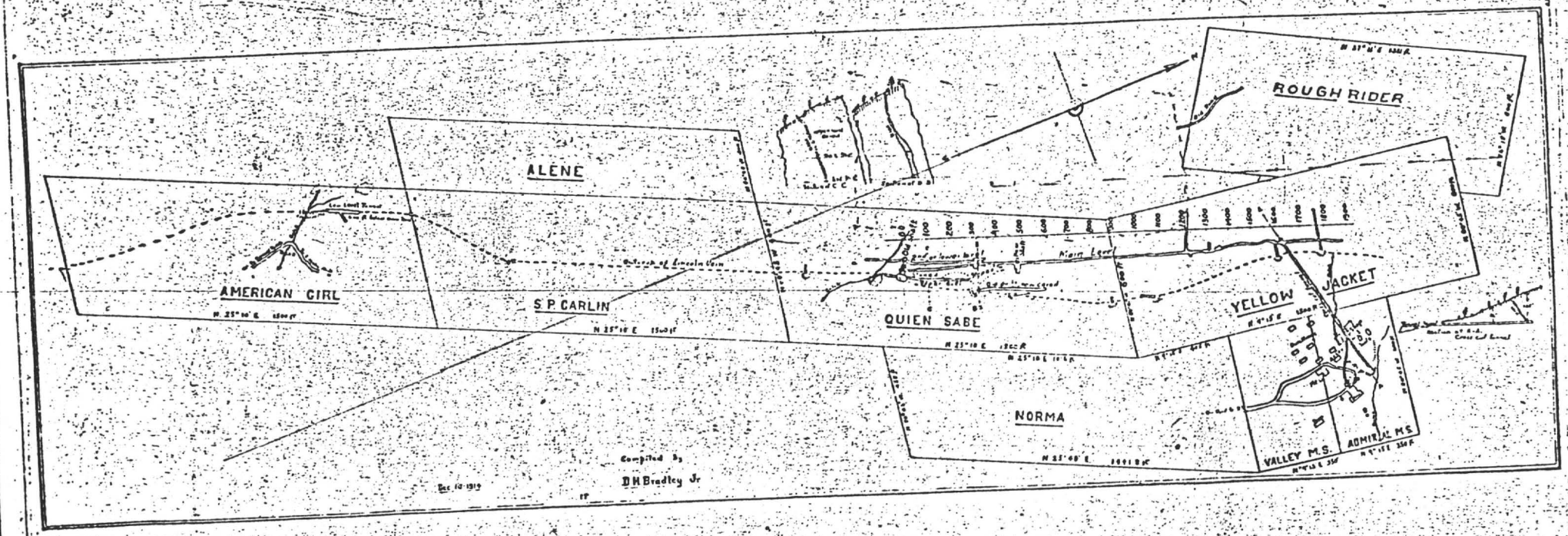
Copies of smelter returns for the period of 1905-1907 inclusive, show that ore shipments from the mine had a gross value in excess of $100,000. An average grade of the ore shipped was approximately gold 2½ oz. per ton; silver 25 oz. per ton, and copper 5%. For further details see Tables 1, 2, 3 and 4 in the accompanying report by Mr. Alvin B. Carpenter.

I have visited the surface locations of the proposed four diamond drill core holes. These holes are designed to explore for the downward continuation of the ore shoot which was previously mined from the surface to a vertical depth of about 300 ft. If these holes should encounter a commercial ore body, they could serve as a basis for determining whether the South camp tunnel should be extended into the area underlying that of the previous mining operation.

After completing a field examination of the subject property and reviewing old geologic reports and maps, it is my opinion that the possibilities of finding commercial ore at the property are promising.

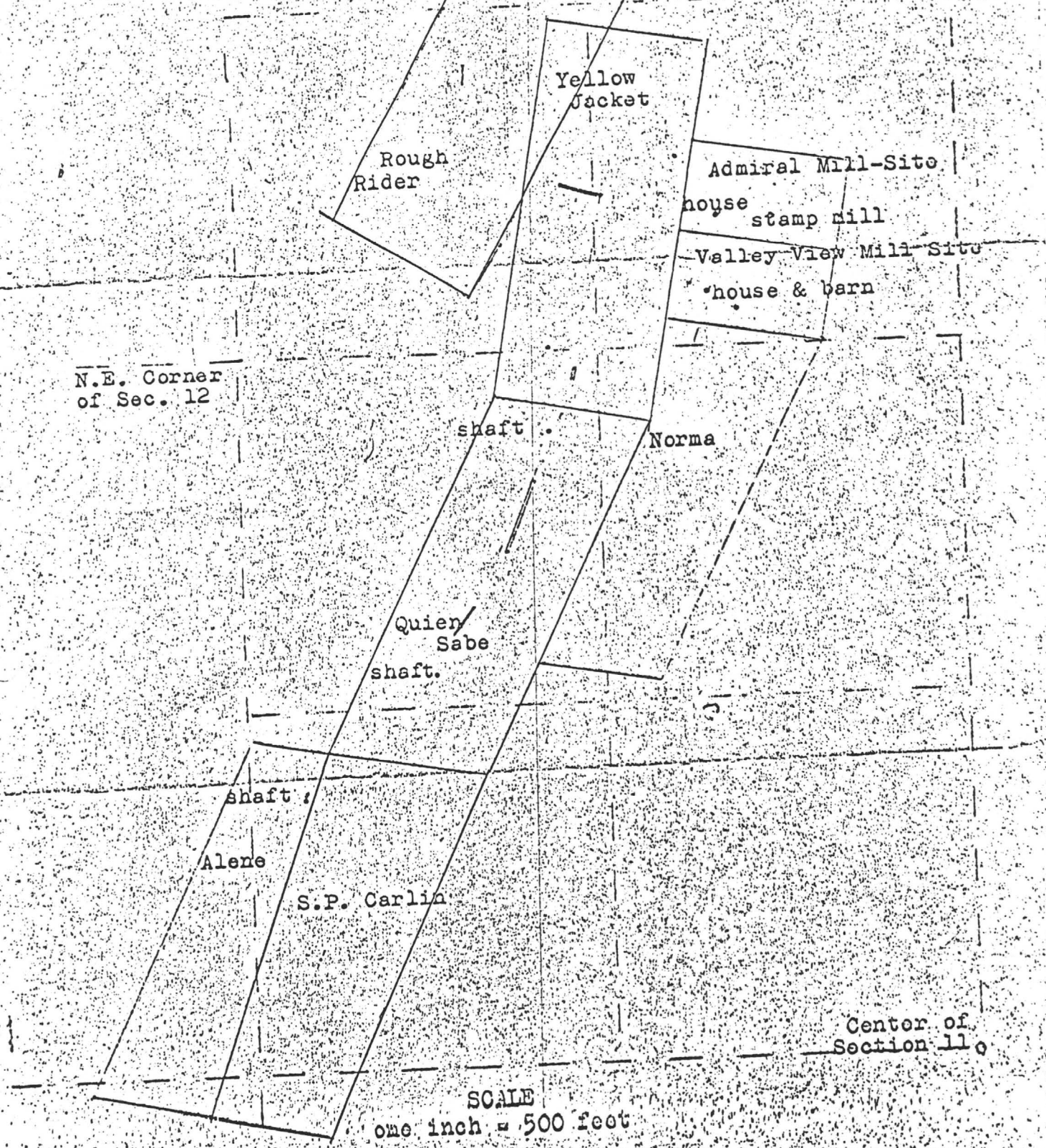
Very truly yours,

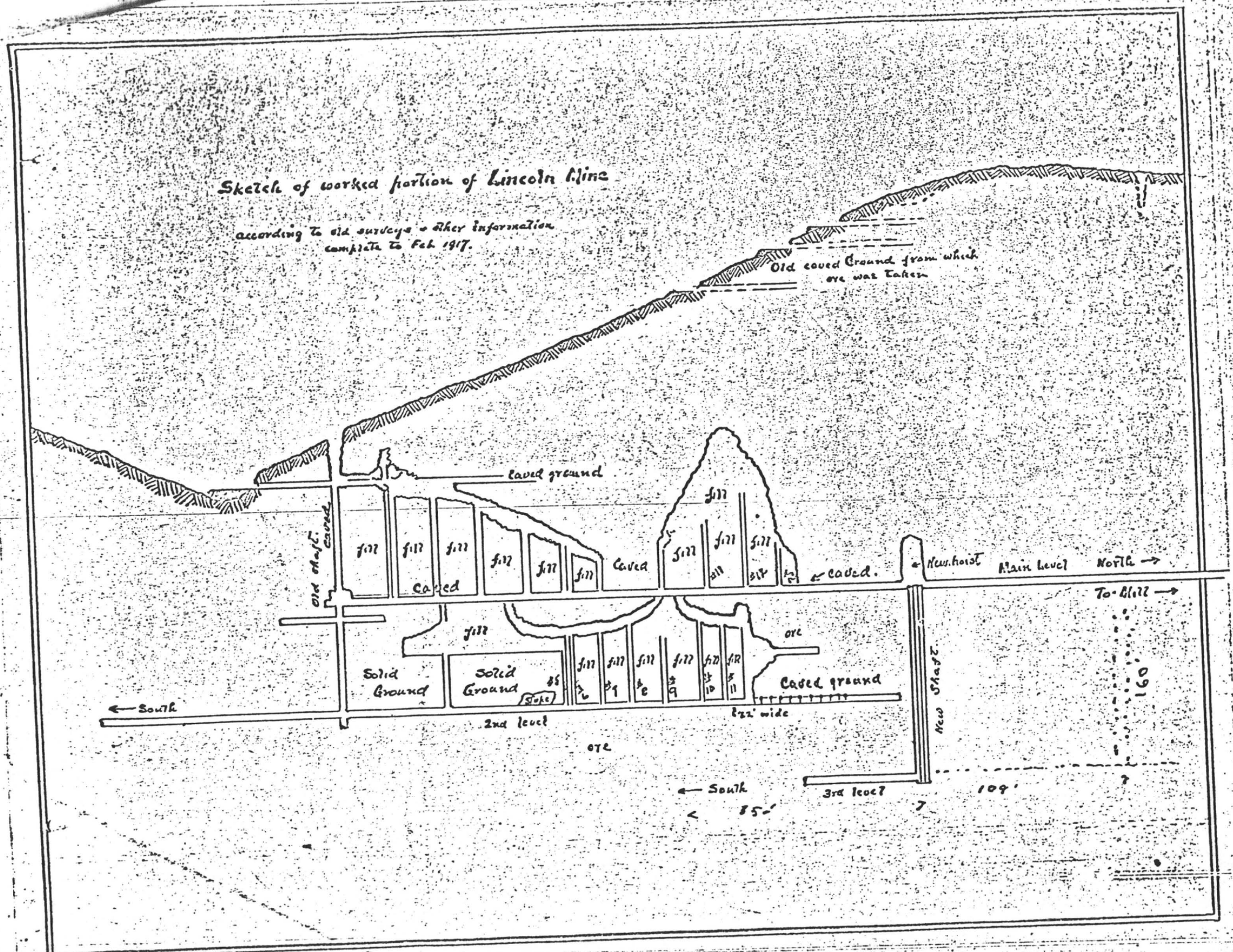
T. H. Boyden
Consulting Mining Geologist


AMERICAN GIRL
ALENE
S.P. CARLIN
QUIEN SABE
NORMA
ROUGH RIDER
YELLOW JACKET
VALLEY M.S.
ADMIRAL M.S.
Compiled by
D.H. Bradley Jr

Protraction Diagram of "The Lincoln Gold Mining-Milling Co."

Prescott Land District Survey No. 1599 A&B, Feb. 25, 1902
"Pine Grove District" lying in portions of Sections 1, 2, 11
and 12 of T.10N, R. 1W G.&S.R.B.&M. Yavapai County, Arizona




Sketch of worked portion of Lincoln Mine
according to old surveys & other information
complete to Feb 1917.
Old caved Ground from which
ore was taken
caved ground
fill
Caved
Caved.
New hoist
Main Level
North →
To Blitt →
old shaft
ore
Solid
Ground
Solid
Ground
Stoke
Caved ground
← South
2nd level
122' wide
New Shaft
← South
3rd level
85'
109'
160'

CABLE ADDRESS: YELDARB

MINE DESIGN
EQUIPMENT

D. H. BRADLEY, JR.
MECHANICAL ENGINEER
BANK OF ARIZONA BUILDING
PRESCOTT, ARIZ.

REPORT

on

THE LINCOLN MINE

Yavapai County, Arizona.

By

D. H. Bradley, Jr.

February 1917.

Location. This property is situated two and one-half miles north and slightly east of Crown King in the Bradshaw Mountains, Yavapai County, Ariz., and southwest of Jerome in the same mineral belt. Crown King is the southern terminus of the Prescott and Eastern Railway, a leased line of the Santa Fe System. The mine is about 6900 feet above sea level and 1000 feet above the Station at Crown King. It is 3.1 miles from station to mine over a good wagon road. With the exception of a few short stretches where the grade does not exceed 6%, the road is in favor of the load going from the mine. The maximum grade is a stretch of about 350' of 17½%, but the balance of the steep pitches do not exceed 13%. The road is for the most part thro a decomposed granite which forms an excellent road bed. It is in good repair and all the hauling to the mine during the last year has been done by a motor truck.

Claims. The Lincoln Group consists of six patented mining claims, two patented mill sites, and one unpatented mining claim. They are named as follows;

No.	Claim	Date of Location.	
1	Rough Rider	May 12, 1899	patented
2	Yellow Jacket	Jan. 1, 1896	patented
3	Norma	June 1, 1895	patented
4	Quien Sabe	Jan. 1, 1895	patented
5	S.P. Carlin	Jan. 1, 1896	patented
6	Alene	July 15,1899	patented
7	Admiral Mill-site	June 15,1899	patented
8	Valley Mill-Site	June 15,1899	patented
9	American Girl		unpatented

The area of the patented claims amounts to 112.56 acres. All the claims, as shown on the attached plan are in one group, 6000 ft in length, running with the main vein.

Title. The title to all this property is held by a close corporation, the most of the stock of which is held by an estate. The title is clear and no claims are on record against it.

Veins. The main vein strikes about N25 E, dips about 65 in some places and in others is more nearly vertical. It is continuous and has been worked on four consecutive claims from north to south, the Yellow Jacket, Quien Sabe, S.P.Carlin, and American girl, and it is about 4270 feet from where the entering cross-cut tunnel from the mill cuts the vein to where a new low level tunnel or drift has been started, from the south on the vein. This main vein extends to both north and south of the property in question.

Some little mining has been done and very good ore is said to have been taken out on the south extendion, and claims are held by other parties to the north. The Lincoln discovery, however, antedates all the others and is considered to be the most valuable part of the vein. Two other veins of unknown value, and practically unworked, run respectively through theRough Rider and Norma CClaims. An outcrop, very prominent, of iron-stained rock, but probably not vein matter, runs to the west of the main vein and from 150 to 750 feet from it. This outcrop is considered by some parties to be of economic importance, and an attempt has been made to cut it underground.

Mine Openings. The main vein is the only one upon which any work has been done, It was originally worked by several drifts close to the surface, so that little stoping ground was available above them. From one of these drifts near the south end of the Quien Sabe claim, a shaft was sunk which was used as the main working shaft. It is at present about 230 feet deep, the upper 130 feet of which is completely caved in. A cross-cut tunnel has been driven in from a point on the eastern slope of the mountain, near the center of the eastern side line of the Yellow-Jacket claim, which cut the vein at 395 ft from the portal. The vein was drifted on 350 feet to the north and 1600 feet to to the south, at which point the drift cut the working shaft, previously mentioned, at a point wbout 110 feet from its present bottom. The 2nd level, 100 feet below this long main level has been opened up 210 feet to the south of the old shaft, and 470 feet to the north. A raise of about 40 feet to the north of the old

shaft, from the main level to the old drift 100 feet above and communicated to the surface serves for ventilation. A winze has been cut down on the vein 30 feet, about 210 feet south of the entrance tunnel. A new inclined working shaft, 6x12x3compartment, has been sunk on the vein from the main level down about 180 feet, just to the north of the known ore shoot. Ore bins and a hoist are located in station in tunnel at collar of the shaft.

Character of Vein. The vein throught the length of this main level can be observed, since timbering is required in only a few places. It is well defined between hard walls. The vein filling is, (at the level of the main level) composed of talcy ground up schist, quite silicized at places, and in addition a band of quartz generally is to be found. The filling is heavily iron stained in strata not usually extending across the full width. At no place did I find the width on this level to be less than four feet, and in some places it is nearly twenty feet. More cross-cutting into the hanging and foot wall will determine this exactly, as usually, both walls of the drift do not co-incide with the walls of the vein. The character of the filling is such as is often found above important ore bodies.

From the old shaft north, for over two hundred feet, some of the sulphides in addition to the oxidized ores were found. These have all been stopped out from the main level, up to the old upper drifts on the hanging wall. The character of the ore from this stope is shown by shipments in 1905, which were mostly from this part of the mine, (see attached record of smelting returns) this same shoot of ore continued down to and below the second level, and is stoped out between first and second levels for about two hundred feet. Shipments in 1906 were mostly from this lower stope, and the grade of ore can be seen by refering to the attached shipping records.

A body of sulphide ore lying on the foot wall some fifteen feet or more from the hanging wall, was stoped out later by leasers and while authentic records of returns from that bunch of ore are not available, it is said to have averaged better than either of the other stopes mentioned.

The better grade of ores seem to have been found where the sulphides have not been completely decomposed, in fact where they are in the original form, the sulphides in the ore runs the highest, the ore carries the best values in both copper and gold.

On the second level for two hundred feet on each side of the old shaft the vein tightens up and the values are low, but probably the ore here could be profitable milled.

Geology. The geology of the district has been carefully studied by experts of the U.S.Geological Survey, and a publication is available, giving in detail this information, together with maps. A copy can be obtained by applying to the director U.S.Geological Survey, Washington, D.C. for a copy of the Bradshaw Mountains Quadrangle Geological Folio, enclosing five cents. The Lincoln Mine is shown on the attached maps.

It will be only necessary to say here, that

the vein occurs in the Yavapai schist formation, and is apparently a fissure vein lying some two hundred yards East of the schist and granite contact. Acid dykes lie on both sides of the vein but not at the main level, in contact with it. The schist is impregnated with minute sulphide crystals in considerable quantity between these dykes and the vein.

Ore Bodies Developed. The ore body located by the stoping now done, extends on the upper level, (one hundred feet above main level) from a point about 330 feet north of the old shaft towards the north for about one hundred feet, and about sixty-five feet above the upper level. On this main level, it extends from the old shaft to the north for about 450 feet. On the second level the high grade ore began at a point about one hundred and fifty feet north of the shaft and continues north as far as that level extends, 470 feet. At no place in this stoped ground did the vein narrow down to a width where the wall rock had to be broken to get the ore and in places the vein is over twenty feet wide. This width is shown by cross cuts at 230 feet and 270 feet north of shaft on main level and 415 feet north on the second level. No ore can be expected from this body above the main level as it has been stoped out completely. Below this a block about 150 feet long has been stoped out for 40 feet below the main level, and another block to the north 150 feet long has been stoped out entirely from the main to the second level.

To the north of this last mentioned block the second level has been extended for 130 feet and an intermediate level 30 feet above it for 50 feet. A good body of milling ore of good width is to be found on the hanging wall and a workable seam of shipping ore on the foot wall.

Below the second level except for a ten foot sump at the shaft no work whatever has been done and theore body undoubtedly extends below this level, pitching to the the north.

No attempt has been made to locate other ore bodies than this one, however this one body that has been worked upon is of sufficient size and value to warrant the present price at which the property is held, providing it is found to continue in depth for even a short distance.

The Old Shaft. The old shaft is in poor condition as previously stated, the shaft has been caved in nearly down to the main level, but a small working space with scant head room is maintained by stulls so that the shaft could be used to extract ore from the lower level. Up to a year ago it was the only entrance to the second level, except a manway thro the stope. The shaft is an incline on the vein about sixty-five degrees dip. A small Webber gasoline or distillate hoist is set close to the shaft on the main level in an offset cut into the hanging wall. This engine drives by belt, a modified Cornish pump which drains the second level. This pump has a 2½' discharge and is said to have kept the mine drained by running 1½ hours out of the 24. Four and one half cubic ft buckets

were used to hoist ore at this shaft and the handling of even these small buckets is awkward owing to the limited head room.

During the Spring,(1915) the stoped ground lying to the north of the old shaft gave way and at present access to the old shaft is cut off entirely. On account of the cost of driving through this caved ground and the small object in doing so it is not in my opinion advisable to attempt its recovery.

New Shaft. On account of the poor condition of the old shaft and since the ore body appears to be pitching away from it, a new shaft has been started down from the main level at a point about 470 feet to the north of the old shaft. It is now down 180 feet, well timbered. This is 6 x 12 over all on an incline of 66. This shaft is close to the hanging wall which forms a very good and safe roof without lagging. A large station has been cut in the foot wall of the vein, amply in size to accomodate the hoist, bins etc which are installed.

The location of the new shaft is good. It is centrally located in regard to the body of the mountain and as to where a large body of ore should be encountered, based upon past work. Thro the main level and out thro the cross cut tunnel, track leads to the mill so that the ore is handled at the minimum cost.

Ore Stoped. It is noteworthy that the shipments in 1905 were from stopes entirely above the main level, the ore averaging $51.20 per ton. In 1906, the second level was reached and ore taken from between the first and second level and the average for this year was $67.40 per ton. In 1907, practically all the shipments were made from ore from the lowest level and the value of this ore, was $101.20 per ton. The steady increase in values is most interesting.

It is also noteworthy that the shipping ore consisted of a salicious sulphide and the the gold values invariably increased with the sulphur contents. This evidence points to the probability that the whole vein carried originally the primary sulphide ore clear up to and probably above the present surface contour; that this ore has been thoroughly leached out of the vein throughout that part of it as yet opened up, with the exception of the nodules and lenses found in their original or secondary form and which were extracted as a shipping ore. Around these lenses was a quantity of more or less oxidized ore and some mineralized schist which carried values and which was milled, but the bulk of the vein was even in that part of the mine well leached of what must have been the original sulphides.

The products of this leaching which evidently dissolved out the gold and silver as well as the copper values, in all probability were carried downwards in the vein, and if as usual they were re-deposited at a lower level, this enriched zone

should produce ore of a considerable higher grade than that previously shipped and in very much greater quantity.

Further more, high grade shipping ore can not be expected with any degree of certainty in large bodies before the oxidized zone is passed and the sulphides reached. The depth at which this change will take place is unknown, but it is not probable that it is over one ore two hundred feet below the present bottom of the new shaft which is now over five hundred feet below the outcrop.

Character of the Ore. The ore is primarily a gold one carrying copper and silver in paying quantities. Pyrites, chalco-pyrites, calcacite, and other copper bearing ores are in evidence. Wherever the sulphides have been found the ore has carried good gold values. The ore, even that containing considerable sulphide, has so far been free milling with the exception of the values remaining in the concentrates. A sampling of the mill tails made three or four years ago with a veiw to retreating them, is said to have gone only 90 cents in gold values. Personnaly, I doubt the acuracy of this, since the mill equipment is such that a high saving can not be expected, and tests that I have made, indicate that the tailings carry more values than stated above.

The value of the ore is well shown in the tables of ore and bullion shipped. These tables were copied by myself from the original smelter liquidation sheets and mint returns. They cover all shipments made from the mine, except as noted thereon. A considerable amount of ore was milled and shipped in 1910, over a period of five months, by parties who had the mine under lease. Authentic records of this work are not available, but in cleaning out all ore that could be found left from previous developement, they cleaned up about nine thousand dollars as far as I have been able to learn.

Previous to the operation of the mine by the present owners, in 1905 to 1908, is was operated by the locator a Mr. Lincoln, in the nineties'. He milled surface ore with a two stamp mill, using plate amalgamation but no concentrators. Local residents, who were there at the time working for him in the mine, say that the ore plated very uniformally around $50 per ton and at times would reach $100.00 per ton. They also say that much of the assay values were not recovered until later when concentrating was begun. The ore that Lincoln took out for this work came from the surface up over the present operations.

Mine Developement Developement of the mine was never carried on ahead of extraction, and blocked out ore is not available. The ore shoot worked upon was continuous and apparently increasing in both width and length with depth, without large barren zones in it. All work done by the present owners was confined to this body of ore, and no attempt was made to locate other bodies or to determine the extent of the one worked upon. In a number of other places on the property the outcrop pans well and it is most probable that proper exploration work

will develope other bodies of economic importance, Old shafts, tunnels and prospect holes show good values in many places throout the length of the property, and there is no reason to believe from inspection or from any other data available that ore will not be generally found throughout the length of the vein as soon as the oxidized zone is passed.

Mine Equipment. Last year the mine was equipped for economical operation, quite completely. A three hundred cubic foot capacity compressor of the oil driven type was installed to furnish power for hoisting, drilling, pumping, and tool sharpening. The cost of fuel oil for this compressor over a six months run, operating on anaverage of about eighteen hours daily, has proven to be only about $3.40 per day, which shows the extreme economy of the installation.

The power house equipment also includes a smaller auxilliary oil engine, electric generator, for lights, power saw, planer, emery wheel, etc. A Leyner air operated drill sharpener and power forge are installed in the blacksmith shop.

A six inch by eight inch double cylinder single drum hoist, capable of lifting a three thousand pound load, is installed underground at the new shaft and handles ten cubic ft buckets. Automatic dumping device permits the hoist man without assistance to dump the buckets into the bin installed at the collar of the shaft.

A No. 5 Cameron sinking pump is hung in the shaft near the bottom and in a few minutes of each shift clears the shaft of water.

Sinking and drifting is done with Denver Hammer Type rock drills which have proven very efficient and satisfactory. In fact the whole equipment has operated without developing any defects in six months use.

All levels have eight lb rails laid on them and the same weight rail is laid out to the mill and dump. The grade is good in favor of the loaded cars out to the mill, but the light weight of rail causes much disalignment of track and derailment and should be replaced by sixteen lb rail as soon as permanentw work is under way. Bins have been erected close to the mill into which shipping ore can be dumped from the mine cars and under which wagons can be run for loading. The trestle leading to these bins and to the mill will have to be rebuilt.

At the old shaft there was a small Webber gasoline hoist about four horse power capacity which wasprevious ly used to do all the hoisting from the second to the main level. At present it is inaccessable due to caved ground and is simply described here to show the primitive equipment that was used to secure the production herein shown.

The Mill. The mill has been designed for amalgamation and concentration. The machinery consists of 10" x 15" Blake type crusher, fifteen 1000 Lb stamps, amalgamating plates two Wilfley tables and three Frue vanners, all driven by a forty horse power gasoline engine. Ten of the stamps are of Frazier and Chalmers make and the other five were made by a Los Angeles firm. The former are double issue mortars and have been used with a back issue blocked. The cam shaft lifting all the ten stamps of the first battery was connected at one end to the cam shaft of the five stamp battery by a flange coupling, but the former shaft broke close to the end so that now no coupling is, or can be, put on it to drive the small battery. This shaft before breaking was 14' 10" long by 5¾" in diameter. The bore of the cam-shaft pulley is so large that the shaft is loose in it and is only held on by collars on each side of it. The shaft has been butted up with a sledge so that these collars would not come off and the cast iron centers of the large wood pulley cracked. The foundation under the mortar blocks is made up of two inch plank on end and it is highly probable that the mortars will have to be re-set on account of this foundation having rotted.

The crusher is apparently in good shape as are the Wilfley tables. The mechanisms of the Vanners are in operating order, but the belts are valueless. The amalgamating plates have been badly treated, the leaser having apparently cleaned them up with a cold chisel, but they are still servicable. The gasoline engine is in bad condition and extensive repairs would have to be made before it could be used and even then, this type of engine is too expensive to operate to pay for repairing.

When the mine is in shape for production of from fifteen to twenty tons of milling ore daily, it will be necessary to remodel the mill. The fifteen stamps should be replaced by a fine grinding, slow speed Chile mill. Flotation apparatus should be added because the ore is particularly adaptable to this process. Amalgamation should be carried on before the pulp reached the flotation apparatus and all free gold removed previously in this way. The tails from the flotation apparatus can well be passed over the Wilfley tables now installed. An oil engine of the same make and type as that used for driving the air compressor, should be installed to drive the mill. These changes together with drying apparatus for the concentrates and arrangements for the return of the mill water, will cost about ten thousand dollars altogether.

The cost of milling in the remodeled mill on a basis of forty tons per day,(the capacity of one 10'Lane Chile mill) should not exceed $1.00 per ton. All the ore we take out in development work on either drifting, sinking or raising, will in all probability run higher than this and it is therefore evident that should we have the mill in commission we could be making a profit while doing this work even if we only ran the mill one shift per day.

Water Supply At present there is nearly sufficient water issuing from the mine to operate five stamps. continuously, without returning any from the tailings, throughout

the year. From February until May there is more water that would be required for milling 100 tons per day. Further sinking in the mine will undoubtedly develop all the water that will be required for milling throughout the year, judging from the experience of other mines on this same vein and adjacent veins in the same country rock. While none of them make sufficient water to cause heavy pumping, ample water will be encountered to serve all milling purposes. In the meantime, re-use of the water after it has passed thro the mill, will permit of steady operation on a moderate scale.

Buildings In addition to the mill, blacksmith shop and tool room previously mentioned, there are erected on the property, a power house and shop, assay office, timber-framing sheds, seven, three and four room houses for dwellings, a mess house and a stable.

The assay office is equipped with one good balance, gasoline assay furnace, a Braun disc sample grinder, a sample crusher, and a small amount of supplies. More accurate sample grinding and sampling apparatus is needed.

The dwelling houses are partially furnished, the mess house is furnished with tables and benches, kitchen range and full culinary equipment and all ready for immediate use.

Aerial Tramway No present method is in use for hauling ore to the railway other than by wagons or motor truck, but the railroad to Crown King, passes to the east of the property, quite close to it and at a much lower elevation. Leaving the mill in a course N.66 E, a tramway could be economically built that would have a 16 per cent down grade for about 2500 ft and then a forty-eight per cent down grade for about 3000 ft. to reach a point on the railroad where a loading switch could easily be put in. It would shorten the rail haul about four miles.

Low Level Tunnel From the point on the railroad, which would be the terminus of the above described aerial tramway, a tunnel could be driven into reach the vein, that would cut it about 1200 ft below the present tunnel level. It would be about 6500 ft long.

Timber and Fuel The property is within the Prescott National Forest limit and some tall pine timber is still standing on the claims, but not enough to supply lumber for mining purposes. Ample native timber is near at hand and available for cutting according to forest service rules, but it is doubtful if it is not more economical to buy lumber by the carload from the saw mills in the north central part of Arizona. That lumber costs about $24.00 per 1000 fob Crown King.

Wood for domestic fuel purposes is standing on the property but not of sufficient supply for power.

Fuel oil is the best and cheapest fuel obtainable for power at the tpresent time. Oil for the semi-Deisel engines installed, cost from four-five/sixths to five and three quarters cents per gallon. Coal, containing about fifteen per cent ash costs eight and one half dollars per ton. Gasoline, 25 cents per gallon and distillate, 15 cents per gallon in barrel lots.

Source of Information The information in my report is obtained from personal inspection, except where noted to the contrary. The old stoped ground below the main tunnel level was under water and therefore inaccessable. I was fortunate in being able to meet the former underground superintendent of the mine, and from him glean such facts as I have stated, regarding this part of the mine, and the ore from it. This man, Mr. Jackson, bears a good reputation in the community, and ha since that time I have had the opportunity of becoming well acquainted with him, I believe that the information he gave me is correct. Information gleaned from all other parties who were conversant with the conditions of the old work, has checked his statements uniformally. Mr. Jackson was in charge of the underground work in the Lincoln, during much of the time it was operated by the owners, and for part of the time the mine was operating in 1910. He is still in Crown King, and in charge of the Wild Flower property there, for the Bradshaw Reduction Co.

Reccomendations for Immediate Work. The first step to be accomplished, is to determine the extent and value of the known ore body below the point to which it has been worked. The next will be to develope other ore bodies along the line of the vein. To accomplish the former, but one plan can be logically suggested, and that is to sink the new shaft and run levels from it in the vein. The new shaft is centrally located and over a portion of the vein where a good body of ore can be most certainly expected in depth.

Above the main tunnel level, no exploration work has been done since the earliest operators high graded from the surface and mined fifty to one hundred dollar ore. Developement of this ground, which can be cheaply done by upraising from the main level, should open up a large tonnage of ore which would prove quite profitable to mill. The large block of ground over the main level which is sixteen hundred feet long and from 100 to 350 feet deep, undoubtedly will produce a large tonnage of milling ore and is quite likely that bunches of high grade will be found when it is worked, that will make this work pay handsomely.

Continuation of the third level to the south should open up good ore within 100 ft.

Sinking of the shaft into the sulphide zone, is essential to provide for the future and to determine the depth and grade of the base ore before making a first payment on the property.

As soon as the mine is in shape to produce from fifteen to twenty tons daily, work should be commenced on remodel-

Record taken from original Smelter return sheets, ore and concentrates.

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	Date		Pounds Weight	Kind	oz. Gold	oz. Silv.	% Cu.	Gross pr ton	Net per ton	Total payment	Freight
	July 31,	1905	45,432	conc	1.60	26.6	5.70	$58.28	$42.92	$ 965.22	$ 95.80
	Aug 3		50,350	conc	1.70	30.0	3.90	58.25	41.80	1026.19	95.36
	" 8		44,328	ore	1.00	16.5	3.10	35.30	17.10	373.32	83.06
	Sept. 25		52,735	conc	1.75	33.8	6.00	67.86	61.15	1563.97	125.00
	Oct. 19		38,750	ore	1.70	27.0	7.30	65.62	57.56	1104.06	264.50
	" 30		48,000	"	1.76	27.6	7.30	62.71	54.31	1256.44	39.60
	Nov. 4		25,775	conc	1.70	29.5	7.00	67.32	60.23	737.46	149.21
	" 4		14,450	ore	2.30	31.8	6.80	97.11	70.10	501.43	103.79
	" 18		52,040	"	1.19	22.0	4.80	44.49	34.23	879.99	57.50
	" 23		74,330	"	1.35	19.9	5.01	51.08	41.42	1523.97	139.37
	Dec. 19		60,000	"	1.60	19.6	5.30	56.46	47.02	1356.99	75.00
	" 19		44,000	"	1.14	15.7	3.50	40.59	30.33	645.90	50.60
	" 22		44,000	"	1.30	23.3	6.39	54.60	54.30	971.68	39.95
	Jan. 11,	1906	31,300	"	2.42	33.2	6.66	87.92	78.27	1210.21	55.00
	" 12		50,000	"	1.80	21.9	5.67	65.84	56.27	1378.61	75.00
	" 21		53,720	"	1.35	28.7	6.30	62.68	53.18	1398.42	80.60
	Feb. 12		47,220	"	1.25	33.2	6.21	63.12	52.87	1218.28	75.20
	Mar. 21		55,350	"	0.20	9.6	4.68	21.79	11.48	298.07	45.67
	Apr. 2		50,556	"	0.15	8.7	3.87	19.51	9.32	221.47	41.70
	" 17		50,920	"	0.19	9.2	3.18	18.72	6.14	202.26	42.00
	May 8		55,220	"	0.26	13.8	5.62	30.17	20.95	560.50	63.85
New	" 29		53,720	conc	2.19	29.0	7.92	86.60	78.42	1925.21	80.60
Mill	June 1		44,820	ore	0,24	13.4	6.02	30.93	21.67	461.20	42.90
	" 12		49,220	"	0.46	15.3	6.35	37.61	26.45	678.45	56.60
	" 12		51,300	conc	1.66	23.2	7.59	71.94	63.41	1485.69	76.95
	July 2		49,060	"	1.57	24.4	8.64	72.90	64.90	1458.24	75.00
	" 18		42,120	ore	0.32	10.0	4.86	26.51	17.51	362.12	48.75
	Aug. 17		49,930	conc	2.30	26.2	7.66	85.32	77.38	1840.87	75.00
	Oct. 5		36,080	conc	1.97	25.8	6.64	77.87	69.04	1124.66	66.00
	" 25		43,320	ore	2.32	19.1	4.68	75.36	64.15	1297.75.	66.00
	Nov. 13		54,820	"	2.61	34.8	5.72	94.96	84.18	2242.72	90.00
	Dec.1 1		36,060	"	0.90	16.5	4.04	43.10	31.42	539.86	
	" 1		16,160	conc	2.34	36.8	10.54	110.79	102.39	782.57	78.35
	" 28		49,620	ore	1.76	20.5	4.46	65.12	53.74	1258.50	74.45
	Jan 17	1907	62,090	"	3.58	27.0	4.56	106.43	95.36	2860.85	122.60
	Feb. 11		59,300	"	3.41	24.0	3.87	98.51	87.21	2430.60	90.00
	Mar. 19		77,120	"	3.21	23.7	4.32	96.76	86.27	3130.30	115.70

BULLION FROM MILL.

Copied from original mint return sheets.

	Date of rec't at mint.	Gross wt amalgam ozs.	Value of gold	Value of silver	Charges.	Net am't paid	
Old Mill Five Stamps	June 17 1905	92.40	$895.09	$19.05	$4.38	$ 909.76	
	July 21	96.35	1154.34	18.29	4.70	1167.93	
	Aug. 4	70.00	897.25	10.58	3.63	904.20	
	" 31	64.55	833.13	11.77	3.59	841.31	
	Sept 13	40.40	455.27	9.20	2.62	461.85	
	Oct. 9	30.00	298.35	8.06	2.18	304.23	
New Mill	June 2 1906	33.64	406.33	7.32	2.36	411.29	
	July 19	32.20	353.71	7.24	2.27	358.68	
	Aug. 20	59.40	527.29	16.53	2.17	541.65	
	Sept. 14	62.05	410.55	20.14	2.01	428.50	Said
	Oct. 11	50.43	406.20	15.92	2.19	420.11	to be
	Nov. 2	26.86	251.87	8.25	1.54	258.38	from
	Apr. 26 1907	-----	Mint record lost		-----	501.85	
	May 10	-----	" "	"	-----	1160.77	310 ton
	" 22	56.08	735.13	10.80	3.22	742.71	
	June 7	75.35	883.39	14.98	3.83	894.54	142 "
	June 20th	71.58	859.52	14.52	3.70	870.34	145 "
	July 10	81.34	949.69	16.91	4.06	362.54	128 "
	" 19	51.61	587.11	11.42	2.89	575.64	92 "
	Aug 5	49.16	570.79	9.24	2.75	577.28	95 "
	" 21	31.45	349.71	7.15	2.17	354.79	57 "
	Sept 7	33.48	363.48	7.74	2.22	368.98	62 "
	" 25	26.48	316.09	6.61	2.05	320.65	
	Oct. 5	39.95	448.09	8.57	2.48	854.18	
One liquidation appears lost.							
	Nov 6	57.90	548.37	12.14	2.99	557.52	
	" 21	56.16	475.22	7.82	2.54	48.50	
	Dec. 10	23.56	262.96	3.91	1.84	265.03	
	Apr. 29 1908	46.35	478.11	9.75	2.86	485.00	78 "
	May 7	43.60	471.79	7.89	2.71	476.97	70 "
	Feb. 10 1910 to June 2nd, according to Bank record					2951.95	

Date	Pounds weight		Oz. Gold	Oz. Silv	% Cu	Gross per ton	Net per ton	Total payment	Freight
Jan. 17, 1907	62,090	ore	3.58	27.0	4.56	$106.43	$ 95.36	$2860.33	$122.60
Feb. 11	59,300	"	3.41	24.0	3.87	98.51	87.21	2430.60	90.00
Mar 19	77,120	"	3.21	23.7	4.32	96.76	86.27	3130.30	115.70
Apr. 11	68,000	"	4.29	26.0	4.41	118.51	108.20	3520.61	132.60
May 10	59,460	"	3.26	28.9	5.31	103.73	92.68	2719.50	117.00
May 16	29,720	Conc	3.00	25.4	5.76	100.22	91.33	1209.20	55.70
June 19	18,652	"	not off original			82.70		684.20	
July 6	47,400	Ore	1.83	22.2	4.11	65.69	53.96	1230.20	102.35
" 12	20,860	Conc	3.34	22.9	4.23	97.42	88.42	839.00	104.50
" "	48,800	Ore	3.28	24.2	3.96	94.17	83.27	1970.80	
Aug. 15	21,720	Conc	4.06	27.5	5.22	115.79	106.34	1045.10	126.15
" "	42,960	Ore	3.73	37.6	7.36	121.25	110.82	2361.85	
Sept.13	64,740	"	3.21	39.6	6.39	106.30	95.92	2990.00	126.25
Oct. 17	54,000	conc	(Oct.				)		
" "	------	ore	(not off original, none made)					3370.00	Smelter failed loaned by Bank on the shipment
Feb. 1,1910	16,740	Conc	1.61	30.2	8.60	61.28	56.24	423.15	Prepaid
Mar. 8	21,681	"	1.84	20.7	5.55	55.74	50.74	503.29	24.94
Apr. 12	15,119	"	2.23	20.3	4.32	61.06	55.79	385.90	20.51
May 10	15,456	"	1.82	16.3	4.90	51.78	45.77	341.67	
" "	12,513	ore	.71	13.4	5.40	28.35	19.09	117.29	25.40
" 24	8,548	conc	1.68	18.8	7.40	53.18	50.00	203.00	9.82

SUMMARY OF PRODUCTION

1905.

210.0 tons of ore shipped	@	$51.20	equals	$10,764
87.1 " " conc "	@	58.40	"	5,445
Bullion "				4,589

1906.

182.5 tons of ore	@	$67.40	"	12,320
126.2 " Conc	@	80.60	"	10,290
173.7 " run of mine	@	26.00	"	4,517
Bullion				2,419

1907.

265.4 tons of ore	@	$101.20	"	26,875
45.5 " " conc	@	99.80	"	4,535
B ullion				12,867

For over the three years

657.9 tons of ore	@	$ 75.90	"	49.959
258.8 tons of concentrate	@	78.10	"	20,270
173.7 tons run of mine	@	26.00	"	4,517
Bullion				19,875

1090.4 tons shipped Total product $94,621.21

(Note-- @ means averaged.)
Values are gross per ton.

The shipments during 1910 are in all probability not complete and are therefor not detailed. It is probable that they amounted to about # 9,000.00

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Over the period that a record of tonnage milled was recorded as shown on bullion return sheets, shows that

1031 tons milled plated $6,961.54 and concentrates during the same period were $ 3,777.50, equivalent to

Saved per ton on plates	$6.75	
Saved per ton in concentrates	3.65	
Total per ton milled		$10.40

At a saving of 70% shows milling ore to have run $15.00 per ton.

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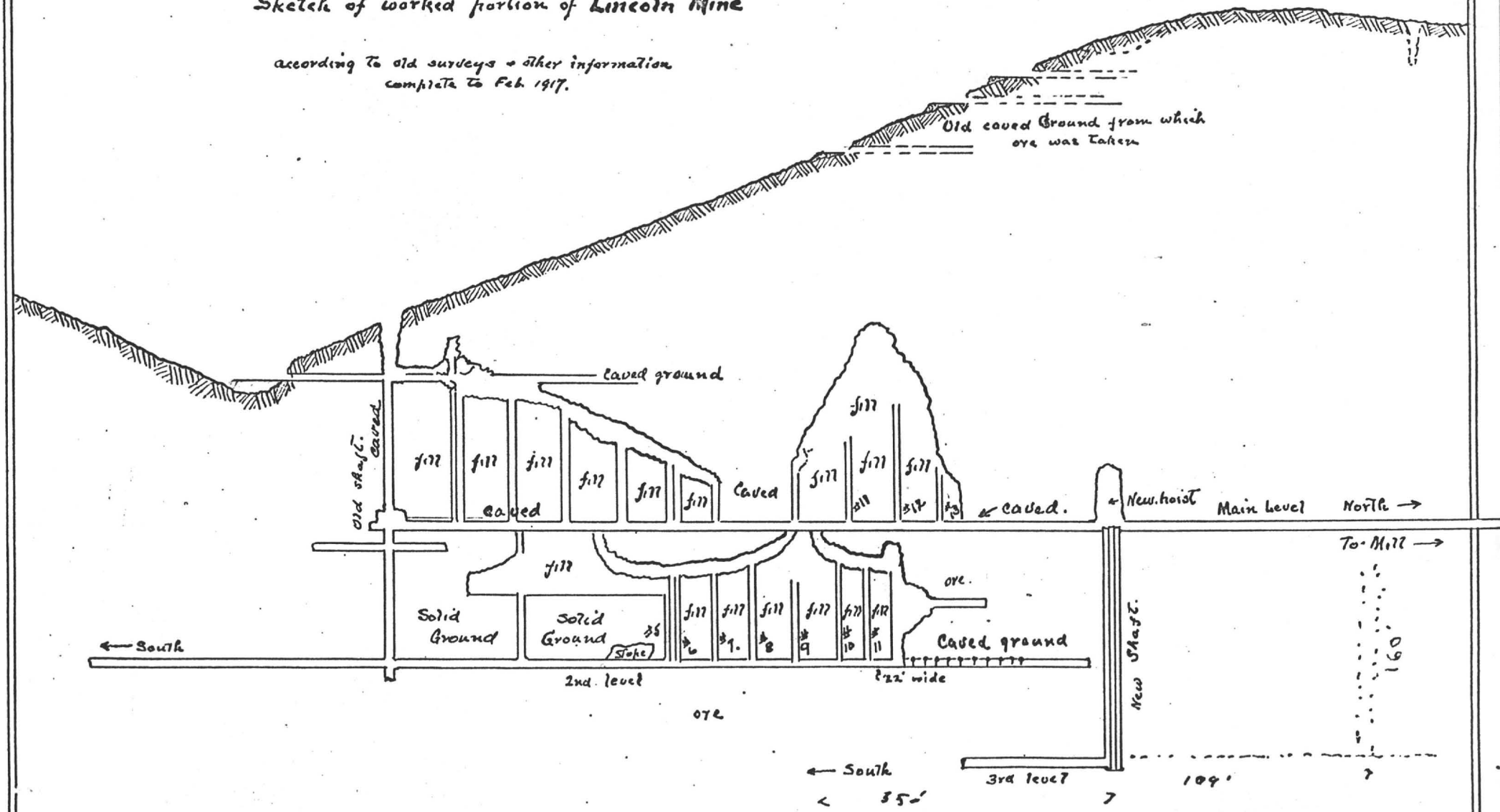
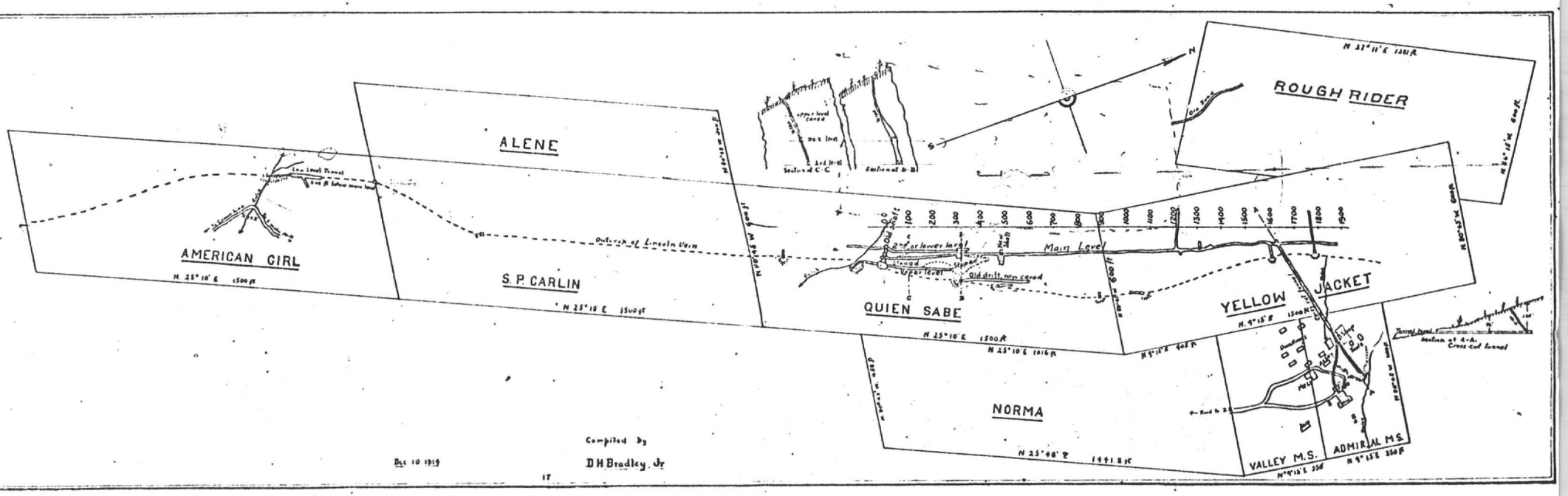
This record is complete and covers all production during the time that the mine was operated except when Lincoln himself operated years before in a very small way.

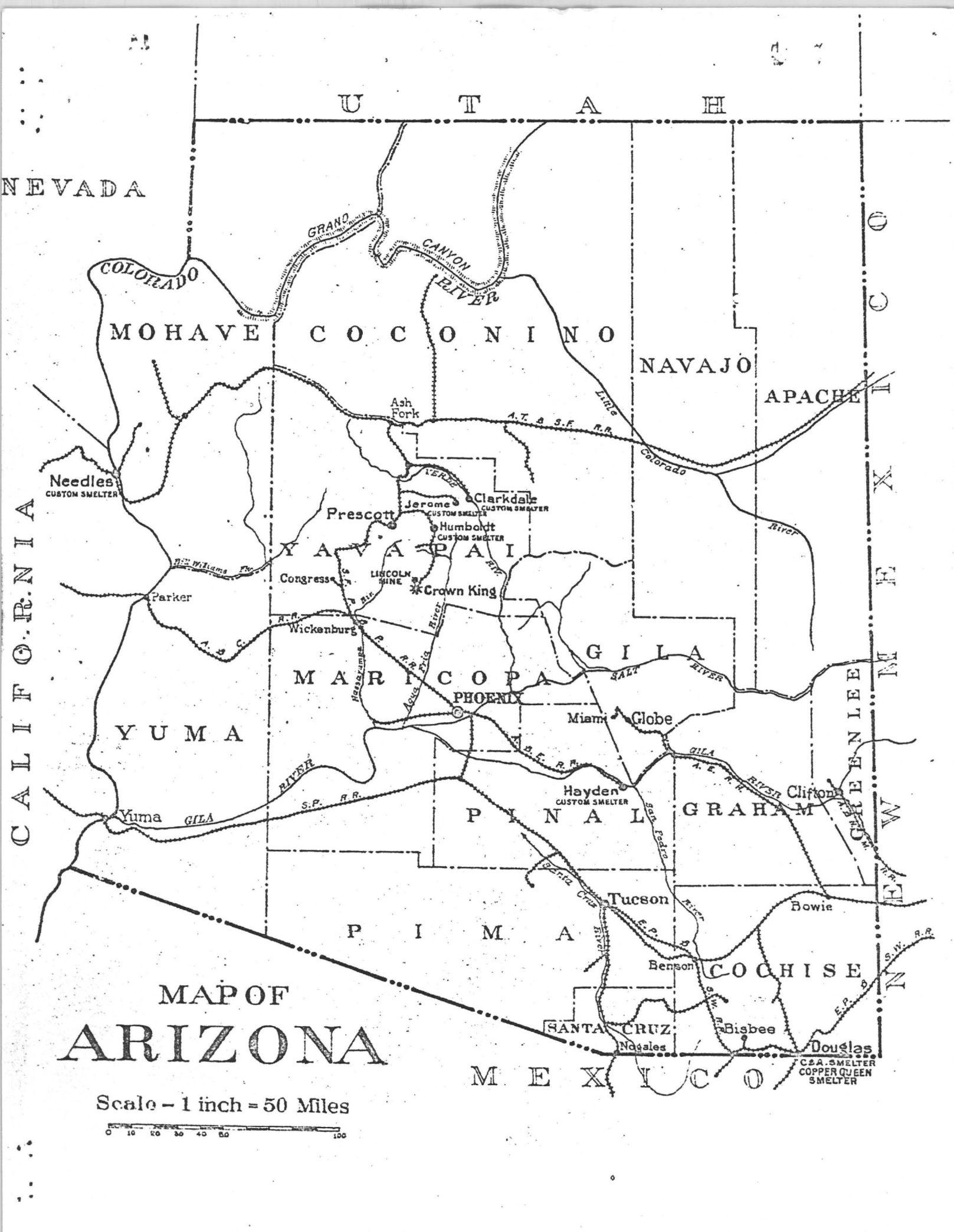
D. W. Bradley, Jr.

Sketch of worked portion of Lincoln Mine

according to old surveys & other information
complete to Feb. 1917.




AMERICAN GIRL
ALENE
S. P. CARLIN
QUIEN SABE
NORMA
YELLOW JACKET
ROUGH RIDER
VALLEY M.S.
ADMIRAL M.S.
Main Level
Outcrop of Lincoln Vein
Compiled by
D H Bradley Jr
Dec 10 1919


UTAH
NEVADA
COLORADO
GRAND CANYON RIVER
MOHAVE
COCONINO
NAVAJO
APACHE
Ash Fork
A. T. & S. F. R.R.
Little Colorado River
Needles
CUSTOM SMELTER
Clarkdale
CUSTOM SMELTER
Jerome
CUSTOM SMELTER
Prescott
Humboldt
CUSTOM SMELTER
YAVAPAI
Congress
LINCOLN MINE
Crown King
Big Bill Williams Fk.
Parker
Wickenburg
A. & C. R.R.
Hassayampa R.
Agua Fria River
MARICOPA
GILA
SALT RIVER
PHOENIX
Miami
Globe
YUMA
GILA RIVER
S.P. R.R.
Yuma
A. & E. R.R.
Hayden
CUSTOM SMELTER
San Pedro River
PINAL
GRAHAM
Clifton
GREENLEE
Santa Cruz River
Tucson
Bowie
PIMA
E.P. & S.W. R.R.
Benson
COCHISE
S.W. R.R.
SANTA CRUZ
Nogales
Bisbee
Douglas
C.&A. SMELTER
COPPER QUEEN SMELTER
CALIFORNIA
NEW MEXICO
MEXICO
MAP OF
ARIZONA
Scale – 1 inch = 50 Miles
0 10 20 30 40 50 100

REPORT ON THE LINCOLN MINE

Made to M. F. George

The property known as the Lincoln Mine originally consisted of a group of six lode claims, Quien Sabe, Yellow Jacket, Rough Rider, S. P. Carlin, Norma and Alene, and two Mill Sites, the Admiral and Valley View, patented under Sur. No. 1599 A & B; the patent acreage being 112.56 acres.

There are also two unsurveyed claims, the American Girl, which is the Southerly extension of the S. P. Carlin lode, and the Rough Rider Fraction, located Oct. 2, 1927, covering a fractional piece of ground between the Rough Rider and the Yellow Jacket and the Watsonville.

The recent acquisition of the Watsonville lode, Sur. No. 2106 adds 11.965 acres to the acreage of the group, making at this time a total of 124.52 acres patented and approximately 30 acres of unsurveyed ground. The title at this time rests in the name of Charles C. Miller, Jr., Trustee.

There was another location in the group at one time known as the Juniper lode, which was the Northerly extension of the Yellow Jacket lode, this claim was abandoned by the Company some years ago.

The property is situated in the Pine Grove Mining District, (better known as the Crown King District) Yavapai County, Arizona. The mill and surrounding buildings which have been the center of operation on the property is situated about two and a half miles from Crown King P. O. and is reached by a road which was constructed by the Lincoln Gold M. & M. Company prior to 1905. The building of the road would be considered quite an extensive operation even at the present time. Apparently it followed a surveyed grade and has some heavy rock cuts.

I doubt if it could be duplicated for $25,000.00 ~~at this time~~. There are some short steep pitches and at this time the surface material has been washed away, making it more difficult to negotiate than if it were in good repair and every-day use. The grade of necessity must be steep as the Lincoln mill is nearly 1,000 ft. higher than Crown King.

The Southern end of the property later referred to as the South Camp is at approximately the half way point on the road to the mill, and only a little over a mile from Crown King.

Until the first of this year the Crown King district has been served by a branch of the A. T. & S. F. R. R. running from Prescott, through Mayer, thence to Middleton and on up to Crown King, with several switch-backs between Middleton and Crown King.

The portion from Middleton to Crown King, about 12 miles in length, has recently been abandoned, the rails removed and the roadbed turned over to the County for a highway. The roadbed is excellent and the grades easy, with a maximum of 4% for a short distance only.

The railroad still maintains twice a week passenger and freight service to Middleton, which is the nearest railroad shipping point to Crown King at the present time.

This is not as much of a drawback as it may seem, as ore or concentrates loaded at the Lincoln mill, for instance, can be hauled down-grade to Middleton for little more than it would cost to Crown King.

TOPOGRAPHY

The surface of the Lincoln groupe, in common with the entire district, is covered with a dense growth of oak and manzineta brush as well as some larger timber, and observations of formation have to be made from the trails leading to or from the different prospect holes. The harder, silicious strata being more resistant to erosion form the observable outcrops, whereas the more easily oxidized and decomposed strata are hidden By the underbrush and not visible unless cut by a trail or road.

The Crown King district as a whole is noted for its rugged topography. With its high points at an elevation of around 7,000 ft., the run-off from winter snowm and torrential rains of summer have cut deep and steep sided canons, which are separated by sharp ridges. Fortunately, the erosion has been greatly retarded by the dense undergrowth.

At the North end of the Lincoln group one of these ridges divides the drainage between Muldoon Canon on the North and Poland Gulch on the South and East. The claims in a Southerly direction being cut by smaller gulches running Easterly into Poland Gulch.

GEOLOGY

The claims of the Lincoln group run about N. 25 deg. E. for 6,000 ft. and cover the contact between Yavapai Schist on the West and the Bradshaw granite on the East. A glance at the geol. sheet of the Bradshaw Quadrangle report shows in the vicinity of the Lincoln mine the marked northeasterly trend and parallelism of the schist-granite contact, the principal intrusive dikes and the larger gulches. The schist belt West of the Lincoln mine is only about a mile wide and the granite on the East only one half to three quarters of a mile wide, being separated from the main mass of granite intrusive by another and still narrower belt of schist.

One of the maps (Plate 1) accompanying this report shows the relation of the schist-granite contact to the Lincoln group.

Throughout the length of the contact as shown I found the granite adjacent to the schist to be fine grained, with very little mica and having a marked shearing parallel to the contact. This condition prevailed for a width of 100 ft. or more beyond which the granite has its normal coarse texture with rounded outcrops. I do not know whether the sheared granite belt is a contact phase of the main mass or whether it is a later intrusion of similar granitic material.

The Yavapai schists in the vicinity of the Lincoln mine are silicious and dark-colored from the predominance of ferro-magnesian minerals. Their strike is uniformly Northeast and Southwest with a dip of 65 to 70 degrees to the Northwest. In a few places I noted lenses of fissle sericitic schist, but they were of small extent except in the immediate vicinity of the Lincoln vein, which will be mentioned later. In following trails over the surface and examining the numerous shallow shafts and cuts one might be led to remark that the old prospector always chose a soft place to do his digging. It will be noted, however, that he was usually digging on a vein of quartz or ore; the conclusion being that the veins and stringers of quartz followed, or were in some way a product of the softer schistose beds and are not found in the hard outcrops which form the backbone of the ridges throughout the district.

Considerable prominence has been given in previous reports to the so-called "iron dike", which is said to lie about 150 ft. West of the Lincoln vein and parallel to it. It shows a great deal of quartz in wavy bands and bunches with intermediate strata of rusty mica or chlorite and hematite. Some of the fragments carry a large percent of iron. I take it to belong to the Yavapai schist formation and it may have been a bed of conglomerate or a series of overlapping lenses. It is comformable with the schistosity and outcrops prominently on account of its hardness.

Intrusive Rocks

The oldest intrusive I noticed is a dike of dark green diorite having a width of 50 or 60 ft. and cutting diagonally across the Yellow Jacket claim. It cuts across the schists and is in turn cut by the Lincoln vein. I did not have time to trace its relation to the granite contact on the East. Its position as far as noted is shown on the accompanying plat.

Light Colored Dikes

These dikes are the latest intrusions. Presumably they are rhyolite porphyry and similar to others in the district which are mentioned by Dr. Lindgren and other geologists. Generally speaking, they follow the schistosity but may cut across it at acute angles. Some of them are entirely barren of mineral; for example, the one 50 ft. or more in width, which shows on the trail above the S. W. Cor. of the Quien Sabe claim. Others bear an intimate relation to the veins and cannot be disassociated from them.

The surface geology of the Yellow Jacket and Rough Rider claims is indicative of rather different conditions than are found in the Southern part of the group.

The Rough Rider runs Northerly along the summit, which divides the drainage between Peck Canyon and Poland Creek. The top of the ridge shows more of the light colored silicious rocks with numerous stringers and some prominent outcrops of quartz. Small areas of schisted diorite were noted and a strong rhyolite dike. The North end of the Yellow Jacket also has some large quartz outcrops.

I have mentioned elsewhere the wide cropping of quartz in the vicinity of the Lincoln vein at about the center of the Yellow Jacket claim. Prominent quartz outcrops are entirely lacking in the Southern claims of the group.

The dump of the old patent tunnel on the Yellow Jacket shows black schists of hornblende, iron and chlorite. If the surface of these claims could be stripped of its soil and vegetation it might prove very interesting.

The association of outcrops of quartz, diorite dike and chlorite schists is suggestive of possible copper mineralization at depth. The reported 40 oz. silver ore in the North winze of the tunnel also indicates a change in the predominant gold mineralization of the Lincoln vein.

VEINS

The Lincoln vein probably originated as a simple fissure which in general follows the schistosity of the enclosing rock but may cut across it in places. The later deposition of quartz and minerals was influenced largely by the structure and composition of the rocks forming the walls of the fissure. Throughout its length the vein may be divided into three segments for convenience and description. In the South segment, through the S. P. Carlin claim, the vein is accompanied by a narrow belt of light colored sericite schist, which is flanked by massive, dark colored hornblende rocks on either side. The soft, disintegrated schist shows on the West side of the mouth of the

South Camp tunnel for only two or three feet in width. Assuming the tunnel was run in similar material, the total width of schist would be only seven or eight feet.

Practically the same condition exists throughout the length of the S. P. Carlin claim, with a possible widening of the schist lense in the vicinity of the old discovery cut, which is 400 ft. from the South end of the claim.

The second segment, which is the Quien Sabe lode, shows a widening of the schist belt, a condition which is probably responsible for the Lincoln ore shoot. At the 75 ft. shaft, which is 130 ft. from the South end of the Quien Sabe, the soft schist shows a width of 40 ft. on the West side of the shaft and from the appearance of the soil, an equal width on the East, making a total width at this point of 80 ft. 350 Ft. further North at the mouth of the Quien Sabe tunnel the schist belt is narrow West of the tunnel, but has widened to 150 ft. on the East. It gradually narrows going North to a width of 100 ft. at the upper caved tunnel. At the North end line of the Quien Sabe it has narrowed down to about as it was through the S. P. Carlin lode.

The first three or four hundred feet of the third segment is about the same as the first; that is, eight or ten feet of decomposed, soft schist. A little further North there are some wide quartz outcrops, but I have not had an opportunity of studying their relation to the vein, and am leaving the North end of the property for further examination.

Throughout the length of the vein the West or hanging wall side consists of the dark colored, silicious and hornblendic members of the Yavapai formation. The same may be said of the East wall except through the Quien Sabe claim, where the sericite schist lense attains its unusual width.

I had little opportunity to study the structure of the vein at the surface as the old cuts and shaft are completely caved and I could only see it a few inches below grass roots. The discovery cut and one or two other holes on the S. P. Carlin showed a few inches of milky porous quartz with limonite stained vugs. Some of the larger fragments on the dump indicated a quartz width of ten inches.

The following paragraph in my former report was based on observations of the vein in the long drift of the Yellow Jacket tunnel:

"Using the term "vein" in its broad sense, I would say that the Lincoln vein was from six to fifteen feet wide and has a Westerly dip of 65 to 70 degrees. The foot wall being fairly well defined and regular as it is the original fissure. Along the foot wall is the main deposition of quartz and sulfides and parallel to it other and narrower bands of quartz separated by

gouge or clayey material. The "paying" width of vein was probably the width over all, of the quartz part of it and varied from a few inches to three or four feet, with the probability that in places the values extend still further toward the hanging wall side. I presume that the mineralization and silicification originated along the foot wall fissure and proceeded toward the hanging wall side a distance depending on the permeability of the vein material and the pressure of the mineralizing solutions."

Apparently the vein is accompanied throughout the greater part of its length by a porphyry dike, which is difficult to distinguish in the surface openings from the narrow belt of schist, both are light colored and disintegrate completely to a sandy-kaolin mass.

CHARACTER OF THE ORE

I have been able to study the oxidized surface ores from the small piles left on the dumps of the numerous workings along the apex of the vein. Apparently the gold and silver values are carried in the quartz and were originally along with the sulfides, the complete oxidation of which gives the typical "iron ore" color and the vugy, porous structure of the quartz.

As to the unoxidized ores from the lower levels, the only opportunity I had to study them was from a pile of a few tons which had been sorted out or had spilled over at the mill ore bin. This pile was made up of chunks of quartz from a foot across to a small fragment. They showed sulfides in plenty, of pyrite and chalcopyrite a less amount of a gray sulfide, which was probably tetrahedrite. A considerable part of the value of the ore is in silver, which is probably carried by the gray sulfide, before referred to. I took a seven or eight pound sample from this pile of ore which assayed .64 oz. gold and 7.08 oz. silver, having a market value of $17.25 per ton, in addition to the copper, which was not determined. This pile of ore was at the mill bin and I suppose was intended for mill ore. One of the Engineers reports that the high-grade part of the vein was "solid sulfides" in places.

DEVELOPMENT AND PRODUCTION

The principal sources of information concerning the development and operation of the Lincoln Mine are the reports of Geo. Kislingbury, dated Oct. 5, 1905, and Bernard P. Miller, not dated but made subsequent to Jan. 1908. I have also had access to the letter files of the late Chas. T. Joslin, which have supplied considerable information lacking in the reports referred to.

At the time of survey of this group of claims for patent in 1901 one of the improvements shown on the patent plat is a tunnel about 200 ft. long on the center line of the Quien Sabe lode. Ore was mined from the back of the tunnel and packed on burros to a two stamp mill located at the present mill site. Subsequent developments have shown the tunnel to be in the main ore shoot.

The owners must have soon realized there was little profit to be made by packing ore on burros to the mill and a new tunnel was run from the camp and mill site. In order to cut the vein the tunnel was run across the formation a distance of 395 ft. from the mouth and then southerly along the vein a distance of 1,627 ft. at which point it intersected a shaft, which had been sunk from the discovery tunnel before referred to.

This project must have cost considerable money, and in fact, very little development work has been done on the property since its completion prior to 1905.

The report of Kislingbury in Oct. 1905 states that ore was being stopped from above the tunnel, and that a five stamp mill had replaced the original two stamps. Also that the shaft in the ore body had been sunk 100 ft. below the tunnel level, and about 100 ft. of drifting both Northerly and Southerly from the shaft along the vein.

Smelter returns up to the date of the Kislingbury report indicated that about $8,000 had been received from the shipment of 1 car of $18 ore, 3 cars of concentrates running $40 to $60 per ton and six shipments of bullion netting $5,000. It appears from these figures that they were saving a large part of their values on the plates as might be expected in treating a thoroughly oxidized ore.

As far as I know this is the earliest record of production we have and it must represent only a small part of the ore mined from 1886 to 1905 of which we have no record. At this time they had the vein opened for a length of 200 ft. on the tunnel level and a small stope 50 ft. long and 50 ft. high the width of the best ore being about 30 inches. He mades an estimate of the ore in sight at about 1,200 tons of $33 ore and 1,200 tons of $9.50 mill ore. It should be remembered, however, that later developments showed the ore shoot to be 400 ft. long instead of 200 ft., and that it extended up to the level of the old Quien Sabe tunnel.

At that date, while the shaft was down 100 ft. below the tunnel level, no ore had been opened up, as the drift had not been extended far enough North.

The report and statement of Bernard P. Miller covers very fully the operation of the mine from Oct. 1905 to Oct. 1907.

The following extracts are taken from his statement, many of the paragraphs being copied in full:

"The present owners during the first few years of development had a two stamp mill and a little later a five stamp mill, and milled ore from the grass roots down"...."the ore milled was an oxidized ore running entirely in gold used to plate from half an ounce to one ounce per ton, with several dollars going into the tailing dump. In the spring of 1906 the little five stamp mill was dismantled and an up-to-date fifteen stamp mill was put in, 1,000 lb. stamps, two Wilfley tables and three Fruevanners, which gave us a perfect concentration, and our tailings from this mill have run as a rule from $1.20 to $1.50."

"The mine was closed down on the first of Nov. 1907 owing to the closing down of the Humboldt Smelting plant forty miles distant, which owed the company for the October shipments."

"The mine has been operated to great disadvantage owing to the fact that the small hoisting plant would not do the work, and not more than ten or twelve miners have worked during the past few years, half of them in the stopes and the balance on keeping up the development work. The payrolls have run from $2,000 to $2,500 per month, which includes supplies, and the ore shipments and returns from mill have generally run in excess of these figures."

Mr. Miller gives a detailed statement of the smelter returns by carlots, of which the following is a summary:

Oct.30,1905 to Dec.23,1905	6 cars-190.8	tons	$31.25	ton	$ 5931.31
Jan.31,1906 to Nov. 1906	7 cars-135	"	45.00	"	5141.75
Jan.11,1906 to Dec.28,1906	21 cars-462	"	45.00	"	20728.70
Jan.17,1907 to Oct. 7,1907	14 cars-523	"	90.00	"	29041.41
	Total ore and concentrates				$60843.17
	Bullion shipments				16095.23
	Total receipts				$76938.40

Mr. Miller has the following to say in regard to the shipments during the year 1906.

"The above ore and concentrates shipments to the Arizona Smelting Co. during the year 1906 amounted to the above figures ($20,728.70). The freight and treatment charges averaged about $12 per ton and the entire shipments for the year averaged $45 per ton net. This would have been considerably more had it not been for the fact that the Sup't. shipped seven cars of ore of such value that it should have gone to the mill instead of the smelter. It was in the rainy season when there was no way of sorting the ore. Had it not been for these shipments, the balance of the ore shipped would have averaged around $65 per ton net. This ore was taken part from the stopes above the tunnel and the balance below the tunnel level."

In regard to the production during 1907 he has the following to say:

"The above ore and concentrates shipped to the Arizona Smelting Co. from Jan. 17, 1907 covering a period of nine months, amounted to the above figures ($29,041.41). This ore was taken from the stopes below the tunnel level. The highest value was $121.25 gross and the lowest was $65.69. The freight and treatment charges averaged about $14 and the net value of the ore from the entire nine months averaged a little better than $96.00 per ton. (I make it $90.00 per ton.)"

"The metallic content of the ore is in gold, silver, copper and iron; the greatest value lies in the gold and silver and the ore is free from antimony, arsenic and zinc. Between 40% and 60% of the gold is free, the copper occurs in chalcopyrite."

"As to the values within this shoot, it is interesting to note the value of the ore shipped to the smelter during the years 1905, 1906 and 1907, when the ore averaged $31.00, $35,00 and $95.00 per ton net. It will be seen that at greater depth the value of the ore has increased considerably; the stopes from the bottom level to the main tunnel have yielded remarkably rich ore."

"The most remarkable feature of the mine in this state of development is unquestionably the aspect of the ore body at the bottom level and in this case the indications are exceptionally encouraging."

"In the South drift of the lower level a new ore shoot seems to make its appearance and development in that direction may lead to the discovery of another important ore shoot."

The shut-down in 1907 to which Mr. Miller refers, marked the end of active production.

(Mr. M. F. George relates that according to his recollection the Smelter owed about $6,000 for ore shipments and that the mine closed down about two months later owing $5,000 or $6,000 which was made up personally by the owners.)

During the following years the property appeared to have been operated intermittently, but I have been unable to get a connected history. The following disconnected facts may be of later interest:

In 1911 about 42 tons of ore were shipped, which averaged $45 per ton. Presumably the ore came from the back of the main tunnel, North of the Quien Sabe stopes. In 1912 a cross-cut was run from the main tunnel level toward the "iron dike", a distance of 150 ft. It was reported that the ground was very hard and the dike had not been cut when work was stopped.

In Nov. 1912 some work was started in the vicinity of the South Camp tunnel by a syndicate who raised $7,000 or $8,000 for the purpose. The work was in charge of J. H. Jones. From his correspondence I judge the work to have been trenching and open cuts, following stringers of ore which went off into the granite near the South end of the S. P. Carlin. It may have been that the South Camp Tunnel was started at this time.

During the latter part of 1915 and 1916 the main tunnel was cleaned out and retimbered and a shaft sunk to a depth of 175 ft. This work was in charge of D. H. Bradley, who in 1917 made a lengthy report on the property and advised sinking the shaft deeper. He states that the shaft was sunk close to the hanging wall, where the ground stood better. This shaft, now known as the "Bradley winze" is shown on the plan map Plate 2 and reference will be made to it later.

In 1918 some ore was mined from above the main tunnel in what is known as the Matheney stope, which is shown on the map. I have been told the ore taken out ran $35.00 but have not learned the amount shipped.

The foregoing portion of this report is largely a compilation of facts and opinions taken from reports of engineers and operators who were familiar with the mine during its operation, their observations being made while the drifts were being run and the stopes were open to inspection, and last but not least, while the impressions gathered were fresh in their minds.

At the date of this report (November, 1927) the Quien Sabe shaft, and all its workings, is completely caved and lost. The Bradley winze and the 40 ft. winze further North in the tunnel is full of water and the main tunnel is caved in places so as to be inaccessible to inspection fro the greater part of its length.

Any estimate we can make at the present time, of the value of the mine, must be based largely on facts derived from former reports, coupled with the existence of geological conditions which may influence our conclusion one way or the other.

Without committing myself at this time as to the profits to be derived, I am convinced of the probable downward extension of the ore shoot which has been mined to a depth of 100 ft. approximately, below the main tunnel level.

First as to its probable value. The best index we have to its value is the record of production in 1907 when the stope was mined out for a depth of 100 ft. below the tunnel level. The records show that the average net value of the shipments was $90 per ton. It is true that the average has been obtained by including the concentrates with the sorted ore shipments.

But on going over the record and taking only the ore shipments, I find the average gross value to run from $51 per ton to $103.70 per ton, with an average net value only a little lower than that obtained by including the concentrates. Bernard P. Miller says in his report - - "The most interesting feature in a mine in this state of development is the aspect of the ore body at the bottom level, and in this case the indications are exceptionally encouraging".

My own experience has been that in ore shoots in which the values in gold and silver decrease with depth, as many of them do, that the decrease takes place at the water level, where the ores change from oxidized to sulfide ores. In this case the water level seems to be at the tunnel level, or a little below it. The reports all mention ores mined from the upper stopes as being thoroughly oxidized, while reference is made to the lower level as showing bunches of "solid sulfides". The small pile of ore, which I saw at the mill bin, was sulfide ore showing little oxidation.

I judge, therefore, that the change from oxidized to sulfide ore has taken place near the tunnel level and with an increase rather than a decrease in values. I feel justified, therefore, in assuming that the value of the ore is going to remain fairly constant for a considerable distance below the present bottom level of the shaft.

Second -- As to the probable dimension of the ore shoot. In this connection your attention is called to the "Longitudinal Section along the Lincoln vein" on Plate 3, accompanying this report.

The outlines of the stopes on Plate 3 are copied from the report map of Mr. Miller giving the conditions which existed at about the time the mine was shut down in November 1907. The ore shoot was 400 ft. long on the main tunnel level and stoped out for the full length, except for an intermediate section 40 ft. long which is also marked "ore" on his map, and may have been left as a pillar.

The ore shoot has a rake of about 45 deg. to the North and hence was not cut on the lower level until the drift had been extended about 160 ft. from the shaft. It is then stoped overhead for a distance of 175 ft. The North face of this stope was probably the working face when work was stopped, by the failure of the Humboldt Smelter (according to Mr. Miller). The drift had been extended for 85 ft. beyond the stope and assays noted on the map show 6 ft. of $8 to $10 ore, 3 ft. of $19.35 ore and 1½ ft. of $32.00 in different cuts. The North face of stope and for some distance ahead of the drift it is also marked "ore".

Assays are also noted at the back of the drift for 50 ft. South of the South end of the stope, running from $8.00 to $12.00. Taking everything into consideration, I think we are justified in assuming that the ore shoot has been proved for a length of 300 ft. on the bottom level, with indications that it may be much longer. In this connection, I wish to call your attention to the location of the Bradley winze as shown on the plan map of workings.

The question naturally arises - If the ore shoot has a considerable extent in a Northerly direction on the 100 ft. level, why was it not cut by the Bradley winze?.

The ore lies on the foot wall of the vein, this is indicated in all the reports. The map shows that the North end of the 100 ft. level is swinging to the East and is approaching a point vertically under the tunnel level. In other words, the quartz foot wall streak instead of going down on the normal dip, is standing almost vertical between the 100 ft. level and the floor of the main tunnel.

Bradley says that his shaft or winze was sunk on the hanging wall of the vein which has a normal dip of 65 to 70 degrees to the West, and I have shown it on the map in that position.

It is easily seen that the winze is not in the ore and that to get the ore from the bottom of the winze it would be necessary to crosscut into the foot a distance of 40 to 70 ft. It is evident, therefore, why there is no ore in the Bradley winze and t hat it does not disprove the extent of the ore in a Northerly direction in the Quien Sabe stope.

Before making any recommendations toward the mining of the ore below the tunnel, I wish to present some additional facts which have a bearing on my conclusions.

In May 1912, Mr. C. T. Joslin engaged E. A. Wetmore, a Mining Engineer, to make a report and recommendations as to the further development of the Lincoln Mine. At that time the old workings were caved in and about in their present condition. Mr. Wetmore's report is confined to a comparison of costs between a new shaft in the old ore body and a tunnel which he advocates from the Southerly end of the S. P. Carlin claim.

In the next few years following Mr. Wetmore's report, an attempt was made to run the tunnel advocated by him, but was not sufficiently financed to carry it through. However, as a result a camp was established, partly on the North end of the American Girl and partly on the S. P. Carlin claim, and a tunnel started beginning near the end line of the S. P. Carlin claim and running into the hill for a distance said to be 467 ft.

This is known as the South Camp Tunnel. The tunnel is said to have been open and accessible until very recently, but at the time of my inspection, the top lagging of the first set of timbers had given away and the soil had caved, blocking the entrance. There is a small stream of water running from the tunnel.

In his report, Mr. Wetmore estimates that the tunnel will cut the Quien Sabe ore body at a depth of 400 ft. below the level of the main tunnel from the mill. I do not agree with him, after going over the surface and taking the vertical angles with the Brunton compass, and would say that the vertical difference is nearer 300 ft. than 400 ft. However, if the weather was favorable, Mr. Wetmore's observation with aneroid barometer is probably more accurate than my estimate. An instrument survey should be made to determine the vertical depth with accuracy.

Mr. Wetmore's report concludes as follows:

"In conclusion, I will enumerate some of the advantages of the tunnel over the shaft plan.

1. The prospecting and development of the long stretch of new territory by the tunnel, which is not done by the shaft and in particular the depth of the tunnel in cutting deep ore shoots.
2. The lower first cost of the tunnel over the shaft as well as the lesser cost of equipment.
3. The lower cost of operating by way of tunnel and the much lower cost of ore extraction.
4. The doing away of all engineers, pump men and all other labor except trammers, by the tunnel.
5. No hoisting of ore or waste, all falls to tunnel by gravity.
6. No cost of handling water, all flows from tunnel by gravity.
7. A sure and abundant supply of water from tunnel for all purposes.
8. The cutting in half of all charges in getting supplies from station to location.
9. Lower rates of transportation on concentrates, etc. from mill to station.
10. Location of mill need not be changed till work is done and future of tunnel assured.

Having in mind the facts available in regard to the Quien Sabe ore body and the reasonable downward extension of the same which may be expected, I am of the opinion the Lincoln vein is worthy of further development with two objects in view; first, the extraction of the ore assured in the Quien Sabe ore shoot. Second, the exploration of 2,000 linear feet or more of the vein which has not been prospected. Furthermore, the only plan of development which I can endorse is the one advocated by Mr. Wetmore.

I have considered the feasibility of a new shaft from the main tunnel level at the mill and, as far as the actual cost of construction is concerned, it would require about the same investment as the tunnel plan.

The deciding point against the shaft is the cost of operation, and particularly the cost of continual pumping of water, the quantity of which cannot be estimated at the present time.

The old workings for a hundred feet below the tunnel level are full either of water or of caved muck saturated with water. The draining of these old workings will add to the normal inflow of water besides being a source of annoyance and expense in stoping the ores.

The added cost of operation would also preclude the mining of a grade of milling ore, which would pay a handsome profit when mined through the tunnel.

In this connection it should be noted that the market value of ore is less today than it was in 1906 and 1907. Silver is somewhat lower and the net value of copper only about half what it was then.

If the shaft plan were adopted, the shaft would be located, of course, some distance North of the Quien Sabe stope and probably about 1,000 ft. from the cross-cut to the mill. The ore tram therefore would be 1,000 ft. plus the length of crosscut of practically 400 ft. or a total of 1,400 ft., which is more than half of the total tram required to get the ore out of the South Camp tunnel.

The shaft plan would also necessitate the cleaning out, retimbering and maintaining of the present tunnel level, which at the present time is badly caved in places.

There are many other objections to the shaft plan of development which I do not think necessary to mention, as most of them are enumerated in Mr. Wetmore's report.

The only argument I can think of in favor of the shaft plan is that the present camp site, with its buildings, and the mill in its present condition, could be used. Measured in dollars and cents, this advantage does not amount to much.

My second reason for advocating the South Camp tunnel plan of development is the probability of the tunnel opening up another body of ore, indications of which are found on the surface directly over the faceof the present tunnel.

There is every indication along the cropping of the vein at from 400 to 800 ft. North of the mouth of the South Camp tunnel of the apex of another ore shoot. Several shallow cuts show 3 Ft. or more of vein matter with iron stained quartz.

On the dump of an old tunnel is a small pile of ore. The ore is a decomposed quartz with a great deal of limonite and hematite and must have originally been a very massive sulfide ore.

Samples from this dump panned gold freely and an assay from an average sample gave 1.07 oz gold and 1.01 oz silver value $22.68 per ton. Copper not determined.

On an old blue print which I have, there is a notation as follows - "4 ft. x 110 ft. surface ore $8 to $33 per ton", this being along the apex of the vein near the old tunnel above referred to.

These showings are in part directly over the face of the present South Camp tunnel. It is well known that ore shoots in the same vein, and, in fact, throughout the same district, almost invariably rake or incline in the same direction. If this ore shoot rakes to the North at an angle of 45 deg. (similar to the Quien Sabe shoot) it would still be from one to two hundred feet ahead of the face of the tunnel.

In consideration of the above showings, I fully expect that the South Camp tunnel will encounter ore within the next two or three hundred feet.

There are one or two other favorable features in connection with the Quien Sabe ore body to which I have not called your attention, which may indicate another shoot of ore to the North or a greater length on the same shoot.

For several years after the period of production ending November 1907 there were sporadic attempts made to work the Lincoln Mine. In one of these periods, approximately 1916 to 1918, some stoping was done above the main tunnel level in what is called the Matheney Stope. I have marked this stope on the longitudinal section Plate 3 with dotted lines as neither its exact location or its extent is accurately known. It is North of the Quien Sabe stope. I have been unable to get any figures as to the quantity of ore mined and only mention it to show a possible extension of ore in a Northerly direction.

Six or eight hundred feet still further North and about 300 ft. before the Crosscut to the mill is reached, there is a winze 40 ft. deep and now full of water, said to show three ft. of ore carrying forty ounces of silver to the ton. This is also mentioned in the report of Bernard P. Miller as a matter of hearsay only.

In a short cross cut 20 ft. South of the winze, there is exposed a body of solid quartz, eight ot ten feet wide and carrying a large amount of iron pyrite. An average sample carries only a trace of gold and silver. In spite of its not showing any value at this point I attach considerable importance to a body of quartz of this size carrying so much pyrite. It is

probably connected in. some way with a point noted on the surface where the vein is 15 to 20 ft. wide with a large amount of quartz.

Taking it all together, thereis considerable evidence of a body of ore North of the old Quien Sabe ore shoot.

Indications of ore extending Southerly from Main Shaft, in regard to the possibility of ore being found South of the Quien Sabe shaft, it is evident that the former operators found some encouragement in that direction as the map shows a drift running 240 ft. Southerly from the shaft.

As quoted hereinbefore in Mr. Miller's report - "In the South drift of the lower level a new ore shoot seems to make its appearance, and development in that direction may lead to the discovery of another important ore shoot."

My recent examination of the surface shows that the widening of the soft schist belt starts South of the 75 ft. shaft near the South end of the Quien Sabe. The surface indications therefore are favorable and tend to substantiate Mr. Miller's belief that ore will be found in that direction.

LENGTH OF TUNNEL

The estimated length of tunnel will be subject to some revision when accurate surveys are made, but from the present information, I make it as follows:

Face of present tunnel to Quien Sabe South end line.....	970 Ft.
Quien Sabe end line to point under Quien Sabe shaft.....	630 "
Allowance for rake of ore shoot.....	300 "
Distance from end of present tunnel to beginning of Quien Sabe ore shoot.....	1,900 "
To this should be added the distance to be driven in the ore shoot, estimated.....	400 "
Total necessary for mining Quien Sabe ore shoot.....	2,300 "

The extension of the tunnel beyond the Quien Sabe ore shoot will probably be a matter for later consideration, depending largely on the value of the ore encountered and the appearance of the vein at the face of the tunnel.

I am estimating that the construction cost of the tunnel will run from $10 to $12.50 per foot, which will be referred to later.

The question ariees as to the quantity of ore which may be anticipated in the Quien Sabe ore shoot below the old stopes.

The former reports have little information about the width of vein or the total tonnage of ore mined.

However, the map with the report of Bernard P. Miller gives the outline of the stopes from which he says the output of ore for 1907 was mined. This was between the 100 ft. level and the main tunnel level, and shows an area of 18,000 sq. ft. of stoping, leaving the width of vein out of consideration. The production from this area was $29,040 in ore and $9,680 in bullion, or a total production of $38,720.

Assuming that the South Camp tunnel extension will gain 250 ft. of additional depth, we will have a block of ground 250 ft. x 400 ft. or 100,000 sq. ft. To be on the safe side say the ore shoot is only 300 ft. long which would give 75,000 sq. ft.

If the value of the ore and the width of vein is the same as above, the net smelter returns would be $162,540. The mining costs which would have to be deducted would depend so much on the width of the vein that it is impossible to estimate them at this time. It might be more profitable to run all the ore stoped through the mill, rather than sorting and shipping the high-grade, which has been done heretofore.

SOUTH CAMP SITE

The location of this camp site on the American Girl claim and about 100 yds. below the mouth of the tunnel is not as favorable as the old camp at the mill. The gulch is rather rough and narrow and the road is steep to the main Crown King road 150 yds. further down the gulch.

There are two small buildings now at the camp which can be repaired at small cost. I figure that you will have to provide housing for 12 or 15 men for the operation of the tunnel, and that additional buildings required will have to be moved from the old camp.

The starting of work on the tunnel involves the following preliminaries:

1. Repairs to roads and buildings at South Camp site.
2. Moving of two or three buildings, and mining supplies, cars, rails, pipe, tools, etc. from the old camp.
3. Providing water supply for domestic and mine use.
4. Extension of electric power line (commented on later).
5. Repairs to present tunnel, power house and shop.
6. Purchase and installation of machinery and supplies.

There are two small corrugated iron buildings at the mouth of the South Camp tunnel; one about 12 ft. square used for a blacksmith shop, the other of similar size for a change house. A new building would be required for a power house.

Expense of repairing the present tunnel is rather uncertain until it can be cleaned out at the entrance and examined. If there are no serious caves further in, the expense will be nominal.

MACINERY AND EQUIPMENT

Following is a list of machinery required which I do not claim is complete and is for the purpose of estimating the outlay required for this purpose. Allowance should be made for additional items.

Ingersol-Rand Compressor, A.R.1 12x10 350 cu.ft. capacity with 60 H.P. Motor, installed	$2,750
Receiver for same	250
Blower and Motor, 2d hand	100
Leyner drill, with air hose, water hose and bar	500
Water tank for compressor, probably can be taken from old camp.	
Blacksmith shop equipment (without drill sharpener) est.	400
	$4,000

Small centrifugal pump and motor for shop.

MINING EQUIPMENT

Drill steel	$300	
2,900 ft. 1" water pipe)		
" " 1½" air ")		
" " 8" ventilating pipe)	2,800	
" " Track - 12# rail)		
Cars (unless old ones can be used)	300	
	$3,400	
	4,000	
		$7,400.00
As an approximate estimate of the cost items (1), (2) and (5) listed on previous page		850.00
Estimated outlay required to start work (except electric power line)		$8,250.00

I am unable at this time to give you figures on the cost of getting the Arizona Power line to the mouth of the South Camp tunnel. I believe you had a tentative arrangement with the Power Company for the extension of lines to the old camp, which it may be necessary to revise on account of the change in plans. Whatever expense is necessary should be added to the "Estimated outlay required to start work" of $8,250.00 given above.

OPERATING EXPENSES:

My estimate of costs is as follows, figuring two eight hour shifts per day:

Labor - 2 miners and 4 muckers	$ 30.00	per day	$100.00
Ammnition (powder, fuse and caps)	20.00	" "	
2 Engineers	11.00	" "	$200.00
Blacksmith and helper	10.00	" "	$35.00
Superintendent or foreman - - - - - - - - - - - - - -	10.00	" "	$30.00
	$ 81.00	" "	

For month of 26 days	$ 2,100.00
Estimated power bill	400.00
	$ 2,500.00

If miners average 4 ft. per shift, cost per foot will be $12.50
If miners average 5 ft. per shift, cost per foot will be $10.00
(figuring 25 effective shifts)

You will notice in this estimate that the cost at the face of the tunnel (miners, muckers and amunition) is from $5.00 to $6.25 per foot. I doubt if you could get a contractor to run it for that price and furnish his own powder.

If anything, my estimate is too low and you will be fortunate to get the tunnel run for $12.50 per foot.

You will notice that I have not allowed anything specifically for cost of timber, ties, lubricating oils or blacksmith coal.

Possibly, labor costs at Crown King may be somewhat lower than I have figured them. I would estimate total cost as follows:

Equipment	$ 10,000.00
2,400 ft. tunnel at $12.50	30,000.00
	$ 40,000.00

MILL SITE AND WATER

Consideration of the mill question may come up on development of ore in the 1st shoot and in a short time after starting work.

The ore in the 1st shoot will be an oxidized ore, a large part of the values being recoverable on the plates.

I would advise that it be fully developed by a raise possibly through to the surface and the ore fully blocked out before making plans for a mill.

Its value then can be fully determined and continuous operation of the mill assured after it is started.

The possibility of a mill being required soon is an argument for extension of the electric power lines instead of using a hot head engine for the compressor, which might be considered if there was only that use for the power.

Without having investigated it in detail, I am satisfied that a suitable mill site can be found near the mouth of the proposed tunnel.

WATER SUPPLY

The assumption may fairly be made that after the tunnel cuts the Quien Sabe ore body, that there will be ample water for milling purposes.

Until that time it may be necessary to develop other water resources.

With this idea in view, I would suggest the acquisition by location, or purchase if necessary, of the ground on which the old arrastra was located. This is a small meadow located East of the Quien Sabe and South of the Norma lode. The schist-granite contact runs through it and there is an old well with water standing to the surface and running over into two small ponds. I have no doubt but that a permanent water supply could be developed along the contact. By putting in a small gas engine pump, the water could be "boosted" over the first ridge and would have a fall of from 200 to 300 ft. from there down to the mouth of the tunnel. About 2,000 ft. of pipe line would be required.

The ground in question is said to be owned by Jim Lewis, who has a cabin there. It is a question as to how much work he has ever done to hold it, but he is an old-timer and has undoubted possessory rights.

My estimates have considered only the cost of tunnel to the limit of the Quien Sabe ore-shoot, a distance of 2,300 ft. beyond the face of the present tunnel. I think, however, that you should seriously plan the extension of the tunnel to the full three thousand feet, as shown on the maps, and your financing with that end in view.

I am recommending the extension of the South Camp tunnel as a means of developing the Lincoln vein for a length of 3,000 ft. and for the economical extraction of the ore, and have discussed heretofore only the ore reserves above the tunnel level.

For mining ore below the tunnel it is evident that one or more shafts will have to be sunk below the floor of the tunnel. This method is entirely practical and is being used in many mines of this State. The miners of the United Verde mine at Jerome all enter the mine through a long tunnel and then down a deep shaft. The hoisting plant being in a station on the tunnel level.

Your tunnel will be available for this purpose, and the ore can be delivered at the mill irrespective of whether it is mined above the tunnel level or below it.

It is premature at this time to make definite plans for mining below the tunnel level as the location of shafts will depend on the position and size of the ore bodies developed by the tunnel.

Finally, in recommending the tunnel plan of development, I have in mind the possibility of extending it beyond the limits of the Lincoln vein, and its use in the exploration and development of the Watsonville and other veins lying to the West and North.

The following notes on the Watsonville lode were made subsequent to the compilation of the foregoing report:

The Watsonville lode claim was located by Ernest R. Hill January 1, 1892 and patent issued August 31, 1905, the patented area being 11.965 acres.

The improvements at date of survey for patent consisted of a tunnel 341 ft. in length, a tunnel 65 ft. in length and three shallow openings.

The Watsonville vein runs through the middle of the claim about 300 ft. West of the Lincoln vein and is probably identical with and the North extension of the Elene vein.

While the Watsonville and Lincoln veins are apparently parallel there is some indication of their converging toward the North.

The Watsonville vein is similar to the Southerly end of the Lincoln vein, that is where the sericite schist lense is very narrow and the walls are hard silicious-hornblendic rocks. The vein dips Westerly at 70 degrees, the vein filling being quartz with pyrite and traces of copper. I do not recollect seeing any porphyry associated with it.

I believe the 65 ft. tunnel is partially open to inspection but I did not go into it except to note that there was a small underhand stope near the entrance, the ore appeared to be tight and 6 in. to 18 ins. in width. A small quantity of iron stained quartz on the dump is said to run $12 to $14 per ton in gold. I understand that Mr. Strain milled some ore from here. The Watsonville fissure seems to be persistent in length for 2,000 or more feet and there may be some place throughout its length where the enclosing rocks are softer, permitting of more extensive mineralization than at the few places which came under my observation.

Its relation to the quartz areas on the Yellow Jacket should be investigated.

Respectfully submitted

Alfred B Coldwell E.M.

Prescott, Ariz.
Nov. 15-1927

Was work done by "eastern group"?
— Not after 1932.

DEVELOPMENT
EXAMINATIONS
VALUATION
REPORTS

ALVIN B. CARPENTER
CONSULTING MINING ENGINEER
1211 PACIFIC MUTUAL BUILDING
LOS ANGELES
MUTUAL 8258

TELEPHONE
MUTUAL 8258

Office Copy
Keep

September 14, 1932

Mr. Melvin F. George

Dear Sir:

At your request I made a visit to the Lincoln Mine near Crown King in Yavapai County, Arizona, on September 11, 1932, and in the following pages I give you a resumé of what I found there, including the present condition of the workings, the equipment, housing, and roads. I also include a statement of the present condition of tax payments as shown on September 10th on the books of the Treasurer of Yavapai County, in Prescott. The following is the information obtained from observation and from Pat O'Hagan, the sole employee at present on the property.

My general understanding is that there is now a lease and bond on the property executed by Mr. Chas. C. Miller, Jr. as Trustee to a Mr. Christenson and others in the name of the CALINCOLN MINES INC.

During 1931 this corporation proceeded to actively work the property. Preliminary to actual mine work, all of the cabins at the mine camp were rehabilitated and put in first-class condition, the outsides painted and the inner

walls neatly lined with straw board. One new cabin was erected by the company and one cottage erected at the personal expense of the President of the Company.

The roof truss in the lower part of the old mill that was broken had been replaced and the mill building appeared to be in good condition. No work has been attempted in rehabilitating the mill and it is doubtful if such would be worth the necessary expense, as the best ore possibilities in the mine are below the long tunnel that leads to the mill, and should be developed and worked from the continuation of the lower tunnel on the S. P. Carlin claim which should be extended into the Quien Sabe claim to the downward extension of the ore shoots exploited in the old upper workings of the property.

A new change house was erected and the compressor house was put in shape.

A timber shed and smith shop were also erected and a large amount of heavy timber, salvaged from an old railway bridge on the old railway to Crown King, was hauled to the mine.

A new Gardner-Denver compound air compressor of more than 600 cu. ft. air capacity, driven by a 75 H.P. Westinghouse motor, all of latest design, was set up at the mine.

The long tunnel with its portal near the old mill was cleaned out to a short distance beyond the "Bradley" winze. A larger station was made at the top of this winze and

an electric hoist installed.

The Bradley winze was cleaned out and retimbered where necessary.

This winze had reached a depth of 168 feet below the long tunnel when operations by Bradley were discontinued. The Calincoln Company carried this winze down about 40 feet to the 200-foot level below the tunnel and drove drifts both north and south. The north drift was run 75 feet to ore and crosscut 10 feet to the footwall. The south drift was run a distance of 158 feet at which point ore was struck on the footwall.

The vein at this level is characteristic of the vein in the upper levels. It is about 15 feet in width between the true hanging and foot walls. The ~~gouge~~ gangue is schist with some soft bands of decomposed greenstone and the ore occurs as quartz lenzes in the schist, sometimes on the footwall, sometimes near the center, and again on the hanging wall of the vein. These quartz lenzes run from 2 feet to 4 feet in width, the very high grade in thin seams, while the full width of the lenzes should make a mill ore of a reasonable value, from $5.00 to $15.00 grade, altho while the shoots have been more or less defined in some places, further crosscutting should be necessary to give an accurate value with sampling.

From the actual mining work done in 1931 I understand three cars of ore were shipped to the smelter, that

just about covered the expense of its extraction, and clearly showed that to make a real mine and a commercial proposition it will be necessary to thoroughly develop the mine in depth.

For such development, the S. P. Carlin tunnel should be driven 1000 feet from its present face and Pat O'Hagan stated that this development was now contemplated. He inferred that the present Calincoln Mines Inc. had arranged to turn over their lease to a well financed New York group who expect to begin this development in October.

The Carlin tunnel will cut the main ore shoots at about 175 feet below the bottom of the Bradley winze, and there is a very good chance of its cutting other ore shoots between its present face and where it would intersect the downward extension of the old ore shoots.

O'Hagan also stated that even a more ambitious program was contemplated by the Eastern people and that there was a probability that a crosscut tunnel may be started from the level of the first old railway switchback below the mine, which would have to be driven about 2000 feet to the vein. This tunnel would cut the vein some 800 feet below the present workings, would save thousands of dollars in transportation costs to the mine, and, if a fair grade of mill ore was encountered in depth, would develop a tonnage that would permit most economical operations for many years to come.

Should the result of the mine development through the S. P. Carlin tunnel show good values in the ore shoots

that it may encounter, the contemplated development at lower depths would certainly be justified, and it is hoped that the Eastern people who contemplate taking over the present lease may have both the financial ability and the patience to undertake this work. I understand that this Eastern group have had several engineers examine the property and that such reports have been satisfactory to them.

TAXES

The only information I obtained derogatory to the present leasing company was an apparently temporary oversight in keeping up the taxes on the patented claims of the property.

The taxes due December 1931 and June 1932 had not been paid on September 10, 1932. Total taxes assessed against the Rough Rider, Yellow Jacket, Quien Sabe (less 150' x 1500'), Norman, Alene, S. P. Carlin, and the Admiral and Valley View mill sites, originally amounted to $188.70, but are at this date increased with penalties to $212.21.

The taxes on the Watsonville claim and westerly 150' x 1500' of Quien Sabe stand as follows: the first installment, December 7, 1931, was paid by Chas. C. Miller, Jr. for M. F. George but the second installment due June 1932 has not been paid.

Regarding the American Girl claim which is held by location, I found Proofs of Labor had been filed and recorded for years 1927, 1928, 1929 to July 1930. No Proof had

been filed for the year from July 1930 to July 1931 but as the Calincoln Company was operating during that period, the cost of road work necessary to maintain the road to the properties could be allocated to such Proof of Labor necessary to protect this claim. There was no assessment work required for the year ending July 1932.

CONCLUSION

The present leasers now have the property in very much better shape than when I visited it in 1928, and have apparently expended about $50,000.00 in rehabilitation and maintenance. They have done very little actual mining or development which, unless it had been carried on in the Carlin tunnel, would not have been to any great advantage to the owner company, for work below the old long tunnel level would be difficult to maintain and only at a constant pumping expense.

The power line is up and paid for and there only lacks the transformer to start the electrical equipment.

The most important thing to know is who the Eastern people are, with whom the Calincoln Mines Inc. has arranged to finance and develop the property, and what are their plans.

This information is undoubtedly in the hands of Mr. Chas. C.Miller, Jr. Trustee, 601 West Adams Street, Phoenix, Arizona.

I would suggest you write Mr. Miller that he have the Calincoln Mines Inc. immediately cover the taxes that are

past due, and that he give you all information he may have regarding the personnel and financial standing of the Eastern group that expect to take over the lease.

I beg to remain,

Very truly yours,

Alvin B Carpenter

Table No. 4

SUMMARY OF PRODUCTION

1905.

210.0 tons of ore shipped	@	$51.20	equals	$10,764
87.1 " " conc "	@	58.40	"	5,445
Bullion "				4,589

1906.

182.5 tons of ore	@	$67.40	"	12,320
126.2 " Conc	@	80.60	"	10,290
173.7 " run of mine	@	26.00	"	4,517
Bullion				2,419

1907.

265.4 tons of ore	@	$101.20	"	26,875
45.5 " " conc	@	99.80	"	4,535
B ullion				12,867

For over the three years

657.9 tons of ore	@	$ 75.90	"	49.959
258.8 tons of concentrate	@	78.10	"	20,270
173.7 tons run of mine	@	26.00	"	4,517
Bullion				19.875

1090.4 tons shipped Total product $94,621.21
(Note-- @ means averaged.)
Values are gross per ton.

The shipments during 1910 are in all probability not complete and are therefor not detailed. It is probable that they amounted to about # 9,000.00

--------o--------

Over the period that a record of tonnage milled was recorded as shown on bullion return sheets, shows that

1031 tons milled plated $6,961.54 and concentrates during the same period were $ 3,777.50, equivalent to

Saved per ton on plates	$6.75
Saved per ton in concentrates	3.65
Total per ton milled	$10.40

At a saving of 70% shows milling ore to have run $15.00 per ton.

--------o--------

This record is complete and covers all production during the time that the mine was operated except when Lincoln himself operated years before in a very small way.

C.W. Doran Jr.

Table No-1

Record taken from original Smelter return sheets, ore and concentrates.

	Date		Pounds Weight	Kind	oz. Gold	oz. Silv.	% Cu.	Gross pr ton	Net per ton	Total payment	Freight
	July 31,	1905	45,432	conc	1.60	26.6	5.70	$58.28	$42.92	$ 905.22	$ 95.80
	Aug 3		50,350	conc	1.70	30.0	3.90	58.25	41.80	1026.19	95.366
	" 8		44,328	ore	1.00	16.5	3.10	35.30	17.10	373.32	83.06
	Sept. 25		52,755	conc	1.75	33.8	6.00	67.86	61.15	1563.97	125.00
	Oct. 19		38,750	ore	1.70	27.0	7.30	65.62	57.56	1104.06	264.50
	" 30		48,000	"	1.76	27.6	7.30	62.71	54.31	1256.44	39.60
	Nov. 4		25,775	conc	1.70	29.5	7.00	67.32	60.23	737.46	149.21
	" 4		14,450	ore	2.30	31.8	6.80	97.11	70.10	501.43	103.79
	" 18		52,040	"	1.19	22.0	4.80	44.49	34.23	879.99	57.50
	" 23		74,330	"	1.35	19.9	5.01	51.08	41.42	1523.97	139.37
	Dec. 19		60,000	"	1.60	19.6	5.30	56.46	47.02	1356.99	75.00
	" 19		44,000	"	1.14	15.7	3.50	40.59	30.33	645.90	50.60
	" 22		44,000	"	1.30	23.3	6.39	54.60	54.30	971.68	39.95
	Jan. 11,	1906	31,300	"	2.42	35.2	6.66	87.92	78.27	1210.21	55.00
	" 12		50,000	"	1.80	21.9	5.677	65.84	56.27	1378.61	75.00
	" 21		53,720	"	1.35	28.7	6.30	62.68	53.18	1398.42	80.60
	Feb. 12		47,220	"	1.25	33.2	6.21	63.12	52.87	1218.28	75.20
	Mar. 21		55,350	"	0.20	9.6	4.68	21.79	11.48	298.07	45.67
	Apr. 2		50,556	"	0.15	8.7	3.87	19.51	9.32	221.47	41.70
	" 17		50,920	"	0.19	9.2	3.18	18.72	6.14	202.26	42.00
	May 8		55,220	"	0.26	13.8	5.62	30.17	20.95	560.50	63.85
New Mill	" 29		53,720	conc	2.19	29.0	7.92	86.60	78.42	1925.21	80.60
	June 1		44,820	ore	0.24	13.4	6.02	30.93	21.67	461.20	42.90
	" 12		49,220	"	0.46	15.3	6.35	37.61	26.45	678.45	56.60
	" 12		51,300	conc	1.66	23.2	7.59	71.94	63.41	1485.69	76.95
	July 2		49,060	"	1.57	24.4	8.64	72.90	64.90	1458.24	75.00
	" 18		42,120	ore	0.32	10.0	4.86	26.51	17.51	362.12	48.75
	Aug. 17		49,930	conc	2.30	26.2	7.66	85.32	77.38	1840.87	75.00
	Oct. 5		36,080	conc	1.97	25.8	6.64	77.87	69.04	1124.66	66.00
	" 25		43,320	ore	2.32	19.1	4.68	75.36	64.15	1297.75.	66.00
	Nov. 13		54,820	"	2.61	34.8	5.72	94.96	84.18	2242.72	90.00
	Dec.1 1		36,060	"	0.90	16.5	4.04	43.10	31.42	539.86	
	" 1		16,160	conc	2.34	36.8	10.54	110.79	102.39	782.57	78.35
	" 28		49,620	ore	1.76	20.5	4.46	65.12	53.74	1258.50	74.45
	Jan 17	1907	62,090	"	3.58	27.0	4.56	106.43	95.36	2860.85	122.60
	Feb. 11		59,300	"	3.41	24.0	3.87	98.51	87.21	2430.60	90.00
	Mar. 19		77,120	"	3.21	23.7	4.32	96.76	86.27	3130.30	115.70

Table No 2.

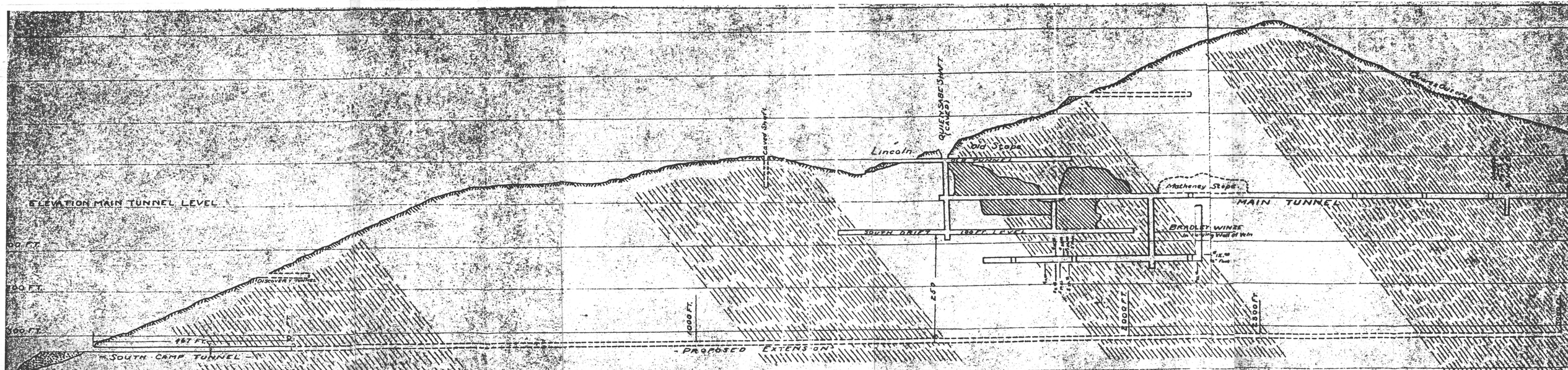
BULLION FROM MILL.

Copied from original mint return sheets.

	Date of rec't at mint.	Gross wt amalgam ozs.	Value of gold	Value of silver	Charges.	Net am't paid	
Old Mill Five Stamps	June 17 1905.	92.40	$895.09	$19.05	$4.38	$ 909.76	
	July 21	96.35	1154.34	18.29	4.70	1167.93	
	Aug. 4	70.00	897.25	10.58	3.63	904.20	
	" 31	64.55	838.13	11.77	3.59	841.31	
	Sept 13	40.40	455.27	9.20	2.62	461.85	
	Oct. 9	30.00	298.35	8.06	2.18	304.23	
New Mill	June 2 1906.	33.64	406.35	7.32	2.36	411.29	
	July 19	32.20	353.71	7.24	2.27	358.68	
	Aug. 20	59.40	527.29	16.53	2.17	541.65	
	Sept. 14	62.05	410.55	20.14	2.01	428.50	Said
	Oct. 11	50.43	406.20	13.92	2.19	420.11	to be
	Nov. 2	26.86	251.87	8.25	1.54	258.38	from
	Apr. 26 1907	-----	Mint record lost		-----	501.85	
	May 10	-----	" "	"	-----	1160.77	310 tons
	" 22	56.08	735.13	10.80	3.22	742.71	
	June 7	75.35	883.39	14.98	3.83	894.54	142 "
	June 20th	71.58	859.52	14.52	3.70	870.34	145 "
	July 10	81.34	949.39	16.91	4.06	932.54	128 "
	" 19	51.61	587.11	11.42	2.89	575.64	92 "
	Aug 5	49.16	570.79	9.24	2.75	577.28	95 "
	" 21	31.45	349.71	7.15	2.17	354.79	57 "
	Sept 7	33.48	353.48	7.74	2.22	358.98	62 "
	" 25	26.48	316.09	6.61	2.05	320.65	
	Oct. 5	39.95	446.09	8.57	2.48	854.18	
One liquidation appears lost.							
	Nov 6	57.90	548.37	12.14	2.99	557.52	
	" 21.	56.16	475.22	7.82	2.54	48.50	
	Dec. 10	23.53	262.95	3.91	1.84	265.03	
	Apr. 29 1908	46.35	478.11	9.75	2.86	485.00	78 "
	May 7	43.60	471.79	7.89	2.71	476.97	70 "
	Feb. 10 1910 to June 2nd, according to Bank record					2951.95	

Table No 3

Date	Pounds weight		Oz. Gold	Oz. Silv	% Cu	Gross per ton	Net per ton	Total payment	Freight
Jan. 17, 1907	62,090	ore	3.58	27.0	4.56	$106.43	$ 95.36	$2860.33	$122.60
Feb. 11	59,300	"	3.41	24.0	3.87	98.51	87.21	2430.60	90.00
Mar 19	77,120	"	3.21	23.7	4.32	96.76	86.27	3130.30	115.70
Apr. 11	68,000	"	4.29	26.0	4.41	118.51	108.20	3520.61	132.60
May 10	59,460	"	3.26	28.9	5.31	103.73	92.68	2719.50	117.00
May 16	29,720	Conc	3.00	25.4	5.76	100.00	91.33	1209.20	55.70
June 19	18,652	"	not off original			82.70		684.20	
July 6	47,400	Ore	1.83	22.2	4.11	65.69	53.96	1230.20	102.35
" 12	20,860	Conc	3.34	22.9	4.23	97.42	88.42	839.00	104.50
" "	48,800	Ore	3.28	24.2	3.96	94.17	83.27	1970.80	
Aug. 15	21,720	Conc	4.06	27.5	5.22	115.79	106.34	1045.10	126.15
" "	42,960	Ore	3.73	37.6	7.36	121.25	110.82	2301.85	
Sept. 13	64,740	"	3.21	39.6	6.39	106.30	95.92	2990.00	126.25
Oct. 17	54,000	conc	(Oct.				)		
" "	-------	ore	(not off original, none made)					3370.00	Smelter failed loaned by Bank on the shipment
Feb. 1, 1910	16,740	Conc	1.61	30.2	8.60	61.28	56.24	423.15	Prepaid
Mar. 8	21,681	"	1.84	20.7	5.55	55.74	50.74	503.29	24.94
Apr. 12	15,119	"	2.23	20.3	4.32	61.06	55.79	385.90	20.51
May 10	15,456	"	1.82	16.3	4.90	51.78	45.77	341.67	
" "	12,513	ore	.71	13.4	5.40	28.35	19.09	117.29	25.40
" 24	8,548	conc	1.68	18.8	7.40	53.18	50.00	203.00	9.82



LONGITUDINAL SECTION

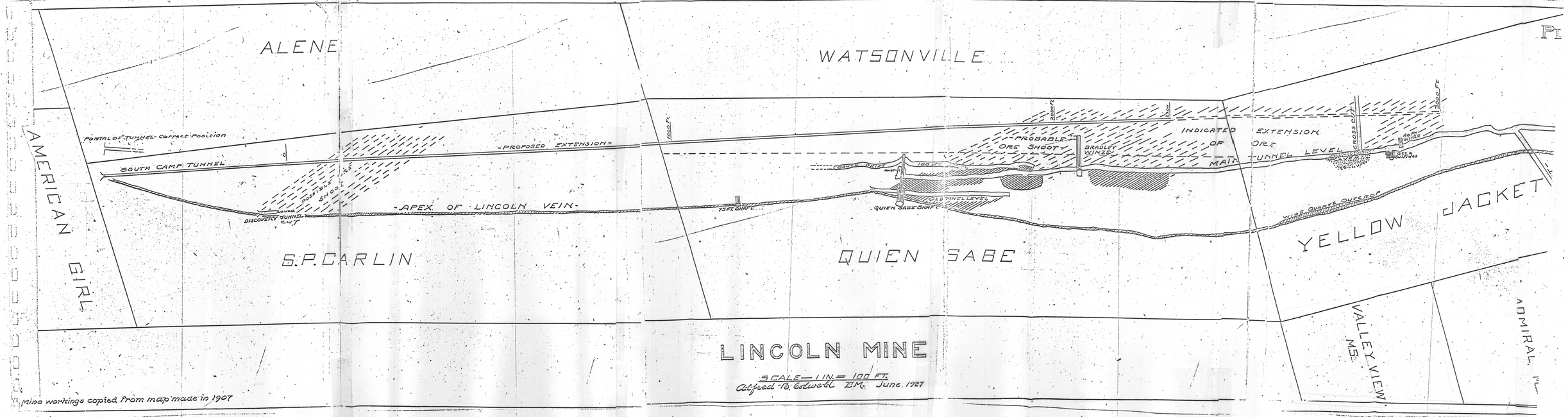
SCALE—1 IN = 100 FT.

CALINCOLN MINE, INC.

Ore

JUNE 20, 1932

H.D. Stewart



Mine workings copied from map made in 1907