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*Duplicate*

# Mine Tax Statement—Short Form

For the Year Ending December 31, 1928

to the

STATE TAX COMMISSION OF THE STATE OF ARIZONA

Provided by Paragraph 4829, Sub. 6, Revised Statutes of Arizona, 1913, Civil Code

Owner M. J. O'Brien, Ltd.,

Address Ottawa, Ontario, Canada.

Lessee Bluford H. J. Balter,

Address c/o Groom Creek Stage, Prescott, Arizona.

Name of Mine or Claims in Contiguous Group Storm Cloud Group

Mining District Senator County Yavapai

Acreage Patented 210 (about) Acreage Unpatented 40 (about)

Wet tons mined 1,039.72 Sold to A.S. & R. Co.

Total Metal Contents in Products Sold: Value and Magma Copper Co.

Gold 1,678 + ozs. \$.....

Silver 11,120 + ozs. ....

Copper 316,847 + lbs. ....

Other Metals --- lbs. ....

Total income received from ores mined during

year Royalty Only \$ 6,271.27

Also as rental for Jan. and Feb'y. 400.00

Operating Costs: \$ 6,671.27

(Do not include any charges for Depreciation, New Construction or New Equipment)

Mining } Show full detail on { \$ 1,200 \*

Milling } back of this sheet { 140 \*

Transportation of Products (freight, hauling, etc.) .....

Smelting and Refining Charges .....

Total \$ 1,340.00

Net Income \$ 5,331.27

## OATH

STATE OF ARIZONA

County of Yavapai } ss.

I, G. M. COLVOCRESSES *Agent for M. J. O'Brien Ltd*, on oath do say that the foregoing report has been prepared from the original records in my possession and is a complete and correct statement of the results of operations on the above mentioned mine or contiguous group of mines during the year ending December 31, 1928.

Subscribed and sworn to before me at Humboldt this 13<sup>th</sup> day of March 1929.

My commission expires April 17, 1931

Notary Public.

Seal

(Stamp of)

WLG  
office copy

GENERAL STATEMENT REGARDING STORM CLOUD MINE

Revised October, 1937.

The Storm Cloud Group of Mining Claims belong to M. J. O'Brien of Ottawa, Canada, whom I represent locally. <sup>15 Patented & 1 unpat (200 acres)</sup>

Although Originally located and worked as a gold mine the production during the last 35 years has been almost entirely from the copper veins and as far as I can learn the last production of gold ore was made in 1898 and '99.

Some production of copper was made in 1906 and later, but the mine was closed down from 1913 to 1925. From 1925 to 1930 it was operated by lessees under my direction and during 1928 and 1929 it was equipped with a concentrating mill.

Substantial reserves of copper ore with some gold and silver values still remain in the mine and these are shown on the assay maps and described in the reports which are attached.

The production made by the various lessees was as follows:

	Tons	Average gold.	Average silver oz.	Av. cu. %
Grove and sons, '25, '26, and '27*	1830	0.065	4.50	8.50
Balter (about)	12000	0.05	2.0	3.00
Bradshaw Co. & Prince & Hussen (about)	370			
	14,200			

The Bradshaw Co. shipped some very low grade material from the dumps, the ore which they mined from the gold vein ran about \$12.00 per ton and the balance of their shipments came from the Curtis and Galena Veins and carried about \$25.00 in gold and silver with a little copper and lead. The Company was wretchedly managed and tried to operate seven different mines at once before going into bankruptcy--no proper records were kept.

Aside from a small amount of development on the gold vein and copper vein, where the results were of little importance, the work of the Bradshaw Co. was mainly confined to the Lion Tunnel where good shoots of pay ore, averaging better than \$20 in gold and silver values were opened up in both veins on the north side of the Lion Crosscut.

Most of the ore from this level to the surface was mined out but all indications point to its continuance with depth and the Bradshaw Co. retimbered and equipped the Ten Spot Shaft intending to extend the old crosscut in the 1st level (100' below the Lion Crosscut) to intersect these veins and continue to the Lion Vein.

The average width of the ore shoots in these veins is slightly less than 3' and if the shoots should prove to have a substantial length, as may reasonably be expected, this work might serve as a basis for small scale mining operations which might later be increased if the ore should be found to continue to or below the 230' level from the shaft where another crosscut could be run out to the veins at a small expense.

In my opinion this development is well justified.

Aside from this work and reopening of the copper vein,--which would hardly be attractive unless the price of that metal was at least 14¢ per pound -there are several other locations which merit investigation as noted below:-

(1) The surface pits on the copper vein north of Jersey Gulch and 300' north of the portal of the main adit, where it is reported that some very good gold and copper assays were obtained.

(The gold vein should have intersected the copper vein before this point was reached, but a search should be made to the east for the outcrop of the gold vein on the chance that they run parallel.

(2) The copper shaft on the Dakota Claim, where a sample gave Au--trace; Ag. 3 oz.,; Cu. 16.2%.

(3) The tunnels and pits near Jersey Gulch on the Paw Paw where some good lead-silver ore was found and worked by some sub-leasers for Grove.

(4) The pits on the main copper or gold vein on top of hill and south of ravine which marks the fault or dyke (on Palmetto or Betsy Ann Claims). Some good copper ore with gold values said to have been found here.

(5) Outcrops of the Cash vein where it crosses the Johnny Claim (see Rosenberg's map.)

(6) Several cuts and pits on the northeast side of Jersey Gulch located on the Hoot Owl, Ginger, and Parintha Claims.

The owner of this property will not work it himself by reason of its distance from his residence and other activities and he would be disposed to make very reasonable terms with any responsible company who might be disposed to proceed with its development.

*Shue*

*Shue Royalty (over) \$ 3040.68 on 1576 t = 1.90¢/t*

*(1576 t, at 0.065, at 4.35, at 8.86)*

*Patton Royalty, over 10.00 on 13000 t.*

KEY TO SAMPLES SHOWN ON ASSAY MAP OF SECTION ON STORM CLOUD  
GOLD VEIN.

Numbered samples taken by Reid, lettered samples by Colvocoresses.

Marked	Width inches	Gold oz. per ton.	Silver oz. per ton	Present gross value
106	16"	nil	tr.	nil
107	12	0.10	1.4	4.50
108	24	0.28	0.5	10.18 )
h	24	0.03	0.1	1.12 )
131	4	tr.	tr.	
118	28	0.60	0.4	21.30 )
g	24	0.01	tr.	0.35 )
119	16	tr	0.6	0.45 )
k	18	0.01	tr	0.35 )
120	46	0.05	0.7	2.25
121	19	0.04	0.5	1.78
127	6	tr.	tr.	nil
126	37	0.15	0.4	5.55
122	12	tr.	tr.	nil
e	38	0.29	0.5	10.43
113	26	0.6	0.3	21.25 )
f	28	0.12	tr.	4.20 )
123	32	tr	tr	nil )
d	30	0.23	0.1	8.12 )
111	71	0.67	0.7	24.10 )
a	68	0.08	0.5	3.18 )
109	60	tr	0.6	0.46
112	65	0.30	0.3	10.75 )
b	73	0.25	0.7	9.29 )
110	65	0.88	0.6	31.20
116	12	tr.	tr.	nil )
c	20	0.27	0.4	9.76 )

The samples which are bracketed were cut not more than one foot apart and wide variation in value is to be noted in all of them except 119-k, and 112-b. In the pairs 108-h, 118-g, 113-f and 111-a Reid's samples are much higher while the reverse is true in respect to 123-d and 116-c.

From Reid's sampling alone I had suspected that the values might be very spotty and this suspicion is now definitely confirmed, although it seems probable that more uniform values, in line with Reid's highest assays, existed in the main portion of the ore shoot which was mined out by the old-timers.

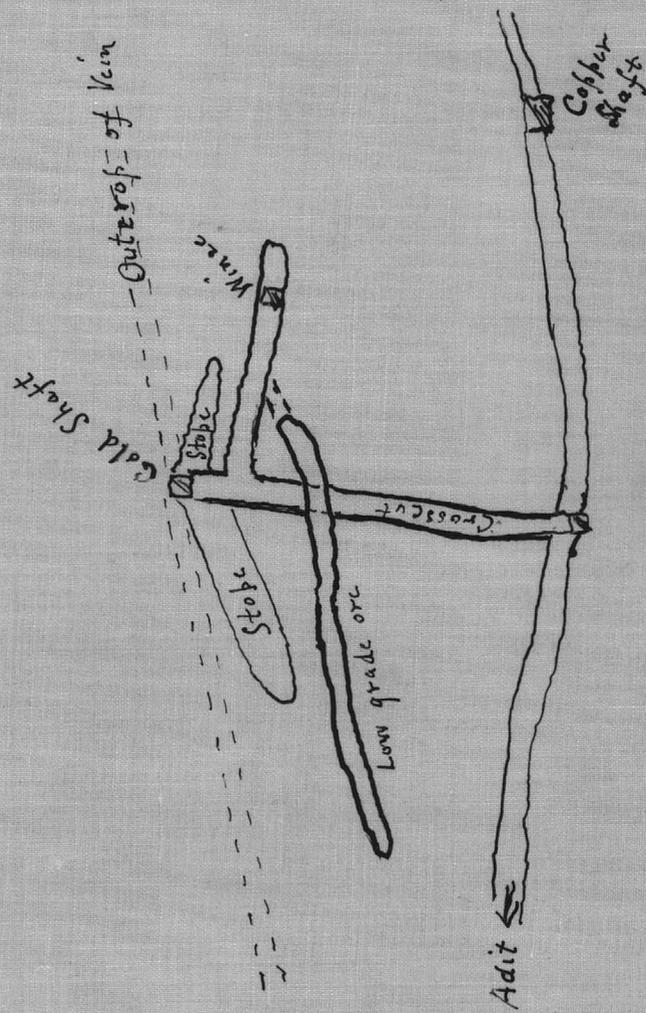
Nov. 14-24, 1917

ASSAYS STORM CLOUD GOLD VEIN (Gold at ~~20.00~~ <sup>35</sup> per ounce. Silver in ounces.

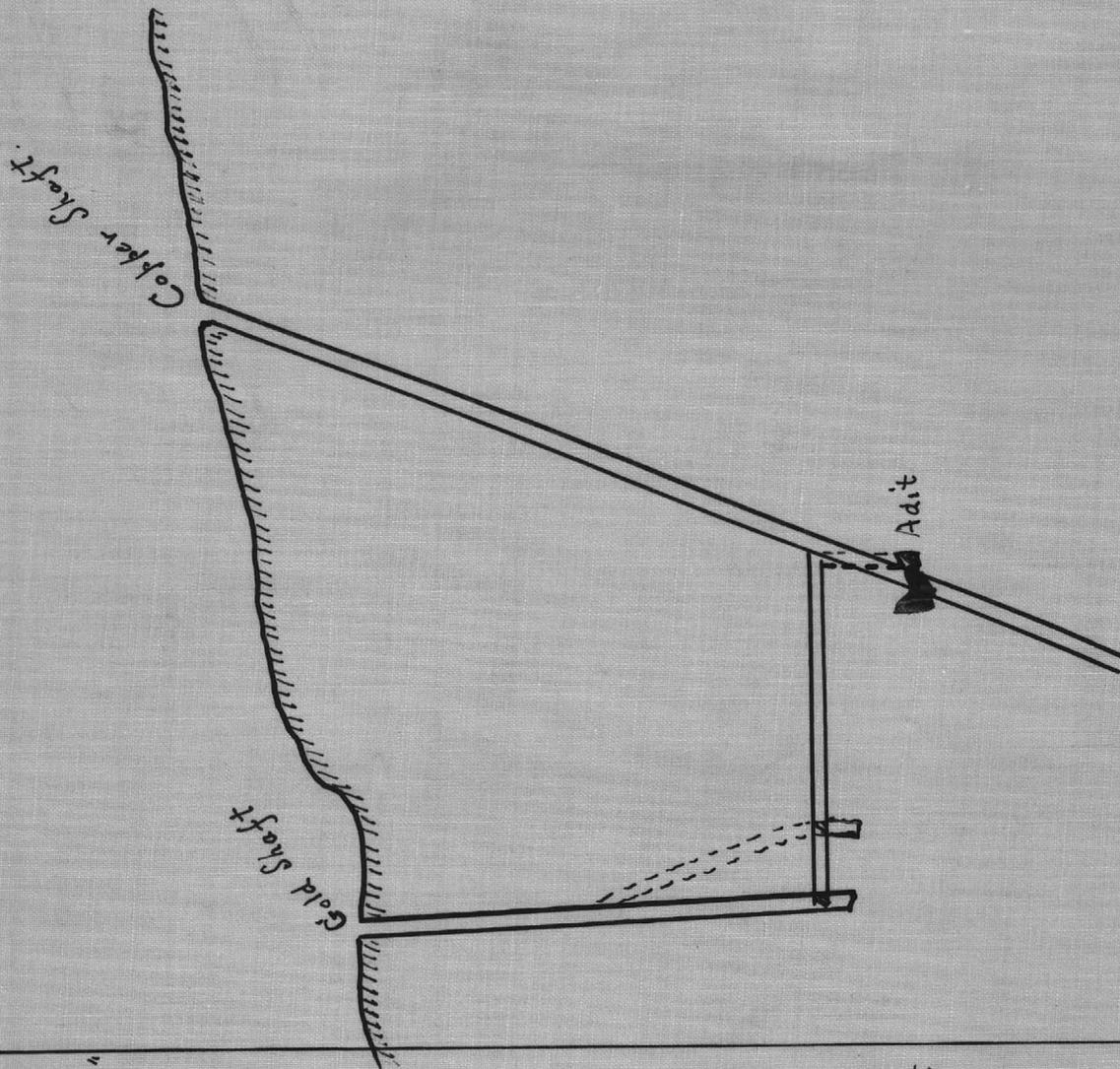
NO.	WIDTH	GOLD	35	SILVER	Gross Value	Location etc.
106	16"	<sup>@ 10.</sup> Nil		Tr.	<sup>Am @ 35 Ag @ 2.77</sup> Nil.	Face of N. E. drift
107	12"	2.00	3.50	1.4	4.50	N. E. drift 10' S. W. of face.
108	24"	5.60	9.80	.5	10.18	N. E. drift 15' S. W. of face.
109	60"	Tr.		.6		Bottom of S. W. winze N.E. side Depth of winze 15.7'.
110	65"	17.60	30.80	.6	31.20	S.W. winze S.W. side 5' above bottom.
111	71"	13.40	23.60	.7	24.10	S.W. winze N.E. side 10' above bottom.
112	65"	6.00	10.50	.3	10.75	S.W. winze 13.6' above bottom S.W. side.
113	26"	12.00	21.00	.3	21.25	N.W. winze bottom at S.W. side. Winze 10' deep (16" taken off bottom 10" taken 3' higher on H.W. side.)
114	31"	13.60	23.80	.4	24.10	N.E. winze N.E. side 3' below top.
115	24"	2.00	3.50	.2	3.65	N. E. winze S.W. side 4' below top.
116	12"	Tr.		Tr.		Face of S.W. stope 4.5' below slip.
117	34"	2.00	3.50	.2	3.65	Face of S.W. stope 6' above 116.
118	28"	12.00	21.00	.4	21.30	N.E. drift 25' S.W. of face
119	16"	Tr.		.6		" " 45' " " "
120	46"	1.00	1.75	.7	2.25	" " 54' " " "
121	19"	.80	1.40	.5	1.78	" " 79' " " "
122	12"	Tr.		Tr.		" " 99' " " "
123	32"	Tr.		Tr.		Face of stope 18' S.W. of N. E. winze.
124	44"	6.00	10.50	.2	10.65	Top of pillar 6' S. of 123
125	18"	8.00	14.00	.4	14.30	Pillar just S.W. of shaft.
126	37"	3.00	5.25	.4	5.55	N.E. stope 9' above last bench
127	6"	Tr.		Tr.		Bottom of N. E. stope 8' S.W. of 126

Plan.

Scale 60' = 1"



Section



# M. J. O'BRIEN, LIMITED

CABLE ADDRESS  
"CALABOGIE"  
OTTAWA

HEAD OFFICE  
OTTAWA, CANADA

KINDLY ADDRESS  
ALL CORRESPONDENCE TO  
THE COMPANY

OFFICE OF THE GENERAL MANAGER

April 15th, 1936.

G. M. Colvocoresses, Esq., M.E.,  
1108 Luhrs Tower,  
Phoenix, Arizona.

*A. 4/20-1936*

Dear Mr. Colvocoresses:

Supplementing my letter to you of April 4th, I now beg to advise that I have had an opportunity of discussing your letter of March 31st with my Principals, and enclose for your information a list of assays secured by Mr. J.A. Reid at the time he made his examination some years ago. From this you will observe that there are some values of note in the two winzes. The southwest winze, 15.7 feet deep, shows an average value (at \$35.00 gold) of \$21.60 for 13.6 feet across 67 inches. The northeast winze is 10 feet deep: three samples show an average of \$14.90 across 31 inches. Other samples were taken around the margin of the old workings wherever accessible.

After thoroughly discussing the matter with Mr. O'Brien, we have decided that if an expenditure of \$1,000.00 will suffice to show the property up sufficiently well for your purpose, we are agreeable to your going ahead, and upon confirmation from you shall be glad to arrange for the necessary funds.

I am asking our Accounting Department to forward to you to-day the additional amount of \$200.00 required for assessment work on the unpatented claims, and must apologize for my delay in forwarding to them your statement for last month.

Yours very truly,

M. J. O'BRIEN, LIMITED

*J. A. Dickerson*  
General Mines Manager.

JGD:EA.  
Encl.

GEORGE M. COLVOCORESSES  
MINING AND METALLURGICAL ENGINEER  
HUMBOLDT, ARIZONA

To M. J. O'Brien, Ltd.,  
Ottawa, Canada.

REPORT ON STORM CLOUD PROPERTY.

This report is intended to supplement and revise the report on the above property submitted by me on May 26, 1925. At that time the mine had been partially opened by the lessees after a shutdown of several years, and only a very limited section of the workings was accessible. The development and operation of the mine during the past two years has served to permit a more accurate survey (as per blue print attached and marked Exhibit "A") and has afforded additional information both as to the ore occurrences and probable results of future development. Certain impressions formed prior to my first report have been found incorrect and are herein corrected, but it should be stated that even today there are many conditions which are not at all clear, and which can only be clarified by further development work followed by complete measurement and sampling of orebodies which are at best merely indicated by the present workings.

No attempt is made to repeat the general description of the property contained in my first report, and in various letters, and no detailed mention is made of other portions of your property than the so-called "Storm Cloud workings" since with one or two exceptions the lessees have confined their operations to the Storm Cloud vein, and no new facts of essential importance have been determined in regard to other veins or indicated ore occurrences.

The lessees have lived up to the terms of their contract and carried out such an amount, but only such an amount, of development as was compulsory upon them under the terms of this lease. This work has naturally been confined to the development of ore which could be quickly mined and shipped with profit, and has not included any attempt to prove up orebodies of lower grade material. In fact, work of this latter character would have involved expenditure of a greater amount

of funds than the leaser possesses, or than I was led to believe they expected to obtain at the time the lease was made, and obviously there is no great incentive for the leasers to develop ore which they could not possibly ship with profit during the term of their lease, nor unless a mill were constructed on the property. This situation has been disadvantageous to the interests of the owners since the work done during the past two years has not served to proportionally increase the ore reserves nor the future value of the property, and the present showings still do not render justice to the possibilities of the mine, although in my opinion the work of the leasers has very considerably increased its value and given substantial encouragement to further development.

#### STORM CLOUD VEIN.

This vein, as previously described, is of a duplex character, that is, really two veins lying between hanging and footwalls of siliceous shist and separated from each other by a dyke of porphyry varying in width from 12' to 35'. The veins are nearly parallel, except where the filling swells at intervals, and there is no indication from present development that they will come together, although they may do so at greater depth. Pay ore has now been found to occur in both hanging and footwall veins, but principally in the latter. The width of the high grade material (over 8% copper) being generally from 1' to 3', while on one or other side generally occurs lower grade ore from 2' to 6' in width, but not workable with profit under present conditions. It appears that the best of the ore occurs in shoots or lenses which at times are found in the hanging wall vein, and at other times in the foot wall vein. Any accurate estimate of tonnage and grade is greatly handicapped by the fact that the drifts are either in one vein or the other, or sometimes in the filling between, and no attempt has been made to completely explore and develop both hanging and foot wall veins throughout the length of the workings.

The attached blue print, comprising the plan and sections

with a number of assays at various points, gives very useful information but fails, for the reasons mentioned above, to clearly show the probable extent of the oreshoots.

In my previous report certain specified shoots were described and designated A, B, C and D, but subsequent work has shown that the impression formed at that time was incorrect, and the mineralization appears to be practically continuous from the surface and portals of the two adits, extending southward to a point beyond the main shaft (No.1) and downward below the 300 level. However (and this is a characteristic of all veins in this section of the State) the vein filling varies substantially in character and values and in places is practically confined to iron sulphides where elsewhere the values in copper, gold and silver gain <sup>to</sup> a point where this ore becomes commercial. The operations of the mine to date have necessarily been confined to the highest grade portions of the vein, and wherever lower grade material was found to exist (even though this might represent a substantial tonnage) the old operators and the present leasers have been obliged to discontinue mining, leaving in place a ~~very~~ large but undetermined quantity of lower grade material which varies in copper content all the way up to 7% or 8%, which represents the present limit of pay ore.

In the present description of the mine I have discarded the designation of the old ore shoots, but for reference have divided the mine into four sections, A, B, C, and D, as shown on the accompanying sectional map.

#### DEVELOPMENT DURING PAST TWO YEARS.

The development recommended on page 8 of my report of May 1925 was as follows:

1. "Extension of the first level to the south of the main shaft." - This has not been done because of the expense which the leasers estimated would be necessary to bridge the old shaft and work on the south side of same, and particularly because the indications showed that ore on the south side of the shaft would not be sufficiently

high grade to permit this being mined with profit. In my opinion there is a very substantial tonnage of lower grade ore on the south side of the shaft above the first level, and the surface showing for a considerable distance farther south substantiates this opinion, but this material could only be treated with profit if a mill is erected on the property.

2. "Opening up the old stopes above the second level." - This work has made good progress and a large part of the production during the past two years has come from the stopes in Section B and Section C, and it is believed that a considerable tonnage exists above the stope in Section A, although the grade of this is somewhat uncertain, and at present it must be practically all classed as low grade material. Work in B Section of the property is continuing at the present time with the production of about 50 tons of high grade ore per month.

3. "Unwatering the winze (designated as 215) and cleaning out drifts from the bottom of this winze." - This work has been completed but the results of sampling as shown on the assay map are decidedly unsatisfactory. To the north of the winze no ore appears in the drift which seems to have left the vein. To the south there is shown an ore shoot 60' long, but samples are erratic and the average of the ore as developed showed only slightly over 4% copper, and hence is not at present commercial. I believe that further development should be carried on on this third level both to north and south and that crosscuts should be run to develop both the hanging wall and footwall veins at the north end of the present drift.

4. "Unwatering the main shaft and sampling same." - This also has been accomplished, but with unsatisfactory results, and practically no ore of commercial grade was found in the shaft below the 200 level. Here again crosscutting and other development is in order for the indications on the second level make it reasonably certain there there is some good ore extending downward, although it is doubtful if any large tonnage of this material will average better than 6%, and further development at this point would involve expenditure with no immediate

prospect of a return.

Other development work which has been done but which was not specifically recommended in my previous report is as follows:

1. "Running in a short level between the first and second adits, (which is designated as the "sub-level")." - This was a rather foolish piece of work carried out entirely on the responsibility of the lessees who were confident that they would find high grade ore close to the portal, in which expectation they were disappointed, and this sub-level has now been abandoned. To be of any real value the sub-level should probably have been extended to the ore shoot at the back of the stope, in section A, but under any circumstances this ore can best be reached by working upwards from the second level.

2. "Sinking of a winze (marked 225) at a point where the vein on the second level showed an unusually good assay, especially in silver values." - This work had my entire approval, and is well worthwhile, for although the very high grade ore was confined, as expected, to a small pocket, there is very fair ore extending downwards in the winze and near the bottom this assayed ~~over~~<sup>nearly</sup> 6% copper. Further work should be carried on in this section of the mine, either by extending the winze downward, or still better, by extending further south the third level from the bottom of the 215 winze and then raising up to connect with the 225 winze. There is probably a substantial body of ore existing between these two winzes and while the average will undoubtedly prove to be only medium grade, some shoots of high grade ore may be expected to occur.

#### PRODUCTION AND WORKING COSTS.

Since the present lease became effective, January 1st, 1925, the ore shipments have totaled 1596 tons, average grade: Gold .065 oz. per ton, Silver 4.38 oz. and copper 8.36%. The gross value has thus averaged about \$26.50 per ton, of which \$4.00 was in precious metals. The lessees have paid \$3040.68 in royalty, almost exactly \$1.90 per ton shipped, and taxes to the amount of \$529.48. At this date there

is mined and stored in the bins ready for shipment approximately 150 tons of ore of similar grade and value. The small output, less than 70 tons per month, is in part attributable to the very limited crew of men employed by the leasers, but also to the necessity of mining, sorting out and shipping a very high grade product in order to stand transportation and treatment charges. For every ton of ore shipped there has been developed and frequently broken and left in the fills, two to four tons of lower grade material which might have been taken out with profit if these charges could have been substantially reduced.

The cost of extracting ore (considering that such extraction has been confined to narrow high grade shoots and then hand sorted before shipment) has proved higher than I expected, and close to \$4.00 per ton, to which has been added approximately \$1.00 for the current development. The haulage cost has now been reduced to about \$3.75 per ton, and freight from Prescott to Humboldt has also been reduced from the rates prevailing in '25. The leaser has not kept any accurate set of accounts, and the work has all been done by Mr. Grove, Sr., his two sons and one grandson, with occasional assistance from outside help. Below is given a tabulation of the approximate present working costs on high grade ore and expense of shipment, treatment and marketing at Humboldt:

	<u>Per Ton.</u>
Development	\$ 1.00
Mining and sorting	4.00
Truck haul	3.95 (Allowance made
Freight	0.75 for moisture)
Smelting Toll	4.00 (Average charge)
Converting and refining charge	<u>4.62</u>
	\$18.52
Royalty	1.90
Taxes	<u>.33</u>
Total costs per ton	\$20.75

Value of this ore as paid for by Smelter:

Au.: .065 oz. @ \$19.50	=	\$ 1.27
Ag.: 4.38 oz. pay 3.88 oz. @ 60¢ oz.	=	2.33
Cu.: 8.36%, pay for 92% @ market less 3¢, i.e., pay for 154¢ @ 11¢	=	<u>16.94</u>

Gross value to shipper..... \$20.54

When shipments are made to Hayden the shipper on this grade of ore will receive net about 60¢ less per ton than when shipping to Humboldt.

ORE RESERVES.

In my previous estimated I included a considerable tonnage of 6% and 7% ore, but experience has proved that this grade of material is not commercial and at present with 12½¢ market as against 14¢ in 1925 it becomes necessary to make a sharp division and to include as workable ore only the material which will contain 8% or higher values in copper, and generally speaking about \$4.00 in gold and silver. The lower grade ore I have limited to material containing more than 4% copper and have shown as a separate estimate, since calculations indicate that all of this material might be worked with profit if a sufficient tonnage is developed and a mill erected on the property. From such information as is at present available, I estimate that for a concentrator an average grade of 5% copper and \$2.00 gold and silver might be maintained, mixing the high grade with the low grade material.

Since strictly speaking only a very small proportion of the developed ore can be called positive, I have combined this with the probable reserves. All figures must be taken as approximate since accurate measurements and sampling are in most cases still impossible.

					POSITIVE - AND -		PROBABLE			
					High Grade, over 8%.			Low Grade over 4%.		
					Tons	Value	%	Tons	Value	%
					Au.-Ag.		Cu.	Au.-Ag.		Cu.
Sect. A.	Above	1st	Level		-	\$		100	\$ 2.50	5.00
"	B.	"	"	"	50	4.00	11.00	800	2.00	4.50
"	C.	"	"	"	200	3.00	8.00	2000	2.00	5.00
"	D.	"	"	"	?			500+	2.00	5.00
"	A.	1st	to	2nd	300+	4.00	9.00	2500+	2.00	4.00
"	B.	"	"	"	350+	4.00	8.00	1000+	2.00	5.00
"	C.	"	"	"	200	3.00	8.00	1400+	2.00	6.00
"	D.	"	"	"	-			900+	2.00	5.00
"	A.	Below	"	"	-			1000	2.00	4.00
"	B.	"	"	"	150	5.00	9.00	2000	3.00	5.00
"	C.	"	"	"	100	3.00	10.00	1000	2.00	4.00
"	D.	"	"	"	-			500	2.00	4.00
In Bins					150					
On Dump (to be sorted)					-			300	2.00	5.00
Totals					1500	4.00	9.00	14000	2.00	4.50

### FUTURE DEVELOPMENTS.

I can make few suggestions in reference to the search for additional high grade ore. When the mine was first reopened it appeared probable that substantial bodies of high grade ore might exist beyond the limits of the old stopes but this has not proved to be the fact. At present there are four exposures of high grade ore, but in each case the location is such that the tonnage is probably very limited. The development and mining which has been done during the past two years indicates that this ore is only found in small shoots and lenses which are liable to occur at almost any place in the mineralized zone. To search for these high grade lenses is like looking for plums in a pudding, and involves a disproportionate amount of development work for the small tonnages found, and is not economical either from the standpoint of the operator or from the standpoint of the owner of the property. This work is necessarily in the nature of "gophering" and consists merely in following the ore where it appears strongest and best, taking out such portions of the vein as will pay to ship and leaving behind, either in place or as filling in the stopes, a much larger quantity of ore which would be worth while and valuable if local treatment facilities were provided. Operations carried on as they have been during the past two years are not likely to prove extensive or satisfactory, since the owner has received royalty from only a very small output, and the leasers in spite of extremely hard work have barely made wages.

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share of attention and there is every reason to believe that some of them will prove capable of contributing substantially to the output of milling ore.

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The principal mine west of the Verde Hills has been the Blue Bell, from which over a million tons has been taken averaging \$2.00 in gold and silver and 3% copper. The DeSoto has produced 200,000 tons of similar grade ore and the Arizona Binghamton about 300,000 tons averaging 3½% copper, with practically no values in gold and silver. The Sheldon Mine at Walker, which appears to be located on an extension of the same mineralized belt as the Storm Cloud (it is three miles Northeast in a direct line) and to which the Storm Cloud can best be compared, has made a production during the past four years of about 60,000 tons of ore averaging \$10.00 in gold and silver and 2.67% copper, and the present reserves are estimated at slightly over 100,000 tons of slightly lower grade with every indication that further development in depth will increase the tonnage of

such ore, but will not increase the average values per ton. All these mines except the United Verde and the United Verde Extension have only been profitably worked by virtue of flotation concentration of all or a large part of their output.

If, then, the Storm Cloud is ever to become a profitable mine of any size, this must probably be on the basis of it's reserves of 5% ore and development work at an estimated expenditure of about \$10,000 should be carried out with the object of developing as large a tonnage as possible of this class of material. The present indications are favorable, they have substantially improved during the past two years, and justify such development work which must make considerable progress before the true value of the mine can be even approximately determined. Should say 30,000 tons of 5% ore be proved and determined to be suitable for concentration, it would then be necessary to make expenditure approximately as follows:

1. MINING equipment to the value of \$10,000 to permit economic operation.
2. MILLING equipment to the value of \$15,000, if 25 tons per day, or \$25,000 if 50 tons a day are to be treated, and camp buildings and road improvement to cost about \$5,000.

Assuming the mill to be erected for treatment of 50 tons per day, the total initial investment will have been \$50,000, and working costs are estimated in the following table:

	<u>Per Ton of Ore Produced.</u>
Current development	\$ 0.25
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Freight to Humboldt	0.35
Smelting concentrates	1.00
Converting, refining, marketing	2.70
Overhead, taxes, etc.	<u>0.15</u>
	\$ 10.10

Assuming the average ore to contain \$2.00 values in gold and silver and 5% copper, and recovery in concentrate to be 85% of gold and silver and 92% of copper, then the smelter would pay for metals contained in concentrates on the following basis:

	<u>Per Ton of Ore</u>
Gold and Silver	\$ 1.60
Copper @ 13.5¢ market	<u>11.50</u>
	\$13.10

The profit on this basis would be \$3.00 per ton of ore, but if selective flotation should make it possible to increase the ratio of concentration to say 6 to 1, with similar recovery, then this profit would be increased by about 80¢ per ton.

#### CONCLUSION.

In my judgment the outstanding facts regarding the Storm Cloud Mine are these: -

1. It has been able to operate and maintain steady the small production of high grade ore yielding a fair royalty to the owner and paying wages to the operators, even tho handicapped by exorbitant working and marketing costs and unsatisfactory metal markets.
2. Altho operated by leasers making no real effort to develop the future possibilities of the mine, there is now developed as much high grade and a great deal more low grade ore than could be estimated two years ago.
3. The mine is not likely to contain any large body of high grade ore and therefore its future value probably depends on developing a tonnage of lower grade ore and providing equipment to treat and market this material with profit.
4. The present showings justify the attempt to develop additional ore reserves and give promise that such <sup>would</sup> meet with success.

In reference to conditions mentioned under (1) the table given on Page 6 of this report shows that the present marketing charges on mined ore (including transportation, smelting, etc., but excluding royalty and taxes) are \$13.32 per ton of 8% ore and would be \$11.46 per ton of 5% ore which charges as applied to this lower grade material are prohibitive. An expenditure of \$10,000 in development is likely to increase the present probable ore reserves to a total of about 30,000 tons of 5% ore, with

\$2.00 value in gold and silver, suitable for flotation concentration.

This tonnage would justify the erection of a mill at or near the mine and thus permit the combined development, mining and milling costs to be reduced to less than the present development and mining costs and reduce the marketing charges to from \$5.20 to \$4.40 per ton, depending on the recovery of values and ratio of concentration. Such conditions would make it possible to mine, treat and market a 5% ore on 13.5¢ copper market with a working profit of \$3.00 or more per ton.

The present lease expires the end of this year and it is not likely that the lessors will wish to renew, in fact unless the present price of copper improves they may not be able to continue to the end of their term without financial loss. The present depressed market conditions have led many copper properties to suspend or curtail production and devote their attention to development of ore reserves in anticipation of improved prices at a later date. Such a policy would be particularly advantageous in the case of the Storm Cloud.

The lessors have a good equipment which with minor additions would be entirely suitable for the development work suggested, and they might be willing to carry this out for day pay and under proper supervision or otherwise to rent it for a year, which would give ample time to prove the extent of the indicated ore bodies.

It is obvious that the value of the Storm Cloud Mine either to you or to a prospective purchaser would be greatly enhanced by favorable results of such work and in my opinion the chances of favorable results are excellent.

From an engineering and operating standpoint, I believe it would be altogether advantageous to cease production from the mine for a year or at least several months and devote this time and some money to the systematic exploration and development of the property, and I submit this recommendation for your careful consideration.

Humboldt, Arizona.  
February 17, 1927.

*L. H. Colman*

GEORGE M. COLVOCORESSES  
MINING AND METALLURGICAL ENGINEER  
HUMBOLDT, ARIZONA

To M. J. O'Brien, Ltd.,  
Ottawa, Canada.

REPORT ON STORM CLOUD PROPERTY.

This report is intended to supplement and revise the report on the above property submitted by me on May 26, 1925. At that time the mine had been partially opened by the leasers after a shutdown of several years, and only a very limited section of the workings was accessible. The development and operation of the mine during the past two years has served to permit a more accurate survey (as per blue print attached and marked Exhibit "A") and has afforded additional information both as to the ore occurrences and probable results of future development. Certain impressions formed prior to my first report have been found incorrect and are herein corrected, but it should be stated that even today there are many conditions which are not at all clear, and which can only be clarified by further development work followed by complete measurement and sampling of orebodies which are at best merely indicated by the present workings.

No attempt is made to repeat the general description of the property contained in my first report, and in various letters, and no detailed mention is made of other portions of your property than the so-called "Storm Cloud workings" since with one or two exceptions the leasers have confined their operations to the Storm Cloud vein, and no new facts of essential importance have been determined in regard to other veins or indicated ore occurrences.

The leasers have lived up to the terms of their contract and carried out such an amount, but only such an amount, of development as was compulsory upon them under the terms of this lease. This work has naturally been confined to the development of ore which could be quickly mined and shipped with profit, and has not included any attempt to prove up orebodies of lower grade material. In fact, work of this latter character would have involved expenditure of a greater amount

of funds than the leaser possesses, or than I was led to believe they expected to obtain at the time the lease was made, and obviously there is no great incentive for the leasers to develop ore which they could not possibly ship with profit during the term of their lease, nor unless a mill were constructed on the property. This situation has been disadvantageous to the interests of the owners since the work done during the past two years has not served to proportionally increase the ore reserves nor the future value of the property, and the present showings still do not render justice to the possibilities of the mine, although in my opinion the work of the leasers has very considerably increased its value and given substantial encouragement to further development.

#### STORM CLOUD VEIN.

This vein, as previously described, is of a duplex character, that is, really two veins lying between hanging and footwalls of siliceous shist and separated from each other by a dyke of porphyry varying in width from 12' to 35'. The veins are nearly parallel, except where the filling swells at intervals, and there is no indication from present development that they will come together, although they may do so at greater depth. Pay ore has now been found to occur in both hanging and footwall veins, but principally in the latter. The width of the high grade material (over 8% copper) being generally from 1' to 3', while on one or other side generally occurs lower grade ore from 2' to 6' in width, but not workable with profit under present conditions. It appears that the best of the ore occurs in shoots or lenses which at times are found in the hanging wall vein, and at other times in the foot wall vein. Any accurate estimate of tonnage and grade is greatly handicapped by the fact that the drifts are either in one vein or the other, or sometimes in the filling between, and no attempt has been made to completely explore and develop both hanging and foot wall veins throughout the length of the workings.

The attached blue print, comprising the plan and sections

with a number of assays at various points, gives very useful information but fails, for the reasons mentioned above, to clearly show the probable extent of the oreshoots.

In my previous report certain specified shoots were described and designated A, B, C and D, but subsequent work has shown that the impression formed at that time was incorrect, and the mineralization appears to be practically continuous from the surface and portals of the two adits, extending southward to a point beyond the main shaft (No.1) and downward below the 300 level. However (and this is a characteristic of all veins in this section of the State) the vein filling varies substantially in character and values and in places is practically confined to iron sulphides where elsewhere the values in copper, gold and silver gain<sup>to</sup> a point where this ore becomes commercial. The operations of the mine to date have necessarily been confined to the highest grade portions of the vein, and wherever lower grade material was found to exist (even though this might represent a substantial tonnage) the old operators and the present leasers have been obliged to discontinue mining, leaving in place a ~~very~~ large but undetermined quantity of lower grade material which varies in copper content all the way up to 7% or 8%, which represents the present limit of pay ore.

In the present description of the mine I have discarded the designation of the old ore shoots, but for reference have divided the mine into four sections, A, B, C, and D, as shown on the accompanying sectional map.

#### DEVELOPMENT DURING PAST TWO YEARS.

The development recommended on page 8 of my report of May 1925 was as follows:

1. "Extension of the first level to the south of the main shaft." - This has not been done because of the expense which the leasers estimated would be necessary to bridge the old shaft and work on the south side of same, and particularly because the indications showed that ore on the south side of the shaft would not be sufficiently

high grade to permit this being mined with profit. In my opinion there is a very substantial tonnage of lower grade ore on the south side of the shaft above the first level, and the surface showing for a considerable distance farther south substantiates this opinion, but this material could only be treated with profit if a mill is erected on the property.

2. "Opening up the old stopes above the second level." - This work has made good progress and a large part of the production during the past two years has come from the stopes in Section B and Section C, and it is believed that a considerable tonnage exists above the stope in Section A, although the grade of this is somewhat uncertain, and at present it must be practically all classed as low grade material. Work in B Section of the property is continuing at the present time with the production of about 50 tons of high grade ore per month.

3. "Unwatering the winze (designated as 215) and cleaning out drifts from the bottom of this winze." - This work has been completed but the results of sampling as shown on the assay map are decidedly unsatisfactory. To the north of the winze no ore appears in the drift which seems to have left the vein. To the south there is shown an ore shoot 60' long, but samples are erratic and the average of the ore as developed showed only slightly over 4% copper, and hence is not at present commercial. I believe that further development should be carried on on this third level both to north and south and that crosscuts should be run to develop both the hanging wall and footwall veins at the north end of the present drift.

4. "Unwatering the main shaft and sampling same." - This also has been accomplished, but with unsatisfactory results, and practically no ore of commercial grade was found in the shaft below the 200 level. Here again crosscutting and other development is in order for the indications on the second level make it reasonably certain there there is some good ore extending downward, although it is doubtful if any large tonnage of this material will average better than 6%, and further development at this point would involve expenditure with no immediate

prospect of a return.

Other development work which has been done but which was not specifically recommended in my previous report is as follows:

1. "Running in a short level between the first and second adits, (which is designated as the "sub-level")." - This was a rather foolish piece of work carried out entirely on the responsibility of the leasers who were confident that they would find high grade ore close to the portal, in which expectation they were disappointed, and this sub-level has now been abandoned. To be of any real value the sub-level should probably have been extended to the ore shoot at the back of the stope, in section A, but under any circumstances this ore can best be reached by working upwards from the second level.

2. "Sinking of a winze (marked 225) at a point where the vein on the second level showed an unusually good assay, especially in silver values." - This work had my entire approval, and is well worthwhile, for although the very high grade ore was confined, as expected, to a small pocket, there is very fair ore extending downwards in the winze and near the bottom this assayed ~~over~~<sup>nearly</sup> 6% copper. Further work should be carried on in this section of the mine, either by extending the winze downward, or still better, by extending further south the third level from the bottom of the 215 winze and then raising up to connect with the 225 winze. There is probably a substantial body of ore existing between these two winzes and while the average will undoubtedly prove to be only medium grade, some shoots of high grade ore may be expected to occur.

#### PRODUCTION AND WORKING COSTS.

Since the present lease became effective, January 1st, 1925, the ore shipments have totaled 1596 tons, average grade: Gold .065 oz. per ton, Silver 4.38 oz. and copper 8.36%. The gross value has thus averaged about \$26.50 per ton, of which \$4.00 was in precious metals. The leasers have paid \$3040.68 in royalty, almost exactly \$1.90 per ton shipped, and taxes to the amount of \$529.48. At this date there

is mined and stored in the bins ready for shipment approximately 150 tons of ore of similar grade and value. The small output, less than 70 tons per month, is in part attributable to the very limited crew of men employed by the leasers, but also to the necessity of mining, sorting out and shipping a very high grade product in order to stand transportation and treatment charges. For every ton of ore shipped there has been developed and frequently broken and left in the fills, two to four tons of lower grade material which might have been taken out with profit if these charges could have been substantially reduced.

The cost of extracting ore (considering that such extraction has been confined to narrow high grade shoots and then hand sorted before shipment) has proved higher than I expected, and close to \$4.00 per ton, to which has been added approximately \$1.00 for the current development. The haulage cost has now been reduced to about \$3.75 per ton, and freight from Prescott to Humboldt has also been reduced from the rates prevailing in '25. The leaser has not kept any accurate set of accounts, and the work has all been done by Mr. Grove, Sr., his two sons and one grandson, with occasional assistance from outside help. Below is given a tabulation of the approximate present working costs on high grade ore and expense of shipment, treatment and marketing at Humboldt:

	<u>Per Ton.</u>
Development	\$ 1.00
Mining and sorting	4.00
Truck haul	3.95 (Allowance made
Freight	0.75 for moisture)
Smelting Toll	4.00 (Average charge)
Converting and refining charge	<u>4.62</u>
	\$18.52
Royalty	1.90
Taxes	<u>.33</u>
Total costs per ton	\$20.75

Value of this ore as paid for by Smelter:

Au.: .065 oz. @ \$19.50	=	\$ 1.27
Ag.: 4.38 oz. pay 3.88 oz. @ 60¢ oz.	=	2.33
Cu.: 8.36%, pay for 92% @ market less 3¢, i.e., pay for 154¢ @ 11¢	=	<u>16.94</u>

Gross value to shipper..... \$20.54

When shipments are made to Hayden the shipper on this grade of ore will receive net about 60¢ less per ton than when shipping to Humboldt.

ORE RESERVES.

In my previous estimated I included a considerable tonnage of 6% and 7% ore, but experience has proved that this grade of material is not commercial and at present with 12½¢ market as against 14¢ in 1925 it becomes necessary to make a sharp division and to include as workable ore only the material which will contain 8% or higher values in copper, and generally speaking about \$4.00 in gold and silver. The lower grade ore I have limited to material containing more than 4% copper and have shown as a separate estimate, since calculations indicate that all of this material might be worked with profit if a sufficient tonnage is developed and a mill erected on the property. From such information as is at present available, I estimate that for a concentrator an average grade of 5% copper and \$2.00 gold and silver might be maintained, mixing the high grade with the low grade material.

Since strictly speaking only a very small proportion of the developed ore can be called positive, I have combined this with the probable reserves. All figures must be taken as approximate since accurate measurements and sampling are in most cases still impossible.

					POSITIVE - AND - PROBABLE					
					High Grade, over 8%.			Low Grade over 4%.		
					Tons	Value	%	Tons	Value	%
					Au.-Ag. Cu.			Au.-Ag. Cu.		
Sect.	A.	Above	1st	Level	-	\$		100	\$ 2.50	5.00
"	B.	"	"	"	50	4.00	11.00	800	2.00	4.50
"	C.	"	"	"	200	3.00	8.00	2000	2.00	5.00
"	D.	"	"	"	?			500+	2.00	5.00
"	A.	1st	to	2nd	300+	4.00	9.00	2500+	2.00	4.00
"	B.	"	"	"	350+	4.00	8.00	1000+	2.00	5.00
"	C.	"	"	"	200	3.00	8.00	1400+	2.00	6.00
"	D.	"	"	"	-			900+	2.00	5.00
"	A.	Below	"	"	-			1000	2.00	4.00
"	B.	"	"	"	150	5.00	9.00	2000	3.00	5.00
"	C.	"	"	"	100	3.00	10.00	1000	2.00	4.00
"	D.	"	"	"	-			300	2.00	4.00
In Bins					150					
On Dump (to be sorted)					-			300	2.00	5.00
Totals					1500	4.00	9.00	14000	2.00	4.50

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Copper @ 13.5¢ market	<u>11.50</u>
	\$13.10

The profit on this basis would be \$3.00 per ton of ore, but if selective flotation should make it possible to increase the ratio of concentration to say 6 to 1, with similar recovery, then this profit would be increased by about 80¢ per ton.

#### CONCLUSION.

In my judgment the outstanding facts regarding the Storm Cloud Mine are these: -

1. It has been able to operate and maintain steady the small production of high grade ore yielding a fair royalty to the owner and paying wages to the operators, even tho handicapped by exorbitant working and marketing costs and unsatisfactory metal markets.

2. Altho operated by leasers making no real effort to develop the future possibilities of the mine, there is now developed as much high grade and a great deal more low grade ore than could be estimated two years ago.

3. The mine is not likely to contain any large body of high grade ore and therefore its future value probably depends on developing a tonnage of lower grade ore and providing equipment to treat and market this material with profit.

4. The present showings justify the attempt to develop additional ore reserves and give promise that such <sup>won</sup> will meet with success.

In reference to conditions mentioned under (1) the table given on Page 6 of this report shows that the present marketing charges on mined ore (including transportation, smelting, etc., but excluding royalty and taxes) are \$13.32 per ton of 8% ore and would be \$11.46 per ton of 5% ore which charges as applied to this lower grade material are prohibitive. An expenditure of \$10,000 in development is likely to increase the present probable ore reserves to a total of about 30,000 tons of 5% ore, with

\$2.00 value in gold and silver, suitable for flotation concentration.

This tonnage would justify the erection of a mill at or near the mine and thus permit the combined development, mining and milling costs to be reduced to less than the present development and mining costs and reduce the marketing charges to from \$5.20 to \$4.40 per ton, depending on the recovery of values and ratio of concentration. Such conditions would make it possible to mine, treat and market a 5% ore on 13.5¢ copper market with a working profit of \$3.00 or more per ton.

The present lease expires the end of this year and it is not likely that the lessors will wish to renew, in fact unless the present price of copper improves they may not be able to continue to the end of their term without financial loss. The present depressed market conditions have led many copper properties to suspend or curtail production and devote their attention to development of ore reserves in anticipation of improved prices at a later date. Such a policy would be particularly advantageous in the case of the Storm Cloud.

The lessors have a good equipment which with minor additions would be entirely suitable for the development work suggested, and they might be willing to carry this out for day pay and under proper supervision or otherwise to rent it for a year, which would give ample time to prove the extent of the indicated ore bodies.

It is obvious that the value of the Storm Cloud Mine either to you or to a prospective purchaser would be greatly enhanced by favorable results of such work and in my opinion the chances of favorable results are excellent.

From an engineering and operating standpoint, I believe it would be altogether advantageous to cease production from the mine for a year or at least several months and devote this time and some money to the systematic exploration and development of the property, and I submit this recommendation for your careful consideration.

Humboldt, Arizona.  
February 17, 1927.

  
E. M. Colman

REPORT ON THE STORM CLOUD GROUP OF MINES - JULY 12, 1928.

By George A. Kirkbride, Manager.

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LOCATION AND EXTENT

Situated in the Hassayampa Mining District, Yavapai County, Arizona, fourteen miles southeast of Prescott, bounded by the Cash Group on the South, the Senator Group on the West and South, and Chase Mines, Inc., on the North, the Storm Cloud Group consists of fifteen patented claims having a total acreage of 216.43, also two unpatented claims adjoining patents, and forming a solid tract.

Elevation at the camp and mill which are situated along the Senator Highway, is about 6700 feet. The present productive portion of the group, namely the Storm Cloud Mine, is about 7500 feet in elevation.

The entire tract is well timbered with pine, oak and spruce, a good deal of which is very valuable for mining purposes.

GEOLOGY

STORM CLOUD, ST. CLOUD, & BETSY ANN, OR UPPER WORKINGS

The country rock is amphibolitic schist with granite contact, both east and west. The Storm Cloud Copper Vein which outcrops the entire length of the two claims and fraction, about 3500 feet, has a quartz vein matter heavily impregnated with sulphides of copper and pyrite, with some gold and silver and an occasional pocket or bunch of galena and sphalerite. This vein is a fissure vein, the ore bodies of which are lenticular in formation, apparently occurring in the same fissure with a very prominent rhyolite porphyry dyke and having a dip of about 80 degrees east. The vein follows the trend of the schist in a northeasterly-southwesterly direction.

THE STORM CLOUD GOLD VEIN

Considerable work has been done on this section of the group. The vein lies about 125 feet east of the Storm Cloud Copper Vein, and a shoot of ore has been removed by sinking and stoping to a depth of about two hundred feet and a length of about three hundred feet. This vein also is lenticular in formation, the old workings showing a width of from one to seven feet.

There is reported to have been a production of \$40,000 from

this work, mostly ore that had a value of about \$20.00 per ton. The surface showing is very good for a continuation of this vein, and a small amount of money spent in reopening the old workings would soon prove the lower extent.

DEVELOPMENT & PRODUCTION

Upper Workings

The present completed accessible development work consists of an inclined shaft 350 feet in depth which is cut by drifts from the surface at 100 feet and 200 feet respectively. This work is all in the vein and has been productive. From the 100 drift some stoping was done, and it is apparent that some ore was removed. The ore above this level is mostly oxidized and of little value to the present operation, until within a few feet of the point where the drift cuts the shaft. The vein at this point is about eight feet in width and carries high grade chalcopryrite, which indicates a good body of ore existing to the South. This ore will be mined through the 203 stope south of the Shaft.

The 200 level or main haulage drift, has four accessible stopes, namely: 201, 202, 203, and 204. Of the inaccessible workings of this level, the winze in the first crosscut west is the most important as it proves the existence of an ore shoot north of any of the present workings. This winze is 75 feet in depth, and a level is started from the bottom.

The Northerly level is 100 feet long and shows some ore. The Southerly level is also 100 feet long, with a good grade mill ore.

The Crosscut is about 280 feet from the mouth of the drift and 380 feet north of any present production. While it is impossible to sample this section of the vein at this time, the assay map gives the following widths and assays:

<u>WIDTH</u>	<u>OZ.AU.</u>	<u>OZ.AG.</u>	<u>% CU.</u>
3. ft.	0.48	19.9	10.02
3. ft.	0.14	6.8	3.30
1.5 ft.	0.01	0.6	0.88
2.4 ft.	0.05	2.4	4.38
2.4 ft.	0.04	0.8	1.20

As this work was done during the time that the mine was being worked for shipping ore, the vein will no doubt prove to have more width of mill grade ore.

The second important inaccessible working is a winze in the 200 drift, at a distance of about 215 feet from the portal. The map shows this to have a depth of about 30 feet and gives a three foot width of ore, assaying:

Au. - 0.04      Ag. - 2.2      Copper - 5.8

The above would indicate the certainly of getting a sizable ore shoot of milling ore in the North Drift of the 300 foot level.

The 201 and 202 stopes are north of the shaft, and were mined exclusively for shipping ore. Both of these stopes are worked out to the 100 foot level. The vein in both of the ore shoots shows to have been from one to five feet in width. The ore appears to have been mostly chalcopryite and was mined on the shrinkage system, working only the high grade feeders. An attempt to mill the fill from the two stopes was unsuccessful on account of the grade's being too low to be profitable with the present fifty ton mill.

South of the shaft are the 203 and 204 stopes. The 203 has been stoped up to a height of about 65 feet and has a width in the main Copper Vein of from six to fifteen feet.

The metallic content is to a large extent chalcocite, chalcopryite, and pyrite, and varies in grade from 2% to 20% copper. Intersecting the Copper Vein in the south <sup>end</sup> end, is a strong vein carrying good copper values. This vein has an average width of five feet and at the intersection, the total vein width is 21 feet, all good grade mill ore. This intersecting vein may, with further development, prove to be the Storm Cloud Gold Vein, although gold values at this point are low.

The 204 stope, south of 203, is just being opened at this time. The vein is from six to twelve feet in width, and all good grade mill ore, about 100 feet in length. The 203 ore shoot has a length of 125 feet and there is a possibility that the 204 shoot is a continuation of the 203. As there is a pillar of about 30 feet between them, this will be determined by later development. The drift ahead of the 204 stope is in good ore and will be pushed ahead as soon as timbering of the 204 is completed. Assays taken in the drift, each round for 56 feet in length gave the following averages:

Width 4.8 ft.      Au. .032      Oz. Ag. 3.21      % Cu. 4.45

The nature of stopes on this level would indicate southward rake to the ore bodies.

Recent recorded production from the 200 foot level as follows:

<u>201 - 202 Shipping</u>				
	<u>Gold</u>	<u>Silver</u>	<u>Copper</u>	<u>Tons</u>
1925	0.054	3.86	8.65	819
1926	0.076	4.93	8.05	776
1927	<u>0.060</u>	<u>5.00</u>	<u>9.80</u>	<u>235</u>
Average	0.064	4.88	8.54	1830 Total

<u>203 - 204 Milled</u>				
	<u>Gold</u>	<u>Silver</u>	<u>Copper</u>	<u>Tons</u>
1928	0.04	2.9	3.34	2221.7

Above mostly from development. There were also 1353.3 tons of stope fill milled in March with an average grade of 1.66% copper.

RECENT ASSAYS TAKEN

<u>203 Stope</u>		
<u>Width</u>	<u>Location</u>	<u>% Copper</u>
5 ft.	New hanging vein	4.2
12 in. strata	New hanging vein	14.74
8 in. strata	New hanging vein	16.48
Pile grab	Under new vein	5.8
5 ft.	40 ft. height	5.8

<u>204 Stope</u>		
3 ft.	Foot wall starting stope	3.3
3 rounds grab pile	Opening south end 30' long	6.28
Mill run	Opening south end, 30' long	3.89
6 ft.	Across south end	7.17

300 FOOT LEVEL

Drifting is in progress both north and south on this level, apparently a barren zone existing for a short length. The north side is but slightly mineralized although the vein is strong and will soon be under the ore shoot opened by the 75 foot winze and levels referred to above. The south drift appears to be breaking into a good grade ore shoot at this time. Recent sample assays gave following results:

<u>Width</u>	<u>Location</u>	<u>% Copper</u>
4 ft	North 12 ft. from shaft	0.24
4 ft	" 14 " " "	0.20
5 ft	" 16 " " "	0.72
5 ft	" 20 " " "	0.72
5 ft	" 24 " " "	2.42
4 ft	" 26 " " "	1.31
14 in	South 10 " " "	6.16
5 ft	" 12 " " "	0.72
5 ft	" 16 " " "	4.05
5 ft	" 21 " " "	0.68
5.5 ft	" 24 " " "	5.80

A total footage of 70 feet has been driven on this level to date.

Below the 300 foot level, the shaft has been sunk to a depth of fifty-five feet. The vein at this point is fourteen feet in width and carries some high grade ore stringers. Drifting in both directions will, no doubt, prove this to be in a barren zone as is the shaft on the level above. Ore shoots in each direction should be struck with seventy-five or eighty feet of drifting. A crosscut was driven east from this level for a distance of 80 feet in an attempt to pick up the Storm Cloud Gold Vein. This attempt was unsuccessful, the Gold Vein having either intersected the copper Vein above the level or faulted before reaching this depth.

The Storm Cloud Copper Vein is a very strong vein the entire length and depth of the present workings, with a favorable surface showing. The present workings have not reached the permanent water level. Larger and higher grade ore bodies should be encountered with depth, especially to the South of the present work. A total of five drills are in operation at this time, all working in ore either for development or mill tonnage, the operation being favorable for a much larger tonnage in the near future, and there is no doubt that sinking or upraising in the narrow or less productive parts of the vein will develop other ore shoots.

#### THE TEN SPOT

The Ten Spot Shaft has a reported depth of 267 feet. Unwatering is under way at this time and the water has been removed to a depth of 180 feet. The water is used in the mill as pumped from the shaft. At a depth of eighty feet there are two crosscuts. The southeasterly crosscut is thirty feet long and cuts a small vein of no value. The northwesterly crosscut is about eighty feet long and cuts the Ten Spot Vein

which appears to be about thirty feet in width, although only twenty feet could be sampled on account of timbers. The vein is badly broken up at this depth and composed of a banded quartz conglomerate.

Samples taken assayed as follows:

<u>Width</u>	<u>Location</u>	<u>Au.Oz.</u>	<u>Ag.Oz.</u>	<u>Cu%</u>	<u>Pb.Oz.</u>
2 ft. Narrow Vein	North Hard band	0.16	2.3	0.24	1.5
1½ ft.	Hanging Wall S. Drift hard band	0.01	1.5	0.12	0.4
14 in.	Hard quartz in large Vein	0.06	4.6	1.06	3.8
20 ft.	Vein Sample north	0.01	0.5	0.08	---
		0.01	0.2	0.12	---

Samples from Surface of the Same Vein:-

<u>Width</u>	<u>Location</u>	<u>Au.Oz.</u>	<u>Ag.Oz.</u>	<u>Value</u>
4 ft.	Near South Tunnel	0.08	1.5	\$ 2.50
3 ft.	200 N - near No. 1	1.50	16.7	20.02
2 ft.	100 N - near No. 2	0.17	17.9	14.14
3 ft.	200 N - North of No. 3	0.37	1.4	8.24
7 ft.	General Sample	0.16	0.6	3.25

A report on the Senator Group shows the Ten Spot as being about 22 inches in width and gives an assay of:

\$ 8.20 Gold      7.1 oz. Silver      1.2% Copper

This was probably one of the bands in the conglomerate. The dump of the Ten Spot on the Senator shows very good lead-silver ore which was evidently encountered in the bottom of the workings. The Galena Vein to the East has good grade lead-zinc copper ore and should be cut by the lower crosscut in the Ten Spot shaft at a depth of 237 feet. A sample of this ore gave:

\$ 24.00 in Gold      \$7.47 Silver      2% Copper  
14% Zinc      2% Lead

Water will be lowered below this level soon. A crosscut tunnel southeast from the bottom of the Ten Spot shaft would cut several veins that have excellent surface showings.

The Cash Veins crossing the Storm Cloud property show some very good sulphide ore bodies, quartz with pyrite sphalerite, chalcopryrite and galena. There are a good many veins paralleling the Storm Cloud that would be worked at a profit through a crosscut from the lower level of the Ten Spot shaft. Among the veins which have proven to carry large ores of commercial value on adjoining properties are: The Galena, Curtis, Lion, Treadwell and Cash. The Snoozer Vein, which was the best producer on the Senator Group, should cross the Storm Cloud property through the Johnny or Hoot Owl claims.

METALLURGY

The Storm Cloud copper ores have proven to be quite amenable to concentration by the flotation process. The present operation is a test plant of fifty tons capacity and lacking many of the refinements that would be added to a larger and more complete permanent installation. Former operations were based upon gold and silver recovery through the amalgamation concentration process or were dependent upon ore of a shipping grade. The present Storm Cloud test plant, operating on low grade sulphide ores, has proven the practicability of latter day practice, also, by actual test, the profit that could be expected from a large scale operation.

Average mill results on past four months' operation:

	MILL RESULTS			
	March	April	May	June
Tons ore treated	1353.3	970.8	437.8	813.1
% Copper head	1.66	3.18	3.37	3.48
% Copper Concentrate	25.7	22.79	20.48	23.51
% Copper Tail	0.24	0.27	0.31	0.39
% Recovery	86.3	92.6	92.2	90.3
Conc. Produced-tons	72.0	119.6	63.1	103.1
Running Time-Percent	90.3	75.5	26.7	58.0

March run was on stope fill from 201 and 202 stopes, April ore from 203 stope and shaft, May and June from development work on 200 level and a small tonnage from 203 stope. This operation would be greatly improved and more consistent on a larger installation which would have automatic reagent feeders, reclaiming equipment for water, additional rougher flotation machiner, etc. Concentrate car shipments from test plant asf follows:

DRY TONS	OZ. GOLD	OZ SILVER	% COPPER	BASE DEDUCTED GROSS VALUE	NET VALUE
28.25	0.15	12.80	23.9	1653.66	1510.65
30.81	0.20	37.20	24.64	2279.18	2101.34
34.62	0.16	21.0	20.90	1967.59	1788.32
26.47	0.17	12.60	25.48	1636.51	1500.51
37.39	0.14	14.2	18.20	1745.67	1574.40
30.91	0.15	11.8	17.10	1341.97	1213.87
35.05	0.11	11.5	15.10	1341.83	1192.89
33.52	0.18	14.6	21.90	1965.93	1798.31
35.45	0.14	14.4	18.30	1740.09	1576.62
<u>36.88</u>	<u>0.14</u>	<u>13.5</u>	<u>17.10</u>	<u>1694.22</u>	<u>1523.47</u>
329.35	1.54	163.6	202.62	17366.55	15780.38
	0.154	16.36	20.26		

from 3575 tons of ore, 1353.3 tons of which was old stope fill.

Fifteen percent of shown net value was deducted to apply on purchase price of property. There are, at this time, about 100 additional tons of concentrate in stock and at the smelter, part of which will apply on the cost of last month's operation.

POWER AND EQUIPMENT

MINE

One 75 H.P. Hold distillate burning engine belted to 12 by 12 Gardner air compressor. One 50 H.P. William Seaver Morgan distillate engine belted to 9 by 8 Chicago pneumatic compressor. A total of 495 cubic feet of air per minute is developed when the two machiner are running. Ample air receiver capacity is provided. Other equipment, ore cars, rock drills, underground hoist, etc., are sufficient to produce from 50 to 60 tons of ore per day. Ore bin capacity for 100 tons with sorting grizzly are installed at mouth of drift on the 200 foot leve.

MILL

The mill is powered with a 100 H.P. Western Enterprise full diesel engine. Concentrating equipment consists of ore bins, Wheeling Crusher, Marcy 54 ball mill, Dorr Classifier, Southwestern flotation machines, and miscellaneous pumps, etc. Water is pumped from the Ten Post shaft with a deep well pump jack and Hercules engine.

The camp equipment, boarding house, etc., are ample to care for thirty men.

COST MINE & MILL

Based upon 50, 100, and 200 Ton Operation

With Electrical Equipment

Recoveries and grade are computed on a higher basis on 100 ton and 200 ton figures for the reason that a new and larger plant would be equipped to give the better results. Have used a 95 percent recovery and a 24.64 percent grade on this calculation, as these are easily possible with proper equipment. Mine and mill costs cover supervision.

50 TON BASIS - 4% CU HEAD

Total mine cost - power, labor, supplies	-	\$ 3.62
Plus 25% development work	-	.90
		4.52
Haulage mine to mill	-	.50
Mill cost per ton	-	1.51
Camp, office and general cost per ton	-	.25
Concentrate haulage per ton ore	-	.30
Total cost per ton at railroad	-	\$ 7.08

Value of concentrate based on net smelter returns after all deductions, i.e. smelter, royalty, and railroad freight.



200 TONS PER DAY

MILL AT MINE CARRYING REGULAR DEVELOPMENT AHEAD WITH  
OPERATING PROFITS

Total mine costs - labor, supplies, power	-	\$ 3.62
Plus 25% development work	-	<u>.90</u>
	Total mine cost-	4.52
Mill cost per ton (possibly less)	-	1.50
Camp and general	-	.25
Concentrate haulage per ton ore	-	<u>.30</u>
	Total cost per ton ore -	6.57

Value of concentrate based on net smelter returns after all deductions, smelter, royalty, railroad freight.

24.64 Cu. content - \$57.99 per ton

95% Recovery at Mill

200 tons x 4% x 90% + 24.64 = 30.84 tons conc.

Smelter returns 200 tons ore per day @ \$57.99 per ton  
or 30.84 d 57.99 = 1789.41

Cost 200 tons @ \$6.57 per ton = 1314.00

Total daily profit \$ 475.41  
Profit per ton ore 2.34

An excellent chance would be afforded to reduce the mine cost on a larger operation.

\* \* \* \* \*

PROPOSED DEVELOPMENT

Storm Cloud Copper Vein

A three-compartment shaft should be sunk to the permanent water level. It has been the history of almost every mine in this district to have a barren zone of one or two hundred feet under secondary enrichment coming into the more consistent ore below the barren zone and at permanent water level. Mud slips and striae on walls of the Storm Cloud Copper Vein would indicate a downward extension of the Vein. The shaft should essentially be sunk in the Vein. A new shaft could be started at the portal of the 200 foot level, or the present incline shaft enlarged to provide for later installation of a skip or cage, and sinking done at that point. The use of the present 350 foot incline would, no doubt, cost less than a new shaft. As this work progressed, levels at suitable intervals could be driven and ore bodies proven. This should be done to a depth of at least 1000 feet. The ore from this development could be milled in the present test plant to provide an income.

As soon as production and development warrant its construction, plant should be made for the installation of a 100 to 150 ton mill. This

mill could be installed either at the Storm Cloud mine, or above the present camp. This would depend upon the amount of water developed in sinking the Storm Cloud Shaft. In event the mill were placed at camp, an ariel tram could be constructed from mine to mill, available water piped down, and the balance of the water made up from other sources. Placing the mill at this point would allow for the subsequent milling of any ores developed on the lower workings of the group.

#### THE TEN SPOT

Water should be pumped below the present 237 foot level and exposed veins samples. A crosscut should be driven to cut the Galena, Lion, Curtis, and Cash veins to the southeast. In event ore bodies of commercial value are encountered, this shaft should be sunk to a greater depth and other crosscut driven under the ore bodies. The ore obtained from this source could be milled in the present 50 ton mill or bedded and milled with ore from the Storm Cloud.

#### GENERAL

The location of a 150 ton mill above the present camp would have the advantage of caring for ores from both mines on the property as well as other ones that may later develop, and by feeding from the Storm Cloud by tram, would be a much more economical operation than a mill at both Storm Cloud and Ten Spot.

The new mill could be installed to metallurgically care for the complex ores that would be obtained from the Ten Spot workings, and a separate copper-lead-zinc shipping product made.

If later development seemed to warrant the action, a crosscut tunnel could be driven from the bottom of the Ten Spot shaft to cut the Storm Cloud Vein, or the working crosscut extended. This would eliminate hoisting and ariel tram at Storm Cloud, and all ore would be mined through the Ten Spot. This crosscut would intersect the Dakota Vein which apparently is a rather strong copper vein and situated about 1500 feet southwest of the Storm Cloud Copper Vein. A sample taken from the shaft dump on the Dakota gave:

Gold - tr Silver 3. oz. Copper 16.2%

#### CONCLUSION

The Storm Cloud Group is a very valuable property and has promise of being a permanent producer. This group and the Senator pro-

Copy: perty form the most important mining operations in this section, although the Chase Mines, inc., on the North are at this time beginning an extensive development campaign on a large body of complex milling ore.

Recent developments indicate that an expenditure of \$250,000 to \$400,000 toward development and replacing present equipment would be fully justified.

Respectfully submitted,

(Geo. A. Kirkbride)

Manager.

Statement made shortly before the mine closed down in '29 was that about 2000 tons of 37% copper ore has broken in the stopes.

This is for about if as much as 500 tons of this ore ~~is~~ is now to be found there and some may have been taken by the Bradshaw Co

(6)  
REPORT ON THE STORM CLOUD MINE - BY FRANK A KENNEDY

JUNE 25, 1928

LOCATION

The Storm Cloud Mine is situated in the Hassayampa Mining District, Yavapai County, Arizona, approximately by automobile road, fifteen miles south of Prescott.

The Cash Mine adjoins the Storm Cloud on the South and is developed by two shafts 300 feet and 400 feet respectively, connected by levels and underground workings.

The Senator property, now controlled by Bluford H. J. Balter, present operator of the Storm Cloud, lies adjacent to the north-east and was formerly operated by the Phelps Dodge Mining Company. This property is developed by one long crosscut tunnel 3100 feet long and is further developed by considerable drifting along the different veins crossed by the long tunnel. The Cash and the Senator have both produced a large tonnage.

DESCRIPTION

The following patented claims are embraced in the Storm Cloud group:

<u>NAME</u>	<u>ACRES</u>	<u>NAME</u>	<u>ACRES</u>
1. St. Cloud	19.37	9. Bugle	01.85
2. Parintha	18.87	10. Storm Cloud	20.66
3. Ginger	14.87	11. Trapezoid	14.90
4. Hoot Owl	17.62	12. Palmetto	07.75
5. Johnnie	18.57	13. Betsy Ann-	13.16
6. Paw Paw	15.49	14. Dakota	20.00
7. Lion	11.69	15. Cracker	20.00
8. Traction	01.63		

Also two unpatented mining lode claims, McCleure and Ranger Chief.

ACCESSIBILITY

The Storm Cloud Mine is on a good automobile road but fifteen miles from Prescott, Arizona, with a hauling charge of approximately \$2.50 per ton down on concentrates and \$4.00 per ton from Prescott to the Mines. It is approximately 200 miles by rail to either the Hayden or Magma smelters.

HISTORY AND OLD DEVELOPMENT

The Storm Cloud is one of the oldest known properties in this district, having been located in 1875. Its old workings and

dumps show that it has produced considerable shipping ore.

The Gold Vein was mined from near the surface to the 200' level, and the ore milled at mills situated on nearby properties. The gold occurred in a free state and was amalgamated. How much was lost in sulphides, I do not know but believe the ore was of a very good grade.

The Storm Cloud gold-silver-copper vein lies parallel and approximately 75 feet to the west of the gold vein and strikes approximately north and south. The copper vein was worked in the past entirely for direct shipping ore, I was not able to get any data on old production but was furnished by G. M. Colvocoresses, mining engineer, who looked after the property for the owner, such data as he had which covered shipments for the years 1925, 1926 and 1927.

	<u>Dry Tons</u>	<u>Oz. Gold</u>	<u>Oz. Silver</u>	<u>% Copper</u>
1925	819	.054	3.86	8.65
1926	776	.076	4.93	8.05
1927	235	.060	5.00	9.80

FOOT UNITS

For Computing Average Assay

	<u>Gold</u>	<u>Silver</u>	<u>Copper</u>
1925	44.186	3135.34	7084.35
1926	59.076	3825.68	6246.80
1927	<u>14.100</u>	<u>1175.00</u>	<u>2303.00</u>
	117.362	8152.02	15634.15

Average Assay - .064 oz. Au., 4.88 oz. Ag., 8.54% Cu.

The Ten Spot Shaft located on the McClellan claim of the Storm Cloud group, is reported to be down 267 feet. The maps show a level 80 feet from the collar of the shaft, with two crosscuts. The one to the southeast cuts a small vein 20 feet from the shaft. The crosscut to the northwest is a little over 100 feet long and crosscuts the Ten Spot vein reported to be 40 feet in width at that elevation. Another level was made at approximately 235 feet in depth and crosscuts driven to both the northwest and southeast. The one to the Southeast is reported to have crossed two veins and the other crosscut cut the Ten Spot Vein. Mr. Rosenberg reports that three feet of this vein averaged \$9.40 in gold and silver, and 4.4% copper. This shaft is being dewatered at the present time.

There are several short tunnels on different claims, all driven to intersect veins, and all look promising and warrant further prospecting.

## GEOLOGY

The country rock series of the Storm Cloud and adjacent area is made up of Yavapai schist shylite and grandodiorite, and some very fine grained rock porphyritic in character carrying some lime. The Storm Cloud vein occurs in conjunction with the rhyolite on the foot wall with a schist hanging wall. There are at least twenty veins crossing the property and evidently all carry values of either gold, silver, copper, lead or zinc.

There are only four veins that I will mention in particular in this report, namely: The Storm Cloud gold-silver-copper vein. The Storm Cloud Gold vein, The Ten Spot vein, and one paralleling the Ten Spot which I shall call the Galena.

The vein filling of nearly all veins is quartz carrying gold, silver, copper, lead and zinc. They vary in width from a few inches to forty feet or more and the surface indications show very good mineralization.

## ORE DEPOSITS

The Storm Cloud vein varies in width from two feet to twelve feet and the vein is continuous. It appears to carry copper values its entire length but of varying grades. The richer grades form in lenticular masses. How far these masses of high grade ore extend downward below the main level of the Storm Cloud, I do not know, but I am convinced that one need not fear that the ore on the copper vein will play out on account of the vein itself not extending down to a very great depth.

The ore in this vein occurs in the form of chalcopyrite carrying both gold and silver, and in some places chalcocite. The average value of the ore can be best ascertained by the assay of the crude ore into the mill for a period of time together with the assays on the assay map. The character of the ore is such as to be classified as a soft ore and is easily drilled and easily reduced by fine grinding in the mill. The dip of the Storm Cloud is approximately 80 degrees to the East and strikes north and south. It is easily traced on surface from cuts and pits for thousands of feet, and is, indeed, a very strong persistent vein. There are approximately 3000 feet of this vein on the property.

Omit

Following is a table showing average mill feed and results obtained from the Storm Cloud copper vein:

DATE	TONS	MILL HEAD % Cu.	CONC % Cu	TAILS % Cu.	COPPER REC.	CONCENTRATES TONS
MAY						
1	25.0	6.07	20.4	0.30	96.5	7.1
2	24.0	2.04	16.3	0.13	94.4	2.7
3	24.0	2.51	18.6	0.21	92.7	3.4
4	25.0	2.90	16.9	0.32	96.2	4.0
5	8.8	2.01	18.4	0.18	91.9	0.8
6	25.0	2.27	18.1	0.10	96.1	2.8
7	2.88	2.39	18.0	0.17	93.7	0.35
8		No Operation				
9	28.0	2.86	17.2	0.15	95.6	4.5
10	22.7	3.93	18.5	0.18	96.3	4.6
11	14.0	4.07	26.6	0.19	96.1	2.0
12	13.8	3.58	22.5	0.21	95.0	2.0
13	14.8	3.76	23.0	0.28	88.5	2.1
14	20.4	3.68	25.8	0.43	89.8	2.6
15	13.0	4.01	23.9	0.30	93.7	2.0
16		No Operation				
17		No Operation				
18	12.8	4.33	21.2	0.36	93.2	2.4
19	10.3	3.63	22.2	0.37	91.3	1.5
20	10.5	3.89	21.84	0.50	89.1	1.6
21		No Operation				
22	14.8	3.64	21.00	0.49	88.6	2.2
23		No Operation				
25	22.7	2.78	15.8	0.65	82.3	3.3
26	28.0	2.39	18.7	0.55	78.9	2.3
27	37.9	4.28	18.7	0.54	89.9	7.7
28	25.5	2.66	15.2	0.26	91.5	4.4
29	9.0	4.74	22.6	0.59	89.8	2.5
30		No Operation				
31		No Operation				
JUNE						
1	19.8	2.41	17.24	0.92	60.8	1.7
2	34.4	2.79	16.12	0.47	85.6	5.0
3		No Operation				
4	32.0	1.66	17.0	0.34	78.7	3.77
5	28.0	2.66	22.5	0.49	79.7	3.0
6	27.5	2.90	20.4	0.38	88.5	3.40
7	31.9	3.24	20.6	0.50	92.8	4.60
8	31.5	3.21	24.2	0.82	77.0	3.17
9	30.0	3.34	28.7	0.36	82.8	2.88
10	29.0	3.34	25.7	0.50	86.6	3.26
11	22.9	3.79	29.5	0.79	81.3	5.20
12	34.5	3.95	28.8	1.16	73.6	3.48
13	17.0	4.52	28.6	0.45	91.5	3.92
14	29.0	4.06	27.6	0.38	91.9	3.92
15	14.0	4.58	24.7	0.35	93.7	2.43
16	27.8	4.68	27.2	0.18	96.8	4.63
17	30.0	4.37	28.4	0.24	95.3	4.40
18	29.5	3.68	25.7	0.20	95.3	4.02
19	31.3	3.97	26.87	0.21	95.5	4.42
20	28.5	3.62	26.7	0.19	95.4	3.69
21	30.4	4.05	25.9	0.27	94.3	4.48
22	29.1	3.52	17.4	0.21	95.2	5.60
23	30.1	4.01	24.1	0.26	94.6	4.75
	1076.9	156.77	995.3	17.13	4038.0	157.7

AVERAGE RESULTS

- 23.90 Tons average tonnage
- 3.48 Average percent copper mill feed
- 22.10 Average assay of concentrates, % copper
- 0.38 Average assay of tailings, % Copper
- 89.70 Average percent copper recovered
- 3.50 Average number tons concentrate
- 6.80 Average ratio of concentration

Note: the mill was run only part time which accounts for low tonnage.

The above assay analysis of 3.48% copper is a fair criterion of the grade of ore encountered in this vein.

The gold vein already referred to has been mined down to approximately 30 feet below the present main level. It is officially reported to have produced \$40,000.00 in gold. More work should be done on this vein in order to determine its extent and value.

The Ten Spot Vein, together with the Storm Cloud, appear to be the two strongest veins on the entire property. The Ten Spot surface indications show it to be a wider and stronger vein, apparently, than the Storm Cloud Vein. It has been developed, according to the survey map of the underground workings on the Senator Mine, for some 750 feet in length. The nearest breast of this vein toward the Ten Spot shaft is some 900 feet from the boundary line of the Storm Cloud group. It is reported that the Ten Spot vein is from 40 to 60 feet in width on the Senator property. This appears to be true, for the surface shows the vein to be a very wide highly mineralized vein. Considerable work has been done recently by leasers on this vein, and direct shipping gold ore has been mined and shipped this season. Five surface samples on the Ten Spot Vein were taken just south of the Bugle Claim line. The following results show very good gold and silver content on three of the samples taken:

<u>No.</u>	<u>Width</u>	<u>Location</u>	<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>Value</u>
1	4 ft.	Near South tunnel	0.08	01.50	\$ 2.50
2	3 ft.	200 ft. No. of #1	0.50	16.67	20.02
3	2 ft.	100 ft. No. of #2	0.17	17.90	14.14
4		200 ft. No. of #3	0.37	01.40	8.24
5	7 ft.	General N. of #4	0.26	00.60	3.25

The Galena Vein runs parallel to the Ten Spot and as stated before, has been crosscut by a level at the eighty foot station in the shaft, also by a shallow tunnel and the vein followed some distance. Further development on this lead vein may develop sufficient tonnage to warrant milling.

#### PRESENT DEVELOPMENT

The maps of the Storm Cloud show how much work has been done on the gold vein and on the Storm Cloud copper vein. The shaft has been sunk to 150 feet below the present main or second level. A new level has been started 100 feet below and is called the third level.

Drifting along the vein has been started both to the North and South on this level, and stoping of ore between the two levels will commence as soon as the development and drifts are driven in a little distance from the shaft. There is without doubt, a very large prospective tonnage between this second level and surface to the South. There is the area between the second and third levels, or 100 feet in vertical height, and from the portal of the tunnel inward 700 feet in length that will produce a large tonnage of milling ore. Some diamond drilling has been done.

The following attached sheets show the classification and results. The small amount of drilling done is no criterion as to the value of the ore body and too much credence should not be placed on the results obtained.

CLASSIFICATION

DRILL HOLE NO. ONE

Dip 30 degrees

*find*

<u>FEET</u>		<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>% Cu.</u>	<u>REMARKS</u>
<u>From</u>	<u>To</u>				
3	23				Albite Diorite
23	32.5				Lime Vein
32.5	34.5	.0	Tr.	.04	Porphyritic
34.5	37	.0	.0	.16	Iron Porphyry
37	38				Vein Casing
38	39				Pyritic Schist
39	39.5	Tr.	.2	.45	Pyritic Schist
39.5	41				Pyritic Schist
41	42	Tr.	.2	.12	Pyritic Schist
42	47				Fe Porphyry
47	50	Tr.	.8	1.64	Ore
50	51				Pyritic Schist
51	51.5				Fe Porphyry
51.5	52.5				Pyritic Schist
52.5	54	.01	.4	1.00	Ore
54	59	.01	1.0	1.89	Ore
59	61	.01	1.8	3.08	Ore
61	65	Tr.	.2	.41	Mineralized porphyry
65	68				Altered Schist
68	75				Porphyry
75	91				Porphyry
91	94				Lime Vein
94	95	Tr.	.3	.28	Altered Schist
95	99				Altered Schist
99	100	.0	Tr.	.06	Altered Schist
100	104				Glossy Porphyry
104	110	.02	.1		Conglomerate
110	121				Pyritic Schist
121	127				Pyritic Schist
127	128	.03	.1		Small Vein
128	129				Schist
129	130	.02	.9		Schist
130	140				Schist
140	142	.02	.1		Schist
142	145				Silicified Schist
145	146				Ore Stringer
146	147				Schist
147	155				Silicified Schist
155	156	.02	.9		Mineralized Schist
156	164				Mineralized Schist
164	166	.01	.1		Mineralized Schist
166	178				Diorite
178	213				Schist

CLASSIFICATION

DRILL HOLE NO. TWO

Dip 60 Degrees

<u>From</u>	<u>FEET</u> <u>To</u>	<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>% Cu.</u>	<u>REMARKS</u>
0	88				Porphyry
88	89	.06	.6	1.18	Vein Matter
89	90				Vein Matter
90	91	Tr	.2	.20	Vein Matter
91	97	.06	5.8	1.28	Vein Matter
97	102	Tr	Tr	.06	Vein Matter
102	103				Porphyry
103	107.5	.Tr	.1	.32	Vein Matter (1st
107.5	109				Mineralized Sch )
109	111				Porphyry
111	114	Tr	.2	.45	Vein Matter
114	117	.01	.6	.28	Vein Matter
117	127				Porphyry

CLASSIFICATION

DRILL HOLE NO. FOUR

Dip 50 Degrees

<u>From</u>	<u>FEET</u> <u>To</u>	<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>% Cu.</u>	<u>REMARKS</u>
0	69				Rhyolite (Limey)
69	72				Mixed
72	78				Porphyry
78	82	.01	.4	.61	Vein Matter
82	96				Schist
96	97	Tr	.4	2.05	Vein Matter
97	101				Min. Schist
101	104	.01	.1	.12	Vein Matter
104	107	Tr	.1	.28	Vein Matter
107	111	Tr	.1	.49	Vein Matter
111	115				Min. Schist
115	116	Tr	.1	.12	Schist & Porphyry
116	127				Rhyolite

WATER

The quantity of water is always a serious question in most places in Arizona. At the present time the mine and mill are being operated sixteen hours per day without any trouble. I believe ample water can be developed to supply the mine and mill through any dry season, whereas during the wet season there is plenty of water.

POWER

There is at present one Holt engine and one W.S.M. gas eliminator engine, each connected to a compressor to furnish air for mining and pumping. The mill is operated by a Western type full deisel engine. The deep shaft pump on the Ten Spot Shaft is run by a gasoline engine.

Electric power can be delivered here on the property for a total cost of \$4750.00 and this amount will be refunded by the power company at the rate of fifteen percent of the cost of the power consumed on that line.

#### EQUIPMENT

The mine is fairly well equipped for exploration and also for milling up to fifty tons daily capacity. Enough electricity is generated for both surface and underground use. The compressors furnish approximately 500 cubic feet free air per minute. The underground hoist used for hoisting between the second and third levels is large enough for prospecting. The drilling equipment together with track and cars, etc. is ample for the capacity of the mill.

#### CONCENTRATION

A fifty ton flotation mill has been erected and is in steady operation. The mill results show that the ores are readily concentrated. The preceding data on the mill feed and concentration shows that copper concentrate of 22.1 percent was averaged during that period from a 3.48 percent copper feed, with a concentration ratio of 6.8 of crude ore to one ton of concentrate. The average recovery was 89.7 percent which would have been higher but the water used came from one of the shafts which had not been pumped out for years, and was very detrimental to the action of the flotation reagents. It was highly acidic which has considerable bearing on the results obtained. Without question, better than 92 percent recovery can be maintained.

It is planned, if electric power is put in, to move the present mill up to the portal of the tunnel which will be highly advantageous, as it will cut out the cost of hauling crude ore from the tunnel to the mill, and thereby make a saving of fifty cents per ton crude ore.

#### SMELTING

At the present writing the Storm Cloud concentrates are sold under the usual smelter rates, namely: 2.5 cents is deducted from the daily current price of copper for that date and is supposed to be to cover cost of refining, marketing, and shipping of bullion, and 85 percent of the copper in the concentrates is paid for under that price. However, this is usual and it is probable that a little better rate could be obtained by entering into a yearly contract with the smelter. Following is a table showing the results of the last smelter returns:

DATE 1928	% CH.	OZ. AN.	OZ. AG.	TONS	VALUE PER TON	TOTAL VALUE LESS FREIGHT
Mar. 4	25.48	0.17	12.60	26.47	\$ 61.80	\$ 1275.01
21	23.90	0.15	12.80	28.25	58.52	1284.05
Apr. 10	24.64	0.20	37.20	30.82	73.95	1786.99
20	20.90	0.16	21.00	34.62	56.81	1520.07
May 2	18.20	0.14	14.20	37.39	46.68	1338.24
7	17.10	0.15	11.80	20.91	43.40	1031.79
18	15.10	0.11	11.50	35.05	38.27	1013.96
June 6	17.10	0.14	13.50	36.88	45.93	1294.95
	<u>162.42</u>	<u>1.22</u>	<u>134.60</u>	<u>260.39</u>	<u>425.36</u>	<u>10545.06</u>
Aver ages	20.30	0.15	16.82	32.55	53.17	1318.13

### COSTS

In making out a cost statement I have conservatively estimated what the mine and mill should be able to do on a basis of 100 tons per day. In doing this, however, I have in mind that the mine will be further advanced on development and electric power installed

Mine Supplies complete	.95	
Mill Supplies complete	.50	
Cost per ton		1.45
Mine labor charge	120.30	
Mill labor charge	<u>57.50</u>	
Cost per 100 tons	177.80	
Cost per ton		1.78
Smelting 4% copper per ton		2.75

### TOTAL ESTIMATED COSTS

#### MINE

Supplies	.95	
Labor	<u>1.20</u>	
Total per ton	2.15	
Daily cost per 100 tons		215.00

#### MILL

Supplies	.50	
Labor	<u>.58</u>	
Total per ton	1.08	
Daily cost per 100 tons		107.50

### TOTAL COSTS

Mine - per ton	2.15
Mill - per ton	1.08
Smelting per ton	<u>2.75</u>
Cost per ton crude ore	<u>5.98</u>

I believe under an average management that the above cost of \$5.98 per ton crude ore for mining, milling and smelting can be approximated very closely.

#### PROPOSED DEVELOPMENT

It would be well to drive the new level to the North and South. There may be barren places but raises put in should strike ore directly above this level. The raises should be put in and stopes started. I suggest, however, it is best to drive the second level or main level drift on the South as fast as possible. This drift can still be driven approximately 700 feet before coming to the end line of the property, and there should be enough tonnage between there and surface to operate a 100 ton mill along period of time.

There is an unexplored area of 1600 feet on the Storm Cloud vein to the North and should be just as productive as the rest of the vein. A series of short diamond drill holes approximately 75 feet apart, drilled along the strike, crosscutting the vein about 100 feet in depth, will conclusively prove up the vein. With the idea of mining to the North it might be advisable to clean out the old shaft located near the compressor house, and sink down to the 100 feet level and drift to the North and South from that point.

It would also be well to complete the diamond drilling for the first eight holes as was planned to explore below the present main level. If any deep drilling seems advisable, I would suggest this be confined to the crosscut from the bottom of the shaft, and two holes put down, one cutting 150 feet below, that level and one cutting the vein 250 feet below that level. This would prove whether the pyritic gangue of the vein had been replaced by copper and whether a second ore horizon existed. Diamond drilling can be done in this vicinity for approximately \$3.10 per foot plus the cost of producing compressed air, and is really the cheapest and quickest way to prospect ahead of any tunnel or mining work. A study of all successful mining companies will show that they are either using the diamond drill or the long hole method for all of their preliminary prospecting.

#### CONCLUSION

In making this report on the Storm Cloud Mine, I have had in mind the possible future of the property, and I feel it is an inopportune time to make a report. In fact, I am certain with drilling confined to

the Storm Cloud vein alone, between surface and 200 feet in depth for its entire length, that the property will appear far more attractive to a mining investor than it does now. In other words, it needs more development laid out in advance and carried out in a systematic manner.

The copper vein is without question the best productive vein on the entire property, although the Ten Spot vein looks very attractive due to its width and continuance. The stopes in the copper vein show up a beautiful body of copper ore. It requires further exploration to prove the tonnage and the grade of copper ore in this vein, and believe it can be made to average as high as the average mill run mentioned previously in this report. The Storm Cloud vein looks very promising and will show a development of ore for its entire length, varying in grade, and I strongly recommend again that exploration for the time being be confined entirely to this vein. I believe the most economical and commercial ore will be derived from the Storm Cloud vein above a horizon 225 feet in depth below surface for its entire length of 3200 feet. It is highly probable that the ore found below that horizon will be very pyritic. The property is very nicely situated to carry on mining at a low cost and within a short distance of some of the biggest producers in the United States.

Respectfully submitted,

(Signed) Frank A. Kennedy.

Mining Engineer,  
Boise, Idaho.

June 25, 1928.

REPORT ON STORM CLOUD MINING PROPERTY

To M. J. O'Brien, Ltd.,  
Ottawa, Canada.

Gentlemen:

I beg to submit the following report on the Storm Cloud Mining Property which has been examined by me on several occasions since December of last year.

LOCATION AND AREA.

The Storm Cloud Group of Mining claims consists of fifteen patented and two unpatented claims, about <sup>220</sup>250 acres altogether, located in the Senator <sup>(Hassaymump)</sup> Mining District of the Bradshaw Mountains, Yavapai County, Arizona. The list of claims is as follows, and a map of these claims is attached to this report and marked "Plate 1":

PATENTED CLAIMS:

Storm Cloud ✓  
Lion ✓  
Abbie ✓  
B. Angle ✓  
Parintha ✓  
Hoot Owl ✓  
Johnnie ✓  
Ginger ✓  
Fraction ✓  
Trapezoid ✓  
St. Cloud ✓  
Paw Paw ✓  
Palmetto & Betsy Ann ✓  
Dakota ✓  
Cracker ✓

UNPATENTED CLAIMS:

McCleure  
Rangerchief

The elevation of the property is from 6700 feet to 7500 feet, the main workings from 7200 to 7500 feet, are situated near the summit of Storm Cloud Mountain between Senator Mountain and Mt. Union. The property is reached by <sup>thirteen</sup>fourteen miles of good mountain road running south from Prescott, County Seat of Yavapai County, a town of 7,000 inhabitants, <sup>and</sup> <sup>is</sup> <sup>reached</sup> <sup>by</sup> <sup>the</sup> <sup>Santa</sup> <sup>Fe</sup>

Railroad.

The topography is rough and steep. The mountain sides are covered with a heavy growth of yellow pine and spruce, furnishing ample timber for mining purposes. There is also a considerable growth of scrub oak and various kinds of brush and grass. The Hassayampa River runs near the claims and Jersey Creek comes down from the slopes of Mt. Union at the southern end and traverses the entire property supplying good domestic water during all seasons of the year.

#### GEOLOGY:

The country rock is largely hornblende-schist with the Bradshaw granite which forms Mt. Union and Mt. Davis intruding from the East. A long narrow tongue of very silicious schist mixed with conglomerate extends into these claims from the southwest, and near by is found an intrusion of diorite from which it is reasonable to suppose originated the mineral bearing solutions that impregnate the veins. The veins themselves, of which there are a great number (~~many of no practical importance~~) are generally found along the contact of the country rock with narrow porphyritic dykes which run northeast-southwest. They are mainly filled with quartz and silicified country rock, together with iron and copper sulphides containing in places substantial values in gold and silver. Near the surface the usual leaching has taken place with secondary enrichment and formation of oxidizes and carbonates, giving way gradually to the more solid primary sulphides below.

#### HISTORY:

From 1870 to 1906 a great number of claims were located in this District, and many small mines were actively worked with a large aggregate production from comparatively shallow workings. The principal values from these mines seems to have been in gold and silver, and while no accurate records are available, it is certain that a very considerable tonnage of high grade ore was produced

and shipped or treated locally by the Senator, Cash, Venezia, Ten Spot, Storm Cloud and other properties.

After 1907 production became very erratic and during the last fifteen years most of the work in this section has been done by leasers operating on a small scale and generally during periods of high market values for silver and copper.

Undoubtedly a considerable tonnage of ore remains in these old mines, but excepting the Storm Cloud, there seems to be little incentive to reopen them at the present time, and mining work in this vicinity is just now practically stagnant. The Storm Cloud which had been idle for a number of years was leased on December 26th, 1924, to F. W. Grove & Sons, and the work of reopening this property began in January, 1925.

#### EQUIPMENT:

Aside from a couple of small dwellings, now occupied by the leasers, the old buildings and equipment on the Storm Cloud property are of no value and are largely in ruins and entirely useless for mining purposes. This applies to the camp buildings located on the McClellan claim, and the old mill which once stood near them and to another old mill, the ruins of which are found in Jersey Gulch half a mile above the Storm Cloud workings.

The leasers are installing new rails, pipe, etc., and a good air compressor of 160 feet cubic capacity. They have also added to the blacksmith equipment, and later on will expect to provide a hoist for cleaning out the winze and operating below the level of the lower adit.

#### OLD WORKINGS:

The Storm Cloud property has been worked at intervals since the 70's, and complete description of the openings which were accessible in 1907 is given in the report of Leo von Rosenberg dated September 15th of that year. Undoubtedly his statements are accurate, although most of them are impossible to check at the

present time, except in connection with the copper vein which has been reopened by the present leasers and is described in this report. Otherwise all the old shafts are now caved and filled with rock and timber and the tunnels are closed at the entrance or partially under water. To render most of these old workings accessible would require a very considerable expenditure for which, after examination of the outcrops and all available data, I can see no justification, but after the present work of the leasers is well advanced I will arrange, insofar as possible, to have the more accessible tunnels reopened and will supplement this report with information concerning any promising veins which may then be exposed.

Judging from the surface indications, and from von-Rosenberg's report, and stories of "Old Timers" in the district, there is a very fair chance to develop some pay ore in the large vein which goes through the McCleur, Lion and Paw Paw claims, and which appears to be the extension of veins which were worked with some profit by the Phelps-Dodge Company and various leasers on the Senator and Ten Spot claims adjoining. Access to this vein will be obtained from a tunnel on the East side of Jersey Gulch which can be reopened with a comparatively small amount of work.

Should a sampling of this vein indicate that it could be mined with profit, further development will be in order, but for the present it seems advisable to concentrate all efforts on the Storm Cloud vein described below, which appears to be unquestionably the most promising and most valuable portion of the property.

#### STORM CLOUD VEIN AND WORKINGS:

The Storm Cloud vein, in von Rosenberg's report, termed "the copper vein", is found on the claim of the same name, and is traceable across the line to the Betsy Ann. Between these claims, according to the map, there is a long narrow triangle which does not appear to have been located, and concerning which I have not yet been able to obtain reliable information. This triangle will

be further investigated and if advisable steps will be taken to secure you in the ownership of this strip of land.

The Storm Cloud is a duplex vein, a type common in this district, and therefore it is really two parallel veins separated by a narrow dyke of porphyritic rock. The strike of the vein is Northeast-Southwest and the dip about  $75^{\circ}$  to the northwest. The duplex vein and the dyke lie between walls of schist. The width of each of the two veins varies considerably and at times they swell to ten or twelve feet but the pay ore which occurs in shoots seems to be confined to a width of from one to four feet, and the general average of the different shoots will not exceed three feet. The walls in certain places show a considerable dissemination of iron pyrite, but from samples taken this appears to be without substantial values in either precious metals or copper.

The vein which lies along the foot-wall of the dyke so far as it was opened up did not appear to carry commercial ore, and the stopes are therefore confined to the hanging-wall section of the vein along which the upper adit level is carried and which is reached by crosscut from the lower adit which followed a seam still further in the hanging-wall. As work progresses it will be possible and advisable to more thoroughly sample the foot-wall section of the vein and there are possibilities that shoots of commercial ore may be found therein, although no account of such possibilities can be taken in present estimates.

The mine workings are best shown on the blue print accompanying this report and marked "Plate 2". The assays on this blue print are indicated by figures, the first figure referring to the width of the ore, and the second figure to the percentage of copper contained. Not all the samples were run for gold and silver, and results of these assays were extremely erratic so that they are not generally indicated on the blue print, although I have taken account of these averages in estimating the present ore reserves.

Entering the upper adit the first shoot of ore, marked "5A"

is about 100 feet long and very close to the surface. It has been largely worked out by the leasers since the first of the year, and the ore produced amounted to something over 200 tons, runs \$4.00 in gold and silver values and 12% copper. There is every reason to believe that this ore shoot with somewhat diminished values will continue downward to the backs of the first two stopes above the second adit level which are now inaccessible. It is stated that good ore was mined from both of these stopes, and as soon as practicable they will be cleaned out and sampled, after which a more accurate estimate of the reserves in this ore shoot can be made. The winze below the second adit is full of water, but the records indicate that good ore was found 70 feet down, and later on it is planned to unwater this winze and examine these lower workings.

Returning to the upper adit, or first level, the second ore shoot, marked "B", is too narrow and too low grade, as indicated by the assays, to justify any amount of work at the present time, and the same thing applies to the third ore shoot, marked "C". It is probable, however, that some better grade material may be found in these shoots between the first and second levels, and special attention will be paid to this point when the stopes above the second level can be cleaned out and sampled.

The fourth shoot of ore, marked "D", extends to and across the shaft. It has a length of over 120 feet and the average grade of samples taken on the first level is 8.50% copper and about \$3.00 values in gold and silver. Some 1500 tons can be estimated as highly probable above this level, but since the drift does not develop the full width or length of the ore, a considerable additional tonnage may also be considered as reasonably probable.

Between the first level and the stopes above the second level there remains a block of some 2000 tons of ore but it is evident that the copper values decrease rapidly below the first level and the average of samples in the back of the stope is less than 4%, so

that the general average of this block, considering assays on first and second level, cannot be figured at better than 6%. The ore shoot undoubtedly extends below the second level, but whether or not the grade of ore will prove commercial cannot be stated at the present time. At one point on the second level (indicated on the assay map) a checked sample taken over a width of two feet of solid sulphide ore assayed 0.18 oz. in gold, 81.68 oz. in silver and 10.40% copper. This very rich ore is only exposed at one point and hence no estimate of tonnage can be made, but it will call for further development in the near future.

To the South and East of the Storm Cloud vein are found the old workings on a gold vein associated with some conglomerate. Apparently all the good ore had been worked out of this portion of the property before 1906, and much of the workings are now inaccessible and no ore can be sampled or estimated here. It is a noticeable fact, as von Rosenberg points out, that this vein and the copper vein should join at depth and if values maintain to this point in the copper vein a certain amount of enrichment may reasonably be expected at their junction.

#### ORE RESERVES AND PROBABILITIES:

So much of the Storm Cloud Mine workings are still inaccessible that an estimate of ore reserves is at present most incomplete and unsatisfactory. The following is set forth very tentatively with the understanding that revision will be made from time to time as the reopening of the old workings and the new development permits additional information to be gained.

ESTIMATE OF ORE RESERVES IN STORM CLOUD MINE

May 1st, 1925.

<u>Location</u>	<u>Tons Positive Ore</u>	<u>Tons Highly Probable Ore</u>	<u>Tons Probable Ore</u>	<u>Value Per ton Au. &amp; Ag.</u>	<u>% Copper</u>
Mined and Stocked for shipment	200	-	-	\$4.00	12.00
To be sorted from old dump	-	200+	-	3.00	9.00
Above 1st level, Shoot "A"	50	-	-	4.00	12.00
Above 1st level, Shoot "D"	-	1500	2000	3.00	8.50
Between 1st and 2nd levels, Shoot "A"	-	2000	4000	About 3.00	About 7.00
Between 1st and second levels, Shoot "D"	2000	-	3000	2.00	6.00
Below 2nd level	-	1000	?	?	?
<b>Total</b>	<b>2250</b>	<b>4700</b>	<b>9000</b>	<b>Say \$3.00</b>	<b>Say 7.0%</b>

In addition to the above estimate, and basing my opinion upon the general indications and von Rosenberg's report, a very considerable tonnage will pretty surely be found, but the exact quantity and value of this ore is pure speculation.

To properly open up the mine I advise that the following development work, as provided for in the Lease, should be undertaken:

FIRST: Extending the first level across and beyond the shaft to determine the full length and value of ore shoot "D".

SECOND: Opening up the old stopes on the second level from the crosscuts and obtaining access to the backs so that the ore exposed can be measured and sampled.

THIRD: Unwatering the winze below the second level and cleaning out the drift at the bottom.

FOURTH: Unwatering the main shaft below the second level to determine the width and value of the ore in Shoot "D" near the bottom of the shaft.

Depending upon the results of Three and Four, an additional program of development can later be outlined for further opening up

and developing the property, and it may then seem advisable to reopen the shaft which was started near the portal of the second adit, and which is now full of water.

#### WORKING COSTS:

Considering the narrow veins, hard ground, and the limited equipment available, the cost of mining will probably be about \$3.00 per ton, to which should be added \$1.00 per ton for a proper proportion of development. Haulage to the railroad now costs \$4.00 per ton and freight to Humboldt Smelter \$1.00, and Smelter charges and deductions on this class of ore amount to about \$6.00 to which must be added the cost of converting and freight, refining and marketing the copper bullion, representing 3¢ per pound of copper contained. Assuming as an average a 7% copper ore, with \$3.00 value in gold and silver, the gross value on a 14¢ market is \$22.60 per ton, and the total costs indicated above amount to \$18.00, which is relatively a very high figure, largely due to the location and character of the mine. If development should later permit operating on a larger scale these costs, especially for mining, haulage and smelter charges, might be considerably reduced, but hardly below a minimum of \$15.00 per ton.

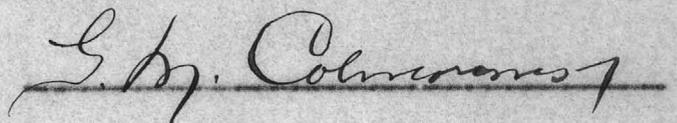
The above calculations would appear to indicate that only a moderate profit can be expected from mining the average grade of ore so far developed in the mine until the price of copper takes a substantial advance, or until conditions justify the erection of a concentrator, which might permit the profitable mining and treatment of a large tonnage of low grade material, provided such tonnage should actually be developed. There is not at present any justification for the erection of a concentrator, but development work will be planned with a view to indicating the reserves of lower grade as well as higher grade material, and later on additional calculations can be made in this regard.

#### FUTURE PROSPECTS:

Obviously the Storm Cloud property suffers from the fact that it had been entirely closed down for some fifteen years until only the upper adit was accessible and that the workings are still in such a condition as to render an accurate sampling and estimate of ore reserves impossible. The showings may be considered very promising since they indicate that the veins are strong and the ore shoots are apparently persistent in depth, and in places the veins are rich in copper and precious metals. If further work proves that these values continue downward there will be an excellent chance of developing a very good little mine which will give promise of operating with substantial profit over a period of years and returning principal and good interest on a moderate investment.

I cannot agree with the very optimistic opinion expressed by Mr. Von Rosenberg as to the prospect of developing a large mine, nor with his recommendations for sinking a deep shaft and carrying on extensive development, but I believe that all present showings justify carrying out the moderate development work recommended in this report, and, if results are favorable, proceeding later on a larger scale, extending the work to greater depth, and perhaps providing for the treatment of low grade ore that could be concentrated on the ground, as well as for the mining and shipment of the higher grade material.

Respectfully submitted,



GMC-s  
Humboldt, Arizona,  
May 26, 1925.

Storm Cloud

STATE AND COUNTY TAXES-- YEAR 1929

Yavapai County, Arizona.

Prescott, Arizona. October 26, 1929.

No. 2646

Page 271

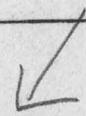
Received the Total Amount Shown Below

From O'Brien, M. J., c/o Bluford H. J. Balter.

By Same.....

In Payment of First Installment State and County Taxes for the Year 1929 on the following described property:

Description	Section or Lot	Township or Block	Range	Number Acres	Real Estate	Im-prove-ments	Personal	Total
Hassayampa Dist:								
Storm Cloud				20.00	10000			
Lion				11.61	420			
Abbie				20.55	750			
Bugle				1.85	65			
Parintha				19.86	720			
Hott Owl				17.61	640			
Johnnie				18.45	670			
Ginger				14.87	540			
Fraction				1.63	60			
Trapezoid				14.90	540			
St. Cloud				19.38	705			
Paw Paw				15.49	560			
Palmetto & Betsy Ann				10.91	390			
Dakota				9.19	335			
Cracker				17.50	640			
							10545	28580



*Should be reduced*

1000

*Red 5100*

10545

28580

R. R. RILEY COLLECTOR

*over*

Office of

# The Recorder of Pinal County

GRACE CHAPMAN  
COUNTY RECORDER

Prescott, Arizona

F. C. BAUER  
CHIEF DEPUTY

October 17, 1925

Mr E.I.Sawyer  
Humboldt, Arizona.

Dear Sir:

In complying with your request for information of certain mining claims, we searched and re-searched the records of this office and find only as follows.

Storm Cloud, patent of which is of record in Book of Deeds 36, page 450.  
Dakota and Cracker patent of which is of record in Book of Deeds 77, page 422  
The McCluer notice of location is of record in Book 20 of Mines page 250  
Rangerchief notice of location is of record in Book 92 of Mines page 180  
We find no record of patent for the following named mining claims altho they are assessed to M.J.O'Brien which would indicate that they are patented. Whoever got the patent evidently neglected to put patent of record.

Storm Cloud-Book of Mines	50-	Page	422✓
The Lion	22	Page	85
McCluer	21	"	321
St Cloud	23		170
Trapezoid	28		397
Parintha	28		395
Abbie	28		394
Fraction	28		392
Hoot Owl	31		24
Johney	33		63
Ginger	33		62
Bugler	38		97
Paw Paw	18		539
Palmetto	24		220
Betsy Ann	42		256

I am sorry that I can not give you more definite information about the mining claims.

Very truly yours

*Grace Chapman*  
County Recorder

**J. WILLIAM WAARA**  
CIVIL AND MINING ENGINEER  
PRESCOTT, ARIZONA

July 21, 1925

Handwritten notes and signatures: "2/22/25", "A", "7/27", and a signature.

Mr. G.M. Colvocoresses  
Humboldt Arizona.

Dear Mr. Colvocoresses;

I have received your letter of the 14th which arrived during my absence in the field, and noted contents and also examined the map.

A patent survey executed about twenty three years ago was in most cases executed under different conditions as compared with the present day custom. No inspection was made at that time, and the ruling with reference to errors was not enforced as at present. For that reason said early surveys were made by the stadia method, although an engineer had to report his working as having been done by actual measurements with a steel tape. In this class of work where stadia methods were used, we have found considerable discrepancies between the actual and recorded positions of claims. This occurred in a greater degree where inclined measurements were taken. The Jerome field has been a source of extra-ordinary expense to claim owners due to this early method of surveys, and I feel that in the case of the claims you mention, the same is more probable to be true than to the contrary. The Walker district has shown the same trouble in the work, I have retraced there.

In view of the above, I have always recommended that all the corners of a group of claims should be examined and connected up in a survey. Fractions within a group generally occur where a corner was to be established on a side line of an adjoining claim. Invariably a fraction occurs, or an overlap, instead of the corner falling exactly upon the line as reported. If a fraction occurs, the ground is open to location, irrespectively of the calls in the patent, on the ruling that position of corners govern over reported courses and distances.

A close examination of the map will show that with the exception of probably four or five ends of claims, the balance of the lines would be considered outside boundaries. This would not warrant a claim owner to reduce his costs, nor would it warrant an engineer to consider it as a factor in reducing his charges, as he would most likely have to retrace some of this lines in order to re-establish obliterated corners which you say has occurred.

I take it that there are 18 claims in this group, consisting of the Bugle, Fraction, McCleur, Jersey, Paw Paw, Lion, Bomeraug, H.J. Glenn, Johney, Hoot Owl, Ginger, Parincha, Abbie, Betsy Ann, Palmetto, Storm Cloud, Saint Cloud, and Trapezoid. From my experience in this district, I find that the combination of mountains and brush, makes work very slow, and I have been able to get a close figure on costs of work there. I will survey the whole group at the rate of fifty dollars per

survey this group as outlined above for fifty dollars a claim, said sum to include all costs, of assistants, lodging, subsistence, and transportation. If any fractions are discovered, they will be located and monumented without costs to you, if situated within the outside boundaries of this group. If fractions are reported between the outside boundaries of this group and adjoining properties, the charge for location and monumenting and platting will be fifty dollars a claim additional.

The above work anticipated the re-establishment of every corner of the group according to the field notes reported, and conditions corresponding with said field notes upon the ground. If stone corners were used, and have fallen down, they will be reset. Posts obtained from timber available on the ground will be used for corners where stones are not available. Monuments of stone or post will be used to witness the position of the corner reset or found so that they may be readily found by the inexperienced person.

Trusting that the above will meet with your approval, and thanking you for the inquiry, I am,

Yours very truly,

*William Waara*

*mailed*  
1 blue print ~~inclosed~~.  
*under separate*  
*cover*

STORM CLOUD MINING CLAIMS

Owned by M. J. O'Brien, Jr.

In Hassayampa Mining District (Senator), Yavapai County, Ariz.

- - - - -

	Location of Record in Yavapai County Book of Mines	Patent of Record in Book of Deeds	Patent Survey Number
Storm Cloud	50 p. 422	36 p. 450	118
Lion	22 p. 85		1660 Sheet 1
Saint Cloud	23 p. 170		1660 " 2
Trapezoid	28 p. 397		1660 " 2
Parintha	28 p. 395		1660 " 2
Abbie	28 p. 394		1660 " 2
Fraction	28 p. 392		1660 " 1
Hoot Owl	31 p. 24		1660 " 1
Johnny	33 p. 63		1660 " 1
Ginger	33 p. 62		1660 " 1
Bugle	38 p. 97		1660 " 1
Paw Paw	18 p. 539		1320
Palmetto	24 p. 220		1660 " 2
Betsy Ann	42 p. 256		1660 " 2
Dakota		77 p. 422	1955
Cracker		77 p. 422	1955
<u>Unpatented</u>			
McCleur	20 p. 250		
&	21 p. 321		

STORM CLOUD MINING CLAIMS

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Dakota		77 p. 422	1955
Cracker		77 p. 422	1955
<u>Unpatented</u>			
McCleur	20 p. 250		
&	21 p. 321		

3 Copies

S.M.C.

THE  
STORM CLOUD GROUP OF MINES

Hassayampa Mining District  
Arizona

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Report by  
Leo Von Rosenberg  
42 Broadway  
New York

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With Maps and Photographs  
September 15, 1907

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Examinations made in Dec. 1906  
and May, 1907.

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7  
To be copied  
George M. Colvocoresses  
1108 Rialto Tower  
Phoenix Ariz

## THE STORM CLOUD GROUP OF MINES

### LOCATION--

This property embracing about 300 acres is situated in the Hassayampa mining district, about 12 miles south of Prescott, in Yavapai county, Arizona. Several of the claims of this group adjoin the property of the Commercial Mining Company, (controlled by Phelps, Dodge & Co., of New York) which is being developed by a crosscut tunnel, known as the "Senator" tunnel, now 3100 ft., in length. The "Cash" property adjoins the "Storm Cloud" group on the south. The "Cash" is developed by two shafts - one about 400 ft., deep and the other 300 ft., deep; these shafts are connected by several levels.

The "Storm Cloud" claim of the Storm Cloud group is one of the oldest locations of the district, (being No. 38) having been located in 1875. The accompanying map shows the Storm Cloud group and the surrounding claims. (The claims marked with numbers are patented). The Storm Cloud group forms a solid tract, which is traversed by many veins, coursing in a general northeasterly direction. Jersey gulch runs in a general northwesterly direction across the claims. through the property toward the Hassayampa river, Cash gulch and Maple gulch, both being branches of Jersey gulch, skirt along parts of the southwestern boundaries of the property. The hill slopes are well covered with oak and pine timber. The elevation of the lower parts of the property (near the junction of Jersey and Maple creeks) is about 6700 ft., while the higher parts, on and in the immediate vicinity of the Storm Cloud claim, lie about 7500 feet in elevation above sea level.

## GEOLOGY--

The country-rock of the locality in which the Storm Cloud group is situated is mainly schist. The veins have a general northeasterly direction following, usually, the trend of the schist. The most important veins occur along, or near, porphyry dikes, some of which are very prominent. The veins are fissure veins - a dike and its accompanying vein or veins often occupying one and the same fissure.

The dip of the veins is usually steep, from 70 to 85 degrees, and to the east, with some exceptions as, for instance, the "conglomerate" gold vein of the old Storm Cloud mine which dips to the west, toward a very prominent porphyry dike. Associated with this dike is the "Copper" vein, of the Storm Cloud claim, which now forms a very important part of this property as will be described further on. The vein of the old Storm Cloud mine was worked for the gold only.

Between the northwestern and northeastern boundaries of the tract are a number of veins. In a general way it may be stated that of the twenty or more veins traversing the property, at least three quarters of that number will become good producers, chiefly in gold, and also copper. The most important of them will be described in a following chapter. The vein matter is usually quartz. The ores carry some native gold, silver, some galena, iron and copper pyrites etc. To a large extent however, the values are carried in sulphide minerals. A part of these ores (as those of the Storm Cloud copper vein) form a shipping product carrying about 10 per cent copper and some gold and silver. This ore is shipped to the smelters at Humboldt. The bulk of the product of the various veins will be milling or concentrating material. As there are more "gold" veins than "copper" veins, the greater part of the income will be derived from the product of the former series.

The ore of the old Storm Cloud mine was reduced in a stamp mill near the mine. The ore is said to have yielded about \$20.00 in

*Arrested*

free gold per ton. No effort was made to save the values contained in the sulphides, which were carried off with the tailings, therefore lost. The mine is reported to have produced about \$40,000. The ore of this vein consists chiefly of brecciated material cemented by quartz and sulphides. Locally it is known as a "conglomerate" vein. The schists carrying the lenses of this vein appear to be very silicious. The thickness of the pay ore of the various veins varies from a foot to seven feet; however, the ore bodies are occasionally much thicker, measuring as much as fifteen feet across the vein.

The pay ore occurs in a succession of swells or lenticular shaped bodies, called ore-shoots. These shoots are found more or less in close proximity to each other, on the course and dip of the vein. The intervening spaces may sometimes be barren, the vein being represented by a mere gouge seam or carry narrow streaks of ore. By sinking or upraising in these narrow or less productive parts of the vein, other ore shoots will in most cases be developed.

#### EXTENT OF THE PROPERTY

It consists of the following claims  
acquired prior to January 1st, 1907.

(all patented)

	SURVEY NUMBERS	NET AREA
> Bugle ✓	1660	1.85 Acres
> Fraction ✓	1660	1.63 "
> Mc Cleur ✓	1626	4.89 "
> Lion ✓	1660	11.69 "
> Paw Paw ✓	1320	15.49 "
> Johnny ✓	1660	18.54 "
> Hoot Owl ✓	1660	17.62 "
> Ginger ✓	1660	14.87 "
> Parintha ✓	1660	18.87 "
> St. Cloud ✓	1660	19.37 "
> Abbie ✓	1660	20.57 "
> Storm Cloud ✓	38	20.66? "
> Trapezoid ✓	1660	14.90 "
> Palmetto ✓	1660	7.75 "
> Betsey Ann ✓	1660	3.16 "

? Parintha?  
Trapezoid  
Dakota  
Cracker  
Mc Cleur  
Ringer Chief

191.86  
20  
20  

---

231.86

There were several fractional claims located which are not yet patented.

Claims acquired since January 1st, 1907.

Hassayamper Ranger Chief		) Names changed
Kent	" " No.1	) when claims
Missing Link	" " No.2 Being surveyed for patent	) relocated.
Lucky Strike Molybdenum		)
San Pedro Beemer #5		)

Dakota )  
Craker ) Patented

Ashurst

The total area of the Storm Cloud group is now about 300 acres, forming a solid tract as shown on the map.

By the acquirement of the Venderbilt, De Veras, January, Dead Shot, Lucky Boy, Lucky Strike and San Pedro claims, the Storm Cloud Mines Company now covers about 7,000 ft. of the course of the Storm Cloud Copper vein and also several thousand feet of that of the conglomerate gold vein. The other claims acquired are also valuable additions, especially the Cracker and Dakota claims.

The principal buildings, consisting of office and boarding house, hoisting works (at Ten Spot shaft) and other structures are situated on the "McCleur" claims. At the Storm Cloud mine are several buildings with compressor, ore bins, etc.

-----

#### DEVELOPMENTS --

The development work in the northeasterly portion of the property on the "McCleur" claims consists of a shaft which was sunk to a depth of 267 ft., several crosscuts were run from this shaft to intersect the various veins in that part of the property.

In the southwestern portion of the property, about three quarters of a mile up Jersey gulch, an adit is being run on the "Copper" vein of the Storm Cloud claim; this tunnel is now over 800 ft. long. The upper tunnel has now a length of 400 ft., recently a shaft was constructed. It is now 325 ft. deep, and 75 ft. below the main tunnel level. It is intended to continue sinking to much greater depth. The development of the other claims consist of various shafts from ten to fifty feet deep,

and many short tunnels, cuts, etc. The surface showings are very good on most of the claims.

THE MC CLEUR, LION or TEN SPOT WORKINGS--

This part of the property will form a mine in itself, when more fully developed. The "Paw Paw" might also be included in this series. The shaft on the "McCleur", known as the "Ten Spot" is now 267 feet deep; at a depth of 80 ft., there are two crosscuts, which were not accessible during my examination. I am informed that the southeasterly crosscut is 30 feet long, cutting a small vein, 20 feet from the shaft. The northwesterly crosscut is about 110 ft long, cutting the "Ten Spot", vein within 68 feet from the shaft. The vein is 40 feet thick. It is described to consist chiefly of "porphyritic" matter with bands of quartz. The values reported ranged from several to forty dollars per ton.

X  
At a depth of 237 ft. two crosscuts were driven. The southeasterly is about 80 feet long, showing two quartz veins, each about 12 inches thick. The northwesterly crosscut is 70 ft. long/ At a point 45 feet from the shaft the "Ten Spot" vein was encountered in this crosscut. A sample taken across three feet of quartz matter yielded:-

\$9.40 in gold and silver and 4.4 per cent copper.

In this connection it may be stated here that the Ten Spot vein has been developed for a length of 900 ft., from the Senator tunnel (on the Commercial Mining Company's property) which intersected this vein at a point about 2300 ft. from its portal. The vein has been drifted on for 580 ft., southwesterly and for 420 feet northeasterly from the tunnel. The breast of the northeasterly drift is now about 1550 ft., from the "Ten Spot" shaft or about 900 ft., from the boundary line of the Storm Cloud group. (The "Storm Cloud" group covers about 1100 ft. on the "Ten Spot" vein which courses through the "Bugle", Fraxtion and the McCleur claims)/

The vein is in good shape in the drift run from the Senator tunnel, showing 6 to 8 ft. of quartz, which, I am informed, carries good values. The width of the entire vein is from 40 to 60 ft.

About 250 feet south of the Ten Spot shaft, on the Lion claim is a crosscut about 200 ft. long; it intersects three or four veins as shown on the accompanying maps. Most of these veins should eventually be cut at much lower depth by the crosscuts to be extended southeasterly from the Ten Spot shaft, as indicated in plan and section on the maps.

The veins cut in the Lion crosscut may be identified as the Galena, Curtis, and Lion. These veins are from a foot to several ft. in thickness in the various drifts. The Lion, which is at the face of the crosscut is a large vein being over 4 ft. thick. The values, however, are low at this point.

The Galena vein showed good values; a sample taken yielded \$24.00 in gold - \$7.47 in silver and 1.5 per cent Copper. The map shows the extent of drifting done on these veins. Some stoping has been done in the southwesterly drift on the Galena vein.

However, this working is too shallow to prove the veins. They will be more effectively developed by the lower crosscuts from the Ten Spot shaft and the drifts to be run on them from the crosscuts.

By extending the lower crosscuts far enough the "Treadwell" and a number of other veins will be encountered.

The "Paw Paw" workings consist of two tunnels, situated on Jersey gulch. The southwesterly tunnel, 37 ft. long, shows a dike about 3 ft. thick - with a 6 inch vein on the hanging and a 12 inch vein on the foot wall. The northeasterly tunnel, about 175 ft. long shows a vein varying from 6 inches to 4 ft. in thickness. No samples were taken in these workings as they are too shallow to prove anything definitely. Whether or not the "Paw Paw" is an extension of the Lion or a separate vein remains to be proven. The Paw Paw territory could be developed in depth from the Ten Spot shaft.

The part of the property embracing the Bugle, Fraction, McClellan and Paw Paw claims, when developed will, in all probability become very productive. It includes the Ten Spot vein for about 1100 ft., the Gaana and Curtis and other veins for about the same distance each and apparently the Lion and Treadwell veins for several thousand ft. By continuing the present development many valuable ore-shoots will, no doubt be opened up on these veins.

#### THE STORM CLOUD MINE -

The most important working on the entire property, at the present time is the tunnel being driven on the Copper vein of the Storm Cloud claim. It is now 810 ft. long. The tunnel was originally started and run on a narrow streak for several hundred feet. The copper vein was encountered and opened up later by crosscutting; there are three crosscuts about 100 feet apart, to the Copper vein as shown on the map of workings.

By this tunnel, this Copper vein has been developed for a total length of 600 ft; the vein occurs in the hanging wall of a very strong porphyry dike which is about 40 feet thick where crosscut. (see maps). Very probably there is also a vein on the foot wall of the dike as indicated by prominent croppings occurring on the top of the hill on the Storm Cloud claim as well as by various cuts and shallow shafts on the St. Cloud claim and the Lucky Strike and San Pedro claims which form the northeasterly extension of the Storm Cloud and on the southwest of the Vanderbilt claim, etc. The crosscut which was run across the dike in the tunnel shows three feet of vein matter on the footwall of the dike. By drifting, however, ore shoots may also be developed along the footwall of the dike.

The dip of the dike and its accompanying vein or veins is about 70 degrees to the east. The ore occurs in a succession of shoots or lenses; the ore being from a foot to seven feet in thickness. Here and there the ore is much thicker as, for instance, in a part of the new shaft it swelled out to fifteen feet (within about 35 ft. above tunnel level). Four distinct ore shoots have so far been opened up by this tunnel; the first shoot is about 150 ft. long; the second shoot about

50 ft. the third about 55 ft. and the fourth is about 150 ft. long. The thickness of the ore in this shoot will be about six feet on the average. The new shaft has proven this shoot for a depth of over 250 feet. The bottom of the shaft is still in ore seven feet thick. Values range from three to six per cent copper and several dollars in gold and silver. The average thickness of the other three or 4 shoots is about thirty inches, carrying on the average, about 5-1/2 per cent of copper and several dollars in gold and silver.

In the spaces between these ore shoots the vein is more or less narrow. The accompanying maps show in plan and section the development up to date.

At the second crosscut in the tunnel a winze was sunk to a depth of 75 ft; levels were started from the bottom of the winze. The northerly level is 100 ft. long, showing some ore. The southerly level is also 100 ft. long, showing good ore for most of this stretch. About 100 ft. above the main tunnel is another tunnel approximately 400 ft. long. For the greater part of the distance it is in ore. This tunnel connects with the new shaft and cuts the new large ore body for a distance of about 100 ft.

Only a small amount of stoping has, as yet, been done on the "Copper" vein.

The old Storm Cloud mine consists of the Storm Cloud shaft, 156 ft. deep, levels and stopes; these workings are approximately 125 feet east of the copper veing workings and are now connected with the same by a crosscut about 115 ft. long; the accompanying cross section and plan of the mine shows this connection, also the shaft and levels on the old Storm Cloud mine. The connection of the new with the old workings was made during last spring, thus securing ventilation for all the present workings. Practically there is now no workable ore in the old Storm Cloud workings. Ore of very good value is said to have been produced from the stopes in quantities; the product was chiefly in gold; the total amount is said to have been \$40,000. The stopes are very limited in extent.

A winze was sunk in the old Storm Cloud level about 60 ft. south of the shaft. At the time of my examination this winze was 15-1/2 ft. deep, showing the ore body to be 5 feet thick; a sample taken from the bottom of the winze, across the vein yielded: - \$14.00 in Gold--\$1.25 in Silver and 0.5 per cent in Copper.

The dip of the Copper vein and the dike being to the east and that of the Storm Cloud Conglomerate gold vein being to the west, it is fair to assume that the veins will meet at a depth of from 150 to 180 ft. below tunnel level. (see across section).

The Storm Cloud conglomerate vein will be further developed in depth when the new shaft of the Storm Cloud copper vein has been sunk to greater depth. It is quite possible that large ore bodies carrying good values will be found at or near the junction of these two veins.

ORE VALUES, SAMPLES, ORE RESERVES, ETC.

The following is a list of samples taken in the Storm Cloud vein tunnel, last December with a Statement of location where samples were taken, thickness of ore body where sampled and assay values. The samples represent, more or less, clean ore.

Note: In sampling it is not always possible to get at the full thickness of the vein or the ore body - a part of the ore being sometimes in the hanging wall and therefore inaccessible for sampling and measurement.

Further, in sampling, some parts of the vein, which apparently show low grade ore, are omitted. This low grade material however, would become a source of profit if handled in a large concentrating plant.

Samples taken on Storm Cloud Copper Vein during examination in December, 1906. The Copper Tunnel was then 430 ft. long from Cross-cut No.1 to the face.

Mark	Location Copper Vein	Thickness Ore Samples	Gold per Ton	Silver per Ton	Copper Per Cent
V	Face Dec.10	6 Ft.	1.60	1.96	3.5
1	5 ft. back from face	6 "	1.20	1.68	3.5
2	15 " " " "	5 "	2.00	1.82	4.1
3	25 " " " "	4 "	1.20	2.52	7.5
4	35 " " " "	2 "	1.00	2.80	6.3
5	45 " " " "	2 "	1.00	1.26	3.1
-6-----					
6	96 "So. of #3 Crosscut	20 In.	2.40	1.82	6.
7	85 " " " " "	20 "	2.00	2.10	3.
8	75 " " " " "	20 "	2.00	1.96	5.5
9	67 " " " " "	24 "	1.00	1.54	3.5
10	In bottom, 48 ft. So. #3 Crosscut	5 Ft.	10.00	41.86	4.5
-----					

Mark	Location Copper Vein	Thickness Ore Samples	Gold Per Ton	Silver Per Ton	Copper %
LL	20 Ft. So. of #3 Crosscut	12 in.	1.00	3.36	12.5
12	10 " " " " "	3 Ft.	1.40	3.76	9.2
13	At #3 Crosscut	3 Ft.	2.00	2.94	6.
14	10 ft. No. of #3	12 in.	1.20	2.80	11.2
15	20 ft. " " "	6 in.	1.00	1.54	8.5
-----					
16	40 ft. So. of #1 Crosscut	14 in.	1.00	1.68	4.1
17	30	24	1.00	2.38	8.5
18	20	24	1.60	3.76	10.
19	10	3 ft.	1.20	1.54	4.1
20	At #1 Crosscut	4 "	1.00	0.98	2.1
21	15 ft. No. of #2 Crosscut	24 in.	Tr.	0.84	2.
22	35	9 "	1.20	3.50	10.2
23	55	28	Tr.	1.26	5.
24	65	26	Tr.	1.40	5.3
25	75	23	1.20	1.40	2.
26	85	10	0.80	1.40	2.
27	90	12	3.00	4.27	20.8
28	97	12	2.40	1.62	2.
-----					
29	At Jct. 90 ft. from mouth of tunnel	24 in.	Tr.	.056	Tr.
-----					
30	So. face level from bottom of winze	14 in.	1.60	1.68	7.
31	No. face level from bottom of winze	12 in.	1.20	1.68	7.
-----					
32	Face upper tunnel	20 in.	2.40	2.52	10.
33	20 ft. back of face, upper tunnel	10 in.	3.20	2.94	15.1
-----					

The upper tunnel has since been extended into the hill to the new shaft. The main tunnel is now (Sept. 15) 600 ft. long, from crosscut No. 1 to the face, or 810 feet from its mouth.

DUMP SAMPLES AT COPPER TUNNEL

A	Pile of ore from face Copper tunnel	2x60	2.00	1.28	3.
B	Sample of large piecee of ore, 3 ft. 2in. thick		3.20	2.94	9.
C	Vein material on dump from between ore-shoots		2.80	1.82	2.5
E	Mill Dirt, low grade		1.20	1.12	2.4
H	" "		1.20	1.54	3.5

SAMPLES OF SHIPPING ORE ON DUMP AND IN ORE BINS AT COPPER TUNNEL

Mark	Location	Gold Per Ton	Silver Per Ton	Copper %
D	Shipping Ore	2.40	3.50	10.
F		2.00	3.08	8.
I		1.00	2.52	8.5
J		2.00	3.08	11.

6e-----

Part analysis and assay of a mixture of samples, consisting of

Nos. 1 to 31 inclusive and sample V yielded:-

Gold \$2.00 per ton  
 Silver 3.43  
 Copper 6.1 per cent  
 Silica 44. " "  
 Iron 22.1 " "  
 Sulphur 26.2 " "

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Part analysis and assay of low grade mill ore (Sample E & H)

Gold \$1.20 per ton  
 Silver 1.14 " "  
 Copper 2.98 per cent  
 Silica 47.1 " "  
 Iron 20.4 " "  
 Sulphur 22.9 " "

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Part analysis and assay of ore shipped (taken from smelter's returns)

Gold 0.03 oz. per ton  
 Silver 4.8  
 Copper 9.84 per cent  
 Silica 34.6 " "  
 Iron 25.9  
 Sulphur 23.1

Samples taken during the examination last May

At shaft of Dakota claim:-

\$1.00 Gold  
 3.22 Silver  
 15.1 per cent Copper

The Dakota is one of the several copper veins on the property. It is situated about 1600 ft. southwesterly of the Storm Cloud copper vein.

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Samples taken in the Dead Shot claim, on the Storm Cloud conglomerate gold vein:

No. 2 sample--	Gold \$32.00--	Silver \$3.92--	Copper 3.4 per cent.
3 " "	22.40	" 3.41	" 0.7 " "
4 " "	21.00	" 0.98	" -----

This is a southwesterly extension of the conglomerate gold vein of the Storm Cloud claim. It will be seen that the gold values decidedly predominate in the ore of this vein.

It will be seen by the above list of assays that the copper contents of the Storm Cloud copper vein, vary from 2-1/2 to 12 per cent, occasionally showing even higher percentage than 12 per cent. This ore invariably carries also some gold and silver values. Ore carrying about 10 per cent copper may be considered shipping ore. The bulk of the ore of all the veins of the copper series as well as of the gold series will be concentrating material.

With a mill of sufficient size to handle 100 tons, or more, per day, of the ores of the various veins, the property will pay a good profit over the operating expenses. An output of no less than 100 tons per day should be figured on to begin milling operations. When several of the gold veins have been developed, the gold contents of the ores will form the main source of the revenue.

The amount of ore developed at present in the Storm Cloud copper vein, by the two tunnels, the shaft and winze, is about 25,000 tons. Owing to the comparatively large size of the ore shoot recently opened up in the two tunnels and in the new shaft this estimate will most likely be considerably exceeded, when the ore is stoped. The above estimate of tonnage is limited to an area or block of ground extending from the first crosscut southerly for about 600 ft., and from the surface down to a horizon of 100 feet below the main tunnel level.

The gross value of this tonnage may safely be placed, in round numbers, at \$500,000.

The amount of profit this particular block will yield will depend upon the size of the milling plant, and the price of copper which may prevail at the time this ore will be mined and milled.

It must be borne in mind that the particular block of ore referred to above, forms, after all, a very small part of the minable areas of the vein or veins. Reasoning from analogy the ore shoots or lenses can be expected to recur along the course and dip of the veins and considering the large number of veins on the property, it should be a well paying one and have a long life.

When several of the various veins have been opened up, of both the gold and copper series, I would recommend that the ore production be regulated somewhat according to the price of copper - that is to say - when copper commands a high price, the reserves on the copper veins should then be heavily drawn upon, in order to obtain the best prices possible for this product. During periods of lower prices of the metal, the reserves on the gold veins should be drawn upon almost exclusively for the mill supply. The mill should be so designed as to meet these conditions.

The cost of mining and development may vary from five to six dollars per ton of ore produced. The cost of milling will vary from \$1.50 to \$2.00 per ton, according to the size of the plant, etc. The number of tons of material which may successfully be reduced into one of concentrates, cannot be definitely stated as the composition of the ore will more or less continuously vary. The milling plant should be planned so as to secure several distinct products - that is, for instance, in milling the ore from the "gold" veins, the copper bearing sulphides should be saved separately from the galena etc. These distinct products should be sold separately to the smelters, at opportune times.

I believe that this method of concentration can be successfully introduced in the milling of the ores of this locality and that it will prove more profitable than the usual method of concentrating all the different sulphides into one product.

A sufficient amount of water will be obtained for milling purposes from several sources, the present ones being chiefly Jersey and Maple gulches, and the sumps of the shafts. When the deep crosscut has been extended for some distance and a number of the other veins have been cut, the supply will be more than ample for even a very large mill.

## PROPOSED DEVELOPMENT--

The Storm Cloud shaft, now about 325 feet deep, will be sunk to a depth of about 1200 feet. As the sinking progresses, levels will be run on this vein in order to open up the ore and to continually augment the ore reserves. Short crosscuts will also be run from the upper levels to the conglomerate gold vein, which courses not far from the copper vein. At the junction of these veins large and good ore bodies are expected to be found.

When the Storm Cloud shaft has reached a depth of 1200 ft., a crosscut will be run westward to meet a crosscut to be run easterly at about the same level, from the Ten Spot shaft. The distance between the shafts, on the level of the crosscut, will be about 5600 ft., allowing for the dip of the Storm Cloud. Many veins will be cut by the main crosscut between the two shafts. Upraises will be made on the various pay veins to the surface and levels run to open up ore, etc. By this system of exploitation a number of veins will be more or less simultaneously developed.

The Ten Spot is vertical and lower in elevation, than the Storm Cloud shaft, being already 267 feet deep, it will have to be sunk only about 550 feet deeper in order to reach the level of the proposed crosscut. The proposed crosscut will be about 300 feet lower in elevation than the "Senator" tunnel.

See Cross section map between Ten Spot and Storm Cloud shafts accompanying this report.

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It will not be absolutely necessary to carry out the above plan of development in its entirety, before erecting a mill as several of the veins of both the copper series as well as the gold series, could be sufficiently developed in a comparatively short time to supply a mill of 100 tons capacity per day. The result of this work will, in all probability, justify the erection of a suitable milling plant within less than a year. The present ore reserves, in the Storm Cloud copper mine, already amount to more than 25,000 tons. After the

installation of such a plant a good revenue would be continuously derived from the mill product, consisting of free gold (amalgam) and various concentrates. As already stated, a part of the mine product will consist of shipping ore to be sent directly to the smelters.

When the Storm Cloud shaft has been sunk say 300 feet deeper and levels have been run on the vein, north and south, the ore reserves will be increased several times the present amount in sight. This could be accomplished within a very short time.

Within a depth of about from 150 to 180 feet below the main tunnel level, the junction of the Storm Cloud copper vein and the Storm Cloud conglomerate gold vein will be reached. Large and good ore bodies can be expected to be found at this junction. See accompanying Cross section map.

As the development progresses and the mines have been opened up on an extensive scale, and a large ore supply has been blocked out ready for stoping, the milling plant, then in operation, could be correspondingly enlarged in order to earn larger revenue for the Company.

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#### GENERAL REMARKS

The Storm Cloud Group is a valuable and exceptionally promising property. As already stated, part of the product will be shipping ore, but the bulk will consist of milling material. The ore and concentrates will be shipped to the smelter at Humboldt, or elsewhere, if more favorable rates can be obtained at other smelters. The Humboldt smelter is situated about 15 miles from the mines. Part of the distance, about four miles, is by wagon road to Walker, then through the Poland tunnel to Poland and from there by the Prescott and Eastern Railroad to Humboldt. The cost of hauling to Walker is \$2.00 per ton; from Walker to the smelter the transportation charges is about \$1.05 per ton.

The smelting charges on ore and concentrates vary from \$4.00 to \$6.00 per ton, according to the composition of the ore and the amount of copper it contains.

Mr. F. M. Murphy, the principal owner of the Poland tunnel, is contemplating the construction of an ore railroad from this tunnel to the mines in the Hassayampa and other nearby districts.

Surveys are being made and rights of way obtained. Upon completion of this road, ore or concentrates, will be shipped from the mines directly to the Humboldt smelter by way of Poland. On connection with this enterprise it is also proposed, by the projectors to erect a custom mill at Poland, for the treatment of the milling ore of the surrounding districts. It is expected that very favorable rates will be obtained by the shippers, both for the transportation and for the treatment of the ores at their mill.

The Prescott and Mt. Union Electric Railway intends to extend its lines from Prescott to the principal mines of the Hassayampa district.

The wages paid to miners is \$3.00 to \$4.00 per day; laborers receive \$3.00 per day; machine men and blacksmiths \$4.00 per day.

The present development indicates that the property will have a good future. By carrying out the proposed plan of development this property can be made one of the most valuable ones in Arizona. An expenditure of from \$200,000 to \$400,000 towards the development and equipment as above outlined during the next year and a half will be fully justified.

The veins and ore deposits of this locality belong to some of the oldest in existence, and are bound to hold out in depth as well as in values. My observations lead me to believe that a number of the as yet undeveloped veins on the property will produce much richer ores than those of the veins now being developed and that they will carry especially good gold values. The surface showings on a number of the undeveloped claims are exceptionally good. On the St. Cloud claim, which

is the immediate northerly extension of the Storm Cloud claim, the showing appears to be very good. Another mine could be easily created here. The same argument holds good at several other parts of the property. The showings on the January and Dead Shot are very favorable for gold bearing ores; the average of the samples taken showing \$25.00 in gold, \$3.00 in silver with some copper. The Dakota has a good copper vein etc.

As already stated, the "Senator" tunnel of the adjoining property has reached a length of 3100 ft., it cuts several large veins in its course. Recently a shaft was started on the Snoozer vein which I am informed carries very good copper values. The north-easterly continuation of this vein courses probably through the Johnny or Hoot Owl claims of the Storm Cloud group.

The Cash property occupying a small area, adjoins the Storm Cloud group immediately to the southwest. About fourteen veins traverse its property which has a width of only 1200 feet. The north-easterly extensions of these veins run into the Storm Cloud group. From a rather limited amount of development work, 9175 tons of ore was produced, yielding over \$200,000.

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The maps accompanying this report comprise:-

- 1st - Map showing the property of the Storm Cloud group and surrounding claims, scale 300 ft. to one inch. Copies of the official plats of the various patented claims are on file in my office; these were obtained in the U. S. Survey or General's office in Phoenix.
- 2nd - Cross Section and plan showing the workings of the Ten Spot shaft in relation to the "Lion" crosscut etc. Scale 60 ft. to one inch.
- 3rd - Longitudinal section of the workings on the "Copper" vein. Scale 60 ft. to one inch.
- 4th - Cross Section showing the Storm Cloud shafts in connection with conglomerate vein, the "Copper" vein, the dike, etc.
- 5th - Map showing section along proposed crosscut from Ten Spot to the Storm Cloud copper vein, showing also approximately the number of veins to be intersected.
- 6th - Map of section and plan of Storm Cloud Copper vein, showing also trend of the Storm Cloud conglomerate gold veins. This map shows that the copper vein has been proven on its course by various surface and underground openings for a length of over 6500 ft. The workings consist of many shafts, cuts, tunnels, etc.

CONCLUSION

The Storm Cloud has every promise to become one of the best producers in the Hassayampa district. This group and that known as the "Senator" property, controlled by Phelps, Dodge & Co., form the most important mining enterprises of this section. With one exception the several large veins, cut in the "Senator" tunnel, traverse also the northwesterly portion of the Storm Cloud group, forming, however, only a small part of the entire vein system of the latter. Of the many veins of the Storm Cloud property, those associated with the various dikes will be found to carry ore bodies to great depth and will prove to be the most permanent producers.

The development work done so far has given very satisfactory results. The property being a valuable and very promising one deserves to be explored upon a very large scale. The property will be both a gold and a copper producer. When a number of the veins of the different series have been developed, the value of the product will be chiefly in gold.

When the development of the veins has sufficiently advanced to insure a daily output of from 100 to 150 tons, a suitable milling plant should be erected. The property will then be on a dividend basis. This can be accomplished in less than a year - the ore reserves on the Storm Cloud vein being already considerable.

When, however, the plan of development outlined in this report has been carried out in its entirety, and a large milling plant of about 300 tons daily capacity has been installed, the earnings will then be largely increased and the property will be an exceptionally valuable one.

Sept. 15, 1907

(Sd) Leo Von Rosenberg  
42 Broadway, N.Y.

HISTORY OF THE SENATOR GROUP OF MINING CLAIMS  
PHELPS DODGE CORPORATION

Cottonwood, Arizona,  
June 23, 1938.

Mr. W. W. Saben, Manager  
Phelps Dodge Corporation  
United Verde Branch  
Clarkdale, Arizona

Dear Sir:

In accordance with your request, I submit to you the following history of the Senator group of mining claims, located in the Hassayampa Mining District, Yavapai County, Arizona, 14 miles south of Prescott.

A well kept, graded highway from Prescott passes over the center of the holdings, which provides movement of ore and material at very low cost.

TIMBER:

The entire surface of the claims is covered with a heavy growth of pine timber which would provide mining timbers for many years.

WATER:

Water, flowing from the mouth of the tunnel, is available for a mill of 200 tons capacity.

HISTORY:

The property was acquired in the early 1880's, and was operated by the Commercial Mining Company until 1893, under the supervision of Mr. Jas. S. Douglas.

The early development was confined largely to the Senator vein, where a shaft was sunk to a depth of 700 ft. with extensive lateral work at 100 ft. intervals. This work no doubt developed very attractive tonnages of ore, as a 20 stamp amalgamating and table concentrating mill was erected on the Hassayampa river, 700 ft. vertically below the collar of the shaft.

Shortly after milling operations began, a 1600 ft. tunnel was driven through very hard rock, encountering the Senator

vein at a depth of 700 ft. This tunnel intersected the vein approximately 100 ft. east of the shaft.

Extensive drifting was done in an easterly and westerly direction on the Senator vein. East of the tunnel there was little or no commercial ore developed. The west drift was driven some 1200 or 1300 ft., but only a small portion of the drift was productive. The ore shoot apparently shortened quite rapidly as depth was gained. Square sets on the sill floor of this drift indicated the ore to be 2 sets wide, but since it had caved before my first visit there, I have no knowledge of its length. Timbers and ladders had rotted out of raises from the tunnel level, making it impossible for me to investigate any of the upper workings without considerable expenditure, which I did not deem advisable.

A winze was sunk from the tunnel 200 ft., and one bunch of tremendously high grade ore was encountered somewhere below the tunnel which produced about \$30,000 in gold from a very small tonnage of ore.

Many of the early employees of the company claimed that at the time operations ceased, some tonnages of commercial ore were left in and on the ends of the stopes, where the ore was said to have ranged in width from a few inches to 8 ft., and the productive area 4 to 500 ft. along the strike of the vein.

#### SURFACE OF THE SENATOR VEIN:

The cropping of the Senator vein is irregularly exposed for the length of the Senator property, and continues out of the Senator holdings into the Dunkirk property.

In a southerly direction on the surface from the Senator shaft, numerous pieces of high grade gold float were found. Many shallow cuts and trenches were dug in search of ore in place, but with no success.

HIGHWAY BOND

The early operation of the Senator mine and mill was profitable, but moneys received from the Senator operation were expended at the Boggs, Hackberry and Copper Basin group, resulting in the entire operation in Yavapai County being costly and unprofitable at that time.

SURFACE OF THE TEN SPOT CLAIM:

On the surface of the Ten Spot claim, there is a large oxidized quartz porphyry vein cropping for the entire length of the claim, ranging from 6 to 30 feet wide.

From the southwest end line, the vein has been more or less productive for a length of 800 ft. in a northeasterly direction.

Small quartz veinlets run diagonally through the larger vein material, continuing to a depth of from a few feet to 70 ft. These small stringers occasionally swell to bunches 7 and 8 ft. wide, the average width being 2 to 2-1/2 ft. The ore was not regular on the various veinlets.

Ore production during the life of Louis Milner's lease from this area was 1628 tons, with average value per ton of .4475 oz. Au., 13.39 oz. Ag., and 2.53% Cu.

The tonnage, lengths and widths of ore remaining in this area is problematical. From my observation on various inspection trips during Milner's lease, I believe that a fairly substantial tonnage of ore ranging from \$4.00 to \$10.00 a ton could be produced profitably if a small mill was built at the Senator tunnel where water is available.

In the early operation, a shallow crosscut tunnel was driven through the Ten Spot vein connecting with the Senator shaft, for ventilation, no doubt.

Old timers who worked in this tunnel claimed that two narrow stringers of high grade ore were cut within the Ten Spot vein, but no lateral work was done on them.

Prior to my supervision there, the construction of a highway over the property had entirely obliterated this tunnel.

There was also a shaft on the surface about 100 ft. easterly from the west end line of the claim, sunk to and connected with the Senator tunnel, about 500 feet at this point. Fritz Viertholer, foreman of this work, repeatedly stated that at about the 250 level a bunch of very high grade gold ore was encountered, but no lateral work was done on it.

Major A. J. Pickrell, former superintendent, said that the average values in the shaft were very low.

DEVELOPMENTS ON TEN SPOT VEIN, SENATOR TUNNEL LEVEL:

A drift was driven a few hundred feet southerly from the Senator tunnel, but no commercial ore was found. Another drift was driven easterly on the same vein about 800 ft., encountering an ore shoot about 700 ft. from the tunnel. This shoot ranged in width from a few inches to 30 inches, and assayed \$14.00 to \$29.00 per ton in gold, silver and copper. In the breast of the drift when stopped, the ore was 10 in. wide and assayed \$14.00 in gold, silver and copper, when gold was \$20.00, silver \$1.00, and copper 23-1/2 cents.

This shoot was never developed vertically, but might continue up from the zone worked by Milner on the surface.

Since the track was removed and the drift was in a bad state of repair at the time of my operation there, I did not think it advisable to undertake farther development of this shoot, due to the cost of getting the drift negotiable, and then I knew very little of the surface ores indicating any regularity to the ore shoots on this vein.

TREADWELL CLAIM:

From the southwest end of the Treadwell claim, the Treadwell vein was largely productive along the surface for about 700 ft. easterly; the widths narrow, ranging from a few inches

to  $2\frac{1}{2}$  feet. A shaft sunk on this vein near the west end to a depth of 90 ft. was productive to the 80 ft. level, with 6 in. of ore continuing in the bottom. The stoped area ranged from 6 in. to 2 ft. and was not over 40 ft. long. This area produced 280 tons of ore that yielded  $9\frac{1}{2}\%$  copper, \$7.75 gold and silver at the Hayden smelter.

150 ft. easterly on the vein, it was productive to a depth of 30 ft. and produced 250 tons of about the same grade of ore as the shaft. This area was about 60% productive for 150 ft. in length, but with no ore continuing in the bottom.

Easterly along the bottom of Maple Gulch the ore was regular along the surface for 300 ft., but was from 6 to 18 inches wide only and it pinched out at a depth of 25 ft. This area produced 160 tons of ore that sampled about \$60.00 at El Paso smelter in gold, silver and lead, though I do not recall the ratio of values in the ore.

Fred Gronlund and associates, present leasers, have encountered another small ore shoot on the 80 ft. level from the shaft that may produce a few carloads of ore, but this is all that can be hoped for.

#### SENATOR TUNNEL LEVEL

When the Senator tunnel encountered the Treadwell vein, it intersected 5 ft. of gold, silver and copper ore, the values being largely in gold with a small percentage of iron and copper. This bunch of ore was stoped later, and produced 240 tons that averaged 1 oz. gold and about \$5.00 per ton silver and copper. The bunch was short--not over 40 ft. long,-- and narrowed down to a few inches, at 20 ft. above the tunnel level. A shallow winze was sunk on this bunch just south of the tunnel, passing through the ore at a depth of 12 ft.

Due to no equipment to handle water, the ore remains below the tunnel level, but from all evidence, only a car or two could be hoped for there.

A drift was driven south on this vein for a considerable distance, but no ore was found.

At a point vertically over the tunnel, a raise was driven 125 ft. on the vein, but no commercial ore was found, and 100 ft. south from the tunnel a second raise was driven 100 ft. Very small, short lenses of ore were encountered in both of these raises, but these lenses were about 6 in. wide with no height or length.

#### CASHIER VEIN:

Where the tunnel intersected the Snoozer vein, it was only 8 in. wide and contained no values, so no drifting was done on it.

The Cashier vein was the last encountered where the tunnel stopped at a length of 3270 ft. A drift was driven southerly from this point 1300 ft., starting on the Cashier vein, finally leaving it, bearing northerly in view of intersecting the Snoozer vein. I drove a raise from this drift 195 ft., definitely determining that the Snoozer vein was never encountered southerly from the tunnel or under the commercial zone of the Snoozer upper workings.

When stoping on the upper levels stopped, this stoping seemed to have changed the downward water courses through the Snoozer vein, a heavy flow of copper water coming from a cross fracture, which, beyond any doubt, led to the ore shoot, in my opinion 50 to 60 feet away. This indicates strongly to me that the Snoozer ore shoot continues down to the tunnel level and might contain attractive grades and tonnages if developed there. This cross fracture is about 300 ft. easterly from the Snoozer raise.

#### UPPER WORKINGS ON THE SNOOZER VEIN:

During the early supervision of Mr. J. S. Douglas, about 500 ft. from the Snoozer endline a shaft was sunk about 300 ft. The shaft continued regularly in ore to a depth of 225 ft., the ore shoot raked easterly, and the shaft passed out of it on the

southwest end of the shoot. (Vertical section map herewith enclosed.) This shoot was regularly productive on the surface for 200 ft., shortening to 150 ft. on the 100 level, and to 100 ft. on the 200 level. The ore ranged from 8 in. to 5 ft. from the 200 level to the surface, average width 24 in.

About 4000 tons was produced from this area, average value 0.95% copper, 9 oz. silver, no gold present in this vein.

From the 250 level in the shaft a drift was driven easterly about 100 ft., entering the ore shoot about 15 ft. from the shaft. The values at this depth had scattered through wider vein material which dropped the average value to .5% copper, 5 oz. silver. Because of the lower values, little stoping was done on this level, and the drift was never continued to the east end of the ore shoot. Widths probably averaged 3-1/2 ft.

#### De VERNON CLAIM

The DeVernon vein is thought to be the continuation of the copper vein of the Storm Cloud group, which in the Storm Cloud produced many thousand tons of shipping grade of gold-silver-copper ore. On this claim the ore shoot was uniform and regular, about 700 feet long, and ranged in width from 1 ft. to 8 or 9 ft. This ore was practically all stoped out to a depth of 300 ft.

Below the 300 level, the ore changed to a massive iron pyrite with very low values, so prospecting was done only to the 400 level. (On the Sheldon property, 3 miles north of the Storm Cloud, on the same strike, same mineral belt, and identical surface showing, the vein was profitably productive to a depth of 200 ft.) Between the 200 and 300 ft. levels the same conditions prevailed as at the Storm Cloud, the iron pyrite giving way to copper, gold, silver ore at about the 300 level, and the Sheldon vein was about 60% productive for 1000 ft. long and 900 ft. deep. This development on the Sheldon leads me and many others familiar with the district to believe that the Storm Cloud deposit might

be at greater depth and might produce large tonnages of commercial ore; it being 700 or 800 ft. higher altitude than the Sheldon, the Storm Cloud might continue to the same horizontal depth as the Sheldon. The above indicates what might be expected if the DeVernon claim is prospected).

300 ft. easterly from the west end line of the DeVernon claim, a shaft was sunk 50 ft. deep, where the vein material was over 30 ft. wide. There was milled from this shaft a few tons of \$9 gold ore. Little or no drifting or crosscutting was done, so little is known of the DeVernon claim. It is an outlying claim from the Senator group, with about 1000 ft. of ground owned by others between it and the Cashier claim. Remnants of sulfide ore on the dumps assayed \$14 in gold and silver at the old prices.

Respectfully,

(Signed) A. B. Peach

(Written from memory)

By M. J. O'Brien

The gold veins seems to have great possibilities having a fair grade of ore of comparatively simple character showing in the bottom of the two winzes and in the S. W. winze is of fair width (5 feet)

Mr. Reid recommends deepening this S. winze to 50 or 60 ft. then drifting 60 feet S. W., that being the direction in which the ore should pitch.

The vein can be reached more readily by crosscutting from the lower tunnel but as it is irregular such work may not be attained with success. If the work on the winze were attained with success it might be as well to crosscut in the bottom of the new shaft on Copper vein, where it should be cut a distance of 40 feet if the present dip and strike of the gold veins continue as they are. If ore is struck, drifting to the S. W. might be done, and I believe some lenses of gold ore will be discovered. Sept. 1922

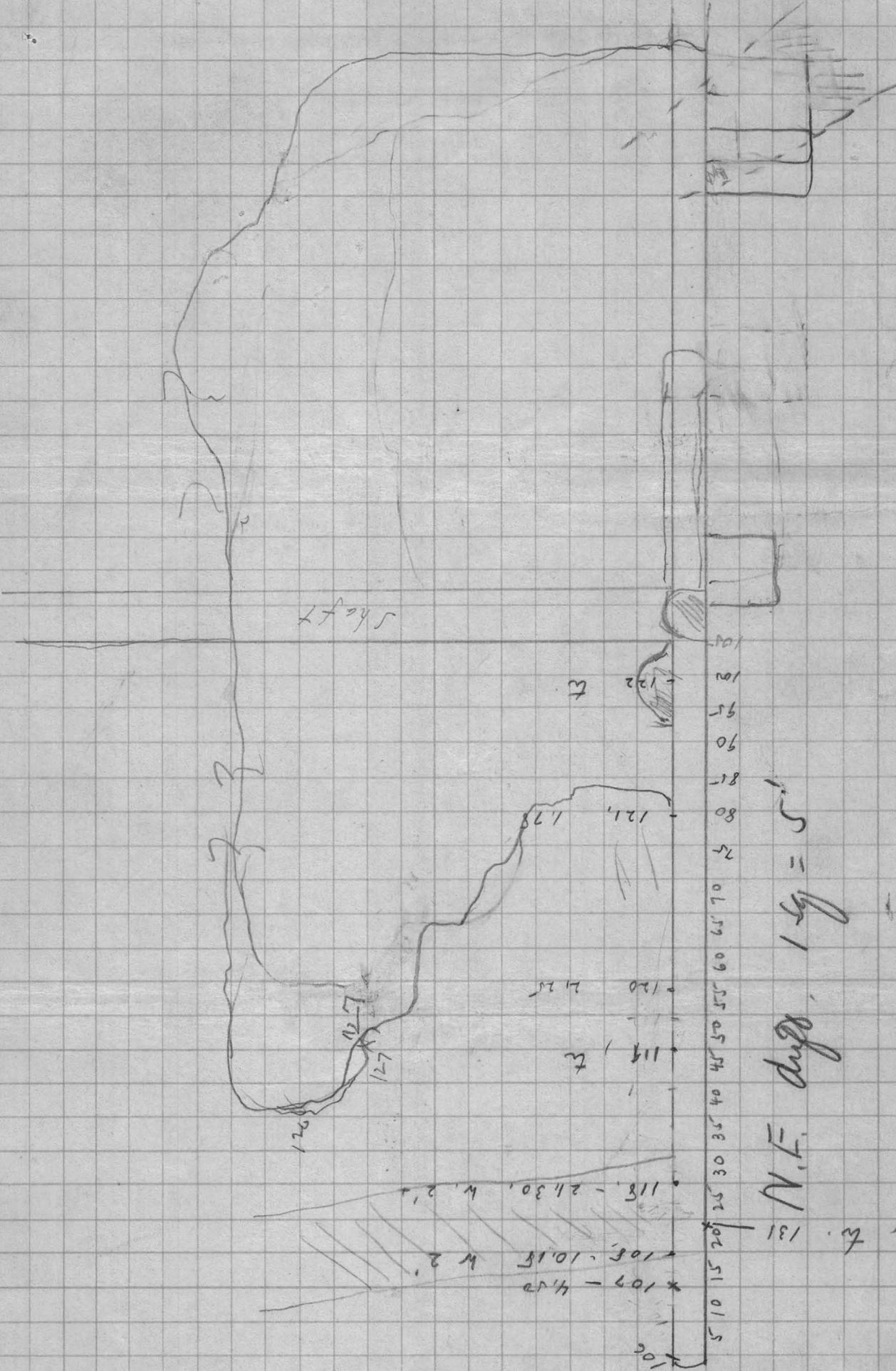
Considerable work has been done on this section of the group. The vein lies about 125 feet east of the Storm Cloud Copper vein, and a shoot of ore has been removed by sinking and stoping to a depth of about two hundred feet and a length of about three hundred feet. This vein also is lenticular in formation, the old workings showing a width of from one to seven feet.

There is reported to have been a production of \$40,000 from this work, mostly ore that had a value of about \$20.00 per ton. The surface showing is very good for a continuation of this vein, and a small amount of money spent in reopening the old workings would soon prove the lower extent. Kirkbride, 1928

The gold vein has been mined down to approximately 30 feet below the present main level. It is officially reported to have produced \$40,000 in gold. More work should be done on this vein in order to determine its extent and value. Frank Kennedy, 1928

The gold vein on which the first work was done opened through drifts from a 200 ft. shaft and is reported to have produced 40,000.

H. J. Balter



N.E. dip, 1 sq = 5''

4' h. 131

Foot

shaft

\*109 - 4.10

108 - 10.15

118 - 24.30

119

120

121

128

122

120

127

127

105

102

95

90

85

80

75

70

65

60

55

50

45

40

35

30

25

20

15

10

5

1934  
Payroll Recap. June, July, Aug, Sept.

June 15 - 30	1 5 0 4 7
July 1 - 15	5 7 3 8 1
" 16 - 31	1 0 3 4 2 8
Aug 1 - 15	7 2 1 0 9 6
" 16 - 31	9 2 4 6 3
Sept 1 - 15	4 3 7 2 5
" 16 - 30	3 0 3 0 0

4 6 1 4 4 0  
5 0 6 Rate

2 4 6 9 6 4 0  
2 3 0 7 2 0 0  

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2 3 3 1 8 8 6 4 0

Admission for fuel 2 5 3 0 0  
2 3 3 1 9

Paid due 1 9 8 1

ASSAYS STORM CLOUD GOLD VEIN (Gold at \$20.00 per ounce. Silver in ounces)

NOV. 14-24, 1917

No.	Width	Gold	Q. N.	Silver	Sum	Location, etc.
106	16"	Nil		Tr.	nil	Face of N.E. drift
107	12"	2.00	3.50	1.4	4.50	N.E. drift 10' S.W. of face
108	24"	5.60	9.80	.5	10.15	" " 15' " " " +
109	60"	Tr.		.6		Bottom of S.W. Winze N.E. side Depth of winze 15.7'
110	65"	17.60	30.80	.6	31.20	S.W. winze S.W. side 5' above bottom +
111	71"	13.40	23.60	.7	24.10	S.W. winze N.E. side 10' above bottom +
112	65"	6.00	10.50	.3	10.75	S.W. winze 13.6' above bottom S.W. side
113	26"	12.00	21.00	.3	21.25	N.E. winze bottom at S.W. side Winze 10' deep (16" taken off bottom 10" taken 3' higher on H.W. side +
114	31"	13.60	23.80	.4	24.10	N.E. winze N.E. side 3' below top +
115	24"	2.00	3.50	.2	3.65	N.E. winze S.W. side 4' below top.
116	12"	Tr.		Tr.		Face of S.W. stope 4.5' below slip.
117	34"	2.00	3.50	.2	3.65	" " " " 6' above 116.
118	28"	12.00	21.00	.4	21.30	N.E. drift 25' S.W. of face +
119	16"	Tr.		.6		" " 45' " " "
120	46"	1.00	1.75	.7	2.25	" " 54' " " "
121	19"	.80	1.40	.5	1.75	" " 79' " " "
122	12"	Tr.		Tr.		" " 99' " " "
123	32"	Tr.		Tr.		Face of stope 18' S.W. of N.E. winze
124	44"	6.00	10.50	.2	10.65	Top of pillar 6' S. of 123 +
125	18"	8.00	14.00	.4	14.30	Pillar just S.W. of shaft +
126	37"	3.00	5.25	.4	5.55	N.E. stope 9' above last bench
127	6"	Tr.		Tr.		Bottom of N.E. stope 8' S.W. of 126
128	4"	8.00	14.00	.2	14.15	" " " " 6' " " " +
129	22"	12.00	21.00	.6	21.40	" " " " 12' S. of 128 and 13' lower. +
130	33"	2.00	3.50	.3	3.70	N.E. drift, floor below stope.

<u>No.</u>	<u>Width</u>	<u>Gold</u>	<u>Silver</u>	<u>Location, etc.</u>
131	4"	Tr.	Tr.	Floor of N.E. drift between 108 and 118 vein smaller in floor.
132	38"	Tr.	Tr.	N.E. stope 24' above last bench
<del>133</del>	42"	15.20	.4	" " S.W. corner near top +
134	50"	Tr.	Tr.	S.W. stope S.W. face 19' above 116
135	42"	2.80	.2	S. W. stope S.W. face 23' above 116.
136	10"	Tr.	Tr.	Continuation of 135 towards H.W.
137	24"	Tr.	Tr.	S.W. stope S.W. face 6' above 136 and 29' above 116.
138	14"	Tr.	Tr.	Continuation of 137 towards H.W.
139	32"	Tr.	Tr.	S.W. stope S.W. face 32.5' above 116.

make up plan to drawing log; scale 10' = 1" & Section

NO.	WIDTH	GOLD	@35.	Silver	Gross Value	Location etc.
128	4"	8.00	14.00	.2	14.15	Bottom of N.E. stope 6' S. W. of 126
129	22"	12.00	21.00	.6	21.40	Bottom of N.E. stope 12' S. of 128 and 13' lower.
130	33"	2.00	3.50	.3	3.70	N.E. drift, floor below stope.
131	4"	Tr.		Tr.		Floor of N.E. drift between 108 and 118 vein smaller in floor.
132	38"	Tr.		Tr.		N.E. stope 24' above last bench.
133	42"	15.20	26.60	.4	26.90	N.E. stope S.W. corner near top.
134	50"	Tr.		Tr.		S.W. stope S.W. face 19' above 116
135	42"	2.80	4.90	.2	5.05	S.W. stope S.W. face 23' above 116.
136	10"	Tr.		Tr.		Continuation of 135 towards H. W.
137	24"	Tr.		Tr.		S.W. stope S.W. face 6' above 136 and 29' above 116.
138	14"	Tr.		Tr.		Continuation of 137 towards H. W.
139	52 "	Tr.		Tr.		S.W. stope S. W. face 32.5' above 116.

*Sell*

STORM CLOUD SAMPLES MAY 1936

(a) #1--Vein on north side of southwest winze, 7' below level, width 68"  
Near to Reid's sample #111 which ran \$23.50

Au---.08 )  
Ag--0.5 ) Value \$2.80

(b) #2 Vein on south side of southwest winze, 6' below level, width 73"  
Between Reid's sample #110 and 112 which ran \$30.80 and \$10.50

Au-- 0.25 )  
Ag-- 0.7 ) Value \$8.75

(c) #3 Back of south drift, width 20", 4' north of breast where Reid  
took sample #116 which ran only a trace.

Au-- 0.27 )  
Ag-- 0.4 ) Value \$9.45

(d) #4 Face of southwest drift, width 30", 2' below Reid's #123 which  
ran only a trace.

Au-- 0.23 )  
Ag-- 0.1 ) Value 8.05

(e) #5 North side of north <sup>west</sup> winze, 5' below collar, width 38"

Au-- 0.29 )  
Ag-- 0.5 ) Value \$10.15

(f) #6 South side of north <sup>west</sup> winze, 6' below collar, width 28" near to  
Reid's #113 which ran \$21.00

Au--- 0.12 )  
Ag. Tr ) Value \$4.20

(g) #7 Back of north drift 25' south from face, width 24", (1' south  
of Reid's #118 which ran \$21.00)

Au 0.01 )  
Ag tr ) Value \$0.35

(h) #8 Back of north drift 18' south of face, width 24" (1' south  
of Reid's #108 which ran \$9.80.

Au -.03 )  
Ag 0.1 ) Value \$1.05

#9 Back of north drift <sup>5</sup> 31' south of face width 18" (near Reid's #119 which ran only a trace.

(K)  
Au 0.01 )  
Ag tr ) Value \$0.35

#10 Grab sample from 10' pit on vein at Rangerchief Claim.  
Width of silicified zone about about 6'.

Au tr.  
Ag. - 0.6 No value

S' = 1 5/8"

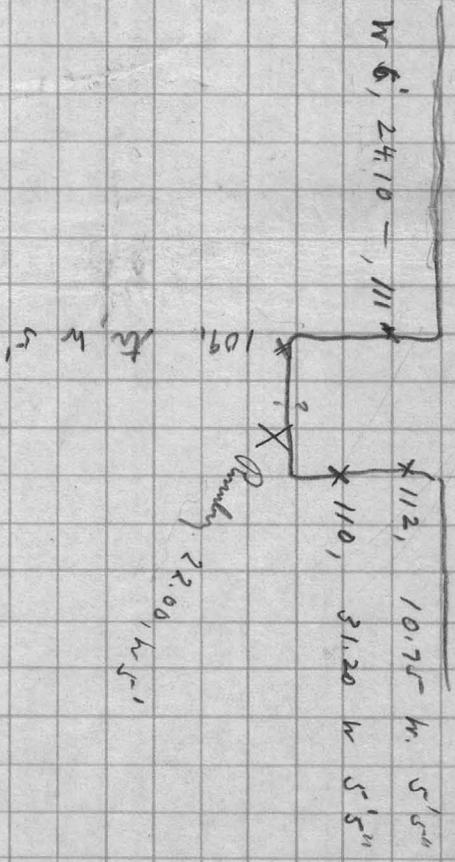
N. W. range



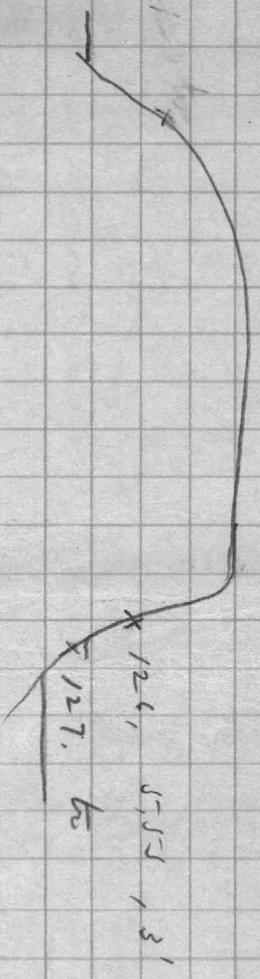
N. E. range



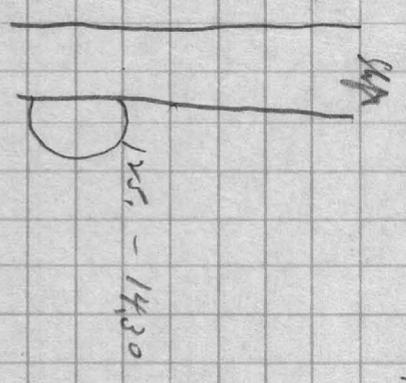
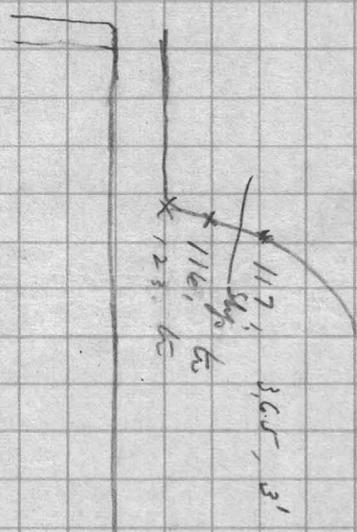
S. W. range  
depth 15.7'



N. E. Slope



S. W. Slope



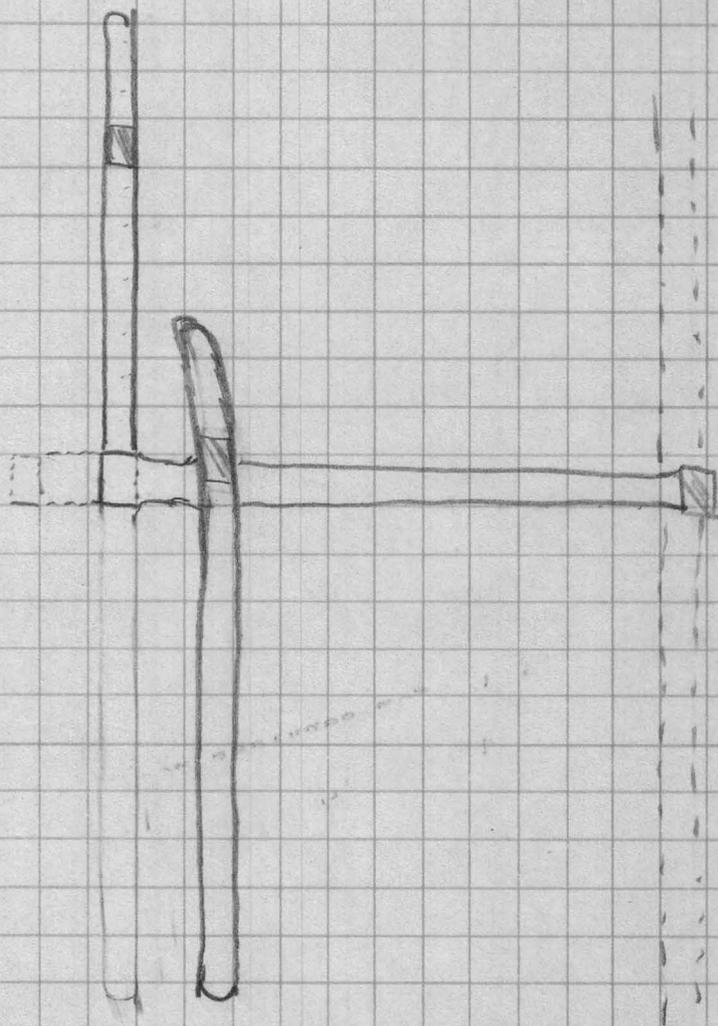
Nov. 14-24, 1917

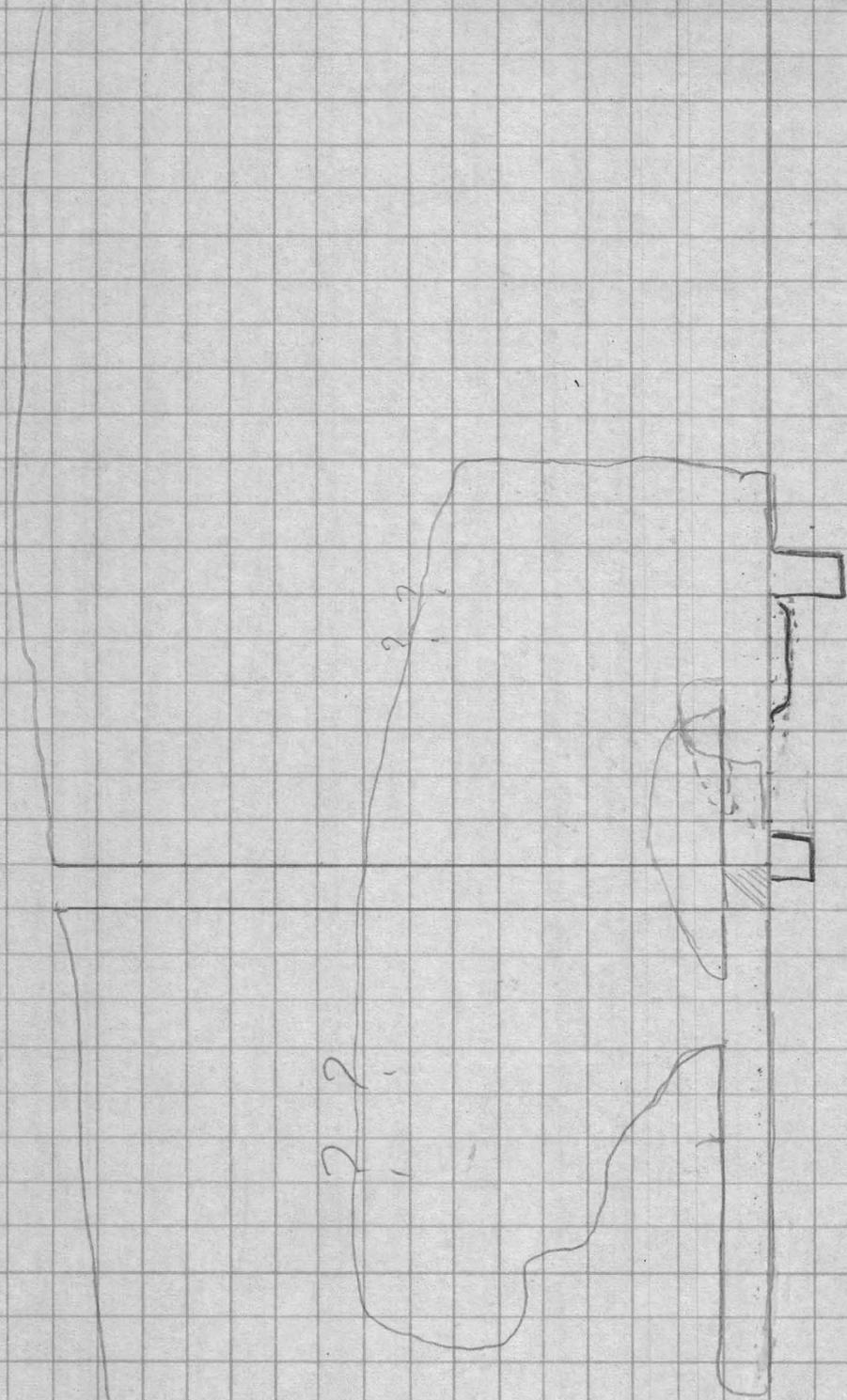
*Reid*

ASSAYS STORM CLOUD GOLD VEIN (Gold at \$20.00 per ounce. Silver in ounces.

NO.	WIDTH	GOLD @20.00	@35	SILVER	Gross Value Au@35.00 Ag@0.774	Location etc.
106	16"	Nil		Tr.	Nil.	Face of N. E. drift
107	12"	2.00	3.50	1.4	4.50	N. E. drift 10' S. W. of face.
108	24"	5.60	9.80	.5	10.18	N. E. drift 15' S. W. of face.
109	60"	Tr.		.6		Bottom of S. W. winze N.E. side Depth of winze 15.7'.
110	65"	17.60	30.80	.6	31.20	S.W. winze S.W. side 5' above bottom.
111	71"	13.40	23.60	.7	24.10	S.W. winze N.E. side 10' above bottom.
112	65"	6.00	10.50	.3	10.75	S.W. winze 13.6' above bottom S.W. side.
113	26"	12.00	21.00	.3	21.25	N.W. winze bottom at S.W. side. Winze 10' deep (16" taken off bottom 10" taken 3' higher on H.W. side.)
114	31"	13.60	23.80	.4	24.10	N.E. winze N.E. side 3' below top.
115	24"	2.00	3.50	.2	3.65	N. E. winze S.W. side 4' below top.
116	12"	Tr.		Tr.		Face of S.W. stope 4.5' below slip.
117	34"	2.00	3.50	.2	3.65	Face of S.W. stope 6' above 116.
118	28"	12.00	21.00	.4	21.30	N.E. drift 25' S.W. of face
119	16"	Tr.		.6		" " 45' " " "
120	46"	1.00	1.75	.7	2.25	" " 54' " " "
121	19"	.80	1.40	.5	1.78	" " 79' " " "
122	12"	Tr.		Tr.		" " 99' " " "
123	32"	Tr.		Tr.		Face of stope 18' S.W. of N. E. winze.
124	44"	6.00	10.50	.2	10.65	Top of pillar 6' S. of 123
125	18"	8.00	14.00	.4	14.30	Pillar just S.W. of shaft.
126	37"	3.00	5.25	.4	5.55	N.E. stope 9' above last bench
127	6"	Tr.		Tr.		Bottom of N. E. stope 8' S.W. of 126

NO.	WIDTH	GOLD	@35.	Silver	Gross Value	Location etc.
128	4"	8.00	14.00	.2	14.15	Bottom of N.E. stope 6' S. W. of 126
129	22"	12.00	21.00	.6	21.40	Bottom of N.E. stope 12' S. of 128 and 13' lower.
130	33"	2.00	3.50	.3	3.70	N.E. drift, floor below stope.
131	4"	Tr.		Tr.		Floor of N.E. drift between 108 and 118 vein smaller in floor.
132	38"	Tr.		Tr.		N.E. stope 24' above last bench.
133	42"	15.20	26.60	.4	26.90	N.E. stope S.W. corner near top.
134	50"	Tr.		Tr.		S.W. stope S.W. face 19' above 116
135	42"	2.80	4.90	.2	5.05	S.W. stope S.W. face 23' above 116.
136	10"	Tr.		Tr.		Continuation of 135 towards H. W.
137	24"	Tr.		Tr.		S.W. stope S.W. face 6' above 136 and 29' above 116.
138	14"	Tr.		Tr.		Continuation of 137 towards H. W.
139	32 "	Tr.		Tr.		S.W. stope S. W. face 32.5' above 116.





189-10

Remond Sulein

at the end of

humble place

||| S

# Storm Cloud Gold Vein

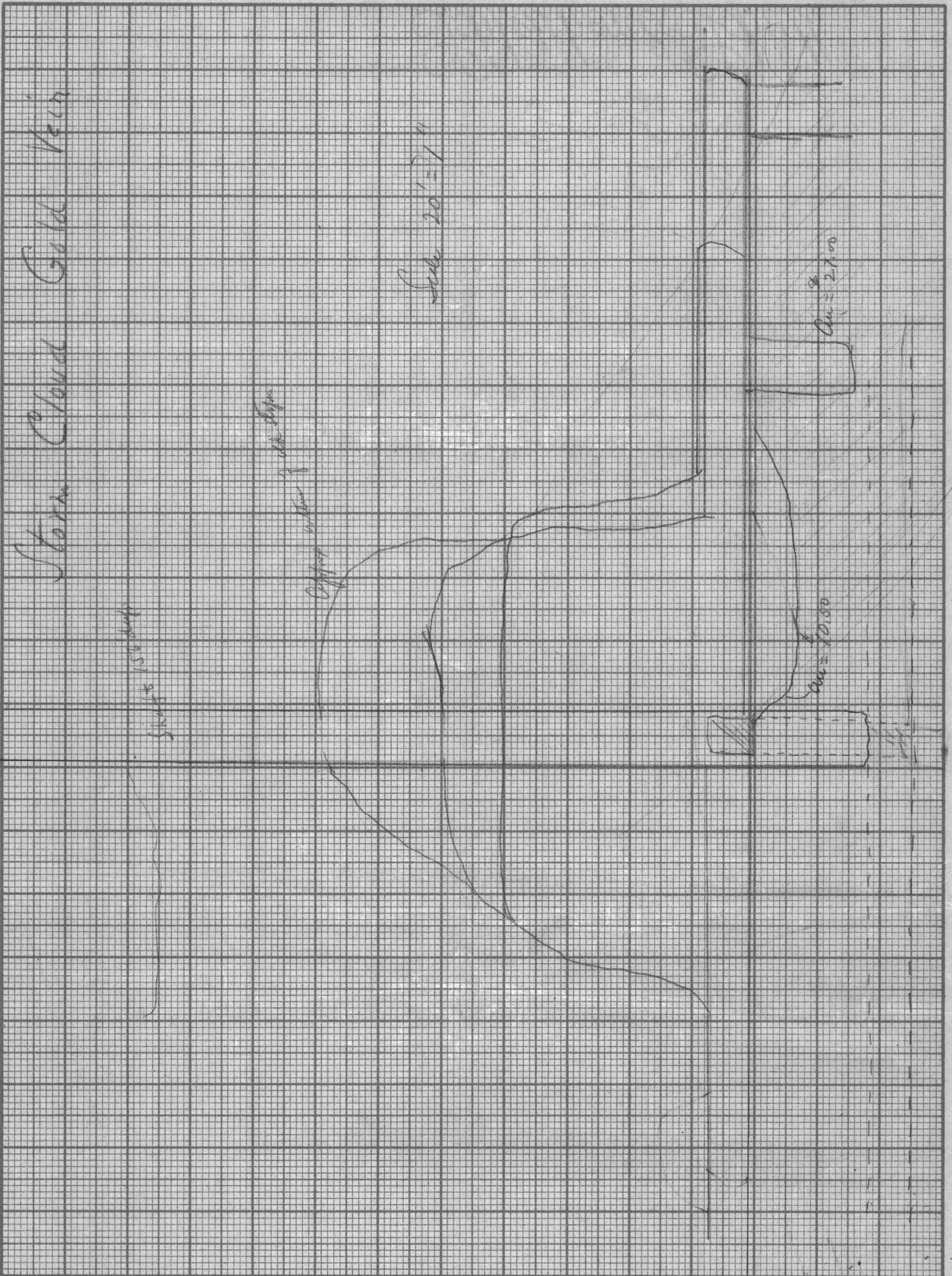
Shaft 156 depth

Approx. water level

July 20' = 7"

Area = 10.50

Area = 2.700



No. 43 Co

Phoenix, Arizona,

CHAS. A. DIEHL

May 14 36

**ARIZONA ASSAY OFFICE**

Phone 3-4001

315 North First Street

P. O. Box 1148

This Certifies That samples submitted for assay by Mr. G. M. Colvocoresses contain as follows per ton of 2000 lbs. Avoir.

MARKS S. C.	SILVER		VALUE (Oz.)	GOLD		VALUE (Oz.) \$35.00	TOTAL VALUE Of Gold and Silver	PERCENTAGE				REMARKS
	Ounces	Tenths		Ounces	Hundths							
1		.5			.08	\$2.80						
2		.7			.25	\$8.75						
3		.4			.27	\$9.45						
4		.1			.23	\$8.05						
5		.5			.29	\$10.15						
6		Trace			.12	\$4.20						
7		Trace			.01	\$.35						
8		.1			.03	\$1.05						
9		Trace			.01	\$.35						
10		.6			Trace							

Charges \$ 12.50

Assayer Arizona Assay Office. *C. A. Diehl*

~~5-10-08~~

(3) (2)

STORM CLOUD MINING CLAIMS

Owned by M. J. O'Brien, Jr.

In Hassayampa Mining District (Senator), Yavapai County, Ariz.

- - - - -

	Location of Record in Yavapai County Book of Mines	Patent of Record in Book of Deeds	Patent Survey Number
Storm Cloud	50 p. 422	36 p. 450	118
Lion	22 p. 85		1660 Sheet 1
Saint Cloud	23 p. 170		1660 " 2
Trapezoid	28 p. 397		1660 " 2
Parintha	28 p. 395		1660 " 2
Abbie	28 p. 394		1660 " 2
Fraction	28 p. 392		1660 " 1
Hoot Owl	31 p. 24		1660 " 1
Johnny	33 p. 63		1660 " 1
Ginger	33 p. 62		1660 " 1
Bugle	38 p. 97		1660 " 1
Paw Paw	18 p. 539		1320
Palmetto	24 p. 220		1660 " 2
Betsy Ann	42 p. 256		1660 " 2
Dakota		77 p. 422	1955
Cracker		77 p. 422	1955
<u>Unpatented</u>			
McCleur	20 p. 250		
&	21 p. 321		

~~Study map showing claims is attached as~~  
~~the~~ ~~all~~ ~~map # 1~~  
 Map contains all essential information - claims listed &  
 recorded from 1902 a platent survey map can be obtained from Land Office of Hassayampa

C  
O  
P  
Y

MINING LEASE AND OPTION

THIS AGREEMENT, made and entered into this 20th day of June, 1942, by and between M.J. O'BRIEN, JR., of Renfrew, Ontario, Canada, hereinafter referred to as the FIRST PARTY; and RICHARD SIMIS, SR., of PHOENIX, Arizona, hereinafter referred to as the SECOND PARTY.

WITNESSETH;

The FIRST PARTY is the legal OWNER of certain patented lode mining claims, situated in the Senator Mining District, Yavapai County, Arizona, to-wit:-

Storm Cloud  
Lion  
Abbie  
Bugle  
Parintha  
Hoot Owl  
Johnnie  
Ginger  
Fraction  
Trapezoid  
St. Cloud  
Paw Paw  
Palmetto & Betsy Ann  
Dakota  
Cracker

Also, unpatented mining claim, in the same district, known as :-

McClellan,

and the Second Party is desirous of obtaining a lease and option on these premises.

NOW, THEREFORE, THIS AGREEMENT FURTHER WITNESSETH AS FOLLOWS:-

That the parties hereto, in consideration of One Dollar, (receipt of which is hereby acknowledged) and of the premises, covenants and the conditions hereinafter set forth, to be kept and performed by them, do agree as follows:-

BOND  
MADE IN U.S.A.

*and Second Party hereby here*

ARTICLE I

TERM OF LEASE AND OPTION

The FIRST PARTY does by these presents, lease, demise and let unto the SECOND PARTY, all of the mining premises hereinabove described, together with such buildings, improvements, machinery and tools belonging to the FIRST PARTY as are now situate on the said premises, for a period of <sup>(three)</sup> two and one-half (2½) years, commencing July 1st, 1942, and ending at midnight, December 31st, 1944, but upon and subject to the following terms and conditions:-

ARTICLE II

OPTION TO PURCHASE

Throughout the term of this lease, or at the expiration thereof, the SECOND PARTY shall have the exclusive right and option to purchase the premises hereby demised, for the sum of Fifty Thousand (\$50,000.00) Dollars, lawful currency of the United States of America. In the event that this option is exercised, any monies previously paid as royalties under ARTICLE III of this agreement, shall be credited as part payment of the purchase price herein stipulated, and the balance of the purchase price shall be paid in three equal instalments. The first instalment payable upon exercising this option, the second instalment payable within one year from date of exercising this option, and the third and final instalment payable within two years of exercising this option, and until the payment of the entire purchase price is completed, FIRST PARTY shall have the first and prior lien upon all of the herein optioned property and upon any and all equipment and machinery which SECOND PARTY may place thereon.

ARTICLE III

ROYALTIES

Throughout the term of this lease, SECOND PARTY shall have the right to mine, extract and remove ores from any or all or any part of said mining claims, and to ship or concentrate or otherwise treat said ores, or any part thereof. On the net smelter and /or Mint returns of all ores, concentrates or bullion or other product derived from the said ores, the SECOND PARTY will pay to FIRST PARTY a royalty of TEN PERCENT (10%) of the net smelter and/or mint returns, as hereinafter defined, but, in any event, the royalty and/or rental during the term of this agreement and lease subsequent to October 1st, 1942, shall not be less than the sum of One Hundred Dollars (\$100.00) per month, payable monthly.

*Change  
w/g*

ARTICLE IV

NET RETURNS DEFINED

The net Smelter and/or Mint returns within the meaning of this lease shall be the correct returns as shown by the liquidation sheets furnished to SECOND PARTY by the Mint and/or Smelting Company and/or Government Agency, whichever shall purchase the output of this property. Said returns shall be considered as the actual payment made by the Mint and/or Smelting Company and/or Government Agency purchasing the ores and/or bullion and/or concentrates from the leased property after the purchaser has deducted from the value of the shipments the railway freight and switching charges, if any, and actual minting or smelting charges and deductions for slag or other loss. The purchaser of the output from this mining property shall be instructed to send to FIRST PARTY, or its AGENT, together with carbon copy of liquidation sheet, the 10% royalty mentioned above, at the same time that the balance of payment for any lot of ore, bullion, and/or concentrate is made to SECOND PARTY. It is understood that SECOND PARTY will use due diligence to secure the best smelting or purchase terms obtainable for the output from the claims hereby leased.

ARTICLE V

TAXES AND ASSESSMENT WORK

During the term of this lease, subsequent to January 1st, 1943, SECOND PARTY will pay the State, County and Local Taxes, assessed against the patented mining claims and will further guarantee to perform sufficient work to cover the Annual Assessment work required by law on the unpatented claims covered by this lease and will make affidavit and record of the performance of such assessment work for and on behalf of FIRST PARTY, fully complying in these respects with the Federal and State mining law, and will from time to time furnish FIRST PARTY, or his local representative, with written proofs of payment and performance within a reasonable time prior to any possible lapse or forfeiture of such mining claims by default in any such payment and/or performance.

Article VIOPERATION OF PROPERTY(1) Mining(A) Workings

All work upon said mining premises by SECOND PARTY shall be done in a good and workmanlike manner and after the manner of good mining. All tunnels, shafts, winzes, raises, and other work by SECOND PARTY, where necessary, or where directed by the State Mine Inspector, or his Deputy, or Assistant, shall be timbered properly and substantially; and all openings necessary for the operation of the mine shall be kept in a safe and workable condition, except such openings as are now caved in and are not necessary for future operations.

(B) Requirements by law

The laws of Arizona and all requirements of the State Mine Inspector shall be complied with promptly by SECOND PARTY, particularly those with reference to fire protection devices, escapement ways, manways, outlets, ladders, signals, notices to employees and the care and storage of explosives.

(2) Reports and Maps

SECOND PARTY shall furnish monthly to FIRST PARTY, without further demand, copies of all progress, profile, contour, surface, assay, underground and other maps or blueprints of of Engineering Reports which may relate to the said mining property, that may be made and/or revised by or at the direction of SECOND PARTY.

ARTICLE VIICLAIMS AND LIENS

Throughout the term of this lease, SECOND PARTY shall comply with all the laws of the State of Arizona with respect to the designation of pay days and the prompt payment of employees, and shall conform to the Workmen's Compensation Law of the State, carrying such Workmen's Compensation as shall protect the FIRST PARTY from all claims for injury or damages arising out of the operation of the leased property. All miners, laborers, and other persons who may labor or furnish labor or material in or upon and of the said mining property during the life of this lease, and to whom any sum may be due from SECOND PARTY for labor or materials, shall be paid promptly by said SECOND PARTY. Notices to the effect that the SECOND PARTY and not the FIRST PARTY shall be responsible for the payment of all bills for labor, material, or other claims in connection with the operation under this lease shall be posted and kept posted on the property by the SECOND PARTY.

Amend.  
g. d. d. b. y.

ARTICLE VIII

It is mutually agreed between the parties hereto, that during the life of this lease, mine operations and development work shall be under the exclusive direction and for the exclusive charge of SECOND PARTY, but FIRST PARTY, through his authorized agent, shall have access at all reasonable times, to any or all of the workings <sup>ground</sup> for the purpose of determining whether or not the terms of this lease and good mining practice are being conformed with by the SECOND PARTY.

ARTICLE IXRIGHT OF REMOVAL

All ore broken and mined by SECOND PARTY, whether on the surface or in underground stopes and also all machinery, equipment and personal property, together with all improvements belonging to SECOND PARTY, excluding houses and other permanent improvements attached to the property, may be removed by SECOND PARTY at any time during the term of this lease, or within sixty (60) days after its expiration; subject always to the provisions of Article 11(2) hereof. But such right of removal shall not extend to ladders, timbers, pipes, ties or tracks in place on or beneath the surface of the property.

ARTICLE XDISPUTES OR ARBITRATION

Should a representative of FIRST PARTY inspect the said mining premises and find or believe that any condition of this Lease had not been complied with by SECOND PARTY, he shall so notify in writing the SECOND PARTY, and demand that the condition complained of be forthwith remedied. All disputes having their origin in such complaints, together with all disputes arising through diverse interpretation of the provisions of this lease, shall, if a settlement cannot be reached by mutual agreement, be determined by three arbiters, one to be appointed by FIRST PARTY, one by SECOND PARTY, and the two so appointed shall agree upon a third, and in default of such agreement the third arbiter shall be appointed by the County or District Judge. The decision of such arbiters, or a majority of them, shall be final. Should the decision of said arbiters be against the SECOND PARTY, he shall have the period of fifteen (15) days after given notice within which to begin to make good his deficiency in compliance with the terms of the lease. Said notices shall be in writing and shall be sent by registered mail to the usual Post Office of the SECOND PARTY, and shall take effect from the day it is mailed by said arbiters to the SECOND PARTY.

Should SECOND PARTY fail to make good such deficiency in compliance with the terms of this lease, after the expiration of a reasonable period, as decreed by the arbiters, this lease shall, at the option of the FIRST PARTY, cease and determine. Expense of arbitration to be borne by the losing party, or pro-rated as the arbiters may decide.

ARTICLE XI

TIMBER

The SECOND PARTY shall have the right to cut and use such timber as may be necessary for the conduct of mining operations on the premises herein leased, but no timber shall be cut, sold or removed from the property for use and/or for sale elsewhere; in which case, however, it is understood and agreed that in the event the option to purchase, as outlined in Article 11 hereof, is exercised by the SECOND PARTY and when the purchase price of Fifty Thousand Dollars (\$50,000.00) has been paid in full to the FIRST PARTY, then all timber on the above mentioned lands shall become the sole property of the SECOND PARTY.

ARTICLE XII

MISCELLANEOUS PROVISIONS

(1) Assignment and Subletting

It is mutually understood and agreed that the SECOND PARTY may assign his rights hereunder to a corporate identity specially organised to carry out and perform all operations herein sanctioned, but no assignment shall be made to any other party or parties without the written consent of the FIRST PARTY, nor shall any such assignment affect or diminish the personal liability of the SECOND PARTY hereunder.

(2) Surrender of Lease

SECOND PARTY may at any time quit and surrender the said mining property, upon giving the FIRST PARTY thirty (30) day's notice in writing of his desire to do so. This lease shall thereupon terminate, but the SECOND PARTY shall not be discharged thereby from any obligation in favor of the FIRST PARTY that may theretofore have accrued under the terms hereof.

(3) Conditions beyond control of SECOND PARTY

Acts of Nature and the public enemy, strikes, fires, floods, financial ~~disturbances~~ disturbances, or any other causes beyond the control of SECOND PARTY, preventing or delaying the fulfillment of the obligation undertaken in this agreement, shall during their continuance, excuse the failure of the SECOND PARTY to carry out said obligations without penalty, excepting as to the payment of the minimum rental and/or royalty in Article 111 hereof.

(4) Forfeiture

Time is the essence of this agreement. If SECOND PARTY shall fail, neglect, or refuse to make any payment when due hereunder, or shall fail, neglect, or refuse to perform any of the acts and things agreed to be done and performed by SECOND PARTY within the time limited herein and in the manner contemplated herein, or if SECOND PARTY shall make default in any of its promises and agreements herein, then and in the event, FIRST PARTY may, at his election, declare a forfeiture of and an end to this agreement and all payments heretofore made by SECOND PARTY to FIRST PARTY shall be retained by FIRST PARTY as rental for the use of said property and as liquidated damages for the breach of this agreement by SECOND PARTY, AND SECOND PARTY shall have no further interest of any kind in said property and shall immediately surrender possession thereof to FIRST PARTY.

ARTICLE XIII

Each and every payment to be made under this agreement by the SECOND PARTY to the FIRST PARTY shall be addressed and made payable to -  
M. J. O'Brien, Limited, 900 Victoria Building, Ottawa, Ontario, Canada, and the evidence of such payment or payments with or without acknowledgment of receipt by M. J. O'Brien, Limited shall constitute a discharge in full of the liability of the SECOND PARTY to the FIRST PARTY in respect to said payments.

ARTICLE XIV

Any notice hereunder may be given by regular mail, postage prepaid, addressed as follows, to the FIRST PARTY -

M. J. O'Brien, Limited,  
900 Victoria Building  
Ottawa, Ontario, Canada

to the SECOND PARTY -

Mr. Richard Simis, Sr.,  
c/o Insurance Service Agency,  
Room 320 Luhrs Building  
Phoenix, Arizona, U.S.A.

Either party may change his address for service by notice in writing to the other party at any time.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed, in duplicate, the day and year first above written.

WITNESS:

(Signed) M. T. Duggan

(Signed) M. J. O'Brien, Jr.

WITNESS:

(Signed) Berniece R. Larson

(Signed) Richard Simis

HAMMERMILL  
BOND  
MADE IN U.S.A.

PROVINCE OF ONTARIO )  
 COUNTY OF RENFREW: )  
 to wit: )

I, Michael T. Duggan  
 of the Town of Renfrew, in the County of Renfrew,  
 and Province of Ontario,  
 make oath and say:-

1. THAT I was personally present and did see the within Instrument and duplicate duly signed, sealed and executed by M..J. O'Brien, Jr., one of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said party at the Town of Renfrew, in the County of Renfrew.
3. THAT I know the said party.
4. THAT I am subscribing witness to the said Instrument and duplicate.

SWORN BEFORE me at the Town of )  
 Renfrew, in the County of Renfrew, ) (Signed) M. T. Duggan  
 this 20th day of June, )  
 A.D. 1942. )

(Signed) E. C. Stewart  
 A Commission, etc.

HAMMERMILL  
 BOND  
 MADE IN U.S.A.

C  
O  
P  
Y

STATE OF ARIZONA ) I, Berniece R. Larson  
 ) of the City of Phoenix, in the State of Arizona,  
 ) one of the United States of America,  
to wit: )  
 ) make oath and says:-

1. THAT I, was personally present and did see the within Instrument and duplicate duly signed, sealed and executed by Richard Simis, Sr., one of the parties thereto.
2. THAT the said Instrument and duplicate were executed by the said party at the City of Phoenix, in the State of Arizona.
3. THAT I know the said party.
4. THAT I am a subscribing witness to the said Instrument and duplicate.

SWORN before me at the City of )  
Phoenix, in the State of ) (Signed) Berniece R. Larson  
Arizona, this 25th day of )  
June, A.D. 1942.

(Signed) C. F. Dureski  
A Commissioner, etc.  
My commission expires 3/29/44

AMENDED

# Notice of Mining Location

LODE CLAIM

IT MAY CONCERN:

g Claim, the name of which is the **MCCLEUR**  
ate on lands belonging to the United States of America, and in which there are valuable  
entered upon and located for the purpose of exploration and purchase by

sert either "a citizen of the United States" or "who has declared his intention to become a citizen of the United States".)

u, on the \_\_\_\_\_ day of \_\_\_\_\_, 192\_\_\_\_\_

le length of this claim is **505** feet,

claim **50** feet,

in a **northeasterly** direction and **455**

feet in a **southwesterly** direction from

the center of the discovery shaft, at which this notice is posted, lengthwise of the claim, together with

**300** feet in width of the surface grounds, on each side

of the center of said claim. The general course of the lode deposit and premises is from the

**northeast** to the **southwest**

The claim is situated and located in the **Hassayampa** Mining District, in

**Yavapai** County, in the State of Arizona, about **1/4 mile**

in a **southerly** direction from **the old Maxton P.O.**

**in Maple Gulch, lying between the Jersey and Fraction patented**

**claims.**

The surface boundaries of the claim are marked upon the ground as follows: Beginning at

**mon.**

at a point in a **northeasterly** direction **50** feet from

the discovery shaft (at which this notice is posted, being in the center of the **northeasterly**

end line of said claim; thence **S.E. 300** feet to a **mon.**

, being the **most easterly** corner of said claim; thence

**S.W. 510** feet to a **mon.**, being at the

**most southerly** corner of said claim; thence **N.W. 300** feet

to a **mon.** at the center of the **southwesterly** end of said claim;

thence **N.W. 173** feet to a **mon.**, being at the

**most westerly** corner of said claim; thence **N.E. 500** feet

to a **mon.** at the **most northerly** corner of said claim,

thence **S.E. 140** feet to the place of beginning.

All done under the provisions of the laws of the United States, and of the State of Arizona.

This is an Amended Location Notice of the **MCCleaur**

Mining Claim, located by **Abbie Williams**

on the **1 st** day of

**Jan. 1885**, and recorded in Book **20** of Record of Mines, at

page **250**, in the office of the County Recorder of the aforesaid County of **Yavapai**,

to which reference is hereby made, and this amended Location Notice is made and posted to correct errors in

the description in the said original Location Notice

Dated and posted on the grounds this \_\_\_\_\_ day of \_\_\_\_\_, 192\_\_\_\_\_

**Witness**

STATE OF ARIZONA,

County of \_\_\_\_\_ } ss.

I, \_\_\_\_\_, County Recorder in and for the County and State aforesaid, do hereby certify that the within instrument was filed for record at \_\_\_\_\_ o'clock recorded in Book No. \_\_\_\_\_ of \_\_\_\_\_ Records of \_\_\_\_\_, 192\_\_\_\_, and duly Arizona, at pages \_\_\_\_\_.

County Recorder.

AMENDED Notice of Location LODE CLAIM

\_\_\_\_\_

Dated \_\_\_\_\_, 192\_\_\_\_

Filed and recorded at the request of \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_, A. D. 192\_\_\_\_

at \_\_\_\_\_ M.

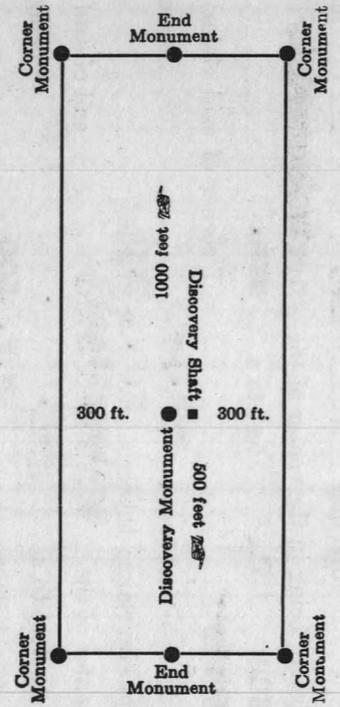
Book \_\_\_\_\_

Pages \_\_\_\_\_

County Recorder.

By \_\_\_\_\_

Deputy Recorder.



This diagram is to give locator a general idea of plan of location under the new law. The Discovery Shaft can be in the center of claim or any distance from either end desired. In the diagram it is placed 500 feet from one end and 1000 feet from the other. Commence description of claim at a center end monument, giving its distance and direction from center of Discovery Shaft; thence bound the claim in either direction. In description be careful to state locality of claim with reference to some natural object, or permanent monument, as will identify the claim.

AMENDED

# Notice of Mining Location

LODE CLAIM

TO WHOM IT MAY CONCERN:

This Mining Claim, the name of which is the **RANGER CHIEF** Mining Claim, situate on lands belonging to the United States of America, and in which there are valuable mineral deposits, was entered upon and located for the purpose of exploration and purchase by

(Locator must insert either "a citizen of the United States" or "who has declared his intention to become a citizen of the United States".)

the undersigned, on the \_\_\_\_\_ day of \_\_\_\_\_, 192\_\_\_\_\_

The length of this claim is **1500** feet,

and \_\_\_\_\_ claim **290** feet,

in a **southwesterly** direction and \_\_\_\_\_

**1210** feet in a **northeasterly** direction from

the center of the discovery shaft, at which this notice is posted, lengthwise of the claim, together with \_\_\_\_\_

**300** feet in width of the surface grounds, on each side

of the center of said claim. The general course of the lode deposit and premises is from the \_\_\_\_\_

**northeast** to the **southwest**

The claim is situated and located in the **Hassayampa** Mining District, in

**Yavapai** County, in the State of Arizona, about **1/2 mile**

in a **easterly** direction from **the old Maxton P.O.**

**and adjoins the easterly side of the Big Four patented claim,**

**being the northerly extension of the Paw Paw and Johnny patented**

**claims.**

The surface boundaries of the claim are marked upon the ground as follows: Beginning at \_\_\_\_\_

**mon.**

at a point in a **southwesterly** direction **290** feet from

the discovery shaft (at which this notice is posted, being in the center of the **southwesterly**

end line of said claim; thence **N.W. 306.8** feet to a **mon.**

**most westerly** corner of said claim; thence

**N.E. 1500** feet to a **mon.**, being at the

**most northerly** corner of said claim; thence **S.E. 308.3** feet

to a **mon.** at the center of the **northeasterly** end of said claim;

thence **S.E. 307.9** feet to a **mon.**, being at the

**most easterly** corner of said claim; thence **S.W. 1500** feet

to a **mon.** at the **most southerly** corner of said claim,

thence **N.W. 302** feet to the place of beginning.

All done under the provisions of the laws of the United States, and of the State of Arizona.

This is an Amended Location Notice of the **Ranger Chief**

Mining Claim, located by **Jno. A. Twiggs**

on the **3 rd.** day of

**April 1912**, ~~xxx~~ and recorded in Book **92** of Record of Mines, at

page **180**, in the office of the County Recorder of the aforesaid County of **Yavapai**,

to which reference is hereby made, and this amended Location Notice is made and posted to correct errors in

the description in the said original Location Notice \_\_\_\_\_

Dated and posted on the grounds this \_\_\_\_\_ day of \_\_\_\_\_, 192\_\_\_\_\_

Witness \_\_\_\_\_

STATE OF ARIZONA,

County of .....

} ss.

I, ....., County Recorder in and for the County and

State aforesaid, do hereby certify that the within instrument was filed for record at .....

..... M., on this ..... day of ....., 192....., and duly

recorded in Book No. .... of ..... Records of ....., 192....., County,

Arizona, at pages .....

WITNESS my hand and official seal the day and year first above written.

County Recorder.

AMENDED  
Notice of Location  
LODE CLAIM

Dated ....., 192.....

Filed and recorded at the request of .....

....., A. D. 192.....

at ..... M.

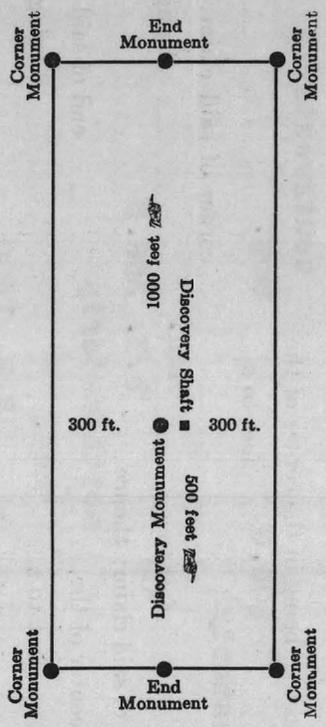
Book .....

Pages .....

County Recorder.

By .....

Deputy Recorder.



This diagram is to give locator a general idea of plan of location under the new law. The Discovery Shaft can be in the center of claim or any distance from either end desired. In the diagram it is placed 500 feet from one end and 1000 feet from the other. Commence description of claim at a center end monument, giving its distance and direction from center of Discovery Shaft; thence bound the claim in either direction. In description be careful to state locality of claim with reference to some natural object, or permanent monument, as will identify the claim.

SURVEY No 1660  
PRESCOTT LAND DISTRICT  
SURVEYED, APRIL 26<sup>th</sup> - MAY 7<sup>th</sup>, 1902.  
BY A. B. MADER, C. E.  
U. S. DEP. MIN. SURVEYOR  
Scale, 500' to an inch.



**J. WILLIAM WAARA**  
CIVIL AND MINING ENGINEER  
PRESCOTT, ARIZONA

*A 7/28*  
July 31, 1928.

Mr. G.M. Colvocoresses

Humboldt Arizona.

Dear Sir;

I am inclosing herein plats of the McCleure and Ranger Chief lode claims which I have surveyed and platted.

In addition to statements made in my letter of the 23rd. I have to report that only the original notice of location of the McCleure lode is of record, so it is advisable to file an amended notice.

During the progress of the survey, I noted a monument wherein had been set a lath, which was marked N.W. Anaconda. Since my return from the field, I have looked up the record and find that the Anaconda lode was located ~~by~~ in the fall of 1925, and a couple of months later was sold to the Sheldon Superior Mining Co. Mr. J A West, our local attorney, was the original locator. The location notice reads to the effect that the claim lies to the east of the Big Four, and between the Johnny and Rancho patented claims.

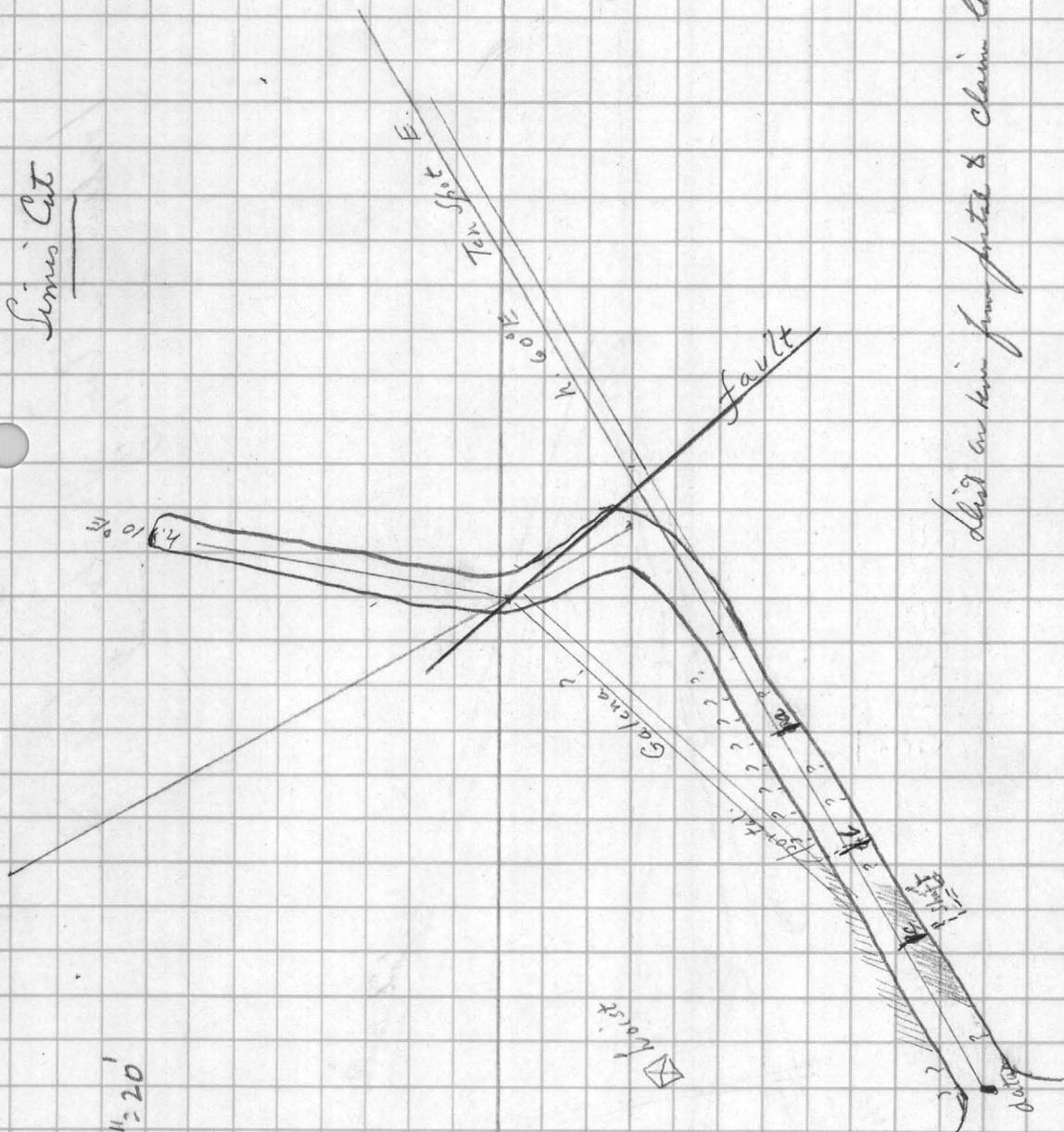
You will note from the plat that the Ranger Chief is a fractional claim. This is due to the fact that the location was found near the Big Four side line, and the general course of the ledge will not permit swinging the northerly end to the east. The ledge was traced substantially as shown by the center line on the plat.

I shall be pleased to take up further with regard to matters stated in your last letter, and if I should have business near or beyond Humboldt, I will be pleased to call. If you should be in Prescott in the mean time, I will be glad to see you.

Very respectfully,

*J. William Waara*

Simon's Cut



dip in km from fault & claim line = 70'

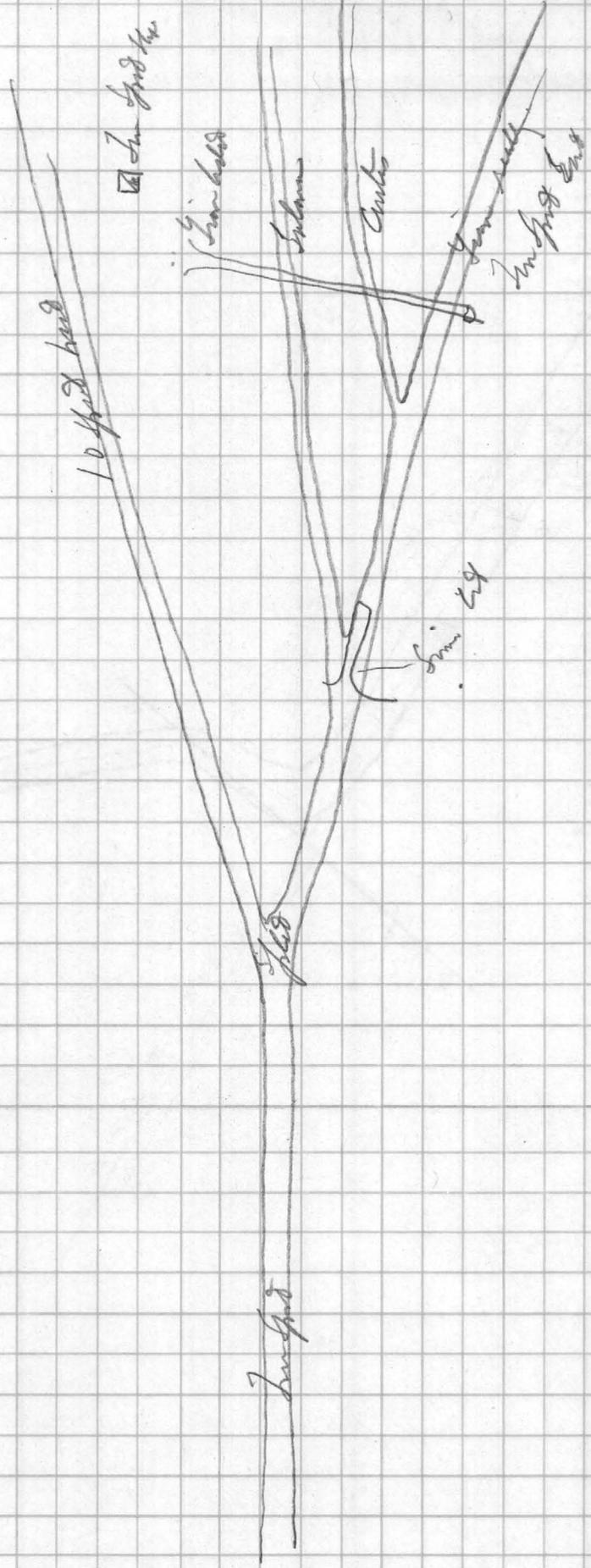
Scale 1" = 20'



Creek 10' below claim

Claim Line

Lower Middle Story of the Grand Ave



No. 183 Co

*Slow Cloud*

Phoenix, Arizona,

CHAS. A. DIEHL

Dec. 15, 1942.

# ARIZONA ASSAY OFFICE

Phone 3-4001

815 North First Street

P. O. Box 1148

This Certifies That samples submitted for assay by **Mr. G. M. Colvocoresses.** contain as follows per ton of 2000 lbs. Avoir.

MARKS S.C.	SILVER		VALUE (Oz.)	GOLD		VALUE (Oz.)	TOTAL VALUE Of Gold and Silver	PERCENTAGE		REMARKS
	Ounces	Tenths		Ounces	Hundredths			%	COPPER	
1								4.75	<i>long step to 33"</i>	
2								3.50	<i>11' high end of step to 32"</i>	
3								3.05	<i>6' S of #2 to 24"</i>	
4	<i>0.25 + 0.35 = 0.63</i>	.4		.01		\$ .35		.10	<i>Sample 235 incl.</i>	
5	<i>2.80 + 1.40 = 4.20</i>	3.0		.04		\$ 1.40		.15		
6								.30	<i>- h. end A</i>	
7								5.65	<i>Step 5' to top / to 3'</i>	
8								3.05	<i>50' S of top 2'</i>	
9								3.55	<i>6' to top 2'</i>	

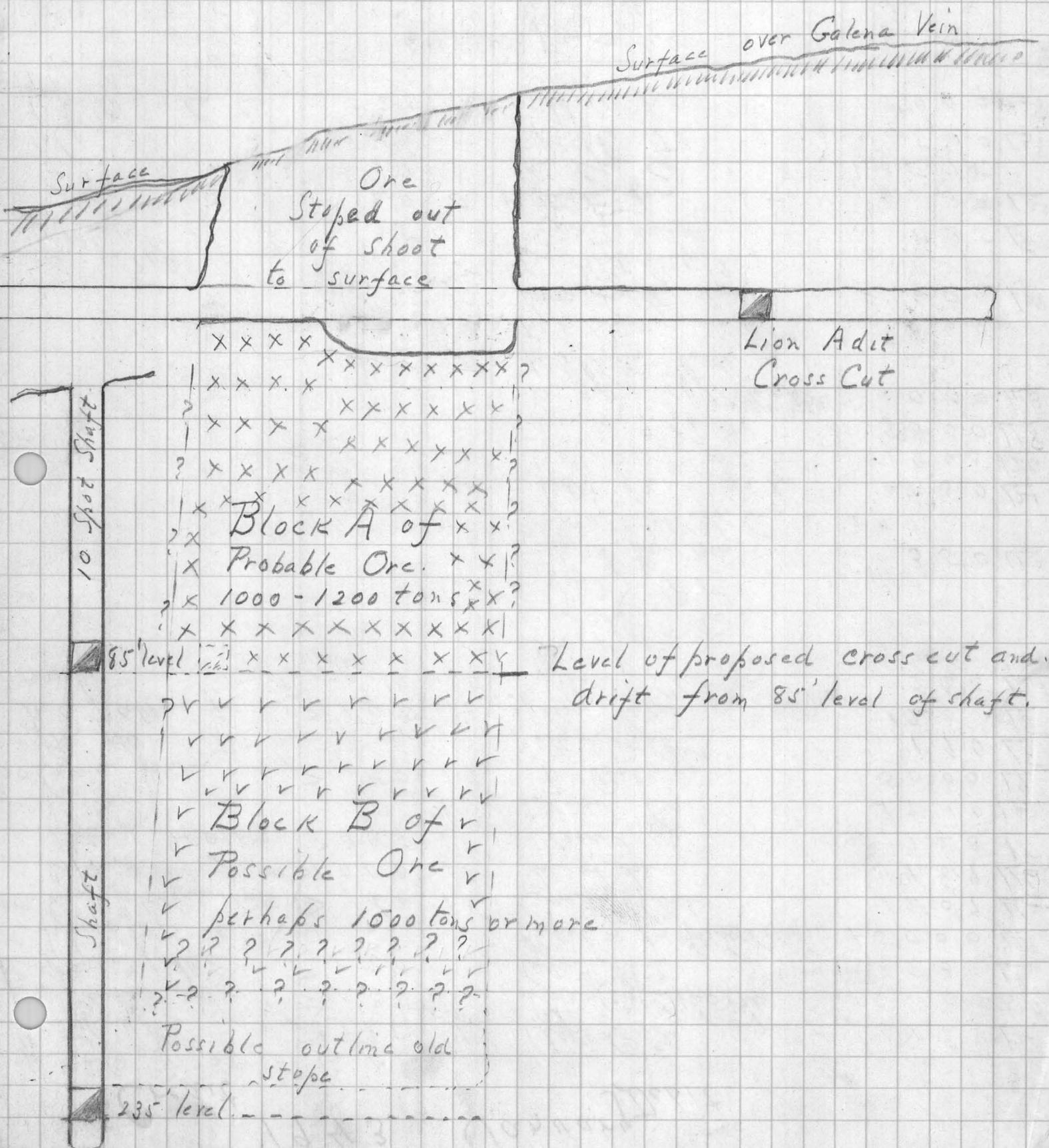
Charges \$ 11.00

Assayer ARIZONA ASSAY OFFICE

*C. A. Diehl*

# Section of Ore Shoot on Galena Vein (Storm Cloud Mine)

Scale 1" = 40'



# Credit.

1943

# Debit.

Debit & Co. 327.27	\$	
1 Bk Post	> 131	1
3 Pension	> 35	
5 Payment of elec	> 100	
15 Insurance exp. it.	2	
10 Surr. (Internal) (50)	> 162	15
Subst. (100)	> 1000	20
Bullard (100) 250	> 200	10
Medium		25
20 Crater Sand	> 40	10
Pay Roll		10
M. Co. of Allen (sp.)	> 1000	10
Hand	1864	25
	732	
		5
		?
		22
		20
		15
		d
		d
		30
		25
		20
		17
		66
Yale Club & Car line	22	
on list	6	
	176	
	\$79	
	755	
Co. Ind.	177	
Ex. Inc. in.	44	
Ins. Paid & held	143	
Auto Club	40	
Car debts & exp. Allen	175	
Pay Allen	579	

1	Appt. Rent	68	85	12
1	Steno (20) (20) (20) (20)	100	00	130
	Appt. Rent	66	30	128
1	Cash on hand (25) (40) (20) (40) (25)	150	00	128
	County Club	12	07	112
	Tel & Tel	14	89	116
	Bowen	7	23	18
	Texas Co.	17	10	128
	F. Baldwin	50	00	19
	Blue Print Co	1	90	18
	Army Office	12	00	18
	Yale Club	17	85	128
	Ch. J. M. E.	17		
	M. M. S. A.	12		
	Rent of P. K.	15		
	Hotel Longway	3	50	112
	Standard Ins Co	7	97	
	Lally Bk. for 20	27	50	121
	Car license & other	14	65	126
	Commiss & Car	50	00	118
	Xmas gifts in bill of Allen & Allen	40	00	113
	1st Division Smith	5	00	
	Post Bus	8	60	
	Doc Smith	1	60	128
	Army Auto Club (Ins.)	3	5	
	Western Union	0	35	18
	Northwestern Ins.	6	235	128
	Am. Copy Co 880	1	35.75	
	R. E. T.	25	00	128
	H. C. Brown	50	00	128

Inv from Feb -> 20.

Payroll	50	15	40
Income	250	7	55
Bullard	150	7	85
Surr.	50	1	75
Co. Ind.	40	9	60
Hand	1000	4	35
	1540	15	25

**J. WILLIAM WAARA**  
CIVIL AND MINING ENGINEER  
PRESCOTT, ARIZONA

July 23, 1928.

Mr. G.M. Colvocoresses

Humboldt, Ariz.

Dear Sir;

I received your letter of the 11th. upon my return from Crown King, and without further ceremony proceeded to the field and have completed the field work in connection with the survey of the Ranger Chief and McCleur claims.

I was able to find the original location notice of the Ranger Chief claim at the discovery hole, which made it possible to positively identify the claim and its original position on the ground. The point of discovery is not as called for in the recorded notice, but is exactly as called for on the notice which we found. It is essential that an amended notice be filed to correct this error, as the locator undoubtedly wrote the "copy" from memory and got the calls reversed.

The McCleur claim was surveyed from the calls in the old patent survey, and the old discovery was identified from said survey record. It does not comply with the original record for the location, and unless I find an amended notice covering this discrepancy, I should advise the filing of an amended notice.

The proposition of amended notices brings up the question of citizenship of the claimants. I have the impression that you stated that the claimants lived in Canada. If my impression is correct, it will be advisable to proceed carefully and not involve the record and validity of the claims, by posting an amended notice in the name of a person who is not a citizen. A non-resident may own unpatented claims through purchase, but cannot locate or proceed to patent.

I will mail you a plat of the survey in a day or so and advise you of any further questions that may come up. I have executed this survey on the basis of our conversation and your letter, the stated sum of \$140.00 becoming due when I have delivered the plats, as the monumenting and survey has already been performed.

Thanking you for this favor, I am,

Very truly yours,

*J. William Waara*

AMENDED

# Notice of Mining Location

LODE CLAIM

TO WHOM IT MAY CONCERN:

This Mining Claim, the name of which is the **RANGER CHIEF** Mining Claim, situate on lands belonging to the United States of America, and in which there are valuable mineral deposits, was entered upon and located for the purpose of exploration and purchase by.....

(Locator must insert either "a citizen of the United States" or "who has declared his intention to become a citizen of the United States".)

the undersigned, on the..... day of....., 192.....

The length of this claim is **1500** feet, and..... claim **290** feet,

in a **southwesterly** direction and..... **1210** feet in a **northeasterly** direction from

the center of the discovery shaft, at which this notice is posted, lengthwise of the claim, together with..... **300** feet in width of the surface grounds, on each side

of the center of said claim. The general course of the lode deposit and premises is from the..... **northeast** to the **southwest**

The claim is situated and located in the..... **Hassayampa** Mining District, in **Yavapai** County, in the State of Arizona, about **1/2 mile**

in a..... **easterly** direction from..... **the old Maxton P.O.**

**and adjoins the easterly side of the Big Four patented claim, being the northerly extension of the Paw Paw and Johnny patented claims.**

The surface boundaries of the claim are marked upon the ground as follows: Beginning at..... **mon.**

at a point in a..... **southwesterly** direction..... **290** feet from the discovery shaft (at which this notice is posted, being in the center of the..... **southwesterly**

end line of said claim; thence..... **N.W. 306.8** feet to a..... **mon.**....., being the..... **most westerly** corner of said claim; thence

..... **N.E. 1500** feet to a..... **mon.**....., being at the..... **most northerly** corner of said claim; thence..... **S.E. 308.3** feet

to a..... **mon.**..... at the center of the..... **northeasterly** end of said claim; thence..... **S.E. 307.9** feet to a..... **mon.**....., being at the

..... **most easterly** corner of said claim; thence..... **S.W. 1500** feet to a..... **mon.**..... at the..... **most southerly** corner of said claim,

thence..... **N.W. 302** feet to the place of beginning.

All done under the provisions of the laws of the United States, and of the State of Arizona.

This is an Amended Location Notice of the..... **Ranger Chief**

Mining Claim, located by..... **Jno.A. Twiggs**..... on the..... **3 rd.**..... day of

..... **April 1912**....., ~~1922~~....., and recorded in Book..... **92**..... of Record of Mines, at page..... **180**....., in the office of the County Recorder of the aforesaid County of..... **Yavapai**.....,

to which reference is hereby made, and this amended Location Notice is made and posted to correct errors in the description in the said original Location Notice.....

Dated and posted on the grounds this..... day of....., 192.....

Witness

ONA,

} ss.

State \_\_\_\_\_ County Recorder in and for the County and  
 recorded in Book No. \_\_\_\_\_ of \_\_\_\_\_ Records of \_\_\_\_\_, 192\_\_\_\_, and duly  
 Arizona, at pages \_\_\_\_\_ County,  
 WITNESS my hand and official seal the day and year first above written.

County Recorder.

AMENDED  
**Notice of Location**  
 LODGE CLAIM

Dated \_\_\_\_\_, 192\_\_\_\_

Filed and recorded at the request of \_\_\_\_\_

\_\_\_\_\_, A. D. 192\_\_\_\_

at \_\_\_\_\_ M.

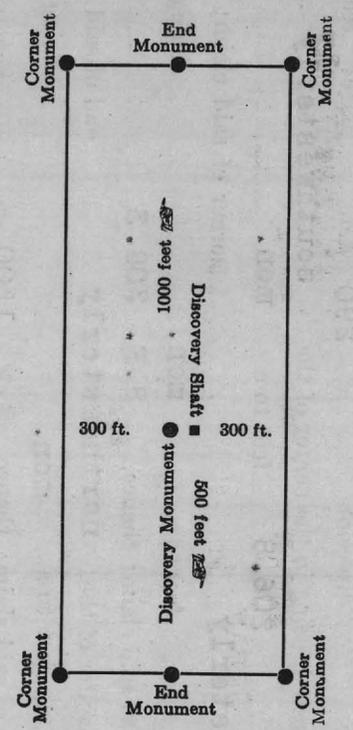
Book \_\_\_\_\_

Pages \_\_\_\_\_

County Recorder.

By \_\_\_\_\_

Deputy Recorder.



This diagram is to give locator a general idea of plan of location under the new law. The Discovery Shaft can be in the center of claim or any distance from either end desired. In the diagram it is placed 500 feet from one end and 1000 feet from the other. Commence description of claim at a center end monument, giving its distance and direction from center of Discovery Shaft; thence bound the claim in either direction. In description be careful to state locality of claim with reference to some natural object, or permanent monument, as will identify the claim.

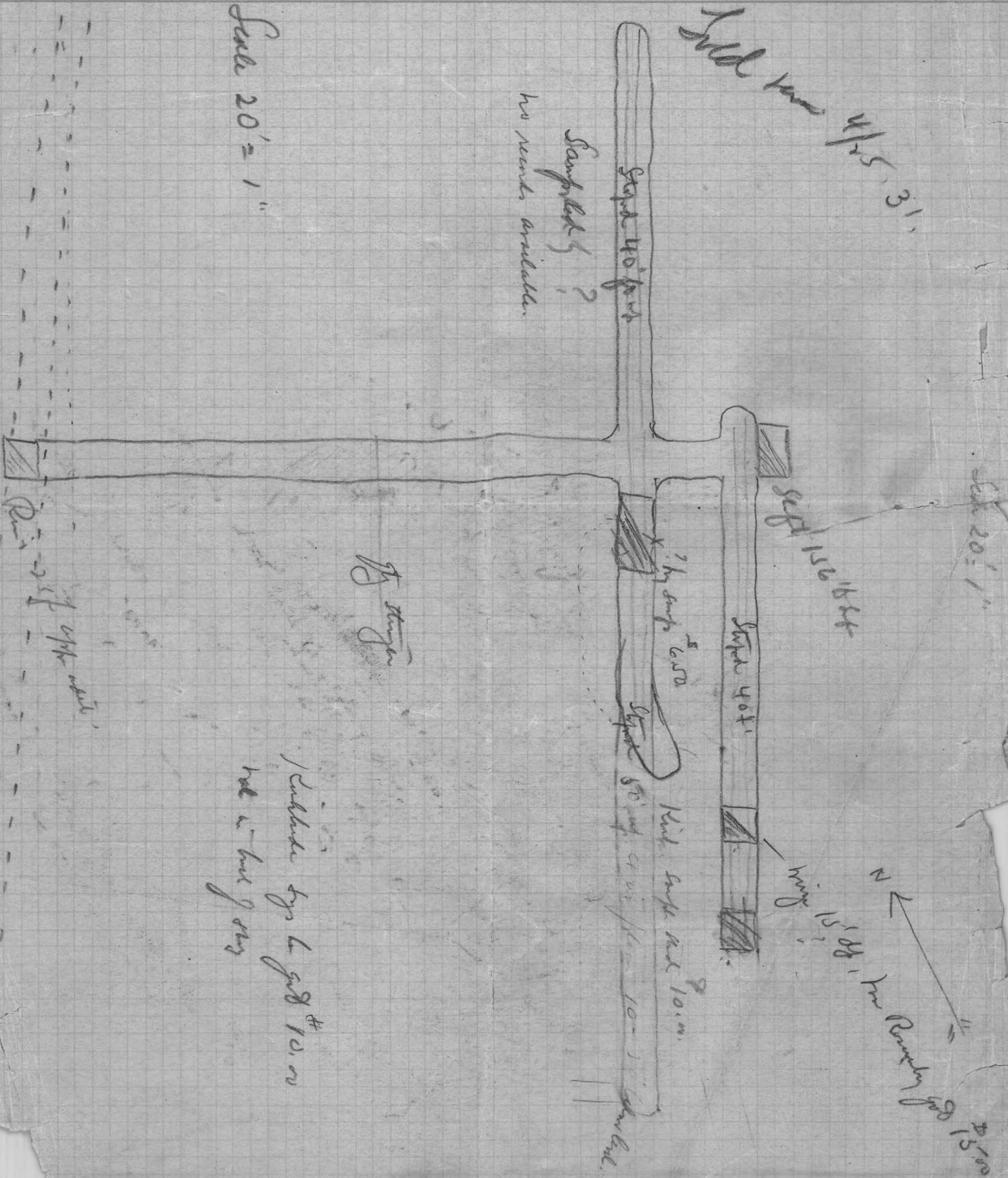
# Consolidated Arizona Smelting Co.

ENGINEERING DEPT.

Date ..... 19....., Humboldt, Ariz.

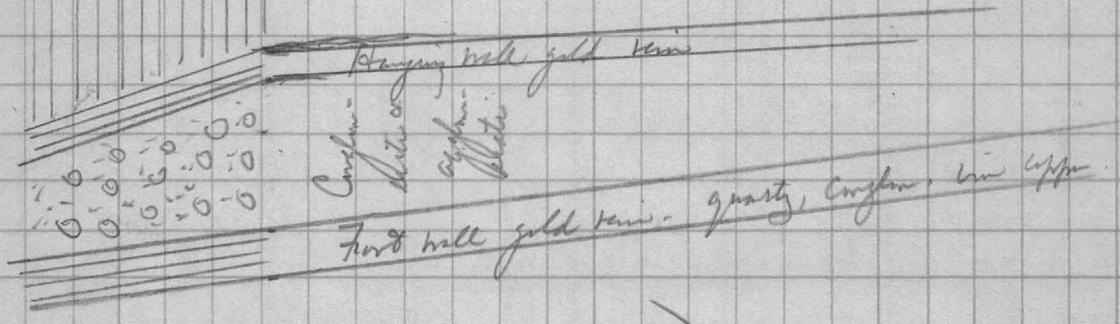
TITLE: .....

Drawn By ..... Checked by ..... Approved ..... Drawing No. S-.....



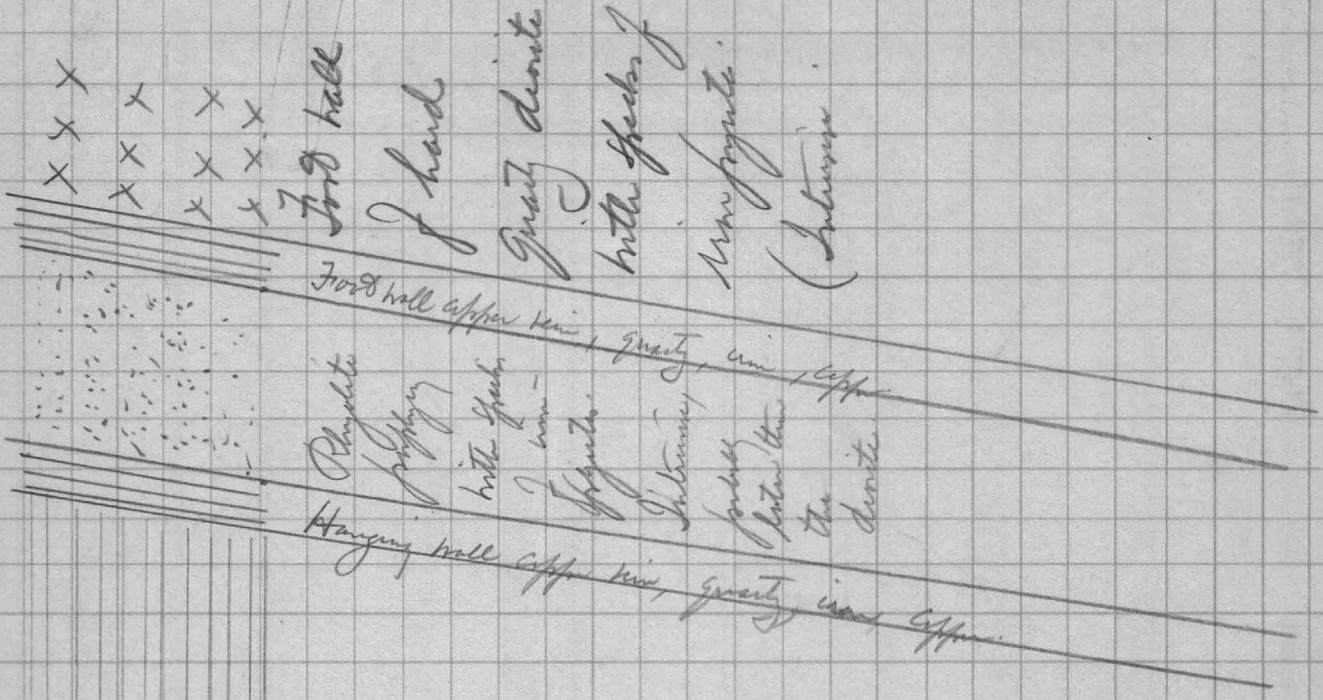
# Geology of Iron and Lead

→ West



Schist and  
or shale  
diorite.

Not amphibolite  
Probably the country rock  
(perhaps diorite in place)

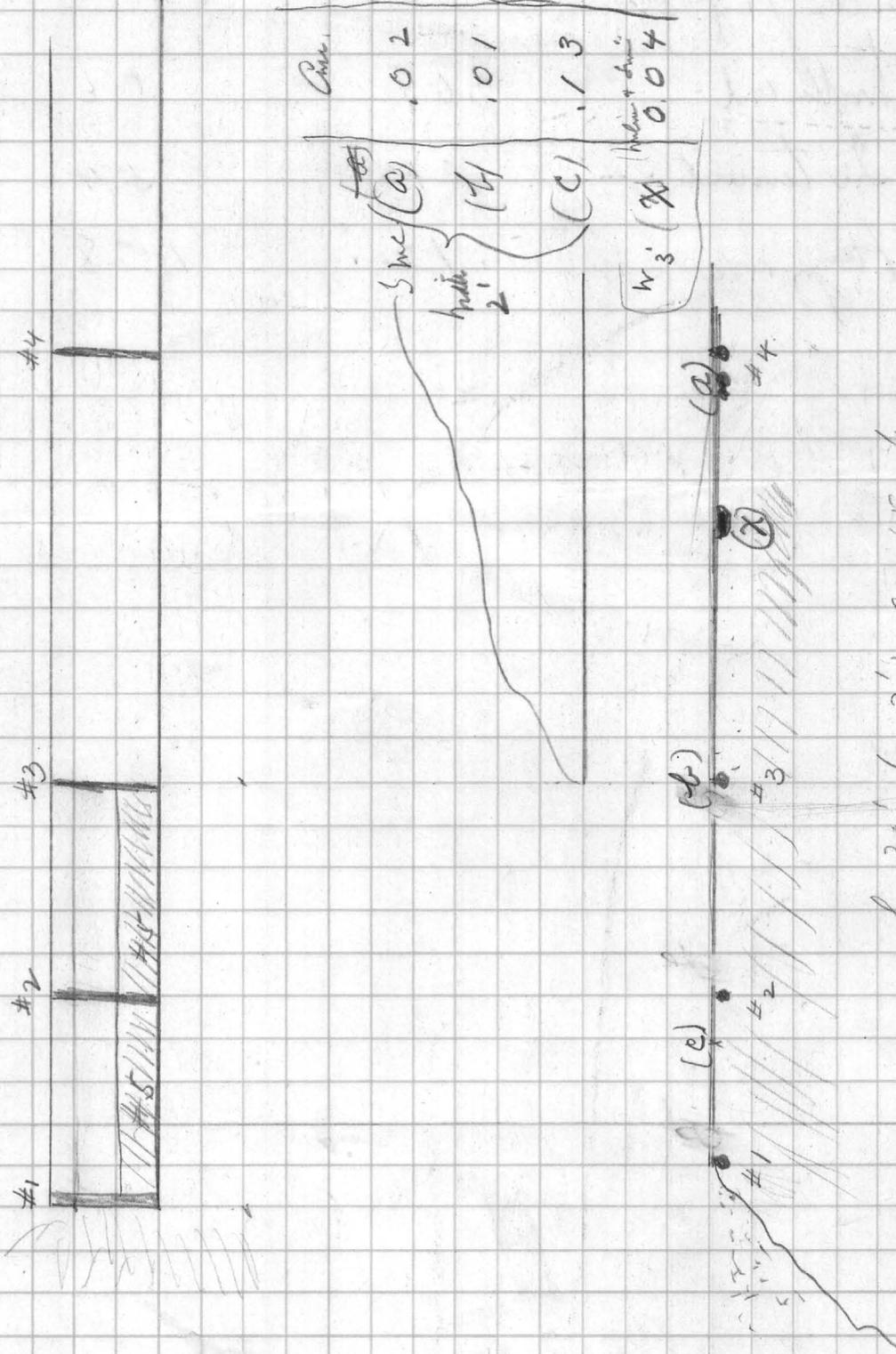


Scale 20' = 1"

1. Spun = 2'

Wilson Samples of Indiana Clay

Sample #	Area S.	Qty.	Con. %	Cal. #
1	.09	6.8	2.79	1 7.57
2	.16	9.1	4.60	2 7.79
3	.02	3.0	1.41	7.65
4	.01	7.5	2.11	1 2.92
5	to	12.8	2.74	1 8.54



Con.	Qty	Cal.
.02	4.6	0.60
.01	1.5	0.35
.13	8.3	3.03
0.04	3.8	8.91
4.0		

l. 30' h 2'4 am / 15.004

DE

~~Analysis~~ Analysis and Samples

	Am	Ag.	Cw.
1. South end.	.01	13.2	3.99
2. Center ft. #3	.05	6.6	2.70
3. North end.	.09	5.6	2.00
4. In tunnel	.01	5.4	1.11
5. Hanging hole	.12	15.8	4.91