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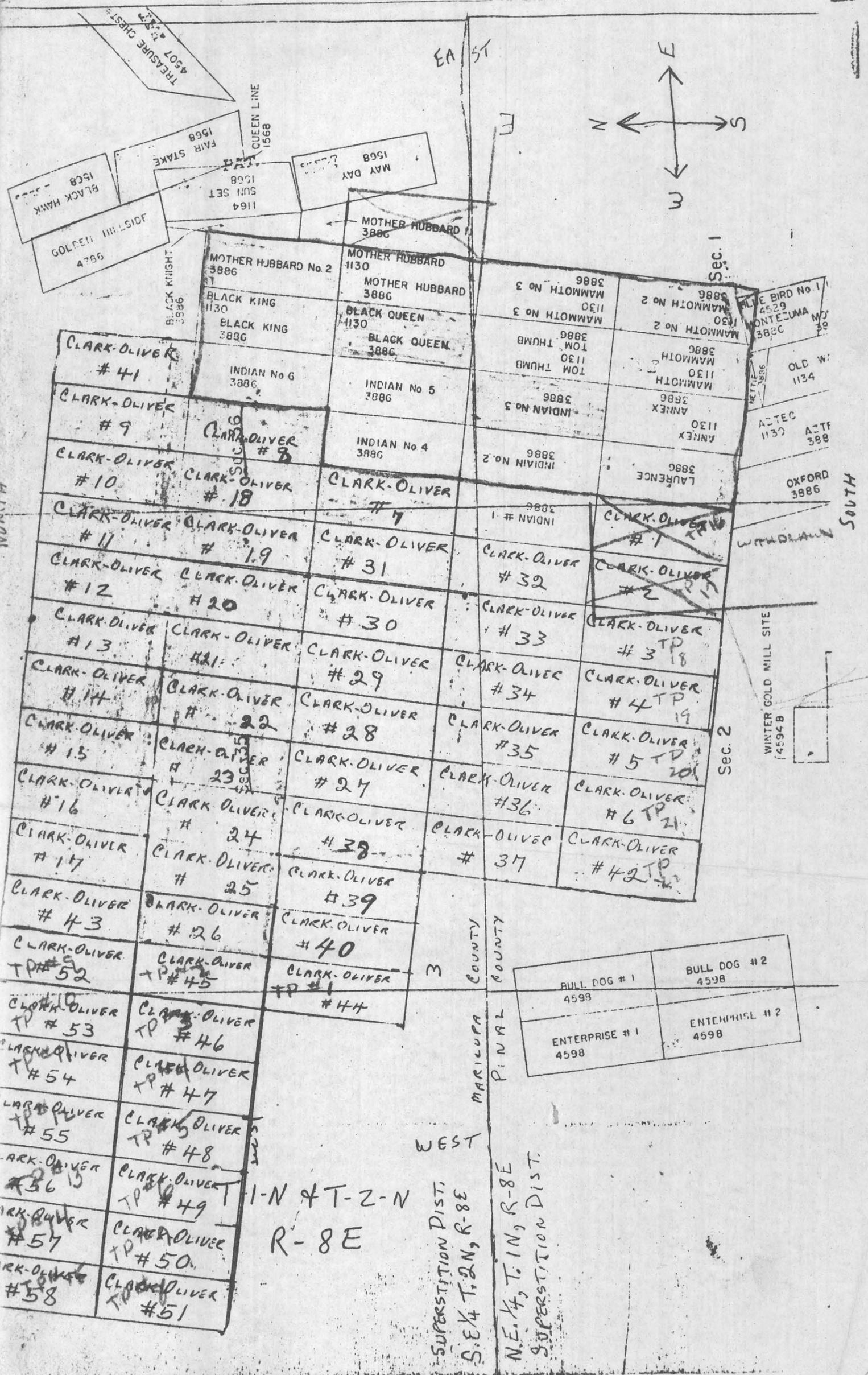
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1762 IN 8E MTP Suppl 1, 12, 17, 18  
 1762 IN 8E MTP Suppl 36

124  
 117  
 118



1-N & T-2-N  
 R-8E

WEST  
 SUPERSTITION DIST.  
 S.E. 1/4 T. 2N, R-8E  
 N.E. 1/4, T. 1N, R-8E  
 SUPERSTITION DIST.

BULL DOG # 1 4598	BULL DOG # 2 4598
ENTERPRISE # 1 4598	ENTERPRISE # 2 4598

WINTER GOLD MILL SITE  
 4594B

OLD W.  
 1134  
 ACTEC  
 1130  
 ACTE  
 388

OXFORD  
 3886

ALIVE BIRD No. 1  
 4529  
 MONTECUMA  
 388C

ANNEX  
 1130  
 MAMMOTH  
 1130  
 MAMMOTH  
 3886

ANNEX  
 3886  
 MAMMOTH  
 1130  
 MAMMOTH  
 3886

66

ALL THIS EXTRA WORK can be done with the SAME amount of OVERHEAD expense we are under at the present time. By putting the CAGE in the South Compartment of the MAIN working shaft we can do ALL of the developing from the 800 UP and at the SAME time by using a BUCKET in the center Compartment we can sink the shaft, and if at any time we wish to stop sinking, we can, by installing another cage in the center Compartment handle a LARGE tonnage of ORE.

With the present hoist and equipment we have, there would not be speed enough to handle the tonnage. Therefore at this time I would recommend ELECTRIFYING THE MINE, for with the Present shaft -- which I can safely say is as good as any in the entire country, by electrifying everything we can use any speed safety would allow.

I have examined the Old Mill thoroughly and conclude that a NEW mill should be installed - one that is up to date in every way because when we start milling we do not want any delays in the way of "breakdowns".

Water is the essential question just at this time, but I believe by piping from different water holes and sources of supply we have at the present time since the rains, we can find quite a supply which will be of material assistance until such time as the Main shaft can be sunk this additional footage, at which time, I believe all the water necessary will be secured, for the reason that as yet we have NOT REACHED THE WATER LEVEL, AND THIS MUST BE ATTAINED TO ENABLE ONE TO KNOW MORE DETAILS BOTH AS TO WATER AND THE PRIMARY ORE ON THE MAMMOTH CLAIM.

I further recommend the development of the BLACK QUEEN property JUST AS SOON AS POSSIBLE, for as I have said - it UNDOUBTEDLY IS A TREASURE HOUSE. It would be advisable to repair the shaft and get in readiness for operation at once, as all assays show good paying ore, of which there is a BIG TONNAGE of HIGH GRADE - and which is practically all in VIRGIN GROUND.

Respectfully submitted,

Chas. B. Broan,  
Superintendent.

MC

		Commodity	Size		
DATE		NAME	AMOUNT RECEIVED	AMOUNT DELIVERED	BALANCE
10-31-28	168	38" Prop. Glory Hole Open Cut		.07x2	
				.14oz	\$2.80
11-2-28	169	Grab Sample of Sacks at Tom Thumb Shaft		.09x2	
				.18oz	\$3.60
11-2-28	170	Face Open Cut 36" Prop. dyke in Glory Hole		.08x2	
				.16oz	\$3.20
11-2-28	171	Sam Jones Copper Ore 13.7% Cu		.17x2	
				.34oz	\$6.80
11-5-28	172	Black Queen Incline North Drift East Cross 5" Sample 12' fram of North Drift cut		.85x2	
				1.70oz	\$34.00
11-6-28	173	Black Queen Incline North Drift East Cross 50' Level - Car Sample on Vein cut		.04x2	
				.08oz	\$1.60
11-8-28	174	Black Queen Incline North Drift East C.C. 2.2" Vein Sample North Wall 15' fram of Drift		.22x2	
				.44oz	\$8.80
11-8-28	175	Black Queen Incline North Drift East C.C. 2.2" Vein Sample South Wall 15' fram of Drift		.58oz	\$7.60
				.09x2	
11-10-28	176	Black Queen Incline South Drift off East C.C. in North Drift on 50' Level - Car Sample		.18oz	\$3.60
				.08x2	
11-13-28	177	Black Queen Incline Car Sample on 50' Level South Drift off of East C.C. on North Drift		.16oz	\$3.20
				.07x2	
11-23-28	178	A-D-2 Face Sample		.14oz	\$2.80
12-13-28	179	Severinghaus Special #1 Black Copper Ore 30.8 Cu	Bead #9 18.20		
12-13-28	180	Severinghaus Special #2 Qtz. Copper Ore 8.9 Cu	Bead #9 12.56		
11-26-28	181	Upper Drift 12" Sample just above the Black Mnd.	Bead #9		
11-26-28	182	Black Diamond Upper Drift 24" Sample Mnd. 2.9% Cu	Bead #9 4.03	Nil	Nil
			Bead #9 15.15		
12-15-28	183	Silver King Ore Dump	Bead #9 18.45	Nil	Nil
12-22-28	184	Alber's Cuyahoga #7, 5'-4" on west side Incline 50' below vert. ladder		1.4% Cu	Tr
	185	Same but on the East Side.		1.2% Cu	Tr
	186	Same	A3 = 46.02		Tr
	187	Diabase above the samples #184-185			Tr
	188	Alber's Porphyry Claim.		Nil	Nil
12-21-28	188	Grab sample off Alber Dump		0.8% Cu	Tr

NC

Commodity Size

DATE	NAME	AMOUNT RECEIVED	AMOUNT DELIVERED	BALANCE
126	Black Queen Incline. 3" Qtz. with lot of waste added. 65'-68' North Side 45° per ton.		13.62 x 2 27.24	\$ 544.80
127	Black Queen Incline. Car Sample from 62'-65'		0.74 x 2 1.48	\$ 29.60
128	Black Queen Incline. Car Sample from 65'-68'		0.35 x 2 0.70	\$ 14.00
129	Black Queen Incline 2" North Side, 68'-72'		0.90 x 2 1.80	\$ 35.00
130	Black Queen Incline 4" Qtz. bottom of shaft at 72', North half.		0.95 x 2 1.90	\$ 38.00
131	Black Queen Incline Car Sample, 68'-72'		0.09 x 2 0.18	\$ 3.60
132	Black Queen Incline 3" Hanging wall, North Half @ 73'		0.67 x 2 1.34	\$ 26.80
133	Black Queen Incline Car Sample, 72'-75'		0.04 x 2 .08	\$ 1.60
134	Sam Jones Special Manganese		Nil	Nil
135	6' wide above open cut. Sam Jones	13.16%	Nil	Nil
136	30' Qtz. to N.E. Sam Jones	0.5% Cu	Nil	Nil
137	Picked Sample Sam Jones	15.9% Cu 1.9202 Ag	0.22 x 2 0.44	\$ 8.80
138	Black Queen Incline Car Sample 78'-82'		0.11 x 2 .22	\$ 4.40
139	Black Queen Incline 2" Qtz. North Side, 78'-81' } see sample } tab		9.75 x 2 19.50	\$ 390.00
140	Black Queen Incline - 3" Hanging wall at 85'		0.05 x 2 0.10	2.00
141	Black Queen Incline Car Sample 83'-85'		0.05 x 2 0.10	2.00
142	Open cut 4" MnO in Middle of cut		0.45 x 2 0.90	18.00
143	Black Queen - 3" Hanging wall 85'-88'		0.095 x 2 0.19	\$ 3.80
144	Black Queen Incline - Car Sample 85'-88'		Tr	Tr
145	Black Queen Incline, 50' Level Stringer 41' E Incline, N. Dkt.	145	Nil	Nil
146	Ditto	146 → 145	Nil	Nil

South side  
in barren.

see  
drawing on tab

**IRON KING ASSAY OFFICE**  
**ASSAY CERTIFICATE**

BOX 14 — PHONE 632-7410  
HUMBOLDT, ARIZONA 86329

ASSAY MADE FOR  
CLARK OLIVER MINING CO. INC.  
Frank Clark  
6942 W. Olive, Sp 68  
Peoria, Ariz. 85345

Sept. 16, 1977

SAMPLE DESCRIPTION	%	Dist. of material	Assay Au Ag/ton	Dist. Au Ag %	Assay Au oz/ton	Dist. Au %	Assay Ag oz/ton
+14 Mesh		6.7	159.2	6.05	105.56	5.96	34.04
-14 +20 Mesh		8.45	182.20	8.73	122.42	8.72	41.98
-20 + 48 Mesh		42.44	193.98	46.71	128.10	45.92	46.28
- 48 Mesh		42.40	160.04	38.50	110.46	39.48	29.98

In addition to above chart a 261 gram portion of the -20 +48 Mesh was amalgamated with mercury. Recovered in the mercury was 1.8523 grams of gold silver plus the quartz adhering to the gold. The same was done to the -48 Mesh portion using the same amount. From this 1.2372 of gold plus quartz was recovered. These portions were fired and the quartz removed. Recovered in the + 48 fraction was 1.29637 grams which was a 30% loss due to the rock material. Recovered in the -48 fraction was 1.11558 grams which was only a 12% loss due to the rock material.

The residue from the amalgamation was assayed and the +48 fraction had 16.26 mgs of au ag left in the residue and the - 48 M fraction had only 6.72 mgs left in the residue.

Conclusion: This clearly indicates that the finer the material is ground more metal is liberated. I am sure that a good grade of concentrate could be made from the coarser material but it would sacrifice recovery.

Respectfully submitted,

WALTER G. STATLER  
 Date Signed 9/16/77  
 ARIZONA, U.S.A.

AGREEMENT TO DRILLING AND MINING

DATE: March 9 1977

LESSEE: J.D. WILBURN

CLARK-OLIVER CORPORATION:

It is agreed that the Clark-Oliver Corporation will enter upon the BLACK QUEEN claim and the INDIAN #2 claim situated in the Superstition Mining District, leased by J.D. WILBURN, to perform drilling and mining if and when it is so determined that enough valuable mineral occurs to warrant the expense of extracting such ore. Clark-Oliver agrees to operate in a good mining-like manner, and they will bear all cost and expenses incurred in mining. Upon termination of mining, restoration of the land will be performed by Clark-Oliver.

It is agreed that J.D. WILBURN, lessee, will receive 20% of the gross returns by the 20th of each month if and when ore is processed. This agreement is an extension of the Nichols lease.

IN WITNESS WHEREOF CLARK-OLIVER has caused this agreement to be executed and has hereunto set his hand as of the day and year first hereinabove written.

SIGNED: John D. Wilburn  
Frank H. Clark

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires

Jan 5, 1980

Bill Mason

Notary Public  
Comm. Exp. Jan 5, 1980

PARTNERSHIP AGREEMENT

THIS PARTNERSHIP AGREEMENT, herein called "Agreement", is entered into at Phoenix, Arizona, and made effective as of the \_\_\_\_\_ day of \_\_\_\_\_ 1979, by and between FRANK H. CLARK, 6942 West Olive Avenue, Space #68, Peoria, Arizona, herein described as "First Party", and CHARLES D. BEARUP, 3630 East Glenrosa, Phoenix, Arizona, herein described as "Second Party";

W I T N E S S E T H :

1. The parties agree to become and be partners in the business of owning, leasing, operating and selling a mining property.

2. The place at which the business shall be conducted and operated shall be as follows:

Those certain unpatented mining claims located in both Pinal and Maricopa Counties, Arizona, more particularly described as CLARK-OLIVER Number Seven (7) through Number Forty One (41) inclusive and number forty three (43), plus the Goldfield Properties.

3. The name under which the business shall be conducted and operated shall be mutually selected by the parties.

4. Contributions:

(a) The First Party shall contribute the unpatented mining claims named CLARK-OLIVER and two thirds (2/3) interest in Goldfield Properties.

(b) The Second Party shall contribute Ten Thousand Dollars (\$10,000) in cash to the partnership as its beginning capital which shall be for the purpose of obtaining that certain Lease-Option Agreement between John D. Wilburn and Goldfield Properties, Inc., and become lessee of the BLACK QUEEN and INDIAN #3 unpatented mining claims, and contribute these two (2) claims into the partnership, of which the Partnership shall assume all rights and obligations thereof.

5. Contributions - Equipment;

In addition to the above described contributions in paragraph (4) of this Agreement, each party shall make available that equipment owned

and in his possession for the furtherment of the scope of this Agreement. Cost of operation, maintenance and repairs of such equipment shall be borne by the individual owner. A fair and just rental fee shall be mutually agreed upon by the parties for such individually owned equipment payable by the Partnership to the respective owner. Such rental fee shall be for operation time required for the benefit of the Partnership only and shall cease upon purchase of such equipment by the Partnership.

6. Acquisition of Property:

It is the intent of the Parties to this Agreement that all property which may be acquired by First Party or Second Party, directly or individually, by location, purchase, lease, or otherwise, within a distance of three (3) miles from the perimeter of the above described properties in paragraph (4) shall be a part of the Properties of the Partnership at no cost to the Partnership unless mutually agreed upon prior to the acquisition of such additional Property.

7. Term of Agreement:

The initial term of the partnership and business shall be for one (1) year commencing on January 1, 1979, and terminating on December 31, 1979, provided, however, that the term of the partnership shall automatically renew itself from year to year unless the partnership and business is ended in the manner hereinafter provided for.

8. Termination:

Either party may at any time give the other party thirty (30) days notice in writing and sent by registered mail to the partner's last known address of his desire to terminate and dissolve the partnership. In event a party gives such notice the party receiving such notice shall have the option of purchasing the interest of the partner who gave notice of termination and dissolution on the terms and conditions set out in paragraphs (9) and (10).

9. The party receiving notice of termination and dissolution, as provided for in paragraph (8), shall have fifteen (15) days from the receipt of such notice to exercise his option to purchase. Such exercise of option shall be in writing sent by registered mail to the last known address to the party who sent notice of termination and dissolution.

10. If the option to purchase is exercised in the manner provided for in paragraph (9) by the party granted such option in paragraphs (8) and (9),

the parties shall forthwith close or have the books of the Partnership closed and its book value shall be a minimum of Two Million Dollars (\$2,000,000.00) whether or not shown at the close of the books. Such closing of the books shall be accomplished by an independent accountant. Half the net value so determined above the minimum value established herein shall be the purchase price. Thereupon the party who exercised the option to purchase as provided for in paragraphs (8) and (9), shall have ninety (90) days from the date the purchase price is determined, to pay the other partner for his share of the business.

11. If the partner who has the option to purchase, as provided for in paragraphs (8) and (9), exercises such option, such party shall be deemed to be the sole owner of the business and its assets from and after the date such party exercises his option. Such party thereafter shall be solely responsible for the debts and obligations of the business and thereafter shall be solely entitled to its income and profits.

12. If the partner entitled to exercise his option to purchase, as provided for in paragraph (8), does not exercise such option within the time provided for in paragraph (9), then the partner who gave notice of termination and dissolution shall have the option of purchasing the interest of the other partner on the terms and conditions provided for in paragraphs (13) and (14).

13. The partner having the option to purchase provided for in paragraph (12) shall have the number of days remaining before the expiration of the notice of termination and dissolution to exercise his option to purchase. He shall do so in writing sent by registered mail to the last known address of the other partner.

14. If the partner who has the option provided for in paragraph (12) exercises it as provided for in paragraph (13), then the parties shall follow the procedure outlined in paragraph (10) to determine the purchase price and the time for payment. Similarly paragraph (11) shall apply as to ownership, obligations and liabilities, income and profits.

15. If either partner agrees to purchase the business from the other, then the seller shall give the remaining partner a recordable quit-claim deed or relinquishment in recordable form covering all of the property and leases.

16. If neither of the options provided for above are exercised, then and in such event the business and partnership shall end on the expiration

date of the notice provided for in paragraph (8). In such case the parties shall liquidate the assets of the partnership, pay off its debts and obligations, and divide the remainder, if any.

17. Death of a Partner:

If a partner dies, the partnership and business shall not automatically end and dissolve. Instead it shall continue for ninety (90) days. During such period the surviving partner shall have the sole right and power to manage and continue the business and such continuation shall be at the risk and expense of and for the benefit and profit of the estate, heirs, beneficiaries, executors, administrators, trustees and assigns of the deceased partner unless such right and power to continue is sooner terminated by exercise of the option provided for in paragraph (18).

18. If a partner dies, the surviving partner shall have the option, within Ninety (90) days from such death, to elect to purchase the share of the business of the deceased partner. Such option shall be exercised in writing sent by registered mail to the last known address of the deceased partner.

19. If the surviving partner exercises the option provided for in paragraph (18), then the provisions and procedures of paragraph (10) shall be followed to determine the purchase price and time for payment thereof. Secondly, paragraph (11) shall apply as to ownership, liabilities and debts, income and profits.

20. If the surviving partner does not elect to purchase the share of the deceased partner as provided for, the business shall end at the expiration of the Ninety (90) day period provided for in paragraph (17). In such event the surviving partner shall forthwith proceed to liquidate the assets of the business and partnership and he shall pay the debts and obligations of the partnership. If there is a remainder, he shall forthwith pay half to the wife, if any, of the deceased partner. If there is no surviving wife, payment shall forthwith be made to the executors, administrators, trustees and assigns, as the case may be, of the deceased partner.

21. Outside Interests:

Until further written agreement of the parties it is understood and agreed that First Party shall be and is entitled to continue to conduct his exploration, assessment work and development of those mining interests he now holds that are not part of this agreement, and shall be entitled to conduct his drilling business and that he will and shall be required to

devote himself to the partnership and business only after such time as required by his presence at drill sites or other properties.

22. Until further written agreement of the parties it is understood and agreed that Second Party shall be and is entitled to continue to conduct his exploration, assessment work and development of those mining interests he now holds that are not part of this Agreement and shall be required to devote himself to the partnership and business only after such time as required by his presence at other properties.

23. The provisions of paragraphs (21) and (22) shall not be so construed as to deny either party reasonable time off so as to enable each to have recreation; be with family and friends. Such time off for each party shall be mutually arranged and agreed upon. The parties shall charge the Partnership reasonable wages for only the time expended by them for the benefit of the Partnership.

24. Responsibilities:

The parties shall be equal partners in and of the business and shall be equally responsible for its management and operations, its debts and liabilities, and shall share equally in its profits, if any.

25. Records:

Upon the commencement of the Partnership and business the Parties shall set up and keep proper books and accounts to reflect the operation of the business.

26. Entire Agreement, Construction; Memorandum:

All of the agreements and understandings of Parties with reference to the Properties and Business are embodied in this Agreement, which supersedes all prior agreements or understandings between the Parties. Section headings in this Agreement are for convenience only, and shall not be considered a part of this Agreement or used in its interpretation. Words in the singular include the plural.

27. All Disagreements to be resolved by the flip of a coin.

IN WITNESS WHEREOF, the Partnership Agreement has been executed as of the date first in this instrument written.

FIRST PARTY

Frank H. Clark  
Frank H. Clark

SECOND PARTY

Charles D. Bearup  
Charles D. Bearup

4/10/79  
J. Freda, Notary Public  
My Commission Expires April 2, 1981



**black queen mine**



*Fred J. Gorchess & Associates*

MANAGEMENT CONSULTANTS

POST OFFICE DRAWER 16147

PHOENIX, ARIZONA 85011, U.S.A.

(602) 279-0111

Name of Mine: Black Queen

Location: Apache Junction (Goldfield Mining District) Arizona

Owner: Contact C.R. Ward Corporation

Principal Mineral: Gold; secondary mineral: Silver

Total Area/Claims: One Claim

Ore Reserves: Estimated \$7,000,000.00 minimum gold & silver reserves

Assays: Assay and flow sheet enclosed

Geology: Brief Geology enclosed

Utilities: Own power- ample water on property

Equipment: 150 T.P.D. mill and tables, operable; plus other normal mining equipment

Operating History: Reported upward of \$1,000,000.00 in values removed (\$20.00 per ounce)

Exploration: Extensive core drilling

Price/Terms: 40 % available, possibility of greater %

Royalties: 10%, probably eliminated by purchase

Reason for Selling: Operators need working capital

*Sample from Mammoth dug by Backhoe*

IRON KING ASSAY OFFICE  
**ASSAY CERTIFICATE**

BOX 14 - PHONE 632-7410  
HUMBOLDT, ARIZONA 86329



ASSAY  
MADE  
FOR

FRANK CLARK  
Clark-Oliver Mining Co.  
6942 W. Olive, sp 68  
Peoria, Ariz. 85345

March 30, 1978

Ref no.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
83-13-4	#1	4.884	0.12					
83-13-5	#2	.066	0.56					
83-15-6	#3	.950	1.17					

CHARGES \$18.00 paid

ASSAYER \_\_\_\_\_

MINING AND ENGINEERING WORLD

OPERATIONS AT MAMMOTH MINE, GOLDFIELDS, ARIZONA

By Chas. A. Dinsmore

October 7, 1911.

The Mammoth mine at Goldfields, Pinal County, Arizona, is being operated by George U. Young, Secretary of Arizona.

A 10 stamp mill is run 12 hours a day, values being saved until the tails carry about 20 cts. per ton only. The ore is a free-milling gold ore, values running from \$5 to \$50 per ton.

A. C. Mossey is superintendent, F. W. Smith engineer and assayer, P. C. Kennedy consulting engineer and mill superintendent. Work is being done through two shafts, total depth being 405 ft.

This might properly be called a "disseminated gold porphyry," if one may infringe so much on the popular copper expression. Here is a brecciated porphyry or granite porphyry, something more than 300 ft. in width, the full length at least of one claim a depth of 100 ft. of ore, and throughout the ore runs an average above \$5. The country is porphyry, trending practically north and south; and there are many flows of andesite running through it. On the Mammoth there are two andesite flows, between which is the ore body as stated. The andesite is barren. But where the andesite and brecciated materials contact there has been a concentration of values, with a narrow ore zone of from 3 to 30 ft. in width, carrying from \$12 to \$200 per ton in gold. This zone is sharply cut off by the andesite on one side and by the brecciated material of lesser grade on the other; but from it through the low grade there are many stringers of varying length carrying high grade ore. In some instances, by following these stringers lenses of rich ore have been found but more often this is not the case, the high grade "petering out" to the regular low grade values. The high value on the contact however has its peculiarities. Where the lense is widest the ore is richest, and the lens is extremely variable in the size, widening and narrowing occasionally, and also the high grade one maintained reliability to the greatest depth attained. On the 100 ft. of 7th a winze has been sunk 45 ft. and here the bottom is in \$60 ore, and the indications are that another of the rich shoots, or probably the continuation of the old ore is coming in.

To the depth of 400 ft. the ore is exactly the same in character and practically so in value as on the surface. It is all oxidized, no sulphides having been found. It was thought that when water was reached the sulphides would come in as usual but it was not the case, so it is altogether probable that this condition will obtain to much greater depth, and Mr. Kennedy states his belief that 1000 ft. of vertical depth will find the ore body identical with that at present being worked. Throughout the porphyry there is more or less quartz in angular fragments giving evidence of considerable movement. During the past few months enough

Prospecting has been done on the surface and underground with a view of definitely ascertaining the quantities of milling ore. It is the belief of those in charge of the enterprise that this property may be worked on much the same principle as that of porphyry coopers by caving after the "glory hole" method shall have been abandoned, and for this reason it is necessary to know the quantities. A great many open cuts, shallow shafts, etc., were made on the surface. Drifts and cross cuts and winzes were made underground, and everything thoroughly sampled and assayed. Taking one full claim, it was all gone over in this manner and an estimate of the hole made, after which a triangular section was taken. Embracing one half of total area, and estimates made on this the basis of the calculations being the work done, assays made, depth, width and length. There are then as so ascertained over three million tons of ore running better than \$4.00 per ton in gold and in making this estimate all the high grade ore on the contact was eliminated. There are two more claims on this contact or great body of brecciated porphyry which it is reasonable to suppose carry similar values, but as the prospecting and developing of these has been on a much more meager scale, no estimate has ever been made as to quantity etc. The mill is running now on old dumps and on waste which was used to fill the depleted stopes by the old timers, and on ore extracted in development. But the mill is an old one, the stamps very light and it is the intention to entirely change the milling practice and operate on a much larger scale treating a 150 or more tons daily. The new practice will be to run the ore through gyratory crushers. Chilean mills thence to cyanide plant, in case however of the higher grade ore the flow from the chileans will be by ladder over plates and thence to cyanide. Test on an elaborate scale have been made by cyaniding this ore, an extraction up to 25% was made without the addition of anything, the ore being almost absolutely neutral and easily handled. In fact, the old dump of tailings from the operation of the mill in the days of the high grade excitement were purchased some years ago by parties who cyanided them and made a good deal of money, this being a complete demonstration of the feasibility of the process here. The cyanide tests were made by K. Kennedy and were extensive and thorough, and he advised the installation of the new style plant as stated, but he strongly advised that the plates be used for high grade, which is certain they will have from time to time and which would be foolish to run through the cyanide direct. In the old milling practice, as nothing but high grade was treated, over plates as now, there was a great loss in values which could have been saved if a final cyanide process had been used.

The Mammoth Mine was discovered in April 1893 and Ci Hall and Dennis Sullivan owned the Black Queen, about half a mile from the Mammoth and they were working in a luke warm sort of way as the ore was high grade. The Mammoth was discovered in the old fashioned (by guess and the elements) way, and the excitement engineered was heart stirring. April 8th of 93 there was a cloud-burst above the Queen and the Gulch carried probably 10 ft. of a raging torrent. The flat below is between the western most end of the Superstition Mountains and low foothills several miles away. There is in the flat not the least indication of minerals, it is being generally covered with

from five to fifty feet of Gila conglomerate. The idea of a mine being there was never entertained, and in fact where the mill now stands was the favourite camping place for prospectors and travellers generally not five feet from the famous "Glory Hole." This torrent of water cleaned the debris from the arroyo or gulch and tore out trees along the edge and washed boulders off. Hill and two more men followed down the gulch to recover some lumber that had been washed away, and they saw the fresh rock apparently a granitic rich with gold. The rock seemed in place, too, and there appeared plenty of it. C.O. Kennedy, the present mill superintendent at the Mammoth, was passing when this discovery was made, and he was asked to sample a bit of rock. He took a small panfull, meagerly crushed it and got a spoonful of gold. The gold was fine, but not floured. The news spread and men came in by hundreds from all directions, and the country was located for miles in either direction, black anthracite, in conglomerate in porphyry, in fact, on open ground was worth locating and some work, regardless of conditions of values. Hall and Denny Sullivan put some men at work on the original discovery opening up what was first called the "Glory Hole" and later on the "Mormon Stope." This vein of ore was 30 ft. wide, 200 ft. in length and 100 ft. in depth. In the month of February 1894 operating fifteen of the stamps, bullion to the value of \$105,000 was recovered. Another rich vein on the contact was discovered on the south end of the property, not more than 500 ft. from the first, but this was not so large as the original discovery. Construction work began on a twenty stamp mill in July, and the first day of September it was in full operation, continuing to the winter of 1897, since then it has been practically shut down until Mr. Young took over the property. Hall bought Denny Sullivan out in 1901, after a disagreement. Hall believed that the ore went to great depth, but Denny wanted a sure thing. Hall went to San Francisco to see his partner and get him to assist in the purchase of machinery to sink 1,000 ft. but Sullivan would not do this, hence the disagreement. A few weeks after the last discovery a miners meeting was held and a camp organized. It was called the Superstition District, and the town Gold Fields. The district is named after the mountain range. A better idea of the rich ore and the easy mining may be had by the statement that at no time during Hall's ownership were there more than 50 men on the payroll in all.

There are, of course, a number of peculiarities here. At one place on the seventh level (125 ft. vertical) a kidney of manganese was found, and the associated quartz has a little iron in it, but this is the only occurrence of the kind. The brecciated ore bearing material runs north and south, dipping about 80 degrees. To ascertain some data on the andesite foot wall the management recently caused an open cut to be made, and from the bottom a shallow shaft was sunk. This was outside the line from the regular contact, but this work was in practically the same ore as that of the main body, and there is an andesite contact to the other side of it, too. This indicates a faulting previous to the main fault. At the north end of the mill some excavation was done. The rock on the surface (it is ore) is brecciated from very close to the surface. But there is, a flat seem about 20 ins. in width of dirt, brown and barren looking.

attention was paid to this, though there was a little speculation to its origin. One day, in the natural course of careful examination, a sample was taken and assayed and it ran 40. Numerous other assays were made with similar results and now they are careful to save dirt. In working the "Mormon Stope" a foot or two of the ore was left standing against the hanging wall, or the seam, of 1 to 3 ft. in width between the ore and the wall, so there would be no timbering necessary. The present management has had some of the rock broken down and it is big pay. There were several slopes filled with "waste" by the old timers, this has been milled at a profit of more than \$2 a ton. There is a dump of waste near the mill, and this too is being milled to good profit. The work in the mine at this time is strictly prospecting and developing, so the discovery that these old waste dumps and the slope fillings carry good values was interesting, as it permits of the operation of the 10 available stamps without doing any mining. Occasionally the material taken out in development is run through the mill, in order that exact knowledge may be had of values on an operating basis.

There has been great erosion throughout this basin, and much water action is noted. The andesite dikes are prominent and noticeable at intervals for many miles. The ore-bearing material has always been called granite, but it may better be named granite porphyry, and that is all brecciated shows the movement to have been of great duration. The greatest depth reached is 465 ft. and at this depth the ore is oxidized just as is on the surface. Throughout the stope which is about 3 miles wide and 8 long, gold may be panned anywhere. North of it several miles are small properties having some development, the ore being gold. It is the same to the east. Some 8 miles southeast, however, on the other side of the Superstition Mountains, copper comes in in quantities, one mine now being worked in a small way carrying copper, gold and silver. But in the Mammoth section there is nothing but gold, with just a little silver. It is the general belief that Mr. Young will be successful in his efforts to operate the Mammoth on the basis of large tonnage for profit on low grade ore; and there seems reason for believing that other properties will develop on the same basis. There will be a necessary expenditure of large sums of money to accomplish this. The work so far done has resulted to justify this expense. In sinking the main shaft, which is to be the working shaft when operations begin on a large scale, 45 ft. of conglomerate was passed through, and yet a shallow shaft 50 ft. distant was in ore at 10 ft. of depth. The andesite is always absolutely barren. The work done by Messrs. Massey, Smith and Kennedy has been exceptionally good, because they had the difficulty of reopening an old mine which had been idle many years; and also there was difficulty in the fact that there might be truth in some of the great tales of rich shoots left to "hold the ground," etc. and these must be investigated. The whole matter is well in hand now. The idea in mining is to leave pillars to hold the ground, using the caving system for material to be milled. There are areas in the large mineralized zone that will run only \$1.50 (this is the least any of it does run), and it is the intention to leave this lowest grade to hold the ground, which is entirely feasible. By adopting the Chilean mills and the cyanide process better extraction may be made than with stamps and plates and lower grade ore may be profitably handled, especially if the tonnage is materially increased, which will be the case. The milling results at this time, however, are excellent, considering the antiquated equipment and that the ore is really not properly suited to the stamps.

Mr George U Young, Mgr.,  
Young Mines Co.,  
410 Fleming Building,  
Phoenix, Arizona

Dear Sir: Pursuant to your request I have carefully made a geological examination of your Mammoth Mine at Youngsberg, Pinal County, Arizona, spending 30 days from Dec 1st to 31st, on the ground, and herewith submit my report thereon:-

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The scope of my investigation has been confined solely to the geologic conditions within, and contiguous to, the mine. Fortunately the mine development to date facilitates an appraisal of those features so that little is left to inference. The several formations and their physical conditions, contacts, etc., have been carefully checked. Note was taken of all jointing planes, and slips, together with their attitude, but they represent only the tension, and compression fractures as consequent adjustment planes to local stresses, etc., accompanying larger scale displacements. They have slight bearing on considerations relative to solution of problems sought, therefore I have generally omitted them on the maps, and reference to them herein will be made only as necessary. In compiling these data I have eliminated technical terms where their use is not consistent with the clarity of the report. Based on results of my investigation I have arrived at conclusions as under:-

#### GENERAL HISTORIC GEOLOGY

In Archean time the country rock was primarily an undisturbed granitic batholith, and this formation probably constituted the earth's lithosphere for the early part of the period. Pre Cambrian faulting ( See Hanging Wall Fault Vein ) resulted in a plane of low resistance traversing the batholith. Probably contemporaneous, or as a close sequence thereto, was the injection along this rupture of an intrusive mass crystallizing out as pegmatite. The pegmatite ascended along the fault plane, and nearing the Pre Cambrian surface, the horizontal and lateral resistance of the older wall rocks was less stable as against the superpressure exerted by the magmatic pegmatite with the consequence that the walls of the primary fault were forced apart by the intruding mass to an extent consistent with the proportionate

degree of resistance exerted by the wall rocks. The resultant mass solidifying between the displaced walls formed a pegmatite chonolith. The feeder to, and the bulk of, the chonolith is Southerly from the area under consideration, hence only the extreme North extremity is encountered in your mine development to date. Radiating along fracture planes in the older wall rocks are many injected vein-dikes of pegmatite magma. Reference to Sheet No 2 will give you a comprehensive idea of the lateral displacement of the footwall country rock side of the primary fault. NO  
SHEET ←

The pegmatite probably extended to the Pre Cambrian surface, but, owing to its structure, pegmatite resists weathering and erosion to a lesser degree than the more compact granite serving as its wall rocks. Early Paleozoic ( Cambrian ) weathering disintegrated the pegmatite and apparently the chonolith was eroded to a depth equal to the 400 level of the main shaft, or perhaps deeper to the East, however movement along the master fault planes resulted in an upthrust of the footwall rocks to the extent that the Cambrian erosion elements became more quiescent; probably due to segmental uplifts in the older rocks, forming barriers that precluded the intense erosive action of previous torrents. With more quiescent conditions the process became one of deposition with silicification where favorable. This deposition in the form of a fluviatile piedmont plain was made up of quartz and other fragments, both transported and local, which when consolidated formed quartzite, or graywacke, conglomerate as the bonding constituents permitted. Following this was a period of slow, long-enduring, disintegration of the conglomerate effecting for the most part the conglomerate predominantly graywacke, as owing to the silicious bond in the quartzite that rock was more stable.

Toward the end of Paleozoic era ( Permian ) this disintegration ceased, and the process of recementation of the residual products took place in a relatively short period. This is indicated by the fact that the residual recementation is an arkose-graywacke continental conglomerate. The arkose is especially predominant along the basal contact of the conglomerate against the Pre Cambrian pegmatite. Few quartzite pebbles are noted in the

later conglomerate, and on the surface an unconformity is observed between the remnant Cambrian quartzite and the recemented arkose-graywacke.

Since Permian time no great change is evidenced locally with the exception of a very considerable movement having taken place along the fault planes. The hanging wall fault, owing to its great length and depth, is amenable to the reactions of adjustment in the igneous rocks within an extensive area of the earth's lithosphere. Regionally there have been extrusions of volcanic lavas, probably late Cretaceous, such as basalt, rhyolite, trachyte, and andesite, however none of these have any relation to the problem under consideration. A basaltic flow traverses the property and fragments of the other lavas are to be found in the unconsolidated alluvium overlying the Permian and older conglomerates.

The above gives a general outline of the events in their geologic sequence from earliest time to the present, however I have not considered accessory conditions in the above; such as fault brecciation and contact metamorphism; having in mind a separate discussion of these subjects, as the conditions have direct bearing on the mineralization of your ore bodies at the time of magmatic injection, and during the long period of weathering since. These same agencies have extensively leached with the aid of circulating ground waters, the soluble minerals and transportation has been back to the ground water level where reprecipitation is favored.

**Fault Brecciation.** Fault breccia is the product of the crushing, grinding, and abrasive action of the two component walls of a fault. The material ranges from microscopic in size to that weighing several tons. The mass is termed the fault zone. Locally the fault zone averages twenty feet in width, and owing to intermittent movement, along the planes, particularly at the hanging wall fault, since the injection of the pegmatite magma there are found in addition to the fragments of the original wall rocks those of the younger injected rock. Minerals from accession vapors, thermal metamorphism, and chemical replacements from down trending ground waters, are noted in the ground mass.

Metamorphism.

Metamorphism. All rocks are subject to metamorphism if the conditions under which they were formed are changed. Such alterations are termed metamorphism. It may be induced chemically or mechanically. Accession gasses from the magmatic intrusions, circulating ground waters, heat, stress, and period of time, all act to the end of changing the identity of a rock and its constituents. With the injection of the pegmatite and its ultimate solidification, as previously outlined, the gasses, heat, and stress served to lay the foundation of metamorphism later completed through the ages by the circulation of the ground waters. Now we have the fault zones and their adjacent wall rocks, more particularly the pegmatite, in various degrees of alteration. Metamorphism being intense at the fault plane diminishes in degree over an average distance of sixty feet to the unaffected rock. On account of different conditions existing at various depths within the lithosphere, different chemical processes assume chief importance in their respective zones. These zones may be termed ( 1 ) Belt of Weathering, in which the principal movement of the ground waters is downward. In the vertical plane of the main shaft I estimate the depth of this belt to approximate 1200 feet

See Sheet No 2. In this zone fractured by the processes of weathering, oxidation, hydration and carbonation prevail. Complex silicates break down and simpler less dense minerals, such as iron oxides, etc., are formed. The dissolved minerals carrying a proportion of the values are carried down to;

( 2 ) Belt of cementation. In which the ground water level is constant and the process is that of cementation effected by the deoxidation, dehydration, and decarbonation of the solutions from the weathering belt. Silicates are built up and great pressure leads to the formation of denser minerals and a compact crystalline structure. It is here that most vein deposits of economic value originate under geologic conditions such as are apparent at your property, therefore I would anticipate the zone below the constant water level to be characterized by massive silicification in the zone of fault brecciation, and also as stringers throughout the contact metamorphic zone adjacent to these faults; accompanied by enrichments of gold values leached

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out by, or entrained with descending ground waters from the belt of weathering in addition to the original primary values in situ within the ores of the anamorphic zone, or belt of cementation.

Economical ore deposits between the 300 level and at, or just below, the constant water level are limited to the fault zones, and then are contingent on pre-existing barrier conditions such as impervious gouges, etc., having retained primary ascending mineralizing agencies, or the descent of the ground waters in such manner as to have formed local concentrations.

Considerable movement along the master fault planes since their primary shear is evidenced, not only by pegmatite fragments in the breccia, but by vertical displacements of the wall rocks. That these events have been accompanied by ascending vapors is evidenced by the silicification of the Cambrian conglomerates superimposing the Archean fault zones. Along fault planes in the conglomerate silicification was extensive, and enrichments of gold ores deposited forming the surface ores mined by your predecessors. This condition should obtain equally as rich in the conglomerate superimposing the footwall fault, beginning at a point about East of the main shaft at the footwall and extending Southeasterly therefrom.

SUMMARY OF HISTORIC GEOLOGY.

- The Historic Geology may be summarized thus:-
- First. Undisturbed granite batholith.
  - Second. Faulting in a North and South plane in the batholith.
  - Third. Injection into this fault rupture of pegmatite magma which forced component parts of wall rocks apart. Axis in vertical plane of shaft estimated at from 1000 to 1250 feet. Is progressively deeper to South. Injection of magma accompanied by thermal mineralizing vapors which started alteration in cooling magma.
  - Fourth. Continued movement in planes of faulting built up wide fault zones which in turn were heavily mineralized.
  - Fifth. Erosion of less stable pegmatite with later faulting of foot wall with up thrust.

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- Sixth. Arresting of erosion and the gradual building up in Cambrian time of piedmont plains composed of the detrital material from granite and pegmatite. The latter is predominant. Areas of this material consolidated to a quartzite, or graywacke as conditions favored.
- Seventh. A long period of weathering ( Cambrian to Permian ) disintegrated the conglomerate, particularly the graywacke.
- Eighth. During a short period of time ( Permian ) products of disintegration consolidated into residual arkose conglomerate.
- Ninth. Weathering and leaching ( Permian to and including Quaternary.-Recent ) has extensively returned solubles to belt of cementation.

PETROGRAPHY

In the above outline of the geologic history consideration as to their occurrence their occurrence is taken of all the three great classes of rocks in the earth's lithosphere. An outline of the physical conditions, and the characteristics of these rocks is as under:-

1. Igneous. The granites in mass as a batholith. The pegmatites as an injected chonolith along a low resistance plane in the batholith, and also as vein-dikes in fracture planes in the wall rocks contiguous to the chonolith. Basalt as an extrusive lava flow. Minerals of the igneous rocks grouped according to their order of crystallization in solidifying are 1. Iron. 2. Ferromagnesian silicates. ( Olivine, Pyroxine, Amphibole, and Mica. ) 3. Feldspar and Feldspathoids. ( Plagioclase, Orthoclase, Nephelite, Leucite, and Analcite. )
4. Quartz ( In acidic rocks ) Pegmatites being the product of magmatic interior of semi solidifying igneous rock obviously are composed of a preponderance of those minerals which would solidify lastly, such as quartz, feldspars and some of the ferromagnesian silicates. Basalt owing to its more sudden cooling is a fine grained rock. All the constituents cool to a more homogenous mass. i.e., before they have had opportunity to cool selectively as individual aggregates. The granites normally have their characteristic light color, however locally circulating solutions have added a preponderance of ferro-

magnesian minerals which unoxidized give these rocks a green color, and if oxidation in any of its stages has taken place the rock is light green to red. The basalt is dark gray to black owing to an excess of dark silicates. ( Pyroxene and Olivine ) and magnetite.

2. Metamorphic Rocks. The quartzite and graywacke conglomerates while originally a sedimentary are metamorphic by reason of their being bonded by newly deposited silica, or silicates, and if metamorphism is complete the rock is compact and will not retain cleavage along previous aggregates. The contact metamorphic pegmatites are in various stages of alteration from gneiss at the fault contact to that showing various stages of change effected by gaseous accessions and circulating ground waters. The pegmatite fragments making up, in part, the fault breccia are highly metamorphosed by heat and pressure, also the gasses and solutions traversing the fault planes. Coloring of the quartzites is brown to red owing to oxidation of their component dark silicates. These rocks and those of contact metamorphism have the following mineral constituents. Quartz, Feldspars, Biotite, Muscovite, Hornblende, Epidote, and chlorite. The graywacke has in addition to the above the ferro magnesian silicates.

3. Sedimentary. These rocks are the residual products of former disintegrations. The arkose conglomerate makes up the bulk of this formation. The sedimentaries retain the constituents, less oxidation, hydration, etc., of their former aggregates and in addition feldspar and newly deposited ferromagnesian silicates. Where oxidation and weathering has broken down the ferromagnesian constituents the color is brown to red depending on the degree of oxidation. Where unoxidized the color is green. Phenocrysts of feldspar are predominantly white in the arkose ground mass.

PHYSICAL CONDITIONS

For area considered see Sheet No 1.

NO SHEET #1

The area under consideration being in the foothill wash country contiguous to the Superstition mountains is superficially covered by erosion products from the higher reaches, and the unconsolidated alluvial fill is largely made up of fragments and pebbles that bear no relation to the geologic

formations in situ locally. The detrital materials extensively obscure  
outcrops and other surface expression of the underlying conditions. Basalt  
as a superficial extrusive mass is noted, but it bears no relation to  
geologic structures influencing economic mineralization. Conglomerate  
ranging from arkose to quartzite is predominant being more resistant to erosion  
this formation now lays in small hillocks upon one of which your camp has been  
built. In the Northeast quarter pegmatite is noted. Its downward trend  
correlates with the cross dikes noted in the extreme North drifts of the  
300 and 400 levels. Contacting the pegmatite on the West is an outcrop  
of trachyte porphyry. I have made no inference as to the genesis of this rock.  
The master fault is traceable partly through outcrops, and otherwise by oxide  
stain in the conglomerate and unconsolidated alluvium. Faulting North of the  
North shaft is indicated by the wash and this fact is substantiated by under-  
ground conditions of the 300 and 400 levels. ( North drifts ) This fault  
has been called the East and West fault. The youngest master fault is the  
Apache fault South of the South drift. It indicates a lateral displacement  
to the West affecting all the formations including the basalt flow. It is my  
opinion that this movement was one of adjustment following the disturbances that  
extruded, or erupted the lavas of the region. No underground development has  
encountered the fault as yet. With few exceptions the surface has little  
expression of the underlying geologic conditions.

GEOLOGIC FEATURES OF THE MINE

Consideration of the geologic features of the several levels in  
the mine together with those of the vertical cross-section will give you  
a conception of the ultimate result of the geologic events.

NO SHEET  
#3

The A, B, and C levels. See Sheet No 3. as indicated were driven  
in the conglomerate formation. Ores were mined from the silicious zones  
superimposing the master faults. Arkose breccia is noted in the general plane  
of the underlying fault zones. Numerous silicifications paralleling the fault  
zone are noted.

NO SHEET  
4

The 300 level. See Sheet No 4. Consideration of this level gives  
a conception of the relation between the conglomerate formation and its country

rock. A remnant of the pegmatite chonolith is noted parallelling the master fault. Reference to the cross-section will explain this. Brecciation along the fault zones is well developed. The breccia contains fragments of the older wall rocks, also the pegmatite, and occasionally conglomerate. The East and West fault indicates a South boundary of a later pegmatite injection not considered herein. The fault terminates with its intersection with the hanging wall fault. The country is highly crushed and metamorphosed into the conglomerate indicating a younger age of the fault and the adjacent pegmatite to the North. The long crosscut East failed to intersect the footwall fault, however a flat fault near the end of the crosscut has apparently displaced a segment of the wall to the East. I have assumed the condition noted on the map solely on account of the flat fault. Otherwise I would infer that a portion of the wall was eroded by a Cambrian eddy.

The 400 level. See Sheet No 5. <sup>MISSING</sup> Development on this level is geologically important in that it determines the depth of erosion of the pegmatite chonolith and indicated the basal contact of the conglomerate as of the vertical plane of the shaft. Contact metamorphism in both formations is well advanced. The depth of the erosion possibly extended farther East, but the uplift of the wall rocks since primary erosion has apparently altered the Cambrian cross-section. Brecciation along all faults is well developed. Fragments of conglomerate are noted in the footwall breccia indicating post Permian movement of the wall.

The 700 Level. See sheet No 2. At a point just above the 700 level the main shaft intersected the footwall fault.

800 level. See Sheet No 6. The station is in the footwall. The footwall fault was intersected at 75 feet, and the hanging wall at 180 feet from the shaft. Beyond the hanging wall 195 feet of cross cut was driven into the hanging wall without intersecting any parallell ore deposits. Occasional pegmatite vein-dikes are noted. Drift to the North was for the most part maintained in the hanging wall side of the fault. Two additional cross-

cuts were driven into the hanging wall country at intervals of 400 feet and 500 feet respectively. Two crosscuts were driven across the brecciated zone of the vein to the wall. Foot wall fault vein makes its junction with hanging wall fault vein 175 feet North of main crosscut. South drift is now prospecting hangingwall fault vein from which favorable samples are being taken. The brecciation along both faults is well developed, and the pegmatite between walls is in a high state of metamorphism.

The 1000 level See Sheet No 7. From the station the crosscut intersects the footwall fault vein at 110 feet, and the hanging wall fault vein at 200 feet. The crosscut extends into the hangingwall country rock an additional 100 feet. A drift North for 100 feet along the brecciated fault zone did not reach the junction of the two faults. The ground is heavy and impossible to hold with timbers. The hanging and foot wall veins will join at 150 to 175 feet from the cross cut. Pegmatite between walls is highly crushed in addition to metamorphism. Footwall country rock is also crushed. This is due to the area being local to the axis of the lateral thrust of the foot wall country.

#### RECOMMENDATIONS

**Shaft.** See Sheet No 2. Anticipating that the water level will be constant at about the 1200 level, and that the nature of the mineral deposition will change as outlined under Historical Geology, and that ore deposits of economical importance will be proven to be greater in extent, and better in average values, than those deposits now developed I would strongly advise that your main shaft be sunk an additional 450 feet from its present bottom. This work completed will establish the 1500 level plus an adequate sump. Cut the 1500 station with an ample pump chamber as water conditions will very materially change when the drift has encountered the fault vein. Cross cut 270 feet East to the primary fault zone. Drifts paralleling the vein in each direction should be driven. Their position can be determined after reaching the locale of the vein. I am of the opinion that the vein matter will be compact and will take a minimum of timbers to mine. In sinking I would advise that only stations be cut intermediate between the 1000 and 1500 levels. It is possible that an

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intermediate pump station be required. Heavier timbers are necessary in any new shaft development.

1000 level. Drift North and South in the foot wall country as outlined on sheet No 7. Completion of this work will have prospected the hanging wall fault vein without passing through excessively heavy ground. Possibilities for ore are fair along the vein in both proposed developments. Keep away from the locale of the junction of the two fault veins, as ground is too heavy to hold, being shattered and crushed, also no doubt more or less completely leached. I would recommend abandonment of the crosscut beyond the footwall fault vein.

800 level. See Sheet No 6. Keep South drift in ground that will stand and crosscut through hanging wall fault vein at say, 50 foot intervals. I would favor the driving of this drift at least 250 feet farther South as I believe that the region South of the Apache fault has possibilities. If fault is intersected turn West along drag to again pick up hanging wall fault vein. It is hardly advisable to drift East along the Apache fault as the fact that this fault is of comparative recent age gives me reason to believe that there will be no ore deposition influenced by it. North drift. From survey station 815 Northerly I advise crosscutting through the fault vein brecciation at least at 75 foot intervals. The drift itself and hanging wall cross cuts do not give a fair idea of your ore possibilities. No particularly adequate cross cuts proved the vein in this drift. There are some very interesting assays on record as coming from this drift, and considering the comparative length of the drift that had no cross cuts to the wall I would advise giving this your attention. The bulk of the muck could possibly be stored in the hanging wall cross cuts.

400 level. No further work on this level advised at this time.

300 level. No work advised other than that in progress at this time

A, B, and C levels. No work advised other than that in progress at this time.

Surface. I would recommend that any future prospecting in the conglomerate be along the foot wall fault vein. This could be accomplished by cutting a

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station on the East side at the 175 level of the main shaft. Cross cutting S 75° E to the foot wall fault vein. Silicious segregations there should prove as remunerative as those of the hanging wall fault vein.

CONCLUSION

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In conclusion I have no hesitancy in stating that with the possibilities to be developed under the constant ground water level at this property your operations should have a favorable outlook. Further I would warn you that while the gold values in your already developed ore body are amenable to reduction by comparatively simple processes, this fact is no criterion as to what the same flowsheet would recover on your ores from depth. I would suggest that you make no plans for a reduction plant until such time as future development at depth demonstrates the type of ore available for reduction. Have absolute demonstrations of any new and untried processes. Flotation is hardly indicated. Cyanidation, while its first cost is possibly higher than other processes has proven to be the most efficient, and costs less per ton milled than any other medium of reduction, if the ores are amenable to that treatment.

In making my examination I have been very generously aided by your Superintendent, Mr Broan, as also by your Engineer, Mr Stanton. Acknowledgement of my appreciation is made.

Very truly yours,

*E. W. Bedford*

Dated December 31st, 1923.

ORIGINAL  
COPY

REPORT OF MAMMOTH MINE

and

PERSONAL RECOMMENDATION TO GEO. U. YOUNG.

Arizona Corporation Commission  
**RECEIVED**  
MAR 2 1925  
DIVISION OF  
CORPORATIONS

L O C A T I O N .

The Young Mines Company, Ltd., property is situated in the counties of Maricopa and Pinal, Arizona, twenty miles northeast of Mesa, a town on the Arizona & Eastern Railway. The Government road to the Roosevelt Storage Dam passes through the property. It was built at great cost, and is an ideal highway.

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POWER ADVANTAGES.

The wires from the electric power plant at Roosevelt pass within 300 feet of your mill.

*Copy obtained from Mineral Branch*

DESCRIPTION.

The ground belonging to your company as shown by map of approved official survey, contains ten full mining locations, and a fraction of a claim. Each location is 1500 feet long by 600 feet wide, including the "Fraction". There are about 216 acres. All are found on Books of Mining Records of Maricopa and Pinal Counties, and are known as follows: - Mammoth, Mammoth No. 2, Mammoth No. 3, Aztec, Annex, Tom Thumb, Black King, Black Queen, Mother Hubbard, Montezuma and Fraction.

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DEVELOPMENT WORK.

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So far, caved ground is visible behind the shaft timbers, but no effort is made to remove it. The main object in view is to get to the bottom and clean out the crosscut where there is 20 inches of free milling ore, assaying \$40.00 to the ton. In the first level at 115 feet, going south, the drift, when cleaned, was in 140 feet. It has since been driven to 187 feet and work is still in progress. A crosscut in which work is also progressing is in 40 feet; all in ore, and as yet no sign of any foot wall. This vast chamber is not high grade, averaging \$3.50, but indications, at present, are all in favor of higher grade. What will be found on the wall, will, undoubtedly, raise its average value.

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#### DETAIL INFORMATION.

During Mr. Tong's foremanship he sunk a 4 x 6 surface shaft, as he supposed, to the east of the mine. At 50 feet he came into the cave, proving the ledge at this place over 50 feet wide. The pressure was great and his timbers crushed and the caved ground entered the shaft. Had this surface excavation been sufficiently long and wide, the cave would have run till the angle was formed and the ore could be taken out with very little timbering. Working wide caved ground in this manner is not new. Mr. Tong got to the

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From the present shafts and surface openings, there is remaining in caved and virgin ground now opened up, not less than four hundred thousand tons in sight, averaging not less than \$4.00 per ton. This is assuming the ledge is but 15 feet wide, 1200 feet long and 400 feet deep, allowing 15 (15) cubic feet to the ton.

#### SUGGESTIONS REGARDING SOUTH SHAFT.

Returning to the South Shaft, I would push the work, and mix the high grade with the caved ground, and not strive to reach rich chambers which may, by this time, be commingled with the great mass. If sufficiently strong financially, the proper method is, by all means, to sink the main vertical shaft for 600 feet, where you are supposed to intersect the ledge you have every reason to expect to strike the same rich ore as was found in the old workings. This is not a great depth for values to continue in a vein as wide and chute as long as the Mammoth.

#### PITCH OF ORE.

The ore pitches to the South. The high values in the South shaft, 430 feet deep, would confirm the belief of rich ore at great depth. This deduction is, undoubtedly, true, and if so, and you are not sufficiently strong financially at this time to prosecute work on the new shaft continuously, it is wisdom to do this at your leisure while working the large tonnage of low grade in sight. It is true, in justice to legitimate mining, you must go deep and block out new ore bodies; but would it not be business to take out the cash in sight while proceeding with the development?

#### CONCLUSION.

Immediate success depends upon the installation of the proper machinery and the economical installation of power, and if these

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Attached herewith please find copies of assays of mill and mine, together with map.

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DIVISION OF  
CORPORATIONS

L O C A T I O N .

The Young Mines Company, Ltd., property is situated in the counties of Maricopa and Pinal, Arizona, twenty miles northeast of Mesa, a town on the Arizona & Eastern Railway. The Government road to the Roosevelt Storage Dam passes through the property. It was built at great cost, and is an ideal highway.

POWER ADVANTAGES.

The wires from the electric power plant at Roosevelt pass within 300 feet of your mill.

DESCRIPTION.

The ground belonging to your company as shown by map of approved official survey, contains ten full mining locations, and a fraction of a claim. Each location is 1500 feet long by 600 feet wide, including the "Fraction". There are about 216 acres. All are found on Books of Mining Records of Maricopa and Pinal Counties, and are known as follows: - Mammoth, Mammoth No. 2, Mammoth No. 3, Aztec, Annex, Tom Thumb, Black King, Black Queen, Mother Hubbard, Montezuma and Fraction.

TITLE.

The title is perfect and beyond dispute; the owners being in quiet possession for many years. The property is under approved official government survey, and is ready at this time for filing in the Department, and ready for the proper prosecuting to securing of a deed.

DESCRIPTION OF VEIN.

This lode is a large, wide contact - the hangingwall porphyry; the foot granite. The trend or course is North, 27 degrees West, and has a slight dip to the East - about ten degrees. It varies in width between walls from 10 to 50 feet, and is traceable by outcrop for over a mile, at times covered by shallow wash from

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Check out  
Copy obtained from  
Mammoth  
Lead

the mountains. The many trenches and small shafts prove the present ore chute more than 1500 feet long.

DEVELOPMENT WORK.

The North, or old working shaft, is 320 feet deep and fully equipped with a Gallow Frame; wire cable 800 feet long, and steam hoist which are all in good condition. 100 feet along the ledge south is the Middle, or new three compartment vertical, intended to be main working shaft. It is down 185 feet, thoroughly timbered with 8 x 8 square sets and lined with 2 inch plank. It has a new up-to-date gallows frame; 1000 feet wire cable and new cage on the ground ready to install. The present power is a steam friction hoist. This shaft is not on the ledge, but from present dip will intersect, according to survey, at a depth of 600 feet. Going south along the ledge some 300 feet, we come to what is known as the south shaft. It is 426 feet deep. It has a new and up-to-date gallows frame, wire cable and steam hoist. The ore is delivered from the hoist to the mill by rail tramway. Your men are cleaning out this shaft. They are at present down 250 feet, and have 180 feet farther to reach the crosscut in the bottom.

So far, caved ground is visible behind the shaft timbers, but no effort is made to remove it. The main object in view is to get to the bottom and clean out the crosscut where there is 20 inches of free milling ore, assaying \$40.00 to the ton. In the first level at 115 feet, going south, the drift, when cleaned, was in 140 feet. It has since been driven to 187 feet and work is still in progress. A crosscut in which work is also progressing is in 40 feet; all in ore, and as yet no sign of any foot wall. This vast chamber is not high grade, averaging \$3.50, but indications, at present, are all in favor of higher grade. What will be found on the wall, will, undoubtedly, raise its average value.

MILL.

On the Mammoth location, and about 100 feet from the North shaft, a twenty stamp mill has been erected, with engine, boilers,

crusher, challenge feeders, together with 4 copper silver-plated plates, each 4 x 16 feet. A pump installed in the North shaft supplied water for the mill. Ten of the stamps are in good condition. The remaining ten can be put in commission with an outlay of about a thousand dollars. This mill was built by Hall and Sullivan, and money was foolishly lavished on its erection.

HISTORY OF MINE.

Here let me say a few words of the early history of this property. It was discovered some sixteen years past. Great excitement followed. The country was located for miles around. It was without a doubt, the largest and richest gold mine in Arizona. The brush was cut 200 feet on each side of the wagon road so the guards escorting the bullion would not be ambushed by road agents. A small town grew upon the property, and a public school was maintained; all depending upon the mine. The ore averaged free milling \$40.00 to the ton. The values were not so remarkable, but the vast tonnage and seemingly inexhaustible supply were the encouraging feature.

While large, rich ore chambers were being blocked out, the timbering was neglected, and there came a great "cave" along most of the openings and shafts from some 700 feet along the ledge.

In what is known as the "Mormon Stope", near the mill, there was blocked out \$90,000.00 of the rich ore, which was lost when this "cave" occurred. Then developed ore from \$10.00 to \$30.00 for several hundred feet south. The owner, Hall, died at that time. Since then, many attempts and much money have been wasted in trying to reach the known rich ore chutes.

DEDUCTIONS.

In looking over the field, it would seem a mistake was made in ignoring the vast tonnage of low grade ore while striving to secure the rich ore. We cannot say how much high grade is mixed with the tumbling walls and lower values. However, the present

work in cleaning some drifts being part of the caved ground, shows, from daily millwork, that the values vary greatly. As an example, the mill run November 14th, averaged \$18.00. Now this ore came from a small shaft 200 feet south of the mill, supposed to be virgin ground. They sunk 30 feet. The ore was clear across the shaft. When they started in to crosscut, one shot, or round of shots, broke into the cave, and then it was abandoned.

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SUGGESTIONS.

There seems but one way to handle this wide ledge and large tonnage, and that is, pay no attention to the high grade ore in the caved chambers at this time, but start right on the surface. Mine all the caved ground, mixed or unmixed, irrespective of values, and then mill and cyanide the entire tonnage. From samples, and average mill runs, I feel safe in calling the average \$4.00. The mine and mill assays show higher values, and should future work sustain the increase, so much the better. 94% of the values can be extracted by cyaniding the tailings, and the cost of mining and milling should not exceed \$1.25 per ton. To do this, however, you must make many changes; install an electric plant. The power is at your door. The mill should be removed further up the hill so your tailings can go from the stamps to the cyanide leaching tanks without rehandling. A large percentage of the ore is soft and easily milled. In addition to the twenty stamps, I would install some Huntington Mills or Gates rolls. You must prepare to work a large tonnage to secure economy.

DETAIL INFORMATION.

During Mr. Tong's foremanship he sunk a 4 x 6 surface shaft, as he supposed, to the east of the mine. At 50 feet he came into the cave, proving the ledge at this place over 50 feet wide. The pressure was great and his timbers crushed and the caved ground entered the shaft. Had this surface excavation been sufficiently long and wide, the cave would have run till the angle was formed and the ore could be taken out with very little timbering. Working wide caved ground in this manner is not new. Mr. Tong got to the

surface a ton of the caved boulders and waste. It assayed \$18.00. One boulder about 40 lbs. averaging \$29.60. From all reports, Hall and son milled about 50,000 tons of the high grade ore before the "cave".

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#### TONNAGE ESTIMATES.

From the present shafts and surface openings, there is remaining in caved and virgin ground now opened up, not less than four hundred thousand tons in sight, averaging not less than \$4.00 per ton. This is assuming the ledge is but 15 feet wide, 1200 feet long and 400 feet deep, allowing 15 (15) cubic feet to the ton.

#### SUGGESTIONS REGARDING SOUTH SHAFT.

Returning to the South Shaft, I would push the work, and mix the high grade with the caved ground, and not strive to reach rich chambers which may, by this time, be commingled with the great mass. If sufficiently strong financially, the proper method is, by all means, to sink the main vertical shaft for 600 feet, where you are supposed to intersect the ledge you have every reason to expect to strike the same rich ore as was found in the old workings. This is not a great depth for values to continue in a vein as wide and chute as long as the Mammoth.

#### PITCH OF ORE.

The ore pitches to the South. The high values in the South shaft, 430 feet deep, would confirm the belief of rich ore at great depth. This deduction is, undoubtedly, true, and if so, and you are not sufficiently strong financially at this time to prosecute work on the new shaft continuously, it is wisdom to do this at your leisure while working the large tonnage of low grade in sight. It is true, in justice to legitimate mining, you must go deep and block out new ore bodies; but would it not be business to take out the cash in sight while proceeding with the development?

#### CONCLUSION.

Immediate success depends upon the installation of the proper machinery and the economical installation of power, and if these

two factors are immediately taken up and settled, there is no danger whatever of this proposition not being a fine success.

Attached herewith please find copies of ~~assess~~ mill and mine, together with map.

Respectfully submitted,

(Signed] E. O.. Kennedy, E. M.

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