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3094

Congress Junction
Martinez

Stanton

Rich Hill

Weaver Cr.

Weaver

Antelope Creek

Martinez

PHOENIX

B.M. 225

B.M. 3530

Harquahala Cr.

B.M. 2595

R. R.

The Box

ORO GRANDE MINE

B.M. 3187

B.M. 2865

B.M. 2384

HASSAYAMPA

50'

R.5 W.

R.4 W. 40'

Scale $\frac{1}{125000}$

1 ½ 0 1 2 3 4 5 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 100 feet.

Datum is mean sea level.

ANNEX I, TABLE OF RESULTS OF SAMPLING
Part of
PRELIMINARY REPORT ON RICH HILL PLACERS;
MERRILL HOLDINGS
by

VAHRENKAMP & SANDERS

	Total Value Gold Recovered.	Value Gold per cu. yd.	Total Weight Black Sand Recovered.	Black Sand per cu.yd. of gravel	Assay Value of Black Sand per ton of Bl.Sand
	@	@			
201	68.7 ¢	7.85¢	340#	39.0#	$ 2.80
207	47.3 ¢	5.81¢	398#	49.0#	2.10
208	$ 1.395	23.3 ¢	61#	10.0#	35¢
208 (Ln 21	6.25¢	3.12¢	19#	10 #	
212	87.2 ¢	19.6 ¢ ?			
215	15.6 ¢	14.6 ¢ ?			
204	39.1 ¢	4.73¢	398#	48.4#	2.45
203	40.5 ¢	3.97¢	280#	28 #	1.05
204	39.6 ¢	3.96¢	215#	21.5#	0.70
205	28.2 ¢	3.06¢	165#	18 #	Trace
302	81.4 ¢	7.45¢	236#	21.7#	3.50
303	68.75¢	5.3 ¢	218#	16.8#	
305	62.5 ¢	5.57¢			
309	78.0 ¢	11.55¢			
310	$ 1.66	21.4 ¢	(310)		
306	$ 1.60	22.7 ¢	138#	19.6#	2.10
307	1.96	29.0 ¢	77#	11.4#	
308	4.22	56.7 ¢	83#	11.2#	
301	$ 1.18	14.8 ¢	77#	9.6#	2.10

/264.47

NOTES: @ Value of gold calculated on the basis of 856 fine (figure obobtained by Mr. Heikes from Local gold buyer at Octave) and $35 per oz. Black sand assays on basis of gold at ~~$~~ $35 per oz.

ANNEX L.

Sample Number	Location	Distance from mouth	Depth of pit	Bank Measurement of pit cu.yds.	Grains Gold Recovered
201	Oro Fino Creek	100'	9.75'	8.75 cu.yds.	11.0 gr.
207	" "	600'	9.2'	8.13 " "	7.6 "
208	" "	1,100'	6.0'	6.0 " "	23.3 "
"	" "	(additional 2')	2.0'	2.0 " "	1.0 "
212	" "	1,100'	5.5' ?	4.9 ? " "	14.0 "
215	" "	7,900'	1.2' ?	1.07? " "	2.5 "
202	Weaver Creek or	100' *	9.0'	8.25 " "	6.25 "
203	Wash	100'	10.0'	10.2 " "	6.25 "
204	"	600'	10.0'	10.0 " "	6.35 "
205	"	600'	9.0'	9.2 " "	4.5 "
302	"	10,000'	10.2'	10.9 " "	13.0 "
303	"	10,000'	8.7'	13.0 " "	11.0 "
305	"	12,000'	12.7	11.2 " "	10.0 "
309	"	15,000'	6.5'	6.76 " "	12.5 "
310	"	15,250'	7.6'	7.76 " "	26.5 "
306	Jap Creek	0'	7.25'	7.05 " "	25.5 "
307	" "	600'	6.6'	6.75 " "	31.5 "
308	" "	950'	6.7'	7.44 " "	67.5 "
301	Slaughter House Gulch	100'	8.6'	8.0 " "	19.0 "

NOTES: (Holes that are abreast of each other across channel, (In Weaver 202 & 203; 204 & 205 are 300' apart, 302 & 303 are (100' apart. In Oro Fino 208 & 212 are 100' apart

* The distances to pits in Weaver are taken from the junction of Oro Fino with it. The mouths of the other creeks are at their junctions with Weaver.

? Estimated by Dodd, work stopped before measurement taken.

RE: MERRILL PLACER

December 14, 1924.

Dr. H. E. Reitz
Story Bldg.
Los Angeles, Calif.

Dear Sir:

In accord with your request I left Los Angeles on December 3rd for Congress, Arizona, to make an investigation for you of a placer deposit on Weaver Gulch about 7 miles east of Congress and adjoining the Octave Mine. Owing to the extent of the deposit and the fact that you wanted just a general inspection rather than a complete examination and report, you will appreciate that my statements cover general conditions and impressions from such a casual examination.

Samples taken from different points on the ground under investigation confirm the statement of the owners and their engineer that there is placer gold of a very fine quality apparently quite uniformly distributed over the claims. You will understand that in order to arrive at anything like an accurate estimate of the average gold content of the deposit, that a systematic plan of development, either by drilling or test pit, would have to be carried on which would entail months of work and considerable expense. However, as to the point of the gold being present, I feel satisfied from the samples which I took that the ground when thoroughly prospected will prove rich enough to work at a profit provided water can be obtained.

In my judgment water is the main problem to be solved before even the expense of drilling and prospecting the ground is undertaken from the information secured relative to the water supply in Antelope Creek where the company anticipated construction of their dam, I am inclined to believe that this source of water would be quite negligible and could not be counted upon as a source of supply.

In reference to the water in the Octave Mine which was spoken of as a possible source of supply, I wired Mr. J. Nelson Nevius, Washington, D. C., Mr. Nevius was for many years ageneral manager and consulting engineer of this property. I asked for information relative to the amount of water the mine might make. He informed

me that the water had not been pumped out of the mine since 1905 and that there was no record of which he had knowledge as to the amount ofwater they were pumping when the old company closed down at that time. I also tried to secure information in Kingman from an engineer by the name of Sherman who was interested around Octave many years ago, but he could give me no information on the amount of water in the mine.

I am trying to get in touch with some of the old timers who had charge of the operation prior to 1905 and see whether any data could be secured, but unless there were letters or written records giving the facts, any verbal information would be of little value because in 18 years' figures carried in a man's mind are not usually very accurate or reliable. Investigation may prove that water might be available from sources quite remote from the deposit which could be brought in by gravity thru pipe or flume. If so, unquestionably the gold shown by the preliminary sampling would justify the expenditure of money to make such survey of a water supply. It appears to me that this point is the vital one to the success of the enterprise and should be determined before any other work is done on the proposition.

You may recall that we were informed that Mr. Bulkley Wells, a well known and successful engineer, made an examination of this deposit some years ago. I have written to Mr. Wells, care of his Denver address for the conclusions of his report and the reason why he did not proceed with the undertaking. Upon hearing from him I will advise you what I learn.

In conclusion I might say that was very much surprised to see the richness of the ground from the very surface down thru the cemented material as far as we were able to sample it, and attach herewith the value per cubic yard of the ten samples that were taken the second day we were on the work and when we were alone. It is not possible to designate these samples or to tell which particular place of ground they came from owing to lack of information on the survey locations, but they will be interesting to you in showing how rich some of the ground is. I trust that some way will

be found by which this deposit of gold can be handled as it undoubtedly is very attractive looking proposition.

Thanking you very much for the opportunity of representing you in this matter, I am

Yours very truly,

(signed) E. H. Kennard

Los Angeles, Cal. Dec.15, 1923.

Result of samples on Weaver Placer estimating 200 Pans per cu. yd.

#1. Sample from top cemented material under surface soil, pit 30" deep, two colors, value per cu. yd. 45

#2 Sample from east side of pit 4' of cemented material below soil. Three fine colors, three coarse colors, two nuggets, per cu. yd. 13.60

#3. Sample surface soil near Octave corner post all soil no gravel Six colors fairly coarse, value per cu. yd. 2.20

#4. Sample from top of west side steep bank on Weaver Creek taken by Dr. Greer, eighteen small colors, value per cu. yd. . . . 12.40

#5. Sample from bottom of bank, west side Weaver Creek, taken by Dr. Greer, four colors, value per cu. yd. 90

#6. Sample from half way up bank west side of Weaver Creek, taken by Dr. Greer, five colors, value per cu. yard. 3.60

#7. Sample taken from pit 8' deep to check sample taken previous day. 17 colors all coarse, value per cu. yd. 18.80

#8. Sample from gravel in creek bed at lower end of property showed 9 colors, estimated value per cu. yd. 2.00

Kennard Engineering Co.

(SIGNED) E. H. KENNARD

R E P O R T

on the

RICH HILL GOLD PLACERS

OCTAVE

WEAVER MINING DISTRICT

YAVAPAI COUNTY, ARIZONA. U. S. A.

by
John M. Nicol,
Consulting Engineer.

Crocker First National Bank Building
San Francisco, California.

OBJECT OF THE EXAMINATION:

The object of the examination on which this report is based was to make a reconnaissance of the district as a whole, to check to some extent the date already obtained, but more particularly to collect date as to the geology and the source of the gold, and as to structural conditions of the gravel as affecting the distribution of gold over such a large area; and generally to express an opinion as to the feasibility and value of the project as a whole, more particularly with respect to dredging operations on a large scale on the lower gravels.

No attempt to sample was made during the present examination, as a sufficient amount of work by other engineers appears to have been done along these lines to indicate very valuable areas of gravel, and I would not consider a limited hand sampling as giving any additional date of immediate value. Any further sampling of such a large deposit must be carried out with the proper equipment and in a systematic manner. This matter is referred to in another part of this report.

LOCATION OF THE AREA UNDER CONSIDERATION:

The properties are located a little to the west of the center of the State of Arizona, U. S. A., within the area outlines in red on the accompanying maps.

The immediate gravel areas are deltas built out by Antelope and Weaver Creeks on the plains to the southwest of Weaver Mountains. The head of the delta is approximately at Octave (see map). Located about nine miles southeast from Congress Junction on the Santa Fe Railroad.

TOPOGRAPHY, CLIMATE AND GENERAL CONDITIONS:

The district is typical of the desert areas of the Central and Southwestern part of Arizona.

Weaver Mountains rise abruptly from a great desert plain. They are a bold and deeply eroded range of mountains, carved out from an extensive area of very early granite intrusive of batholithic proportions.

The eastern portion of Weaver Mountains are of complex of much more recent (geologically speaking) extrusive volcanic rocks. This area cuts off and forms the head of the valley of Antelope Creek. The highest point being 6,391 feet altitude.

The railroad station at Congress Junction has an altitude of approximately 3,000 feet and the mine camp of Octave (quartz mine) has an altitude of approximately 3,300 feet.

From this point the delta fan of gravels slope gently down to the main drainage valley of the Hassayampa River.

There are two gradually diverging slopes. The first slope is to the south and southeast and is drained by Cuanide and Yaqui Gulches which finally join the Hassayampa above the "Box" (see map). The second slopes to the south and southwest and is the most important body of gravel. It is drained ay the lower Weaver and Antelppe Creeks. These, after joining Martinez Creek, flow into the Hassayampa below the "Box" (see Topographical map).

The division of these two deltas or gravel slopes, seems to be influenced by a line of low hills, viz, "Round Mountains". The Hassayampa has cut a gorge through this line of hills which is known as the "Box".

The general slope of the gravels gives a grade of approximately 150 feet to the mile and the beds of the present gulches which have been eroded through the gravels have slightly steeper grades, until they all unite in a big flat with the Martinez Creek. Taking a general line at right angles to the slope of the gravel, and also to the erosion of the gulches it is noticeable that the top, or un-eroded parts of the main gravel banks, show a remarkably even peneplain, as is evidenced on reference to the contour line of the topographic sheet. Further reference will be made to this when discussing the structural nature of the gravel deposits as it is indicative of some rather interesting possibilities.

The total surficial area of the gravels under consideration cover an irregular zone approximately two miles across at the upper end, and about three miles across at the lower end, and about five miles long.

Within this area approximately six thousand acres of placer claims have been tied up and are now held as one group, which forms the placer dredge mining ground, the subject of this report.

The climatic conditions are favorable for work all the year, the winters are mile and the summers, although hot, are not subject to the excessive hot spells of some parts of Arizona.

The rainfall is small and erratic as is usual in all the desert areas of the southwest of the United States. Some years there are good season, and almost every year there are short spells of heavy rainfall which causes a heavy runoff in the streams and gulches and admits of impounding water where impounding sites are available. In counting on water resources and annual impounding sites, the average of three to four seccessive dry years should be taken. When the impounding site admits of several years equalization-storage, the mean of several years, including wet years, may be taken, in the appendix, data will be found on this subject.

The average at Congress may be considered as from 10 to 12 inches and for the Kirkland and Peoples Valley water -shed as from 15 to 19 inches; and the upper Hassayampa River drainage area as from 14 to 16 inches of rainfall.

The average evaporation rate of central and southern Arizona is very high, but would be considerably less in dams at the higher altitudes.

There is a small and constant flow of potable water in Antelope Creek just above Stanton and there is a good well at Stanton.

There is potable water in a well at Weaver, and a very small flow in evidence on Weaver Creek at about the 4000 foot contour. But over all of the great gravel area of the gravel slopes no water is in evidence and none can be found in shafts. But during heavy rainfall or cloudbursts, the gulshes become raging torrents and become impassible for several hours.

There is a camp with a considerable number of good buildings at Octave Quartz mine (at present inoperative) and there is a store, post office, and a telephone line connecting with the outside world. The camp is well supplied with a good supply of drinking water piped in with a pipe line several miles long from springs on Yarnell Mountain.

Excellent facilities for camp arrangements could probably be made here, also a supply of water for test purposes, by rental from the company owning the property. This could be a great consideration during the operations of thorough test-sampling and also during the first stages of actual construction work.

TRANSPORT AND LINES OF COMMUNICATION:

The Santa Fe Railroad (branch line) between Phoenix (the capital of Arizona) and Ashfork Junction on the main line, passes within a few miles of the property. The nearest station siding is at Harquahala, about four miles from the lower end of the property, but there are no roads, but an auto truck road can easily be built.

The railroad point generally used is Congress Junction. Here there is a railroad, sepot, postoffice, telegraph office, two hotels, restaurant, two stores, garage and repair shop and a total population of about fifty. From this point to Octave there is a rough road passable for autos, distance about nine miles.

The nearest town at which medical assistance can be obtained is Wickenburg. The nearest city of importance is Prescott, about fifty miles to the north.

There is a new highway of excellent construction and well surfaced which is now nearly completed and passes through both Wickenburg and Congress. This is the main State highway from Phoenix to Prescott, and forms a valuable and convenient addition to themeans of communication and places the mines in easy communication with the outside world.

There would be no difficulty in opening up truck roads to any part of the property. For the transport of heavy dredging machinery, I consider a line from the lower end of the property to some point on the railroad as being better than to Congress Junction; but for all preliminary work Congress Junction should be the point of connection with the railroad.

AREA OF CLAIMS AND TITLES:

I have not investigated this matter as I have accepted the owners statement that an area up to 6,000 acres can be delivered with clear title when required.

WATER SUPPLY FOR DREDGING OR PLACER OPERATIONS:

As I have already indicated there are ample and excellent sources of water supply for camp and testing purposes; but in the immediate vicinity there is no water for mining purposes. This is the real reason why this valuable body of gravel is still intact.

All the recorded production to date has been from easy and shallow points of considerable natural concentration in mountain gulches and cross-wash gulches near the head of the delta or on the upper gravels.

The work has been entirely dependent on the flood waters in good winters, or on curde hand dry-washing methods. Nothing but the richest zones of concentration averaging several dollars per cubic yard and upwards have so far been worked, and only relatively conrse gold could be saved by this means, and therefore all the large bodies of gravel are entirely virgin and intact.

Within the zone under consideration there are large areas suitable for standard dredging operations; these areas are the large flats of gravel of secondary concentration in the bottom of the lower gulches.

The delivery point for water for the first areas to be considered would be about the 2800 foot contour (see Tophgraphic

Map). Water may ultimately be required as high as the 3100 foot contour.

A preliminary study of the water situation has been made and a report rendered by Mr. Charles Kirby Fox. With certain reservations given below, I find that this report covers most of the available water sources. It shows conclusively that with sufficient capital ample water can be obtained for a number of dredges.

Briefly reviewing the report, it shows that there are four main sources of water supply:

(1) The main Hassayampa River at the Walnut Grove Dam Site:

(2) An impounding site at the outlet of the Lower Kirkland Valley;

(3) An impounding site at the outlet of Peoples Valley:

(4) Pumping water from the lower Hassayampa River.

There are several other minor sources of water which I consider as insufficient for any dredging operations of importance.

As a summary I may state that sufficient water can be made available to work these placers by dredging even on a large scale if desired, and the cost will not be prohibitive considering the reported richness of the ground, and furthermore, any water system developed will always have value for agricultural purposes, and would be a permanent asset long after the mines are worked out.

The water question is more of a political and lefal one than one of engineering difficulty. With sufficient capital I see no difficulty in providing all the water required.

GENERAL GEOLOGY OF THE DISTRICT:

All the central and southwestern part of Arizona is, geologically speaking, of great age. Weathering and erosion of the rock surfaces of mountain ranges has developed on a vast scale and through out great epoches of time, with the result that large areas of underlying rocks of great age have been discovered by erosion. In other words, the gradual wearing down of the mountain and the leveling off processes and corresponding filling-up of the valley (constructional) has been going on with less interruption from young or recent mountain building forces and extrucive processes than is the case in California.

There is evidence over considerable areas of teritiary eruptives, and some later flows of basalt, but over the greater part of central and southwestern Arizona there are very limited areas of the later sedimentary rocks. The mountain ranges are either a complex of schist (mostly archean), with intrusive of granitic rocks (mostly pre-cambrian), or else the remains of massive tertiary extrusives.

There have been no detail geological work done in the vicinity of Octave (Rich Hill) and in the short time available during a rather hasty reconnaissance I could not possibly do more than make a general observation of the quite complex geological conditions surrounding the base of Rich Hill. I took no geological samples and made no identifications of rocks other than mesgascopic field approximations.

But pending further investigations, I think the following will

be found useful as a tenative if rather hypotical interpretation of the surficial phenomena in evidence.

Rich Hill is a mass of very early intrusives, - granite, and appears to be distincitge to the main granite of Weaver Mountains to the northwest.

There is a fairly strong belt of schists with an almost vertical dip, and a general north-south strike that is in evidence on Antelope Creek, and which can be traced for a considerabel distance above Stanton. A similar belt can be traced between Octave and Weaver on the east of Weaver Creek.

Tenatively I can co-relate these schists as Archean. The granite is evidently intrisive to the schists, a little above Weaver and again right on the top of the north end of Rich Hill, there are two large masses of what appear to be a dark, highy silicified achistose-slate, of great age, highly metamorphosed and contorted. I would calssify them as a partly eroded roof-pendant of what were the overlying rocks at the time of the intrusion. They are similar to many of the early Paleozoic sedimentaries.

I noticed a great number of fragments of the same rock scattered all through the gravel even as far as four miles down the gulches.

There appears to have been a considerable amount of magma differentiation, and there are areas of rock rich in the ferro-magnesian minerals, in places forming almost a hornblendic-gabbre, this in places has been intrusive as irregular masses and vein-dikes into the fractured complex zone surrounding the granite. There are also a number of large pegmatite dikes cutting both granite and schists.

Later than these are a number of small vein-dikes of actinolite, intrusive and at times faulting an early series of quartz veins. I noticed a number of stringers of vein dike quartz veins cutting these almost at right angles and again evidencing faulting.

There is a more or less regular system of quartz veins, which have a NW to SE strike and dip into the hills. These have been worked as gold quartz mines, of which Octave was the principal producer. But in addition to these larger veins there is a vast complex network of quartz stringer, lenses, and pockety deposits which cover Rich Hill and particularly the slopes of the hill to the east between Octave and Weaver and also above Stanton, and to a lesser extent on the slopes to the west of Antelope Creek.

The gradual weathering and decomposition of this cast complex of small gold bearing veins has been the source of the gold in the detrital gravels below.

I consider the general indications are that there have been a number of successive periods of gold impregnation in and about the Rich Hill granite plug; from very early geological times up to and probably including a final mineralization during tertiary times, - the corresponding period of enrichment accompanying the Miocene intrusives in Mexico and California.

There is evidence of great movement as affecting the granite plug of Rich Hill, which I could not trace in the main granite range to the northwest or at any rate they are not as clearly in evidence. These movements, which were profound and intensive, have developed a series of flat dipping cleavage planes in the granite mass, striking about NW ans SE and dipping into the mountains. Towards the north the dip increases until in the northern central part of Rich Hill they appear to be almost vertical. Movement and pressure have

developed a gneissodic structure in some places.

It is also evident that there was formerly an extensive "blanket" of earlier rocks into which the granites intruded, and that there have all been removed by erosion, the slate roof-pendants, mentioned above, being the only remaining evidence; and that it is more than probable that there were numerous and possibly richer gold quartz veins in this eroded "blanket". This probably represents at least several thousand feet removed through a period of many millions of years.

It is of course true that the greater part of the gold eroded during these earlier periods has gone far down the streams, but what I wish to emphasize is that the geolocical evidence shows intensive gold impregnation with successive periods of enrichment of gold quartz veins of the Rich Hill District, also the great age of the District, with consequent long periods of erosion, with concentration and re-concentration of the gravels; so that there is the opportunity for a very general distribution of gold over large areas and far down on the course of the gravel deposition, - providing that we keep within the limits of the zone that has deployed from the source of the gold, viz. The gold bearing veings in the general zone of impregnation. This zone is covered by a "fan" of gravels deploying from Weaver and Antelope Creeks south, southeast and southwest.

Another fact that I wish to draw attention to is the following; Antelope Creek has eroded a valley following the line of the belt of schists (already referred to) and gives evidence of being the deepest valley cutting through the mountain barrier of granite, of any valley except the present Hassayampa River. The head of Antelope Valley is cut off by a mass of Teritary eruptives (volcanic flow rocks). The valley is evidently older than these eruptives. It seems quite possible and even probable that the present Antelope Valley is the lower end of an extensive pre-tertiary valley that at one time drained a large area to the north; possibly an area now drained by the upper Hassayampa and Kirkland Rivers.

When the Tertiary eruptions started they dammed this valley, and eventually new drainage lines were formed. Possibly a large lake was formed, the overflow of which excavated the gorge of the Hassayampa below Walnut Grove. There is some correlative evidence of this in that there are large areas of stratified water deposited tuffs in the Walnut Grove section.

Continued and extensive eruptions completely changed the topography and built up a high chain of mountains north of the head of Antelope Valley and new drainage lines were developed.

This large valley that certainly once existed and continused southwards below the mouth of Antelope must have maintained a deeply eroded pre-tertiary channel down to some meeting point with other valleys, say at some point of the present lower Hassayampa, probably a little west of Round Mountain.

When the main flow was dammed back, the erosional power of the stream would be less, and it would begin to fill in and become constructional, especially as there was probably a great deal of detrital matter from the volcanic action.

It seems therefore highly probable that there are deep-seated underlying beds of gravel, of pre-tertiary age; and also probably one or more well defined old river channels, which are now buried under the existing layers of Tertiary and Quaternary gravels.

These earlier gravels, naturally represent a much longer

period of erosion, of sorting, concentration and reconcentration and may be completely preserved by the present fan of constructional gravels.

I consider it essential to explore and prove the question by a series of carefully located shafts and some drifting. It must also be remembered that there have been many changes of climate and that in the pleistocene period, subsequently to the volcanic eruption, there was a long period of very heavy rainfall and the sorting action of the flood waters was very active, and that therefore in any case there whould be a zone of considerable re-concentration at the point where the grade changed, from the grade of Antelope Creek to the junction point of the Hassayampa and Martinez Creek, at or about the flats just north and west of Round Mountain. Pit sinking and test work should be developed at this point.

I would suggest that if deep pits or shafts are put down at actual true bed-rock, that these should be located by survey and a cross-section should also be made, and as far as possible a contour line of the underlying bed-rock established.

There are a number of other interesting geological features but which do not have an immediate relationship to the interpretation of these gravel deposits, so they are not germane to this report.

SUMMARY OF GEOLOGICAL INTERPRETATION:

(1) That the district is one of great geological age and erosion and gravel concentration has been active through a great period of time.

(2) That Rich Hill forms the center of a zone of intensive gold impregnation, as evidenced by the great number of veins and that furthermore there appears to have been a number of different and successive periods of mineralization.

(3) That Antelope Valley shows indications of having been part of a main valley of a larger drainage system, and that this may account for the great number of water worn boulders in the lower gravels; and that as a sonsequence there are great probabilities of there being buried old channels under the present fan-blanket of gravels.

(4) That the great age of the deposit and the evident long period of deposition, erosion and re-concentration of the gravels make it likely that there is a very general distribution of the gold and also that the lower true bedrock zones should be rich and that it is necessary to explore for these. They w ill probably occur in well marked channels, There is also a chance of greater deposition at the meeting point of the lower cross valleys and lower Antelope valley - though this may be deep.

THE GRAVEL DEPOSITS:

Their extent, nature and structural conditions, zone of distribution of gold and reported values; the whole of the s ope from the foot of Weaver Mountains extending over the plains is covered with a great blanket of "wash", a great part of which is more or less waterworn and partly sitrtified gravel.

The area that debouches from Antelope Creek and Weaver Creek (marked with yellow on the topographic sheet) shows a far larger proportion of well washed gravel, and the posotive evidence of being true

river gravels, This area is the only one that is known to be gold bearing in a marked degree.

I have found various statements in which it is asserted that these gravels are relatively shallow. This is not true - I find the existing exposed or surficial gravels may be classified as:

(1) Original promary gravels, in places, even on the surface, these are compact and partly cemented by infiltration of alkaline matter, - the so-called "caliche".

(2) Gravels in part re-concentrated and washed down gy recent (late quaternary) gulch waters, and forming intermediaru benches and gradual shopes, up to the main banks of No. 1.

(3) Loose ahd sandy gravels forming the most recent and actual stream beds in the floor of the existing gulches, forming a third state of very recent re-concentration.

These later gravels generally rest directly on a floor of No.1 with "Caliche" structure, and so-called false bed-rock.

I have already mentioned that the main body (No.1) of gravels shows a remarkably even level at any point where a cross section is made at right angles to the median course of Antelope and Weaver Creeks if forms what geologically is termed a peneplain.

"ith a hand level I took several approximate cross sections, and I found that the level of thepeneplain is generally from 60 feet to 80 feet above the surface of the wash on top of No.3 gravel.

In two cases I found shafts over 30 ft. deep below the level of No.3, so in this case the total depth of original gravel was over 110 ft. So far <u>true</u> bedrock has never been reached.

From the general structural conditions and the position of bedrock at the upper end(it is exposed at Antelope and Weaver Creek where they debouch from the countains) and also the slope of Round Mountain, I expect that bedrock will be found within 50 ft. at the upper end, and within 80 ft. at the lower end of the present bottom gulch levels. In any event there is overwhelmingevidence that the main body of No.1 gravel will average over 75 ft in depth over the whole property.

The surficial area of the 6,000 acres is approximately 30 million square yards, and the average depth 25 yards gives a gross cubic content of 750 million yards of gravel.

There is good evidence that the source of all this gravel was gold bearing, and that it has been concentrated and redoncentrated over a vast period ot time. There seems to be reasonable evidence that that at least all the grabels of No.2 and No.3 class are recent local gulch concentrations, and that a large part of these carry gold in commercial quantities.

The structural nature of this great fan of gravels is not altogether easy to explain. If is was built up or more or less fine and well stratified gravel, it could be explained by the usual constructural out-building effect of a streat delta debouching from a mountain valley on to a plain. ut there is very little regular stratification, and realtively coarse gravel and occasional large boulders are"peppered" all through the mass. Furthermore, rather large and perfectly waterworn gravel and occasional smallboulders are to be found right on the surface of the top banks, at least four miles south

of the mountain valley limit.

Tentatively, I think, that while it is not in any way a glacial deposit, I believe "levee building" by minor snow and ice action, has helped to control the flood and maintained the water within, at times, narrow limits, thus facilitating the transportation of coarse material over relatively great distances on the surface of the fan delta. This probably represents a period of heavy rainfall during the end of the ice age in the late Pleistocene.

However it came about, there is a very general and rather regular distribution of a limited amount of well water worn and coarse gravel over the whole fan of gravel.

Where recent flood action has cut gullies through the main mass of the gravel it has tended to wash away the lighter material and"drop" and concentrate a blanket of coarse rock on the bottom.

These blankets of coarse gravel and boulders, being very much in evidence, having caused some of the investigating engineers to form a wrong idea of the extent of these "boulders" to be handled in case of dredging operations being commenced.

The photograph taken just at the outlet of Twinshaft Flat, (see Photos) shows a typical extreme case in the middle section of the ground. Actually just above the ground and just below there are shafts sunk to approximately 30 feet which show no excessive proportion of heavy gravel, and also clearly indicate structural conditions, - showing that the boulders are a total concentration out of 90 feet (vertical) of erosion, and that they rest on "Caliche" or a false bedrock formed of average primary gravels. In another section I suggest a method of which these boulders can be uncovered, mined and broken up or removed in advance of the actual dredge cut.

The recent, and up to the present, erosional forces that have cut the existing gulches below the general peneplain of what I term primary or No.1 gravel, have also tended to concentrate the gold, so that the No.2 and No.3 gravels contain a considerable enrichment, representing all the gold out of the gravels eroded to form the gulch this as already stated is from 60 to 90 feet vertical blanket of from 2 to 20 feet, averaging about 9 to 10 feet, the ratio of concentration has varied at from 8 or 10, to 1.

This accounts for some of the high sampling results of some of the shallow pits in No 2 and also that the drywashers have been able to make a living on the edges between No.2 and No.3 If the original average of the upper parts of the primary banks averages 40¢ ot 50¢ it accounts for shallow pit sampling in No.2 showing returns og several dollars per cubic yars. It also shows what we might expect if we can find, yet undisturbed, the original shannels on true bedrock, and shows that it is well worth looking for them.

It is to be noted that even on the flat surface of the tops of the high banks there has been a certain amount of ehrichment due to the concentrating action of the run-off of rain water, and there is a shallow blanket all over the surface of from 6 inches to 1 foot in depth that represents a probably concentration of from 3 to 5 to 1, so that all work on sampling must take into account the above structural facts, and the results of the blanket enrichments must be recorded separately from the average, This is also particularly true os all minor gulches, gullies, washes, draws, etc.

Care must also be taken to distinguish between upper primary gravels, i.e. No.1 and gravels of the No.2 and No.3 grade, and if deep shafts are sunk, careful watch must be made to distingusih between the great mass of No.1 gravels and possible underlying pre-tertiary gravels.

The existence throughout the upper exposed portions of even the big banks of rock fragments of the tertiary lavas, shows that all of the banks at present exposed are of querternary constructional; periods, althoug they may contain a considerable portion of reconcentration of early banks and benches. This seems probable as I noticed many fragments and even some boulders of the metamorphic rocks and schistose-slates, which evidently correspond to an erosional period of the upper capping of rocks above the granites.

I noticed that the proportion of heavy and large boulders is excessive in the upper gulches close to the debouchment from the mountains, but that further down the fullies the proportion steadily decreases, until from the middle section south I consider the gound as suitable for dredging, providing large sized and powerful dredges are used, with not less than 12 cubic feet buckets. This is dealt with under another section.

The zone of the distribution of the gold is evidently limited to the fan debouching from Antelope and Weaver Creeks, and to a minor degree from the gulches to the southeast up to Foot's Canyon. But to the northwest immediately you pass the zone of gravels built out by Antelope, gold in paying quantities is not longer found.

The Hassayampa River undoubedly brings down a certain amount of fine gold, and there are indications which I did not have time to investitate, that it at one time flowed northwest from the entrance ot the "Box" and probably passed to the north of Round Mountain and porbably there was a general junction just about where Martinez, Antelope and Weaver now come together.

Gold seems to be distributed all the way down the fan to this point and also on the southeast slope, down to the Hassayampa River above the Box.

REPORTED VALUE OF THE GRAVEL:

Personally I did no sampling, as I could see no use in duplicating work already done, unless I could apply more thorough methods, which I did not have the time or equipment to carry out. I refer to a proposed plan of sampling in another section.

I did, however, see ample evidence that it has been a recognized dry placer district of considerable import; and I saw dry washing at work, and quite a number of samples of gold that had been bought by merchants. There is also sufficient data in the U. S. G. records to show the recognized importance of the camp.

A great quantity of data and various reports have been submitted to me, and I hereby - beg to quote from these as follows:

"VALUE" DATA OF OTHER REPORTS:

J. E. Russel states: " I found gold in every pan - - Where I panned it would run from 30¢ to 60¢ per cubic yard, if not better . . I got 60¢ from one pan ...and $1.38 from another... I took out a ditch and ran 25 or 30 yards of gravel... the recovery was about $4.80 per cubic yard.

W. L. Leland states: "You have in my judgment, made a big

mi_stake in not going below your so-called false bedrock, because it is possible, and in fact quite likely, that your best values will be found down deeper... As a matter of fact, I got my best sample down in the false bedrock.... If the gold I found has been flaky, or if I had found places barren of gold altogether, which I did not, I would not, after making only 30 tests, even touch on the subject of values in this letter, However, the evidence of extensive dry-washing in all directions is a factor to be considered in connection with my own sampling. I did not weigh the gold I panned out, but from forth years experience I am positive it was not less than $1.50 per cubic yard after estimating that half of your yardage is composed of small boulders and course gravel that does not carry values, and which are always thrown out in filling a pan.... Now it is highly improbable, considering the general law of averages, that I would happen to stumble on to only rich sports every time, yet it might possibly be so. No one suggested where I should take the samples and no one was given the slightest chance to salt any of the dirt I took as samples.

"So much for values so far as 30 samples can be considered as establishing same on a very large area."

W. A. Farish states: "In sampling this ground I dug a cubic yard of gound at various points, loaded it into a wagon (after placing a canvas in the wagon to prevent any lost) and hauled each yard so obtained to the river and ran it through a small sluice box, catching and keeping the gold content of each sample separate. The results were taken to a laboratory and their amount and value carefully determined. I took about a dozen samples, over an area of about 300 acres, and the results ranged from 30¢ to $1.47 per cu. yd. As I remember throwing out the high sample of $1.47, the results averaged about 45¢ per cubic yars... I met Mr. Axtell, who informed me he had made extensive drilling tests of the ground and the engineer referred to above was present and did the sampling of the holes and after throwing out the heavier particles of gold, the be safe, the ground ran over $1.00 per cubic yard."

A. H. NcNeer states: "The area of ground under consideration (see diagram) is shown as follows: ....placing a reasonable average at 20 feet; throughout the entire area checked on the diagram amounting to about 4,100,000 cubic yards. This at $1.51 per cubic yard, making a total value of about $6,191,000" (for the area of this section.)

Chas, Kirby Fox states: "The lowest values I have heard of are about $1.30 per cubic yard. Along the benches near the Hassayampa River south of Rich Hill, it is said that the values are greater the higher one goes. At the east base of Rich Hill lying along Weaver Creek a plot of ground containing about 180 acres with about 80% boulders runs about $3.25 per cubic yard. One acre of this ground I tested, and would feel sure in saying that it would run considerably over $10.00 per yard. Taking ten pans from this acre I recovered $26.30. The values at this point are very rich and coarse.

". E. Plank states: "This ground is no exception to the rule and although there are 7,665 acres under location, I feel sure, speaking with circumspection, that but 200 acres of it are qorkable... While no where near sufficient prospecting have been done for operating purposes I have no hesitation in stating that it is my belief that the entire 200 acres will run some 1.35 per cubic yard.

1905 - U. S. Geological Survey Mineral Resources, "Weaver District, the Rich Hill, in this district, has yielded from the surface fabulous sums in the past. It was the scene of much activity adurin the spring months of theyear. A total of $16,273.00 in gold dust extracted from the gravel of the Rich Hill and vicinity, was sold to

storekeepers in the neighborhood camps."

1899 - Report of the Governor of Arizona to the Secretary of the Interior: "The gold placer deposits of Weaver are celebrated for their richness and the coarseness of the weight of the grains of gold. (Nuggest). They are at the southern base of the mountain and west of the Hassayampa River at the foot of Rich Hill at Stanton. They have been worked for many years, thirty or more.

History of Arizona by Farish: "The Rich Hill channel is noted for its coarse heavy gold (nuggets) ... One of the largest found was worth $400.00, another $300.00, and another $150.00 ... Three lumps taken out were worth $1008.00 /.. Nuggets to the agregate value of some $2,000.00 were taken out within a small area.. Pedro Lucero, at Weaver, found one piece worth $450.00.

While I do not endorse the methods used to sample, and while I think some of the conculsions drawn in the reports are altogether correct, still we must accept, at their face value, the statement of so many different men, and there must be some ground for a tenative appraisal of the property.

Frankly, I think everybody has both over-estimated on the basis of shallow pits in No 2, and entirely under-estimated, because none of them ever reached true bedrock or sampled it. I consider this to be absolutely essential.

The high bank of gravel to the right is a block of partly eroded No.1 gravel, sloping to the right (east) with a blanket of No.2, down to the flats of Oro Fino, just out of the limit of the photo.

From the starting point up to this point the flat averaged 500 yards across, and I estimate as average of 40 ft. as an arbitrary convenient working depth below pond level; there is no real level of false bedrock. It is simply a question of how deep do you want to cut into the primary gravels, or how deep do you want to dredge. Based on this arbitrary depth I estimate that this first section is 1,500 yards long, averages 500 yards wide and as 16 yds. average depth; (8 ft. to 10 ft. above pond level and 40 ft. below pond level); this gives an available 12,000,000 cubic yards.

The second section above this I estimate contains 4,000,000 cubic yards, or a total of sixteen million cubic yards for this No. 1 zone, consisting of Lower and Upper Rabbit Flat.

I made no cross section or survey of the other three zones, but I think it safe to say that sixty million cubic yards of dredgable ground suitable for standard methods can be developed within the flats of these lower gulches.

Until I sample the ground myself I have no means of making even an approximate appraisal of the real value of this property. But based on the statements ladi before me which I have quoted above we make a tenative estimate to obtain some idea of its possibilities.

If we take the value of the dredgeable areas of these bottom gulches, as averaging 50¢ per cubic yard at 80% extraction, with a recoverable value of 40¢, and even if we placed dredging costs as high say as 10¢ per yard and add to this costs for pumping water for breaking upper bank by hydraulic mining, and for extra high stacking, etc, and bring the total costs up to 20¢. it would still

leave us a net valuation of these four zones of approximately $12,000,000.00.

In addition to this we have the possibilities of True bedrock gravels, and of the far greater area of high banks, for which I am prepared to suggest a suitable method of mining. These statements must be taken with the reservations that I have made, but I have seen sufficient to state that I consider the body of gravel one of the largest desert placers that I know, and that there are sufficient values in evidence to warrant a thorough, complete and systematic sampling; and if the values are then found to check up, I would in that event unhesitatingly urge the investment of the large capital necessary to bring on the water and equip with large dredges.

METHODS OF DREDGING SUGGESTED:

Due to the scarcity of water and the necessity of conserving it, dredging should be commenced at the upper end of any given section, and work driven down grade. By this means tight water-holding ground will be maintained as a water-dam on the down grade side, and the loose and porous tainings will remain behind on the up-stream side. The pond can be so maintained that the tailings piles will act as a break to protect the dredge incase of cloud-burst floods.

This method would have a further advantage in developing any water that came "down gulch" as seepage or grom upper ponds of during moderate flows.

In those cases where it is desired to work into fairly high banks and break ground hydraulically in advance of the dredge, it will be found that there will be an excessive load for the stacker, and that the increased volume to be handled will need very high stacking. In this case the "fines" can be handled by a dredge pump, and delivered a considerable distance back on to the top of the coarse tailings pile. In this case the water would filter down and return to the pond and thus conserve water, whereas, if dredging was up-stream this could not be done.

Until further exploration is undertaken with deep shafts the nature and "position-depth" of true bedrock is unknown. The value found in true bedrock gravels will determine if it will be worth while to dig to the probably great depth required. Meanwhile I am assuming a digging depth of 40 feet below gulch floor, and in this case we woule be creating a false bedrock and be simply digging to a given depth in No.1 gravels.

Assuming this to be the case I suggest the following procedure as a means to meeting the difficulty of the blanket of boulders that exist in places (as shown in Photo No.4).

The dredge pond level to be maintained a few feet below the level of the "caliche" floor on which the boulders are resting; an auxiliary pontoon with pressure pump to be provided to supply water to a small hydraulic mining outfit to "break bank" to a bench in advance of the dredge cut, thus exposing the boulders, the surrounding "fines" being sluiced to the dredge pond and taken care of in the normal process of digging.

The boulders as exposed could either be "block-holed" and blasted down to a size that can easily be ahndled by the dredge buckets, or else they could be stacked back fy a derrick to one side, or to bedrock back of the digging ladder the derricks could be mlunted on the side at the forepart of the dredge.

In case of required deep digging or in the event of it being

found that the big banks will pay to mine, I can see no reason why an extension of this system should not be developed to take care of quite high banks in advance of the dredge cut; of course in this event extra high stacking of the additional coarse material would be required, and also a rather larger proportion of water; also there would be added costs for pumping back a considerable volume of fines. But there is no reason why a combination of pump-sluice hydraulicing and standard dredge work should not be worked out, which would, in my opinion, meet the requirements of extra-deep digging or of mining the high banks. Its adoption will entirely depend on the values found when the properties are systematically sampled. If there are high enough to wartant the dual and increased cost, there appears to me to be no mining-engineering difficulty in the way of finding means to work all of the gravels.

This view adds greatly to the prospective possibilities of the deposit viewed as a whole, and is an additional argument for a thorough study and sampling by pits of all of the types of gravels, and to prove bedrock depths.

It is evident that if the greater part of this vast deposit can be mined and it is proved that it will pay as a commercial venture, and that we have here a very, very large undertaking, but at the same time one that can be proved-up by careful stages, and in which it will be a definite engineering development of an appraisable asset.

THE PROBABLE COSTS OF DREDGING:

I am personally satisfied that the sturctural conditions that built out this deposit and the richness and nearness of the source of the gold, and the long period of gravel concentration, all indicate a probability that this ground will be found to be far richer than the average California ground that consists essentially of lower river deltas.

But conversely the larger proportion of heavy gravels, the greater depth, the local absence of water, requiring considerable engineering work and expense to bring it in, and other factors, will necessarily make costs higher and require a certain amount of engineering constructive effort, to meet conditions not entirely in accord with standatd practices. This however is a matter of small moment providing savable values are found to be correspondingly higher.

Tentatively I therefore estimate a base cost of 10¢ per yard for the easily worked flats of No.2 gravels. But to meet the requirements of all four zones that I have mentioned, and to be in a position to meet possible special work, I think we should tentatively estimate as follows:

Standard heavy ground dredging.	10¢
Extra high stacking costs.	3¢
Pumping-fines, back over tailings. . . .	3¢
Cost of water conservation and delivery. .	4¢
Total cost	20¢

This is a conservative and safe estimate. We may be able to cut costs to 12¢ or 15¢, but water costs alone will always average 3¢ to 4¢ on this basis - and assuming the data given by other engineers as more or less correct, and taking a mean average value of 50¢ per cubic yard and a recoverable value of 80%, we have a net valuation of 20¢ per cubic yard on the basis of an individual dredge capacity of 200,000 yds. for a 12 cubic foot bucket dredge. We would have a possible profit of $40,000. per month, and with ten months working season, a net redeemable value per dredge of $400,000. per

year. And on the same basis the four proposed zones of dredging would have a net valuation of $12,000,000. as already stated. It must be clearly understood that this is not to be taken as my appraisal of the property, but merely as a tentative estimate based on such date as is available, and merely for the purpose of visualizing the possibilities of the property. The real appraisal can only be made by a complete study and a proper sampling with the right equipment.

Furthermore I wish to draw attention to the fact that I do not consider the above should be taken as a "limiting" valuation, because the total area of gravel is very great, and even if they prove to be lower than the estimate made, for the zones given above, if they are found to be of a commercial grade, and if a system of mining can be developed that will include the high banks and also the true bedrock zones, which so far have never been sampled, we may have to revise these tentative estimates and place the gross valuation on a much larger saale.

The above must only be considered as an economic perspective based on the limited data available.

SUMMARY:

Location: Middle of Arizona - 9 miles east and southeast of Congress Junction on Santa Fe Railroad.

Communication: Santa Fe Railroad and State Highway, Post Office on Property. Telegraph 9 miles.

Topography: Desert plains, and delta, debouching from Weaver and Antelope Creeks in Weaver Mountains. Altitude at mines 3300 ft.

Climate: Good for desert, open for mining all year. Rainfall about 10 inches. Evaporation high.

Water: Good drinking and camp supply at head of property. No water for mining on property. Abundance can be developed and brought in with sufficient capital outlay and no great engineering difficulties.

Area: Over 200 acres gravel claim can be obtained.

Gravel Structure: A large delta of quaternary gravels with part reconcentration of tertiary gravels and possibly underlying bedrock area of pre-tertiary gravels. Gravels have been re-concentrated into three types by gulche waters:

(1) Primary gravels, deep-over 100 feet.
(2) Secondary gravels forming flats in bottom of lower gulches. Dredgable gravels.
(3) Actual loose bulch wash.

Volume of Gravels: Surficial area 200 acres, or average depth 25 yds. - gives fross total of 63,000,000. cubic yards.

Value of Gravels: No sampling made - data from other reports shows $1.50 to $4.00 per cubic yard as average. Estimated average for working basis of valuation $1.50 cubic yard.

General Geology: Archean schists, pre-cambrian granitic intrusives, relatively recent tertiary eruptives. Gold source from complex of rich veins,in, and surrounding Rich Hill - at head of Delta.

CONCLUSION:

Well worth complete sampling and durther exploration. Possible valuation very great. Immediate tentative valuation on data available

$12,000,000.00.

Submitted,

S/ John N. Nicol

2 copies in other white paper
orig & one carbon (double space)

~~Main Report~~ Copy of Report of
J. M. Colvocoresses

August 23, 1934.

David Mines Inc

Mr. George G. Moore,
David Mines, Inc.,
Monterey, California.

Dear Sir:

I beg to submit the following report on the property now under option to the David Mines, Inc., upon which I have conducted, under your instructions, an investigation since July 1st of this year.

The property described in this report is known as the Rich Hill Placer, or locally as the Merrill Placer. According to the map furnished by Merrill, this comprises placer claims covering nearly ten square miles or say, 6,000 acres, located along Weaver Creek and its tributaries, Jap, Slaughter House and Oro Fino. The claims extend from the south slope of Rich Hill southward for a distance of some six miles along Weaver Creek and the average width of the ground is nearly a mile. The map which accompanies this report shows only a portion of the area indicating the sections which have been sampled todate and on which it is proposed that commercial operations should first be undertaken.

The general features of the property will be touched upon very briefly since they have been investigated and described by many other Engineers whose findings are available.

LOCATION:

The proposed site for the washing plant (which may be considered as headquarters for operations) is located fifteen miles by road from the town of Wickenburg which is on the Prescott and Phoenix branch of the Santa Fe Railroad. The elevation at the washing plant is

2800 ft. and it is seven miles by newly made road from the Harqua Hala siding on the same line of railroad.

CLIMATE:

Dry and very hot in summer, but delightful in winter. The mean annual rain-fall is about 6", but the creeks drain the west slope of Weaver Mountains where the rain-fall is as much as 15 to 18". Frost is rare and operations can be carried on continuously thru-out the year.

TOPOGRAPHY:

Typical semi-desert country, - sand and gravel ridges separating narrow valleys and arroyas. Highest ridge on the property rises about 80', most of them from 20 to 40'. No timber and the only vegetation is mesquite, catsclaw, paloverde, ironwood, greasewood, cactus, and small desert shrubs and bunch grass. Surface is rocky or sandy with some red iron clay in places.

WATER:

No water flows on the surface except for short intervals after the infrequent rains. It is reported that drill holes have found water at less than 100' below the surface near Antelope Creek, but I doubt if this represents a permanent water table. It will later pay to investigate the possibility of securing a local water supply by sinking wells or shafts to the bed rock along Antelope and Weaver Creeks, but pending the result of this investigation it must be assumed that the nearest water supply is found in the Hassayampa River, where the underflow at "The Box" according to available records exceeds 4,000 gallons per minute. Application has been made for ten second feet (4,400 gallons per minute) but it is evident that no such quantity could actually be taken from the river without injuring the rights of other parties who are at present using about 1,000 gallons per minute. The requirements of your washing plant cannot be definitely figured until the character of the gravel has

been determined and the amount of return water which can be recovered is established, but tentatively I have assumed that you will require approximately 500,000 gallons per day and it should be possible to pump up to double this amount of water from "The Box" without infringing upon other users or depriving them of any needful water supply.

The present plan for supplying water to the washing plant contemplates the sinking of large wells in the river bottom at the "Box". These wells should be lined with a 16" to 20" perforated steel casing with gravel envelope to prevent the inflow of sand. I believe that two such wells will be necessary and they should be sunk to bed-rock which is reported 70' below the level of the sand bed. Deep well centrifugal pumps will lift the water to a sump on the bank where the main pumping plant will be located at an elevation of approximately 2200' above sea level.

The main pumping plant should consist of two 500 gallon centrifugal pumps which will lift the water thru an 8" pipe line to a reservoir or stand-pipe located some 2 miles distant and at an elevation of about 2900' along the east slope of Round Mountain. The pumps may be driven by electric power and the pipe line should have a diameter of at least 8"; the type of pipe to be selected later, as favorable opportunity for purchase presents itself.

From the reservoir on Round Mountain the water will run by gravity thru a lighter pipe for a distance of 3½ miles with a drop of 100' to the washing plant where another reservoir should provide storage for at least one days' requirements.

GEOLOGY:

The underlying rocks appear to be mostly Pre-Cambrian granites and schists with some intrusions of quartz-diorite and volcanic

agglomerate in the vicinity of the Octave Mine and remnants of tertiary lavas covering the tops of some of the higher mountains.

The ancient rocks were intruded by many dykes of igneous origin and they are traversed by a great number of quartz veins, many of which are gold bearing. Erosion of these rocks and veins has been responsible for the sand, gravel and clay which cover large sections of the slopes and plain to the west and south of the Weaver Mountains and extend for a long distance to the westward. The ancient channels of Antelope and Weaver Creek which existed in tertiary or pre-tertiary times have been indicated by certain exploration carried on at intervals in the past, but have not been definitely located and most investigations of the placer ground have been confined to the shallow beds of gravel and sand lying along or near the surface above the top layer of caliche and formed during very recent times.

These top gravels vary in depth from one to five yards and the bed of caliche on which they lie was formed by a cementation of the gravel thru the filtration of alkaline solutions frequently carrying a large percent of lime. Locally, this caliche is termed the "false bed-rock". It is quite apparent that the gravel below this caliche also contains gold and in some sections there are several seams of caliche separated by from 10 to 20' of gravel. It is reasonable to suppose that the bottom gravel lying on the true bed-rock should carry the best values of all, but this has never been explored and it is desirable that such an investigation should be undertaken at a later date.

The gravel itself is made up of iron stained sand and clay with large pebbles and boulders which represent from 10% to as much as 70% of the yardage in various localities. The higher percentage of boulders is found near the heads of the present creeks.

Very few of these pebbles or boulders are well rounded or show any evidence of travel or water wear and the gold itself occurs mostly in fine sharp grains or angular nuggets, indicating that it has not travelled any great distance from its original source. The bulk of the coarse gold naturally occurs along the upper reaches of the streams, but the finer gold is well distributed thru the gravel along the banks and on top of the low mesas between them. The richer section of these gravels lie just above the caliche, but there is also a surface concentration on top of the ground which is sufficient to permit dry-panning in places or ground sluicing after each heavy fall of rain.

The gold is mostly clean and bright and can be readily amalgamated. There is very little flour or rusty gold found on this property, therefore, the recovery of a high percentage of values can be expected from a well designed washing plant.

PREVIOUS HISTORY AND INVESTIGATIONS:

The Weaver placers, of which the Merrill property forms a part, have attracted attention since the original discovery of gold on Rich Hill early in the 1860's. Many small mining operations have been conducted at intervals, mostly near the heads of the creeks, but none of these have covered a large area or resulted in any permanent operations or sustained production of gold.

Mr. R. M. Merrill began to acquire his property in 1919 and since that time has gradually increased his holdings which have been made the subject of several examinations, conducted at intervals by various Engineers, mostly in the employ of prospective purchasers. During these investigations a great number of pits and several shafts 30' or more in depth have been sunk in various sections of the property and in the aggregate a large amount of money must have been spent in the various samplings.

It is unfortunate that so little of the results of this work now appears to be available and while many letters, and some reports and assays have been submitted, generally giving a favorable opinion or recommending additional exploration, yet I have not been able to obtain the complete reports of Ray, Sawyer, Nichols, Draper, Stinnes, and other well known Engineers who have examined the property and it seems to me obvious that they either did not recommend the property to their clients or that the clients could not make satisfactory terms with Merrill since no active development and mining has been carried on to-date.

The reports of McNeer, Habecker and others submitted by Mr. Merrill do not appear very convincing and I cannot place any great confidence in assays of samples calculated from panning since these are dependent too largely on the personal equation and represent an opinion rather than a scientific determination of values.

However, the entire situation has been materially changed by the increase in the value in gold from $20.67 to $35.00 per ounce, and all calculations must be made on this new basis which brings up the value of gravel which was worth 10¢ per yard in former years to 18¢ per yard in 1934.

PROCEDURE OF SAMPLING:

At the outset of our work it seemed advisable to make several changes in the equipment of the test washing plant and to some extent in the method of taking samples.

~~Leaving out~~ The attempt to sample with ~~the steam~~ a power shovel, as described below, ~~which~~ did not prove successful and only covered a very small area., ~~our procedure followed the standard practice of digging test pits from the surface to the upper layer of caliche. We bottomed these pits a few~~

difficult.

When digging samples with the steam shovel, we covered the top of the truck with a 4" grizzly so that all rocks larger than this size were discarded at the start and this is similar to the practice which it is proposed to follow when loading railroad cars with a large steam shovel, altho the grizzly in that case will probably have an 8" or 12" opening. The samples sent to the plant represented in each case 1.3 cubic yards of broken gravel as nearly as could be measured, which should be equivalent to one cubic yard of gravel in place.

Elsewhere our ~~procedure~~ sampling followed the standard practice of digging test pits from the surface & the upper layer of caliche. We bottomed these pits a few inches below the top of the caliche since experience indicated that no substantial values would be found at greater depth. Boulders were sorted out from the excavated material and the percentage of the bank which they represented was measured & estimated after which the sand & gravel representing one ~~or~~ cubic yard, or in some cases two cubic yards, were trucked to the washing plant where the further procedure followed, as nearly as possible, that which would obtain in a commercial plant

there will be no more mechanical difficulties and that the crosscut will proceed with reasonable speed. The rented compressor seems to be a good piece of machinery and was run in the shop this morning before we took it away. I had to take it over for a month at a rental of $100.00, but that seemed to be the only method by which the work could be continued, and there is every reason to believe that the crosscut will be completed during this month so that we can return the compressor at that time under any circumstances.

Meanwhile it is very likely that the replacement shaft will come in so that Tod can continue with his own compressor after our work is completed if he decides to resume the operation at the mine.

I presume that under the terms of our agreement with Tod we shall have to pay for the repair to his compressor, altho actually the machine simply wore out as it undoubtedly would have done no matter who was operating and no fault attaches to the operators.

I hope that I can give you more favorable news in my next letter.

Yours very truly,

GMC:b

At the testing plant the sample was dumped into a hopper feeding into a cement mixer where it was washed and thoroughly agitated with the object of cleaning the rocks and pebbles and disintegrating the clay which was prevalent in some of the samples and likely to carry off much fine gold unless entirely broken up.

From the cement mixer the samples were next washed over a 1½" screen, the over-size being rejected thru a sluice provided with riffle bars and the under-size passing into a revolving trommel with ½" openings where the material was again thoroughly shaken and agitated and the over-size rejected.

The under-size from the trommel passed to a rubber shaking riffle where much of the coarse gold was saved and from the riffle the overflow went to a Denver-Mechanical-Pan provided with one quicksilvered amalgamating tray and with two rubber mats.

After each sample had been run thru, the entire plant was carefully cleaned and the black sand removed from the concentrates by recleaning with the rubber riffle. The final cleanup was carefully panned and amalgamated by hand and the resultant amalgam taken to the Arizona Assay Office in Phoenix where it was treated by laboratory methods for the separation of the gold from the mercury and all other impurities. The resultant gold was refined and weighed and the value of each sample calculated back to determine the value of the fine gold in the bank and in the pay-dirt which would be sent to the commercial washing plant after the boulders had been separated.

Previous tests on the black sand had indicated a value of about $2.00 per ton and our two tests averaged $2.45 per ton which in itself is too low grade to be commercial, altho it will be advisable at a later date to make some effort to concentrate the values from the

black sand and in this way it may be possible to save an additional two or three cents per yard of gravel, but no exact figures can be given at this time.

Pannings of all of the tailings and reject products were taken at frequent intervals and I feel justified in saying that our work has been carefully done by skilled men and that the results and values as shown by the samples are representative of the recoverable value of gold in the portions of the gravel which were sampled. These results may, therefore, be considered as reflecting the value of the gold from these sections which will be recovered by similar procedure in a commercial plant.

I wish to point out that the total area of gold bearing gravel in this property is extremely large and that the time allotted for sampling made it impossible to test more than a very small portion of the mineralized area so that this report is of necessity based upon data which is not nearly as complete as I could wish, as will be pointed out in my estimate of yardage and values.

GENERAL DESCRIPTION OF GRAVEL:

The placer ground, covering some 6,000 acres of superficial area may be roughly divided into four different classes as follows:

(A) The high mesas which appear to be benches formed by old streams and rivers, the course of which can no longer be traced. The extent of these may be roughly figured at 2,000 acres. There is no logical reason to assume that these mesas would carry any pay values near the surface and such pits as have been sunk on them do not appear to be in commercial gravel. They may later be made the subject of another investigation, but for the time being I must class them as barren.

(B) The low mesas such as lie between portions of Weaver and Oro

Fino and between and in the vicinity of the two Oro Fino's. The total area of these may be roughly figured at 3,000 acres and a few pits sunk at scattered points have indicated that gold is sometimes found down to the first layer of caliche but the depth is comparatively shallow, rarely more than one yard, and the character of the material is largely reddish clay which would be difficult to wash. It is possible that a large section of these mesas may prove to be commercial gravel and the total yardage down to the upper caliche runs up to a figure of 15,000,000. No thorough investigation of this ground has been attempted and from such information as is available it would appear possible to mine some 15¢ gravel from the upper yard of top soil if such mining can be carried on with any profit.

(C) The upper stream gravels and benches located along and near the present beds of the principal creeks, especially Weaver, Slaughter House, Jap, and big and little Oro Fino. The total superficial area is about 1,000 acres and of this we have partially sampled only about sixty acres in which I estimate that the depth of the top gravel is about three yards along Weaver Creek and two yards along Oro Fino. Details of sampling and value are given in another portion of this report.

If further sampling should indicate that all of this gravel has a similar grade and depth, the total yardage in this class would be about 15,000,000.

(D) The deeper gravel underlying the top layer of caliche and extending down to the true bed-rock which lies at a great depth varying from 50 yards to perhaps as much as 150 yards below the present surface. This gravel represents the building up of the old benches and channels of Weaver and Antelope Creek and their tributaries. It consists of unclassified layers of sand, boulders, and pebbles, laid down in times long

past and separated into layers during intervals of small rain-fall by beds of caliche which constitute several different seams of false bed-rock.

Theoretically, there should be some rich gravel found upon each of these strata of caliche and a very rich layer of old channel gravel should lie along the true bed-rock. Indications obtained from drill holes and from a few deep shafts confirm the first portion of this statement, but do not give any information regarding the bottom channel which has never yet been penetrated. It is possible that the old placer found at the top of Rich Hill represents an elevated section of one of these deep channels and if ~~this~~ that can be considered as a fair sample, then it may be expected that an extremely rich deposit lies on the true bed-rock and should be well worth investigating. Such a buried channel could probably be mined by shaft and drifts as has been done in the drift mines of California and elsewhere with substantial profit. Reference to this possibility is made by Stinnes and Nichols and it has been mentioned by others but no positive data has yet been obtained regarding the extent or value of such a channel and the best procedure to obtain such data would probably involve a geophysical survey to determine the contour of the true bed-rock and water level (if any) followed by three or four shafts at favorable locations penetrating to the bed-rock and from which sampling drifts could be run both along and across the channel.

ESTIMATE OF YARDAGE AND VALUES:

From our recent investigation of this property, I am only able to describe certain portions of the top gravel along the creek bottoms, classed under "C" above.

Along Weaver Creek I include all of the samples taken by

the steam shovel and from the pits below the steam shovel cut, but value these only as two separate samples. I also include the pit samples taken along Slaughter House and Jap Gulches as these were near the Junction with Weaver Creek. The average of values are purely arithmetical since the pits were spaced in such an irregular manner (in order that the truck might reach them) that it is practically impossible to calculate any weighted average.

On this basis I figure that our sampling has partially covered along Weaver Creek some forty acres of ground to a depth of three yards, thus representing some 600,000 cubic yards of gravel which averages in the bank, from our thirty-one samples, 14.22¢ per yard. From this material, after discarding the larger boulders, we would mine 300,000 cubic yards of pay dirt with an average recoverable value of 28.44¢ per yard. The total value to be recovered from this section is $85,320.

Along Oro Fino we have taken twenty-five pit samples, partially covering about twenty acres of ground to an average depth of two yards and I find the average value to be 27.88¢ per yard in bank from which we would expect to mine and send to the plant approximately 160,000 yards of pay dirt with an average recoverable value of 34.85¢ per yard. The recoverable value in this block of ground is $55,760.

The total recoverable value in these two areas is, therefore, $141.080, or say $2700 per acre and there are altogether about 1,000 acres of the same class of ground, a large part of which may reasonably be expected to carry similar values. The somewhat higher average obtained during the first two weeks sampling was probably due to the fact, that the pits which we sunk during that time were located mostly near the junctions of the various creeks where there was a certain amount of local enrichment which did not extend thru-out the entire area.

On the low mesas we only put down three scattered pits to an average depth of one yard and these show a value of 16.27¢ per yard with a very small percentage of boulders to be thrown out. Obviously these pits on the mesas do not give any basis for an estimate of tonnage or value, altho they do indicate that gold is found in this class of material and suggest the possibility of mining over a very large additional area if it should be determined that the working costs of such a shallow bank would be low enuf to leave any reasonable margin of profit.

COMMERCIAL OPERATIONS AND EQUIPMENT:

Preliminary:

If, on the basis of the present sampling and other available data, it is decided to put this property on an operating basis, the following preliminary procedure will be in order after the titles have been verified and the water permit obtained:

(1) Conduct a careful metallurgical study of the exact character of the gold and the most efficient means of affecting a high percentage of recovery. It is a great mistake to suppose that all placer gold is similar or adapted to similar methods of treatment and a procedure highly successful in Alaska or California might prove entirely unsuited to your work at Weaver.

(2) According to the results of this investigation, design the washing plant with reference to the contours of the proposed site which should first be carefully surveyed.

(3) Survey for the power line from near the Octave Mine down to the washing and pumping plant (total distance about eight miles) and obtain the permit for construction from the State and Federal authorities.

(4) Survey for the pipe line and reservoirs and obtain the necessary right-of-way over lands belonging to other parties.

(5) Obtain from the State of Arizona the proper lease to permit mining operations on such claims (if any) as are located on State property.

(6) Survey for the railway with proper grades, switches, etc.

(7) Locate by survey and construct a much better road from the railway to the site of the washing plant to permit the easy transportation of heavy equipment. I think that such a road will cost close to $3,000.

The costs of all the above, including fees, legal and engineering services, etc., may be roughly estimated at $8,000, and the time required to complete this work will be close to two months.

Plant and Equipment:

For excavating the gravel I concur in your plan of using two steam shovels of about 3½ cubic yards capacity. I believe that you already have such shovels under option and accept your figures as to their cost.

For transportation, it is proposed to use two oil burning 56 ton locomotives and ten 40 ton steel dump cars which will be equipped with grizzlys designed to permit the passage of boulders up to 8" or 10" diameter. I also use your figures for the cost and freight on this equipment, but have added the cost of installing the grizzlys.

Two ore trains will thus run on a standard gauge track (65 lb. rails) from the diggings to the washing plant and ~~all of~~ this equipment appears to be amply sufficient to dig up to 10,000 yards of bank gravel per day and transport some 6,000 yards of pay dirt to the washing plant.

Because of the higher values found along Oro Fino, I recommend that the first mining should start along Weaver just below its junction with this creek and should then proceed up Oro Fino. The first

digging will be very close to the washing plant, but in order to get a proper grade, the construction and operation of at least one mile of railway track is probably necessary and later on this will be extended as the work proceeds further up Oro Fino or swings over to the mesas or Weaver Creek.

Power for the washing and pumping plants will be obtained from the Arizona Power Company, whose high tension line crosses the Merrill property near the Octave Mine less than three miles from the washing plant. The exact cost of power cannot be accurately figured until the total requirements and especially the load factor are determined, but it should certainly not exceed 2¢ per K.W. hr. and may be reduced to close to 1½¢ by ~~gravel~~, plant design, and management. A still further reduction could be obtained by the use of Diesel Engines and shovels, but this might involve a considerable increase in the capital investment.

The main water supply and pipe line have been previously discussed and some auxiliary pumps and lines will be required to return the waste water from the tailings pond and to permit using any water that may be stored in dams on the creeks or developed in their underflow.

The washing plant should not be designed until the metallurgy of the ore has been studied and there has been no opportunity to do this to-date. Tentatively, we may assume that it will follow along the general lines proposed by the Mutual Engineering Company and will cost approximately the same figure which they have bid, plus the extra expense for additional bin capacity and trommels as well as additional gold saving devices. The capacity of this plant will represent 6,000 cubic yards of pay dirt in bank per day, equivalent to about 7,500 yards of broken material as it will come by the cars.

A considerable amount of auxiliary equipment must be provided for any operation of this nature, particularly when it is to be conducted many miles from a town or railway. Living accomodations must be built for the workers, also office and laboratory facilities at the plant. Fuel oil tanks must be constructed at the railroad and at the plant and trucks purchased to haul the oil and other supplies between them. Also, automobiles for general utility and for repairs a small machine shop and carpenter shop will be essential.

Operating Procedure:

After the water supply and power have been provided and the railway and washing plant constructed, I should advise that actual mining be commenced a little below the junction of Weaver and Oro Fino and that the digging should proceed up along Oro Fino where the best gravel so far sampled is located.

The details of the operations have been carefully planned and since the large boulders in this section of the property do not exceed 20% of the yardage in bank, the work should be planned so as to dig approximately 7,200 yards of bank per day from which 6,000 yards would go to the washing plant. The proposed digging and washing equipment should be ample to take care of this yardage.

After the material has passed thru the washing plant and the gold has been recovered, the disposal of the rejected oversize gravel and of the fine tailings becomes of great importance. This disposal should not only be carried out with every possible economy, but also in such a way that the tailing dam will serve to form a reservoir for the storage of the waste water from the plant which will be settled to some extent and then pumped back and re-used as often as possible.

The site selected for the washing plant permits this to

be done since the tailings will at first be dumped into a little dam on the east of the ridge on which the plant is to be located and afterwards in the bed of Weaver and Oro Fino, after the upper gravel has been mined from that section, and assuming that there is no question of attempting to mine the deep channel in this locality.

The gold recovered as metal from the riffles or as amalgam from the tables, plates or amalgamating equipment should be retorted and melted at the plant so that bullion could be shipped direct to the Mint and the cost of marketing kept to the lowest possible figure.

The estimated costs of construction, etc., and for operation are tabulated on the attached sheets; many of the figures, as noted, being based upon the prices which you have given me as representing firm bids or contracts now in your possession.

CONCLUSION AND RECOMMENDATIONS:

To sum up the results of our investigation, I can say that the Merrill Placers undoubtedly contain a very large quantity of gold bearing surface gravel. Our investigation was limited to only one class, namely, the stream beds and covered only about 6% of that area, i.e., 60 acres out of 1,000. It is obvious that no definite value can be assigned to the great bulk of this property from these results, but we have partially sampled approximately 800,000 cubic yards of bank gravel with an average value of 17.6¢ per yard from which about 460,000 yards of pay dirt could be mined and shipped to the washing plant after the boulders had been discarded. The average value of this dirt would be slightly in excess of 30¢ per yard.

There is no logical reason to believe that the area which we sampled was any better or any worse than the balance of the stream

beds and if the entire 1,000 acres should be mineralized to a similar extent this area would contain approximately 13,300,000 yards of gravel in bank from which there could be sent to a washing plant approximately 7,670,000 yards of 30¢ dirt. The total recoverable value of this gravel would be $2,301,000 and the net profit which might be realized would amount to $1,227,000 spread out over a period of four years, if operations continued along the scale which is now planned.

The physical condition of this property is of such a nature that sampling is extremely difficult and expensive and to cover any large section of the property with sample pits would involve an expenditure greater than the cost of the commercial operating plant which you propose to build and which, by its operation, will serve to further sample the property and to make such sampling more than self-supporting.

I believe that you are justified in assuming that the total yardage of material similar to that which we have sampled will prove more than sufficient if treated at the estimated cost to repay the expense of equipment and construction as well as the operating expenses of the commercial plant and to leave a reasonable margin of profit which may later be increased if working costs can be somewhat reduced.

I also believe that a better grade of surface material than was found in the sampled area occurs along the upper stretches of Weaver Creek, Slaughter and Jap, and mining these sections should show a larger margin of profit than I have figured, even considering that the digging costs will be somewhat higher than estimated because of the larger percent of boulders and hauling charges slightly higher, because of the greater distance to the washing plant.

For the treatment of the surface gravel in accordance with your present plans and on the basis of washing approximately 6,000 cubic

yards of pay dirt per day, I believe that you will have to spend somewhat more than the $105,000 set down in the detailed estimate of construction costs and in addition some $40,000 should be provided for warehouse stock and supplies and for working capital. When your operations are conducted on a regular basis it appears that working costs will be around 14¢ per cubic yard of pay dirt washed, including the royalty to the owner, and that the expected profit will amount to 16¢ per yard, - say $960.00 per day.

I am now well satisfied that large steam shovels will dig the gravel efficiently and economically and I believe that the cost of transportation to the central washing plant will fall within the estimate. The location and arrangement of the washing plant seem satisfactory, but the equipment for gold saving should not be definitely decided upon until the character of the gravel and the best means of recovering the maximum amount of gold have been made the subject of further study, which can be done while the other construction is in progress. It should be quite feasible to affect a high saving of values for the estimated cost of operation.

It is my personal opinion that the great potential value of this property lies in the chance of developing in the lower channels of Weaver Creek, a body of extremely high grade ancient gravel which should lie on the true bedrock and form the main lead or channel. I understand that this possibility is one of the principal reasons why you and your Associates are attracted to this enterprise which might otherwise seem to promise a lower margin of profit than is generally required for ventures of this nature and that it is your idea to eventually devote some portion of your working profits to the exploration of the deeper channel from which it is quite possible that extremely large profits

might be won.

While there is no very exact data regarding the Rich Hill deposit, it seems to me reasonably certain that this did represent an elevated section of an ancient channel and very probably a portion of the ancient channel of Antelope or Weaver Creeks and I think there is an excellent chance that some or all of the other portions of these channels still lie buried at a depth varying from 100' to 500'.

Mr. Stinnes, in a letter of which you have a copy, has stated quite definitely that it is his opinion that such ancient channels exist under both Antelope and Weaver Creeks and that they should carry values in excess of $2.00 per square foot of bedrock, which is equivalent to many dollars per cubic yard or per ton, depending on the height of the rich bedrock deposit. With this opinion Mr. Nichol and others are in agreement and I have long been struck with the similarity of the conditions in the vicinity of Weaver Creek to those which exist in certain other localities with which I am familiar and where very profitable drift-mining has been conducted along the bedrock, altho in all such cases it must be remembered that the working costs are comparable to those in lode mines and not to the costs which prevail in placer operations.

The Merrill property includes one stretch of upper Antelope Creek, about one mile in length and seven miles along the length of Weaver Creek, and these areas may well contain a far greater quantity of gold in the deep channels than is found in all of the surface area, and it would probably occur in a highly concentrated form which should yield a profit of several dollars per yard mined.

A geophysical survey for the purpose of determining the location and depth of the buried channels would cost from $2,000 to $5,000, depending upon the area covered, but would, of course, give no indication

as to values.

Following this, some four or five shafts could be sunk to bedrock for a total cost of probably $50,000, (depending upon the depth and water conditions) and additional drifting from the bottom of these shafts across and along the ancient channels would involve the expenditure of another $50,000 which should definitely serve to determine the approximate quantity and quality of a very large yardage of deep gravel.

While there is no positive assurance that any such valuable deposit will be found, I feel that the chance is an excellent one and well worth while as a piece of mining exploration.

With the understanding that my conclusions and recommendations are not based upon nearly as complete an investigation as I could have wished to make, and with the further understanding that there is a distinct element of financial risk in every enterprise of this nature, I now recommend that you proceed with your plans to equip the property for surface operation, and especially bear in mind the advisability of later on exploring the deep channels wherein a much larger return may be hoped for.

Attached to this report, and forming a part of it, is a map showing certain portions of the property including the area sampled with the location of the pits and the site of the proposed test plant. A record of the samples and values in bank is noted on the map. There are also attached to this report detailed estimates of the cost of construction and of the working costs per operating day, and per yard of bank and of pay dirt.

Yours very truly,

GMC/HC

G. M. Colvocoresses.

ESTIMATE OF OPERATING COSTS PER YARD OF BANK GRAVEL AND PER YARD OF PAY DIRT WASHED

	Per Yard Of Bank Gravel	Per Yard Of Pay Dirt
Excavating with Steam Shovels	$ 0.018	$ 0.030
Railroad transportation, moving track, etc.,	0.015	0.025
Washing dirt and recovering gold, including water supply	0.021	0.035
Disposal of waste rock and tailings	0.006	0.010
General expenses and overhead	0.006	0.010
Royalty to Owner	0.018	0.030
TOTAL	$ 0.084	$ 0.140

In the above calculations it is assumed that the pay dirt will represent 6,000 yards per day and the bank gravel 10,000, but it should be understood that the relative percentage of bank gravel and pay dirt will vary to a considerable extent in different portions of the property.

ESTIMATE OF COSTS OF COMMERCIAL OPERATION ON BASIS OF DIGGING FROM 7,000 to 10,000 CUBIC YARDS OF BANK GRAVEL PER DAY, and WASHING THE EQUIVALENT OF 6,000 YARDS (in place) OF PAY DIRT.

LABOR AT DIGGINGS & RAILROAD			PER DAY	
3 shovel runners	@	$8.00	$24.00	
3 Cranemen	@	5.00	15.00	
3 Firemen	@	5.00	15.00	
1 Superintendent	@	8.00	8.00	
6 Locomotive Engrs.	@	7.00	42.00	
6 Locomotive Firemn.	@	4.50	26.00	
4 Trackmen (1 foreman)			16.00	
2 Laborers for cleanup	@	3.50	7.00	
AT WASHING PLANT				
Superintendent, Assayer, Machinist, Electrician, Engineer & Clerk			40.00	
3 Bin men	@	4.00	12.00	
6 Plant operators	@	5.00	30.00	
3 Pump men			12.00	
6 Men on waste disposal			22.80	
2 Truck Drivers			8.00	
2 General Workers			7.20	
			$285.00	
Industrial Accident Insurance			15.00	
TOTAL			$300.00	$300.00
Electric power for pumping and washing plant, and returning waste water				100.00
Fuel for locomotives and shovels				140.00
Misc. supplies, oils, grease, gasoline, mercury, etc.,				40.00
Repair and maintenance supplies				30.00
Overhead, taxes, engineering, insurance				50.00
				$ 660.00

Assuming that 6,000 yards of pay dirt are washed per day, the operating cost will be 11¢ per yard to which must be added the royalty of 10%, or say, 3¢ on the assumed average recoverable value of 30¢ per yard. This will bring the total operating cost to 14¢ per yard and the profit to 16¢ per yard of pay dirt, or $960 per day.

The amount of bank gravel which will have to be moved will vary with the character of the bank and may run up as high as 12,000 yards per day in upper Weaver or be as low as 7,000 along Oro Fino or on the mesas. On the average I figure that about 9,000 yards of bank will be moved per day and for the estimated daily cost which would bring the operating cost to slightly over 9¢ per cubic yard of bank with the proper adjustment of the royalty. The digging costs will actually go up to some extent when the percentage of boulders is high, but there will also be some difference due to the depth of gravel and as these are greater in Weaver than in Oro Fino it may largely adjust the difference and the average given should be pretty well maintained on all sections of the property which I have tested.

ESTIMATE OF CONSTRUCTION AND EQUIPMENT COSTS ON BASIS OF DIGGING EQUIPMENT SUFFICIENT TO HANDLE UP TO 12,000 CUBIC YARDS OF BANK GRAVEL PER DAY AND TRANSPORTATION AND WASHING EQUIPMENT FOR 6,000 YARDS OF PAY DIRT PER DAY.

Preliminary expenses, including surveys and road, as mentioned in report	$8,000.00
Washing plant (balance of purchase price)	15,133.00
Additional Gold Saving Equipment	2,000.00
Railroad Construction (1 mile)	10,000.00
Two Steam Shovels (Mr. Moore's Figure)	4,000.00
Freight on Shovels	3,600.00
3 Locomotives (55 tons ea.) (Mr. Moore's figure)	3,000.00
10 Railway cars " " "	3,000.00
Freight on locomotives and cars, from Bisbee	1,250.00
Grizzlys over cars	2,000.00
Power line (Mr. Moore's figure)	6,400.00
Pumps and motor, based on Mr. Moss' estimate (allowing for two wells)	7,000.00
Drilling two wells (100' deep, - Mr. Moss' estimate)	2,000.00
Pipe line (Mr. Moore's figure)	15,528.00
Cars and motors for waste dump	2,500.00
Auxiliary equipment, housing, piping, tanks, trucks, etc., (Mr. Moore's figure)	5,000.00
Bringing in equipment from R.R. to property, (Mr. Moore's figure)	2,000.00
Office and laboratory	3,500.00
Erecting plant, foundation, etc., (Mr. Moore's figure)	5,000.00
Miscellaneous	4,089.00
	$105,000.00

Estimate does not include any warehouse stock or working capital for which purposes I think that $40,000 should be provided.

I N D E X.

RE: MERRILL PLACER

January 3rd, 1934.

Mr. H. Hardaway
Bristol, Virginia.

Dear Sir:

Below please find report re Gold Hill Placers of Rich Hill District, Congress, Arizona; made in your behalf, by the undersigned, during the month of December, 1923.

1. In reporting the investigation of placer deposits the geology of the same need not be entered into further than sufficient to prove the known character of material carrying values; local conditions including those physical; to aid of hinder flow of same; and to show the agencies of distribution value; character of gravel to be handled; method and ability to recover same, these being the principal points of procedure and study.

2. The deposits referred to lie principally within the bounds of the property under option to Messrs. C. L. Hotel of Pulaske, Va. and A. H. McNeer of Dants, Va., from the Rich Hill Gold Mining Co. of Los Angeles, California and only that part of the flow which is within these bounds/ofthe part which seemed to have merit, was investigated.

3. Owing to the absence of evidence of any systematic plan to determine anything pertaining to the areas in which the more attractive values might be found; first duty was to outline a plan to determine such facts; to proceed to execute and diagram same; having determined the areas worthy of consideration a rough diagram was made and is herewith submitted.

4. Concerning these deposits; gold was found on the surface throughout, very persistently; and those usually lease in experience in trying to acquaint themselves with the property, go to the more concentrated spots where the best values are found (perhaps guided by evidence where more or less dry washing has been done by the individual miner) take their specimens with thrilling results; never stopping to consider anything more than what they really seee. These deposits lie peculiarly so as to excite the layman.

5. However, this is the more reason why a more comprehensive investigation be made, even tho in a limited measure, conclusions drawn and a system established to determine character of deposition and the value (if any) and the area where located. It was decided to sink pits and run open cuts in so far as a purely preliminary investigation could be carried on.

METHOD OF SAMPLING:

6. The ordinary gold pan was used as the medium in testing values and character of materials found in placer gold. A pan holds to wash, easily 20# material. 200 pans are reckoned as one cu. yd. The character of material under consideration must govern as to how many pans are really allowed to the yard. In this estimation 65 pans is the constant.

RECORDS OF SAMPLES TAKEN.

7/ Sample #1. Represents cross section upper end of property (see diagram) of five pans from pits sunk in the ground to depth of from 20" to 30". (Note: The surface throughout is composed of a very soft deposit; but in every instance in each pit was encountered a cement gravel of questionable nature, as to whether it could be handled to mine under the common system of dredging.) Quality and quantity per pan about the same altho pan #15 showed distinct characterization.

8. Sample #2 represents cross section of five pans. In no place was the cement gravel found to a greater depth than 30". Pan #1 characterized distinct run of bright gold which will hereafter be called "Bright." Pan #2 contained both Bright and Regular gold.

9. Sample #3 represents cross section of six pans. Pan #1 small colors Bright. Pan #2 Bright and Regular (flat) Pan #3 from 3 ft. of surface open cut 5' deep which contained Regular and a heavy gold. To designate this will term "Coarse". Pan #4 from 3' cement gravel directly under pan #3, gold too fine to characterize Pan #5 gold Regular better size. Pan #6 Regular and Coarse. Quality each pan same.

10. Sample # 4 represents cross section of 6 pans. #1 Bright small. #2 Bright and Regular; but Regular heavier. #3 first 3' open cut of 5', all gold Regular but small. #4 taken from cement gravel under #3, colors too small to characterize. (Note: In a pit sunk into cement gravel 20' distant from pan #4 results were very favorable. Carried coarse gold and one 2 ct. nugget.) #5, depth 24' to cement gravel, gold small. #6 depth 28' gold small, character coarse.

11. Sample #5 where pits, easier reported, sunk to depth of 45' but refilled to depth of 12'; five pans were taken from original; five pans from Mate. (Note: hereafter to designate the number will be original and the number plus A. shall be Mate.) Original taken from wall of pit to depth of 12'. The pans were uniform throughout as to quantity and size. Regular predominated. Very little Bright. Five pans "Mate" taken from material where dumped around the pit reported to be depth 45' gold evenly distributed throughout dump. Each pan in quantity and quality the same. In each case Regular gold predominated.

12. Sample #6 from pit sunk 5' (heavy rain filled pit hindering further work) original, 3 pans showing Coarse and Regular. From Mate 4 pans, Bright and Regular showing that the pit represented three distinct runs.

13. Sample #7. Specimens taken from an open cut run in the bank of a gully and faced up to depth of 20'; original 7 pans taken. Gold found to be heavier from bottom up first 6 feet. Small nugget in 34d pan 6" high (not included in estimate) Other four pans: Bright, Regular and heavy, evenly divided from Mate 7 pans ranged Regular and Bright principally. In lower pan coarse.

14. Sample #8. Specimens taken from an open cut (same as #7; but further in property) to a depth of 20'. Original of 5 pans showed values evenly distributed from bottom to top. (Note In no place of open cut work does the loose gravel go deeper than 36"). Each pan showed Bright, Regular and Coarse. Small nugget found near surface tho not included in estimate.

The deposition is unfavorable to a regular distribution of values. In the cement gravel streaks of sand and gravel alternating was encountered. From Mate 4 pans were taken; sand and gravel intermingling. Gold too small almost throughout to characterize. Small nuggets found but not included in estimate.

15. Sample #9. Specimens taken from open cut in gully and faced up 18' showing cement gravel all but top 30'. From original 6 pans showing Coarse and Regular. Pan from bottom carried more values than any other pans. From Mate, 6 pans almost identical with Original.. Carried small nugget, not included in estimate.

16. Sample #10. Open cut in gully faced up to 30' bottom to top. Cement gravel bottom to within 24" of top. Original, 9 pans. Best values in bottom. Gold almost identical with sample #5. Mate found about the same as original.

17. Sample #11. Open cut faced up to depth of 25' all in cement gravel. From original 4 pans were taken. Deposition found to be about the same as #8. Mate same as original, both bearing to Regular.

18. Sample #12. Open cut faced up to 16'. Four pans taken, concentration poor. Deposition irregular and very unsatisfactory Gravel thin and values running more to Bright. Content gold bearing agency infrequent.

The only sample used in estimating are Original and Mate, 5, 6, 7, 8, 9, 10, & 11. Nos. 1, 2, 3, & 4, showed only veneer over cement gravel of an uncertain and known concentration #12.

RECORDS OF SAMPLES TAKEN

1-	5 Pans	$1.11 per cu. yd.			
2-	5 "	.80 "			
3-	6 "	.74 "			
4-	6 "	.592 "			
5-	5 "	2.133 "			
5a-	5 "	1.686 "	$3.82	$1.19 cu. yd.	
6-	3 "	.888 "			
6a-	4 "	.832 "	1.722	.86 "	
7-	7 "	1.831 "			
7a-	7 "	.476 "	2.307	1.15 "	
8-	5 "	2.000 "			
8a-	4 "	.167 "	2.167	1.08 "	
9-6	6 "	2.925 "			
9a-	6 "	1.851 "	4.776	2.39 "	
10-	9 "	3.061 "			
10a	9 "	1.876 "	4.937	2.47 "	
11-	4 "	.555 "			
11a-	4 "	.746 "	1.502	.75 "	

Total amount values of samples used in examination $10.61

12--4 Pans(not included) .50 per cu. yd.

$10.61 divided by 7 equals $1.51 per cu. yd. of basis of calculation.

VALUES IN YARDAGE:

The area of ground under consideration is shown as follows:- #5 depth 12'; #6 depth 5'; #7 depth 20', #8 depth 18'; #9 depth 16'; #10 depth 30'; #11 depth 28'; placing a reasonable average at 20' throughout the entire area checked on diagram amounting to about 4,100,000 cu. yards. This at $1.51 per cu. yd. making a total value of about $6,191,000.

If it were considered necessary to more minutely demonstrate the above or to explore to a greater depth, drilling would have to be resorted to. The modern dredge handles ground to a depth of 80', which in this case leaves a strata of 50' the value of which is undetermined at the present time.

CEMENT GRAVEL:

Throughout the Rocky Mountain system there are to be found great beds of cement gravels which in many instances carry gold values sometimes yielding profit even in the more hardened formation; but often they proven unprofitable owing to the impossibility of causing speedy dissolution thru process of mining; thus allowing much of the gold values to be carried off.

Of the area examined 90% of it was of this cement gravel formation; making it purely a problem for the dredge constructor as to whether or not the money content would be more or less absorbed thru process of extraction.

In case a dredge were to be installed on this property, one of the largest, most sturdy type would be considered adequate to handle this cement gravel formation. Such a dredge handles 500 cu. yds. per hour in free gravel. Upon this basis it would be consistent to calculate that with this cement gravel to content with, 250 cu. yds. per hour or 6000 cu. yds. per day, would be its reasonable capacity.

Water is one of the prime factors in placer mining. There are reported to be several sources of water available for this project; but that of the Hassayampa River is the one considered to be most feasible. During December, 1923, its average flow was about 2 second ft. At that place where water can be taken from the river the confines of the canyon thru which the river flows are such that a dam to a height of 125 ft. can be constructed, where water may be impounded to make up for shortage during the dry periods. From this point to about midway of property is a distance of some five miles. The water necessary to operate dredge 2 second feet, must be raised from outlet of dam approximately 200', by process of pumping, and from this point would flow by gravity thru 12" iron pipe to dredge.

POWER:

For sufficient power to operate a dredge and for pump and shop purposes; 100 H. P. would be required. Crude oil, being the cheapest fuel procurable; the Diesel engine using this oil would be the best medium for generating power.

SYNOPSIS:

Presuming that the area of gravel (see Diagram) to be handled is about 4,100,000 cu. yards, of a valuation of $1.51 per cu. yd. would yield some $6,000,000; the proposition resolves itself to the following figures:-

Total yield of ground		$6,000,000
	DREDGE	
To one Dredge	$500,000	
To Freight to Congress	75,000	
To Freight to Ground	25,000	
To Install	100,000	
		700,000
	POWER	
To two Diesel Engines 1000 H. P.	100,000	
To Freight to Congress	20,000	
To Install & Housing	15,000	
To Transmission Lines to Dredge & Pump.	15,000	
		150,000
	WATER	
To Dam (Hassayampa River)	100,000	
To Pipe Line & Install	100,000	200,000
	CAMP	
To build & equipping Camp & shops	20,000	20,000
	DRILLING	
To drilling ground for demonstrating purposes.	30,000	30,000
To cost operate dredge to work out ground 20% gross output		1,300,000
To amount to be cut 50-50 between owners & operators		3,700,000
		$ 6,000,000

TIME REQUIRED.

To drill	6 months	
To make and install dredge	12 "	
To work ground	24 "	Total 42 Mo. or 3½ years.

Placer mining is not unlike any other industry or business, providing the industry or business is there. To outline the scheme and carry it thru to success, there must be some one continuously identified with it who knows the game and who has the vim to execute it;

And, for the investor who does not know the Gold Mining Game, there is risk simply because the idea of gold mining is luring, and at times this takes possession of the inexperienced beyond his judgment. While mining ventures is no greater risk than any other venture when handled in a knowing way, weighing the proposition; studying it as any business requires and taking time in doing it.

The owners of the Rich Hill Gold Mining Co., were promised a copy of this report. Same will be forwarded to them. You will please advise Mr. Robert A. Armstrong c/o McAlpine Hotel, N. Y. City your wish in the matter as per request of owners.

Yours truly

(Sgd.) A. H. McNeer.

Los Angeles, Cal.
July 28, 1926

Mr. R. M. Merrill
1558 Pacific Avenue
Alameda, California

Dear Sir:

"This is to confirm what I told you verbally in explanation of the results of our prospecting work at Octave on your placer ground. It might be well to recall here that our company in taking up your placer ground, was looking wholly for a volume of gold bearing gravels that could be dredged at a profit. Incidentally, as a result of my preliminary examination, I told you that I felt certain there were at least two old channels cutting thru the flats upon which the ground optioned to us exists. While our company was looking only for dredging ground, I felt that if theseold channels did not exceed 80' in depth the bedrock pay on them would be high enough to pay for the moving by a dredge of the overlying barren gravels, and, therefore, my prospecting work would not be confined only to the large volume of gravels in the flats, but to these old channels as well."

"You will recall that I maintained from the first that there must exist two channels out of those mountains--one from Antelope and one from Weaver creek. Owing to the quantity and nature of the gold already produced in the upper stretches of these two creeks, it seams certain there would be a concentration rich enough to yield excellent profits from the drifting of those concentrations or pay stretches (streaks). While our drilling has not reached the bedrock, that is, to the paystreak, it has proven the deep trough existing in the old Antelope channel and the nature of the gravel indicates conclusively that there must be a rich concentration or paystreak on bedrock.

Our geological work on Antelope Creek enables us to trace quite clearly this old channel for a distance upstream of three or four miles. This is important in that once the paystreak is out below, mining can be done upstream for that distance and, since the source of the gold is being constantly approached as work progressed upstream, the richness should also increase.

I have not dwelt on Weaver Old Channel because our work was mainly confined to Antelope and nothing has been done to prove our assumption in regard to Weaver. The indications, however, are just as clear, and only a small amount of work would be required to locate that old channel as well.

From a study of the production records, of the geology of the two valleys, and from the distribution of goldshedding stringers in the country traversed by Antelope and Weaver Creeks, together with the remnant of an extremely rich old channel on the top of Rich Hill. I am firmly convinced of the existence of unusually rich paystreaks on bedrock in those old channels. By the paystreaks I mean concentrations of gold bearing material which will pay to drift, and, by unusual I mean about two dollars per square foot of bedrock (not per cubic yard of gravel.) I think I neglected to mention that we struck water at about one hundred feet. This is not only another indication of the channel, but assures you a source of water you had not formerly anticipated."

I do not hesitate to recommend, that you, either by yourself or with some associate, arrange for the necessary finances to sink on this old channel and to prospect it by drifting across it."

Yours very truly

(sgd.)Norman C. Stines.

A RECONNOISSANCE OF THE OLD RIVER CHANNELS OF ANTELOPE GULCH

Yavapai County Arizona

For

R. M. MERRILL

By

JOHN M. NICOL, CONSULTING ENGINEER.

OCTAVE, ARIZONA

AUGUST 1926

JOHN MALCOLM NICOL
CROCKER FIRST NATIONAL BANK BLDG.
SAN FRANCISCO, CALIFORNIA

The general geological report on the Rich Hill District covers fully all the present data available; the following is a more detailed sketch of the evidence of an old gold bearing channel of Antelope Valley.

There is much evidence on which to base the supposition that the lower end of Antelope Gulch forms part of a main valley of great age, that at one time drained a considerable territory to the north, possibly as far as Skull Valley.

Great volcanic eruptions of the tertiary epoch filled the whole middle section of the valley and for a time damned its lower outlet, forming a lake of considerable dimensions, the remains of which, as buried lake beds, are still clearly in evidence.

Great flows of lava covered the whole, the remains of which form the prominent mountain peaks of Antelope and others to the east and west. Recent erosion has gradually developed the lower end of the old valley and restored it to somewhat of its former shape, but has not yet eroded it to the same depth as in pre-tertiary times. In other words,, the old channel remains buried below the present bottom of the existing Antelope Gulch Channel.

The present channel and one of its upper branches, has cut thru the "rims" of the old channel at a number of places which enables it to be very clearly traced for about 3½ miles, that is, from its lower end at Stanton, where it disappears under, and is buried by the great delta fan of Valley gravels to a point going north where it disappears under the great cap of tertiary lavas that form Antelope Peak and the hill to the north. How much further the channel extends is, of course, a geological surmise; we may for the present count on a workablelength of over 3 miles.

The rims as exposed over the whole length are schistose rocks, the bedrock is therefore undoubtedly the same character of schist and would be easily worked in drifting and would be an excellent "gold catcher."

The widths of the old channel vary from about 200' at the narrowest to about 1200' at the widest point at the lower end.

Assuming a drifting depth of 6 feet, or two yards, and an average width of one hundred yards, we have approximately 350,000 cu. yards of workable gravel per mile run. As there are three miles of channel whose existence is well established we may count on approximately one million cu. yards of workable gravel; what we need now is some basis on which to form a judgment of the probable values of this gravel.

The district of Rich Hill has been famous for the rich placer diggings in the shallow gulches worked in the early days.

There seems to be fairly authentic data to the effect that over $3,000,000 in placer gold was taken out from the 60's to the 90's and there are estimates running in several millions more. It is also certain that many large nuggets were taken out, one of over $1,000, and many of several hundred dollars in value.

The writer has seen quite a few nuggets taken out in recent times from the Weaver side of Rich Hill. The bulk of this gold came from benches of old channels.

On the west side of Rich Hill there are two well marked sections of an old bench of a still earlier channel of Antelope Valley and there is some evidence of an old fragmentary bench near the top of Rich Hill; that these benches were the principal feeds of gulches and the main source of the smooth well washed placer gold, is quite certain, because those gulches that were not tributary to these benches did not have as much gold; and when we go up Antelope beyond the last point where rims of the old channel are to be found, we get practically no gold.

Prospecting on the minor benches and the exposed sections of the rim of the old channel shows good ground---and this, together with the above facts, leads us to the normal conclusion that the bedrock of the deepest of the old channels should be very rich. I would not be surprised to find sections averaging $10.00 a yard on bed rock.

The old channel is entirely virgin as far as old records and actual evidence of the absence of old working goes.

The matter of sinking a main working shaft and drifting on the old channel by breating should not be difficult.

It could be carried out in accord with standard California practice.

In fact, I can see no special engineering or other difficulties in the way of developing the old channel and a moderate investment of capital would soon prove it up.

An expenditure of $15,000 should be sufficient for a preliminary shaft and $5,000 sufficient for a moderate sized equipment.

There is no question as to the recognized value of the district as a gold bearing placer zone. That the old channel is there--and still intact---is self evident. I feel, therefore, it is a good venture for a moderate capital investment.

Submitted,

(signed) John M. Nicol

I hereby certify that the foregoing is a true and correct copy of original report signed by John M. Nicol.

(SIGNED) BERNICE DRIVER BARIE

Notary Public in and for

Los Angeles County, California

Dated August 27th, 1926.

15.

A RECONNOISSANCE OF THE
RICH HILL
MERRILL PLACERS

YAVAPAI COUNTY ARIZONA

FOR

R. M. MERRILL

BY

W. L. LEMAND

SAN FRANCISCO
CALIFORNIA

JULY, 1930.

San Francisco, Cal.
40-25th Ave.
July 1, 1930

Mr. R. M. Merrill
Congress, Arizona

Dear Mr. Merrill:

You have asked me for a report on your Arizona gravel property, located at or near the town of Octave, Yavapai County, Arizona, with particular reference to my idea of how to profitably mine the same.

The fact that we have disagreed on several vital points, particularly the water situation, is why I have hesitated to make any formal report for you and for that reason I will at this time outline my ideas in a letter. If, after you have read this letter you desire that I do so, I will make a formal report and also submit a plan for working the ground. Understand, please, the report, if made, will follow closely along the lines herein indicated.

There is but one problem to solve: Water. I mean the cost of developing, storing and conveying, water to your ground in quantities commensurate with your requirements. You probably have enough water locally without pumping, to operate one steam shovel on the middle portion of your Weaver Creek holdings, and at that you may at first be obliged to pump some extra water out of one of the local mines, until the muddy water from your mining operations tighten up some of the seepage places in a storage reservoir, which I suggest be built.

Now, with all respect to your judgment, it is not possible to develop enough additional water to locally to operate a second steam shovel outfit. There is no use wasting any time arguing this question, and your first step, I am very sure is to get a good steam shovel to work there. The total cost of eventually developing, storing, and bringing in two thousand miners inches of water would be, comparatively speaking, small and the tremendous amount of gold you undoubtedly would be able to get out of your ground with this amount of water, would be on the whole make the first cost

almost insignificant. But you cannot make anyone believe this-no use trying-not until you first prove the values in your ground, and do it by operating on a big enough scale to remove all possible doubts on this vital point from the minds of people to whom you may look for finances. They cannot be convinced, I feel sure, in any other way.

Now, so far as I have been able to determine, the cheapest and best way by far, and in fact, the only practicable way that I know of, considering how little water there is available locally, is to use a steam shovel, separating your boulders and coarser gravel from the pay dirt by using the identical same standard tried out with gold dredge machinery that has been proven for this purpose. Try no experiments. Then the fine gravel, sand, etc. containing the gold can be washed up in sluice boxes in the usual way, as you go along by using an outfit on skids carrying regular dredge machinery, the skids of sled to follow along immediately behind, and connected by means of a chain to a steam shovel, such as I sketched out for you. This fine gravel, sand, etc. containing the pay dirt should be carried away by means of a regular dredge standard type Robbins belt-conveyor to your sluice boxes, locatedd 80 or possibly 90 feet away from the steam shovel in order to prevent water and sluice trailings from running back down and a round the steam shovel, thereby clogging up your operations, and otherwise hampering your work.

Personally, I have never seen any steam shovel outfit do mining work satisfactorily, unless they kept the sluice water and tailings clear off and well out of the way of the steam shovel. This is the only way so far as I can determine, to conclusively demonstrate (considering your lack of water handicap) what you have there in the way of gold values. Anyway, its first cost will be at least 90% cheaper than the cost of a dredge and a pumping plant. Understand you will have to build a fairly good sized dirt-dam across Weaver Creek below your steam shovel. This can be done in a few days, either with a shovel or horses and scrapers. Then as soon as the water fills up your reservoir, you can immediately begin operations, washing up the fine gravel and pay dirf by using the water out of the

reservoir over and over again. Set your electric pump at the lower end of the dam where the water is still and comparatively free of mud. While the water will, of course, be muddy, it will not be too muddy for sluicing purposes. The fine gravel sand and heavier portions of the silt will settle along the creek, some of it will go along down into the bottom of the reservoir in the still water of course, but before it gets down as far as the pump most of the material, excepting the finest silt will sink. There is no experiment in or about this sort of an arrangement, because the plan is in use right along in several places.

This installation complete, will cost in the neighborhood of $30,000 or $35,000. In no case will it, I am sure, exceed $40,000. A 1½ cubic yard steam shovel should theoretically make three trips per minute and at that rate should handle 6525 cu. yards of material every 24 hours. But let us cut this estimate down say 85% to only 1,000 cu. yards handled every 24 hours. A whole lot of your ground is rich enough to pay back your entire $40,000 initial cost of installing your plant, plus operating expenses every Saturday night, even if you handle only 1,000 cu. yards every 24 hours.

As a matter of fact you should average over two thousand cu. yards every day in the year. If you can get all of your money back and all of your expenses back, including maintenance costs, even once a year, that in itself would be pretty good. In any event, you should get your money back every month if you fix up right and use common sense in your operations. I think you will find your heavy boulders (steam shovel) ground will not average less than $1.88 per cu. yard anywhere. As a matter of course, you will work your boulder steam shovel ground as you come to it. It will not average $10.00 per cu. yard or even half that much. But the poorest of the Weaver Creek steam shovel ground will pay back your entire steam shovel investment every month at the very least, I am am sure, if you fix it up right using a good hard and a half steam shovel (no doubt you would use either electricity or a Diesel engine for power on your "steam"shovel) If you put in a half way outfit and hire a half-way

manager, it means failure before you start, beyond the slightest doubt.

A 3/4 or one yard shovel will not handle all of the larger boulders. And that means that your men will be constantly straining the shovel machinery in trying to move the larger boulders, and consequently you will be laid up a good part of the time while making expensive repairs. There are a few boulders that even a 1½ yard shovel will not handle. These can be blasted or rooted over to one side.

You will note I have suggested holes 2" in diameter, in the dredge type trommel. This is on account of the large nuggets. If you could be sure of 1½ diameter holes letting all the nuggets through, it would materially cut down your power bill for pumping water from the reservoir for sluicing purposes, so as not to be obliged to sluice anything over 1½" diameter. One of the many reasons for urging a 1½ cubic yard shovel or larger, is if you get one too light, the hydraulic cylinder on the sled will pull the shovel back to the sled instead of pulling the sled up to the steam shovel when it moves ahead a few feet at a time on its own caterpillar tract. Do not get a wheel propelled steam shovel.

First thing, when you get there with your steam shovel is to dig a pit 14 or 15 feet deep, 30 feet wide, and 70 or 80 feet long, and start building your sled in the pit. Then take your shovel up where the creek forks, and in one or two days you can build a dyke to turn the water down the south water way, so as to be safe in case of a cloud burst. Then take the shovel and build the storage dam across Weaver Creek. By that time you should have the outfit ready to go to mining.

In wet weather, you will no doubt be obliged to run a hose on board from your sluice water pipe, to wash the mudd off the boulders, while they are still stumbling in the trommel...At the same time, you will very likely have to decrease the grade of the trommel, so as to get the boulders clean before they fall out of the lower end of the trommel, on to the 3 feet wide belt.

Please remember there were no gold dredges 32 years ago. That it was many years before the combined efforts and costly experiments of all the dredge mining people finally got down to a point that enabled them to design a good standard dredge. Now please just stick with this standardized dredge machinery on your sled-viz a standard dredge trommel, not a gravel pit type trommel, and standard type Robbins dredge belt-conveyor, and not the usual economically designed outfit for indoors steady load crushed gravel handling.

Kindly bear in mind, as I have often told you, to refrain from stating the correct values or any values for that matter in your ground, because no one will believe you and it probably would result in creating suspicion in the minds of others as regards any other statements you may make on any other subject. Let who ever goes in with you determine the values there for themselves. Insist on this, it is easily done in this kind of mining. Not so in underground gravel mining or in hard rock mining either.

After you demonstrate with a steam shovel the values in that portion of your ground, where it is too shallow to dredge, which ground it so happens, contains boulders so large that no dredge every built couldpossibly handle them, it ought to be easy then for you to raise enough money to build a regular proven type steel dredge, one capable of handling 10,000 cu. yards per day which means over 14,000 tons per day. (Some dredges handle as much as 20,000 cu. yds. per day) Such a dredge will cost ready to run about $400,000, not counting pipe lines or pumping plants for supplying water which might run up to another $100,000. Then locate the dredge four or five miles down Weaver Creek just north of Round Mountain and about 4 miles from the Santa Fe Railroad at Harqua Hala Station. There are no large boulders down there, or anything else unusual to trouble you in dredging work, except of course the lack of water, and you can get that by pumping.

About 80 miners inches of water (2 second feet) is all that I have ever known to be necessary to be put into a dredge pond to keep the dredge afloat and going good. However, for the purpose of playing sure, let us estimate that it will require as much as three

second feet (180 cu. ft. of water per minute) of water for a 10,000 cu. yard capacity dredge on the lower Weaver Creek flat. By putting a pumping power plant at the head of Box Canyon in the Hassayampa River, you can, by forcing the water up about 530 feet vertically, get it up to the top and over the hill, on down to the first dredge site on lower Weaver Creek. The pipe line would be about 2 3/4 miles long. (These elevations and long distance figures are taken from the U. S. Geological Survey Map) If you use a 12" diameter screw pipe line or a 12" welded joint pipe line, your friction loss will amount to practically 2 feet for every hundred feet in length of the pipe line if you pump as much as 3 second feet of water through it.

Now, if the pipe line is say 15,000 ft. long, then the pressure of resistance to overcome from friction alone will amount to about a three feet lift or head, in other words 131 pounds pressure per square inch or a total of 850 ft. head to overcome, or a total pressure per sq. inch of 372 pounds to pump against. Now this will require nearly 500 H. P. and therefore, the bill for electricity at 2¢ per K. W. hour for pumping the water alone, would amount to nearly $4,000 per month. (It would cost only $2,000 per month if you use a Diesel engine) but the first cost of a power plant would, of course, be greater. Please note if you can get alone with 1½ cu. ft./per second of water, your pipe friction losses will be reduced from 300' to only 75'. Water is imcompressible. The law of friction of water in pipes is in proportion as to the square of the relative velocities.

If you have a 10,000 cu. yd. daily capacity dredge, which means handling 300,000 cu. yds. of material per month the $4,000 cost per month for power alone just for pumping, water would foot up to 1-1/3 cents for water for every cu. yd. handled. This expense does not include the cost of power for operating the dredge itself. However, when working in 60¢ a cu. yd. gravel, you could easily afford to pay 1-1/3 cents per cu. yd. for power for pumping water. I chose the figures, viz. 60¢ per cu. yd., because that is the lowest estimate by anyone that has tested the lower dredge ground. The power bill for operating the dredges at Marysville and Folsom, California, amounts

on an average for the two places on 16 dredges to 1¼¢ per cu. yd. year in and year out. This includes pumping water out of the dredge pond for sluicing up gravel on the dredge. In deep ground where the dredge does not travel very far in a day you can take water directly on board and save part of this expense.

To be exact the figure is 1.24/100 cents per cu. yd. handled. If your electric power costs you, say twice as much at Octave as it costs at Marysville, you will have to go against a handicap of an additional 1¼ cents per cu. yd. for dredge operation power. Then add the one and one-third cents additional per cu. yd. that it will require to pay for power for just the water supply and you will see that you are working in Arizona to a disadvantage or handicap to 2.6¢ per cu. yd. as compared with Marysville. costs. However, there are no other disadvantages or expenses to meet that I know of that they do not have at Marysville. Power at Marysville prices for dredges averages a trifle over 7/8 of one cent per K. W. power. I have two annual dredge reports I will send you herewith. (one is for the Yuba Consolidated Gold Field Ltd. annual report to operate near Marysville, while the other one referred to is the Latomas annual report). Let us take for purposes of comparison their highest annual cost per cu. yd. for their yardage average of gravel handled, which figures by the way, includes amortization and maintenance, viz/ 6. 1/19¢ per cu. yd. This you should certainly be able to compete with having a new modern steel large capacity dredge, even if handicapped with two and six tenths cents extra cost for water and the extra rates charged for dredge power, and keep your yardage costs well under their 6. 1/19¢ cost, allowing of course the extra six and two-tenths cents handicap referred to in detail above, or a total dredging cost at Octave of 8 13/20¢ per cu. yd. based on Marysville cost figures, plus the extra cost of your handicaps. Please note that nearly all of their dredges are old and that they ran on an average of not quite 19 hours each day for the year and period covered by the reports. Many of their dredges are wooden.

The Three Friends Dredge that Mr. Ringe, Mr. Giffen and myself built 24 years ago, which I operated for 7 years, had an average record of running 23 hours and 22 minutes out of every 24 This dredge, by the way, is still running.

Unless the Arizona Power Co. (who I understand have a trunk line over your Octave property) have at least two plants for a generating electricity, you should by all means besides your electric pump, put in Diesel Engine power plant, on the Hassayampa River for pumping for safey sake if for no other reason to prevent the possible chance of your dredge settling down on even ground in the bottom of the dredge pond, which it certainly would do if the water, for any reason , should fail you. Either do that or else build a suitable storage reservoir somewhere above your dredge and keep sufficient water in it at all times, in case of an emergency to keep the dredge afloat for at least a month. This in case of serious disaster to the Arizona Power Co. Elec. Power Plant or plants, which might possibly be put out of commission for a month. If they had say, three separate generating plants, that would be different.

The earnings of one 10,000 cu. yd. capacity dredge on lower Weaver creek on 60¢ gravel, will, I am sure easily pay for the necessary expenditures as you go along for storing and brining in a couple of thousand minors inch of water by gravity to your ground. Then you can hydraulic off the rich steep hill sides high up above the area where you will be obliged to use steam shovels, no matter how much water you have. The same water may be used below free of all cost for the four or five additional dredges you will probably install later on, after you have carefully drilled and tested all of your ground. You will no doubt go out on the edges of your land and take everything that will be 60.10¢ per cu. yd. which as stated above will require perhaps as many as five ten thousand cu. yd. capacity dredges to work out your ground. (There were 42 dredges at work at Oroville at one time) To pump enough water for all of these dredges would run up to close a quarter of a million dollars per year. If your dredges will last say 20 years you

can reasily see why you must develop, store and bring water in by gravity.

Remember you have 4 distinct kinds of mining on your land viz: first steam shovel work. This will be on ground where there are too many big boulders for dredging and at the same time it so happened in this case the ground where the large boulders are too shallow to float a dredge and besides all that there would be no place to dump your tailings if you should attempt to hydraulic where you should use shovels. Furthermore this steam shovel ground should be worked out before you cover it up with hydraulic tailings. Second, it will have to hydraulic your steeper ground above the steam shovel ground.

Then, third, go after the dredging ground, that is the main standby. And, finally perhaps you may in the future conclude to sink shafts and drift out the gravel if it pays in your deeply covered up ancient river channels that runs down near Antelope Creek just west of Rich Hill.

There is no safer investment possible in any line of human endeavor where ground is suitable for dredging and the gold is evenly distributed throughout the gravel, provided it is carefully and intelligently drilled. It is not unusual to measure up the ground dredged the day you clean up and before you get the gold out of the sluices be able to tell with pencil and paper from the land area dredged since the previous clean ups taking the figures from the drilling records to within two or three per cent of how much the clean-up for the half month's operation will amount to before you get the gold weighed.

There is no fire hazard of fire insurance to pay as modern dredges are built entirely of steel. The only real hazard is the possibility of twisting your dredge hull out of shape if for any reason the water goes out of the pond, or if the dredge should sink. By taking the ordinary precaution of putting in water type tight bulk heads, and keeping the man holes to the lower deck covered and locked at all times, there is no danger of sinking a dredge.

Now, Mr. Merrill, in my judgment the only way to put this property of yours on its feet is to work reasonably close along the lines above indicated. There is no doubt the financial result whatever provided you go at it right, and handle your yardage and save your gold. But, don't, please, deal with any one who wants to experiment and positively refuse to permit any machinery to be installed that has not heretofore been thoroughly tested out on standard dredges. I refer to machinery to be installed on your skids or sled, same to follow along just behind your steam shovel and further please don't let them put Cousin Jim or Uncle Ed in charge to try to run the outfit on your property unless he is competent. And in any case, dont fool with dry washers.

Remember the water you develop and store for mining will be valuable for all time for irrigation purposes after you are through mining.

As to where the gold came from or how it got into your ground is inmaterial. The gold is there, no mistake about it, which is sufficient for our purpose.

I cannot say, neither can any one else for that matter say, whether or not your deep channel will carry good enough values to pay to mine, but we need not consider that angle now. However, there is no doubt in my mind about the values in the rest of your ground. I repeat, insist upon your people sampling it for themselves. It is easily done. If the old timers had had water you would have the sign of a mine there today. They had no place to store storm water in your water shed and no money to go elsewhere to store flood water and bring it on to the ground with ditch.

You cannot get the necessary money either in my opinion to do this unless you first prove conclusively by actual operations from gold actually recovered what values you have there.

There is but little gravel os soil on the steep side hills above your ground to hold rain water. Therefore, a few hours after a heavy storm, there is no very great amount of water left in the stream. In other words, the storm water runs off quickly. Thisis what pre-

vented your upper ground from being hydraulicked more than it has been.

All the patented dry washers were failures and dry washers always were and always will be failures. If the ground has even the slightest moisture in it, for it costs too much to dry the moisture out. Experienced miners with small machinery have made money there in mid-summer for three-fourths of a century by working during the middle of the day. Just think what a dredge could earn in that kind of ground. A dredge which is capable of handling more gravel in a day than 10,000 can possibly handle in the same time with dry washers or rather dry panning, as most of them do. And even then there is enough gold left in their washer tailings to pay to dredge. Just pan some of their dry wash tailings and see.

Now, a cubic yard is more gravel than the average dry washer miner can handle in a day. There are 120 pans of gravel in a cubic yard, and there are only 480 minutes in eight hours, that means a panful must be dug out and dry washed every four minutes if they handle a cubic yard per man per day. They just don't do it that fast, that's all.

The man who tested a part of your ground for me before my last trip down there was competent and 100% reliable. It was this man who tested the Three Friends Dredging Co. ground (referred to above) before we built our dredge. The ground he tested paid over a period of seven years to within 2-3/9% of what his drilling records indicated it would pay and that error was in our favor.

In closing, I can unhesitatingly say that I am very sure from the very best possible source of information and my own personal observations and tests that the value in your ground justifies going ahead. And I also unhesitatingly assure you that if you do not go at the right you will surely fail irrespective of the value in the ground. There are no doubt ways to go about the work other than herein stated. However, I feel sure that the plans I have outlined if followed out carefully will succeed.

Yours truly,
(sgd) W. L. LELAND

COUNTY OF LOS ANGELES: SS

STATE OF CALIFORNIA :

I hereby declare the foregoing to be an absolute and correct copy of the original report made by Mr. W. L. Leland.

(SIGNED) MARY E. LAWRENCE

Notary Public in and for
the County of Los Angeles,
California.

27-a

CALIFORNIA TREASURE BOX LIMITED

CHICO, CALIFORNIA

San Francisco, California
40 25th Avenue
Feb. 24, 1932

Mr. C. O. Byrd
538 Fidelity Bldg.
Los Angeles, California

Dear Mr. Byrd:

My letter file discloses the fact that I send Mr. R. M. Merrill all of Mr. Bell's rough sketch field notes of his prospecting on Weaver Creek, Arizona, from a point opposite the Octave Mines for a little over 3,000 ft. and 1320 ft. in width. Mr. Bell staked out 6,000 feet, 1320 feet wide, but was taken ill and died before finishing the work. Where he got down it showed an average depth of 20 feet 9". The bottom ground was always the best. His average values was $1.88 plus per cu. yard. Bell estimated 62½% of the material was boulders and gravel over 2" in diameter. There are 120 pans in a cu. yd. If his estimate is correct there would be only 45 pans left that would carry values out of a cu. yd., or a trifle over 4¢ per pan to make up $1.88. I think Bell's sister still has the gold, several ounces of it that Mr. Bell obtained in his pannings. Mr. Merrill has never offered to pay me for Bell's work or even thank me so I fail to see why I should give him the gold. I am sending a copy of this to you in care of Mr. Louis Garbrecht, 1201 Robison Blvd. El Paso, Texas.

Yours truly

W. L. LELAND

Tuesday

Octave, Nov. 23

Mr. dear Mr. Merrill:

Yesterday I took 10 pans, principally on Orfino Gulch as follows:

1 Pan	#10	surface -#12 where Castle sunk	½¢	27¢	yd.
" "	11	Shaft			
"	12	Hillside Orfino below Castle Camp	1/8¢	15¢	yd.
" "	13	Orfino Gulch	25¢	600	"
" "	14	Bank of Gulch	½¢	75¢	"
" "	15	Orfino Gulch	3¢	400	"
" "	16	" "	2½¢	350	"
" "	17	" "	3/4	110	"
" "	18	" "	1/8	15¢	"
" "	19	" "	0		
			19		
		TOTAL	1602		

$1.60 per yd. av.

10 pans 1602

Personally taken 8 pans 35
18 1637 - $.90¢ average 18 pans.

The eight pans I could hardly expect any colors from. The looseness of the gravel. I worked until 40'Clock and then walked 4 miles to Octave and was good and tired. Got a good supper at Gilles and had a sleep in good Bed at Club House, I did not think they would care to open the Superintendent's house, although I did not ask as they have been very kind to me. I expect to be very diligent and not lose any time, so if you do not hear from me you may know that all is going well. I hope to be through with my part of the work here in two weeks, altho I will not leave anything undone.

"Old Desert" did not swear once yesterday in my presence the nearest he came to it was Dog gone it. He is a dear old soul and my ambition is to get him to see and know his Saviour. Tell Mrs. M. to be careful and turn the lamp down.

Sincerely yours,

Octave, Arizona

December 5, 19

My dear Mr. Merrill:

Your note received. I will get the cement and express the first time I am down that way. I received a telegram from S. & B to remain here, that they may be having someone come on down, so I may not leave here before the middle of the month. I have planned to go to San Francisco for a week and then return here on my way east and finish my work, but now I will stay here until finished and then come on to San Francisco.

Sincerely yours,

JOHN J. HABECKER

Octave, Arizona

Dec. 9,

My dear Mr. Merrill:

I have not yet learn't whether S. & B. are coming out or sending someone. I am rapidly cleaning up my work here and hope to start for San Francisco by Sunday or Monday.

I have a shaft on No. 7 in the creek that I want to get to bedrock before I leave. It was 19 feet deep at noon today, and no bedrock amd no pay in the bottom, although we did pass through a streak about 2/3 way down that gave three pans 11¢, 5 pans 9¢, total 8 pans 20¢, $3.75 average per yard. 29 other pans showed 0, but I would not be surprised to strike something good on bed rock if we can reach it, On No. 8 we struck bed rock at 10 feet.

Pretty lonely here but I am busy.

Yours truly,

JOHN J. HABECKER

MEMBER AMERICAN INSTITUTE MINING AND METALLURGICAL ENGINEERS

CHAS. J. STONEHAM

MINING ENGINEER

Phone Axridge 4849
Los Angeles, California
October 25, 1931.

R. H. Harman

Los Angeles, California

Dear Sir:

At your request I made one trip of observation and one trip for the purpose of checking values at the Yavapai Mine at Octave, Arizona.

I was accompanied by Mr. Thos. Holladay, who took the samples at and under my personal direction and who has been present at the running of these samples. At the time of extraction of the values, and the weighing of them.

I am herewith giving you the results of the same.

TAILINGS SAMPLES TAKEN

Sample #1. Taken from the tailings being dumped upon the dam weight 110# moisture 10#, net weight 100#.

Sample #2. Taken at lower end of old tailing dump. Net weight 97#.

Sample No. 3 Taken at upper end of old tailing dump, net weight 125#.

VIRGIN PROPERTY SAMPLES.

Sample No. 4.

Taken from under Grizzly over spilled material. Net weight 83#.

Sample No. 5.

Straight clay material being thrown away as an overburden and as of no value by Superintendent. Net Weight 55#.

Sample No. 6

Sand from bed or creek and at depth of 6". These samples taken of two shovels at points 50' apart. Net Weight 110#.

The results of these tests are on the second page hereto.

Respectfully submitted,

CHAS. J. STONEHAM?
MINING ENGINEER.

MEMBER A.I.M.& ME.

Page No. 2
R. H. Hartman
10-28-31

Sample	# 1	100#	Aa,	74	Mg.	Values	$	.932	Ton	$ per yard
"	# 2	97	"	67	"	"		1.007	"	1.51" "
"	#3	125#	"	72	"	"		.906	"	1.15" "
"	#4	83"	"	5023		"		75.95	"	113.92 "
"	#5	55#	"	1027		"		22.50	"	35.29 "
"	#6	112$	"	10		"		.112	"	.17 "

NOTE:

Sample No. 4 gave 5,000 M. G. coarse nuggets and 23 M. G. fine gold.

Sample No. 5 gave 1,012 M. G. coarse nuggets and 15 M. G. fine gold.

In my opinion based upon my experience in my observations you have a very fine property, that will prove a great success with proper management.

In my opinion your material can be handled at a cost not to exceed 23¢ per yard, provided you have the proper machinery and equipment. It is my further opinion that the ground will yield an average of not less than $1.75 per yard.

Very respectfully submitted,

CHAS. J. STONEHAM

Subscribed and sworn to before me the 29th day of October, 1931.

Annie B. Myers, Notary Public
in and for the County of
Los Angeles, State of California

Com. expires Jan 24, 1932.

ASSAY WEIGHTS REDUCED TO VALUE IN GOLD AT 900 FINE.

NO. SAMPLE	MILLIGRAMS	PANS	PER CUBIC YARD.	
1	45.94	3	$ .70¢	
2	52.92	3	.81	
3	18.52	3	.38	
4	44.55	3	.68	
5	58.22	2	1.34	
6	42.30	3	.85	
7	42.88	3	.66	
8	35.04	3	.54	
9	61.52	3	.94	
10	54.36	3	.80	
11	73.26	4	.84	
12	45.50	4	.52	
13	106.56	4	1.23	2 nuggest Nol
14	40.93	3	.63	01861 #2 0.19
15	36.82	3	.56	Sample 13
16	37.80	4	.43	Milg. Value
17	36.46	3	.56	Nugget 127.58.07
18	23.00	2	.53	Nugt. 65.00 .04
19	48.78	3	.75	
20	36.96	6	.28	
21	62.78	4	.72	
22	37.18	2	.86	
23	18.10	2	.41	
24	47.13	4	.54	
25	67.58	6	.52	
26	36.42	3	.56	
27	58.00	4	.67	
28	55.44	3	.85	
29	25.42	5	.23	
30	14.76	1	.22	
31	87.40	2	2.02	
32	85.36	9	.44	
33	73.18	6	.56	
34	74.70	4	.86	
2				

E. LIONEL C de la Pole

Feb. 18, 1929

KEY SHOWING LOCATION WHERE SAMPLES WERE TAKEN.

No. 1 West end.
No. 2 Cross section No. 1
No. 3 Channel
No. 4 Cyanide Gulch and Yaqui
No. 5 Orofino, 2 Miles S. of Slaughter House Gulch
No. 6 Yaqui 2 miles S. of mill
No. 7 Antelope W. of Stanton
No. 8 Slaughter House Gulch, high bank E.
No. 9 Junction of Cyanide and Yaqui
No. 10 3½ miles S. on Yaqui
No. 11 3 miles s. on Yaqui
No. 12 Fool's Canyon
No. 13 Caliche Weaver
No. 14 Slaughter House Gulch & Weaver
No. 15)
No. 16)
No. 17) Cross Section No. 2
No. 18)
No. 19 Cyanide W. of Octave
No. 20 Ninety Feet Caliche W. Bank of Weaver S. of Red Hill
No. 21 Cross section No. 4
No. 22 Antelope West Round Mountain
No. 23 Cross Section No. 3
No. 24 " " " "
No. 25 100 ft. caliche weaver
No. 26 Cross section No. 4
No. 27 Cross section
No. 28 Weaver and Orofino
No. 29 West Antelope
No. 30 Photograph No. 4 Flat N. of Round Mountain
No. 31 Antelope west of Round Mountain
No. 32 High Bank Weaver & Slaughter House Gulch
No. 33 CrossSection No. 3
No. 34 Orofino North of Weaver
No. 35

Nugget Cross Section No. 4
" " " No. 3

E. LIONEL C. de la POLE

FEBRUARY 18, 1929.

STREAM FLOW RECORDS - HASSAYAMPA RIVER AT BOX DAM SITE
RECORDS AND ESTIMATES BY W.A. FARRISH, CH. ENGR, WITMAN PROJECTS

ACRE FEET

YEAR \ MONTH	OCT.	NOV.	DEC.	JAN.	FEB	MAR	APR.	MAY	JUNE	JULY	AUG	SEPT	TOTAL
1915-16						35450*	19410*	910*	250* ✓	460* ✓	180* ✓	7510*	64170*
1916-17	15400*	340* ✓	890*	10130*	1770*	2360*	23970*	3160*	380* ✓	1010*	4090*	460* ✓	63960*
17-18	250* ✓	250* ✓	510* ✓	680*	420* ✓	760*	340* ✓	210* ✓	150* ✓	170* ✓	8990*	630*	13360*
18-19	170* ✓	210* ✓	1980*	1310*	3460*	760*	340* ✓	230* ✓	100* ✓	3210*	15610*	760*	28140*
19-20	1650*	10130*	8100*	78070*	63300*	18710*	9370*	2450*	270* ✓	320* ✓	25320*	1600*	219290*
20-21	460* ✓	460* ✓	1160*	1480*	1100*	1350*	590*	340* ✓	120 ✓	9210*	5320	910	6940* 15560
21-22	3720	180 ✓	4030	12900	25370	23910	8450	1970	480 ✓	600	1690	2260	85560
22-23	170 ✓	270 ✓	800	520 ✓	2040	8690	1700	310 ✓	110 ✓	420 ✓	3670	7940	26640
23-24	160 ✓	1560	22620	3310	1140	1590	3010	350 ✓	150 ✓	90 ✓	60 ✓	290	34330
24-25	80 ✓	50 ✓	930	320 ✓	280 ✓	160 ✓	210 ✓	90 ✓	350 ✓	1940	2350	23970	30730
25-26	8390	230 ✓	280 ✓	230 ✓	410 ✓	690	15460	520 ✓	150 ✓	720	1430	7810	36320
26-27	1560	80 ✓	9220	330 ✓	109840	14270	3980	1000	180 ✓	1580	11440	2400	155880
27-28	2760	380 ✓	1630	1320	12090	860	430 ✓	410 ✓	100 ✓	350	2410	90 ✓	22830
28-29	107 ✓	39 ✓	66 ✓	107 ✓	272 ✓	143 ✓	136 ✓	77 ✓	75 ✓	308	1568	975	3873
29-30	54 ✓	45 ✓	42 ✓	160 ✓	120 ✓	1796	213 ✓	111 ✓	19 ✓	75 ✓	833	147	3615
30-31	31 ✓	155 ✓	112 ✓	134 ✓	10132	465	179 ✓	84 ✓	28 ✓	579	18886	316	31101
31-32													
32-33													
33-34													

✓ = Months during which flow dropped below 1 MGD

Note:- 10 Sec.-ft. = 595 A.F./Month = 4500 GPM
1 MGD = 92 A.F./Month = 695 GPM

*Computed from relation curves with Hassayampa above Walnut Grove

PRESENT USE WICKENBURG
City 30 Mil. Gals/Year
Sta Fe 21-26 ✓ ✓ ✓

Appropriation at or below "The Box" - Hassayampa River 8-3-34

App. No	Name	Amt Water	Sec.	Dir. Pt Tp	R	Use	Permit	Rights
260	Ariz. Water Cons. Dist.	100 S.F.	28	7N	4W	Irr.	342	O.K. as far as Sta. Wat. Com. knows
1034	✓	17 S.F.	28	7N	4W	✓	701	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓
1289	Fred C. Bolen	— ?	5N-6N		4W	Mining		good standing - not examined
1380	Claud Gobble	1/4 S.F.	28	7N	4W	Domestic		✓ ✓ ✓ ✓
C-60	Lloyd D. Simmonds	65 AF/YR	26	8N	SW	Irr.		?
C-61	Ephrian Baker	220 AF/YR	23-26	8N	5W	✓		?
C-7	Mary P. O'brien	800 AF/YR	12	7N	5W	✓		Rights are good if filed affadavit 1907 O.K.
O-41	Romaine H. Londermilk	400 M. In	26	8N	5W	Irr.-Stock		Rights good for some amount depending on acres irrigated
C-1	Cal S. Carr	75 AF/YR	26	8N	SW	Irr.		Rights?
C-2	C.E. Evans (well 1914)	90 ✓	30	5N	1E	?		Rights?
C-3	M.S. Rhoades	80 ✓	14	8N	SW	Stock. Dom. Irr.		Rights (1907-08)?
C-4	John Grace	60 ✓	14	8N	SW	✓		Rights (1907)?
C-5	Romaine H. Londermilk	110 ✓	26	8N	SW	Irr.		Rights? (Filed in Yavapai Co. 1913)
O-21	A.W. Lawe	300 M. In.		?		Mining		Rights (Yavapai Co.)?

Old or contested - no status by S.W.C.

→ For location see Maricopa Recorder

Bk 53 pg 352
58 330
74 181-2
} Location of claims

Gold Mines