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ITEM 36

REPORT ON VARIOUS MINES AT AURORA, NEVADA

HUMBOLDT MINE

PROSPECTUS MINE

JUNIATA GROUP

DEL MONTE MINE

DUMPS OF LAST CHANCE HILL

ESMERALDA GROUP

NEW ESMERALDA GROUP

REPORT ON THE

HUMBOLDT MINE

OF THE CAIN CONS. GOLD MINING CO.,

AURORA, MINERAL COUNTY, NEVADA

SUMMARY

The Humboldt property consists of two full patented claims, belonging to the Cain Syndicate, and a small fraction between the two claims, located by Spurr & Company in behalf of the Tonopah Mining Company, as a result of their surveys. The mine was worked in the earlier days of the Camp, especially around 1886, when ore averaging around $18.00 was mined, and milled at the brick mill still standing below Aurora. The ore was treated by pan-amalgamation, and the tails averaged around $5.00. Development work was done on the 100, 200, 300, and 400-foot levels. Considerable water was encountered in the bottom, and eventually the mine was shut down, and has been abandoned for 25 years. The evidence is that under the then existing circumstances $10 - $12 ore (of which considerable still remains in the mine) could not be made to pay.

The Humboldt claims cover essentially one huge vein—the Humboldt, which is a fissure vein in andesite. About 1300 feet of the outcrop of this vein are comprised within the property. The vein is of dense white quartz, carrying finely disseminated gold. Silver occurs in the proportion Au: Ag = 1 : 3 by weight. The vein runs into the Silver Lining property on the northeast, and is cut off by a heavy fault on the southwest, the faulted continuation being the Prospectus vein. The known extent of the original vein along the strike was about a mile, and it is likely that it proceeds further beneath the capping.

For about 750 feet in the Humboldt property, the vein is from 20 to 70 feet wide and will probably average 40 feet in width.

The water flowing from the Prospectus tunnel would probably be sufficient for the operation of a 100-ton mill.

The first level of the Humboldt shaft develops the vein for a length of about 147 feet, but only explores a portion of its width. The 200-foot level develops a length of 125 feet, and shows up a very wide vein; but it is doubtful if the total width has been developed at all points. The third level develops the vein for a length of 525 feet; and the vein has an average width of 60 feet. Between the main shaft workings and the Silver Lining ground is a shaft. This shaft is about 40 feet deep, with a cross-cut through the vein, which is here about 25 feet wide, with 10 feet of $3.00 ore. Near the Silver Lining boundary the vein is about 60 feet wide. Workings on the Silver Lining, near the boundary, shows ore running $7 - $17, for a width of 3 or 4 feet; and this ore probably runs into the Humboldt property.

In sampling the Humboldt workings, 50-pound samples were taken, the cuts being about 3 - 4 feet long, and assays were made on each sample both in Tonopah and in Aurora.

On the 40-foot level, one cross-section (#2) shows 18½ feet of quartz averaging $9.20 per metric ton of 2204 lbs; another 9.8 feet, averaging $4.02. In neither case was the full width of the vein exposed.

On the 100-foot level section 1 shows 12 feet of quartz averaging $3.21; section 2, 16.4 feet averaging $5.30; section 3, 9.4 feet averaging $9.84; section 4, 8.2 feet averaging $7.18. The width of the vein is only partially developed on this level. The total average value on the 100-foot level is $6.07.

On the 200-foot level, section 2 shows 8.5 feet of ore averaging $4.39; section 3, 40 feet of ore averaging $5.87; section 4, 57 feet (width) of ore averaging $5.78. The width of vein on this level is not fully developed. The average value of ore on the 200-foot level is $5.70, the average exposed width 35 feet.

On the 300-foot level there is a total of 1045 feet of workings, including three cross-cuts across the vein. One cross-cut shows no ore averaging over $2.50; another shows a total of 36 feet (in two belts) of ore averaging $4.95; and another a width of 20 feet of ore averaging $4.34.

The fourth level is at the time of writing inaccessible; it is reported that about 500 feet of development work was done ~~high~~; that the vein was wide, but showed no high-grade ore.

With the above data, the following tonnages and values of ore-reserves above the Prospectus tunnel level, and east of the Humboldt shaft have been calculated:

Total visible, probable and possible ore	Tons	Average Value per ton
	568,078	$4.90

The Aurora ores have hitherto been treated by amalgamation (pan-amalgamation or plate-amalgamation). The values left in the tailings was great, the Humboldt tails from the Consolidated Esmeralda mill in 1886 averaging around $5. The last mill constructed (by Mr. Cain) had about $10. tails, which have recently been re-treated, by cyanide.

The ore is evidently an ideal cyaniding ore, being free from sulfides and impurities and with values mostly in gold. Various tests made under the direction of Mr. A. R. Parsons indicate a recovery of 95% of the gold and 60% of the silver, or 94.5% total recovery.

Should systematic mining operations be begun at the Humboldt property, the Prospectus drain tunnel would be extended to the Humboldt shaft. This would connect at about the 400-foot level, and would give about 400 feet of backs on the vein. The ore in the block above the tunnel could then be mined very cheaply. Breaking and stoping, timbering, and development charges would all be small. The principal item of cost which requires careful consideration is power, and it is essential that this should be supplied by the Pacific Power Company at a low rate.

In seeking to arrive at an estimate of the cost of mining and milling ore, the method of comparison with known operating mines was used. The closest parallel which I know is the mines at Silver Peak, Nevada--not far from Tonopah. In several respects Aurora has a slight advantage in conditions over Silver Peak, in respect to dip of vein, tramway charges, wage scale, etc. The Silver Peak costs for the first quarter of 1911 were a

total of $2.719 per short ton. Taking the same basis, but modifying the figures for development, and deducting the Silver Peak aerial tramway charge, we get a total cost for the big Humboldt vein, of $2.605. This would probably not be attained at first, on account of the time required to organize properly; but is deemed ultimately possible. Per metric ton (as our assay values are given) this figure should be increased 10%, to $2.86. Where ore is already developed, the minimum assay value, whose recovery value would repay all costs, would be $2.85.

The figure of $2.86 has been arbitrarily raised to $3.00, for calculating net profits.

To the total estimated ore-reserves in the Humboldt mine, estimated above at 568,078 tons, the dump ores are added as follows:

	Tons	Av. Value	Recov. Value	Est. Cost	Est. Net Profit per T.	Total Net Profit
Total Ore Estimated in Mine	568,078	$4.90	4.63	3.00	1.63	$926,987.
Dump Ores	3,900	2.88	2.72	1.41	1.31	5,109.
Total	571,978					$932,096.

In contemplating this possible profit, we have to take into consideration an outlay for purchase, installations, etc. of $560,000. This would leave a net profit of $372,000. With a 500-ton mill, the total estimated tonnage would be handled in a little over three years.

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SPURR & COMPANY

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HISTORY

The mine was doubtless prospected and perhaps worked in a small way from the surface in the early days of the camp, about 1862-64. Afterwards considerable work was done on it, and the ore was hauled to the Del Monte mill, whose large brick structure still stands, below Aurora (Consolidated Esmeralda Mining Company's mill). This Company (the Consolidated Esmeralda Mining Company) appears to have been an effort to revive the camp as a whole, and appears to have been drawn upon various

LOCATION AND EXTENT OF PROPERTY

The Humboldt Property consists of two full patented claims, the Humboldt and the West Humboldt, each about 1500 by 200 feet, and lying side by side, and slightly overlapping. (See Map, Sheet No. 1).

The Humboldt shaft, which is about half-way between the ends of the West Humboldt claim, is about 3100 feet from the center of the village of Aurora, in an air-line. A good wagon road connects the shaft with the village.

At one point, between the Humboldt and the West Humboldt claims, our surface surveys discovered a long narrow fraction 800 feet long, and with a maximum width of 12 feet. I located this for the Company, Aug. 16, 1911, but in the name of M. B. Huston, for diplomatic reasons. This is the Harry fraction, and is important, in that it covers or disputes part of the apex of two important branches of the Humboldt.

HISTORY

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mines besides the Humboldt, as the Durand and the Del Monte, but these to a limited extent. An old assay book for this mill, for the year 1886, gives the values of the Humboldt ore (which seems to have been the principal source of supply of the mill) for several months. Following is the record in part:

Humboldt Ore 1886	Heads	Tails
March 16 to Apr. 10	$24.82	$3.97
Apr. 10 " May 1	21.25	4.73
May 1 " May 31	15.59*	5.05**
June 1 " June 30	16.65	5.34
July 1 " July 16	13.17	6.29

The ore was treated by pan-amalgamation, with a very heavy loss, as the results above show. The hoist was driven by steam, with wood fuel; all drilling was done by hand, which was slow, as the quartz is very hard. The wagon haul from the shaft to the Del Monte Mill was also an item of expense. Miners who worked in the mine during this period say that the mine costs together with the high cost of milling, exceeded the recovery value of the ore. This is also indicated by the fact that ore of the same grade as went through the mill has been left, even on the upper levels. The shaft was sunk deeper by this Company, and a great deal of development work done on the 300-foot level and probably some on the 400-foot level.*** On the 400-foot level, however,

* $13.91 gold and $1.68 silver
** 4.07 " " .98 "
*** We have as yet been unable to reach the 400-foot level.

a great deal of water was encountered. Sharpe, the rancher at Fletcher's Station, who was pumpman at the time, says that there were two pumps, one pumping water from the 400-foot level sump to the 200, and one throwing it from the 200 to the surface; one having a four-inch and the other a six inch pipe; and that frequently the lower pump was almost drowned. This indicates a flow of water around 200 gallons a minute. It is probable that the work on these lower levels was with a view of finding greater values in depth than those encountered in the upper workings; and failing in this the mine was shut down, about 25 years ago. It has lain idle since that time.

WATER SUPPLY

A rough estimate of the water flowing from the Prospectus drain tunnel, on Aug. 13, 1911, showed 98 gallons per minute.

Mr. Parsons estimates that ton for ton (water and ore) is a liberal allowance for mill supply. At this rate the above water supply would suffice for a 450-ton mill. With increased development work, the water flow from the tunnel will naturally increase, so that there will probably be sufficient for required milling purposes.

About a mile up the valley, from the mill site, is a spring of pure water, flowing, on Aug. 13, about 40 gallons a minute. This would furnish abundant water for domestic purposes. This is covered by the Juniata mill site, a location marked in the Carson Land Office as abandoned, but which

Mr. Cain claims is still valid, and that the property is owned by him. We have made surveys as to the spring location, and find that it is also situated on an agricultural patent belonging to George S. Green of Reno, which overlaps in the portion around the spring, the Juniata mill site. The Green holdings consist of 240 acres of flat land occupying an amphitheatre, where the natural place for residences and stores would be were there any considerable mining operations centered around the Prospectus Drain Tunnel; and this Green land, together with the Juniata patent, would give the Company valuable holdings, essential both for water supply and residential purposes.

GEOLOGICAL CONDITIONS

The Humboldt claims cover essentially one huge vein--the Humboldt vein, which is a fissure vein in andesite. Roughly about 1300 feet of the outcrop of this vein is comprised within the property. The vein strikes about N. 60 E., with a steep northwest dip. It is made up of hard white fine-textured quartz, having something of the appearance of broken stone-china; and is frequently marked by faint bandings which suggest somewhat the bandings of chalcedony. Sulfides are absent; the gold appears to occur in this quartz in the native form, finely divided and ordinarily invisible. Silver occurs in about the proportion Au: Ag = 1 : 3. by weight, so that silver constitutes about 7½%, gold 92½% of the values.

The Humboldt vein runs from a point about 150 feet southwest of the Humboldt shaft through to the northeastern boundary of the property without any save minor breaks or disturbances. To the northeast it passes into the Silver Lining property, owned by Mr. Smith, the borax magnate, and continues through this property, outcropping for a further distance of about 1500 feet, till it reaches the bottom of Gregory gulch. On the further side of the gulch the andesite is supplanted by rhyolite, a rock of younger age, which is believed to be probably younger than the Humboldt vein, which probably continues under this capping. As this capping rock extends a long distance to the northeast, the total extent of the vein in this direction is not known.

At about 150 feet southwest of the Humboldt shaft, the vein encounters a transverse fault, which offsets it in right handed fashion, shifting the vein on the southwest side of the fault some 200 feet or so to the northwest. This may be called the Humboldt fault. Southwest of the Humboldt fault, the vein outcrop continues strongly toward the southwest for perhaps 400 feet, where it is cut off by the Prospectus fault, the greatest fault thus far recognized in the district, which offsets it horizontally and in right-handed fashion (to the northwest on the southwest side) four or five hundred feet, the faulted extension being known as the Prospectus vein. The Prospectus vein can be traced into the heart of the village of Aurora, by which time it has weakened considerably.

The original Humboldt-Prospectus vein, then had a demonstrated outcrop of about a mile in length, and may extend much further.

Between the Humboldt fault and the Silver Lining boundary, the vein is from 20 to 70 feet wide, of practically solid quartz, and will probably average 40 feet in width. Between the Humboldt and the Prospectus faults, the vein splits into three or four branches, each of generous size, and probably each averaging 10 to 20 feet wide. Junctions such as these are known to be influential in ore-deposition; and the ore exposed in the Humboldt mine may be in part due to this cause.

Practically all of the quartz in the Humboldt vein carries a weighable amount of gold. Some of it is of very low grade, however, too low even to be profitable. Other portions run up to $12 - $15. a ton. The difference is not visible to the eye, and can be told only by assaying. In sampling across the vein the length of cut for each sample averaged about 1 meter (3.28 feet) so that the richer portions were easily located. In the present workings of the Humboldt mine, as sampled, nearly the whole vein exposed may be considered as averaging probable pay ore, although of low grade.

EXTENT OF DEVELOPMENT

The Humboldt shaft is somewhat over 400 feet deep. It has levels at 100, 200 and 300 feet, which have been examined and sampled; and a level at 400 feet, which so far has been inaccessible. Some richer portions of the ore (such as were

represented by the mill runs above referred to), were partly stoped down to the 200-foot level. Most of the vein, however, including some of the richer ore, is intact from the surface down, so that the mine workings, show considerable reserves of low-grade ore.

On the first level the vein is developed for 49 feet (15 meters) southwest of the shaft, and 98 feet (30 meters) northeast of it, a total distance of 147 feet (45 meters), with a total of about 270 feet (82 meters) of development, including drifts and cross-cuts. It is certain, however, that this work has only developed a portion, and the lesser portion of the total width of the vein. The average width of the ore exposed in this level is 11½ feet (3.52 meters).

The 200-foot level develops the vein for a length of about 125 feet (38 meters), some 33 feet (10 meters) southwest of the shaft, and 92 feet (28 meters) northeast of it. On this level the width of the vein has been more thoroughly explored, although even here the full width has not always been satisfactorily exposed. The average width of the ore exposed in this level is 35 feet (10.7 meters). One cross-section on this level shows a width of vein of 64 feet (19.5 meters), all but about 6 feet of which is low-grade ore. This level has roughly 320 feet (98 meters) of workings.

On the 300-foot level the drifting has been more extensive. There is a total of about 1045 feet (about 318 meters) of workings, of which about 504 feet (153 meters) are cross-cuts, and

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On the 300-foot level the drifting has been more extensive. There is a total of about 1045 feet (about 318 meters) of workings, of which about 504 feet (153 meters) are cross-cuts, and

541 feet (165 meters) is drifting. The total distance drifted on the vein, measured in a straight line, is about 525 feet, this being all east of the shaft. Roughly 200 feet more drifting would reach the Silver Lining boundary.

Of the cross-cuts, that at the shaft is 350 feet (106.5 meters) long; that at the extreme east end of the drift is about 34 feet (10.5 meters) long; and one, about half-way between, 120 feet (36.5 m.) long.

In the cross-cut at the shaft the vein is 26 m. (85 feet) wide; in the middle cross-cut about 20 m. (65 feet), and in the eastern cross-cut 9 m. (30 feet) wide. The ore in the shaft cross-cut is low grade. The six meters (20 feet) on the foot-wall side averages $2.48, and the 6 m. on the hanging wall side averages $2.50; while the intermediate portion of the vein runs only $0.53. The middle cross-cut is of better grade. The first six meters on the foot-wall side of the vein averages $4.22; the next five meters $1.85; the next five average $5.83; and the last four $1.92. The easterly cross-cut averages $4.34 for the first six meters on the footwall side; while the last three meters average only $1.53.

Concerning the 400-foot level, we have the following information from Ex-Governor Colcord of Nevada, who was superintendent of the Humboldt mine at the time this level was run:

"We opened a station, cross-cut the ledge, drifted both ways to the extent of something over five hundred feet of development work. It is a big ledge, in fact the Humboldt is the mother lode of that district. I did not find any high-

grade ore. All of this work was done on the 400-foot level."

The above information was obtained in September, 1911, in response to a letter from us. The only piece of development work between the shaft and the Silver Lining ground is a shaft 45 feet deep, with a cross-cut through the vein for about 25 feet. This is situated about 400 feet southwest of the north-east end-line of the Humboldt. The outcrop here is inconspicuous; but the vein cut underground is 21 feet thick. Of this vein, two meters, or about 6.3 feet, showed assay values of $3.03,* of which $2.86 was gold; the rest of the vein showed very low values, and was not possible ore. This shaft and cross-cut are shown in the accompanying section. To the northeast of this shaft the outcrop again thickens to imposing proportions, and near the Silver Lining boundary is about sixty feet across. On the Silver Lining, a few feet from the Humboldt, is a shaft estimated to be about 90 feet deep, in the vein. This is inaccessible, but the white quartz on the dump was sampled, showing 17.5 grams gold and 52 grams silver—total value $12.68. On the Silver Lining ground, a tunnel runs in to the hill, toward the southwest, and connects with the shaft above mentioned. The vein is cut within about 100 feet of the Humboldt boundary, and drifts on the footwall portion of the vein with two short

* This would give a recovery value of $2.91 (see page).

cross-cuts to the northwest,--one 4 meters and one 6 meters in length.

Near the Humboldt samples taken in this tunnel showed the following results:

Sample No.	Locality	Au Gms	Ag Gms	Au Val.	Ag Val.	Total Val.	Width Cut
258	Near face of tunnel (not far from Humboldt line)	25.25	36	$16.75	.61	$17.36	0.85 m.
259	10 m. back (N.E.) from face	10.12	20	6.73	.34	7.07	0.95 m.
260	30 m. from face	6.12	8	4.08	.14	4.24	1.20 m.

The mineralization of this ore-shoot is evidently increasing toward the Humboldt, and it is probable that the shoot passes into the Humboldt, where it does not seem to have been investigated.

ASSAY VALUES

In sampling, the length of cuts averaged, as before stated, about one meter, and the average sample was fifty pounds. After crushing, pulverizing and quartering, duplicates of each sample were assayed independently by C. F. Loker, assayer for the Tonopah Mining Company at Tonopah, and G. W. MacDaniel, assayer for Spurr & Company, in our own laboratory, fitted up at Aurora. The results of these two assayers had to check. Where they did not do so, the assays were repeated till an agreement was reached. The results are therefore regarded as extraordinarily accurate, a very necessary thing in a low-grade proposition.

Following is a list of Humboldt assays, with the exception of the third level assays, which are given later.

Assays from Humboldt vein

Sample No.	Length in Meters	Location and Description	Grams Gold per T	Grams Silver per T	Value Gold	Value Silver	Total Value per T.
38	—	Dump-Grab Sample	3.75	12	$ 2.49	$0.20	$ 2.69
39	—	" " "	4.87	17	3.24	0.29	3.53
		100 Level					
172	1.20	South Face Main Drift	4.87	16	3.24	0.27	3.51
173	1.90	Face of 1st Left X-Cut	4.25	15	2.83	0.25	3.08
174	0.95	6 m. from face main drift	6.00	23	3.99	0.39	4.38
175	1.10	2 m. South of Shaft	4.00	17	2.66	0.29	2.95
176	1.00	2 m. " "	3.62	22	2.40	0.37	2.77
177	1.00	1st M. in 2nd L- X-Cut	7.87	14	5.23	0.24	5.47
178	1.00	2nd M. " " " "	7.62	15	5.06	0.25	5.31
179	1.00	3rd M. " " " "	8.75	26	5.82	0.44	6.26
180	0.55	4th M. " " " "	6.00	43	3.99	0.73	4.72
181	1.00	5th M. " " " "	4.00	8	2.66	0.14	2.80
182	1.00	6th M. " " " "	0.75	6	0.50	0.10	0.60
183	1.00	7th M. " " " "	tr	2	0.00	0.03	0.03
184	1.00	8th M. " " " "	0.75	3	0.50	0.05	0.55
185	1.20	9th M. " " " "	2.37	9	1.66	0.15	1.81
186	1.00	Main Drift 5 M. S. of shaft	1.62	9	1.07	0.15	1.22
187	0.90	" " " " " " "	11.87	29	7.89	0.49	8.38
188	1.00	1st M. in 3rd L- X-Cut	1.87	8	1.24	0.14	1.38
189	1.00	2nd M. " " " "	1.25	7	0.83	0.12	0.95
190	1.00	3rd M. " " " "	2.25	7	1.50	0.12	1.62
191	1.00	4th M. " " " "	9.50	21	6.31	0.36	6.67
192	0.90	5th M. " " " "	12.12	46	8.06	0.78	8.84
193	0.80	N.face of Main Drift	6.25	12	4.16	0.20	4.36
194	2.00	Last 2.M. in 5th L. X-cut	6.25	12	4.16	0.20	4.36
195	2.10	1st 2.M. in5th L. X-cut	0.75	3	0.50	0.05	0.55
196	0.95	6. M. from N.face M. drift	2.25	8	1.50	0.14	1.64
197	1.00	1st M. in Right X- cut	5.62	24	3.73	0.41	4.14

Sample No.	Length in Meters	Location and Description	Grams Gold per T	Grams Silver per T.	Value Gold	Value Silver	Total Value per T.
198	0.30	At R. X-cut in Main Drift	3.75	99	$ 2.49	$1.68	$4.17
199	1.70	" " " " " "	13.87	24	9.22	0.41	9.63
200	1.00	1st M. in 4th L. X-cut	2.25	11	1.50	0.19	1.69
201	-	Dump-Grab Sample	4.25	14	2.83	0.24	3.07
202	-	" " "	3.12	8	2.07	0.14	2.21
211	1.00	2nd M. in 4th L.X cut	3.50	6	2.31	0.10	2.41
212	1.00	3rd " " " " " "	1.37	8	0.91	0.14	1.05
213	1.50	In shaft 1st Level	0.50	2	0.33	0.03	0.36
		200' Level					
214	1.05	1st R. X-cut face	7.50	21	4.98	0.36	5.34
215	1.00	" " " " 2 M. from face	4.50	12	2.99	0.20	3.19
216	1.00	" " "-cut 3 M. from face	2.75	13	1.83	0.22	2.05
217	1.00	" " "-cut 4 M. from face	9.37	18	6.23	0.31	6.54
218	1.00	" " "-cut 5 M. from face	13.12	15	8.72	0.25	8.97
219	1.00	" " H"-cut 6 M. in	1.50	7	0.99	0.12	1.11
220	1.00	" " Hand X-cut 7 M.	4.75	12	3.16	0.20	3.36
221	1.00	" " " " "8 M.	7.87	27	5.23	0.46	5.69
222	1.00	" " " " "9 M.	4.75	13	3.16	0.22	3.38
223	1.00	" " " " 10 M.	2.00	11	1.33	0.19	1.52
224	1.00	" " " " 11 M	2.62	6	1.74	0.10	1.84
225	1.00	" " " " 12 M	4.87	11	3.24	0.19	3.43
226	1.00	" " " " 13 M	9.37	13	6.23	0.22	6.45
227	1.55	" " " " 14 M	7.87	16	5.23	0.27	5.50
228	1.30	In Main Drift at first R.Hand X-cut	17.37	54	11.61	0.94	12.55
229	1.30	" " " " " " " "	16.62	78	11.05	1.33	12.38
230	1.25	Main Drift-13 M. from 1st L.X-cut	5.75	16	3.82	0.27	4.09
231	1.10	Entrance to 2nd Left X-Cut	5.50	19	3.65	0.32	3.97
232	1.25	Face of 2nd Left X-Cut	22.25	72	14.80	1.22	16.02
233	0.65	Main Drift 7. M. from 1st L.X-cut	6.75	19	4.49	0.32	4.81
234	1.00	" " " " " " "	5.50	10	3.65	0.17	3.82
235	1.20	Entrance 1st Left X-cut	4.12	9	2.74	0.15	2.89
236	1.00	4th M. 1st L.X-cut	2.00	11	1.33	0.19	1.52
237	1.00	5th M " " " "	1.62	8	1.07	0.14	1.21

Sample No.	Length in Meters	Location and Description	Grams Gold per T	Grams Silver per T.	Value Gold	Value Silver	Total Value per T.
238	1.00	6th M. 1st L.X-cut	3.12	6	$2.07	$0.10	$2.17
239	1.00	7th M " " " "	1.75	7	1.16	0.12	1.28
240	1.00	8th M " " " "	4.87	6	3.24	0.10	3.34
241	1.25	9th M " " " "	7.87	28	5.23	0.48	5.71
242	1.40	1st Sub Drift 4.M from face	7.62	34	5.06	0.58	5.64
243	1.10	" Sub-Drift South face	6.00	19	3.99	0.32	4.31
244	1.20	" " Drift 2.M. from N. face	7.75	26	5.15	0.44	5.59
245	1.30	Stope above 2nd Lev.	11.00	37	7.31	0.63	7.94
246	1.30	" " " "	7.75	19	5.15	0.32	5.47
247	1.25	" " " "	1.25	12	0.83	0.20	1.03
248	1.00	" " " "	7.12	16	4.73	0.27	5.00
249	1.00	" " " "	2.50	9	1.83	0.15	1.98
250	1.00	" " " "	4.00	5	2.66	0.08	2.74
251	1.00	" " " "	5.25	19	3.49	0.32	3.81
252	1.00	" " " "	1.25	6	0.83	0.10	0.93
253	0.90	S. face of stope	17.00	54	11.30	0.92	12.22
254	1.00	N. " " " "	10.62	38	7.06	0.65	7.71
255	1.30	N. " " " "	19.37	38	12.88	0.65	13.53
256	1.20	Face of Main Drift	5.75	13	3.82	0.22	4.04
257	0.65	Stope of 1st Sub"	33.00	139	21.89	2.35	24.24
765	1.70	3 M. North of #172	4.50	22	2.99	0.37	3.36
766	0.75	2 M. " " #174	4.75	15	3.16	0.25	3.41
767	0.90	S. face of Sub-Drift	15.62	35	10.38	0.59	10.97
768	0.20	2nd L. X-Cut	2.25	5	1.50	0.08	1.58
769	1.10	N. face of Drift	20.62	28	13.71	0.48	14.19
770	1.00	3 M. South of #186	2.50	14	1.83	0.24	2.07
771	0.75	3rd L. X-Cut	5.87	26	3.90	0.44	4.34
772	1.00	" " " "	0.50	9	0.33	0.15	0.48
773	1.00	" " " "	0.87	43	0.58	0.73	1.31
774	1.00	" " " "	5.25	16	3.49	0.27	3.76
775	1.00	" " " "	21.75	21	14.46	0.36	14.82
776	1.00	" " " "	14.37	43	9.56	0.73	10.29
777	1.70	6 M. S. of #196	5.25	28	3.49	0.48	3.97
778	1.00	3 M " " "	0.75	8	0.50	0.14	0.64
779	1.20	3 M. N. " "	2.75	9	1.83	0.15	1.98
780	1.00	5th Left X-cut	5.00	10	3.32	0.17	3.49
781	1.00	" " "	1.50	6	0.99	0.10	1.09
782	1.00	" " "	1.50	5	0.99	0.08	1.07
783	1.00	" " "	1.25	3	0.83	0.05	0.88
784	1.20	Stope above #186	11.87	16	7.89	0.27	8.16
785	0.75	" " "	9.12	28	6.06	0.48	6.54
786	0.90	" " "	22.87	61	15.21	1.04	16.25
787	1.75	2.5 M. S. of #256	10.12	18	6.73	0.31	7.04
788	1.00	3. M " " #230	4.12	6	2.74	0.10	2.84
789	1.00	3 M " " #233	4.50	9	2.99	0.15	3.14

Sample No.	Length in Meters	Location and Description	Grams Gold per T	Grams Silver per T.	Value Gold	Value Silver	Total Value per T.
790	1.00	In Left X-Cut	4.50	9	$2.99	$0.15	$3.14
791	1.55	" " " "	1.87	4	1.24	0.07	1.31
792	1.45	" " " "	1.75	7	1.16	0.12	1.28
793	1.00	" " " "	3.50	11	2.31	0.19	2.50
794	1.00	" " " "	2.37	9	1.66	0.15	1.81
795	1.00	" " " "	9.12	10	6.06	0.17	6.23
796	1.00	" " " "	4.62	9	3.07	0.15	3.22
797	1.20	" " " "	3.12	10	2.07	0.17	2.24
798	0.95	2.5 M. N. of #243	8.12	33	5.40	0.56	5.96
799	0.90	In stope above #257	11.37	47	7.56	0.80	8.36
800	0.75	" " " #244	24.87	100	16.54	1.70	18.24
801	1.20	N. face of Sub-Drift	9.75	26	6.48	0.44	6.92
802	1.00	Stope - S - Face	10.75	28	7.15	0.48	7.63
803	1.20	" " " "	6.37	16	4.24	0.27	4.51
804	1.30	" " " "	5.00	21	3.32	0.36	3.68
805	1.05	" " N "	5.37	15	3.57	0.25	3.82
806	1.00	" below #252	5.00	17	3.32	0.29	3.61
807	1.20	" " " #252	2.50	9	1.83	0.15	1.98
808	1.00	S.Face-Intermediate Level	4.25	22	2.83	0.37	3.20
809	1.00	" " " " "	7.12	24	4.73	0.41	5.14
810	1.00	" " " " "	5.12	18	3.40	0.31	3.71
811	1.00	X-cut " " "	6.87	17	4.57	0.29	4.86
812	1.00	" " " " "	12.00	24	7.98	0.41	8.39
813	1.00	" " " " "	24.25	23	16.13	0.39	16.52
814	1.60	" " " " "	10.62	10	7.06	0.17	7.23
815	1.00	S.Face Sub-Drift Intermediate Level	11.50	25	7.64	0.42	8.06
816	1.60	N. " " " " "	10.87	11	7.25	0.19	7.44
817	1.00	Floor near Shaft	7.75	22	5.15	0.37	5.52
818	1.00	" " "	20.50	30	13.63	0.51	14.14
819	1.00	4th Left X-Cut	2.75	5	1.83	0.08	1.91
820	0.80	" " " "	1.00	4	0.66	0.07	0.73
		Small Shaft					
821	1.00	In X-Cut	1.00	7	0.66	0.12	0.78
822	1.00	" " "	0.50	2	0.33	0.03	0.36
823	1.00	" " "	0.50	3	0.33	0.05	0.38
824	1.00	" " "	0.75	4	0.50	0.07	0.57
825	1.00	" " "	1.75	3	1.16	0.05	1.21
826	1.00	" " "	4.50	11	2.99	0.19	3.18
827	1.00	" " "	4.12	8	2.74	0.14	2.88
828	1.00	" " "	1.00	5	0.66	0.08	0.74
829	1.00	Bottom of Shaft	1.00	5	0.66	0.08	0.74
830	1.10	3. M. up of "	0.75	6	0.50	0.10	0.60
831	1.35	6 M. " " "	1.12	5	0.74	0.08	0.82
832	1.80	12 M " " "	7.87	7	5.23	0.12	5.35
833	1.70	15 M " " "	19.50	15	12.96	0.25	13.21

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Sample No.	Length in Meters	Location	Grams Au per T	Grams Ag per T	Au Val. per T	Ag Val. per T	Total Value per T.
1240	1.30	1st X-cut Left	3.87	9	2.57	0.15	2.72
1241	1.00	" " " "	3.37	7	2.24	0.12	2.36
1242	1.00	" " " "	3.75	5	2.49	0.08	2.57
1243	1.00	" " " "	4.12	6	2.74	0.10	2.84
1244	1.00	" " " "	3.00	4	1.99	0.07	2.06
1245	1.00	" " " "	3.75	5	2.49	0.08	2.57
1246	1.00	" " " "	1.75	3	1.16	0.05	1.21
1247	1.20	" " " "	1.25	4	0.83	0.07	0.90
1248	0.80	" " " "	0.50	3	0.33	0.05	0.38
1249	1.50	" " " "	1.00	5	0.66	0.08	0.74
1250	1.00	" " " "	1.25	7	0.83	0.12	0.95
1251	1.50	" " " "	1.00	6	0.66	0.10	0.76
1252	1.30	" Shaft	2.25	5	1.50	0.08	1.58
1253	1.30	" "	1.75	6	1.16	0.10	1.26
1254	1.00	3rd X-Cut	1.75	5	1.16	0.08	1.24
1255	1.00	" " "	1.87	5	1.24	0.08	1.32
1256	1.00	" " "	2.87	7	1.91	0.12	2.03
1257	1.00	" " "	4.87	8	3.24	0.14	3.38
1258	1.00	" " "	7.75	14	5.15	0.24	5.39
1259	1.00	" " "	4.12	10	2.74	0.17	2.91
1260	1.00	" " "	4.00	9	2.66	0.15	2.81
1261	1.00	" " "	6.00	13	3.99	0.22	4.21
1262	1.00	" " "	10.50	17	6.98	0.29	7.27
1263	1.25	Drift 3 M from face	6.37	9	4.24	0.15	4.39
1264	1.25	" 6 M " "	2.12	6	1.41	0.10	1.51
1265	1.60	" 9 M " "	1.25	3	0.83	0.05	0.88
1266	1.05	" 12 M " "	0.50	5	0.33	0.08	0.41
1267	1.00	" 15 M " "	2.75	6	1.83	0.10	1.93
1268	0.75	" 18 M " "	tr	5	0.00	0.08	0.08
1269	0.75	" 21 M " "	4.00	6	2.66	0.10	2.76
1270	1.20	" 24 M " "	4.37	9	2.91	0.15	3.06
1271	1.65	" 27 M " "	8.62	27	5.73	0.46	6.19
1272	1.15	" 30 M " "	12.75	26	8.48	0.44	8.92
1273	1.30	" 36 M " "	8.75	18	5.82	0.31	6.13
1274	1.25	" 39 M " "	3.00	26	1.99	0.10	2.09
1275	0.80	" 42 M " "	4.62	20	3.07	0.34	3.41
1276	1.40	" 45 M " "	2.25	18	1.50	0.31	1.81
1277	1.90	" 48 M " "	2.75	13	1.83	0.22	2.05
1278	1.55	" 51 M " "	4.00	12	2.66	0.20	2.86
1279	1.70	" 54 M " "	3.37	16	2.24	0.27	2.51
1280	0.85	" 57 M " "	tr	12	0.00	0.20	0.20
1281	1.55	" 60 M " "	0.50	9	0.33	0.15	0.48
1282	2.35	" 63 M " "	0.50	8	0.33	0.14	0.47
1283	1.25	" 66 M " "	1.00	3	0.66	0.05	0.71
1284	1.25	" 69 M " "	1.25	4	0.83	0.07	0.90
1285	1.80	" 72 M " "	1.25	5	0.83	0.08	0.91
1286	1.40	" 75 M " "	2.12	10	1.41	0.17	1.58
1287	1.30	" 78 M " "	7.12	17	4.73	0.29	5.02
1288	1.30	" 81 M " "	11.62	31	7.72	0.53	8.25

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Sample No.	Length in Meters	Location	Gms Au per T	Gms Ag per T	Au Val. per T	Ag Val. per T	Total Value per T.
1289	1.35	Drift 84 M from face	12.12	35	8.06	0.59	8.65
1290	1.00	" 87 M " "	12.50	32	8.31	0.54	8.85
1291	1.20	" 90 M " "	12.62	21	8.39	0.36	8.75
1292	1.10	" 93 M " "	12.50	20	8.31	0.34	8.65
1293	2.15	" 96 M " "	11.62	27	7.72	0.46	8.18
1294	1.60	" 99 M " "	9.50	18	6.31	0.31	6.62
1295	1.00	2nd X-Cut	4.00	15	2.66	0.25	2.91
1296	1.00	" " "	3.00	12	1.99	0.20	2.19
1297	1.00	" " "	1.25	12	0.83	0.20	1.03
1298	1.00	" " "	2.12	12	1.41	0.20	1.61
1299	1.00	" " "	3.75	14	2.49	0.24	2.73
1300	1.00	" " "	20.50	25	13.63	0.42	14.05
1301	1.00	" " "	2.87	9	1.91	0.15	2.06
1302	1.00	" " "	10.25	19	6.82	0.32	7.14
1303	1.00	" " "	4.50	17	2.99	0.29	3.28
1304	1.00	" " "	2.62	13	1.74	0.22	1.96
1305	1.00	" " "	4.50	10	2.99	0.17	3.16
1306	1.00	" " "	2.00	6	1.33	0.10	1.43
1307	1.00	" " "	3.37	8	2.24	0.14	2.38
1308	1.00	" " "	1.00	7	0.66	0.12	0.78
1309	1.00	" " "	4.25	14	2.83	0.24	3.07
1310	1.00	" " "	7.62	11	5.06	0.19	5.25
1311	1.00	" " "	2.75	7	1.83	0.12	1.95
1312	1.00	" " "	2.12	6	1.41	0.10	1.51
1313	1.00	" " "	10.50	31	6.98	0.53	7.51
1314	1.00	" " "	8.37	30	5.57	0.51	6.08
1315	1.00	Drift	1.00	8	0.66	0.14	0.80
1316	0.50	Drift 18 M from S face	1.62	6	1.07	0.10	1.17
1317	1.35	" 18 M " " "	0.37	4	0.25	0.07	0.32
1318	1.15	" 15 M " " "	1.75	8	1.16	0.14	1.30
1319	1.45	" 12 M " " "	2.00	9	1.33	0.15	1.48
1320	0.75	" 9 M " " "	4.62	12	3.07	0.20	3.27
1321	1.50	" 6 M " " "	15.50	45	10.30	0.76	11.06
1322	1.40	" 3 M " " "	11.37	34	7.56	0.58	8.14
1323	1.00	1st X-cut Right	2.75	11	1.83	0.19	2.02
1324	1.00	" " " "	7.75	18	5.15	0.31	5.46
1325	1.00	" " " "	2.00	9	1.33	0.15	1.48
1326	1.00	" " " "	3.50	7	2.31	0.12	2.43
1327	1.00	" " " "	2.50	7	1.66	0.12	1.78
1328	1.00	" " " "	3.25	11	2.16	0.19	2.35
1329	1.00	" " " "	0.75	3	0.50	0.05	0.55
1330	1.00	" " " "	0.25	5	0.17	0.08	0.25
1331	1.00	" " " "	0.62	5	0.41	0.08	0.49
1332	1.00	" " " "	0.25	4	0.17	0.07	0.24
1333	1.60	" " " "	0.50	6	0.33	0.10	0.43
1334	1.00	" " " "	0.50	4	0.33	0.07	0.40
1335	1.25	" " " "	0.37	5	0.25	0.08	0.33
1336	0.30	" " " Left	4.25	8	2.83	0.14	2.97

ORE RESERVES

HUMBOLDT MINE

Figuring the values and tonnages of the ore-reserves has been done above the 3rd level by the aid of certain cross-sections, shown on the accompanying plans.

Ore in Sight

40' Level — **Section 2**

Width vein exposed 5.6 M.

Sample No.	Au Gr	Ag Gr	Au Val.	Ag Val.	Total Value	Width Cut
811	7.25	16	4.82	0.27	5.09	1.00
812	12.50	23	8.31	0.39	8.70	1.00
813	24.25	25	16.33	0.43	16.76	1.00
814	10.75	10	7.15	0.17	7.32	1.60
815	11.25	26	7.48	0.44	7.92	1.00
						5.60

5.09 x 1.00 = 5.09
8.70 x 1.00 = 8.70
16.76 x 1.00 = 16.76
8.14 x 1.60 = 13.02
7.92 x 1.00 = 7.92
5.60) 51.49
$9.20 Av. Value

Length vein developed = 20. M.

Section 1

Width vein exposed 3.0 meters

808	4.	21	2.66	0.36	3.02	1.00
809	7.25	24	4.82	0.41	5.23	1.00
810	5.25	18	3.50	0.31	3.81	1.00

3) 12.06
$4.02 Av. Value

100' Level Section 1

Total exposed width 3.6 m. (southwest end of workings)

Sample No.	Au Gr	Ag Gr	Val. Au	Val. Ag	Total Value	Width Cut
173	4.25	15	2.83	0.25	3.08	1.90 m
765	4.50	22	2.99	0.37	3.36	1.70 m
						3.6

3.08 x 1.9 m. = 5.852
3.36 x 1.7 m = 5.712
3.6) 11.564
$3.21 Av. Value

Section 2 - Opposite Shaft

Exposed width vein 5. m.

Sample No.	Au Gr	Ag Gr	Val. Au	Val. Ag	Total Value	Width Cut
180	6.00	43	3.99	0.73	4.72	0.55
179	8.75	26	5.82	0.44	6.26	1.00
178	7.50	15	4.98	0.25	5.23	1.00
177	7.75	14	5.15	0.24	5.39	1.00
771	6.00	24	3.99	0.41	4.40	0.75
					26.00	4.30 m.

4.72 x 0.55 = 2.596
6.26 x 1.00 = 6.26
5.23 x 1.00 = 5.23
5.39 x 1.00 = 5.39
4.40 x 0.75 = 3.30
4.30) 22.776
$5.30 Av. Value

Section 3

Width exposed vein 3 m +

Sample No.	Au Gr	Ag Gr	Au Val.	Ag Val.	Total Value	Width Cut
774	5.25	17	3.49	0.29	3.78	1.00 m
775	22.25	22	14.80	0.37	15.17	1.00 m
776	14.75	44	9.81	0.75	10.56	1.00 m
					3)29.51	3.00

$9.84 Average total value

Section 4

Width exposed vein 2.5 m

197	5.50	24	3.65	0.41	4.06	1.00
198	3.75	99	2.49	1.68	4.17	0.30
199	13.75	24	9.14	0.41	9.55	1.70
						3.00

4.06 x 1.00 = 4.06
4.17 x 0.30 = 1.25
9.55 x 1.70 = 16.235
3.00) 21.546
$7.182 Average

Averages of Sections

	Total Av. Value	Width Vein Exposed
Section 1	3.21	3.6 m
" 2	5.30	5.0 m
" 3	9.84	3.0 m
" 4	7.18	2.5 m

3.21 x 3.6 = 11.556
5.30 x 5.0 = 26.50
9.84 x 3.0 = 29.52
7.18 x 2.5 = 17.95
14.1) 85.526
$6.07 Av. total Value 100' Level

4)14.1
3.52 m. av. width ore =11.5 feet

Length of vein developed = 45. m
Width of vein only partially explored

200' LEVEL

Section 2 - Through Shaft

Width vein exposed = 2.6 m + (1.2 + 1.4-separate veins)

Sample No.	Au Gr	Ag Gr	Val. Au	Val. Ag	Total Value	Width Cut
235	4.00	9	$2.66	$0.15	2.81	1.2
242	7.75	34	5.15	0.58	5.73	1.4

2.81 x 1.2 = 3.372
5.73 x 1.4 = 8.022
2.6 m) 11.394
$4.39 Av. Value

Section 3

Width vein exposed = 12 m

Sample No.	Au Gr	Ag Gr	Val. Au	Val Ag	Total Value	Width Cut
788	3.75	9	2.49	0.15	2.64	1.00
230	5.75	16	3.83	0.27	4.10	1.25
231	5.50	19	3.65	0.32	3.97	1.10
232	22.25	72	14.80	1.22	16.02	1.25
801	10.25	27	6.82	0.46	7.28	1.20
796	4.75	9	3.16	0.15	3.31	1.00
797	3.25	9	2.17	0.15	2.32	1.20
					$39.64	8.00 m

2.64 x 1.00 = 2.64
4.10 x 1.25 = 5.125
3.97 x 1.10 = 4.367
16.02 x 1.25 = 20.025
7.28 x 1.20 = 8.736
3.31 x 1.00 = 3.31
2.32 x 1.20 = 2.784
8.00) 46.987
$5.873 Av. Value

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Section 4

Vein width exposed - 17.5 m

Sample No.	Au Gr	Ag Gr	Au Val.	Ag Val.	Total Value	Width
214	7.50	21	4.98	0.36	5.34	1.05
215	4.50	12	2.99	0.20	3.19	1.00
216	2.75	13	1.83	0.22	2.05	1.00
217	9.37	18	6.23	0.31	6.54	1.00
218	13.12	15	8.72	0.25	8.97	1.00
219	1.50	7	1.00	0.12	1.12	1.00
220	4.75	12	5.15	0.20	5.35	1.00
221	7.87	27	5.23	0.46	5.69	1.00
222	4.75	13	3.16	0.22	3.38	1.00
225	4.82	11	3.20	0.19	3.39	1.00
226	9.37	13	6.23	0.22	6.45	1.00
227	7.87	16	5.23	0.27	5.50	1.00
228	17.37	54	11.55	0.92	12.47	1.30
229	16.62	78	11.05	1.33	12.38	1.30
796	4.75	9	3.16	0.15	3.31	1.00
797	3.25	9	2.16	0.15	2.31	1.20
801	10.25	27	6.82	0.46	7.28	1.20

5.34 x 1.05 = 5.607
3.19 x 1.00 = 3.19
2.05 x 1.00 = 2.05
6.54 x 1.00 = 6.54
8.97 x 1.00 = 8.97
1.12 x 1.00 = 1.12
5.35 x 1.00 = 5.35
5.69 x 1.00 = 5.69
3.38 x 1.00 = 3.38
3.39 x 1.00 = 3.39
6.45 x 1.00 = 6.45
5.50 x 1.00 = 5.50
12.47 x 1.30 = 16.211
12.38 x 1.30 = 16.094
3.31 x 1.00 = 3.31
2.31 x 1.20 = 2.772
7.28 x 1.20 = 8.736

18.05 m) 104.360
$5.78 Av. Value

Averages of Sections:

	Av. Val.		Width Vein Exposed	
Section 2	4.39	x	2.6 m	= 11.414
" 3	5.87	x	12.0 m	= 70.440
" 4	5.78	x	17.5 m	= 101.150
			32.1 m)	183.004

$5.70 Av. value ore 200'Level

3)32.1
10.7 Av. width vein

Total length vein developed = 40 m

Width not fully developed.

Calculation of Tonnages

BLOCK 1 A

From 100' Level to Surface

Highly Probable Ore

Length 45 m; vertical end lines.

	Av. Width	Length			Sp.Gr.
100' Level area	3.5	x 45	= 157.5 sq. m		
Assume same area to surface	157.5 x 30 m = 4725. cu. m.				x2.5 = 11812. metric tons
			height		

Total Values	100' Level	40' Level	Accepted Value	Av.Width
Section 1	$3.21	$4.02	3.61	3.3 m
" 2	5.30	9.20	7.25	5.3 m
" 3	9.84		9.84	3.0
" 4	7.18		7.18	2.5 m

3.61 x 3.3 = 11.913
7.25 x 5.3 = 38.425
9.84 x 3.0 = 29.42
7.18 x 2.5 = 17.95
14.1) 97.708
$6.93 Av. accepted Value Block 1

11812 metric tons Av. Value $6.93

Block developed on 100 foot level full length; on 40 foot level ½ length.

BLOCK 1 B

Probable Ore - From 100' Level to Surface not developed.

Assume total area of ore on 100' level same as on 200' level.

Area measured 200' Level = 428. sq. m
" " 100' " = 157.5 " "
260.5 difference

height sp.gr.
260.5 sq. m x 30 m = 7815 cu. m. x 2.5 = 19,537 tons

Assume same av. value as average 200' level = $5.70

Between 100 and 200 foot Levels

BLOCK 2 A

Ore in Sight

Level	Area developed	Av.Val.	
100'	157. 5 sq. m	x $6.07 =	956.02
200'	428. " "	x 5.70 =	2439.6
	2)585. 5		3395.6
	292. 7 sq. m	3395.6 ÷ 585.5 = $5.80 Av. Value Block 2 A	
	30		
	8781.0 cu. m. x 2.5 = 21,952. metric tons		

BLOCK 2 B

Probable Ore

Area measured 200' Level = 428. sq. m
" " 100' " = 157.5
260.5 m

Block figured as wedge with upper area of 260.5 sq. m on 100' Level, and 0.0 m. on 200'

2)260.5 h.
130.2 x 30. m = 3906. cu. m = 9765 metric tons

Assume same average value as av. 200' Level = $5.70

BLOCK 3

Between 2nd and 3rd Levels
(Ore in Sight or Probable)

Calculations from 3rd Level Assays

	Width Ore		Average Value	
Central Cross-Cut	6 m	x	$4.22	= $25.32
	5 m	x	5.83	= 29.15
Easterly Cross-Cut	6 m	x	4.34	= 26.04
	2)17			)80.51
	8.5 m = 27.8 feet			$4.74 Av. Value
	= Average width ore in vein			ore on 3rd Level

Length Ore 3rd Level 140. m
Av. Width " " " 8.5
Area " " " 1190 sq. m
" " 2nd " 428
2) 1618
809 sq. m. average

809 sq.m x 30 (height) = 24270 cu. m x 2.5 (sp.gr) = 60,675 metric tons

$4.74 x 1190 = $5640.60
5.70 x 428 = 2439.60
1618) 8080.20
$4.99 Average value Block 3

BLOCK 4

Probable Ore

Exposed only on one side (3rd Level) and that not entirely.

Length 192 m x Av. Width Ore in Vein-3rd Lev. 8.5 m = 1632 sq. m x 30 (height) =48,960.cu. m

48,960. cu. m x 2.5 (sp.gr) = 122,400 metric tons

Av. Value 3rd Level ore = $4.74

BLOCK 5

Possible Ore

60 (Undeveloped Portion of Vein between
90 Prospectus Tunnel Level and
2)150 Surface)

142 m x 75 m = 10650.

height

50 m x 90 = 4500.

15150 sq. m x 8.5 m = 128,775 cu.m

(sp.gr) (av. width

128,775 cu.m x 2.5 = 321,937 metric ore 3rd Lev.)

tons

Average value 3rd Level ore = $4.74

Summary of Ore-Reserves of Humboldt Mine

Above Prospectus Tunnel Level and East of Main Shaft

Ore in Sight	Tons	Av. Value		Total Gross Val.	Av.Width
BLOCK 2 A	21,952 x	$5.80	=	127,321.60	7.1 m
" 3	60,675 x	4.99	=	302,768.25	9. *
Highly Probable Ore					
BLOCK 1 A	11,812 x	6.93	=	81,857.16	3.5
	94,439	5.42		511,947.01	
		Av.Value			
Probable Ore					
BLOCK 1 B	19,537 x	5.70	=	111,360.90	3.6
" 2 B	9,765 x	5.70	=	55,660.50	3.6 m
" 4	122,400 x	4.74	=	580,176.00	8.5
	151,702	4.92		747,197.40	
		Av.Value			
Possible Ore					
BLOCK 5	321,937 x	4.74	=	$1,525,981.38	8.5

* Av. Width ore 2nd Level = 10.7 m x 40 m (length ore) = 428 sq. m
" " " 3rd " = 8.5 m x 140 m = 1190 " "
180) 1618
9. m.

Ore in Sight and Highly Probable	Tons	Av. Value	Total Gross Value
	94,439	5.42	511,947.
Probable Ore	151,702	4.92	747,197.
Possible "	321,937	4.74	1,525,981.
Grand Total	568,078	$4.90	$2,785,125.

Humboldt Dump

At Shaft

Sample No.	Au Gr	Ag Gr	Value Au	Value Ag	Total Value	Tonnage
38	3.75	12	$2.50	0.20	2.70	300
39	4.87	17	3.24	0.29	3.53	500
201	4.25	14	2.83	0.24	3.07	2100
202	3.12	8	2.07	0.14	2.21	1000
				Total	Tonnage	3900

2.70 x 300 = 810.
3.53 x 500 = 1765.
3.07 x2100 = 6447.
2.21 x1000 = 2210.
3900) 11232.
$2.88 av. value

MILLING TESTS

The Aurora ores have been previously treated by amalgamation, with very recently, some subsequent cyaniding of the tailings. Therefore, as stated on page , the loss in milling was very great, the Humboldt tails from the Cons. Esmeralda Mill in 1886, averaging around $5. The same amalgamation method was used by the last mill constructed--a 20-stamp mill built by Mr. Cain near the mouth of the Prospectus drain tunnel. A sample from the tails of this mill ran 0.31 ounces gold, and 7.15 ounces silver, with a total value of $6.41 gold and $3.79 silver, or $10.21.

The ore is evidently an ideal cyaniding ore--free from sulfides and impurities, with values mostly in gold.

A sample from the Humboldt dump was tested, under the direction of Mr. A. R. Parsons, as follows:

TEST ON SAMPLE NO. 3, HUMBOLDT DUMP

AURORA, NEVADA.

Made at Desert Power and Mill Company's Mill

July 7 to July 8, 1911.

TEST NO. 1, PRELIMINARY.

	Ozs.Au.	Ozs.Ag.
Heads Assay	0.149	0.62

Ground to pass 200 mesh

Agitated in Laboratory Percolator at Specific Gravity of 1.22, or 2.2 parts of solution to 1 part of ore.

Strength of original solution 2.2 lbs., or 0.011% KCN per ton.

DETAILS OF SAMPLES TAKEN DURING TEST NO. 1.

SAMPLE	STRENGTH OF SOLUTION POUNDS PER TON	ALKALINITY LBS. CaO PER TON	ASSAY OF PULP Ozs.Au.	Ozs.Ag.	EXTRACTION %Au.	% Ag.
Heads	2.2	1.2	0.149	0.62		
12 Hrs. Agit.	1.6	0.2	0.02	0.33	86.6	46.8
CaO brought up to		0.8				
24 Hrs. Agit.	1.3	0.0	0.013	0.35	91.3	43.5

Cyanide consumption 1.98 lbs. per ton of ore.

Extraction end of 24 hours agitation, 91.3% gold and 43.5% silver.

Lime consumption 15.8 lbs. per ton, or 3.96 lbs. CaO per ton. Lime 25% soluble.

TEST ON SAMPLE NO. 3, AURORA, NEVADA.

Made at Desert Power and Mill Company's Mill,

July 9 to July 11, 1911.

TEST NO. 2.

	Ozs.Au.	Ozs.Ag.
Heads Assay*	0.149	0.62

Fifty pounds ground to pass 200 mesh in Ball Mill.

Agitated in small Pachuca at Specific Gravity of 1.35, or 1.28 parts of solution to 1 part of ore.

Strength of original solution 2.3 lbs., or 0.115% KCN per ton.

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* Total value of sample $3.41 (J.E.S)

DETAILS OF SAMPLES TAKEN DURING TEST NO. 2.

SAMPLE	STRENGTH OF SOLUTION POUNDS PER TON	ALKALINITY LBS. CaO PER TON	ASSAY OF PULP Ozs.Au.	Ozs.Ag.	EXTRACTION %Au.	%Ag.
Heads	2.3	0.7	0.149	0.62		
12 Hrs. Agit.	2.1	0.3	.015	.43	89.9	30.7
10 gms. lime added						
24 Hrs. Agit.	2.1	0.2	.01	.35	93.3	43.5

Cyanide consumption 0.27 lbs. per ton of ore.

Extraction end of 24 hours agitation, 93.3% gold, and 43.5% silver.

17 lbs. lime per ton of ore added. Lime 25% soluble.

3.9 lbs. CaO consumption, or 15.6 lbs. lime.

The total extraction thus indicated is 88.5%, but this dump ore is of lower grade than the average of the mine ore, and probably gives a less percentage of extraction. A sample of ore from the middle dump of the Juniata (which will be described fully in the Juniata report) ran a total of $9.68, and the tests gave an extraction of 97.7% of the gold and 65.6% of the silver, or a total saving of $9.29 or 96%. Similarly a sample from the Prospectus upper tunnel dump (to be described in the Prospectus report) ran $6.43, and the tests gave an extraction of 96.6% of the gold, and 75.7% of the silver, a total saving of $6.13, or 95.3%. Mr. Parsons is therefore of the opinion that in figuring net values a recovery of 95% gold and 60% silver may be taken, which, with the average proportion of gold and silver in the Humboldt would be 94.5% total recovery.

The mill to treat these ores would probably be of simple construction, and could therefore be economically run.

Subsequent tests of amalgamation were made by Mr. Parsons, as follows:

AMALGAMATION TEST,

ON SAMPLE NO. 3, AURORA, NEVADA.

Made at Desert Power and Mill Company's Mill

August 16, 1911.

100 gms. ore agitated with about 5 gms. mercury and water in flask for 1½ hours.

100 gms. of ore contained	0.50 mlgs. gold.
Tails contained	0.168 " "
Amalgam contained	0.30 " "

Extraction, calculated from heads and tails, 66.4%.

Extraction, calculated from gold in amalgam and heads, 60%.

Average, 63.2% extraction.

These tests indicate that a combination of amalgamation and cyaniding may be eventually adopted..

Further tests are now being made by Mr. Parsons, with a view to finding whether the values may not be extracted from sands by cyaniding, thus avoiding the expensive all-sliming process.

In any event, the indications assure efficient and cheap milling.

CONDITIONS FOR MINING

Should systematic mining operations be begun at the Humboldt property, the Prospectus Drain Tunnel would be extended to the Humboldt shaft. This tunnel would connect with the shaft about on the 400-foot level, so that there would be approximately 400 feet of backs on the vein. The distance to drive the tunnel, to connect with the shaft, would be 1000 feet, but a portion of the Humboldt vein would be cut in 600 feet or less.

The ore in the block above the tunnel would then be mined overhand. The average width of the vein is very wide, so that breaking and stoping charges would be low. The quartz is very hard, and the wall-rocks fairly so, and the intention is to devise methods of stoping that would require very little timbering. Development charges, on account of the great size of the vein, would be very slight. There would be no charge for pumping, and very little for hoisting (a little auxiliary hoisting would be done in the shaft, for men, tools, etc.) The ore would be sent down in chutes to the tunnel level, drawn off into cars, hauled by an electric locomotive to the mill which would be near the mouth of the tunnel, and dumped into the mill bins. Conditions are therefore seen to be very favorable for very cheap mining. The nearest railroad station is Thorne, on the Southern Pacific, 35 miles distant by wagon road; but the amount of supplies to be hauled for this operation would be small, as there would be no incoming power supplies (power being obtained from the main line of the Pacific Power Co. which runs within a few hundred yards of the property)

nor outgoing ores nor even concentrates. Freight is now hauled to Bodie, some eight miles further from the railroad than Aurora, at $18. a ton, and it is estimated that it could be hauled to Aurora for $16. a ton. Automobile trucks, now coming into use, would if successful, probably cut this cost in half. The lack of a railroad is therefore scarcely felt as a drawback; for as compared with mining camps further south in Nevada it is thought that the additional cost of railroad freight would offset the cost of wagon haul.

The principal item of cost which requires careful consideration is that of power. This would naturally be obtained from the electric plant of the Pacific Power Company. Naturally, it should be obtained at cheap rates, as Aurora is not far from the source of power (Mill Creek, 30 miles distant) so that the loss of power in transmission and the cost of maintaining the line is not comparable with similar costs for more remote camps in Nevada. Moreover, no extra line construction is needed, as the main line already passes the property and there is a substation at Aurora.

It is evident that in a low-grade mining enterprise, where every item of costs must be scientifically pruned down, the item for power should be reduced also. This can be done largely by careful planning of mine and mill operations, so as to economize the expenditure of power; but in addition it is essential that an economical rate should be obtained from the power company.

MINING AND MILLING COSTS

In seeking to arrive at an estimate of the cost of mining and milling ore, the method of comparison with known operating mines was first used. The nearest analogous case which I know is at Silver Peak, Esmeralda County, Nevada, with the ores, ore-bodies, and mining and milling conditions of which I am personally familiar. The veins at Silver Peak are of quartz; are large, low grade, and with most of the values in gold. The average grade of the ore is understood to be a little over $5.00. The ore is mined mostly through a tunnel. The ore is cyanided. The size, value, and metallic contents of the veins closely approximate the conditions at the Humboldt Mine. In certain respects the Humboldt proposition has the advantage. Abundant water for milling purposes flows out of the Prospectus drain tunnel, and would be delivered straight to the mill. At Silver Peak water has to be pumped up to the mill from the valley below. At Silver Peak there is an aerial tramway charge of $0.167 per ton, which would not be true of the Humboldt property. At Silver Peak the ore-bodies dip flatly, while at the Humboldt they are nearly vertical or very steeply inclined--a decided point in favor of the Humboldt. At Silver Peak there is a development charge of $0.399 per ton while at the Humboldt--so far as the block between the surface and the tunnel level is concerned, would not exceed 15 cents a ton, although this might be voluntarily increased for more extensive prospecting operations.

At Silver Peak there is 2000 feet difference of elevation between the mine and the mill, while at the Humboldt they are close together; so that the cost for electric haulage should be much less than at Silver Peak.

The wage scale at Silver Peak is as follows:*

Eight Hour Shift

Shift bosses, carpenters, machinists, electric workers, shovelmen -	$6.00
Locomotive Engineers, blacksmiths - - - - - - - - - - - -	5.50
Hoist and compressor engineers, motormen, tramway brakemen, linemen - - - - - - - - - - - - - - - - - - -	5.00
Machine men, timbermen, skipmen, crushermen, shovel helpers, machine men helpers - - - - - - - - - - - -	4.50
Muckers, trammers, blacksmith helpers, yardmen, and all other labor - - - - - - - - - - - - - - - - - - -	4.00

The wage scale at Bodie, Calif. (near Aurora) is as follows:**

Shift bosses, hoisting engineers, blacksmiths - - - -	$5.00
Timbermen, carpenters, - - - - - - - - - - - - - - - - - -	4.50
Miners, machine men, muckers, trammers, tool sharpeners	4.00
Surface labor -	3.00

The Aurora camp is closely associated with Bodie, and it would not be necessary to go above the Bodie wage scale. As Aurora is a better place to live than Bodie, the better class of the men would probably be drawn here. This wage scale gives the Humboldt a decided advantage over the Silver Peak.

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* Article by Edmund Juessen, Manager, Min. & Sci. Press July 8, 1911, page 39.

** Information by J. S. Cain, Aug. 16, 1911.

Silver Peak has a branch railroad connecting it with the Tonopah and Goldfield R.R., but the necessary supplies for Aurora would be in small amount, and the cost of freight from Thorne to Silver Peak is believed to about offset the haulage from Thorne to Aurora.

At Silver Peak some of the mining is done by glory-hole and open-cut methods, the statement being made that "at present the underground ore represents 60% of the total tonnage and 73% of the total cost, while glory-hole and open-cut mining produces 40% of the ore, at 27% of the cost." *

This statement means that the total cost for mining and development given below ($1.396) may be segregated as follows: Glory-hole work $0.942, Underground work $1.698. At the Humboldt the conditions are as favorable for open-cut and glory-hole work as those at Silver Peak, as I recall them; nevertheless, in assuming Humboldt costs, I shall take the Silver Peak figure for underground mining alone.

The power situation is about the same at the two mines, Silver Peak getting electric power from the Nevada-California Power Company, under the same management as the Pacific Power Company, which serves Aurora.

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* Mining & Scientific Press, July 8, 1911, page 38

Silver Peak costs per ton for the first quarter of 1911.*

Mining	$0.997
Development	.399
Crushing	.059
Aerial Tram	.167
Milling Total	1.097
Total	$2.719

These total costs include all over-head charges, expense of Pittsburgh office, expense of both mine and mill, and also the work of building the railroad to Valcalda, and the driving of the Valcalda tunnel.

Assumed Humboldt costs, by comparison

Mining & Development	$1.449**
Crushing & Milling Same assumed as at Silver Peak	1.156
Total costs	$2.605

This estimate is based, with the exception only of a reduced charge for development work, on Silver Peak costs, whereas there are a number of conditions, already pointed out, which give the Humboldt the advantage over Silver Peak; so that it is within the range of possibility that the total costs might ultimately be reduced to $2.50 per ton. It is my opinion that the fixed conditions are such that the costs, for the Humboldt vein between the Humboldt shaft and the Silver Lining property (which constitutes the principal possible ore-reserve), should not exceed the total cost for the Silver Peak mine. At the same time, it must be borne in mind that these costs could probably not be attained in the beginning of the operating period, nor for some time thereafter, as

* Figures secured by A. R. Parsons.

** This figure is obtained by taking the cost of underground mining and development at Silver Peak, as figured on page 35 ($1.698) and deducting therefrom the difference $0.249 between the stated Silver Peak development costs and the estimated necessary Humboldt development costs ($.399 - $.15 = $.249) leaving $1.449 as an estimate for Humboldt underground mining and development costs.

it always takes considerable time for a mine to get into smooth, efficient, economical operation. It might also appear advisable, later, to voluntarily increase the costs, for the sake of getting greater profits, as is often necessary, when it comes to mining high-grade ore over scattered areas, or of doing more expensive development work, which would eventually pay for itself. In such cases, however, this increased development work and increased costs should not be applied to the great low-grade Humboldt vein, which should be treated on its own merit, as a separate proposition.

In this connection, it may be pointed out that where ores are already developed, the development per ton estimate should be deducted from the total estimate per ton, to get the minimum grade of ore which can be mined and milled at cost. For example, with the above figures, Humboldt ore already developed could be mined and milled for $2.60 - $.15 or $2.45. With the recovery value of ore at $2.45 (recovery figured at 94.5%) the assay value would be $2.59.

All these figures apply to the short ton, in use at Silver Peak. In estimating the ore-reserves the metric ton has been used, which is 10% more. The estimates of metric tons can be transformed to short tons by adding 10%; and the values which are given per metric ton, can be changed to values per short ton by subtracting 9.1%.

For the metric tons and the corresponding assay values, therefore, the above estimates of cost should be increased by 10%; thus:

	Short Ton	Metric Ton
Total assumed Humboldt Mining costs	2.605 + .26	= 2.86
Same less development charges	2.45 + .245	= 2.70
Minimum assay value of developed ore, to repay mining and milling costs	2.59 + .259	= 2.85

The assumed estimate of $2.86 is arbitrarily raised to $3.00, for purposes of calculating net profits.

Revised Estimate of Costs

Since writing the above, an estimate of mining costs was made jointly by Messrs. Blackburn and Huston, as follows:

SPURR & COMPANY

ESTIMATED COST OF MINING HUMBOLDT VEIN AT AURORA.

Aurora, Nev. Aug. 24, 1911.

Classification	No. of Men	Rate by day or month	Distribution		Mining Expense Labor	Mining Expense Supplies	Development Expense Labor	Development Expense Supplies
Supt.	1	$300.00	2/3	1/3	$200.00		$100.00	
Foreman	1	225.00	"	"	150.00		75.00	
Engineer	1	165.00	½	½	82.50	$10.00	82.50	
Eng.Asst.	1	100.00	½	½	50.00		50.00	
Shift Bos.	2	150.00	2/3	1/3	200.00		100.00	
Comprs.	3	4.00	¾	¼	234.00	75.00	78.00	$25.00
B'l'k.Shp.	(5	4.00						
	(1	3.50	¾	¼	458.00		153.00	
Elec.Haul	(1	5.00						
	(1	4.00	1	0	234.00	10.00		
Timbering	(1	4.50						
	(1	4.00	1	0	247.00	600.00		
Miners	37	4.50	31	6	3627.00		702.00	
Muckers & trammers	18	4.00	12	6	1248.00		624.00	
Hst. Engs	2	5.00	¾	¼	195.00	10.00	65.00	
Mechanics	2	5.00						
	1	4.00	5/6	1/6	304.00	80.00	60.00	
Powdermen	2	4.00	"	"	169.00		39.00	
Changeman	1	3.00	¾	¼	59.00		19.00	
Watchman	1	4.50	¾	¼	88.00		29.00	
Teamster	½	4.00	¾	¼	50.00	5.00	17.00	
Power		800.00	4/5	1/5		640.00		160.00
Pipe-Track	1	4.00	½	½	52.00	35.00	52.00	35.00
Explosives						3861.00		958.00
Tools			4/5	1/5		280.00		70.00
Iron-Steel			"	"		64.00		16.00
Other Supp						320.00		80.00
Proportion general					1952.00	1220.00	488.00	
Suspense or det. acct.						200.00		
					$9599.50	$7410.00	2733.50	$1344.00
					7410.00			2733.50
Total Mining - -					$17009.50			$4077.50

Cost per ton at 15,000 tons per month - - - - - - $1.134 - - - - - - - - - - $0.270

1.134

Total Mining and Development Cost - - - - - - - $1.404

Mr. A. R. Parson's preliminary estimate of milling costs - - 1.15

Total per short ton $2.55

~~per metric ton~~

SPURR & COMPANY

ESTIMATED PROFITS, HUMBOLDT MINE

On the above grounds we may make the following estimate of net profits from the ore-reserves of the Humboldt mine. It should be pointed out again that these figures may be considerably in excess of the actual outcome, on account of the delays and difficulties of the early period of operation, before things get to running smoothly.

ORE-RESERVES

HUMBOLDT MINE

	Tons	Av. Value	Total Recov. Val. (94.5% of Assay)	Est. Cost	Est. Net Profit per T.	Total Net Profit
Ore in sight & highly probable	94,439	5.42	5.12	3.00	2.12	$200,212.68
Probable Ore	151,702	4.92	4.65	3.00	1.65	250,308.30
Possible "	321,937	4.74	4.48	3.00	1.48	476,466.76
Dump	3,900	2.88	2.72	1.41*	1.31	5,109.
Total	571,978					$932,096.74

In contemplating this possible profit we have to take into consideration the following outlay:

Mill and other Installation	$400,000.
Price of Property	160,000.
	$560,000.
Total Estimated Net Profit	932,000.
Net Profit after repayment of outlay	$372,000.

With a 500-ton mill, handling 180,000 tons a year, the total estimated tonnage of 571,978 above the Prospectus tunnel would be handled in 3.18 yrs.

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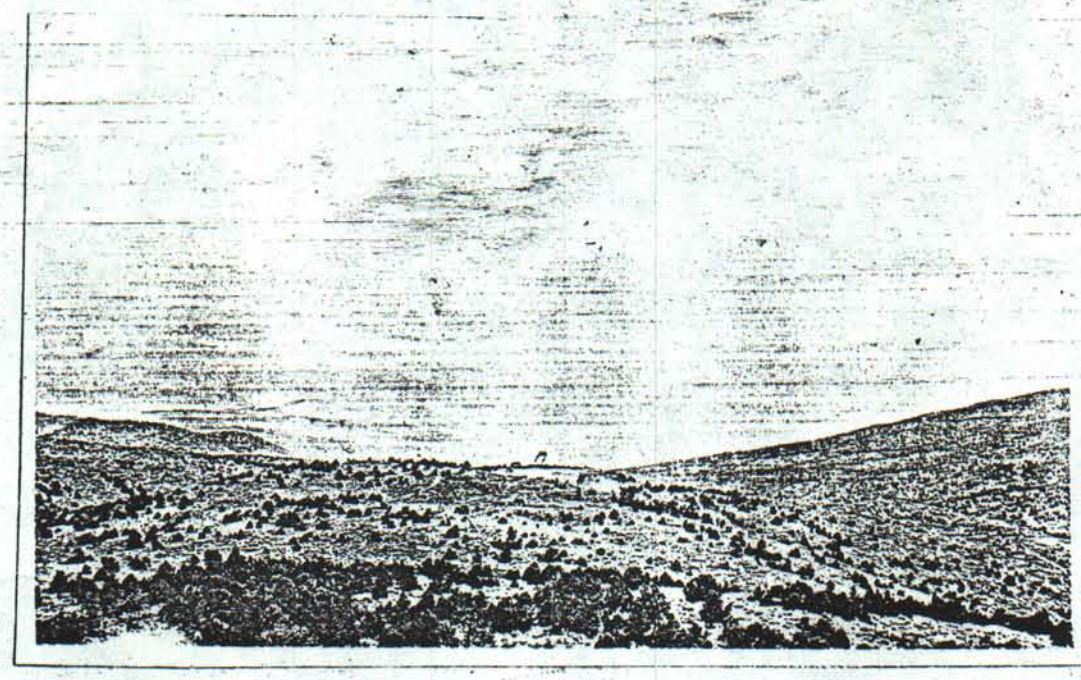
* This figure is based on Silver Peak costs which are $1.156 for crushing and milling. To this has been added $0.25 for increased cost involved in changing to metric tonnage, and for handling and administration.

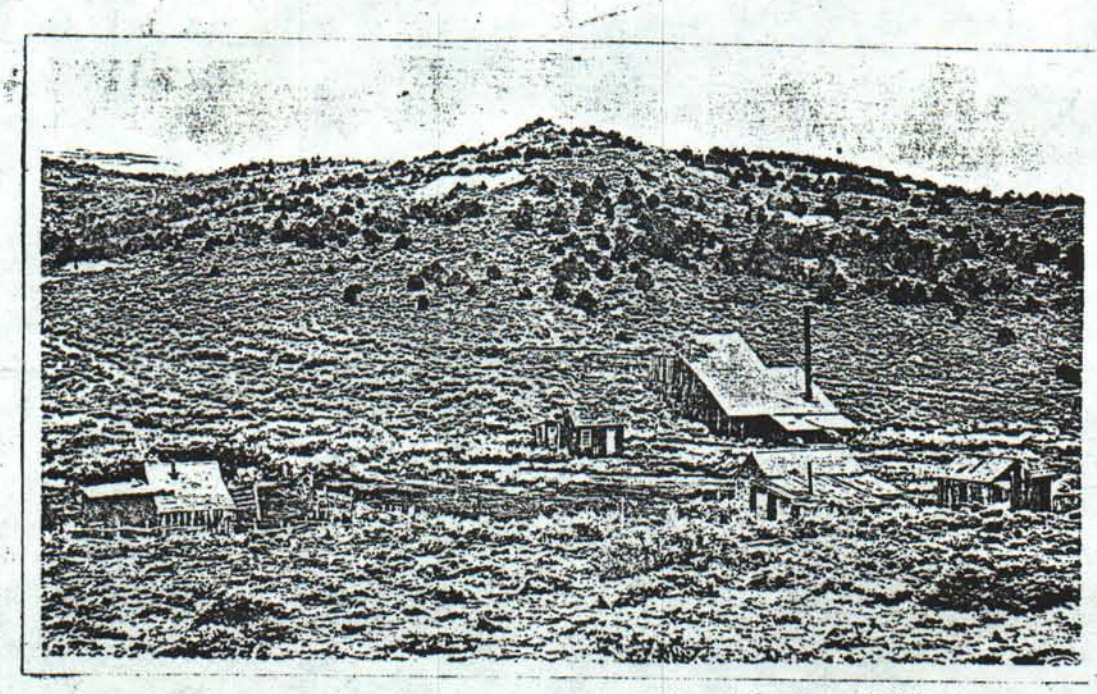
SPURR & COMPANY

ORIGINAL SIGNED

August 1911 by J. E. SPURR



I Humboldt Shaft, and Outcrop of Juniata Vein; from Juniata Hill



II Silver Lining Mill and Outcrop; Eastern Outcrop on Humboldt Claim at Summit of Hill