

1920  
MINING DEPT.  
CLEVELAND - CLIFFS IRON CO.

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THE  
CLEVELAND - CLIFFS IRON CO.  
MINING DEPARTMENT  

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ANNUAL REPORT OF GENERAL MANAGER  
FOR  
YEAR ENDING  
DEC. 31<sup>ST</sup> 1920

MS 86-100  
1991

MADE IN U.S.A.

#1991

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January 1, 1921.

Mr. Wm. G. Mather, Pres.,  
Cleveland, Ohio.

Dear Sir:-

I beg to submit the following report of the operations of the Mining Department for the year 1920. The inventories, maps, and statements relating to this report have gone forward to you under separate cover. The colored portions of the maps show the work for the year. The reports of the different mines of the Company were made by the Superintendents in Charge and the reports of the Mechanical, Engineering, Geological, Safety, and Welfare Departments by the heads of these departments.

ANNUAL REPORT

OF THE

LAKE MINE

(1920)

Production and Shipments.

The Lake Mine worked 299 days in 1920, and produced 156,000 tons of ore, an average of 522 tons per day. As the stock-piles were not cleaned up, there was no overrun from them credited to production for the year. The mine worked on double-shift until November 1st, and thereafter hoisting was done on day-shift only.

11,565 tons of rock were mined, an average of 39 tons per day.

The work done after November 1st was all above the third level, and was in the nature of exploration.

Table I.

Production by Grades.

Grade	Total for Year		Average per Day	
	1920 Tons	1919 Tons	1920 Tons	1919 Tons
Lake	100,972	207,114	338	695
Lakedale	<u>55,028</u>	<u>108,005</u>	<u>184</u>	<u>362</u>
Total Ore	156,000	315,119	522	1,057
Rock	<u>11,565</u>	<u>19,290</u>	<u>39</u>	<u>65</u>
Total Ore and Rock	167,565	334,409	561	1,122

Table II.

Shipments.

Grade	Pocket Tons	Stock-Pile Tons	Total Tons
Lake	77,237	59,636	136,873
Lakedale	<u>18,616</u>	<u>13,533</u>	<u>32,149</u>
Total	95,853	73,169	169,022



All the Lake ore shipped from the pocket and all except a small tonnage of this grade shipped from the stock-pile was crushed. Neither stock-pile was cleaned up. 18,727 tons of ore was loaded at the Presqu' Isle stock-pile by the Furnace Department and shipped to Pioneer No. 2 Furnace.

Table III.

Stock-Pile Balances, Dec. 31st, 1920.

Grade	At Mine Tons	At Presqu' Isle Tons	Total Tons
Lake	18,907		18,907
Lakedale	<u>151,156</u>	<u>29,499</u>	<u>180,657</u>
Total	170,065	29,499	199,564

Table IV.

Division of Product by Levels.

Level	Ore Tons	Rock Tons	Total Tons
1225 Sub-Level	3,620	1,466	5,086
Second Level	3,636	2,430	6,066
1145 Sub-Level	3,590	1,045	4,635
Third Level	2,721	2,090	4,811
Fourth Level	4,535		4,535
925 Sub-Level	3,662		3,662
910 Sub-Level	33,559		33,559
890 Sub-Level	43,536	348	43,884
880 Sub-Level	19,954	1,740	21,694
870 Sub-Level	5,442		5,442
Fifth Level	17,233	2,446	19,679
845 Sub-Level	<u>14,512</u>		<u>14,512</u>
Total	156,000	11,565	167,565

Table V.

Production by Months.

Month	Days	Ore Per Day Tons	Lake Tons	Lakedale Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
January	26	763	13,812	6,040	19,852	1,505	21,357
February	23	789	11,470	6,686	18,156	1,540	19,696
March	27	781	14,076	7,018	21,094	830	21,924
April	23	750	13,250	3,995	17,245	1,080	18,325
May	25	658	10,254	6,204	16,458	420	16,878
June	25	549	6,967	6,753	13,720	455	14,175
July	26	459	7,104	4,820	11,924	990	12,914
August	25	440	9,358	1,638	10,996	1,075	12,071
September	25	349	7,889	833	8,722	780	9,502
October	26	302	6,446	1,410	7,856	1,380	9,236
November	23	178	373	3,727	4,100	825	4,925
December	25	235		5,877	5,877	685	6,562
Year	299	522	100,999	55,001	156,000	11,565	167,565

Table VI.

Delays.

Date	Hours	Tons Lost	Cause	Repair Cost
June 16	2	100	Main drift caving.	\$ 22.65
Nov. 23	<u>8</u>	<u>175</u>	Broken brake band on ore hoist.	<u>46.11</u>
Year	10	275		\$ 68.76

There were no delays due to lack of electric power.

Table VII.

Estimate of Ore Reserves.

Level	Gross Ore Tons	Deductions for Rock and Timber	Net Ore Tons
1256 Sub-Level	4,585	50%	2,292
1224 Sub-Level	7,020	50%	3,510
Second Level	11,040	60%	4,416
1142 Sub-Level	17,088	60%	6,835
Third Level	<u>10,770</u>	60%	<u>4,308</u>
Total	50,503		21,361

Factor used:- 15 cu. ft. per ton.

## Exploration.

### Underground Drifting.

When the system of mining was changed from square-set rooms and pillars to top-slicing and caving the rooms above the first level were about six sets high and there was some ore still in the back. At this time there were some dangerous runs of mud, and this part of the mine was abandoned, and a floor of ore 30 feet thick was left under the first level before slicing started. In order to see if any of this floor, or the pillars above the first level, or the ore above the first-level rooms, remained intact, raises were started from the third level in July, and were continued until the back of the old first-level rooms had been found, about 35 feet above the second level. Sub-levels were opened half-way between the third and second levels, at the old second level, and at 35 and 67 feet above the second level, and considerable drifting and cross-cutting was done on these sub-levels. The floor left under the first level and the old pillars were found to have been completely wrecked by later mining operations, but some clean ore was found in places on the foot-wall, and on the two sub-levels the ore was badly broken, but was not mixed with timber and sand, as on the second and third levels. It is not, however, as high grade as the ore lower down. By careful sorting a considerable quantity of ore has been mined from between the old timbers, and a fair percentage of extraction can be obtained when stoping is started. It is estimated that 21,000 tons of ore has been developed by this exploration. The average iron content is about 55%.

### SURFACE.

There was no new construction during the year, and only minor repairs were made. A sheave on the shaft-house was replaced in February, and tile and iron pipe was put in place of the old launder where the mine-water ditch crosses the Lake Superior location on South Pine St.

In August the roof over the east room in the dry was sent to the Cliffs Shaft Mine to replace the roof that had burned, and many of the lockers

from this room were sent to other mines.

The electric air-compressor was torn down in September and sent to the Maas Mine.

#### UNDERGROUND.

##### Development.

Aside from the development undertaken above the third level in the old workings, as described under the heading of "Exploration," the only development-work done was the extension of the fifth level main drift to the north-east in rock and the opening of the 845 foot sub-level below the fifth level. The drift to the north-east on the fifth level was extended to get under an isolated body of ore developed on the 925 and 910 foot sub-levels. This ore extended down to the 890 foot sub-level, but pinched out quickly.

A winze was sunk in rock to the 844 foot sub-level in February and a hoist and skip were installed. This was used for mining the ore below the fifth level.

##### Stoping.

The 925, 910, 890, 880, 870, and 845 foot sub-levels and the fifth level were mined out and finished during the year, the last ore from this part of the mine being hoisted in the first week of November. Since that time all work has been confined to the old workings above the third level.

At the beginning of the year there were 25 contracts working, of which 20 were stoping. The number of gangs was gradually decreased until there were only 10 in November. The average number of contracts for the year was 17, of which 10 were stoping, 5 drifting in ore and 2 in rock. Nearly every gang spent about 15% of its time in repairing.

LAKE MINE.

COMPARISON OF COST SHEETS FOR 1919 AND 1920.

The Lake Mine worked on double-shift throughout 1920, hoisting being done on day-shift only after November 1st. The ore in the bottom of the mine was finished about November 1st, and thereafter the product was very small, coming from drifts and raises in the old workings above the third level. There was a gradual decrease in product and in the number of men employed throughout the year.

Wages were increased 10% on February 1st, 1920, making the average rate for 1920 9.2% higher than in 1919.

The tremendous increase in the cost of coal made a big difference in the cost of supplies, as the mine ran almost entirely on steam-power during most of the year.

Production.

	1919	1920
Days Worked	298	299
	Tons	Tons
Ore	315,119	156,000
Rock	<u>19,290</u>	<u>11,565</u>
Ore and Rock	334,409	167,565
Ore Per Day	1,057	522
Rock Per Day	<u>65</u>	<u>39</u>
Ore and Rock Per Day	1,122	561

Labor.

	1919	1920
Average number of men	248	154
Average rate per day	\$ 5.71	\$ 6.26

Tons Per Man Per Day.

	1919	1920
Surface	15.16	11.77
Underground	<u>5.91</u>	<u>4.72</u>
Total	4.26	3.37

Cost of Production.

	1919	1920
Labor	\$ 1.300	\$ 1.848
Supplies	<u>.468</u>	<u>.598</u>
Total	\$ 1.768	\$ 2.446

GENERAL EXPENSE.

No. 26 - Insurance.

1919	\$ 854.52	\$ .003
1920	<u>244.56</u>	<u>.002</u>
Decrease	\$ 609.96	\$ .001

The decrease is in riot insurance, which cost \$ 657.12 in 1919.

No. 27 - Engineering.

1919	\$ 1089.14	\$ .003
1920	<u>1042.97</u>	<u>.007</u>
Decrease	\$ 46.17	
Increase		\$ .004

No. 28 - Analysis.

1919	\$ 11089.31	\$ .035
1920	<u>8720.63</u>	<u>.056</u>
Decrease	\$ 2368.68	
Increase		\$ .021

The decrease is due to smaller production in 1920, requiring less analyses and one less sampler at the mine.

No. 30 - Personal Injury Expense.

1919	\$ 5458.74	\$ .017
1920	<u>5387.21</u>	<u>.034</u>
Decrease	\$ 71.53	
Increase		\$ .017

The principal charges were as follows:-

	<u>1919</u>	<u>1920</u>
Medical & Hospital Exp.	\$ 1268.80	\$ 785.00
Compensation Payments	1021.02	1997.31
Hospital Deficit	<u>3168.92</u>	<u>2604.90</u>
Total	\$ 5458.74	\$ 5387.21

No. 30a - Mine Office.

1919	\$ 12544.98	\$ .040
1920	<u>11718.46</u>	<u>.075</u>
Decrease	\$ 826.52	
Increase		\$ .035

The office force was cut down to two men in 1920, and only one policeman was retained after October 1st.

MAINTENANCE.

No. 125 - Tracks and Yards.

1919	\$	4042.21	\$	.013
1920		2817.92		.018
Decrease	\$	1224.39		
Increase			\$	.005

No. 126 - Docks, Trestles and Pockets.

1919	\$	1568.52	\$	.005
1920		674.77		.004
Decrease	\$	893.75	\$	.001

No. 127 - Buildings.

1919	\$	2908.01	\$	.009
1920		615.54		.004
Decrease	\$	2292.47	\$	.005

No. 128 - Shop Machinery.

1919	\$	244.97	\$	.001
1920				
Decrease	\$	244.97	\$	.001

No. 129 - Boiler Plant.

1919	\$	1917.30	\$	.006
1920		934.69		.006
Decrease	\$	982.61	\$	.000

No. 130 - Hoisting Machinery.

1919	\$	1937.09	\$	.006
1920		500.63		.003
Decrease	\$	1436.46	\$	.003

No. 131 - Compressors and Power Drills.

1919	\$	20003.86	\$	.064
1920		392.92		.003
Decrease	\$	19610.94	\$	.061

No. 132 - Pumping Machinery.

1919	\$	877.24	\$	.003
1920		653.92		.004
Decrease	\$	223.32		
Increase			\$	.001

No. 133 - Top Tram Engines and Cars.

1919	\$	1675.60	\$	.005
1920		663.28		.004
Decrease	\$	1012.32	\$	.001

No. 134 - Skips and Skip-Roads.

1919	\$	904.48	\$	.003
1920		463.41		.003
Decrease	\$	441.07	\$	.000

Charges for moving and maintenance of tracks were higher in 1919, and there was also a charge for filling and grading near No. 1 shaft, which was not necessary in 1920.

Charges for maintaining the rock-dump were much lower in 1920 than in 1919, and maintenance of railroad pockets was also lower.

Repairs to the coal-dock were \$ 1834.67 in 1919, and were slight in 1920. Repairs to other buildings decreased also.

New chain-blocks cost \$ 170 in 1919.

The economizer gave little trouble in 1920, and repairs to boilers, stokers and settings were lighter.

In 1919 new hoisting ropes cost \$ 966.81 and \$ 200 was paid in settlement of bill for new drum. There were no new ropes used in 1920.

In 1919 a new electric air-compressor was erected, on E and A. 370, and was charged to this account.

Repairs to pumps were light in 1920, the principal charges being for renewing the steam-line and overhauling the steam-pumps on the fourth level.

In 1919 a new rope cost \$ 100, repairs to cars \$ 200. The engine was overhauled also.

The decrease is due to less ore hoisted.



MAINTENANCE. (Continued)

No. 135 - Underground Tracks and Cars.

1919	\$	2949.36	\$	.009
1920		<u>936.05</u>		<u>.006</u>
Decrease	\$	2013.31	\$	.003

The decrease is due to less maintenance on cars and tracks on sub-levels. The length of the tracks and the number of cars were less in 1920.

No. 136 - Electric Tram Plant.

1919	\$	7976.36	\$	.025
1920		<u>4857.30</u>		<u>.031</u>
Decrease	\$	3119.06		
Increase			\$	.006

The length of tracks and the number of cars were much less in 1920.

No. 137 - Telephones and Safety Devices.

1919	\$	2130.79	\$	.007
1920		<u>2254.51</u>		<u>.015</u>
Increase	\$	123.72	\$	.008

The principal items were as follows:-

	<u>1919</u>	<u>1920</u>
Mine Telephones	\$ 224.19	\$ 182.81
Safety Gates and Underground Improvements	1783.40	1999.04
First Aid Devices for Injured Persons	4.88	31.50
Signs and Signals	.34	
Engine-House and Compressor	117.98	41.16
Total	\$ 2130.79	\$ 2254.51

No. 138 - Crushing and Screening.

1919	\$		\$	
1920		<u>252.43</u>		<u>.002</u>
Increase	\$	252.43	\$	.002

Crushing charges were taken out of Acct. No. 183 in 1920 and put in No. 138.

No. 139 - Lake Angeline Drainage.

1919	\$	1071.52	\$	.003
1920		<u>818.25</u>		<u>.005</u>
Decrease	\$	253.27		
Increase			\$	.002

The decrease is in repairs to pipe-line and surface pumps.

MINING EXPENSE.

No. 150 - Air-Pipes.

1919	\$	1881.79	\$	.006
1920		<u>1908.45</u>		<u>.012</u>
Increase	\$	26.66	\$	.006

The increase is due to running the steam-driven compressor, to the high price of coal, and to a 10% increase in wages Feb. 1st, 1920.

No. 151 - Compressors.

1919	\$	17172.65	\$	.054
1920		<u>18683.59</u>		<u>.120</u>
Increase	\$	1510.94	\$	.066

The increase is due to the high price of coal and to 10% increase in wages on Feb. 1st, 1920.

No. 152 - Hoisting.

1919	\$	25914.34	\$	.082
1920		<u>27659.24</u>		<u>.177</u>
Increase	\$	1744.90	\$	.095

MINING EXPENSE. (Continued)

No. 153 - Pumping.

1919	\$	13427.67	\$	.043
1920		<u>13475.92</u>		.086
Increase	\$	48.25	\$	.043

No. 155 - Rock Drifting.

1919	\$	22280.07	\$	.071
1920		<u>29853.51</u>		.191
Increase	\$	7573.44	\$	.120

No. 156 - Breaking Ore.

1919	\$	223381.41	\$	.709
1920		<u>119780.94</u>		.768
Decrease	\$	103600.47		
Increase			\$	.059

No. 157 - Trammig.

1919	\$	27857.62	\$	.088
1920		<u>24845.50</u>		.159
Decrease	\$	3012.12		
Increase			\$	.071

No. 158 - Filling.

1919	\$	1846.51	\$	.006
1920				
Decrease	\$	<u>1846.51</u>	\$	.006

No. 159 - Timbering.

1919	\$	87535.74	\$	.278
1920		<u>55534.39</u>		.356
Decrease	\$	32001.35		
Increase			\$	.078

No. 160 - Captain and Bosses.

1919	\$	15449.58	\$	.049
1920		<u>13958.29</u>		.089
Decrease	\$	1491.29		
Increase			\$	.040

No. 161 - Dry-House.

1919	\$	8208.56	\$	.026
1920		<u>7768.04</u>		.050
Decrease	\$	440.52		
Increase			\$	.024

No. 162 - Top Landing and Trammig.

1919	\$	13755.03	\$	.041
1920		<u>10907.80</u>		.070
Decrease	\$	2847.23		
Increase			\$	.029

The increase is due to drifting and raising on the upper levels during the second half of the year.

Total decrease is due to less tonnage mined. Cost per ton increased on account of 10% increase in wages on Feb. 1st, 1920 and higher cost of powder, and on account of drifting in ore and caved ground on upper levels.

The decrease is due to less ore produced, and the cost per ton increase is due to higher wages and lower production factor.

1919 charges were for rock stored underground.

Mining timber decreased \$ 16,951. The balance, \$ 15,050, is in labor of handling on surface and underground and in repair-work.

There were only two shift-bosses after Nov. 1st, 1920.

There was only one dry-man after Nov. 1st, 1920, and one room was not used. This offset the high cost of coal.

There was no night-shift after Nov. 1st, 1920.

MINING EXPENSE. (Continued)

No. 163 - Stocking Ore.

1919	⌘	9439.28	⌘	.030
1920		<u>2712.66</u>		<u>.018</u>
Decrease	⌘	6726.62	⌘	.012

The east trestle was built in 1919. There was practically no trestle construction in 1920.

No. 164 - Sorting Ore.

1919	⌘	391.08	⌘	.001
1920		<u>889.10</u>		<u>.006</u>
Increase	⌘	498.02	⌘	.005

The charge is for picking rock on stock-pile.

No. 166 - Cave-In.

1919	⌘	4638.30	⌘	.015
1920		<u>3766.03</u>		<u>.024</u>
Decrease	⌘	872.27		
Increase			⌘	.009

Pumping charges in the lake bottom were lower in 1920.

No. 167 - Lake Angeline Drainage.

1919	⌘	1485.98	⌘	.005
1920		<u>1567.71</u>		<u>.010</u>
Increase	⌘	81.73	⌘	.005

No. 168 - Crushing and Screening.

1919	⌘		⌘	
1920		<u>2831.97</u>		<u>.018</u>
Increase	⌘	2831.97	⌘	.018

Crushing charges were taken out of Acct. No. 183 in 1920 and put in No. 168.

No. 171 - Ventilation.

1919	⌘	1398.88	⌘	.004
1920		<u>1588.04</u>		<u>.010</u>
Increase	⌘	189.16	⌘	.006

The increase is in power charges.

RECAPITULATION.

	Year 1919		Year 1920		Increase		Decrease	
	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
General Expense	31036.69	.098	27113.83	.174	.076		3922.86	
Maintenance	50207.31	.159	16835.62	.108			33371.69	.051
Mining Expense	<u>476064.49</u>	<u>1.511</u>	<u>337731.18</u>	<u>2.164</u>	<u>.653</u>		<u>138333.31</u>	
Cost of Production	557308.49	1.768	381680.63	2.446	.678		175627.86	

LAKE MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1920.

GRADE	IRON	PHOS.	SILICA
Lake,	61.06	.115	4.79
Lakedale,	58.05	.170	7.34

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1920.

GRADE	IRON	PHOS.
Lakedale,	(All Mixed)	
Lake,	60.56	.127-(This means 13 cargoes all crushed and consigned to Michigan Ports for Charcoal Furnaces).

ORE STATEMENT - DECEMBER 31ST, 1920.

	LAKE ORE AT MINE	LAKEDALE AT MINE	LAKE ORE STOCKED AT PRESQUE ISLE	TOTAL	TOTAL LAST YEAR
On hand January 1, 1920,	54,808	128,279	48,226	231,313	150,337
Output for Year,	100,972	55,028		156,000	315,119
TOTAL,	155,780	183,307	48,226	387,313	465,456
Shipments,	136,873	32,149	18,727	187,749	234,143
Balance on hand,	18,907	151,158	29,499	199,564	231,313
Decrease in Output-50%				159,119	
Decrease in ore on hand-13%				31,749	
1920 - 2-8 Hour Shifts Jan. 1st to Nov. 1st, 1920					
1-8 " " Nov. 1st to Dec. 31st, 1920					
1919 - 2-8 Hour Shifts					

SHIPMENTS FOR YEAR 1920.

GRADE	POCKET	STOCKPILE	P. I. ST. PILE	TOTAL	TOTAL LAST YEAR
Lake,	77,238	59,635	18,727	155,600	174,160
Lakedale,	18,617	13,532		32,149	59,983
TOTAL,	95,855	73,167	18,727	187,749	234,143
Total last year,	180,536	53,607	0	234,143	
Decrease - 19%,				46,394	

LAKE MINE.

LAKE MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 2 0.	1 9 1 9.	INCREASE.	DECREASE.
PRODUCT	156,000	315,119		159,119
General Expense	.174	.098	.076	
Maintenance	.108	.159		.051
Mining Expense	2.164	1.511	.653	
Cost of Production	2.446	1.768	.678	
Exploratory		.036		.036
<u>DEPRECIATION.</u>				
Original Purchase	.212	.355		.143
Equipment Account	.003	.002	.001	
Total Depreciation	.215	.357		.142
Taxes	.193	.082	.111	
Central Office	.090	.058	.032	
Miscellaneous	.014			.014
Sundry Expense	.018	.007	.011	
Cost on Stockpile	2.948	2.308	.640	
Loading & Shipping	.167	.065	.102	
Total Cost on Cars	3.115	2.373	.742	
No. Days Operating	299	298	1	
No. Shifts and Hours	2-8-251 1-8- 48	2-8hr		
Avg. Daily Product	522	1,057		535
<u>COST OF PRODUCTION.</u>				
Labor	1.848	1.300	.548	
Supplies	.598	.468	.130	
Total	2.446	1.768	.678	

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LAKE MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 0	1 9 1 9	INCREASE	DECREASE
PRODUCT	156,000	315,119		159,119
No.Shifts & Hours	2-8-251 1-8- 48	2-8hr		
AVERAGE NO.MEN WORKING				
Surface	44	69		25
Underground	110	179		69
Total	154	248		94
AVERAGE WAGES PER DAY				
Surface	5.48	5.00	.48-9.6%	
Underground	6.57	5.98	.59-9.8%	
Total	6.26	5.71	.55-9.6%	
WAGES PER MONTH OF 25 DAYS				
Surface	137.00	125.00	12.00	
Underground	164.25	149.50	14.75	
Total	156.50	142.75	13.75	
PRODUCT PER MAN PER DAY				
Surface	11.77	15.18		3.41
Underground	4.72	5.92		1.20
Total	3.37	4.26		.89
LABOR COST PER TON				
Surface	.466	.330	.136	
Underground	1.391	1.011	.380	
Total	1.857	1.341	.516	
AVG.PRODUCT BRK'G & TRM'G	8.16	8.41		.25
" WAGES CONTRACT MINERS	6.73	6.08	.65	
" " " LABOR	6.73	6.08	.65	
TOTAL NUMBER OF DAYS				
Surface	13,253 $\frac{3}{4}$	20,763 $\frac{3}{4}$		7,510
Underground	33,062 $\frac{3}{4}$	53,279 $\frac{1}{4}$		20,216 $\frac{1}{2}$
Total	46,316 $\frac{1}{2}$	74,043		27,726 $\frac{1}{2}$
AMOUNT FOR LABOR				
Surface	72,654.29	103880.95		31226.66
Underground	217,064.39	318831.87		101767.48
Total	289,718.68	422712.82		132994.14

Proportion Surface to Underground Men:

- 1920 - 1 to 2.27
- 1919 - 1 to 2.59
- 1918 - 1 to 3.09
- 1917 - 1 to 3.32
- 1916 - 1 to 2.79

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LAKE MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1920.

KIND.	LINEAL FEET.	AVG. PRICE PER FOOT.	AMOUNT	
			1920.	1919.
6" to 8" Timber	40,701	.0286	1165.39	1497.91
8 " 10" "	56,558	.0701	3962.89	7721.84
10 " 12" "	35,194	.0754	2653.73	8716.54
12 " 14" "	4,844	.1303	631.26	1478.72
Total - 1920	137,297	.0613	8413.27	
Total - 1919	258,061	.0752		19415.01
	LINEAL FEET.	PER 100'.		
5' Lagging	617,525	.856	5284.51	6783.11
7' "	14,700	.90	132.30	201.51
8' "	5,600	.90	50.40	227.86
9' "	10,800	.90	97.20	157.50
Total Lagging (1)	648,625	.858	5564.41	7369.98
Poles	11,684	1.17	136.70	255.60
Total - 1920	660,309	.863	5701.11	
Total - 1919	1,020,062	.748		7625.58
Product			15,600	315,119
Feet Timber per ton of ore			.880	.819
Feet Lagging " " (1)			4.158	3.150
Feet Lagging per foot of timber			4.724	3.846
Cost per ton for timber			.0539	.0616
" " lagging			.0357	.0234
" " poles			.0009	.0008
" " timber, lagging & poles			.0905	.0858
Equivalent of stull timber to board measure			257,912	464,040
Ft. Bd. Measure per ton of ore			1.65	1.47
Total cost for Timber, Lagging & Poles	1920			14,114.38
"	1919			27,040.59
"	1918			30,668.00
"	1917			28,753.10
"	1916			25,050.94

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LAKE MINE. MADE IN U.S.A.

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LAKE MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICE	AMOUNT 1920	AMOUNT 1919
50% Powder, L. F. Standard 1½"	26,900	.1801	4,844.05	10,819.86
Total Powder - -	26,900	.1801	4,844.05	10,819.86
Fuse - - - - -	75,900	9.547	724.59	1,365.69
Caps - - - - -	25,200	13.645	343.85	675.60
Cap Crimpers - - - - -	9	.241	2.17	6.17
Connecting Wire - - - - -	2	.508	1.02	.78
Total Fuse, etc. - -			1,071.63	2,048.24
Total Explosives - -			5,915.68	12,868.10
Product - - - - -			156,000	315,119
Pounds of Powder per ton of Ore			.172	.190
Cost per ton for Powder - - - -			.0310	.0343
" " " " Fuse, Caps, etc.			.0069	.0065
" " " " All Explosives			.0379	.0408
Avg. Price per Lb. for Powder -			.1801	.1806

LAKE MINE

Damascus 17



ANNUAL REPORT  
OF THE  
CLIFFS SHAFT MINE

(1920)

Production and Shipments.

The Cliffs Shaft Mine worked 298 days in 1920, and produced 319,151 tons of ore, an average of 1,071 tons per day. Shipments from both stock-piles were much larger than last year, and pocket shipments were practically continuous throughout the shipping season.

15,196 tons of rock were produced during the year, all of which was dumped underground.

The mine worked underground on single-shift throughout the year, hoisting being done on both shifts until December 1st. At that time the number of men was reduced to 150 and the number of contracts to 25.

Production was below normal during the spring and summer on account of a shortage of trammers.

Table I.

Production by Grades.

Grade	Year 1920		Year 1919	
	Tons	Per Cent	Tons	Per Cent
Lump	198,836	62.3	211,962	57.8
Crushed	<u>120,315</u>	<u>37.7</u>	<u>154,811</u>	<u>42.2</u>
Total	319,151	100.0	366,773	100.0

Table II.

Shipments.

Grade	Pocket Tons	Stock-Pile Tons	Total Tons
Lump	123,854	66,757	190,611
Crushed	<u>58,736</u>	<u>117,988</u>	<u>176,724</u>
Total	182,590	184,745	367,335

Table III.

Ore in Stock, Dec. 31st, 1920.

Cliffs Shaft Lump	198,417 Tons
Cliffs Shaft Crushed	<u>124,800</u> "
Total	323,217 "

Table IV.

Division of Product by Levels.

Level	"A" Shaft			"B" Shaft			Both Shafts		
	Ore Tons	Rock Tons	Total Tons	Ore Tons	Rock Tons	Total Tons	Ore Tons	Rock Tons	Total Tons
1st				23,595	448	24,043	23,595	448	24,043
2d	14,376	337	14,713	4,502	101	4,603	18,878	438	19,316
3d	3,101		3,101	2,198		2,198	5,299		5,299
4th	1,742		1,742				1,742		1,742
5th	20,614	184	20,798	5,753		5,753	26,367	184	26,551
6th	31,694	1,111	32,805	14,911		14,911	46,605	1,111	47,716
7th	25,565	1,122	26,687	16,634	536	17,170	42,199	1,658	43,857
8th	7,046	1,810	8,856	12,444		12,444	19,490	1,810	21,300
9th	42,511	905	43,416	3,242	334	3,576	45,753	1,239	46,992
10th	1,378	1,427	2,805	4,879		4,879	6,257	1,427	7,684
11th	12,478		12,478	11,462	475	11,937	23,940	475	24,415
12th	7,133	83	7,216	18,922	78	19,000	26,055	161	26,216
13th				27,453	1,086	28,539	27,453	1,086	28,539
14th				5,357	1,364	6,721	5,357	1,364	6,721
15th				161	3,795	3,956	161	3,795	3,956
Total	167,638	6,979	174,617	151,513	8,217	159,730	319,151	15,196	334,347

Table V.

Production by Months.

Month	Days	Ore per Day Tons	Lump Tons	Crushed Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
January	26	1,237	16,063	14,553	30,616	1,542	32,158
February	23	1,240	18,523	9,994	28,517	1,078	29,595
March	27	1,206	21,213	11,358	32,571	1,160	33,731
April	23	1,181	17,456	9,711	27,167	1,176	28,343
May	25	1,111	18,411	9,373	27,784	1,124	28,908
June	25	1,114	18,494	9,368	27,862	1,154	29,016
July	26	1,039	17,667	9,335	27,002	1,356	28,358
August	23	1,032	15,695	8,050	23,745	970	24,715
September	25	1,047	17,030	9,134	26,164	1,388	27,552
October	26	1,074	17,764	10,160	27,924	1,848	29,772
November	24	1,095	13,897	12,392	26,289	2,112	28,401
December	25	540	6,623	6,887	13,510	288	13,798
Year	298	1,071	198,836	120,315	319,151	15,196	334,347

Table VI.

Delays.

Date	Hours	Tons Lost	Cause	Repair Cost
Jan. 10	1	100	Top tram counter-weight rope broke.	\$ 6.00
Jan. 12	3	300	Cleaning skip-pit.	19.80
Jan. 15	1	50	Rope off lower tram sheave.	1.50
Jan. 19	$\frac{1}{2}$	100	Fingers on "A" shaft controller out of adjustment.	.50
Jan. 20	1	50	Top tram controller out of adjustment.	1.00
Jan. 20	$1\frac{1}{2}$	100	Repairing "B" shaft skip.	5.00
Jan. 26	3	100	Broken liner on "A" shaft skip-dump.	21.45
Jan. 27	$1\frac{1}{2}$	200	Broken liner on "A" shaft skip-dump.	3.25
Feb. 20	1	50	Broken wheel on lump stocking car.	9.25
Feb. 23	1	100	Installing counter-weight pipe in "A" shaft.	
Feb. 24	2	150	Putting on counter-weight in "A" shaft.	7.75
Feb. 25	3	125	Cutting "A" shaft counter-weight rope.	4.80
Mar. 1	1	100	Cleaning "B" shaft skip-pit.	6.60
Mar. 27	$2\frac{1}{2}$	200	Cleaning "B" shaft skip-pit.	16.20
Apr. 6	$1\frac{1}{2}$	200	Cutting "B" shaft counter-weight rope.	7.00
Apr. 16	1	50	Chunk blocked 7th level pocket "B" shaft.	2.65
Apr. 29	4	175	Putting on new counter-weight rope in "B" shaft.	15.50
June 7	2	200	No current. Main line.	
June 10	1	100	No current. Main line.	
June 28	5	600	No current. Main line.	
July 27	2	100	No current. Main line.	
Aug. 10	$2\frac{1}{2}$	200	Axle broke on "B" shaft top tram car.	55.10
Aug. 16	3	200	Dry-house fire.	3,116.17
Aug. 17	16	1,100	Dry-house fire.	
Sept. 8	8	400	No current. Main line.	
Sept. 15	3	100	No current. Main line.	
Oct. 27	4	300	"A" shaft top tram trestle broke.	134.82
Nov. 8	3	300	"A" shaft counter-weight rope kinked on drum.	13.87
Nov. 11	<u>8</u>	<u>300</u>	Underground men not out at night.	
Total	87	6,040		\$ 3,448.21

Table VII.

Delays Due to Lack of Current.

Date	Hours	Tons Lost
June 7	2	200
June 10	1	100
June 28	5	600
July 27	2	100
Sept. 8	8	400
Sept. 15	<u>3</u>	<u>100</u>
Year	21	1,500

Table VIII.

Estimate of Ore Reserves.

	"A" Shaft Tons	"B" Shaft Tons	Total Tons
Pillars	992,000	640,000	1,632,000
Floors	1,548,000	1,035,000	2,583,000
Partly Developed	535,000	20,000	555,000
Total	3,075,000	1,695,000	4,770,000
Less 10% Rock	307,000	170,000	477,000
Net Total	2,768,000	1,525,000	4,293,000
To Support Surface	1,562,000	976,000	2,538,000
Available Ore	1,206,000	549,000	1,755,000
Less 10% Rock and 10% Loss in Mining	241,000	110,000	351,000
Net Available Ore Jan. 1st, 1921.	965,000	439,000	1,404,000

Recapitulation.

	Developed Tons	Prospective Tons	Total Tons
Available Ore	1,480,000	275,000	1,755,000
Less 10% Rock and 10% Loss in Mining	296,000	55,000	351,000
Net Available Ore	1,184,000	220,000	1,404,000

Factors used:- 8, 9 and 10 cu. ft. per ton.

Table IX.

Ore mined during the year from C.I. M. Co.'s land, - 4,102 Tons

GENERAL.

Labor.

There was a shortage of trammers during the spring and summer, which caused a reduction in output. On December 1st 200 men were laid off, reducing forces to approximately 150 men. Most of the married men laid off replaced single men at other mines.

Wages were increased 10% on February 1st.

New Construction.

E and A. 379. Concrete Shaft-Houses.

The inside forms were removed in January and February, and the sheaves moved to the concrete beams. The old shaft-houses were then torn out, and the outside forms removed in March and April. Concrete floors were put in both shaft-houses in July. The buildings present a fine appearance, and from an operating stand-point are also a great improvement over the old type of shaft-house.

Table X.

Cost of E and A. No. 379, New Concrete Shaft-Houses.

	<u>Estimate</u>	<u>Total Cost</u>
(1) 1,866 Cu. Yds. Concrete, Including Forms	\$ 37,320.00	\$ 40,076.88
(2) Tearing Down Old Shaft-Houses	2,500.00	796.82
(3) Moving Sheaves and Building Floors, Stairways, Windows and Doors	2,500.00	4,651.75
(4) Tie Rods and Reinforcing	1,600.00	8,326.34
(5) Moving Tracks and Lengthening Chutes	300.00	628.35
(6) Lighting and Heating	300.00	438.92
(7) Local Office and Supervision	1,000.00	1,399.95
(8) Consulting Engineers, Fees and Expenses, and Travelling Expenses	2,500.00	1,842.50
Total	48,020.00	58,161.51
10% for Contingencies	4,800.00	
Grand Total	\$ 52,820.00	\$ 58,161.51

### Cages.

A double-decked cage for handling men was built at the mine and put in service at "A" shaft in July. Another cage like it is being built for "B" shaft.

### Counter-Weights.

12-inch counter-weight pipes were put in both shafts and new counter-weights put on in February and April. Some trouble was experienced with the ropes breaking, because they were of Lang lay, and because the counter-weights are free to twist in the pipes. Regular lay ropes overcame the difficulty. The new counter-weights weigh 6 tons apiece and are 31 feet long.

### Cars.

12 new, all-steel motor-cars were built at the mine for the fifteenth level for use in the drift to Section 3. They hold 5 tons apiece, and are a new departure.

### Forges.

Two oil-burning forges were set up in the drill-shop in December, replacing the coke forges, formerly used. There has been a great improvement in drill-steel since their installation.

### Power.

There was a shortage of electric power in February and part of March, and again in October and November, so that it was necessary to run the steam-compressor and the steam-pumps.

### Stock-Piles.

Extra plank was laid on both stock-pile floors in the early winter, and in the fall new trestles were erected to stock lump ore.

Unwatering No. 3 and Incline Mines.

The water was pumped out of No. 3 Mine to a point 40 feet below the third level, which is the lowest level connected to the Incline Mine. An old trestle across a stope on the third level was repaired, and the water was allowed to rise again nearly to the third level, at which point it is now held. The Incline Mine was then unwatered below the third level, and the water-level is being kept close to the bottom. A drift is being driven from the Cliffs Shaft Mine to make connections with the bottom of the Incline Mine. When this connection is made it will not be necessary to pump any more in the Incline.

Exploration.

Thirteen diamond drill-holes were drilled underground during the year, and some new ore was found on the thirteenth level in "B" shaft and on the ninth level in "A" shaft. A description of this work will be given in the Geologist's report. The following table sets forth the principal facts:-



Table XI.

Underground Diamond-Drill Holes.

Hole No.	Depth Feet	Ore Feet	Shaft	Level	Direction	Inclination Degrees	Vein
312	144	22	"B"	13	North	0°	Main Vein
313	178	13	"B"	13	N. 45° E.	0°	Main Vein
314	433	30	"B"	13	S. 26° E.	0°	Fault Vein
315	77	0	"B"	13	North	0°	Main Vein
316	169	0	"B"	13	North	-30°	Main Vein
317	331	28	"B"	13	South	0°	Fault Vein
318	210	0	"B"	13	S. 3° E.	-31°	Fault Vein
319	180	0	"B"	13	Down	Vertical	Main Vein
320	245	0	"B"	11	S. 26° E.	0°	Fault Vein
321	175	0	"B"	11	South	0°	Fault Vein
322	190	0	"B"	6	N. 21° W.	0°	Fault Vein
323	130	0	"B"	6	N. 30° E.	0°	Fault Vein
324	<u>165</u>	<u>59</u>	"A"	9	South	0°	South-East Deposit
Total	2,627	152					

Fire in Dry-House.

Between one and two o'clock in the morning of August 17th fire broke out in the dry, destroying the middle change-room, and injuring the rooms on either side. About 100 men lost their mine clothes, and work was practically suspended at the mine on that day. The roof was removed from the east room of the dry at the Lake Mine, and was put on the dry at the Cliffs Shaft. Practically all repairs except windows and painting had been completed within two weeks of the date of the fire.

There was no insurance on the building or contents, and the men were paid for the loss of their clothes.

UNDERGROUND.

General.

The number of contracts was slightly reduced at various times during the year on account of the shortage of trammers and on account of the rock-drifting which was undertaken. These rock drifts were driven on both shifts, and two contracts were combined to make the crew, instead of hiring extra men. The number of contracts was cut down to 25 on December first, the reduction being mostly in places where known ore reserves were being mined.

The following table shows the average distribution of contracts for the year.

Table XII.

Classification of Contracts.

Kind of Work	"A" Shaft	"B" Shaft	Total
Stoping	12	9	21
Floors	7	7	14
Backs	3	2	5
Ore Raises and Drifts	5	3	8
Rock	<u>3</u>	<u>5</u>	<u>8</u>
Total	30	26	56
Mining Known Reserves	13	9	22
Developing New Ore	14	12	26
Rock	<u>3</u>	<u>5</u>	<u>8</u>
Total	30	26	56

Development.

In "A" shaft the principal development has been in the South-East Deposit. In this deposit the known ore-area on the ninth level has been considerably enlarged by two contracts, which have been stoping there, and by one diamond drill-hole. The ore on this level is about 800 feet long with a maximum width of 150 feet. In the same deposit two gangs have been drifting and raising on the fifth, sixth and seventh levels. Two raises have been completed from the eighth to the fifth levels, and are connected by drifts on each level. Not enough work has been done to determine the size of the ore-body, but on the seventh level it is more than 65 feet wide.

Three development-stopes have been driven east on the eleventh and twelfth levels, but the outlines of the ore have not been determined.

A rock-drift was driven west on the seventh level under the big stopes on the sixth level in the North Vein, but it was stopped December 1st, before it was completed. Stopping and raising have also been carried on on the sixth and seventh levels in the Fault Vein at the east end of the North Vein, and the known limits of the ore have been extended. On the tenth level a rock-cross-cut has also been driven to this vein, which has been developed in previous years on the eighth and ninth levels, and a raise is being put up to the ninth level. When this raise is connected to others leading to the top of this ore-body some cheap ore can be mined, as there will be no hand-loading necessary.

At the east end of the eighth level a rock-drift is being driven to connect with the bottom of the Incline Mine. 250 feet of drift and 100 feet of raise are required. Some ore will probably be found by this drifting.

In "B" shaft the principal development has been in the Main Vein and Fault Vein between the tenth and fifteenth levels. Very little new ore has been discovered on the upper levels.

The ore on the south side of the Main Vein has been followed west on the eleventh and twelfth levels, and its limits have been pretty well determined on the thirteenth level. A long drift was driven west to the

hanging-wall of this vein on the fourteenth level, but the extent of the ore found on this level has been very disappointing. On the north side of the Main Vein the only ore developed is on a sub-level between the eleventh and twelfth levels. The ore is very flat here, and its limits have not been determined. It is apparent, however, that it does not extend down to the twelfth level.

Two stopes have been opened in the Fault Vein on the thirteenth and fourteenth levels, and ore was cut in two places in this vein by diamond drill-holes on the thirteenth level.

The west drift on the fifteenth level was extended 335 feet in rock, and a raise was started towards the ore on the fourteenth level, but work was stopped on December 1st.

In May a cross-cut was started to the north-east from the main drift 50 feet east of "B" shaft on the fifteenth level, and had advanced to a point 450 feet from the drift, when it was stopped on December 1st. A fan-station and an air-way were cut out, but no fan was installed.

#### Stoping.

##### "A" Shaft.

On the second level two gangs worked up to December 1st in the Main Vein about 600 feet east of "A" shaft, taking up floors of old sub-levels. Another gang was doing similar work at the top of the South Lens 300 feet south-west of the shaft. All three places were stopped December 1st.

Two gangs worked in the North Vein 550 and 650 feet north-west of "A" shaft up to December 1st, mining the floors of the fourth level during most of the year, but were discontinued December 1st. There is little ore left here.

The floor of the fifth level in the Main Vein east of the rock-crossing 600 feet east of the shaft was finished in November, and the floor in the North Vein was also finished. One gang was stoping on the foot-wall 300 feet south of the shaft in the South Lens until December 1st, and another is stoping east in the South-East Deposit 1350 feet south-east of "A" shaft,

where connection was made to the raise from the eighth level early in the year. Another worked in the Small Body, 300 feet north-east of "A" shaft, up till December 1st, cleaning down the foot-wall and taking ore in the back.

On the sixth level three contracts worked near the east end of the North Vein, one stoping east, one stoping and raising in the back and one mining floors. The two latter places were stopped December 1st. In the South-East Deposit two raises from the eighth level were connected and a raise put up to the fifth level.

There were six gangs working on the seventh level most of the year. One is stoping south in the South-East Deposit 1300 feet south-east of "A" shaft, and has proved the ore to be 65 feet wide without finding the foot-wall. One is mining floors in the South Lens 600 feet east of the shaft, and one is stoping east at the east end of the Main Vein. Two gangs were drifting in rock and taking up the bottom of the old stopes in the North Vein, 1000 and 1200 feet north-east of the shaft, up to December 1st, and one is stoping east in the Fault Vein 1950 feet east of the shaft.

The principal work on the ninth level has been in the South-East Deposit, where two gangs have been stoping all year. On this level the ore is nearly 800 feet long with a maximum width of 150 feet. Up to December 1st one gang was mining the floor of a sub-level in the South Lens and one was mining backs in the Main Vein. Some raises were also put up in the Fault Vein.

There was no work done on the tenth level, but on the eleventh level two stopes were driven east. Both of these stopes are still working, and are looking well. Another stope is being driven east under them on the twelfth level.

#### "B" Shaft.

In "B" shaft there were four gangs working on the sub-levels above the first level up to December 1st, and there are now three. One gang has been mining the floor of the 1200 foot sub-level 500 feet south-east of the shaft, another mined quite a little ore in the back of the drift 100 feet

further south, and a third has started a stope east from the big chute 15 feet below the 1200 foot sub-level. The fourth gang has mined the floor of the 1190 foot sub-level in the South Lens, 1000 feet south-east of the shaft, down to 1165 feet and has nearly finished the ore in this deposit.

One contract mined under the first level, 200 feet north-east of "B" shaft, up to December 1st, and another has been stoping in the North Vein 200 feet further north, under the second level. There is not much ore showing in either place, and both contracts have been laid off.

In the North Vein on the fifth level one contract was stoping and raising up to December 1st 650 feet north of the shaft, but found little more ore than they took out.

On the sixth level one gang has been mining the floor of a sub-level 900 feet west of the shaft, and two others have been mining floors in the North Vein. Two gangs have been mining the floor of the seventh level in the Main Vein 1100 and 1600 feet west of the shaft, but were stopped on December 1st.

During most of the year one gang was stoping west at the end of the ninth level, 1600 feet west of "B" shaft, one gang was mining the back of the tenth level and the floor of the ninth, 1200 feet south-west of "B" shaft, and another was mining the floor of the tenth level 900 feet north-west of "B" shaft. All these contracts have been stopped.

On the eleventh level the Main Vein has been followed west on the south foot-wall, and a small-body of ore has been found in the foot-wall. Two gangs are working here. Two gangs have been working on the twelfth level, one following the ore west on the south foot-wall and one stoping on a sub-level 30 feet up on the north side. This place is looking very promising, but the ore in the south stope has nearly pinched out. Both places are working.

On the thirteenth level the horizontal limits of the ore in the Main Vein have apparently been found, but there may be more ore in the back. One gang is raising on the south foot-wall, and another was laid off. A stope has been opened in the Fault Vein, and the ore is being followed west.

The ore on the fourteenth level has not amounted to much. A drift was driven west in jasper with ore in the back to the hanging-wall, and a small stope opened, but the ore was almost entirely cut off. Another rock cross-cut was driven south to the Fault Vein, and a stope is being driven west in the ore.

CLIFFS SHAFT MINE.

COMPARISON OF COST SHEETS FOR 1919 AND 1920.

The Cliffs Shaft Mine worked on single shift in 1920, but hoisting was done on both shifts until December 1st. On that date 200 men were laid off, and hoisting was done on day-shift only.

Wages were increased 10% on February 1st, 1920, making the average rate for 1920 9.2% higher than for 1919.

New construction in 1919 cost \$ 117,252.60, and some of this work went over into 1920. As all this work was charged out as it was done, the tons per man on surface was low for both years, and the cost for maintenance was high.

There was a shortage of trammers during most of 1920, and most of those obtainable were not first class, so that efficiency was not as high as it should have been.

During the second half-year a rock drift was started towards Section 3, and the cost of this drift as well as the new equipment required was charged against the ore. There was another large item of expense in unwatering the No. 3 and Incline Mines, and drifting to make connection with their workings.



Production.

	<u>1919</u>	<u>1920</u>
Days Worked	298	298
	Tons	Tons
Ore	366,773	319,151
Rock	<u>11,128</u>	<u>15,196</u>
Ore and Rock	377,901	334,347
Ore Per Day	1,231	1,071
Rock Per Day	<u>37</u>	<u>51</u>
Ore and Rock Per Day	1,268	1,122

Labor.

	<u>1919</u>	<u>1920</u>
Average number of men	361	320
Average rate per day	\$ 5.66	\$ 6.38

Tons Per Man Per Day.

	<u>1919</u>	<u>1920</u>
Surface	11.13	11.52
Underground	<u>4.90</u>	<u>4.71</u>
Total	3.40	3.34

Cost of Production.

	<u>1919</u>	<u>1920</u>
Labor	\$ 1.663	\$ 1.890
Supplies	<u>.806</u>	<u>.766</u>
Total	\$ 2.469	\$ 2.656

GENERAL EXPENSE.

No. 26 - Insurance.

1919	\$	1452.33	\$	.004
1920		<u>121.08</u>		<u>.000</u>
Decrease	\$	1331.25	\$	.004

The decrease is in Riot Insurance.

No. 27 - Engineering.

1919	\$	2470.81	\$	.007
1920		<u>2673.59</u>		<u>.009</u>
Increase	\$	202.78	\$	.002

There was a new engineer in 1920. Central Office charge.

No. 28 - Analysis.

1919	\$	2453.07	\$	.007
1920		<u>2982.50</u>		<u>.009</u>
Increase	\$	529.43	\$	.002

The increase is due to 9.2% higher wages in 1920 and to larger shipments.

No. 30 - Personal Injury Expense.

1919	\$	18108.05	\$	.049
1920		<u>11790.92</u>		<u>.037</u>
Decrease	\$	6317.13	\$	.012

There were two fatal accidents in 1919 and none in 1920. The principal items were as follows:-

	1919	1920
Medical & Hospital Exp.	\$ 2004.23	\$ 1668.80
Mutual Settlement	125.00	
Compensation Payments	9561.08	4601.01
1/2 Day Funeral Expense	1691.15	
Hospital Deficit	<u>4726.59</u>	<u>5521.11</u>
Total	\$ 18108.05	\$ 11790.92

No. 30a - Mine Office.

1919	\$	15542.36	\$	.042
1920		<u>16289.35</u>		<u>.051</u>
Increase	\$	746.99	\$	.009

The increase is due to Central Office charges and 10% increase in clerks' wages.

MAINTENANCE.

No. 125 - Tracks and Yards.

1919	\$	2546.17	\$	.007
1920		<u>4917.62</u>		<u>.015</u>
Increase	\$	2371.45	\$	.008

There was an increase in land improvement in 1920 of \$ 2200.00.

No. 126 - Docks, Trestles and Pockets.

1919	\$	6628.81	\$	.019
1920		<u>3453.59</u>		<u>.011</u>
Decrease	\$	3375.22	\$	.008

The principal item in 1919 was new sollar-plank.

No. 127 - Buildings.

1919	\$	54419.24	\$	.148
1920		<u>12160.03</u>		<u>.038</u>
Decrease	\$	42259.21	\$	.110

The cost for both years was high on account of building new shaft-houses, E and A. 379, which was charged out as the work was done.

MAINTENANCE. (Continued)

No. 128 - Shop Machinery.

1919	\$	228.57	\$	.001
1920		<u>2101.26</u>		<u>.006</u>
Increase	\$	1872.69	\$	.005

Drill sharpener equipment for oil furnaces.

1 Furnace cost	\$	400.00
Pyrometer cost		125.00
Sharpener Base		121.00
Express and Freight		81.00
Formers		<u>42.00</u>
Total	\$	<u>769.00</u>

Balance is smaller supplies and overhauling both No. 5 sharpeners and 2 lathes.

No. 129 - Boiler Plant.

1919	\$	2572.72	\$	.007
1920		<u>1576.54</u>		<u>.005</u>
Decrease	\$	996.18	\$	.002

The decrease is in labor repairing boilers.

No. 130 - Hoisting Machinery.

1919	\$	10866.09	\$	.030
1920		<u>5974.04</u>		<u>.019</u>
Decrease	\$	4892.05	\$	.011

In 1919 450 feet of 12" counter-weight pipe was charged out, a new bell system was installed, and a new rotor was bought for "B" shaft hoist. Two new ropes were put on in 1919 and three in 1920. The counter-weights and pipes were installed in 1920.

No. 131 - Compressors and Power Drills.

1919	\$	41681.61	\$	.114
1920		<u>1585.43</u>		<u>.005</u>
Decrease	\$	40096.18	\$	.109

In 1919 two new air-compressors cost \$ 38,164.21, three new drills cost \$ 990, a circulation pump and motor cost \$ 990, 6-inch pipe cost \$ 387 and 4-inch pipe cost \$ 114.

No. 132 - Pumping Machinery.

1919	\$	10252.42	\$	.028
1920		<u>19680.26</u>		<u>.062</u>
Increase	\$	9427.84	\$	.034

The principal items in both years were maintenance and installation charges for pumping out No. 3 shaft, which in 1919 amounted to \$ 5912.55, and to \$ 17766.26 in 1920. In 1919 two new cables cost \$ 2327 and an oil circuit-breaker \$ 298.

No. 133 - Top Tram Engines and Cars.

1919	\$	2447.51	\$	.007
1920		<u>3808.36</u>		<u>.012</u>
Increase	\$	1360.85	\$	.005

1 - 50 H.P. Motor was charged out in 1920, - Price \$ 1620.00.

No. 134 - Skips and Skip-Roads.

1919	\$	2713.31	\$	.007
1920		<u>5364.75</u>		<u>.017</u>
Increase	\$	2651.44	\$	.010

Repairs to skip-roads were high in 1919. In 1920 one new double-decked cage and part of another one were built, and two skips were rebuilt.

No. 135 - Underground Tracks and Cars.

1919	\$	14727.13	\$	.040
1920		<u>15433.49</u>		<u>.048</u>
Increase	\$	706.36	\$	.008

Wages increased 10% on Feb. 1st, 1920.

MAINTENANCE. (Continued)

No. 136 - Electric Tram Plant.

1919	\$	6028.76	\$	.016
1920		<u>13919.91</u>		<u>.044</u>
Increase	\$	7891.15	\$	.028

In 1920 one new locomotive cost \$ 4295.00 - Hard Ore shop charges \$ 296.00 for repairing armature. Balance on cars.

No. 137 - Telephones and Safety Devices.

1919	\$	4574.74	\$	.012
1920		<u>2751.22</u>		<u>.009</u>
Decrease	\$	1823.52	\$	.003

A new cable and connections for telephones, lights, etc. was put in during 1919, for which supply-charges slightly exceeded \$ 2000.

No. 138 - Crushing and Screening.

1919	\$	3010.00	\$	.008
1920		<u>2956.56</u>		<u>.009</u>
Decrease	\$	53.44		
Increase			\$	.001

No. 140 - Fire Expense and Damage.

1919	\$		\$	
1920		<u>3116.17</u>		<u>.010</u>
Increase	\$	3116.17	\$	.010

The middle room of the dry was burned in August 1920.

Underground Shovel and Gas Car.

1919	\$	1020.81	\$	.003
1920		<u>5455.89</u>		<u>.017</u>
Increase	\$	4435.08	\$	.014

1920 charges include the cost of a new Hoar Loader, which cost \$ 3000. Balance is repairs to gas locomotives.

MINING EXPENSE.

No. 150 - Air-Pipes.

1919	\$	5376.44	\$	.015
1920		<u>4228.67</u>		<u>.013</u>
Decrease	\$	1147.77	\$	.002

In 1919 pipe and fittings cost \$ 2895.95 and hose \$ 244.09. In 1920 pipe and fittings cost \$ 1611.82 and hose \$ 449.98, giving a net decrease of \$ 1078.24.

No. 151 - Compressors.

1919	\$	38376.68	\$	.105
1920		<u>34874.44</u>		<u>.109</u>
Decrease	\$	3502.24		
Increase			\$	.004

Production was less in 1920, and compressors were not run on night-shift after December 1st.

No. 152 - Hoisting.

1919	\$	20189.09	\$	.055
1920		<u>20956.46</u>		<u>.066</u>
Increase	\$	767.35	\$	.011

Power charge 1919	-	\$	11,812.20
Power charge 1920	-	<u>11,303.65</u>	
Decrease	-	\$	508.55

There was an increase of \$ 300 for heating expense and \$ 200 in miscellaneous supplies and packing, offsetting the lower cost of power. The balance is higher wages of brakemen.

MINING EXPENSE. (Continued)

No. 153 - Pumping.

1919	\$	22814.96	\$	.062
1920		<u>23568.61</u>		<u>.074</u>
Increase	\$	753.65	\$	.012

The increase is due to running steam-pumps during the latter part of 1920.

No. 154 - Sinking and Shaft Repairs.

1919	\$	5331.59	\$	.015
1920		<u>1246.59</u>		<u>.004</u>
Decrease	\$	4085.00	\$	.011

"B" shaft was repaired near surface in 1919.

No. 155 - Rock Drifting.

1919	\$	65439.35	\$	.178
1920		<u>76824.16</u>		<u>.241</u>
Increase	\$	11384.81	\$	.063

In 1919 3362 feet of drift cost \$ 19.46 a foot, and in 1920 3451 feet cost \$ 21.34 a foot. Both labor and supplies were more expensive in 1920.

No. 156 - Breaking Ore.

1919	\$	234774.65	\$	.640
1920		<u>247924.38</u>		<u>.777</u>
Increase	\$	13149.73	\$	.137

In 1920 wages were 9.2% higher than in 1919, and explosives were higher. In 1919 there were 53 contracts breaking ore and in 1920 48 contracts. There were 22 contracts mining floors and backs in 1919 and 19 contracts on similar work in 1920. In 1920 more was broken than hoisted.

No. 157 - Trimming.

1919	\$	204336.01	\$	.557
1920		<u>189673.63</u>		<u>.594</u>
Decrease	\$	14662.38		
Increase			\$	.037

The increase in cost per ton is due to 9.2% higher wages in 1920. The decrease is due to less ore trimmed.

No. 158 - Filling.

1919	\$	6257.73	\$	.017
1920		<u>5559.71</u>		<u>.017</u>
Decrease	\$	698.02	\$	.000

Much of the rock in 1920 came from the fifteenth level and from other levels in "A" shaft, and was dumped in "A" shaft where the expense was less than in "B" shaft.

No. 159 - Timbering.

1919	\$	4382.18	\$	.012
1920		<u>6457.22</u>		<u>.020</u>
Increase	\$	2075.04	\$	.008

The cost of timbering is mostly building chutes and putting in ladders. The higher cost in 1920 is due to higher wages and high cost of plank and ladders.

No. 160 - Captain and Bosses.

1919	\$	16172.47	\$	.044
1920		<u>17126.56</u>		<u>.054</u>
Increase	\$	954.09	\$	.010

The increase is due to higher wages in 1920. Only two bosses were retained after Dec. 1st, 1920.

No. 161 - Dry-House.

1919	\$	6816.10	\$	.019
1920		<u>10256.30</u>		<u>.032</u>
Increase	\$	3440.20	\$	.013

The increase is due to higher wages and higher cost of coal.

MINING EXPENSE. (Continued)

No. 162 - Top Landing and Trimming.

1919	\$	11068.66	\$	.030
1920		<u>11660.05</u>		<u>.037</u>
Increase	\$	591.39	\$	.007

The increase is due to 9.2% higher wages in 1920.

No. 163 - Stocking Ore.

1919	\$	27021.28	\$	.074
1920		<u>18933.35</u>		<u>.059</u>
Decrease	\$	8087.93	\$	.015

In both years the cost of the new trestles made the cost of stocking ore high. It was higher in 1919, because the lump ore trestle was entirely new then.

No. 164 - Sorting Ore.

1919	\$	10006.40	\$	.027
1920		<u>10833.66</u>		<u>.034</u>
Increase	\$	827.26	\$	.007

The increase is due to 9.2% higher wages in 1920.

No. 166 - Cave-In.

1919	\$	6.04	\$	.000
1920				
Decrease	\$	6.04	\$	.000

No. 168 - Crushing and Screening.

1919	\$	15721.54	\$	.043
1920		<u>11141.23</u>		<u>.035</u>
Decrease	\$	4580.31	\$	.008

Crushed ore was put on the stock-pile during practically all of 1919, and only during the winter of 1920.

Pumping No. 3 Shaft.

1919	\$	7434.12	\$	.020
1920		<u>18341.08</u>		<u>.057</u>
Increase	\$	10906.96	\$	.037

Pumping was carried on for three months in 1919 and for all year in 1920.

RECAPITULATION.

	Year 1919		Year 1920		Increase		Decrease	
	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
General Expense	40026.62	.109	33857.44	.106			6169.18	.003
Maintenance	163917.89	.447	104255.12	.327			59662.77	.120
Mining Expense	<u>701525.29</u>	<u>1.913</u>	<u>709606.10</u>	<u>2.233</u>	8080.81	.320		
Cost of Production	905469.80	2.469	847718.66	2.666		.197	57751.14	

CLIFFS SHAFT MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1920.

GRADE	IRON	PHOS.	SILICA
Cliffs Shaft Lump,	59.71	.103	4.96
Cliffs Shaft Crushed,	58.09	.104	5.88

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1920.

GRADE	Mine		Lake Erie	
	IRON	PHOS.	IRON	MOIST.
Cliffs Shaft Lump,	59.73	.104	59.88	.48
Cliffs Shaft Crushed,	58.09	.101	58.27	1.83

ORE STATEMENT - DECEMBER 31ST, 1920.

	CL.SHAFT LUMP	CL.SHAFT CRUSHED	TOTAL	TOTAL LAST YEAR
On hand Jan. 1st, 1920,	109,192	181,209	371,401	101,762
Output for year,	198,836	120,315	319,151	366,773
Total,	389,028	301,524	690,552	468,535
Shipments,	190,611	176,724	367,335	97,134
Balance on hand,	198,417	124,800	323,217	371,401
Decrease in output, -13%			47,622	
Decrease in ore on hand -13%			48,184	
1920 - 1-8 Hour Shift for year				
1919 - 1-8 " " " "				

CLIFFS SHAFT MINE

SHIPMENTS FOR YEAR - 1920.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Lump Cliffs Shaft,	123,853	66,758	190,611	95,473
Crushed Cliffs Shaft,	58,735	117,989	176,724	1,661
Total,	182,588	184,747	367,335	97,134
Total last Year,	85,416	11,718	97,134	
Increase - 277%			270,201	



CLIFFS SHAFT MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 2 0.	1 9 1 9.	INCREASE.	DECREASE.
PRODUCT	319,151	366,773		47,627
General Expense	.106	.109		.003
Maintenance	.327	.447		.120
Mining Expense	2.223	1.913	.310	
Cost of Production	2.656	2.469	.187	
Exploratory	.030	.027	.003	
<u>DEPRECIATION.</u>				
Original Purchase	.157	.249		.092
Plant Account	.027	.021	.006	
Equipment	.008	.003	.005	
Total Depreciation	.192	.273		.081
Taxes	.321	.268	.053	
Central Office	.093	.070	.023	
Fire Loss	.005		.005	
Miscellaneous	.002	.003		.001
Sundry Expense	.019	.007	.012	
Cost on Stockpile	3.318	3.117	.201	
Loading & Shipping	.093	.018	.075	
Total Cost on Cars	3.411	3.135	.276	
No. Days Operating	298	298		
No. Shifts & Hours	1-8hr	1-8hr		
Avg. Daily Product	1,071	1,231		160
<u>COST OF PRODUCTION.</u>				
* Labor	1.890	1.663	.227	
Supplies	.766	.806		.040
Total	2.656	2.469	.187	

CLIFFS SHAFT MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 0	1 9 1 9	INCREASE	DECREASE
PRODUCT	319,151	366,773		47,627
No. Shifts & Hours	1-8hr	1-8hr		
AVERAGE NO. MEN WORKING				
Surface	93	110		17
Underground	227	251		24
Total	320	361		41
AVERAGE WAGES PER DAY				
Surface	5.42	4.95	.47-9.5%	
Underground	6.78	5.98	.80-13.4	
Total	6.38	5.66	.72-12.7	
WAGES PER MONTH OF 25 DAYS				
Surface	135.50	223.75	11.75	
Underground	169.50	149.50	20.00	
Total	159.50	141.50	18.00	
PRODUCT PER MAN PER DAY				
Surface	11.52	11.13	.39	.1
Underground	4.71	4.90		.19
Total	3.34	3.40		.06
LABOR COST PER TON				
Surface	.471	.445	.026	
Underground	1.438	1.221	.217	
Total	1.909	1.666	.243	
AVG. PRODUCT BRK'G & TRM'G	6.53	6.38	.15	
" WAGES CONTRACT MINERS	6.82	5.80	1.02	
" " " TRAMMERS	8.01	6.92	1.09	
" " " LABOR	7.26	6.24	1.02	
TOTAL NUMBER OF DAYS				
Surface	27,702 $\frac{3}{4}$	32,943 $\frac{1}{2}$		5,240 $\frac{3}{4}$
Underground	67,724 $\frac{3}{4}$	74,909 $\frac{1}{2}$		7,184 $\frac{1}{4}$
Total	95,427 $\frac{1}{2}$	107,853		12,425 $\frac{1}{2}$
AMOUNT FOR LABOR				
Surface	150264.43	163102.95	12838.52	
Underground	458929.75	447812.75	11117.00	
Total	609194.18	610915.70		1721.52

Proportion Surface to Underground Men:

1920 - 1 to 2.44  
 1919 - 1 to 2.30  
 1918 - 1 to 3.14  
 1917 - 1 to 3.25  
 1916 - 1 to 3.87

CLIFFS SHAFT MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICES	AMOUNT 1920	AMOUNT 1919
50% Powder - - - - -	280,585	.18105	50,799.92	49,496.68
Black Powder - - - - -				19.00
Total Powder - -	280,585	.18105	50,799.92	49,515.68
Fuse - - - - -	373,620	9.049	3,381.18	2,779.27
Caps - - - - -	76,820	14.56	1,118.53	1,192.18
Cap Crimpers - - - - -	28	.55	15.40	16.00
Total Fuse, Etc. - -			4,515.11	3,987.45
Total All Explosives-			55,315.03	53,503.13
Product - - - - -			319,151	366,773
Pounds Powder per ton of Ore			.8791	.749
Cost per Ton for Powder -			.1591	.1350
Cost per Ton for Fuse, Caps, etc.			.0141	.0109
Cost per Ton for All Explosives			.1732	.1459
Avg. Price per Lb. for Powder -			.18105	.1801 $\frac{1}{2}$

CLIFFS SHAFT MINE

ANNUAL REPORT  
OF THE  
SALISBURY MINE

(1920)

Production and Shipments.

The Salisbury Mine worked 300 days in 1920, and produced 108,257 tons of ore of all grades, an average of 361 tons per day. 4,336 tons of rock were hoisted, an average of 14 tons per day.

Most of the Clinton stock-pile and part of the Clinton Silica pile were shipped during the season. The Bessemer stock-pile was untouched.

Table I.

Production by Grades.

Grade	Year 1920		Year 1919	
	Total Tons	Per Day Tons	Total Tons	Per Day Tons
Bessemer	162	1	158	1
Clinton	54,374	181	51,061	171
Clinton Silica	<u>53,721</u>	<u>179</u>	<u>55,929</u>	<u>187</u>
Total Ore	108,257	361	107,148	359
Rock	<u>4,336</u>	<u>14</u>	<u>8,626</u>	<u>29</u>
Total Ore and Rock	112,593	375	115,774	388

Table II.

Shipments.

Grade	Pocket Tons	Stock-Pile Tons	Total Tons
Clinton	27,340	21,327	48,667
Clinton Silica	<u>5,254</u>	<u>41,219</u>	<u>46,473</u>
Total	32,594	62,546	95,140

Table III.

Stock-File Balances, Dec. 31st, 1920.

Grade	1920 Tons	1919 Tons
Bessemer	918	756
Clinton	12,457	6,750
Clinton Silica	<u>48,404</u>	<u>41,156</u>
Total	61,779	48,662

Table IV.

Division of Product by Levels.

Level	Bessemer Tons	Clinton Tons	Clinton Silica Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
5th		3,142	14,538	17,680	684	18,364
7th		8,882	9,782	18,664	1,366	20,030
8th		1,298	8,185	9,483	618	10,101
9th		743	10,704	11,447	132	11,579
10th		165	1,640	1,805		1,805
11th		2,849	7,496	10,345	772	11,117
12th	162	17,925	586	18,673	118	18,791
13th	—	<u>19,370</u>	<u>790</u>	<u>20,160</u>	<u>646</u>	<u>20,806</u>
Total	162	54,374	53,721	108,257	4,336	112,593

Table V.

Production by Months.

Month	Days	Ore Per Day Tons	Salisbury Bessemer Tons	Clinton Tons	Clinton Silica Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
January	26	381		4,178	5,740	9,918	428	10,346
February	23	373		4,466	4,120	8,586	230	8,816
March	27	357		4,716	4,928	9,644	542	10,186
April	24	367		4,718	4,093	8,811	370	9,181
May	25	395		4,592	5,276	9,868	358	10,226
June	25	358		3,768	5,176	8,944	348	9,292
July	26	370		4,434	5,184	9,618	280	9,898
August	24	333		3,922	4,068	7,990	290	8,280
September	25	328		4,373	3,825	8,198	294	8,492
October	26	343	162	5,271	3,489	8,922	458	9,380
November	24	356		4,852	3,686	8,538	356	8,894
December	25	369		5,084	4,136	9,220	382	9,602
Year	300	361	162	54,374	53,721	108,257	4,336	112,593

Table VI.

Delays.

Date	Hours	Tons Lost	Cause	Repair Cost
Feb. 16	3	25	Cutting ice in skip-road.	\$ 18.12
May 3	3	50	Skip off track below eighth level on account of a broken rail.	24.80
June 10	1	50	No current. Main line.	
June 28	3	75	No current. Main line.	
Aug. 13	8	200	Air compressor motor burnt out.	164.94
Aug. 23	4	100	Air compressor motor burnt out.	71.65
Dec. 16	<u>4</u>	<u>50</u>	Broken axle on skip.	<u>35.02</u>
Year	26	550		\$ 314.53

Table VII.

Delays Due to Lack of Current on Main Line.

Date	Hours	Tons Lost
June 10	1	50
June 28	<u>3</u>	<u>75</u>
Year	4	125

Table VIII.

Estimate of Ore Reserves.

Developed Ore.

Level	Bessemer Tons	Clinton Tons	Clinton Silica Tons	Total Tons
3d			2,000	2,000
4th			5,000	5,000
5th			7,000	7,000
8th		4,000	18,000	22,000
9th		3,000	9,000	12,000
10th		5,000	14,000	19,000
11th		5,000	11,000	16,000
12th		7,000	7,000	14,000
13th		19,000		19,000
14th	5,000	28,000		33,000
16th	<u>3,000</u>	<u>13,000</u>	<u>9,000</u>	<u>25,000</u>
Total	8,000	84,000	82,000	174,000
Less 10% Rock & 10% Loss in Mining	<u>1,500</u>	<u>17,000</u>	<u>16,500</u>	<u>35,000</u>
Net Total	6,500	67,000	65,500	139,000

Factors used:- Bessemer and Clinton:- 10 cu. ft. per ton.

Silica:- 13 - 15 cu. ft. per ton.

## GENERAL.

### Exploration.

#### Underground Diamond Drilling.

Five horizontal holes were drilled from the fifteenth level in the South-East Deposit in June and July without finding any ore. The total distance drilled was 1,211 feet, all in diorite. The level was allowed to fill with water, as soon as the drilling was finished.

### Accidents to Equipment.

The motor driving the air-compressor gave a great deal of trouble during the second half of the year, burning out frequently, and was finally replaced.

## SURFACE.

The mine office was shingled in October and the shaft-house pockets were repaired. The tunnel to the coal-pocket was retimbered in May and June.

The undermined area south of East Terrace St. was fenced off and danger signs erected. There has been some subsidence over this part of the mine.

## UNDERGROUND.

### Development.

Above the fifth level some new ore was found in the North Vein. Three long raises were put up, one in No. 2 shaft-pillar on the foot-wall, one 730 feet south-east of No. 5 shaft in mid-vein, and one 800 feet south-east of No. 5 shaft near the hanging-wall. Some Clinton ore was found in each raise, especially in the last one, which is still going up. One contract is stoping in each of the others. The ore in which the last raise is being put up has also been opened on two sub-levels below the fifth level, and has been partly mined out. It was 300 feet long and 30 to 40 feet wide on the 1205 foot sub-level, but is smaller on the 1185 foot sub-level.



On the 1154 foot sub-level, 32 feet above the eighth level, a long drift was driven westward through the old workings in and near old No. 2 shaft-pillar, and a raise was put up to the fifth level. There is practically no ore between this drift and the fifth level, but there is some in the bottom, between it and the eighth level.

A raise was put up from the 1045 foot sub-level, which is just under the old ninth level, in the North Vein, and a sub-level was opened in the old workings under the east end of the eighth level. One gang is still working here, getting some very good ore.

On the 1000 foot sub-level, just under the tenth level in the South Vein, a small pillar of high grade ore was found during stoping operations in the old room next to the hanging-wall. This pillar was being opened up at the end of the year.

#### Stoping.

In the old mine there are eleven gangs working, and in the South-East Deposit six. Above the fifth level one gang is stoping on the 1344 foot sub-level on the foot-wall next to an old cave in No. 2 shaft-pillar, and another gang is stoping nearer the hanging-wall 106 feet lower down. Another is stoping close above the fifth level 700 feet south-east of No. 5 shaft, and a fourth is raising from the main drift 80 feet further south-east. For 100 feet east from this point ore was mined on both sides of the main drift and in the back, and some of the floor has been beaten away.

Below the fifth level one gang is stoping on the 1205 foot sub-level, 850 feet south-east of No. 5 shaft, in the new ore-body close to the hanging-wall, and another is stoping on the 1154 foot sub-level 100 feet north-west of old No. 2 shaft.

Below the eighth level three gangs have worked all the year on the 1101 foot sub-level. One is stoping in the old workings at the east end of the North Vein, and the other two have finished the ore on the foot-wall in the South Vein from 700 to 870 feet and from 1120 to 1180 feet south-east of No. 5 shaft respectively.

On the 1000 foot sub-level one gang mined an area 100 feet long and 45 feet wide in the old workings at the east end of the South Vein, caving the rooms on the tenth level, and are now opening up a small pillar of high grade ore next to their stope 400 feet south-east of old No. 4 shaft. Another contract assisted in this work during the latter part of the year.

In the South-East Deposit six gangs have been stoping throughout the year. They have mined all the ore remaining above the 905 foot sub-level, and are now opening the 895 foot sub-level, which is 18 feet above the thirteenth level. At the beginning of the year the highest sub-level in this deposit was the 950 foot sub-level. At the rate at which we are mining, this ore-body will be exhausted in two years.

SALISBURY MINE.

COMPARISON OF COST SHEETS FOR 1919 AND 1920.

The Salisbury Mine worked on double-shift throughout both 1919 and 1920, and there was little change in the method of mining. There was less rock-work in 1920, but more development in ore, especially above the eighth level in the "old mine."

Wages were increased 10% on Feb. 1st, 1920, making the average rate 9.2% higher for 1920 than for 1919.

Production.

	<u>1919</u>	<u>1920</u>
Days Worked	298	300
	Tons	Tons
Ore	107,148	108,257
Rock	<u>8,626</u>	<u>4,336</u>
Ore and Rock	115,774	112,593
Ore Per Day	359	361
Rock Per Day	<u>29</u>	<u>14</u>
Ore and Rock Per Day	388	375

Labor.

	<u>1919</u>	<u>1920</u>
Average number of men	127	129
Average rate per day	\$ 5.56	\$ 6.08

Tons Per Man Per Day.

	<u>1919</u>	<u>1920</u>
Surface	12.02	12.45
Underground	<u>3.69</u>	<u>3.61</u>
Total	2.82	2.80

Cost of Production.

	<u>1919</u>	<u>1920</u>
Labor	\$ 1.976	\$ 2.162
Supplies	<u>.618</u>	<u>.599</u>
Total	\$ 2.594	\$ 2.761

GENERAL EXPENSE.

No. 26 - Insurance.

1919	\$ 591.92	\$ .006
1920	<u>290.80</u>	<u>.003</u>
Decrease	\$ 301.12	\$ .003

The decrease is in Riot Insurance.

No. 27 - Engineering.

1919	\$ 1063.83	\$ .010
1920	<u>680.94</u>	<u>.006</u>
Decrease	\$ 382.89	\$ .004

Central Office charge. There was a change in personnel early in the year, resulting a smaller charge against the Salisbury Mine.

No. 28 - Analysis.

1919	\$ 4816.63	\$ .045
1920	<u>4892.77</u>	<u>.045</u>
Increase	\$ 76.14	\$ .000

No. 30 - Personal Injury Expense.

1919	\$ 3360.16	\$ .031
1920	<u>3343.68</u>	<u>.031</u>
Decrease	\$ 16.48	\$ .000

There were no fatal accidents in 1919 or 1920. Items of expense were as follows:-

	<u>1919</u>	<u>1920</u>
Medical & Hospital Exp.	\$ 671.20	\$ 673.60
Compensation Payments	554.35	314.98
$\frac{1}{2}$ Day for Funeral	411.88	
Hospital Deficit	<u>1722.73</u>	<u>2355.10</u>
Total	\$ 3360.16	\$ 3343.68

No. 30a - Mine Office.

1919	\$ 7611.80	\$ .071
1920	<u>8727.23</u>	<u>.081</u>
Increase	\$ 1115.43	\$ .010

At the mine supplies were \$ 75 higher in 1920, half being exchange, and salaries increased \$ 245. Balance is Central Office charge.

MAINTENANCE.

No. 125 - Tracks and Yards.

1919	\$ 1912.45	\$ .018
1920	<u>1618.85</u>	<u>.015</u>
Decrease	\$ 293.60	\$ .003

The decrease is due mostly to the expense of cleaning out the ditch below Lake Sally in 1919.

MAINTENANCE. (Continued)

No. 126 - Docks, Trestles and Pockets.

1919	\$	213.09	\$ .002
1920		<u>231.58</u>	<u>.002</u>
Increase	\$	18.49	\$ .000

No. 127 - Buildings.

1919	\$	243.69	\$ .002
1920		<u>605.34</u>	<u>.005</u>
Increase	\$	361.65	\$ .003

The increase is due to shingling the office and re-timbering the coal-tunnel in 1920.

No. 129 - Boiler Plant.

1919	\$	.21	\$ .000
1920		<u>21.81</u>	<u>.000</u>
Increase	\$	21.60	\$ .000

No. 130 - Hoisting Machinery.

1919	\$	2908.15	\$ .027
1920		<u>1697.55</u>	<u>.016</u>
Decrease	\$	1210.60	\$ .011

1919 charges were high on account of a new motor for the hoist.

No. 131 - Compressors and Power Drills.

1919	\$	1369.22	\$ .013
1920		<u>1392.33</u>	<u>.013</u>
Increase	\$	23.11	\$ .000

No. 132 - Pumping Machinery.

1919	\$	2148.32	\$ .020
1920		<u>969.68</u>	<u>.009</u>
Decrease	\$	1178.64	\$ .011

In 1919 repairs to the centrifugal pump and to the water-column were high. There was little trouble with either in 1920.

No. 133 - Top Tram Engines and Cars.

1919	\$	465.80	\$ .004
1920		<u>361.85</u>	<u>.003</u>
Decrease	\$	103.95	\$ .001

The decrease is in repairs to top tram engine and wheels and axles for cars.

No. 134 - Skips and Skip-Roads.

1919	\$	1709.21	\$ .016
1920		<u>1787.66</u>	<u>.017</u>
Increase	\$	78.45	\$ .001

No. 135 - Underground Tracks and Cars.

1919	\$	3945.39	\$ .037
1920		<u>3594.79</u>	<u>.033</u>
Decrease	\$	350.60	\$ .004

In 1919 an extra man was put on cleaning ditches, which had been neglected in 1918.

No. 137 - Telephones and Safety Devices.

1919	\$	441.29	\$ .004
1920		<u>538.88</u>	<u>.005</u>
Increase	\$	97.59	\$ .001

MINING EXPENSE.

No. 150 - Air-Pipes.

1919	\$	996.56	\$	.009
1920		<u>1105.19</u>		<u>.010</u>
Increase	\$	108.63	\$	.001

The increase is due to 9.2% higher wages in 1920.

No. 151 - Compressors.

1919	\$	8646.00	\$	.081
1920		<u>8133.38</u>		<u>.075</u>
Decrease	\$	512.62	\$	.006

Mine office records show a difference of only \$ 11.91 in cost of operating compressors.

No. 152 - Hoisting.

1919	\$	12274.05	\$	.115
1920		<u>12702.08</u>		<u>.117</u>
Increase	\$	428.03	\$	.002

The increase is due to 9.2% higher wages in 1920.

No. 153 - Pumping.

1919	\$	10838.82	\$	.101
1920		<u>10537.72</u>		<u>.098</u>
Decrease	\$	301.10	\$	.003

Power decreased \$ 586 in 1920. Wages increased 9.2%.

No. 154 - Sinking and Shaft Repairs.

1919	\$	3626.94	\$	.034
1920		<u>1208.53</u>		<u>.011</u>
Decrease	\$	2418.41	\$	.023

Repairs to the knuckle were high in 1919.

No. 155 - Rock Drifting.

1919	\$	14358.32	\$	.134
1920		<u>6836.30</u>		<u>.063</u>
Decrease	\$	7522.02	\$	.071

Rock drifting decreased from 1260 feet in 1919 to 577 feet in 1920.

No. 156 - Breaking Ore.

1919	\$	102839.53	\$	.960
1920		<u>127215.39</u>		<u>1.175</u>
Increase	\$	24375.86	\$	.215

The price of powder was higher in 1920, and tons per man were lower on account of a larger proportion of the miners working in the old mine. Wage increase averaged 9.2%.

No. 157 - Trimming.

1919	\$	30821.57	\$	.288
1920		<u>33643.12</u>		<u>.311</u>
Increase	\$	2821.55	\$	.023

The increase is due to 9.2% higher wages in 1920.

No. 158 - Filling.

1919	\$	541.81	\$	.005
1920		<u>661.02</u>		<u>.006</u>
Increase	\$	119.21	\$	.001

There was more rock dumped underground in 1920.

No. 159 - Timbering.

1919	\$	31829.63	\$	.297
1920		<u>34063.20</u>		<u>.315</u>
Increase	\$	2233.57	\$	.018

Cost of timber increased \$ 600. Balance is due to 9.2% increase in wages in 1920.

MINING EXPENSE. (Continued)

No. 160 - Captain and Bosses.

1919	\$	10988.77	\$	.103
1920		<u>13087.37</u>		<u>.121</u>
Increase	\$	2098.60	\$	.018

Wages increased 10% Feb. 1st, 1920, and in 1919 the mine did not have its full complement of bosses. In 1920 one extra boss was employed for two months while Capt. Dunstan was in Europe.

No. 161 - Dry-House.

1919	\$	4308.85	\$	.040
1920		<u>4257.94</u>		<u>.039</u>
Decrease	\$	50.91	\$	.001

No. 162 - Top Landing and Trammimg.

1919	\$	9980.29	\$	.093
1920		<u>10698.84</u>		<u>.099</u>
Increase	\$	718.55	\$	.006

The increase is due to 9.2% higher wages in 1920.

No. 163 - Stocking Ore.

1919	\$	1991.66	\$	.018
1920		<u>2207.53</u>		<u>.021</u>
Increase	\$	215.87	\$	.003

The increase is due to higher wages and to cost of erecting trestles in 1920.

No. 166 - Cave-In.

1919	\$	230.40	\$	.002
1920		<u>502.71</u>		<u>.005</u>
Increase	\$	272.31	\$	.003

The increase is in pumping charges and repairs to launders leading to surface-pump.

No. 171 - Ventilation.

1919	\$	882.69	\$	.008
1920		<u>1209.52</u>		<u>.011</u>
Increase	\$	326.83	\$	.003

The increase is in power charges which were estimated in 1919.

RECAPITULATION.

	Year 1919		Year 1920		Increase		Decrease	
	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
General Expense	17444.34	.163	17935.42	.166	491.08	.003		
Maintenance	15356.82	.143	12820.32	.118			2536.50	.025
Mining Expense	<u>245155.69</u>	<u>2.288</u>	<u>268069.84</u>	<u>2.477</u>	<u>22913.95</u>	<u>.189</u>		
Cost of Production	277957.05	2.594	298825.58	2.761	20868.53	.167		

SALISBURY MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1920.

GRADE	IRON	PHOS.	SILICA
Salisbury Bessemer,	60.79	.067	5.93
Clinton,	60.03	.082	7.65
Clinton Silica,	50.83	.076	21.34

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1920.

GRADE	Mine			Lake Erie	
	IRON	PHOS.	SILICA	IRON	MOIST.
Salisbury Bessemer,	(No Shipments)				
Clinton,	(All Mixed)				
Clinton Silica,	51.38	.072	20.10	50.72	11.20

ORE STATEMENT - DECEMBER 31ST, 1920.

	SALISBURY BESSEMER	CLINTON	CLINTON SILICA	TOTAL	TOTAL LAST YEAR
On hand January 1st, 1920,	756	6,750	41,156	48,662	48,489
Output for Year,	162	54,374	53,721	108,257	107,148
TOTAL,	918	61,124	94,877	156,919	155,637
Shipments,		48,667	46,473	95,140	106,975
Balance on hand,	918	12,457	48,404	61,759	48,662
Increase in output - 1%				1,109	
Increase in ore on hand - 27%				13,097	
1920 - 2-8 Hour Shifts for year					
1919 - 2-8 " " " "					



MADE IN U.S.A.  
*Wm. Bond*

SALISBURY MINE  
SHIPMENTS FOR YEAR - 1920.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Salisbury Bessemer,	0	0	0	51,561
Clinton,	27,340	21,327	48,667	51,561
Clinton Silica,	5,253	41,220	46,473	55,414
Total,	32,593	62,547	95,140	106,975
Total last Year,	24,970	82,005	106,975	
Decrease - 11%			11,835	

SALISBURY MINE.

Damascus  
Bond

SALISBURY MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 2 0.	1 9 1 9.	INCREASE.	DECREASE.
PRODUCT	108,257	107,148	1,109	
General Expense	.166	.163	.003	
Maintenance	.118	.143		.025
Mining Expense	2,477	2,288	.189	
Cost of Production	2,761	2,594	.167	
Exploratory	.021		.021	
<u>DEPRECIATION.</u>				
Original Purchase		.021		.021
Equipment	.003	.006		.003
Construction	-	-		-
Total Depreciation	.003	.027		.024
Taxes	.052	.057		.005
Central Office	.100	.083	.017	
Miscellaneous	.009	.003		.006
Sundry Expense	.032	.007	.025	
Cost on Stockpile	2,960	2,771	.189	
Loading & Shipping	.088	.135		.047
Total Cost on Cars	3,048	2,906	.142	
No. Days Operating	300	297	3	
No. Shifts & Hours	2-8hr	2-8hr		
Avg. Daily Product	361	361		
<u>COST OF PRODUCTION.</u>				
Labor	2,162	1,976	.186	
Supplies	.599	.618		.019
Total	2,761	2,594	.167	

Damascus  
SALISBURY MINE.

SALISBURY MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 0	1 9 1 9	INCREASE	DECREASE
PRODUCT	108,257	107,148	1,109	
No. Shifts and Hours	2-8hr	2-8hr		
AVERAGE NO. MEN WORKING				
Surface	29	30		1
Underground	100	97	3	
Total	129	127	2	
AVERAGE WAGES PER DAY				
Surface	5.44	4.98	.46-9.2%	
Underground	6.26	5.74	.52-9.1%	
Total	5.08	5.56	.52-9.5%	
WAGES PER MONTH OF 25 DAYS				
Surface	136.00	124.50	12.50	
Underground	156.50	143.50	13.00	
Total	152.00	139.00	13.00	
PRODUCT PER MAN PER DAY				
Surface	12.45	12.02	.43	.00
Underground	3.61	3.69		.08
Total	2.80	2.82		.02
LABOR COST PER TON				
Surface	.437	.415	.022	
Underground	1.733	1.556	.177	
Total	2.170	1.971	.209	
AVG. PRODUCT BRK'G & TRM'G	5.14	5.34		.20
" WAGES CONTRACT MINERS	6.56	6.01	.55	
" " " TRAMMERS	5.24	0		
" " " LABOR	6.25	6.01	.24	
TOTAL NUMBER OF DAYS				
Surface	8,693 $\frac{1}{4}$	8,913		219 $\frac{3}{4}$
Underground	29,957 $\frac{1}{4}$	29,035 $\frac{1}{4}$	921 $\frac{3}{4}$	
Total	38,650 $\frac{1}{2}$	37,948 $\frac{1}{2}$	702	
AMOUNT FOR LABOR				
Surface	47317.27	44423.23	2894.04	
Underground	187639.04	166711.28	20927.76	
Total	234956.31	211134.51	23821.80	

Proportion Surface to Underground Men:

1920 - 1 to 3.7  
 1919 - 1 to 3.23  
 1918 - 1 to 3.13  
 1917 - 1 to 2.68  
 1916 - 1 to 2.42

SALISBURY MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1920.

KIND.	LINEAL FEET.	AVG. PRICE PER FOOT.	AMOUNT	
			1920.	1919.
6" to 8" Timber	25,501	.0370	942.51	477.60
8" " 10 "	18,834	.0650	1238.18	1868.87
10" " 12" "	7,584	.0850	647.50	726.24
12" " 14" "	853	.10	85.81	352.14
Total - 1920	52,772	.0550	2913.50	3424.35
Total - 1919	87,076	.0393	3424.35	4391.63
	LINEAL FEET.	PER 100'		
5' Lagging	283,475	1.02	2887.83	2876.60
7' "	106,801	.8954	956.28	1101.26
Total Lagging	390,276	.9850	3844.11	3977.86
Poles	117,426	1.20	1416.25	1810.15
Total - 1920	507,702	1.0361	5260.36	
Total - 1919	580,067	.997		5788.01
Product			106,642	107,142
Feet timber per ton of ore			.495	.813
Feet lagging "			3.660	4.123
Feet lagging per foot of timber			7.397	5.079
Cost per ton for timber			.02732	.0319
" lagging			.03604	.0371
" poles			.01328	.0168
" timber, lagging & Poles			.07664	.0859
Equivalent of stull timber to bd. measure			78,467	143,187
Ft. Bd. measure per ton of ore			.0736	1.335
Total cost for timber, lagging, and poles	1920			8173.86
"	1919			9212.36
"	1918			8615.93
"	1917			8213.84
"	1916			6932.89

SALISBURY MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

KIND	QUANTITY	AVERAGE PRICES	AMOUNT 1920	AMOUNT 1919
40% Powder - - - - -	13,150	.1791	2,247.47	2,335.34
50% " - - - - -	39,350	.1827	7,191.29	3,482.40
Total Powder - -	52,500	.1798	9,438.76	5,817.74
Fuse - - - - -	146,500	9.1253	1,336.89	837.27
Caps - - - - -	35,800	14.4335	516.58	408.95
Cap Crimpers - - - - -	6	.60	3.60	3.73
Total Fuse, Etc. -			1,857.07	1,249.95
Total Explosives -			11,295.83	7,067.69
Product - - - - -			106,642	107,142
Pounds Powder per ton of Ore			.203	.322
Cost per ton for Powder - -			.088	.055
" " " " Fuse, Caps, etc.			.017	.011
" " " " All Explosives -			.105	.066
Avg. Price per Lb. for Powder - -			.1798	.1747

SALISBURY MINE

ANNUAL REPORT  
OF THE  
ANGELINE MINE

(1920)

Production and Shipments.

The Angeline Mine worked 299 days in 1920, and produced 47,995 tons of ore of all grades, an average of 161 tons per day. All the ore came from "D" shaft.

Shipments were made from all stock-piles except the Silica ore, and the Angeline Bessemer and Hard Ore piles were cleaned up.

2,254 tons of rock were hoisted, an average of 8 tons per day.

Table I.

Production by Grades.

Grade	Year 1920		Year 1919	
	Total Tons	Per Day Tons	Total Tons	Per Day Tons
Angeline Bessemer	33,448	112	26,873	97
Angeline	7,630	26	9,982	33
Angeline Silica	5,771	19	3,198	11
Hard Bessemer	<u>1,146</u>	<u>4</u>	<u>27</u>	<u>—</u>
Total	47,995	161	42,080	141

Table II.

Shipments.

Grade	Pocket Tons	Stock-File Tons	Total Tons
Angeline Bessemer	18,853	10,707	29,560
Angeline	2,589	9,604	12,193
Hard Bessemer	<u>—</u>	<u>1,047</u>	<u>1,047</u>
Total	21,442	21,358	42,800

Table III.

Stock-Pile Balances.

Grade	1920 Tons	1919 Tons
Angeline Bessemer	6,926	3,038
Angeline	3,810	8,373
Angeline Silica	6,432	661
Hard Bessemer	<u>126</u>	<u>27</u>
Total	17,294	12,099

Table IV.

Production by Levels.

Level	Angeline Bessemer Tons	Angeline Tons	Angeline Silica Tons	Hard Bessemer Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
4th	33,448	7,630	5,771		46,849	856	47,705
7th	—	—	—	<u>1,146</u>	<u>1,146</u>	<u>1,398</u>	<u>2,544</u>
Total	33,448	7,630	5,771	1,146	47,995	2,254	50,249

Table V.

Production by Months.

Month	Days	Tons Per Day	Angeline Bessemer Tons	Angeline Tons	Angeline Silica Tons	Hard Bessemer Tons	Total Ore Tons	Rock Tons	Total Ore and Rock Tons
January	26	130	1,051	859	1,068	404	3,382	154	3,536
February	21	159	1,582	1,432	325	5	3,344	70	3,414
March	27	150	2,188	1,063	711	83	4,045	56	4,101
April	24	173	3,266	486	369	20	4,141		4,141
May	25	166	1,863	1,286	870	140	4,159	52	4,211
June	25	174	1,738	1,697	693	216	4,344	94	4,438
July	26	148	2,264	756	804	29	3,853	186	4,039
August	25	137	2,160	605	669		3,434	328	3,762
September	25	169	3,974		167	95	4,236	498	4,734
October	26	195	4,856	95		119	5,070	272	5,342
November	24	155	3,684			35	3,719	234	3,953
December	25	171	4,268				4,268	310	4,578
Year	299	161	32,894	8,279	5,676	1,146	47,995	2,254	50,249
Transfers			+ 554	- 649	+ 95				
Net									
Total	299	161	33,448	7,630	5,771	1,146	47,995	2,254	50,249

Table VI.

Delays.

Date	Hours	Tons Lost	Cause	Repair Cost
Feb. 17	16	180	Using electric current to thaw water column.	\$ 219.45
Feb. 18	16	160	Using electric current to thaw water column.	
Mar. 31	3	50	Chute broke underground.	198.06
April 20	4	80	Chutes broken down.	326.24
April 21	3	60	Repairing chutes.	
May 20	4	80	Stope caved in.	281.58
July 21	4	100	No railroad cars.	
July 27	7	100	No current. Main line.	
Total	57	810		\$ 1,025.33



Table VII.

Delays Caused by Lack of Electric Current.

Date	Hours	Tons Lost
July 27	7	100

Table VIII.

Estimate of Ore Reserves.

Level	Developed Ore			Prospective Ore			Total Ore			
	Bessemer Tons	Angeline Tons	Total Tons	Bessemer Tons	Hard Bessemer Tons	Total Tons	Bessemer Tons	Angeline Tons	Hard Bessemer Tons	Total Tons
1318	17,000		17,000				17,000			17,000
1290	16,000	5,000	21,000				16,000	5,000		21,000
1274				7,000		7,000	7,000			7,000
1080					10,000	10,000			10,000	10,000
<b>Total</b>	<b>33,000</b>	<b>5,000</b>	<b>38,000</b>	<b>7,000</b>	<b>10,000</b>	<b>17,000</b>	<b>40,000</b>	<b>5,000</b>	<b>10,000</b>	<b>55,000</b>
Less 20% Net	7,000	1,000	8,000	1,000	2,000	3,000	8,000	1,000	2,000	11,000
<b>Total</b>	<b>26,000</b>	<b>4,000</b>	<b>30,000</b>	<b>6,000</b>	<b>8,000</b>	<b>14,000</b>	<b>32,000</b>	<b>4,000</b>	<b>8,000</b>	<b>44,000</b>

Factor used:- 12 cu. ft. per ton.

GENERAL.

New Construction.

A 6" air-line was laid to the Holmes Mine and connected to the compressor there at the end of the year.

In March and April an electric pump was erected at the East End Pit on surface, discharging into the end of the big wooden pipe at the Lake Mine. This takes care of all the surface water at the east end of the mine.

In February, while the pump was idle over Sunday, the water column froze in "D" shaft, causing a delay of two days, while it was being thawed out. Some of the pipe had to be replaced.

SURFACE.

In April the old ware-house was torn down, and the material from it was used to repair the houses in the location.

The surface over "No. 56" pillar, 1000 feet east of the shaft, caved in May and again in September, necessitating a change in the road.

UNDERGROUND.

Development.

In the pillar at "No. 56" timber-raise 1000 feet east of the shaft, practically all the work above the 1318 foot sub-level was stoping. In this deposit the only development-work was a cross-cut south on the 1290 foot sub-level, which was mostly in rock, and a drift east on the 1274 foot sub-level, starting near Raise 4B. This latter drift has gone in 50 feet on the foot-wall and is in ore all the way.

In the hard ore deposit above the seventh level some work has been done near the west boundary-line. A raise was put up from the 1190 foot sub-level near the north-west corner of the property, and a drift was driven a short distance west to an old room filled with broken ore. Work was stopped here until a better outlet could be provided. On the 1180 foot sub-level a cross-cut was driven north across one of the old rooms, but this work was

also stopped while a new raise was being put up. This raise was put up from the seventh level in hard jasper, 1200 feet west of the shaft, and had reached the elevation of the 1190 foot sub-level at the end of the year. It has three compartments and will be the main chute and travelling-road for this part of the mine. As soon as connection is made to the sub-levels stoping in this area can be started.

Stoping.

At the beginning of the year there were six gangs drifting and stoping on the 1375 and 1350 foot sub-levels in "No. 56" pillar, and another was drifting in ore on the 1318 foot sub-level. All this ore has been mined out down to the 1335 foot sub-level, and there are now six gangs working on the 1325 foot sub-level. The south-west corner of the pillar has been mined down to the 1318 foot sub-level. Two other gangs are drifting on the 1290 and 1274 foot sub-levels, and one is raising on the seventh level, making nine gangs in all, an increase of one since the first of the year.

ANGELINE MINE.

COMPARISON OF COST SHEETS FOR 1919 AND 1920.

The Angeline Mine worked on double-shift in 1920, operations being confined entirely to "D" shaft. Hoisting on one shift was tried for a short time, but was not a success.

Wages were increased 10% on Feb. 1st, 1920, making the average rate in 1920 9.2% higher than in 1919. The higher rate of wages and the cost of a large raise in rock in the Hard Ore Vein contributed to the higher cost in 1920. The principal cause, however, was the operation of the East End and Happy Hollow Pits during part of 1919.

Production.

	<u>1919</u>	<u>1920</u>
Days Worked	298	298
	Tons	Tons
Ore	42,080	47,995
Rock	<u>6,484</u>	<u>2,254</u>
Ore and Rock	48,564	50,249
Ore Per Day	141	161
Rock Per Day	<u>22</u>	<u>8</u>
Ore and Rock Per Day	163	169

Labor.

	<u>1919</u>	<u>1920</u>
Average number of men	66	68
Average rate per day	\$ 5.23	\$ 6.12

Tons Per Man Per Day.

	<u>1919</u>	<u>1920</u>
Surface	6.43	9.78
Underground	<u>3.91</u>	<u>2.57</u>
Total	2.35	2.34

Cost of Production.

	<u>1919</u>	<u>1920</u>
Labor	\$ 2.194	\$ 2.647
Supplies	<u>.837</u>	<u>.770</u>
Total	\$ 3.031	\$ 3.417

GENERAL EXPENSE.

No. 26 - Insurance.

1919	\$	359.20	\$	.009
1920		<u>72.58</u>		<u>.002</u>
Decrease	\$	286.62	\$	.007

The decrease is in Riot Insurance.

No. 27 - Engineering.

1919	\$	302.09	\$	.007
1920		<u>919.39</u>		<u>.019</u>
Increase	\$	617.30	\$	.012

Central Office charge. There was more surveying in 1920.

No. 28 - Analysis.

1919	\$	2219.48	\$	.053
1920		<u>2517.70</u>		<u>.053</u>
Increase	\$	298.22	\$	.000

The increase is due to higher wages in 1920 and to more stope samples taken.

No. 30 - Personal Injury Expense.

1919	\$	1224.37	\$	.029
1920		<u>2507.28</u>		<u>.052</u>
Increase	\$	1282.91	\$	.023

Central Office charge. The principal items were as follows:-

	<u>1919</u>	<u>1920</u>
Medical & Hospital Exp.	\$ 347.00	\$ 359.00
Compensation Payments	99.00	851.65
Hospital Deficit	<u>811.37</u>	<u>1296.63</u>
Total	\$ 1257.37	\$ 2507.28

No. 30a - Mine Office.

1919	\$	4263.18	\$	.101
1920		<u>5348.76</u>		<u>.111</u>
Increase	\$	1085.58	\$	.010

The increase at the mine was less than \$ 100, and was due to higher charges for choreman, telephone, Safety Department Expense and Exchange. The rest is a Central Office charge.

MAINTENANCE.

No. 125 - Tracks and Yards.

1919	\$	1718.87	\$	.041
1920		<u>1214.57</u>		<u>.025</u>
Decrease	\$	504.30	\$	.016

The decrease is practically all labor of cleaning up the grounds around the plant in 1919.

No. 126 - Docks, Trestles and Pockets.

1919	\$	242.15	\$	.006
1920		<u>11.63</u>		<u>.000</u>
Decrease	\$	230.52	\$	.006

In 1919 the principal charges were for repairing stocking-floors.

No. 127 - Buildings.

1919	\$	493.32	\$	.012
1920		<u>223.91</u>		<u>.005</u>
Decrease	\$	269.41	\$	.007

In 1919 the principal charges were for painting and for changing the piping in the dry, lockers for the carpenter-shop, screen-doors, and for moving surface-dry from East End to No. 56.

In 1920 the engine-room was painted and minor repairs were made to other buildings.

No. 128 - Shop Machinery.

1919	\$	94.57	\$	.002
1920		<u>10.00</u>		<u>.000</u>
Decrease	\$	84.57	\$	.002

A riveting hammer was bought in 1919.

No. 129 - Boiler Plant.

1919	\$	39.47	\$	.001
1920		<u>8.90</u>		<u>.000</u>
Decrease	\$	30.57	\$	.001

No. 130 - Hoisting Machinery.

1919	\$	623.22	\$	.015
1920		<u>740.50</u>		<u>.015</u>
Increase	\$	117.28	\$	.000

In 1919 there were minor repairs to "D" shaft hoist, and the cost of dismantling the East End and Happy Hollow hoists was charged to this account.

In 1920 the principal items were for new brake-lining and 12 new idler sheaves.

No. 131 - Compressors and Power Drills.

1919	\$	403.64	\$	.009
1920		<u>3072.97</u>		<u>.064</u>
Increase	\$	2669.33	\$	.055

In 1920 a 6" air-line was laid to the Holmes Mine, and 4 new drills were charged out. Thawing out the air-line in the first two months of the year cost about \$ 150.

No. 132 - Pumping Machinery.

1919	\$	1054.70	\$	.025
1920		<u>1940.22</u>		<u>.041</u>
Increase	\$	885.52	\$	.016

The increase is in repairs to the water-column, which froze in February, and in repairs to the centrifugal pump.

No. 133 - Top Tram Engines and Cars.

1919	\$	1144.23	\$	.027
1920		<u>663.17</u>		<u>.014</u>
Decrease	\$	481.06	\$	.013

In 1919 charges were high principally on account of repairing side-dump cars at the East End and taking up rail and moving sheaves at the East End and Happy Hollow Pits.

MAINTENANCE. (Continued)

No. 134 - Skips and Skip-Roads.

1919	\$	619.68	\$	.015
1920		<u>178.60</u>		<u>.004</u>
Decrease	\$	441.08	\$	.011

In 1919 a new skip was built and the old one repaired, and some new runners put in the shaft. There were charges for cutting ice in both years.

No. 135 - Underground Tracks and Cars.

1919	\$	1347.03	\$	.032
1920		<u>714.31</u>		<u>.015</u>
Decrease	\$	632.72	\$	.017

In 1919 new track and cars were charged out in excess of 1920.

No. 136 - Electric Tram Plant.

1919	\$		\$	
1920		<u>1214.43</u>		<u>.025</u>
Increase	\$	1214.43	\$	.025

In 1919 all charges to this account, amounting to about \$ 700, were absorbed by E and A. 361.

In 1920 much of the electrician's time was charged to this account, and a trolley wire was hung up on the seventh level. The tracks were also changed at the shaft.

No. 137 - Telephones and Safety Devices.

1919	\$	385.48	\$	.009
1920		<u>322.21</u>		<u>.007</u>
Decrease	\$	63.27	\$	.002

Lake Angeline Drainage.

1919	\$		\$	
1920		<u>768.07</u>		<u>.016</u>
Increase	\$	768.07	\$	.016

In 1920 an electric pump was installed at the East End Pit.

MINING EXPENSE.

No. 150 - Air-Pipes.

1919	\$	1205.42	\$	.029
1920		<u>823.88</u>		<u>.017</u>
Decrease	\$	381.54	\$	.012

Charges in 1919 were higher on account of opening new sub-levels, requiring new pipe.

No. 151 - Compressors.

1919	\$	2145.00	\$	.051
1920		<u>3295.00</u>		<u>.069</u>
Increase	\$	1150.00	\$	.018

The increase is due to higher charges from the Lake Mine on account of new and expensive coal.

No. 152 - Hoisting.

1919	\$	4331.80	\$	.103
1920		<u>5279.74</u>		<u>.110</u>
Increase	\$	947.94	\$	.007

Hoisting was done on two shifts in practically all of 1920, but on one shift only in part of 1919.

MINING EXPENSE. (Continued)

No. 153 - Pumping.

1919	\$	5589.96	\$	.133
1920		<u>4009.19</u>		<u>.083</u>
Decrease	\$	1580.77	\$	.050

There was not as much water in 1920, partly on account of the dry season and partly on account of the pump at the East End Pit. The electrician did the pumping in the second half year.

No. 154 - Sinking and Shaft Repairs.

1919	\$	40.68	\$	.001
1920		<u>86.13</u>		<u>.002</u>
Increase	\$	45.45	\$	.001

The increase in charges is due to the big raise put up in the Hard Ore Vein above the seventh level.

No. 155 - Rock Drifting.

1919	\$	1474.47	\$	.035
1920		<u>9364.61</u>		<u>.195</u>
Increase	\$	7890.14	\$	.160

In 1919 some of the ore was mined in the East End Pit, and in 1920 all came from underground. Wages were 9.2% higher in 1920, and 5,915 tons more ore was mined.

No. 156 - Breaking Ore.

1919	\$	52771.19	\$	1.254
1920		<u>64589.00</u>		<u>1.346</u>
Increase	\$	11817.81	\$	.092

The increase is due to tramping on double-shift during all of 1920 and only part of 1919. Wages were 9.2% higher in 1920. Tramping cost is high because of transfers and water in the chutes.

No. 157 - Tramping.

1919	\$	13345.31	\$	.317
1920		<u>20032.94</u>		<u>.417</u>
Increase	\$	6687.63	\$	.100

Mine-timber increased \$ 4000; balance of increase is due to higher wages and to repairing underground.

No. 159 - Timbering.

1919	\$	9577.34	\$	.227
1920		<u>18907.16</u>		<u>.394</u>
Increase	\$	9329.82	\$	.167

Wages were 9.2% higher in 1920. There were two shift-bosses most of 1919 and all of 1920.

No. 160 - Captain and Bosses.

1919	\$	6253.33	\$	.149
1920		<u>7170.54</u>		<u>.149</u>
Increase	\$	917.21	\$	.000

No. 161 - Dry-House.

1919	\$	2193.02	\$	.052
1920		<u>2237.51</u>		<u>.047</u>
Increase	\$	44.49		
Decrease			\$	.005

Top-landing was higher in 1919 because of the operation of the East End Pit as well as "D" shaft. In 1920 these charges were lower after the East End Pit was closed.

No. 162 - Top Landing and Tramping.

1919	\$	5486.96	\$	.130
1920		<u>4573.35</u>		<u>.096</u>
Decrease	\$	913.61	\$	.034



MINING EXPENSE. (Continued)

No. 163 - Stocking Ore.

Stocking trestles were torn down and erected twice in 1919.

1919	\$	1829.39	\$	.043
1920		876.41		.018
Decrease	\$	952.98	\$	.025

No. 164 - Sorting Ore.

No charge in 1919.

1919	\$		\$	
1920		110.80		.002
Increase	\$	110.80	\$	.002

No. 165 - Stripping.

This is for stripping at the East End Pit and for settlement of Hoose & Person Contract.

1919	\$	4786.44	\$	.114
1920				
Decrease	\$	4786.44	\$	.114

No. 166 - Cave-In.

Charge is for operating pump at East End Pit and for fencing caved ground.

1919	\$	3.40	\$	.000
1920		178.80		.004
Increase	\$	175.40	\$	.004

RECAPITULATION.

	Year 1919		Year 1920		Increase		Decrease	
	Total	Per Ton	Total	Per Ton	Total	Per Ton	Total	Per Ton
General Expense	8368.32	.199	11365.71	.237	2997.39	.038		
Maintenance	8166.36	.194	11073.59	.231	2907.23	.037		
Mining Expense	111033.71	2.638	141525.06	2.949	30491.35	.311		
Cost of Production	127568.39	3.031	163964.36	3.417	36395.97	.386		

ANGELINE MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1920.

GRADE	IRON	PHOS.	SILICA
Angeline "D" Shaft Bess.,	60.78	.039	8.90
Angeline "D" Shaft,	58.06	.054	11.69
Hard Bessemer,	60.98	.035	8.65
Angeline Silica,	52.84	.043	20.12

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1920.

Angeline "D" Shaft Bess.,	(All Mixed)
Angeline "D" Shaft,	" "
Hard Bessemer,	" "
Angeline Silica,	(No Shipments)

ORE STATEMENT - DECEMBER 31ST, 1920.

	"D" SHFT. BESS.	H. HOL. BESS.	"D" SHFT. ANG.	H. HOL. ANG.	ANG. SIL.	H. ORE BESS.	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1920,	2538	500	7061	1312	661	27	12099	6492
Output for year,	32894		8184		5771	1146	47995	42204
Transferred,	1054	500	758	1312				
Stockpile Overrun and shortage,								124
Total,	36486	0	16003	0	6432	1173	60094	48572
Shipments,	29560		12193			1047	42799	36473
Balance on hand,	6926		3810		6432	126	17294	12099
Increase in output-14%							5791	
Increase in ore on hand-30%							5195	
1920 - 2-8 Hour Shifts for year								
1919 - 2-8 " " " "								

ANGELINE MINE

SHIPMENTS FOR YEAR 1920.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
"D" Shaft Bessemer, Happy Hollow Bessemer,	19,773	9,787	29,560	11,918 2,078
"D" Shaft Angeline, Happy Hollow Angeline,	2,791	9,402	12,193	1,398 211
Angeline Silica, "D" Shaft Hard Bessemer,		1,047	1,047	2,537 18,331
Total,	22,564	20,236	42,800	36,473
Shipments last year,	14,059	22,414	36,473	
Increase - 15%			6,327	

ANGELINE MINE.