

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

6. SURFACE:  
(Continued)

a. Buildings, Repairs: (Continued)

1. Buildings, Mine:

The water-tank supplying water to the dry and compressor was repaired. The bottom of the tank was cemented, new timbers put in the stand and rebuilt the dead air space compartment around the pipes from the ground to the bottom of the tank, so as to prevent freezing.

A new concrete cooling tower was constructed for cooling the compressor water. The old one had been heaved and cracked by the frost and had not been used for several years.

2. Buildings, Location:

Only minor repairs were made to the location houses during the past season. The usual amount of kalsomining and painting was done by the tenants, the material being furnished by the Company.

The Captain's residence was painted, using labor from the mine. Our steam shovel loading was very intermittent and this work gave employment to our runner and craner. The job did not cost as much as if done by contract and we know the best of material was used. A new hot air heating system was installed in the Captain's house. The old one was a pipeless type and did not give sufficient heat.

The boarding house at the Spies Location has been occupied continuously, but has not had any boarders for some time. Since transferring of men to Iron River from Republic, we have had a demand for our location cottages whenever one is vacated, as the housing condition in Iron River is quite a problem. The building was remodeled into a four family house without any additions to the outside walls. Partitions were changed so as to provide the following apartments:

<u>Apartment</u>	<u>Floor</u>	<u>Rent per Month</u>
1-6 Room	First	\$ 8.00
1-4 Room	First	7.00
1-5 Room	Second	7.00
1-4 Room	Second	6.50
	Total	\$ 28.50
	Present Rent	8.00
	Increase	\$ 20.50

The remodeling and building of woodshed and outhouses is estimated at \$ 1500.00 besides the cost of a new Johns-Manville asbestos shingle roof at \$ 425.00. The roof would have had to be put on regardless of whether the change was made or not. The first floor apartments were occupied during December and the upstairs ones are rented.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

6. SURFACE:  
(Continued)

b. Stockpiles:

The ore stocked during the winter of 1929-1930 was all placed on the main pile northeast of the shaft. The trestle was filled early in February and we started side dumping. When side dumping an additional man is employed on each shift, otherwise one man, the engineer, can take care of the top tram.

We loaded out 66,219 tons from stockpiles during 1930, all but a few thousand tons coming from the north pile. The ore was taken from the extreme north end of the north pile. The carpenters put up two lengths of trestle at the end of this pile of eight bents each. These trestles will not take care of our winter's stocking, but there is plenty of room for side dumping. On account of the distance to the end of the north pile, stocking is slow, especially on stormy nights.

During the summer we were forced to stock for a short period the high phosphorus ore. In anticipation of having to continue it, a space about 30 feet wide along the west side of the north pile was cleared and graded. We also cleared and graded more ground on the east side, as we were not sure of the tonnage to be shipped from stockpile. Part of this area was graded by the Chicago & Northwestern Railway Company when they constructed the loading track to the north pile.

On account of the tonnage of high sulphur ore secured in the development above the eighth level, it has been necessary to clear additional ground for this grade northeast of the shaft.

7. UNDERGROUND:

b. Development:

Fourth Level:

There was no new development on the fourth level. The two new raises put up from the sixth level for a traveling and hoisting raise reached the fourth level elevation early in January. The raises were connected and a drift driven to the south crosscut on the level. These raises are now the only through connection between the sixth and fourth levels, as mining has progressed around No. 604 Raise and the raise from the 330 foot sub to the fourth level, so they cannot be used.

Sixth Level:

The only development done on this level was diamond drilling, to more accurately outline the ore below the level. Two holes, Nos. 114 and 118, were drilled on this level. They were horizontal holes and to the north to see if the orebody proved up by Holes Nos. 112 and 113 extended to or above the level. These holes did not strike any ore.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

7. UNDERGROUND:  
(Continued)

b. Development: (Continued)

Subs Above Sixth Level:

There was no actual development of any additional ore on the sub-levels above the sixth level. We did mine, however, ore that was not included in the areas estimated last year. Three contracts were engaged in development drifting on the 330', 255', 185', 165', 145' and 120' sub-levels, blocking out the ore in the vicinity of 604 Raise and connecting the new traveling and hoisting raises put up from the sixth level with the stope to the north.

As the stoping progressed toward the end of the year the stoping gangs did some drifting to connect the south ends of the southeast crosscuts on the 305', 280' and 230' sub-levels to permit a safe entrance into the working part of the stope.

Eighth Level:

The development drifting on the -130 foot elevation, the information from the deep holes and diamond drill holes proved an orebody north of the eighth level drift. Further, development was slow on account of the long tram to Raise No. 800, put up from a point near the end of the drift. A new drift was driven N. 70° W., starting 250 feet northeast of the breast of the main drift. This was just in the center of the high sulphur area cut in the drift from the shaft. This drift was extended 360 feet when it was stopped in order to put up raises. The progress was slow due to the soft and slabby character of the ground. The formation stands almost vertical, with the strike about parallel to the direction of the drift. Soft slate seams interbedded in the ore made it very treacherous and required careful timbering. The sides as well as the back had to be lagged and fore-poled as the drift advanced. The fore-poles in the back were reinforced with three 30 pound rails. The raises required the same care and had to be cribbed.

Six raises were put up to the -130 foot sub-level from the north side of the drift and three on the south side staggered between those on the opposite. The raises are located at 54 foot centers.

Subs Above Eighth Level:

The development on the sub-levels above the eighth level together with the drilling has proved another fold in the footwall to the north of the main body extending below the sixth. Thus far we estimate 193,000 tons of merchantable ore. The -100 foot sub-level which has been developed as far west as the Virgil-Sherwood line shows an orebody 530 feet long by an average width of 72 feet. The drilling has proved the ore to extend to a height of 150 feet above the west end of the -100 foot sub and 75 feet above the east end. Two raises have been put through to the sixth level, one as a traveling way and the other for the handling of supplies. Some work has been done on both the -75 foot and -50 foot elevations toward the east end.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

7. UNDERGROUND:  
(Continued)

b. Development: (Continued)

Subs Above Eighth Level:

The -130 foot sub-level is being opened in high sulphur ore and is to be used as a grizzly sub, that is, grizzlies will be placed over the raises from the eighth level and all chunks broken before going down the raise. The low sulphur ore lies about 10 to 15 feet above this sub or to the point where the coneing will start, and therefore, we will not have to leave any merchantable ore. A traveling drift is being driven so as to be 10 feet into the top of the raise. From the top of the raise at this elevation we drive a stub drift 15 feet long, to the southeast, northwest and northeast. From the end of these stubs incline raises are put up to the -100 foot sub where stoping operations will be started, so that there is a raise within a radius of 25 feet.

While no connection has been proved between this ore-body and the main one below the sixth, there are several leaders at the west end of the -100 foot sub. We still believe that on the -75 foot elevation we will find the two orebodies come together.

We plan to extend the Northwest drift on the eighth level further west and crosscuts to the south, depending on our finding on the -75 foot sub.

c. Stoping:

Sixth Level:

The ore hoisted the past year has practically all been secured from stoping operations above this level, amounting to 128,092 tons, or 89.69%; the balance from development and stoping above the eighth level. Three gangs were engaged in stoping until the middle of March when one gang was laid off. For the balance of the year two crews of miners working double shift were able to break as much ore as we could pull from the chutes on the level. At times when there was an accumulation of ore in the stope, a gang was put on development drifting in connection with their stoping operation or helped to break chunks in raises or opening in the stope.

Stoping was conducted on the 120 foot sub and all elevations up to the 380 foot sub-level. Practically all the ore in the lens extending to the east was exhausted early in the year and stoping of the area south and east of 604 Raise started. The remaining available ore, some 300,000 tons, is all in this area. As the stope above the eighth is opened up, we will cut down on the tonnage mined here. With two stopes to pull from we will be able to maintain a more uniform production.



SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

7. UNDERGROUND:  
(Continued)

c. Stoping: (Continued)

Eighth Level:

Stoping was started on the -100 foot sub-level during November from the raises off No. 812 Raise. These raises were coned the area gradually enlarged to the north and east. Only a very small tonnage had been mined up to the end of the year.

d. Timbering:

The main level drifting where timber is used was on the eighth level. The largest part of the timber consumed was 6" to 8" for cribbing the raises from the eighth level and was about five times that used in 1929. This work also increased the quantity of lagging consumed.

Statement of Timber Used:

<u>Kind</u>	<u>Lineal Feet</u>	<u>Average Price Per Foot</u>	<u>Amount 1930</u>	<u>Amount 1929</u>
6" to 8"	14,466	.045	650.97	128.65
8" to 10"	1,000	.095	95.00	343.23
10" to 12"	1,600	.094	150.33	
12" to 14"	798	.1158	92.37	
14" to 16"	55	.149	8.19	72.71
Total Timber 1930	17,919	.0556	996.86	
Total Timber 1929				544.59
		<u>Per 100 Ft.</u>		
6' Lagging	6,760	.650	43.94	
7' Lagging	33,600	.632	212.40	
Total Lagging	40,360	.635	256.34	
Poles	18,340	1.471	269.79	326.40
Total Lagging & Poles 1930	58,700	.896	526.13	
Total Lagging & Poles 1929				326.40
Product			142,827	165,163
Feet of Timber per Ton of Ore			.1255	.0421
Feet of Lagging per Ton of Ore			.2826	
Feet of Lagging per Foot of Timber			.2252	
Cost per Ton for Timber			.00698	.00329
Cost per Ton for Lagging			.00179	
Cost per Ton for Poles			.00189	.00198
Cost per Ton for Timber, Lagging & Poles			.01066	.00527
Equivalent of Stull Timber to Board Measure			27,922	12,122
Feet of Board Measure per Ton of Ore			.1955	.0734
Cost of Timber, Lagging & Poles 1930	-	\$ 1522.99		
Cost of Timber, Lagging & Poles 1929	-	870.99		

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

7. UNDERGROUND:  
(Continued)

e. Drifting and Raising:

The following is a comparison of the drifting and raising done in the years 1930 and 1929.

<u>Year</u>	<u>Drifting</u>		<u>Raising</u>	
	<u>Ore</u>	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>
1930	4539'	1111'	682'	988'
1929	6515'	839'	1440'	406'

We employed two less contracts on development work during 1930 than the previous year, which explains the decrease in feet drifted and raised. Practically the entire footage of both drifting and raising was done in the course of development on and above the eighth level. The footage of rock work includes the high sulphur material, as while it is stockpiled separately it is considered waste.

f. Explosives, Drilling and Blasting:

The powder costs were less for 1930 due to a smaller production and a decrease in cost of explosives. Further, we did less drifting in 1930. Our powder costs are higher for dog drifting than stopping, which further explains the decrease in cost per ton for explosives.

We continued to use Gelamite No. 2 powder in our stope which reduced the cost somewhat. We also experimented with Gelamite No. 1, but as we use very little powder of higher percentage than 40% did not purchase any quantity during the year.

Statement of Explosives Used:

<u>Ore Development and Stopping:</u>	<u>Quantity</u>	<u>Average Price</u>	<u>Amount 1930</u>	<u>Amount 1929</u>
40% Powder	69,023	.1177	8,126.17	15,331.08
60% Powder				1,018.89
No. 1 Gelamite Powder	500	.1275	63.75	
No. 2 Gelamite Powder	<u>26,950</u>	<u>.1295</u>	<u>3,489.38</u>	<u>364.37</u>
Total Powder	96,473	.1211	11,679.30	16,714.34
Fuse	278,900	5.788	1,614.21	1,953.80
Caps	43,250	11.617	502.40	575.88
Fuse and Cap Seal	13 Pts.	.60	7.80	.60
Powder Bags	18	1.25	22.50	26.25
Tamping Bags	2,000	2.41	<u>4.82</u>	<u>54.77</u>
Total Fuse, Caps, Etc.			2,151.73	2,611.30
TOTAL ALL EXPLOSIVES			13,831.03	19,325.64
Production			142,827	165,163
Pounds Powder per Ton of Ore			.6755	.8335
Cost per Ton for Powder			.0818	.1012
Cost per Ton for All Explosives			.0968	.1170

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

7. UNDERGROUND:  
(Continued)

f. Explosives, Drilling and Blasting: (Continued)

Statement of Explosives Used: (Continued)

<u>Sinking, Rock Development, Etc.</u>	<u>Quantity</u>	<u>Average Price</u>	<u>Amount 1930</u>	<u>Amount 1929</u>
40% Powder	5,594	.1190	665.79	924.84
No. 2 Gelamite Powder	450	.1325	59.62	
Total Powder	6,044	.1200	725.41	924.84
Fuse	20,300	5.788	117.50	138.29
Caps	3,000	11.71	35.13	37.12
Powder Bags	1	1.25	1.25	
Total Fuse, Caps, Etc.			153.88	175.41
TOTAL ALL EXPLOSIVES			879.29	1,100.25
TOTAL EXPLOSIVES USED IN MINE			14,710.32	20,425.89
AVERAGE PRICE PER POUND FOR POWDER			.1210	.1213

8. COST OF  
OPERATING:

a. Comparative Mining Costs:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
<u>PRODUCTION:</u>				
Ore Produced	142,827	165,163		22,336
Average Daily Product	517	547		30
Tons per Man per Day	6.37	6.35	.02	
No. Days Operating	276½	302		25½
No. of Shifts and Hours	2-8	2-8		
Budget Estimated Production	159,000	180,000		21,000
Budget Estimated Cost at Mine	1.897	1.709	.188	
<u>COSTS:</u>				
Underground Costs	1.007	.974	.033	
Surface Costs	.201	.189	.012	
General Mine Accounts	.206	.188	.018	
Cost of Production	1.414	1.351	.063	
Cost of Loading & Shipping	.033	.035		.002
Cost at Mine per Cost Sheet	1.447	1.386	.061	
<u>Depreciation</u>				
Plant and Equipment	.038	.038		
Development	.219	.219		
Movable Equipment	.001	.006		.005
Taxes	.132	.115	.017	
Supply Inventory	.008	.000	.008	
Total Cost at Mine	1.845	1.764	.081	

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

a. Comparative Mining Costs: (Continued)

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
<u>EXPENSE BEYOND MINE:</u>				
Royalty	.407	.407		
Rail Freight	.820	.820		
Lake Freight	.655	.655		
Cargo Insurance & Analysis	.010	.010		
Shrinkage	.031	.030	.001	
Total Cost at Lower Lake Ports	3.768	3.686	.082	

b. Detailed Cost Comparison:

1. Days and Shifts:

The mine operated 25½ days less during 1930 than in 1929, having worked 2-8 hour shifts six days per week from Jan. 1st to July 14th, then five days per week to Dec. 31st, 1930.

2. Production:

We show a decrease of 22,336 tons for 1930. 13,183 tons is due to the less days operated and the balance to a smaller average daily hoist, as conditions in the stope were not as favorable. Further, less men were employed.

Even with a smaller production we show a slight increase in tons per man. The total cost at the mine shows an increase of \$ .081 for 1930, which is found in the items, Exploring in Mine, Trimming, Timbering, Pumping, Underground Superintendence, Mine Office and Taxes, as well as items effected by the five day week. These increases were partly offset by a decrease in Development in Ore and Stopping.

4. Underground Costs:

Exploring in Mine:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 8,521.68	\$ .060
Year 1929	<u>4,043.54</u>	<u>.025</u>
Increase	\$ 4,478.14	\$ .035

The drilling period was the same each year. The 1930 exploring was all done with diamond drill, while in 1929 about half was done with the deep hole machine. This explains the increase in labor and supplies and analysis. Further, there was a much heavier charge for Geological Department.

	<u>1930</u>	<u>1929</u>
Labor	\$ 1979.88	\$ 1669.32
Carbon	1404.06	384.20
Other Supplies	1650.43	768.99
Analysis	1469.75	460.03
Geological Charge	<u>2017.56</u>	<u>761.00</u>
Total	\$ 8521.68	\$ 4043.54
Feet Drilled	2338	1602
Drilling Cost per Foot	\$ 2.153	\$ 1.762
Total Cost per Foot	3.645	2.049



SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

4. Underground Costs: "

Development in Rock:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 5,254.59	\$ .037
Year 1929	<u>6,572.56</u>	<u>.040</u>
Decrease	\$ 1,317.97	\$ .003

	<u>Feet</u>	<u>Cost per Foot</u>
1930 - Rock Work	663	\$ 7.925
1929 - Rock Work	977	6.727

The increased cost per foot is on account of the two raises put up from the eighth to the sixth level 250 feet, being in rock for the top 115 feet.

Development in Ore:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 31,429.54	\$ .220
Year 1929	<u>39,604.69</u>	<u>.240</u>
Decrease	\$ 8,175.15	\$ .020

Less labor employed on ore development during 1930, securing a smaller footage of drifting and raising. The unit cost shows a decrease of \$ .02.

Stopping:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 29,958.85	\$ .210
Year 1929	<u>39,016.47</u>	<u>.236</u>
Decrease	\$ 9,057.62	\$ .026

One less gang employed after March and mine on five day week schedule explains large labor decrease as well as decrease in supplies used. With the reduced tonnage the cost per ton was \$ .026 less.

Timbering:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 8,555.09	\$ .060
Year 1929	<u>8,401.54</u>	<u>.051</u>
Increase	\$ 153.55	\$ .009

The timber used was almost double that in 1929, on account of the number of raises put up from the eighth level. This was partly offset by less labor employed during the year. The increase per ton is due to the smaller output.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

4. Underground Costs: "

Tramming:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 18,201.75	\$ .127
Year 1929	<u>18,360.70</u>	<u>.111</u>
Decrease	\$ 158.95	
Increase		\$ .016

Less current used to tram the smaller tonnage, but this was partly offset due to employing an additional motorman on the eighth level the last three months in the year.

Ventilation:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 106.92	\$ .001
Year 1929		
Increase	\$ 106.92	\$ .001

A fan was operated on the eighth level until raises were holed through to the sixth and produced a natural ventilation. This installation was not made until 1930.

Pumping:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 8,650.91	\$ .061
Year 1929	<u>8,635.04</u>	<u>.052</u>
Increase	\$ 15.87	\$ .009

There is only a small increase, with an increase in water pumped on account of the new ground opened up above the eighth level. The increase in current was partly offset by less labor, as with a reduced operation we have worked out a schedule over the week end to eliminate one shift.

Compressors and Air Pipes:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 16,078.55	\$ .112
Year 1929	<u>19,226.62</u>	<u>.116</u>
Decrease	\$ 3,148.07	\$ .004

There is a decrease in both labor and supplies as the compressor was operated 25 $\frac{1}{2}$  shifts less in 1930 than in 1929.

Underground Superintendence:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 6,583.68	\$ .046
Year 1929	<u>6,486.70</u>	<u>.039</u>
Increase	\$ 96.98	\$ .007

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

4. Underground Costs: "

Underground Superintendence: (Continued)

This increase is due to paying the shift bosses an average of the contract miners plus a safety bonus of 35¢ per day for each two week period without a lost time accident.

Compressors & Power Drills:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 2,106.02	\$ .015
Year 1929	<u>1,594.13</u>	<u>.010</u>
Increase	\$ 511.89	\$ .005

The compressor was re-erected during January by an engineer from the Ingersoll-Rand Co., taking a week's time and new parts. In 1929 we purchased six new S. 49 drills and three JC Mountings.

Electric Tram Equipment:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 6,831.54	\$ .048
Year 1929	<u>7,452.37</u>	<u>.045</u>
Decrease	\$ 620.83	
Increase		\$ .003

The charge to this account has been large each year on account of repairs to underground cars. The decrease is explained by less track work in 1930. Tie plates were installed on the sixth level in 1929.

Pumping Machinery:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 1,586.52	\$ .010
Year 1929	<u>1,463.91</u>	<u>.009</u>
Increase	\$ 122.61	\$ .001

During 1930 a pipe line was installed for drawing water from the old stopes of the Virgil Mine. New pump poles were put in Prescott Pump No. 208, a new electric bilge shaft pump installed in November and December cost \$ 290.00, while in 1929 the third level dam pump was overhauled and Diamond Drill Hole No. 10 reamed out.

5. Surface Costs:

Hoisting:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 7,748.84	\$ .054
Year 1929	<u>8,198.10</u>	<u>.050</u>
Decrease	\$ 449.26	
Increase		\$ .004

Smaller tonnage handled and less labor employed due to the five day week after July 14th, 1930.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

5. Surface Costs: "

Stocking Ore:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 3,074.45	\$ .022
Year 1929	<u>4,319.26</u>	<u>.026</u>
Decrease	\$ 1,244.81	\$ .004

The total tonnage stockpiled during 1930 was less than that of 1929.

Screening-Crushing at Mine:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 3,202.64	\$ .022
Year 1929	<u>2,929.64</u>	<u>.018</u>
Increase	\$ 273.00	\$ .004

The decrease in labor for 1930 on account of 25 $\frac{1}{2}$  less operating days was offset by new wearing plates, spider cap and other repairs to the crusher.

Dry House:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 3,518.17	\$ .025
Year 1929	<u>3,101.06</u>	<u>.019</u>
Increase	\$ 417.11	\$ .006

This increase is explained due to the overhauling of the boiler feed pump, water tank and additional radiators installed in the dry.

General Surface Expense:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 3,814.12	\$ .027
Year 1929	<u>3,484.46</u>	<u>.021</u>
Increase	\$ 329.66	\$ .006

Due to intermittent steam shovel operations the crew was employed cleaning up on surface. This account also includes annual rental "Flooding Lands."

Hoisting Equipment:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 2,855.09	\$ .020
Year 1929	<u>3,030.18</u>	<u>.018</u>
Decrease	\$ 175.09	
Increase		\$ .002

A new hoisting rope was put on the cage in 1930 compared with one on both skip and cage in 1929. Further, a new box was made for the skip during 1930.



SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

5. Surface Costs: "

Shaft:

		<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$	253.20	\$.002
Year 1929		<u>879.69</u>	<u>.005</u>
Decrease	\$	626.49	\$.003

Only minor repairs were made during the year. In 1929 the casing plank between the cage and skip ways was renailed with monel nails as well as new monel lag screws used on the runners.

Top Tram Equipment:

		<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$	2,184.25	\$.015
Year 1929		<u>1,585.64</u>	<u>.010</u>
Increase	\$	598.61	\$.005

New trolley wire and track installed when arranging to stock on the north pile; also more repairs to larry cars.

Docks, Trestles & Pockets:

		<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$	1,326.84	\$.009
Year 1929		<u>2,471.07</u>	<u>.015</u>
Decrease	\$	1,144.23	\$.006

In 1930 the shaft-house loading pocket was relined completely and some grading done for extensions to stocking grounds. In 1929 the permanent trestle leading off the shaft-house was rebuilt.

Mine Buildings:

		<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$	759.54	\$.005
Year 1929		<u>1,210.75</u>	<u>.007</u>
Decrease	\$	451.21	\$.002

Less repairs were made to mine buildings in 1930. The 1929 labor charge included the expense of tearing down the water power compressor building at Republic, amounting to \$ 290.20.

6. General Mine Accounts:

		<u>Amount</u>	<u>Per Ton</u>
<u>Insurance:</u>			
Year 1930	\$	157.17	\$.001
Year 1929		<u>232.02</u>	<u>.001</u>
Decrease	\$	74.85	\$.000

Smaller monthly charge made in 1930.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:  
(Continued)

b. Detailed Cost Comparison: (Continued)

6. General Mine Accounts: "

Engineering:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 1,685.56	\$ .012
Year 1929	<u>1,962.86</u>	<u>.012</u>
Decrease	\$ 277.30	\$ .000

Less time spent on Spies-Virgil work in 1930 than 1929 by the mining engineer.

Mechanical & Electrical Engineering:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 233.84	\$ .002
Year 1929	<u>683.94</u>	<u>.004</u>
Decrease	\$ 450.10	\$ .002

Smaller proportion of Mechanical and Electrical Department expense charged in 1930.

Analysis and Grading:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 3,970.44	\$ .028
Year 1929	<u>2,962.08</u>	<u>.018</u>
Increase	\$ 1,008.36	\$ .010

There were 5475 determinations made in 1930 compared with 3027 in 1929. The increase was due to sampling of development drifts on subs above the eighth level for analysis map and to more daily samples run on account of the high phosphorus ore from some of the chutes.

Personal Injury Expense:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 2,875.49	\$ .020
Year 1929	<u>3,077.64</u>	<u>.019</u>
Decrease	\$ 202.15	
Increase		\$ .001

The charge to this account is on a pay roll basis of 2% of the total labor plus \$ .107 per C. of total labor.

Safety Department Expense:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 507.24	\$ .004
Year 1929	<u>1,426.49</u>	<u>.009</u>
Decrease	\$ 919.25	\$ .005

Fewer helmet and first aid practices were held during 1930 and the 1929 charge included \$ 699.64, the Spies-Virgil proportion of the cost of the Safety Picnic.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

8. COST OF  
OPERATING:

b. Detailed Cost Comparison: (Continued)

6. General Mine Accounts: "

Telephones & Safety Devices:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 887.66	\$ .006
Year 1929	<u>1,208.20</u>	<u>.007</u>
Decrease	\$ 320.54	\$ .001

Fewer new safety devices installed and a smaller maintenance cost during 1930 explains the decrease.

Local and General Welfare:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 1,534.78	\$ .011
Year 1929	<u>1,377.68</u>	<u>.008</u>
Increase	\$ 157.10	\$ .003

Small increase.

Special Expense, Pensions & Allowances:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 4,598.88	\$ .032
Year 1929	<u>4,892.67</u>	<u>.030</u>
Decrease	\$ 293.79	
Increase		\$ .002

This account is distributed from the Ishpeming Office.

Ishpeming Office:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 5,319.82	\$ .037
Year 1929	<u>6,375.17</u>	<u>.038</u>
Decrease	\$ 1,055.35	\$ .001

The 1929 charge to this account included some charges that were distributed in 1930, which explains the decrease.

Mine Office:

	<u>Amount</u>	<u>Per Ton</u>
Year 1930	\$ 7,561.79	\$ .053
Year 1929	<u>6,875.31</u>	<u>.042</u>
Increase	\$ 686.48	\$ .011

A larger proportion of Superintendent's salary charged after Holmes Mine was closed; and \$ 205 for new Monroe calculating machine.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

9. EXPLORATIONS  
AND FUTURE  
EXPLORATIONS:

b. Underground Explorations:

The drilling program started in 1929 was continued into September 1930 when the diamond drill equipment was stored at the mine and the runner transferred to the Holmes Mine. The total footage drilled during 1930 amounted to 2338 feet at a cost of \$ 3.645 per foot, which includes Analysis and Geological Department expense.

Holes Nos. 112, 113 and 114 were drilled from the same station, approximately 200 feet east of the Virgil-Sherwood line and 2000 feet south of the northwest corner of Section 24, T. 43 N., R. 35 W. The sub-level development and deep hole drilling on the -130 foot elevation done during 1929 proved a sizable orebody of low sulphur grade just above the -130 foot sub-level. While the drift was started on the eighth level for mining this ore, we felt additional drilling should be done to determine the height.

Hole No. 112 was drilled due north at a 70° angle down. It cut 65 feet of merchantable ore, the bottom of which was just at the -130 foot elevation, besides several runs of high sulphur ore below the eighth level. No. 113 was then drilled due north at a 45° angle down and cut the same merchantable seam 48 feet below the sixth level, which at this point proved to be 124 feet thick, and showed the orebody to widen out on its upward trend. For this reason No. 114 was drilled to the north at a 15° angle up, to see if this ore extended above the sixth level. This hole was drilled to a depth of 247 feet without striking any ore. After sub-level development progressed and the orebody was found to extend so far to the east, we thought there was a chance of it flattening out and at the sixth level it would be found farther to the east. Hole No. 118 was therefore drilled due north and horizontal from a point 100 feet further to the east and 70 feet north. This hole was also a blank and stopped in gray slate at 100 feet.

The other four holes, Nos. 115, 116, 117 and 119, were drilled to the south and west to more definitely locate the bottom of the main orebody below the sixth level. Hole No. 115 was drilled vertical 100 feet south of Nos. 112 and 113. It was started in a lean area and continued in it to a depth of 198 feet. The formation was nearly vertical and the hole followed close to a contact as the core was partly ore and partly slate. No. 116 was drilled vertical 100 feet west of Hole No. 115. It was in ore to 65 feet below the level. Hole No. 117 was drilled due south at an angle of -70° and had ore from 35 feet to 155 feet. These two holes, Nos. 116 and 117, show a decided roll in the foot, high at No. 116 and low to both the north and south. Hole No. 119 was drilled from the most southwest location available. It was drilled at a flat angle of 43° and on a course to strike the boundary line at the eighth level elevation. This hole cut ore to a point 75 feet above the eighth level. The grade of ore in



SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

9. EXPLORATIONS  
AND FUTURE  
EXPLORATIONS:  
(Continued)

b. Underground Explorations: (Continued)

Hole No. 119 varied between high and low sulphur material. The core was all low in sulphur, but the soluble sulphur brought the larger part of the ore footage above the merchantable grade limit. The soluble sulphur usually amounts to about 50% of the sulphur in the sludge, but in this case, however, it was many times higher. The water supply for this hole was taken from Diamond Drill Hole No. 10, which was found to contain a larger percentage of soluble sulphur. In order to find out if the water had any effect on the sulphur content, Hole No. 119A was drilled to a depth of 100 feet with a new water supply and found to be all merchantable ore. In our estimate we have assumed the entire footage to be low in sulphur.

Our 1930 estimate of prospective ore below the sixth level was made from new north-south sections, using the information in Holes Nos. 115 to 119A inclusive. This estimate was only about 15,000 tons less than that made in 1929 from east-west sections.

10. TAXES:

The following tabulation is a comparative statement of taxes paid in Iron County for the years 1930 and 1929.

<u>Description</u> <u>Iron County</u>	<u>1930</u>		<u>1929</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
<u>Iron River Township</u>				
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35, 40 acres	See Note (a)		See Note (a)	
SE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35, 40 acres	" " "		" " "	
Spies Dwellings	5,000	154.60	5,000	153.42
Collection Fees		1.55		1.53
Total Dwellings		156.15		154.95
<u>Spies-Virgil (a)</u>				
NE $\frac{1}{2}$ of NW $\frac{1}{4}$ Sec. 24-43-35, Spies )	200,000	6,184.00	187,000	5,737.80
SW $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35, Virgil)				
Stockpile, Supplies & Equipment	370,000	11,440.40	383,000	11,751.77
Total	570,000	17,624.40	570,000	17,489.57
Collection Fees		176.24		174.90
Total Spies-Virgil Mine		17,800.64		17,664.47
(a) Total Iron River Township	575,000	17,956.79	575,000	17,819.42
Rate		3.092		3.068

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

10. TAXES:  
(Continued)

<u>Description</u> <u>Iron County</u>	<u>1930</u>		<u>1929</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
<u>Village of Mineral Hills:</u>				
<u>Spies Mine:</u>				
SE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35	See Note (a)		See Note (a)	
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35	" " "		" " "	
Dwellings	5,000	9.82	5,000	12.30
<u>Virgil Mine Lease:</u>				
(a) SW $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 24-43-35	200,000	392.64	187,000	459.94
Stockpile, Supplies & Equipment	370,000	726.39	383,000	942.06
Total Opt. Spies-Virgil	570,000	1,119.03	570,000	1,402.00
Total Mineral Hills	575,000	1,128.85	575,000	1,414.30
Rate		1.9632		2.46
 (a) The valuation of \$ 570,000 includes both the Spies and Virgil descriptions noted above for the year 1930 and 1929. Not divided by tax appraiser and any division would be arbitrary.				
 (a) The valuation is not divided between the Spies and Virgil and the surface of the Spies is included in the mineral assessment of the Virgil.				
<u>Bates Township</u>				
Erickson Lease SW $\frac{1}{4}$ Sec. 21-43-34	226,000	8,869.23	226,000	8,346.86
Collection Fees		88.69		83.47
Total Bates Township		8,957.92		8,430.33
Rate		3.921		3.694
<u>Mastodon Township</u>				
<u>Neely Lease</u>				
NW $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 12-42-33, 40 Acres)			137,000	5,381.36
NE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 12-42-33, 40 Acres)	See Note (b)		1,400	62.58
NE $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec. 12-42-33, 40 Acres			138,400	5,443.94
Total				5,498.38
Collection Fees				54.44
Total Mastodon Township				5,498.38
Rate				3.928
<u>Village of Alpha</u>				
NE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 12-42-33	137,000	2,127.61	137,000	2,639.99
Collection Fees		21.28		26.40
Total Village of Alpha		2,148.89		2,666.39
Rate		1.553		1.947

(b) Sold to Oliver Iron Mining Co. during 1930, who pay State and County taxes. Village Taxes paid by C.C.I. Co. for 1930.

NOTES: The Village of Alpha is situated in Mastodon Township. Mineral Hills is in Iron River Township. The valuation as shown here are the valuations (either all or in part) as the valuations of the respective townships.

Village taxes paid in August 1930.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

11. ACCIDENTS  
AND  
PERSONAL  
INJURY:

a. Accidents:

There were three lost time accidents at the Spies-Virgil Mine during 1930 compared with four in each 1929 and 1928. Two of the accidents that occurred in 1930 were more serious than those in the past two years, requiring a compensation payment to Jan. 1st, 1931 of \$ 423.00 compared with \$ 153.20 in 1929 and \$ 14.50 in 1928.

One of the accidents was slight and the man was only home for six days and received no compensation.

Another accident was nothing more than a scratch, the man continuing to work. Infection with gangrene resulted and the middle finger of the right hand, up to the second joint was amputated.

The other accident which was due to thoughtlessness on the part of the injured man might have been more serious. A motorman left his train to guard an entrance while a chunk on one of the cars was being "bull-dozed." At the same time blasting was being done in a chute nearby. The chute blast went off first and without thinking the motorman walked into his train to see how the chunk had broken, and his blast went off just as he got there. There was severe contusion of both eyes.

During the year there were also nine slight accidents causing no disability.

b. Safety Work:

Regular training was given throughout the year in first aid and helmet work.

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION:

A new fourteen stall community garage was built at the location. This garage was erected out of the lumber salvaged from the compressor building at the Republic Water Power Plant. A concrete footing was put in and the walls of the building were gunited on expanded metal lath both outside and inside, so that it is partly fireproof. This garage will provide a stall for the mine truck and one for each of the houses at the location and two for the boarding house, which has now been changed into a four-family apartment.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

14. MAINTENANCE  
AND REPAIRS:

a. Shafts:

1. Spies Shaft:

A thorough examination is made of all pipes and cables in the shaft at frequent intervals on account of the action of the water. It is necessary to replace the pipe hangers and bolts where eaten away. The inspection made in November found the steel armor on the haulage cable between the fourth and sixth levels broken and eaten away in a number of places, making a poor return for this circuit. This length of cable had been salvaged from one of the Gwinn District mines and the jute covering was worn away in places at the time of its installation in the Spies Shaft. A new length of cable has been ordered.

2. Virgil Shaft:

A monthly inspection is made of the old Virgil shaft and connecting drifts and raises to the workings of the new mine. During the latter part of 1929 it was noticed that the water was raising in the old stopes below the first level. Diamond Drill Hole No. 10, an underground hole from the old workings and cut on the sixth level, was reamed out. While the flow of water increased, it was not sufficient to drain the stope and the water continued to raise. A pipe line was installed from the stope to the third level Spies, so as to syphon the water out of the stope upon reaching a higher level. Toward the end of 1930 for some unknown reason the water began to lower.

b. Hoisting Equipment:

The new cage hoisting rope installed on January 5th, 1930 was turned end for end in September and is still in service and in good condition. The skip rope was new on October 31st, 1929, turned end for end in March 1930 and has considerable life as yet. It has been in service fourteen months whereas previous ropes have only lasted a maximum of eleven months. We believe this increased life due to better greasing and the use of wood-lined idler sheaves which have been installed on all stands.

The skip was changed in May and again in October. The one put on in October had a new box which was built in the mine shops. It has been necessary to change a few runners in both the skip and cage compartments and put in monel metal lag screws or ones made at the mine out of "Rezestal" Metal. A new pulley stand was built just in front of the engine-house to prevent the whip of the ropes. The slack rope alarm was changed to just in front of this new sheave stand.



SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

14. MAINTENANCE  
AND REPAIRS:  
(Continued)

c. Pumps:

The Prescott pumps gave very little trouble during the past year. New poles were installed in No. 208 and the old ones are being cased with "Rezistal" tubing. We tested out this "Rezistal" metal and found it to be almost acid resisting.

A new electric bilge pump was purchased for the shaft to replace the air driven pump. This pump is in place and ready to operate as soon as the electric shaft cable and transformers are received. Having an air pump in the shaft makes it necessary to operate the compressor when the mine is idle for cleaning skip pit. This electric shaft pump will pay for itself within a short time, due to the number of idle days on our present operating schedule.

d. Compressor:

The compressor had not been operating satisfactorily for sometime and we had it inspected by an engineer from the Ingersoll-Rand Company. He had the necessary repair parts sent to the mine, arriving the end of December 1929. Mr. E. Krauth, Erecting Engineer of the Ingersoll-Rand Company, arrived in Iron River on January 9th and started work to re-erect the compressor on the morning of January 10th. This work was carried on, both with a day and night shift, in order to complete it in the shortest possible time. The compressor was re-assembled and ready to turn over on the afternoon of January 15th. It took the night shift to pump out the water which had accumulated in the shaft below the eighth level and hoisting was resumed on January 16th. The following is an extract from Mr. Krauth's report on the condition in which he found the compressor and the repairs made by him:

"The main bearing brasses were not mated, the one on the high pressure side being 1/16" thinner than the other, bringing the shaft out of level and having only one half bearing on each brass. The shaft was badly scored at the main bearings.

Beds were 1/8" too close at the shaft end, throwing the machine out of line. Cylinder ends of beds were working in the grout and there was a movement at the bed to cylinder joint.

The stator was not placed centrally causing the shaft to be pulled hard against the low pressure main bearing collar, causing friction and of course heat.

On cutting the machine out of the grout it was found that the grout was oil-soaked and did not support the beds properly at the cylinder ends.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

14. MAINTENANCE  
AND REPAIRS:  
(Continued)

d. Compressor: (Continued)

The intercooler tubes were largely plugged with mud, but otherwise in very good condition.

Water jackets were in fair condition.

High pressure cylinder and piston were in very good condition.

The low pressure cylinder is worn .032" out of round and the rings showed where the air was blowing through.

The regulator body, body valves and auxiliary valve and chest are worn out and should be replaced at once.

I replaced the old main bearings with new throughout and dressed down the bearing surfaces on the shaft. Relined the machine and reset the motor. Fitted the new babbitt crosshead gibs and one new crosshead pin bearing. The new main bearings required careful scraping in. The wrist pin on the low pressure side also required dressing. Cleaned out cooler and all water jackets. The crouting was carefully done with quicksetting cement.

On starting the machine she operated perfectly for 24 hours without heat any where and all pounding had disappeared.

There remains the replacing of the low pressure piston rings and the worn out parts of the A 33 regulator."

17. CONDITION  
OF  
PREMISES:

The mine and location premises were cleaned up during April and were kept in a neat and clean condition until cold weather set in. At the mine all material was kept neatly piled and grass plots around the buildings kept trimmed. The mine truck and team cleaned up the alley behind the location houses at regular intervals during the summer. With the addition of the new garage building, we were able to get rid of a number of shacks that had been used as garages and thus improve the looks of the location.

SPIES-VIRGIL MINE  
ANNUAL REPORT  
YEAR 1930.

18. NATIONALITY  
OF  
EMPLOYEES:

	<u>1930</u>		<u>1929</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
American -----	6	.077	6	.070
English -----	23	.296	25	.291
Croatian -----	1	.013	1	.012
Dane -----	2	.025	2	.023
French -----	6	.077	7	.081
Swede -----	7	.090	7	.081
German -----	4	.051	3	.035
Finn -----	17	.218	17	.198
Polish -----	6	.077	10	.116
Italian -----	4	.051	6	.070
Irish -----	2	.025	2	.023
<b>Total</b>	<b>78</b>	<b>100%</b>	<b>86</b>	<b>100%</b>

WADE MINE  
ANNUAL REPORT  
YEAR 1930

1. GENERAL:

Operations at the Wade Mine during the past year were confined exclusively to underground activities. Mining ore was confined to the West Deposit. A very small tonnage of ore was derived from development in the East Deposit.

The mine was put on an operating basis on January 20th, and so continued throughout the remainder of the year. The work during the previous period was classed as "re-opening" and consisted of cleaning out and re-timbering old drifts and raises.

Preparations for opening and developing the East ore deposit were started at the beginning of August.

Pumping conditions were normal throughout the greater part of the year. An increase of about 75 gallons of water per minute was noted towards the close of the year, which was derived from the East ore body as the development work progressed.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. <u>Production by Grades:</u>		
Wade Pocket to Dock, -----	82,891 tons.	
Wade Pocket to Stockpile, -----	<u>77,963</u>	"
Total Underground Ore, -----	160,854	"
b. <u>Shipments:</u>		
Pocket, -----	82,891	"
Stockpile, -----	<u>16,517</u>	"
Total, -----	99,408	"
c. <u>Stockpile Inventories:</u>		
On Hand, January 1st, 1931, -----	61,446	"
e. <u>Production by Months:</u>		
January, -----	3,438	"
February, -----	8,288	"
March, -----	9,981	"
April, -----	11,139	"
May, -----	14,425	"
June, -----	15,890	"
July, -----	15,647	"
August, -----	15,780	"
September, -----	19,183	"
October, -----	17,380	"
November, -----	16,164	"
December, -----	<u>13,539</u>	"
Total, -----	160,854	"



WADE MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

e. Production by Months: (Continued)

The production during the early part of the year was very low owing to the large amount of old timber, sand and debris in the old workings, which it was necessary to remove in order to mine the remaining pillars of ore.

f. Ore Statement:

	<u>1930</u>	<u>1929</u>
On Hand January 1st, -----	-	-
Output for Year, -----	<u>160,854</u>	<u>162,595</u>
Total, -----	<u>160,854</u>	<u>162,595</u>
Shipments, -----	<u>99,408</u>	<u>162,595</u>
Balance, January 1, 1931, -----	<u>61,446</u>	-

g. Delays:

There were no delays at the Wade Mine during the season of 1930.

3. ANALYSIS:

a. Average Analyses on Shipments:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Meng.</u>	<u>Alum.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
Wade Pocket to Dock,	82,891	56.58	.071	7.09	1.52	1.98	13.54	48.92
Wade Stkpile to Dock,	<u>16,517</u>	<u>57.32</u>	<u>.069</u>	<u>7.34</u>	<u>1.31</u>	<u>2.20</u>	<u>12.21</u>	<u>50.32</u>
Total & Average,	99,408	56.70	.070	7.13	1.48	2.01	13.34	49.14

a.a. Average Analyses of Production:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>
Wade Pocket to Dock,	82,891	56.58	.071	7.09	1.52	1.98
Wade Pocket to Stockpile,	<u>77,963</u>	<u>57.18</u>	<u>.071</u>	<u>7.28</u>	<u>1.37</u>	<u>1.84</u>
Total Underground Ore,	160,854	56.87	.071	7.18	1.45	1.91

b. Average Analyses on Cargoes:

	----- MINE -----			----- LAKE ERIE -----		
	<u>Iron</u>	<u>Moist.</u>	<u>Fe.Nat.</u>	<u>Iron</u>	<u>Moist</u>	<u>Fe.Nat.</u>
Chippewa,	57.09	12.65	49.87	57.04	12.43	49.95
Gwinn,	56.38	13.19	48.94	56.34	12.79	49.13
Wadena Special,	57.95	14.44	49.58	57.73	13.40	49.99
Wadena,	57.49	14.69	49.04	57.28	13.89	49.32
Alexandria,	55.96	12.63	48.89	56.17	12.03	49.41
Kevin Special,	57.03	11.71	50.35	56.82	11.51	50.28
Union,	57.98	7.57	53.59	57.83	7.36	53.57

d. Composite Analyses of Season's Shipments:

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss.</u>
Wade,	56.74	.071	7.08	1.47	1.93	.78	.46	.012	6.37

WADE MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF  
ORE RESERVES:

a. Developed Ore:

Assumption: 13 Cubic Feet equals one ton.  
10% Deduction for rock.  
10% Deduction for Mining Loss.

West Deposit, ----- 510,715 tons.

b. Undeveloped Ore:

East Deposit, ----- 1,121,362 "

Total, ----- 1,632,077 "

Deacon Bessemer, ----- 80,000 "

Deacon Non-Bessemer, ----- 95,000 "

Grand Total, ----- 1,807,077 "

The reduction in tonnage from last year's estimate is the result of a new computation based on more recent information and further study of the drilling records.

The Deacon tonnage, which is segregated above, is not included in our estimate of mineable reserve tonnage. Available information indicates heavy charges for pumping and cost of development, which would result in prohibitive mining costs on the basis of present ore values.

c. Estimated Analysis:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
West Deposit,	510,715	57.51	.071	6.78	1.28	1.14	13.50	49.34
East Deposit,	1,121,362	57.76	.077	6.89	1.81	.78	13.50	49.96
Average,	1,632,077	57.68	.075	6.86	1.64	.89	13.50	49.90
Deacon Bess.	80,000	56.65	.045	8.04	1.16			
" Non-Bess.	95,000	55.77	.053	8.43	.42			

5. LABOR & WAGES:

a. Comments:

There was no difficulty encountered in securing ample labor during the past year.

Wages paid were comparable with those of other operations on the Range and the same as paid during previous years. Common surface labor was paid \$4.20 per day.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

5. LABOR & WAGES:b. Comparative Statement of Wages & Product:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
PRODUCT, -----	160,854			
No. Shifts & Hours, -----	2, 8-Hr.			
<u>AVG. NO. MEN WORKING:</u>				
Surface, -----	22			
Underground, -----	96			
Total, -----	118			
<u>AVG. WAGES PER DAY:</u>				
Surface, -----	4.86			
Underground, -----	5.49			
Total, -----	5.35			
<u>WAGES PER MO. OF 25 DAYS:</u>				
Surface, -----	2702.85			
Underground, -----	10452.12			
Total, -----	13154.97			
<u>PRODUCT PER MAN PER DAY:</u>				
Surface, -----	24.04			
Underground, -----	7.04			
Total, -----	5.44			
<u>LABOR COST PER TON:</u>				
Surface, -----	.202			
Underground, -----	.779			
Total, -----	.981			
AVG. PRODUCT BRK'G. & TRM'G:	10.67			
AVG. WAGES CONTRACT MINERS:	5.85			
<u>TOTAL NO. OF DAYS:</u>				
Surface, -----	6668 $\frac{1}{2}$			
Underground, -----	22859 $\frac{1}{2}$			
Total, -----	29528			
<u>AMOUNT FOR LABOR:</u>				
Surface, -----	32434.21			
Underground, -----	125425.47			
Total, -----	157859.68			

Proportion Surface to Underground Men - 1 to 3.43

There were no underground operations in 1929 and therefore no figures for comparison.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

3. SURFACE:

a. Buildings, Repairs:

The major repairs to location houses were as follows:

Exterior painting of Houses Nos. 17, 18, 19 & 20 -	\$ 526.35
Interior painting and new roof, House No. 17,	565.00
Repairs to Heating Plants,	32.81

The expenditures on mine buildings for exterior painting were as follows:

Office )	
Change House )	
Garage )	\$ 415.85
Engine House )	
Shop )	

Some minor repairs were made to location dwellings and mine buildings by the mine carpenter.

Some reinforcements and replacements of timber in the shaft house were made. Some consisted of new sills, new posts and other reinforcements.

A 36-ft. head-frame was erected over the new timber shaft. The timber hoist from the Boeing Mine was set up to serve this shaft. A wooden shed, from the location, was moved to and placed over the timber shaft hoist, to serve as a hoisting house.

The cost of head frame and hoist installation is as follows:

	<u>Estimated Cost</u>	<u>Actual Expenditures</u>
Head frame, -----	\$ 600.00	\$643.28
Hoist and Cage, -----	985.00	1385.94
Total, -----	<u>\$1585.00</u>	<u>2029.22</u>

The increase in cost over estimate is due, in most part, to the increased cost of the hoist. The hoist needed repairs and new parts not anticipated at the time of making the estimate.

Considerable labor was expended in a general clean-up of the location. Three carloads of scrap iron, which had accumulated during a period of underground idleness, were loaded and shipped from the property.

b. Stockpiles:

A new wood trestle was built from the head-frame to the stockpile grounds, also a new trestle from head-frame to rock dump. The last year's dumping trestle was rebuilt for a distance of 500 feet and about 200 feet of new trestle added thereto.

An additional area was graded for stockpile ground, necessitating the removal of about 4300 cubic yards of earth. This work was done



WADE MINE  
ANNUAL REPORT  
YEAR 1930

6. SURFACE:  
(Continued)

b. Stockpiles: (Continued)

with a small gasoline shovel and trucks, which were rented by the day.

The cost of preparing additional stockpile ground is as follows:

	<u>Estimated Cost</u>	<u>Actual Expenditures</u>
Grading and Covering,	\$ 4,000.00	\$ 2,924.45

The total capacity of the enlarged stocking ground is about 145,000 tons.

The ore from stockpile during the past season was loaded with a small Marion #36 revolving shovel. A shovel crew from the Alexandria Mine was employed to load the ore.

c. Tracks, Roads, Transmission Lines, etc:

The old approach tracks to the shaft were laid over a portion of the underground ore in the West Deposit. It was, therefore, necessary to construct a new approach grade from the East to the shaft. This work was done by the Great Northern Railway Company, at their own expense, and was completed before the beginning of the shipping season.

Roads:

No new roads were built during the past year. A very small amount of work was done in maintaining old roads about the property. It will be necessary to move the highway, which crosses the Northerly part of the East ore body, during the next two years. It is anticipated that this work will be done by the Village of Kinney.

Drainage:

A small amount of labor was expended in timbering and covering a surface drainage ditch for a distance of about 200 feet. This ditch crosses the mine location.

A large open ditch was excavated between the Wade and Kinney waste dumps. This work was necessitated by the caving of an old wooden culvert between the dumps. The length of this ditch was about 200 feet, with a maximum depth of 23 feet. The work was done by a contractor with a small gasoline shovel and trucks, hired by the day, at a total cost of \$1,189.89.

A transmission line was erected from the sub-station to the hoist house at the timber shaft, at a cost of \$112.08.

7. UNDERGROUND:

a. Shaft Sinking:

A two-compartment timber shaft, located approximately 200 feet Northeast of the main hoisting shaft, was sunk during the past summer. The shaft is two compartments, with outside dimensions 8' x 12', sunk to a depth of 138 feet. It penetrated 100 feet of surface and the

WADE MINE  
ANNUAL REPORT  
YEAR 1930

UNDERGROUND:  
(Continued)

a. Shaft Sinking: (Continued)

lower 38 feet in rock. The station is connected with the 1405 level drift, which is being driven from the shaft to the East Deposit. The shaft sinking was begun on May 17th, and the sinking, including the work of cutting station and crosscut, completed on July 26th. The cost of shaft and cross-cut is as follows:

	Estimated Cost	Actual Expenditures
Shaft Sinking:		
Labor, -----		\$ 2,976.53
Supplies, -----		2,084.05
Total, -----	\$5,000.00	5,060.58
Crosscut, -----	1,200.00	1,184.06
Total, -----	6,200.00	\$ 6,244.64

The purpose of this shaft is to serve operations in the East Deposit, as well as in part of the West Deposit.

b. Development:

The development work of the past year included the completion of the two main haulage drifts on the 1355-ft. level of the West Deposit, known as the North and South haulage ways.

Raises were driven from these drifts and the old central haulage drift, at intervals of about 30 feet, to the elevation of top levels, which varied in different parts of the mine. In the Northwest corner, where the ore extended to the 1420-ft. level, raises were driven to the 1400-ft. level, and the ore was mined through sub-level raises and transferred to the main raises.

In the track pillar area, raises were driven to the 1400-ft. level while in other portions of the mine they ended on the 1388-ft. and below.

A main haulage drift was also driven Eastward a distance of 180 feet from old crosscut No. 2. The purpose of this was to enable us to mine the ore body and avoid the excessive flow of water, which comes from the old raises in the drift to the South.

Development work for opening the East ore body was begun immediately after August 1st. The work since that date has consisted of extending the rock drift on the 1405-ft. level, from the end of the old rock drift which was driven about 440 feet Northeast from the shaft during the period of previous operation.

This drift encountered ore after having been advanced 65 feet from the end of the old drift, and continued in same in an Easterly direction for a distance of 505 feet. The total footage advanced

WADE MINE  
ANNUAL REPORT  
YEAR 1930

UNDERGROUND:  
(Continued)

b. Development: (Continued)

was 717 feet, of which 106 feet is rock, 561 feet ore and 50 feet of mixed ore and surface material. The ore secured in drifting, excepting the fifty feet of mixed ore and sand, was included in the production.

The work progressed very satisfactorily during the early months, but was retarded considerably during the latter months by seepage of water from above. The flows of water, when first encountered, were heavy enough to interfere with the work considerably, but dried up after a comparatively short period of time.

The expenditure on development to December 31st, on East ore body, is as follows:

	<u>E. &amp; A. NO. 597</u>	<u>EXPENDITURES</u> <u>TO DATE</u>
Drifting and Raising,	\$ 29,600.00	\$ 2,583.76
Track Drifting Equipment,	3,000.00	1,782.61
Tracks and Pipe Lines,	2,500.00	1,367.72
Electric Haulage,	8,000.00	2,423.17
Drills and Tugger Hoists,	<u>15,000.00</u>	<u>-</u>
Total, -----	\$ 58,100.00	\$ 8,157.26

c. Stopping:

1420 - 1410' Level:

A narrow body of ore, above the 1400 ft. level, in the Northwest corner of the mine extends along the edge of the open pit a distance of about 150 feet. The top of this ore, above the 1420-ft. level, had been mined during the period of previous underground operation. All of the ore on the 1420-ft. level was mined during the past summer and also a large part of that on the 1410-ft. level. Much difficulty was encountered in mining on account of sand runs, as the old covering had rotted and the ore was over-lain with fine loose sand. Mining progress was retarded on account of the necessity of using great care in approaching the remaining pillars along the crest of the open pit. The transfer of the ore to the main raises necessitated several scraper operations, which retarded production output per man. Toward the close of the year conditions in this area were very much improved.

1400' Level:

The bulk of the ore mined on this level was located in the old track pillar area. The ore was over-lain with loose sand and gravel, which, at times, interfered with mining progress. The entire section at this elevation was mined during the past year.

1388' Level:

Considerable ore had been mined in the Eastern part of this level during previous operation and the entire Western part thereof had been fully developed. The recovery of this developed ore, in

WADE MINE  
ANNUAL REPORT  
YEAR 1930

UNDERGROUND:  
(Continued)

c. Stoping: (Continued)

1388' Level: (Continued)

which the old drifts were practically entirely filled with sand, necessitated the handling of much sand and gravel or waste material, seriously effecting the output per man. All of the ore in the old developed area has been mined on this level.

1376' Level:

No ore was mined on this level during previous operation except in the extreme Southeastern corner of the ore body. In the Southwestern portion of the deposit, stoping operations were begun on this level during the latter part of the year. No obstacles were encountered in the operation.

In the Southeastern extension of the deposit, slicing work was carried on during the latter months of the year. There is a very strong flow of water coming in to this section of the mine, which interferes considerably with mining work. However, through approach from the new development drift mentioned herein-before, fair progress has been made in spite of the fact that more water has been encountered than anticipated when planning this mode of attack.

General:

The underground operations during the past year have been penalized to a considerable extent on account of the restricted area in which operations were possible. Much additional timbering has been necessitated on account of the close proximity of caving areas, causing extraordinary weight to be thrown upon pillars. We anticipate more favorable conditions when development of the East deposit has advanced sufficiently to permit a portion of the output to be derived from that deposit.

OPEN PIT:

A tonnage of ore, estimated at about 1,100 tons, was cleaned up in the bottom of the open pit and trammed into the underground workings during the past summer. The ore was of rather low grade, but was recovered at the insistence of the fee owner's representatives.

During the latter months of the season an effort was made to recover the pillar of ore in the Southeast corner of the open pit, which was mentioned in last year's report. A considerable portion was recovered through milling methods to a drift on the 1376-ft. level. This was satisfactory to the Great Northern Company.

d. Timbering:

The timber used per ton was normal in all classes, except lagging. The re-timbering of old workings necessitated the use of large quantities of lagging.



WADE MINE  
ANNUAL REPORT

Statement of Timber Used.

	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1930	AMOUNT 1929
7" to 9" Timber,	99445	.079	7862.90	
9" to 12" "	65733	.119	7826.14	
Total Timber, 1930 -	165178	.095	15689.04	
Total Timber, 1929 -	-		-	-
		PER 100'		
6' Lagging,	710,790	.764	5430.28	
3" Poles,	340,152	1.25	4251.05	
Cribbing Timber, Framed	18,380	4.70	860.28	
1" Covering Boards, Bd.Ft.	190,900	12.00 M.	2290.80	

---

Product,	160,854
Ft. Timber Per Ton of Ore,	1.026
Ft. Lagging Per Ton of Ore,	4.419
Ft. Lagging Per Ft. of Timber,	4.303
Cost Per Ton for Timber,	.097
Cost Per Ton for Covering Boards,	.014
Cost Per Ton for Lagging,	.034
Cost Per Ton for Poles,	.026
Cost Per Ton for All Timber, etc.,	.177
Cost of Timber, Lagging, Poles, etc., 1930 -	28,521.45

e. Drifting and Raising:

Very little rock drifting was done in the West Deposit during the past year, while the mine was operated on a production basis.

Thirty-seven raises in ore were put up from the main haulage drifts to upper sub-levels of the West Deposit. These raises have a total footage in ore of 1247 feet.

The rock drift on the 1405' level was driven Westward a distance of thirty feet and from that point, on an incline of 33°, to the 1376-ft. level. The total footage of rock in this drift was approximately 100 feet. The estimated cost was \$1,200.00 and the actual expenditure, \$936.81.

f. Explosives, Drilling and Blasting:

The greater part of the ore deposit is comparatively soft so that it can be drilled with jackhammer drills and auger steel. Small areas were encountered, where bands of hard ore, varying in thickness from a few inches to several feet, are prevalent, which necessitated the use of hexagon steel with Star Bits.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

7. UNDERGROUND:  
(Continued)

f. Explosives, Drilling & Blasting: (Continued)

Statement of Explosives Used:

<u>KIND:</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>AMOUNT 1930</u>	<u>AMOUNT 1929</u>
40% Extra Powder, (Lbs.)	108200	11.51 C.	12456.53	
<hr/>				
Total Powder, 1930 -	108200	11.51 C.	12456.53	
Fuse, (Ft.)	314850	.568'	1793.38	
Caps,	70000	11.79 M.	825.30	
Etc. etc.,			17.47	
<hr/>				
Total Fuses, etc., 1930 -			2636.15	
<hr/>				
Total all Explosives, -			15092.68	
<hr/>				
Product,			160,854	
Pounds of Powder Per Ton of Ore,			.672	
Cost Per Ton for Powder,			.0774	
Cost Per Ton for Fuse, Caps., etc.,			.0163	
Cost Per Ton for All Explosives,			.0937	
Average Price Per Pound for Powder, etc.,			.1151	

g. Mining & Loading:

Practically all of the ore mined was transferred from slices to chutes by tuggers and scrapers. Some difficulty was encountered during the early part of the operation on account of scrapers digging trenches in the bottom of transferred drifts. This situation was remedied by laying timbers longitudinally in the bottom of the drift as same was driven. These timbers served to keep a level drift bottom and slide for the scraper and also served as covering when the drift was caved.

i. Ventilation:

The natural circulation of air was sufficient to furnish fairly satisfactory ventilation in the greater part of the mine. Certain areas where entrance to pillars was through one raise entry only, artificial circulation was obtained by the installation of small electric-driven 1/2 H.P. Vano Blowers.

Ventilation in the development drift to the East ore deposit was obtained by the installation of a 10 H.P. direct connected blower located near the timber shaft and Vent-tube installed to the breast of the drift.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

8. COST OF OPERATION:

a. Comparative Mining Costs:

<u>PRODUCT:</u>	<u>1930</u>	<u>Estimate</u>	<u>Increase</u>	<u>Decrease</u>
	160,854			
Average Daily Product,	559	612		53
Tons Per Man Per Day,	5.44		5.44	
Days Operating,	288	308		20
Budget Estimated Production,		187,000		26,146
Budget Estimated Cost At Mine,		1,820	.217	
 <u>COST:</u>				
Total Cost at Mine:				
Underground Costs,	1.325	1.263	.062	
Surface Costs,	.117	.084	.033	
General Mine Expense,	.171	.106	.065	
Cost of Production,	1.613	1.453	.160	
Loading & Shipping:				
Steam Shovel,	.008	-		
Pocket,	.015	-		
Total Loading & Shipping,	.023	.018	.005	
Re-opening Mine,	.092	.084	.008	
Depreciation - Plant &				
Equipment-	.018)	.025	.005	
- Development-	.012)			
- Movable				
Equipment-	.006		.006	
Taxes - Ad Valorem,	.240	.158	.082	
- Occupational,	.015	.033		.018
- Royalty,	.018	.030		.012
Total Cost At Mine,	2.037	1.801	.236	
Miscellaneous Debits & Credits,		.019		.019
TOTAL COST,	2.037	1.820	.217	

b. Detailed Cost Comparison:

(1) Production:

The total ore mined was 26,146 tons less than the estimated production. This was due to the large amount of non-productive work necessary in mining the areas which were developed during previous operation.

(2) Underground Costs:

Underground costs show an increase of .062 over estimated expenditures. This is accounted for in development and stoping .08, and superintendence .023, with a decrease of .041 in tramming. The increase for superintendence is due to smaller production per day and the employment of two shift bosses instead of one as anticipated in the estimate. The decrease in tramming is due to the charging of a part of tramming labor to handling timber or timbering.

(3) Surface:

Surface expense shows an increase of .033. This is accounted for in most part, by maintenance top tram equipment .003, docks, trestles and pockets .022 and mine buildings .004.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

8. COST OF  
OPERATION:  
(Continued)

b. Detailed Cost of Comparison: (Continued)

(3) Surface: (Continued)

New trestles were built, the necessity of which did not become apparent, until weaknesses and inadequacy of the old trestles were disclosed when put into service.

The increase in surface expenditure was also due to some extent, to reduced production.

(4) General Mine Expense:

The increase in General Mine Expense is due, in most part, to Mining Engineering .022 and Mine Office .033.

More mining engineering was required due to the necessary enlargement of stockpile ground, and preliminary work for the development of the East ore deposit.

At the time the estimate was made no charge for superintendence was anticipated in Mine Office Expense.

(5) Loading & Shipping:

The loading and shipping shows an increase of .005 as no provision for stockpile loading expense was made in the budget estimated cost.

(6) Re-opening Mine:

The increase of .008 is due to a revised estimate of the tonnage against which this charge is to be made.

(7) Depreciation:

The increase of .005 in Plant & Equipment and Development is due to the decrease in total production for the year. The increase of .006 in Movable Equipment covers the purchase of equipment which was not anticipated in the estimate.

(8) Taxes:

The increase of .082 in Ad Valorem taxes is due to an increase of .0201 in the tax rate and reduced production.

10. TAXES:

Tax Statement:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
Wade Mine, -----	\$ 31,784.60	\$ 33,546.70		\$1,762.10
Personal Property, -	<u>6,776.37</u>	<u>871.96</u>	<u>\$5,904.41</u>	
Total,	\$ 38,560.97	\$ 34,418.66	\$4,142.31	

The large increase in personal property is due to stockpile ore. There was no stockpile in 1929.



WADE MINE  
ANNUAL REPORT  
YEAR 1930

11. ACCIDENTS  
AND  
PERSONAL  
INJURY

The following statement shows the number of accidents and total lost time during the past year.

NAME: Hugo Jackola DATE: Mar. 27, 1930.  
CAUSE: Jackola was spotting a car under a chute. The car started to move forward after being uncoupled as the block was placed upon a slippery rail. Jackola attempted to hold the car by bracing his knee against it and thereby turned his ankle.  
NATURE: Sprained ankle of right foot and traumatic bursitis.  
TIME LOST: Returned to work April 28, 1930. Laid off thirty-one days.

NAME: Eli Karakis DATE: Apr. 4, 1930.  
CAUSE: Karakis, a miner, while walking around a tigger slipped and fell striking his hand on a chunk of hard ore.  
NATURE: Cut of left hand behind the third joint of fourth finger.  
TIME LOST: Returned to work April 9, 1930. Off four days.

NAME: Carmilo Springhetti DATE: Aug. 28, 1930.  
CAUSE: Springhetti, a miner, while engaged in setting up a post, was struck by some loose ore which fell from the side of the drift. He fell and struck a piece of timber lying in the drift.  
NATURE: Injury to the body on right side below the ribs.  
TIME LOST: Returned to work Sept. 8, 1930. Laid off ten days.

NAME: William Sandvik DATE: Aug. 5, 1930.  
CAUSE: Sandvik, a miner, engaged in timbering the bottom of the timber shaft. In moving a ladder, it struck a block lying upon the timbers above, which fell and struck his head and arm.  
NATURE: Fracture of right radius at junction of upper and middle thirds.  
TIME LOST: Finished shift. Off for several days and returned and worked August 26, 1930, and was discharged.

NAME: Richard Richards DATE: Dec. 29, 1930.  
CAUSE: Richards was engaged in loading a car at chute. He stood upon the car and his foot was struck by a chunk of ore.  
NATURE: Crushing injury to distal phalanx of right great toe including fracture and laceration. (Nail torn off).  
TIME LOST: Still home, January 1, 1931.

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION:

New construction work completed during the past year included the erection of a head frame over the new timber shaft and two trestles extending from the hoisting shaft to the stockpile ground, and to the rock pile. No new construction work is anticipated, at this time, for the coming year.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

13. EQUIPMENT AND  
PROPOSED  
EQUIPMENT:

The equipment purchased during 1930 for the Wade Mine is as follows:

1 - Caterpillar Tractor,	\$ 1200.00
3 - 7½ H.P. Sullivan Electric Double Drum Tuggers,	2355.00
1 - 6 Ton G.E. Haulage Motor, ( From Boeing Mine),	1750.00
1 - Timber Shaft Electric Hoist, ( From Boeing Mine),	700.00
2 - Coppus Vano Blowers,	270.00
2 - Ingersoll-Rand, S-70 Rock Drills,	850.00
2 - Drill Bars,	184.00

One 15 H.P. Sullivan Double Drum Tuggers was sold to the Alexandria Mine for \$1171.50.

14. MAINTENANCE  
& REPAIRS:

Some repairs were made to the timbering in the hoisting shaft. New lathe was put in to replace broken planks and some reinforcing stuttles were put in.

Both plates and stuttles show considerable rot, in places, and some replacements may be necessary during the coming year.

15. POWER:

Electric power is furnished by the Minnesota Power & Light Company. There was no shortage of power at any time throughout the year.

16. WATER  
SUPPLY:

The water supply for the surface plant and location is pumped from the main drift in the southeast corner of the West ore deposit. There was an ample supply of water during practically all of the year.

17. CONDITION  
OF  
PREMISES:

Much clean-up work on the premises was necessary during the past year, as there was considerable obsolete equipment and debris which had accumulated during the period of idleness of the mine. No work was done except such as was absolutely necessary. The painting of the mine buildings and four location houses has added materially to the appearance of the premises.

WADE MINE  
ANNUAL REPORT  
YEAR 1930

18. NATIONALITY  
OF  
EMPLOYEES:

<u>NATIONALITY</u>	<u>NO. OF MEN</u> <u>1930</u>
American, .....	8
English, .....	6
Finnish, .....	40
Austrian, .....	33
Italian, .....	14
Serbian, .....	6
Montenegrins, .....	4
Polish, .....	<u>7</u>
Total, .....	118

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

1. GENERAL:

Ore operations were started on May 1st and completed September 29th. This work was begun a week later than in 1929 and closed one day later.

The general results of the season's operations were less favorable than in 1929, due to the fact that more work was done in the rocky areas in the bottom of the Hill pit. One shovel operated the entire season in the Hill rocky wash area and a second shovel was employed here during the latter part of the season. Operations were interfered with to some extent during the latter part of the season on account of a shortage of Great Northern Railway cars.

The seasons tonnage was reduced from 480,000 to 400,000 tons, as the result of curtailment on the part of the consuming interests.

The operations in the Trumbull pit were largely confined to Area "F" on the South side. Some ore was mined from Area "D", which is located on the North side of the Trumbull pit. Operations at the West end of this area disclosed a very poor grade of ore and only a part of this material could be handled.

In the Hill pit, the direct ore was mined from Area "A" and two small scam deposits. The wash ore was obtained from three rocky areas - "B", "C" and "G", and a small tonnage was mined in connection with the direct ore. The East end of the cuts in Area "B" were very rocky and the balance of the material in this area was about as expected, the rock deduction running from 35% to 50%. Area "C" contained considerable rock, but the operation was as favorable as had been anticipated and the tonnage obtained was in excess of the estimated figure. Area "G" was extremely rocky and the ore obtained here was less than anticipated.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production by Grades:

Hill Crude Ore, -----	140,973 tons.
Trumbull Crude Ore, -----	361,315 "
Total Crude Ore, -----	502,288 "
Hill Bessemer Direct Shipping Ore, -----	182 "
Hill Non-Bess. Direct Shipping Ore, -----	55,090 "
Hill Bessemer Concentrates, -----	80,229 "
Hill Non-Bessemer Concentrates, -----	7,716 "
Trumbull Non-Bessemer Direct Shipping Ore, ---	12,319 "
Trumbull Bessemer Concentrates, -----	22,944 "
Trumbull Non-Bessemer Concentrates, -----	224,118 "
TOTAL SHIPPING GRADE, -----	402,598 "

b. Shipments:

The shipments from the Hill-Trumbull Mine during 1930 was the tonnage shown under the production statement, as all ore mined was forwarded to Lake Erie ports.



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:  
(Continued)

c. Stockpile Inventories:

No merchantable ore, either concentrates or direct, was stockpiled at the Hill-Trumbull property during 1930, but the following lean non-wash material was placed in stock:

Concentrating Material Above 25%:

	<u>Tons</u>	<u>Fe.</u>	<u>Phos.</u>	<u>Silica</u>
Trumbull, -----	114,385	27.82	.034	53.70
Hill, -----	12,991	27.50	.035	50.82

Non-Concentrating Material Above 35%:

Hill, -----	22,375	48.31	.096	19.69
-------------	--------	-------	------	-------

Non-Concentrating Material Above 40%:

	<u>Tons</u>	<u>Fe.</u>	<u>Phos.</u>	<u>Silica</u>
Hill (1921 Stockpile)	282	41.81	.033	35.63
Hill (1920 Stockpile)	7,245	32.90	.028	43.65

e. Production by Months:

(1) Crude Ore:

<u>MONTH</u>	<u>HILL</u>	<u>TRUMBULL</u>	<u>TOTAL</u>
May, -----	15,284	104,862	120,146
June, -----	17,653	93,591	111,244
July, -----	24,522	74,534	99,056
August, -----	39,572	26,145	65,717
September, -----	43,942	62,183	106,125
TOTAL - 1930, -----	140,973	361,315	502,288
TOTAL - 1929, -----	293,405	358,501	651,906

(2) Concentrates and Direct Ore:

<u>MONTH</u>	<u>HILL</u> <u>DIRECT</u>	<u>TRUMBULL</u> <u>DIRECT</u>	<u>HILL</u> <u>CONCTS.</u>	<u>TRUMBULL</u> <u>CONCTS.</u>	<u>GRAND</u> <u>TOTAL</u>
May, -----	3,011	6,347	8,902	72,070	90,330
June, -----	8,072	3,527	10,416	64,933	86,948
July, -----	11,075	66	15,122	49,573	75,836
August, -----	8,197	1,891	25,729	19,285	55,102
September, ----	24,768	487	27,442	41,111	93,808
Oct. (Adjustment)	149	1	334	90	574
TOTAL - 1930, -	55,272	12,319	87,945	247,062	402,598
TOTAL - 1929, -	77,411	33,270	171,005	240,159	521,845

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:  
(Continued)

f. Ore Statement:

All material considered as ore that was mined during 1930, was shipped from the property.

g. Delays:

The following delays were reported during the year 1930:

Pit Delays:

<u>DATE</u>	<u>HOURS LOST</u>	<u>CAUSE</u>
May 20th,	30 Min.	Broken shovel cable.
November 17th,	4 Hrs. -	Broken crankshaft on Shovel #28

Washing Plant Delays:

May 2nd,	1 Hr. -	Adjusting vibrating screens.
May 19th,	1 Hr. -	Adjusting classifiers.
May 20th,	- 50 Min.	Classifiers plugged.
June 2nd,	1 Hr. -	No power
June 9th,	- 30 Min.	Classifiers plugged.
June 20th,	- 50 Min.	North Log plugged.
July 9th,	- 10 Min.	No power
July 26th,	- 40 Min.	No power.
August 7th,	2 Hrs. -	Repairing 20" Pipe Line.
August 22nd,	- 45 Min.	No power
September 10th,	- 15 Min.	No power.
September 12th,	4 Hrs. 15 Min.	Repairing coil on Solenoid Brake to Conveyor.
September 22nd,	1 Hr. 50 Min,	Classifiers plugged.

Delays Account no Cars:

A total delay of 59 hours - 28 minutes, on account of not being furnished with Great Northern Railway cars, was suffered during the shipping season of 1930. These delays were largely the result of Great Northern dock congestion and occurred, for the most part, during the latter part of the season. The car delay during 1930 compares with 25 hours - 20 minutes during 1929.

Delays to Stripping:

<u>DATE</u>	<u>HOURS LOST</u>	<u>CAUSE</u>
October 14th,	5 Hrs. 30 Min.	Broken arch bar on Shovel #26.
November 19th,	4 Hrs. -	Broken crankshaft on the swinging engine of Shovel #28.
November 25th,	1 Hr. 30 Min.	Broken pipe lines.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

3. ANALYSIS:a. Mine Analysis of Production and Shipments:

	<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
Hill Bessemer Direct,		182	60.60	.021	10.91	8.00	
Hill Non-Bess. Direct,		55,090	56.02	.068	11.98	7.51	
Hill Bess. Concts.,		80,229	60.91	.033	9.71	5.54	
Hill Non-Bess. Concts.		7,716	56.69	.073	12.86	6.63	
Trumbull Non-Bess. Direct,		12,319	56.13	.056	12.81	7.93	
Trumbull Bess. Concts.		22,944	59.32	.045	7.59	6.47	
Trumbull Non-Bess. Concts.		224,118	59.16	.055	7.20	5.52	
TOTAL - 1930 -----		402,598	58.94	.052	8.66	5.94	
TOTAL - 1929 -----		521,845	58.79	.049	8.87	7.45	54.41

b. Average Analysis on Straight Cargoes:

<u>Mine Analysis-----</u>					<u>-----Lake Erie Analysis-----</u>				
<u>Grade</u>	<u>Iron</u>	<u>Moist.</u>	<u>Phos.</u>	<u>Fe.Nat.</u>	<u>Grade</u>	<u>Iron</u>	<u>Moist.</u>	<u>Phos.</u>	<u>Fe.Nat.</u>
McCook	57.15	8.34	.073	52.38	McCook	57.29	7.78	-	52.83
Hill Bess.	59.93	6.78	.037	55.87	Hill Bess.	59.49	6.85	.038	55.41
(C.C.I.Co)									
Hill Bess. (Butler Bros.)	59.40	7.70	.036	54.83	-	-	-	-	-

d. Average Analysis of Crude Ore Production:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Hill Crude, -----	140,973	44.97	.028	32.35
Trumbull Crude, -----	361,315	41.88	.041	33.24
TOTAL - 1930, -----	502,288	42.75	.037	32.99
TOTAL - 1929, -----	651,906	41.93	.035	33.08

e. Composite Analysis of Season's Shipments:

<u>Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mn.</u>	<u>Alu.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss.</u>
Hill Bess. Direct.	60.60	.021	10.71	.19	.20	.19	.10	.030	2.00
" Non-Bess. "	55.90	.073	12.45	.19	2.34	.31	.23	.090	4.48
Hill Bess. Concts.	60.80	.035	9.75	.20	.33	.23	.22	.014	2.50
" Non-Bess. "	56.70	.072	13.00	.22	1.16	.28	.23	.016	4.03
Trumbull N. B. Direct,	55.95	.055	12.95	.16	.63	.21	.19	.012	5.72
" Bess. Concts.	59.51	.045	7.30	.18	.46	.20	.20	.013	6.67
" Non-Bess. "	59.07	.055	7.33	.18	.41	.20	.19	.015	7.20

The analysis of the ore shipped during 1930 was in line with our anticipation. The average analysis of all the ore shipped from the Hill-Trumbull Mine during 1930 was 58.94 Iron, with an 8.66 Silica, as compared with the 1929 shipments showing 58.79 Iron and 8.87 Silica. These 1930 results were especially gratifying in view of the fact that so much rocky wash material was handled.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF  
ORE RESERVES:

a. Developed Ore:

Assumption: 13 cu. ft. per ton for Direct Ore.

17 cu. ft. per ton for Wash Ore.

A rock deduction of 10 per cent was made in the case of the Direct Shipping and Wash Ore and 35 per cent for the Rocky Wash. Concentrates are figured on 65 per cent gross recovery.

Hill Bessemer Direct Shipping Ore, -----	636,000	tons.
Hill Non-Bessemer Direct Shipping Ore, -----	1,143,932	"
Hill Bessemer Concentrates, -----	328,835	"
Hill Non-Bessemer Concentrates, -----	456,065	"
TOTAL HILL ORE, -----	2,564,832	
Trumbull Bessemer Direct Shipping Ore, -----	85,000	"
Trumbull Non-Bessemer Direct Shipping Ore, -----	206,411	"
Trumbull Bessemer Concentrates, -----	2,283,929	"
Trumbull Non-Bessemer Concentrates, -----	694,596	"
TOTAL TRUMBULL ORE, -----	3,269,936	"
GRAND TOTAL HILL AND TRUMBULL ORE -----	5,834,768	"

The ore estimate of January 1st, 1931 is based on deducting the 1930 shipments for the various grades from the estimate of January 1, 1930.

No drilling or deep test-pitting was done in either the Hill or Trumbull pits during 1930 and therefore no exploratory work was carried on other than for the purpose of determining the grade of the ore in the areas to be mined.

Operations in the Trumbull pit were in line with our expectations and demonstrated that the factors used were correct. In the case of the Hill ore operations, the rock deduction factors used in some cases were too low and in others too high, one off-setting the other and for this reason no change is made from the estimate of January 1, 1930, other than the deduction of shipments.

b. Prospective Ore:

The drilling of the land to the North of the Hill pit in the vicinity of the taconite island, will no doubt show up an additional tonnage of concentrating ore. Test-pits put down along the ore limits of the pit in 1925 indicated that the ore makes back beyond the stripping banks and a few old scattered drill holes confirm this. From the standpoint of taxes, it has not been advisable to conduct any drilling in this locality, but the time is approaching when we should ascertain the possible extension of our open pit limits and the character of the ore, so that plans can be made to work in this ore so as to obtain a satisfactory mixture in our grades from year to year. This matter will be given special attention and a report made thereon during the present year.



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF  
ORE RESERVES:  
(Continued)

c. Estimated Analysis:

<u>Hill Mine:</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Fe.Nat.</u>
Bessemer Direct Shipping,	636,000	58.00	.045	13.00	53.36
Non-Bess. Direct Shipping,	1,143,932	58.00	.055	13.00	55.36
Bessemer Concentrates,	328,835	59.50	.045	8.50	55.04
Non-Bess. Concentrates,	456,065	60.00	.059	7.50	55.50
<b>TOTAL HILL ORE, -----</b>	<b>2,564,832</b>	<b>58.57</b>	<b>.052</b>	<b>11.38</b>	<b>54.87</b>
 <u>Trumbull Mine:</u>					
Bessemer Direct Shipping,	85,000	56.40	.040	12.79	51.32
Non-Bess. Direct Shipping,	206,411	58.04	.060	9.85	52.82
Bessemer Concentrates,	2,283,929	59.00	.043	9.00	54.57
Non-Bess. Concentrates,	694,596	59.00	.080	9.00	54.57
<b>TOTAL TRUMBULL ORE, -----</b>	<b>3,269,936</b>	<b>58.88</b>	<b>.054</b>	<b>9.14</b>	<b>54.38</b>
<b>GRAND TOTAL HILL-TRUMBULL,</b>	<b>5,834,768</b>	<b>58.74</b>	<b>.053</b>	<b>10.11</b>	<b>54.59</b>

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Labor of all kinds was plentiful during 1930. There was no change made in the wage schedule during the year.

(2) New Construction:

New construction work undertaken during the year 1930 consisted in the installation of classifiers and secondary crushers in the washing plant; the erection and equipping of a Quick Laboratory; the placing of a sprinkler system to care for the dust from the tailings basin and the drilling of a well for fresh water at the washing plant.

b. Comparative Statement of Wages and Product:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
PRODUCT, -----	402,598	521,845		119,247
No. Shifts & Hours, -----	1 - 10	1 - 10	-	-
Avg. No. of Men Working, -	130	130	-	-
Avg. Wages Per Day, -----	\$5.18	\$5.20	-	.02
Product Per Man Per Day, -	24.04	25.68		1.64
Labor Cost Per Ton, -----	.2154	.2024	.0130	-
Total No. of Days, -----	16745 $\frac{1}{2}$	20322 $\frac{1}{2}$		3577
Amount Paid for Labor,	\$86,718.85	\$105,614.13		\$18,895.28

In 1923 - Production from May 5th to October 3rd.  
 1924 - " " April 26th to September 13th.  
 1925 - " " April 25th to October 6th.  
 1926 - " " May 7th to October 9th.  
 1927 - " " April 25th to October 12th.  
 1928 - " " May 7th to September 26th.  
 1929 - " " April 22nd to September 28th.  
 1930 - " " May 1st to September 29th.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

5. LABOR & WAGES:  
(Continued)

b. Comparative Statement of Wages and Product: (Continued)

In order to furnish cargoes to accommodate boats, it was necessary to operate over-time during the season of 1930 in the amount of 1,323 hours in the pit and 1,378 hours at the washing plant. Considerable more over-time was worked in 1930 than in 1929, even with the smaller production, but this was due entirely to the slow operations resulting from the handling of the rocky wash ores in the Hill pit.

6. SURFACE:

a. Buildings, Repairs:

The concrete floors in the shops were repaired and the brick wall of the round-house was replaced with concrete as high as the window ledge. The bricks in the round-house wall had disintegrated to quite an extent as the result of frost conditions.

The furnace in house No. 6 was over-hauled.

c. Tracks, Roads, Transmission Lines:

The track crew started work on April 3rd. The loading tracks in the pit were put in shape for the ore season and new ties were placed where necessary in the approach and main line tracks. During the ore season the track crew were engaged in shifting the loading tracks, keeping up the dump tracks and doing such maintenance work as was necessary on the main lines.

At the beginning of the stripping operations in October, loading tracks were laid for the Hill clean-up job and for the stripping operations in the Trumbull pit to the East of the approach. The dump tracks were put in shape for the handling of stripping and lean ore material.

The track grade in to the Hill merchantable ore area was completed during the spring and a track was laid here for ore loading.

7. OPEN PIT:

a. Stripping:

Upon the closing of the ore season on September 29th, a loading track was laid for clean-up operations in the Southeast corner of the Hill pit and the dump tracks were put in shape for the disposal of waste material.

On October 6th, shovel #26 started loading out the material that had been cast along the Southeast corner of the Hill pit in connection with clean-up work, and grading in to the direct ore area. Three cuts were taken by shovel #26 and the small revolving shovel completed the cleaning out of corners. The job was finished on October 28th.

A total of 23,244 cubic yards of dirt and 546 cubic yards of Hill wash ore were handled in connection with the clean-up operations. The wash ore was dumped back into the pit to be picked up later.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

a. Stripping: (Continued)

The 350-ton shovel started stripping in the Trumbull area to the East of the approach on October 28th. The old track bench was removed by November 7th, completing the surface stripping in this area and the shovel was then moved to the North edge of the pit bank and began cleaning the ore on November 10th. The first cut was taken on a down-grade of 1.6% in order to obtain a 15 foot depth at the East line of the property. The cut was continued on to the Hill to provide for a tail track. This job was completed on November 21st. The shovel was moved back to the Trumbull line and started the second cut, progressing Westward. This cut was taken on a level grade in order to affect the most satisfactory separation of the several materials encountered, which were wash ore, lean ore and waste. The second cut was finished December 19th and the shovel then operated on a third cut, going down on a 2% grade. The shovel had progressed Eastward about a quarter of the cut when operations were suspended on December 24th. Such wash ore as was encountered in these operations was cast over the high Trumbull bank to be picked up in connection with regular ore operations in the bottom of the pit when they are resumed at this point.

The material handled in connection with the stripping operations in the Trumbull area follows:

	<u>YARDS</u> <u>STRIPPING</u>	<u>YARDS</u> <u>WASTE</u>	<u>YARDS</u> <u>LEAN ORE</u>	<u>YARDS</u> <u>TOTAL</u>
Hill,	-	3,510	-	3,510
Trumbull,	20,618	68,060	6,240	94,918
Total,	20,618	71,570	6,240	98,428

Due to the fact that the 1931 shipments from the Hill-Trumbull properties are to be reduced, it will not be necessary to mine any Trumbull ore to the East of the approach. For this reason stripping operations in the lean ore area here will not be resumed until the completion of the 1931 ore season. It is the intention to place this area in shape for mining during 1932.

d. Timbering:

Statement of Railroad Ties Used:

<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
5,674	8,504	-	2,830

Fewer ties were used in 1930 as less replacements were necessary on the main line and approach tracks.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT  
(Continued)

f. Explosives, Drilling and Blasting:

Statement of Explosives Used:

<u>KIND</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>AMOUNT 1930</u>	<u>AMOUNT 1929</u>
25% Hercules, -----	-	-	-	11.65
40% Hercules, -----	550	.1157	63.63	47.01
40% Gelatine, -----	-	-	-	774.00
60% Gelatine, -----	850	.1275	108.38	240.62
Hercomite #2 & #4 (Sticks)---	9,500	.1252	1,189.73	63.75
Hercomite Bag, -----	107,750	.1262	13,599.38	14,158.86
Total Powder, -----	118,650	.1261	14,961.12	15,295.89
Fuse, -----	3,300	.0062	20.58	14.37
Caps, -----	2,000	.0117	23.31	17.38
Electric Exploders, -----	3,250	.1018	330.69	320.53
Connecting Wire, -----	44	.4032	17.74	16.02
Crimpers, -----	-	-	-	.50
Total Caps, etc., -----			392.32	368.80
<b>TOTAL EXPLOSIVES, -----</b>			<b>15,353.44</b>	<b>15,664.69</b>

	<u>1930</u>	<u>1930</u>	<u>1929</u>	<u>1929</u>
	<u>CRUDE</u>	<u>CONCTS.</u>	<u>CRUDE</u>	<u>CONCTS.</u>
	<u>&amp;</u>	<u>&amp;</u>	<u>&amp;</u>	<u>&amp;</u>
	<u>DIRECT</u>	<u>DIRECT</u>	<u>DIRECT</u>	<u>DIRECT.</u>
Product, -----	569,879	402,598	762,587	521,845
Lbs. Powder per Ton of Ore-	.2082	.2947	.1577	.2304
Cost Per Ton for Powder,---	.0263	.0372	.0201	.0293
Cost Per Ton for Caps, Etc.-	.0007	.0010	.0005	.0007
Cost Per Ton All Explosives	.0269	.0381	.0205	.0300
Avq. Cost per Lb. for Powder	.1261	.1261	.1272	.1272

Commenced operations May 1st, 1930; suspended operations  
September 29th, 1930.

g. Open Pit Mining & Loading:

Wash Ore:

The new Armstrong drill was taken into the Hill rocky wash ore area on April 7th and the Cyclone drill was moved to the Trumbull pit on April 8th. Operations were started with these two drills the first of May and this work continued throughout the ore season.

The electric shovel #34 started loading in the Trumbull Area "F" the first of May. This machine completed three cuts and had taken approximately one-half of a fourth cut during the ore season. This shovel was worked steadily during May, June and July. In August and September operations here were somewhat intermittent, as it was necessary to force the Hill production to get as much bessemer ore as



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT  
(Continued)

g. Open Pit Mining & Loading: (Continued)

Wash Ore (Continued)

possible and to work out the Hill areas agreed upon with the Great Northern Company. During the latter part of the season some low grade ore was obtained from the West end of Area "D".

The ore mined in Area "F" during 1930 was of a general good grade, although the West end of the cuts were somewhat lean. Direct ore was encountered about the middle of the cuts.

Shovel #27 started loading lean wash ore from the West end of Area "D" at the beginning of the season. The material here was of quite low grade and it was necessary to do some sorting in order to obtain a concentrate that could be carried in the McCook mixture. On May 22nd this shovel was moved to the Easterly part of Area "D" and cut in to a high grade ore. This was done to sweeten the material at that time being mined by shovel #34 at the West end of Area "F". The #27 machine was moved back to the West end of Area "D" on June 7th and loaded out some lean ore, in connection with the wash ore operations. The shovel was moved back and forth several times between the East and West ends of Area "D" as grading conditions demanded.

Bank samples were taken at the West end of Area "D" and these showed that a large percentage of the material was not of washable character. Operations were discontinued here and the #27 shovel was moved to Hill Area "G" on August 5th.

The operations in Area "G" were very slow due to the large quantity of rock encountered. The #27 shovel was operated here on night shifts for the most part, excepting when good ore pockets were encountered. The first cut was completed on September 12th and the machine was engaged in the second cut at the end of the season.

Shovel #26 began loading operations in Hill Area "B" on May 1st. A part of a cut remaining from the 1929 operations, was finished by May 19th. A second cut was started in Area "C" and carried in to Area "B" and was finished on July 1st. The third and last cut taken here was completed on July 19th. The material in Area "B" was very rocky and progress was extremely slow.

On the completion of the last cut in Area "B", shovel #26 was turned around and started a cut in Area "C". This cut was begun on July 20th and was completed August 14th. The shovel was again turned around and started back in a third cut August 15th. The third cut was finished September 4th and a short fourth cut completed by September 24th. This shovel was engaged in a short fifth cut at the end of the season.

The ore from Area "C", although somewhat mixed with rock, afforded a better operation than we had anticipated and a high grade concentrate was secured from a treatment of the ore.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

g. Open Pit Mining & Loading: (Continued)

Wash Ore: (Continued)

Shovel #19 loaded some wash ore, while finishing the grade to the Hill direct ore area. This work was finished on May 17th.

Shovel #22 loaded some wash ore from Hill Area "A" during the latter part of August and early in September.

Direct Ore:

Shovel #19 started work on the track grade leading to the Hill direct ore area on May 1st and finished this job on May 17th.

Shovel #22 started loading Hill direct ore on May 5th and was engaged in this locality in handling direct ore, lean cretaceous ore and a small quantity of wash ore throughout the season. Four cuts were taken here during the season and a fifth cut was started, when operations were suspended.

Two small scam areas of direct ore at the East end of the Hill pit were cleaned up during the year. One of these scams was worked by hand but the larger one was cleaned up by the small revolving shovel #19.

Shovels Nos. 27 and 34 loaded out some Trumbull direct ore in connection with the wash ore operations in Areas "D" and "F". Shovel #26 loaded a small quantity of Hill direct ore in connection with wash ore operations in Area "C".

Lean & Waste Ore:

Shovel #27 loaded lean ore from the West end of Area "D" in connection with wash ore operations.

Shovel #22 removed lean cretaceous ore, which occurred as a capping over the direct ore Area "A".

The 350-ton shovel loaded out some lean and waste ore in connection with the stripping operations in the Trumbull pit to the East of the approach.

k. Water Level in the Pit:

The Layne & Bowler pump was operated on night shifts only during the past year. The pit was kept drained and so far as our knowledge goes, the water level has been carried down well below the bottom of the Trumbull pit.

The water was drained from the bottom of the Hill pit, due to the operations of our Layne & Bowler pump and the Hill-Annex Company's pumping and it was not necessary to operate our raft pump, located in the bottom of the Hill pit, during the past year.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

3. COST OF OPERATION:

a. Comparative Mining Costs:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
<u>PRODUCT:</u>				
Direct Shipping, -----	67,591	110,681		43,090
Concentrates, -----	335,007	411,164		76,157
Total Production, -----	402,598	521,845		119,247
Avg. Daily Product, -----	3,121	3,781		660
Tons Per Man Per Day, -----	22.20	25.68		3.48
Days Operated, -----	129	138		9
Budget, Estimated Production, -----	480,000	500,000		20,000
Budget, Estimated Cost at Mine	1.474	1,474	-	-

COST:

Total Cost at Mine:

Open Pit Direct Shipping Ore,	.133	.136		.003
Open Pit Wash Ore, -----	.409	.363	.046	-
Concentrating, -----	.203	.166	.037	-
General Expense, -----	.164	.118	.046	-
Cost of Production, -----	.696	.565	.131	-
Depreciation, Plant & Equipt.	.200	.200	-	-
Depreciation, Movable Equipt.	.001	.001	-	-
Taxes - Ad Valorem, -----	.240	.059	.181	-
" - Occupational, -----	.045	.048	-	.003
" - Royalty, -----	.056	.056	-	-
Amortization, Stripping, -----	.350	.400	-	.050
Total Cost at Mine,	1.588	1.329	.259	-
Administrative & Genl. Expense	.131	.109	.022	-
Miscellaneous Income, -----	.031	.004		.035
Total Cost at Mine, -----	1.688	1.442	.246	-

d. Detailed Cost Comparison:

(1) Product:

There was a decrease of 43,090 tons in the Direct Ore produced in 1930, as compared with 1929 and a decrease of 76,157 tons in the Concentrates for 1930 as against those in 1929. This makes a total decrease in the shipments from the property during 1930 of 119,247 tons. This decided decrease in the production affects considerably all the fixed charges for the Hill-Trumbull Mine.

The average daily output was 660 tons per day less in 1930 than in 1929. This was due to the greater amount of rocky material handled during 1930.

The budget estimated cost for 1930 was \$1.474 as compared with a cost of \$1.688 secured in the year's operation, or an increase of \$.214 over the budget figure. The two factors entering into this increase over the budget figures are - first: an increase of \$.18 per ton for Ad Valorem taxes, over what we had anticipated and - second: the curtailment in the estimated production from 480,000 to 400,000 tons.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

B. COST OF  
OPERATION:

d. Detailed Cost Comparison: (Continued)

(2) Direct Ore Costs:

The cost per ton for producing the Direct Ore in 1930 was \$.003 per ton under that for 1929. This was due to less track work being charged directly to Direct Ore operations in 1930.

(3) Wash Ore Costs:

The wash ore costs were \$.046 per ton higher in 1930 than in 1929. This was due entirely to the fact that operations were conducted to a considerably larger extent in rocky wash material during the latter year. A number of isolated rocky areas were cleaned up in 1930 at a comparatively high cost. We do not anticipate that there will be, for a number of years, as much work done in any one season in rocky wash material as there was in 1930.

(4) Concentrating:

The increase of \$.037 per ton in the Concentrating costs for 1930, as compared with those in 1929, is explained by the fact that the material treated in 1930 contained considerably more rock, with the result that mill operations were slowed down and additional labor was required in sorting out the waste material. As explained under "Wash Ore", we do not intend to put through as large a proportion of rocky wash material in future seasons and the Concentrating cost for the next several years should be more in line than that obtained in 1929.

(5) General Expense:

The cost for General Expense in 1930 was \$.046 per ton higher than for 1929. The curtailment from 480,000 to 400,000 tons increased this cost decidedly and compared with an output of almost 522,000 tons in 1929, explains the increased cost per ton as between the two years.

(6) Miscellaneous Group:

The 1930 Ad Valorem taxes were raised considerably as the result of a re-estimating of the tonnage in the Trumbull property on the part of the Tax Commission's engineers. The Ad Valorem taxes in 1929 were adjusted, as the result of a large reduction in the tonnage estimate of the Hill Mine by the Tax Commission, affecting the taxes set up in the 1929 accounts. The result of the adjustment in 1929 and the decided increase in the 1930 taxes, resulted in an increased cost per ton under this caption of \$.181.

The Occupational taxes for 1930 showed a decrease of \$.003 as the 1930 profits were less than those of 1929 on account of higher costs prevailing in 1930.

The account - "Amortization of Stripping" was arbitrarily reduced from \$.40, used in 1929, to \$.35 in 1930. This was the result of estimates made, which showed that the stripping account at the Hill-Trumbull Mine would be amortized by the charging of 35¢ per ton.



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

b. COST OF OPERATION:

d. Detailed Cost Comparison: (Continued)

(6) Miscellaneous Group: (Continued)

In 1930 "Winter Expense" was charged to the various accounts and was carried as a special item. This resulted in increasing the charges to the various accounts, which absorbed the winter expense, in 1930.

The Cleveland Office items showed an increase in 1930 of \$.022 per ton as the result of larger charges being made against the Hill-Trumbull Mine for that year and this had to be absorbed by 119,247 less tonnage.

There was a decrease of \$.035 per ton in the "Miscellaneous Income" account for 1930 as compared with that of 1929. In 1929 there was a charge of \$.004 to this account, whereas in 1930 there was a credit of \$.031. This is explained by the high shop earnings obtained in 1930 as the result of doing the repair work on equipment for the Holman and Canisteo Mines.

b. EXPLORATIONS AND FUTURE EXPLORATIONS:

During the month of January a force of seven crews of test-pitters were employed. Two crews worked in the Trumbull pit, one crew in the newly stripped Trumbull area to the East of the approach, three crews in the Hill rocky wash area and one crew in the Hill direct ore area. The test-pitting in the Hill direct ore area was finished early in February, while the five crews in the Hill rocky wash area and the one in the newly stripped Trumbull area continued until the latter part of March.

One crew of test-pitters was started in the rocky area on the North side of the Hill pit on August 25th. The force of test-pitters was increased to four gangs by the latter part of September and the work in the rocky area here was completed by the end of October.

A number of pits were put down in the East end of the Hill pit to outline the rock in its relationship to the direct ore. This work was finished November 25th.

A drill outfit was moved in to the tailings basin on October 29th in order to secure samples for tests to ascertain the treatability of this material. This work was finished on November 15th.

Outside of the test-pitting, no exploratory work was undertaken in the pits during 1930. Unless it is decided to conduct a drilling campaign to the North of the Hill pit during 1931, no exploratory work, other than the ordinary test-pitting is contemplated for the present year.



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

• ACCIDENTS  
AND  
PERSONAL  
INJURY:

NAME: John Ivancic DATE: March 26th.  
CAUSE: Was chipping casting with air hammer. Goggles were worn over his eyes, but considerable steel dust had collected on his face due to perspiration. Ivancic removed goggles to rub his eyes and in doing so, rubbed some of the steel dust into his eye.  
NATURE: Foreign body left Cornea removed.  
TIME LOST: Two days.

NAME: Norman Hodgman DATE: April 23rd.  
CAUSE: Victim does not know, but thinks that strong wind blew piece of dirt into eye.  
NATURE: Foreign substance in left eye.  
TIME LOST: Five days.

NAME: Lawrence Thew DATE: Several days prior to May 5th; also on May 5th.  
CAUSE: Several days prior to May 5th, Thew was helping to lift a drill bit when he strained his back. At this time he complained to Marshall Stewart, the drill runner, that he hurt his back. On May 5th, he was repairing the caterpillar tread of the drill when he wrenched his back again.  
NATURE: Myositis back muscles, and sprain of back muscles.  
TIME LOST: Four days.

NAME: Leonard Hendrickson DATE: September 2nd.  
CAUSE: The locomotive crane had just finished coaling the No.26 shovel, and swung around to pick up a large rock, which it cast out of the way in order to lay a track back of the #26 shovel. While the locomotive crane was picking up this rock, Hendrickson thoughtlessly walked over and leaned on the deck of the crane. In swinging back, the crane caught Hendrickson and dragged him up between the deck and the revolving body of the crane, crushing his head and upper part of his body, resulting in instant death. Hendrickson had absolutely no task to perform that would require him to be in the proximity of the crane.

• NEW CONSTRUCTION:  
AND PROPOSED  
NEW CONSTRUCTION:

As the result of encountering a grade of material in the Hill-Trumbull pits that could not be treated to advantage in our washing plant, it was deemed necessary to replace the turbos with Bowl Classifiers and to install secondary crushers to further reduce the product from the trommel screen and treat this material in the log washers. Two 4-ft. Symons secondary crushers were installed, together with the necessary conveyor belting to carry the trommel oversize to the crushers and return the crusher product to the logs, and the replacing of the two turbos by two Dorr bowl classifiers. The work of installing the

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

1. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION:

classifiers was completed prior to the opening of the ore season and the secondary crushers were placed in commission during the season. We were able to handle lower grade ore to advantage as the result of this installation.

A fresh water well was drilled near the washing plant to provide for our washing plant crew and caretaker.

On account of unsatisfactory analytical work it was deemed advisable to construct and equip a Quick Laboratory at the Hill-Trumbull washing plant. This was done and the Laboratory started functioning July 21st. The results have been very much more satisfactory than those obtained when Lerch Brothers were doing our work.

The bridge over the State Highway, located between the pit and the washing plant, is in rather a bad state of repair and the question of renewing this bridge will have to be considered during the spring. The present bridge has a center bent, which stands in the middle of the highway. This is a dangerous condition for motorists and a State law now requires that no bridges be built with a center span. A survey will be made with an idea of constructing a new bridge of a single span crossing the highway.

3. EQUIPMENT AND  
PROPOSED  
EQUIPMENT:

No new equipment was purchased for the Hill-Trumbull operations during the year 1930. The question of providing a new electric shovel was discussed, and as our operations at the Canisteo Mine did not require the use of the two electric shovels, purchased for that Mine, one of these shovels was taken to the Hill-Trumbull and was rented for the 1930 season. It is expected that this shovel will be purchased from the Canisteo-Cliffs Company and operated in future in the Hill-Trumbull pit. Other than this shovel, no equipment will be purchased for the Hill-Trumbull Mine during 1931, except a second-hand flue rattler, to be purchased from the A. Guthrie Company.

4. MAINTENANCE  
& REPAIRS:

Repair work on locomotive #152, which was started in December, was finished by February 15th. The boiler work had been completed by January 1st and the repairs on the machine in 1930 consisted in boring the cylinders, grinding the valves, replacing the pistons and piston rods and re-assembling. The drivers were removed and the driving boxes replaced and pins and bushings repaired. This engine was returned to the Hill from the Holman-Cliffs Mine in September to have the cylinders bored and new pistons and piston rods. This engine, which is the property of the Holman-Cliffs Company, was returned to that property at the end of October.



HILL--TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

4. MAINTENANCE  
& REPAIRS:

Locomotive #180, which is the property of the Holman-Cliffs Company, was taken into the Hill-Trumbull shops for repairs in December, 1929 and the overhauling of the machine was completed March 4th. New sheets were put in the fire box and the flues were re-tipped. The boiler was taken from the frame and the ash pan rebuilt, new grates installed and the tank trucks were repaired. The drivers were removed and the driving boxes, shoes and wedges were repaired. The air pump and air equipment was overhauled, the cylinders were bored and new pistons and piston rods were put in.

Locomotive #128, the property of the Canisteco-Cliffs Company, was taken into the Hill-Trumbull shops on February 15th. New sheets were put in the fire box, the flues were re-tipped, a cracked saddle was welded, the cylinders bored and the valves ground. The drivers were removed and the driving boxes, shoes and wedges were repaired. The pins and bushings of the side and main rods were repaired. Work on this engine was done intermittently and it was finally turned out of the shops on July 12th.

Locomotive #176, belonging to the Canisteco-Cliffs Company, was sent to the shops on March 3rd. The drivers were removed and the driving boxes, shoes and wedges were repaired; the cylinders were bored; the valves machined; the air pump and air equipment overhauled; the tank and tank car repaired; new lining plates put in the smoke box; new table grates installed; new pistons and piston rods placed and the brake rigging repaired. This engine was painted and turned out of the shops April 9th.

Locomotive #148, belonging to the Canisteco-Cliffs Company, which had been partly repaired in the Holman shops, was transferred to the Hill-Trumbull on April 12th. The cylinders were bored, the valves machined; the drivers removed and the driving boxes, shoes and wedges overhauled; the pins and bushings of the side and main rods were repaired; the piping in the cab overhauled and the air pump repaired and the flues re-tipped. New pistons were made for this engine, which was sent out on June 24th.

Locomotive #146, the property of the Canisteco-Cliffs Company, was taken into the shops on May 5th and the work of overhauling the engine completed by May 24th. The drivers were removed and the driving boxes, shoes and wedges repaired; the cylinders were bored; the valves machined, new pistons and piston rods made and the tank was repaired. This engine had been partly repaired at the Holman-Cliffs shop.

Locomotive #156, the property of the Canisteco-Cliffs Company, went into the shops on May 25th and it was turned out the fore part of August. The drivers were removed and the driving boxes, shoes and wedges repaired; the flues re-tipped; the cylinders bored; the valves machined; new pistons and piston rods placed, and the air pump was overhauled. Some light repairs had previously been made at the Holman-Cliffs shops.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

1. MAINTENANCE  
& REPAIRS:

Locomotive #101 had some new stay-bolts placed in the boiler during April.

Locomotives Nos. 102 and 103 were taken into the shops in May to have some of the bottom flues repaired and to receive new stay-bolts. Engine No. 103 was turned out the latter part of May and No. 102 by June 10th.

On May 31st the crank-pin on Locomotive #148 broke, causing the pistons to drive through the front cylinder head and break off a section of the cylinder. The broken cylinder was repaired by welding; the rods were straightened and the machine was put back in service. A flaw in the crank-pin caused this accident. This engine was used at the Hill-Trumbull while Hill-Trumbull locomotives Nos. 101, 102 and 103 were in the shops for repairs.

Shovel #27 was taken into the shop during the first week in January. The engines were overhauled, the front end of the boiler patched and the front truck and swinging circle were repaired. This work was completed by January 25th. The boom and swinging circle were repaired in April.

The boom of shovel #26 was given an overhauling, the work being finished during the first week in March. The swinging circle and front truck of the machine were repaired in April.

New paddle shafts were made for the log washers during January and February.

Repair work on the 20-yard cars was started in January. The journal boxes were cleaned and greased; the air equipment was overhauled, new arch bars put on the trucks and minor repairs made to the bodies. All of the cars had been put through the shop by April 5th.

The 120-B electric shovel was delivered to the Hill-Trumbull Mine early in March. The work of erecting the machine was started April 7th and completed April 22nd.

The locomotive crane was taken to the shops for repairs on April 18th. A new hoist drum was installed, a new swinging pinion put in; the propelling gear was fitted with new bushings and the clutches were overhauled. Repair work was finished April 26th.

One of the 60-ton shovels was repaired during the summer and fall months. The work on this machine was not continuous. The frame was welded and reinforced; the boom and dipper sticks repaired and the engine overhauled.

Shovel #26 was taken into the shops early in November and the front truck was rebuilt and the engines were being overhauled at the end of the year.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

14. MAINTENANCE  
& REPAIRS:

The Holman-Cliffs locomotive #105 was sent to the Hill-Trumbull during the first week in November. The drivers were removed and the brasses, shoes and wedges repaired and some new frame bolts were put in. This work was finished December 13th and the locomotive returned to the Holman.

Holman locomotive # 104 was taken into the Hill-Trumbull shops on December 13th and the drivers and driving mechanism was being repaired at the end of the year.

The toggle bearing of the Holman-Cliffs jaw crusher was re-babbitted and the shaft machined during November.

Washing Plant Repairs:

Repair work was started on January 2nd. The 8-ft. pan conveyor was taken apart and the lugs on the head sprocket were built up. The rollers of the 36" belt conveyor were cleaned and greased.

The end casting of one of the 25-ft. logs was repaired and reinforced and general repairs were made to the trommel screen.

The new log paddle shafts were assembled and installed and the gears and bearings of the machine repaired.

New apron plates were put in under the grizzly.

New lining plates were put in the rock pockets and a new cushion box was built for the discharge end of the picking belt. New tailings pipes of 16" diameter, leading from the classifiers to the tailings basin, were installed.

The electric haulage locomotive was overhauled.

A new 36" conveyor belt was installed in April. The old belt was put in service on August 15, 1925 and had handled 2,811,262 tons of ore before it was removed. This tonnage is much higher than any other that we have ever handled on a conveyor belt.

The center bin was repaired and a flooring was placed over the top of it.

A sprinkler system was installed along the North and West sides of the tailings basin during the months of May and June. During dry spells in the summer months the tailings become very dusty and when there is much of a wind they are blown over the surrounding country. We have had a number of complaints from the Village of Calumet and to avoid any question of a law suit, it was deemed advisable to put in this sprinkling system, which consists of a 10" main run from the washing plant around the West and North sides of the tailings basin

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

14. MAINTENANCE  
& REPAIRS:

and 2" riser pipes placed about 40 feet apart and discharging a spray 40 feet in the air. This spray-curtain has worked satisfactorily and there was no dust carried into Calumet last summer, although the season was extremely dry and we would have had serious trouble if we had not been protected by this installation.

In preparing for the installation of the Symons crushers and Dorr classifiers, all of the equipment on the table and turbo floors were removed and such as had salvage value was stored at the mine. The excavation for the Symons crusher foundations was started the latter part of January and finished by February 10th. Openings were cut through the floors and the roof of the washer building and concrete foundations were placed by the E. W. Coons Company. The foundations were completed March 13th and the crushers placed.

The turbo floor was reinforced to carry the Dorr classifiers; the foundations for these machines built and the work of installation started on March 22nd. The machines were ready for operation May 1st.

The vibrating screens, to deslime and dewater the product from the logs, were installed in March. As a result of this de-sliming process, the moisture in our concentrates was lowered over one percent and there was considerably less water going into the Great Northern cars.

Subsequent to May 1st a crew of men were kept at work on the installation of the Symons crushers; the housing for the crushers and the necessary conveyors to carry the screen oversize to the crushers and the product from the crushers to the 25 ft. logs. The motor foundations were built, the motors installed, the conveyors and the additions to the washer building completed so that one of the crushers was put in operation June 16th and the second on July 20th.

At the conclusion of the 1930 ore season the plant was cleaned and drained. The paddle shafts were removed from one of the logs for repairing. The 8-ft. pan conveyor was opened up so that the lugs on the head sprocket could be built up. The 5-ft. pan conveyor was taken apart and new connecting pins put in, the old lining was removed from the receiving bin; some new timber and lining put in and the head gears and bearings of the 36" belt conveyor were repaired.

The repair work was started on the hopper under the big screen and the worn out perforated plates were removed. Repair work was started on the rock cars and a pump house was built at the new well.

The Hill-Trumbull washing plant crew was sent to the Canisteo-Cliffs plant at the end of October. This crew will be used to install the machinery at the Canisteo washer, and will complete repairs at the Hill-Trumbull washer during the coming spring.



HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

18. NATIONALITY  
OF  
EMPLOYEES:

<u>NATIONALITY</u>	<u>NO. OF MEN</u> <u>1930</u>	<u>NO. OF MEN</u> <u>1929</u>
Finnish, -----	23	13
Swedish, -----	12	13
Jugo-Slav, -----	17	22
German, -----	14	-
French, -----	3	4
English, -----	12	15
Serbian, -----	2	3
Irish, -----	13	15
Italian, -----	3	2
Bulgarian, -----	3	3
Dane, -----	1	1
Croatian, -----	2	5
Norwegian, -----	5	4
Scotch, -----	4	6
Austrian, -----	3	4
Welch, -----	1	2
Polish, -----	1	2
Dutch, -----	0	1
Slovanian, -----	0	0
TOTAL, -----	119	115

19. WASHING PLANT  
OPERATIONS:

Washing plant operations were started on May 1st and finished September 29th.

The customary trouble with frost was not encountered, but the operation of the plant during the first week was rather slow on account of the necessity of making adjustments to the classifiers.

Operating conditions at the washing plant were quite satisfactory during 1930. The large amount of rocky wash ore put through the mill slowed it down considerably at times. Further than this there was a considerable tonnage of lean wash ore treated and the handling of this ore with the rocky material resulted in a higher washing cost than usual.

No work was necessary on the tailings basin during 1930 with the exception of the installation of the sprinkler system.

In 1930, 502,288 tons of wash ore was treated as compared with 651,906 tons in 1929.

The production of concentrates for 1930 amounted to 335,007 tons, which compares with 411,164 tons for the previous year.

HILL-TRUMBULL MINE  
ANNUAL REPORT  
YEAR 1930

19. WASHING PLANT  
OPERATIONS:  
(Continued)

The rejects from the mill during 1930 amounted to 25,125 tons, averaging 25.78% Iron. This compares with 28,296 tons of rock, running 24.05 Iron for the 1929 season.

The gross recovery for 1930 was 66.70% as against 63.06% for the year 1929. This is a very gratifying result, considering the leaner character of the ore and the large amount of rocky material handled in 1930 as compared with 1929.

The iron unit recovery for 1930 was 92.91% as compared with 88.97% for 1929. This result was also very satisfactory in considering the lean and rocky character of a substantial part of the ore treated in 1930.

The improved gross and iron unit recoveries in 1930 were the result of the operation of the secondary crushers and Bowl Classifiers.

The analyses of the product from the several machines for the years 1930 and 1929, were as follows:

	-----1930-----				-----1929-----		
	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>		<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>
Screens, -----	55.91	.048	13.28	Screens ----	56.53	.045	12.30
Logs, -----	59.23	.050	8.18	Logs, -----	59.63	.045	8.42
Turbos, -----	-	-	-	Turbos, ----	54.61	.039	17.15
Classifiers,--	54.23	.041	18.11	Classifiers--	-	-	-
Tailings, ----	14.37			Tailings, --	11.49		

The analysis of the plant rejects for the year 1930 were as follows:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Hill, -----	20,466	28.43	.029	52.65
Trumbull, -----	4,659	14.14	.018	74.61
Total 1930, -----	25,125	25.78	.027	56.72

The rock removed from the pit and placed on the dumps during 1930, together with the iron analysis, follows:

	<u>TONS</u>	<u>IRON</u>
Hill, -----	48,690	28.83
Trumbull, -----	-	-
Total 1930, -----	48,690	28.83
Total 1929, -----	63,785	31.49

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

1. GENERAL:

Most of the work carried on under the E. & A's., was discontinued during the winter months and was resumed in the spring. The track and washing plant work was completed during the early part of the summer.

The pit sump job and locomotive repairs were carried on throughout the winter.

Ore operations were started on May 12th and completed October 21st.

During May and early June numerous interruptions occurred at the washing plant and a number of necessary adjustments were made. Some delays were suffered as the result of soft tracks in the pit. During the early part of the pit and mill operations considerable trouble was experienced with frost. From July 1st to the end of the season both pit and washing plant operations were conducted quite satisfactorily.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

a. Production by Grades:

Holman Crude Ore, -----	790,079 tons.
Brown Crude Ore, -----	15,916 "
North Star Crude Ore, -----	152,649 "
Total Crude Ore, -----	958,644 "
Holman Bessemer Concentrates, -----	13,539 "
Holman Non-Bessemer Concentrates, -----	526,969 "
Brown Non-Bessemer Direct Shipping, -----	2,845 "
Brown Non-Bessemer Concentrates, -----	10,346 "
North Star Direct Shipping, -----	12,565 - "
North Star Bessemer Concentrates, -----	18,353 - "
North Star Non-Bessemer Concentrates, -----	88,431 - "
TOTAL HOLMAN-CLIFFS MINE, -----	673,048

b. Shipments:

The shipments from the Holman-Cliffs Mine during 1930 were the same tonnages as shown under the production statement, as all ore mined was forwarded to Lake Erie ports.

c. Stockpile Inventories:

No merchantable ore, either concentrates or direct shipping, was stocked at the Holman-Cliffs property during 1930, but the following lean non-wash material was placed in stock:-

Concentrating Material Above 25%:

	<u>Tons</u>	<u>Fe.</u>	<u>Phos.</u>	<u>Silica</u>
North Star,	20,658	26.29	.046	49.24

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

e. Production by Months:

(1) Crude Ore:

<u>MONTH</u>	<u>HOLMAN</u>	<u>BROWN</u>	<u>NORTH STAR</u>	<u>TOTAL</u>
May, -----	23,445	-	6,784	30,229
June, -----	137,607	-	10,330	147,937
July, -----	208,455	4,673	1,245	214,373
August, -----	207,464	7,786	3,570	218,820
September, -----	143,109	649	83,102	226,860
October, -----	69,999	2,808	47,618	120,425
<b>TOTAL - 1930 -----</b>	<b>790,079</b>	<b>15,916</b>	<b>152,649</b>	<b>958,644</b>

(2) Concentrates & Direct Ore:

	<u>HOLMAN</u> <u>CONCTS.</u>	<u>BROWN</u> <u>DIRECT</u>	<u>BROWN</u> <u>CONCTS.</u>	<u>NORTH STAR</u> <u>DIRECT</u>	<u>NORTH STAR</u> <u>CONCTS.</u>	<u>TOTAL</u>
May, -----	14,870	-	-	-	4,726	19,596
June, -----	91,176	772	-	9,283	7,153	108,384
July, -----	139,931	-	2,991	1,886	1,060	145,868
August, --	146,284	573	5,119	-	2,179	154,156
September, --	100,673	1,500	475	1,396	57,719	161,763
October, --	47,574	-	1,761	-	33,947	83,282
<b>TOTAL - 1930,540,508</b>	<b>2,845</b>	<b>10,346</b>	<b>12,565</b>	<b>106,784</b>	<b>673,048</b>	

f. Ore Statement:

All material considered as ore that was mined during 1930, was shipped from the property.

g. Delays:

The following delays were reported during the year 1930:

<u>DATE</u>	<u>HOURS LOST</u>	<u>CAUSE</u>
May 12th,	25 Hrs. - 0 Min.	Derailment.
June 12th,	25 " - 0 "	Coil burned out in motor of motor generator set.
June 17th,	2 " - 0 "	Chute plugged.
June 17th,	1 " - 0 "	Repairing rock gun.
June 19th,	- " 45 "	Rock motor off track.
June 19th,	2 " - "	Repairing logs.
June 19th,	1 " - "	Chute plugged.
June 21st,	2 " 15 "	Repairing generator.
June 24th,	1 " - "	Repairing loading pocket
June 24th,	1 " 30 "	Repairing rock haulage motor.
June 24th,	1 " - "	Rock machine clogged with rock.
June 26th,	2 " - "	Repairing air compressor.
June 26th,	3 " - "	Classifier plugged.
June 26th,	- " 45 "	Motor off track.



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

g. Delays: (Continued)

<u>DATE</u>	<u>HOURS LOST</u>	<u>CAUSE</u>
June 27th,	3 Hrs. - 0 Min.	Classifier plugged.
June 27th,	1 " 30 "	Chutes plugged.
July 2nd,	1 " -	Repairing rock gun.
July 2nd,	2 " -	Testing electrical equipment.
July 7th,	- 30 "	No power.
July 9th,	3 " -	Classifier plugged.
July 11th,	2 " 30 "	No power.
July 12th,	1 " -	Repairing vibrating screen.
July 13th,	2 " 15 "	Jaw crusher plugged.
July 19th,	1 " 30 "	Repairing crusher.
July 21st,	1 " -	No power.
July 31st,	- 30 "	Changing motor.
August 5th,	2 " -	Motor off track.
August 6th,	2 " -	Repairing conveyor.
August 8th,	3 " 30 "	Classifier plugged.
August 11th,	6 " -	Classifier plugged.
August 20th,	5 " -	Log motor broke down.
August 22nd,	- 45 "	No power.
August 28th,	2 " -	Repairing revolving screen.
September 8th,	5 " -	" " "
September 9th,	8 " -	" " "
September 11th,	2 " -	Repairing log.
September 11th,	1 " -	Repairing pump.
September 11th,	5 " -	No power.
September 13th,	2 " 30 "	Repairing revolving screen.
September 13th,	4 " 30 "	No power.
September 14th,	1 " -	Repairing crusher motor.
September 19th,	1 " 30 "	Yards plugged with loads.
October 15th,	2 " -	Crusher plugged.
October 15th,	2 " -	Broken journal on a Guthrie car at pocket.

Delays Account of No Cars:

There was a total delay of 95 hours and 10 minutes on account of no cars.

3. ANALYSIS:

a. Mine Analysis of Production and Shipments:

<u>Grade:</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Moist.</u>
Holman Bess. Concts., -----	13,539	57.14	.045	9.60	10.48
Holman Non-Bess. Concts.---	526,969	56.50	.083	10.02	9.37
Brown Non-Bess. Direct Ship-	2,845	61.69	.057	6.30	10.26
Brown Non-Bess. Concts.----	10,346	53.96	.079	13.67	9.40
North Star Direct Shipping-	12,565	58.63	.093	7.08	12.38
North Star Bess. Concts.---	18,353	57.55	.037	10.67	8.58
North Star Non-Bess. Concts.	88,431	56.33	.059	11.45	9.33
<b>TOTAL, -----</b>	<b>673,048</b>	<b>56.54</b>	<b>.078</b>	<b>10.20</b>	<b>9.43</b>

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

3. ANALYSIS:  
(Continued)

d. Average Analysis of Crude Ore Produced:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Holman Crude, -----	790,079	46.15	.072	25.34
Brown Crude, -----	15,916	40.38	.070	34.25
North Star Crude, -----	152,649	47.13	.050	25.16
 TOTAL CRUDE ORE, -----	 958,644	 46.21	 .068	 25.46

e. Composite Analysis of Season's Shipments:

	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mn.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>
Holman Bess.Concts.	57.16	.046	9.61	.69	.34	.27	.26	.026	6.90
Hol. Non.Bess.Concts.	56.52	.086	10.20	.43	1.25	.23	.21	.016	6.52
Brown N.B.D.Shipping	61.60	.051	5.87	.22	2.07	.19	.16	.011	3.42
Brown N.B.Concts.	53.80	.086	13.90	.32	1.01	.20	.19	.012	7.16
N.Star Direct Ship.	58.60	.094	6.90	.28	3.57	.30	.26	.014	4.90
N. " Bess. Concts.	57.53	.037	10.69	.22	.34	.20	.20	.016	6.30
N. " Non.B.Concts.	56.35	.074	11.60	.33	.65	.21	.20	.014	6.15

The analysis of the ore shipped from the Holman-Cliffs Mine during 1930 was lower in Iron Natural than anticipated, due largely to our obtaining a higher Moisture than we had figured on. The Silica content of the ore was very close to our expectations.

4. ESTIMATE OF  
ORE RESERVES:

a. Developed Ore:

Assumption: 16 cubic feet per ton for Wash Ore.

A rock deduction of 10% was made generally and in estimating a part of the deposit the deduction was increased to 20%, due to the exceptionally rocky condition of this ore.

The tonnage listed below is on a concentrated basis and is figured on a 60% gross recovery:

Brown No. 1, -----	1,161,500 tons.
Brown No. 2, -----	1,900,843 "
Holman, -----	2,994,257 "
 TOTAL HOLMAN-BROWN ORE, -----	 6,056,600 "
 Bingham, -----	 1,400,000 "
North Star, -----	726,900 "
 TOTAL BINGHAM-NORTH STAR ORE, -----	 2,126,900 "
 GRAND TOTAL, -----	 8,183,500 "

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF  
ORE RESERVES:  
(Continued)

a. Developed Ore: (Continued)

While some pockets of direct ore may be developed in the mining of the Holman-Cliffs Mine ore bodies, we have not considered, or set up any tonnage of direct ore in this estimate.

The ore estimate of January 1, 1931 shows some change over that of the previous year.

In the case of the Brown No. 1, there is a decrease in the estimate of January 1, 1931, as compared with that of January 1, 1930 and deducting the shipments from this property during the year 1930, of 431,300 tons. This was due partly to the fact that we had done practically no test-pitting or exploratory work on this property previous to January 1, 1930 and the Oliver Iron Mining Company in their last year's operation at this property mined more tonnage than was assumed by Mr. Derby at the time of making his original estimate and the Oliver Company later showed up a rock island condition in the center of the Brown No. 1 pit that was not anticipated at the time of making the original estimate. It was not deemed advisable to make any changes in the estimate of January 1, 1930 as we had not conducted any exploratory work here and we were not positive as to conditions in this pit.

The Brown No. 2 and Holman Mines show an increase in tonnage, off-setting the decrease in the Brown No. 1 estimate. The increase in the tonnage estimate at the Brown No. 2 and Holman properties is due to structure drilling done in the fall of 1930.

At the Bingham Mine no work was undertaken during the year 1930 and the tonnage in this property is the same as was shown on January 1, 1930.

The drilling on the North Star property, which was done during the spring and summer of 1930, resulted in our eliminating part of the ore shown in our estimate of January 1, 1930. The decrease in the North Star ore estimated on January 1, 1931, as compared with that of January 1, 1930, shows a decrease of 334,800 tons.

b. Prospective Ore:

It is very probable that drilling at depth on the Holman and Brown No. 2 properties will show additional ore of washable grade. Further than this the improved methods of treating the so-called jig ores, which are being experimented with and developed, will undoubtedly show a substantial tonnage of lower grade ore, which can later be added to our ore reserves in these properties.

There is a small likelihood of adding any tonnage of wash ore in the case of the Brown No. 1 Mine, but there undoubtedly will be some lower grade jiggling material included in future estimates.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF  
ORE RESERVES:  
(Continued)

b. Prospective Ore:

The North Star property has now been pretty thoroughly drilled and test-pitted and the tonnage here will probably not be increased, at least so far as the wash ore is concerned.

The Bingham Mine has not been thoroughly drilled and we anticipate that the ore reserves in this property will be increased when the drilling campaign is undertaken. The drilling of this property will probably be done within the next two years.

c. Estimated Analysis:

<u>Holman-Brown:</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Moist.</u>	<u>Ir.Nat.</u>
Brown No. 1, -----	1,161,500	56.30	.038	12.97	9.35	51.03
Brown No. 2, -----	1,900,843	56.93	.063	11.12	9.35	51.61
Holman, -----	2,994,257	57.17	.063	10.44	9.33	51.84
Total, -----	6,056,600	56.93	.058	11.14	9.34	51.61
<u>Bingham-North Star:</u>						
Bingham, -----	1,400,000	59.60	.060	10.10	9.40	54.00
North Star, -----	726,900	58.09	.046	10.63	9.36	52.65
Total, -----	2,126,900	59.08	.055	10.28	9.39	53.54
Grand Total, -----	8,183,500	57.49	.057	10.92	9.35	52.11

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Labor conditions were entirely satisfactory at the Holman-Cliffs Mine during the past year. The force engaged during 1930 at this property was partly recruited from old Oliver Company employees who had lived in Taconite for some time. There was no change in the wage schedule in force at the Holman-Cliffs Mine during the year 1930.

(2) New Construction:

This information is shown under No. 12 - "New Construction and proposed New Construction".

b. Statement of Labor & Wages:

	<u>HOLMAN-BROWN</u>	<u>BINGHAM-NORTH STAR</u>
PRODUCT, -----	553,699 Tons	119,349 Tons
No. of Shifts & Hours, -----	2, 10-Hr.	2, 10-Hr.
Avg. No. of Men Working, -----	155	34 $\frac{3}{4}$
Avg. Wages Per Day, -----	\$5.05	\$5.05
Product Per Man Per Day, -----	23.19	22.35
Labor Cost Per Ton, -----	.217	.226
Total No. of Days, -----	23,874	5,340 $\frac{1}{2}$
Amount Paid for Labor, -----	\$ 120,486.12	\$ 26,945.82



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

5. LABOR & WAGES:  
(Continued)

b. Statement of Wages and Product:

<u>PRODUCT:</u>		
Holman-Brown, -----		553,699 tons.
Bingham-North Star, -----		119,349 "
<u>NO. SHIFTS &amp; HOURS:</u>		
Holman-Brown, -----		2, 10-Hr.
Bingham-North Star, -----		2, 10-Hr.
<u>AVG. NO. MEN WORKING:</u>		
Holman-Brown, -----		126 $\frac{1}{4}$
Bingham-North Star, -----		28 $\frac{3}{4}$
<u>AVG. WAGES PER DAY:</u>		
Holman-Brown, -----		\$5.03
Bingham-North Star, -----		5.03
<u>PRODUCT PER MAN PER DAY:</u>		
Holman-Brown, -----		21.36 tons.
Bingham-North Star, -----		20.40 "
<u>LABOR COST PER TON:</u>		
Holman-Brown, -----		.235
Bingham-North Star, -----		.246
<u>TOTAL NO. OF DAYS:</u>		
Holman-Brown, -----		25,918
Bingham-North Star, -----		5,850-3/4
<u>AMOUNT PAID FOR LABOR:</u>		
Holman-Brown, -----		\$130,416.40
Bingham-North Star, -----		29,441.77

In 1930 - Production from May 12th to October 21st.

6. SURFACE:

a. Buildings, Repairs, etc:

The houses in the Taconite District, under lease from the Oliver Iron Mining Company, and occupied by employees of the Holman-Cliffs Mine, were repaired during the year 1930, the total expenditures being as follows:

Labor,	\$ 1,897.78
Supplies,	2,684.37
Total,	<u>4,582.15</u>

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

6. SURFACE:  
(Continued)

a. Buildings, Repairs, etc: (Continued)

Rather extensive repairs were made to the foundations of the office building and the structure was painted.

A new furnace was installed in the office to provide for the heating of the Chemical and Research Laboratories, as well as the office and a new heating system was installed in the shops.

c. Tracks, Roads, Transmission Lines:

A crew started work on the mine tracks April 7th. They worked on the main line between the dump and the washing plant until this job was completed May 1st.

Some work was done in the way of raising and tamping the main line and approach tracks and it was necessary to do considerable maintenance work on these tracks throughout the season.

One of the electric shovels started casting a track grade to the North Star area the middle of April. The grade was finished by the end of the month and the track was laid here early in May. The loading tracks in the Holman pit were placed during the month of May.

Due to the saturated condition in the bottom of the Holman pit, considerable maintenance work was required throughout the ore season and in a number of cases it was necessary to dump ore and raise the tracks to maintain the proper grades.

In July a rented gasoline shovel was used to prepare a grade and a second track was laid on the upper South approach bench. This provided an easier grade for the loads and by having a double track system available, congestion was relieved.

At the end of the ore season the track crew started work on the main line and approach tracks and they were engaged here until they were laid off on November 8th.

It was necessary to do some re-tieing in the yard tracks in the vicinity of the shops during the past summer.

A power line was constructed from the sub-station in to the pit during the spring months. This line served the electric shovels and electric power drills.

7. OPEN PIT:

a. Stripping:

The A. Guthrie Company's Model 300 shovel had completed about one-half of the second cut in the taconite island by the end of January, when this job was shut down for the winter. The shovel had suffered several severe break-downs and on account of the extremely cold weather it was deemed advisable to postpone this stripping work until spring.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:

a. Stripping: (Continued)

The 300-ton shovel was repaired in March and stripping operations were resumed in the taconite island April 1st. The second cut, which had been left unfinished, was completed April 26th and the machine was then moved back to cast some rock which had sloughed in taking the first cut. This material was loaded and the shovel was cut around the South end of the island to start the third cut in May. The third cut was finished on July 11th and the machine then started loading out the track bench, which had been provided between the second and third cuts in order that dumping to advantage might be obtained above the digging level. The track bench was loaded into cars, operating on a track laid in the third cut and connected to the South approach tracks. The removal of the track bench was finished August 19th and the shovel was moved to the North end of the island and a fifth cut started. This cut was finished by the end of October and the machine started back, removing a second track bench and digging in some material sloughed along the bottom of the previous cut. An additional depth of lean, unwashable material was disclosed by the drilling along the Northerly part of the taconite island and the shovel was engaged in digging out this bottom when operations were suspended for the year, December 2nd. The remaining taconite to be removed on the A. Guthrie Company's contract consist of about one weeks digging in this bottom rock and the taking of about a half cut-wide along the South half of the present East bank. It will probably take from six weeks to two months to complete the taconite stripping, covered by the contract.

A small amount of ore was loaded during the season by the A. Guthrie Company in connection with the taconite stripping.

Stripping operations were resumed in the Mt. Griffen area on April 16th by the A. Guthrie Company. The Model 125 shovel used here took a number of short cuts on the North Star and Brown #1 properties, loading out surface, waste, wash ore and direct ore. The ground here was stripped back to the limits of the area as outlined for the 1930 program. The top of the ore is very uneven here and it was necessary to conduct a clean-up stripping and ore operation as the cuts progressed. All of the ore mined from this area was loaded by the A. Guthrie Company. This stripping and ore loading job was completed November 6th.

The rented gasoline shovel cleaned up a small amount of dirt along the North Star area on the North side of the pit.

In order to provide for our scheduled ore operations in the North Star property and in order to make available sufficient Brown ore to catch up with our minimum requirements on those properties, it will be necessary to push stripping operations across the Brown #1 property, removing some 63,000 yards here and conducting extensive operations on the North Star property. In order to make available sufficient

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:a. Stripping: (Continued)

North Star ore for our expected schedule for 1932, this stripping should be started in April and pushed through the winter of 1931-1932. Plans are at present being made to this end.

The yardages handled by the A. Guthrie Company on the taconite island and in the Mt. Griffen area, were as follows: Taconite - 688,078 cu. yds. - Surface: 310,763 cu. yds. - Waste Ore 27,945 cu. yds., - Lean Ore 14,588 cu. yds.

d. Timbering:Statement of Ties used:

Holman-Brown, -----	4,707
Bingham-North Star, -----	1,730
Joint - Washing Plant, -----	870
Joint - Waste Pile, -----	940
New Construction, -----	<u>5,486</u>
 Total, -----	 13,733

f. Explosives, Drilling & Blasting:Statement of Explosives Used:HOLMAN-BROWN MINE

<u>KIND:</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>AMOUNT 1930</u>	<u>AMOUNT 1929</u>
25% Gelatin, -----	198,350	.10803	21,428.00	-
40% Gelatin, -----	350	.12000	42.00	-
40% L.F. Extra, -----	400	.11750	47.00	-
60% L.F. Extra, -----	1,000	.13726	137.26	-
60% Gelatin, -----	23,750	.14045	3,335.63	-
60% Nitro-Glycerin---	150	.15500	23.25	-
Hercomite Bag, -----	1,000	.12250	122.50	-
Hercomite No.4-----	100	.12750	12.75	-
Total Powder, -----	<u>225,100</u>	<u>.11172</u>	<u>25,148.39</u>	
Fuse, -----	2,600	.0062	16.23	-
Caps, -----	800	.0116	9.28	-
Electric Exploders,--	700	.0981	68.70	-
Connecting Wire, -----	48	.3940	18.89	-
Lead Wire, -----	500	.0100	5.00	-
Cordeau - Plain, -----	17,571	.0425	746.77	-
Cordeau - Double, ---	20,468	.0489	1,000.89	-
Total Caps, etc.--			<u>1,865.76</u>	-
Total Explosives,-			27,014.15	-



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:f. Explosives, Drilling & Blasting: (Continued)HOLMAN-BROWN MINE

	1930 CRUDE & <u>DIRECT</u>	1930 CONCTS. & <u>DIRECT</u>	1929 CRUDE & <u>DIRECT</u>	1929 CONCTS. & <u>DIRECT</u>
Product, -----	808,840	553,699	-	-
Lbs. Powder Per Ton of Ore--	.2783	.4065	-	-
Cost Per Ton for Powder, ---	.0311	.0454	-	-
Cost Per Ton for Caps, -----	.0023	.0034	-	-
Cost Per Ton for All Explosives,	.0334	.0488	-	-
Avg. Cost Per Lb. for Powder,	.1117	.1117	-	-

Commenced operations May 15th, 1930. Suspended operations  
October 17th, 1930.

BINGHAM-NORTH STAR MINE

<u>KIND:</u>	<u>QUANTITY</u>	<u>AVERAGE PRICE</u>	<u>AMOUNT 1930</u>	<u>AMOUNT 1929</u>
25% Gelatin, -----	37,350	.10640	3,974.25	-
60% Gelatin, -----	3,700	.13791	510.25	-
60% L.F. Extra, -----	100	.13250	13.25	-
Hercomite No. 4, -----	150	.12750	19.13	-
Total Powder, -----	41,300	.10937	4,516.88	-
Fuse, -----	500	.0062	3.12	-
Caps, -----	300	.0116	5.48	-
Exploders, Electric, -----	325	.0857	27.86	-
Connecting Wire, -----	22	.3950	8.69	-
Cordeau - Plain, -----	2,522	.0425	107.19	-
Cordeau - Double, -----	3,496	.0489	170.95	-
Total Caps, etc., -----			323.29	-
Total Explosives, -----			4,840.17	-

  

	1930 CRUDE & <u>DIRECT</u>	1930 CONCTS. & <u>DIRECT</u>	1929 CRUDE & <u>DIRECT</u>	1929 CONCTS. & <u>DIRECT</u>
Product, -----	165,214	119,349	-	-
Lbs. Powder Per Ton of Ore,-	.2500	.3460	-	-
Cost Per Ton for Powder, ----	.0273	.0378	-	-
Cost Per Ton for Caps, etc.-	.0020	.0027	-	-
Cost Per Ton for All Explosives,	.0293	.0405	-	-
Avg. Cost per Lb. for Powder,	.1094	.1094	-	-

Commenced operations May 22nd, 1930; suspended operations  
October 21st, 1930.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

g. Open Pit Mining & Loading:

Wash Ore:

The two new Armstrong drills were placed in operation during April. Holes were drilled and blasted in the taconite island area, which had been stripped and in the old Holman pit bottom.

Wash ore operations were started on May 12th. The production was somewhat small during the balance of May due to the necessity of making a number of adjustments at the mill and to the soft condition of the loading tracks in the bottom of the pit.

Shovel #32 started loading from the taconite island area. In the first cut considerable sorting had to be done due to the fact that some taconite had been sloughed over in the A. Guthrie Company's stripping operations and a seam of lean material was encountered toward the North end of the cut. There was also some paint-rock to be sorted throughout the cut. The first cut was completed on June 28th and the shovel was moved back and started the second cut June 30th.

During the second week in June, shovel #32 was used to load out the paint-rock and taconite that had been cast away from the ore bank to avoid contamination.

The second cut in the island area was finished on July 21st. It was necessary to sort out paint-rock and lean material in taking this cut.

The third cut was finished August 9th; a fourth cut on August 25th and the fifth cut September 5th. The length of the cuts shortened as they progressed Eastward. The ore in the South end of the fifth cut was quite lean and the bank had been reduced to a height of about 10 feet.

Shovel #32 was moved across the pit to the North Star area "B" and began loading here September 10th. The first cut was finished September 23rd and the machine was then used for loading out some cast surface material before attempting the second cut. The second cut was started September 25th, but had not been completed by the end of the season. The #32 shovel was moved back to the island area on October 6th, where it was engaged during the balance of the season.

It is the intention to mine the balance of the ore in North Star Area "B" as mixing and grading conditions warrant. This ore is of rather low grade and the Silica in the concentrates will prohibit its being mined rapidly.

Shovel #33 started loading ore from the top of the North Star Area "B" on May 18th. The production here was low on account of poor loading conditions and the grade of ore was not satisfactory. In order to secure a better grade ore this shovel was moved to the

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

g. Open Pit Mining & Loading:

Wash Ore:

Holman bottom and started digging here May 26th. The first cut was started near the sump, as it was necessary to dig on a slight up-grade away from the sump in order to take care of the drainage. The No. 33 shovel was cut down along the edge of the sump and dug Southward across the pit, the water draining to the sump through this cut. The first cut was finished on June 14th and the machine was moved back to the sump to start the second cut. During the season's operations in the bottom of the Holman pit it was necessary to start all cuts from the sump until the ultimate depth had been secured.

The ore in the vicinity of the sump was somewhat mixed with rock and loading conditions here were slow.

The second cut in the Holman pit bottom was completed July 23rd and the third and fourth cuts were finished during August. A fifth cut had been taken by September 13th and the sixth cut by September 25th. The No. 33 shovel was engaged in the seventh cut at the end of the season. As the cuts progressed Eastward the grade of material became somewhat poor, due to the fact that they were extended into the painty horizon.

The rented gasoline shovel started loading out the top five feet of the North Star ore from Area "B" during the last week in May. This small machine was engaged here until July 21st, when it was moved to the approach track job. Upon completing the approach work the fore part of July, the gasoline shovel was moved to the bottom of the Holman pit to clean up some cast taconite and paint-rock. Upon the completion of this work the machine was moved to the North Star Area "B" and completed loading out all of the upper bench in this area by August 9th. The shovel was then moved down into the bottom of the Holman pit and loaded out material which had been excavated in digging the sump. This job was finished August 16th and the gasoline shovel was then used to clean up the remaining surface over the East end of North Star Area "B".

Starting in July, the contractor's No. 125 shovel loaded wash ore intermittently during the balance of the season. All of the ore handled from the Holman-Cliffs Mine from October 15th to the 21st was loaded out by the contractor in this Mr. Griffen area.

Direct Ore:

A small tonnage of direct ore was secured from the Brown No. 1 and two short cuts were taken in a high grade quality of North Star ore.

HOLMAN-BROWN MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

k. Drainage:

The sump excavation was completed February 15th. This job was very slow due to the necessity of drilling and blasting under water and to the packing of the material due to the action of water.

The 5,000-gallon pump did not function properly because the inflow of water was not sufficient to operate the pump continuously. A second raft was built and a smaller capacity pump from the Wade Mine was put in operation March 15th.

The inflow of water from the Brown No. 2 pit was impounded at the South end of the taconite island and a pump and pipe line were installed to take care of this water independently of that draining to the main sump. This equipment was put in operation on March 26th. It was necessary to care for the Brown No. 2 water in this manner, as otherwise it would have interfered to a considerable extent with our operations in the bottom of the Holman pit and later on with A. Guthrie Company's stripping operations in the taconite island.

The Layne & Bowler pump in the old Oliver shaft was operated intermittently. The drainage drift leading to the pit was cleaned out in April and pumping operations here were conducted as an aid in the pit drainage while the sump was being dug.

A line of drill holes was put down across the bottom of the pit from the sump to the South side and these were blasted in hopes that the water seeping to the sump would be increased and that it would not be necessary to take drainage cuts in loading the ore. The effect of this blasting was negative so far as the drainage was concerned.

At the end of the ore season it was necessary to dig a new sump to carry the drainage below next season's ore operating level. A gasoline excavator was rented for this purpose and started work on November 10th. Work in the sump was rather slow due to caving ground and to the necessity of drilling and blasting under water. The work of deepening the sump was completed December 20th and the machine was engaged in digging a ditch across the pit at the end of the year. This job should be completed before the middle of January, 1931.



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

3. COST OF OPERATION:

<u>a. Comparative Mining Costs:</u>	<u>1930</u>	<u>Estimated Costs</u>	<u>Increase</u>	<u>Decrease</u>
<u>PRODUCT:</u>				
Direct Shipping, -----	15,410	-	15,410	-
Concentrates, -----	657,638	667,000	-	9,362
Total Production, -----	673,048	667,000	6,048	--
Avg. Daily Product, -----	4,579	-	-	-
Tons Per Man Per Day, ----	21.19	-	-	-
Days Operated, -----	147	-	-	-
Budget, Estimated Production	667,000	667,000	-	-
Budget, " Cost at Mine,-	1.708	1.708	-	-
 <u>COST:</u>				
<u>Total Cost at Mine:</u>				
Open Direct Shipping Ore,	.146	-	-	-
Open Pit Wash Ore, -----	.297	.513	-	.216
Concentrates, -----	.187	.228	-	.041
General Expense, -----	.115	-	-	-
Cost of Production, ----	.592	.741	-	.149
Depreciation, Plant & Equipment, -----	.150	.147	.003	-
Depreciation, Movable Equipt.	.000	.000	-	-
Taxes, Ad Valorem, -----	.057	.109	-	.052
Occupational, ----	.036	.036	-	-
Royalty, -----	.035	.040	-	.005
Amortization, Stripping,-	.518	.525	-	.007
Total Cost at Mine, ----	1.388	1.598	-	.210
Administrative & General Expense, -----	.116	.104	.012	-
Miscellaneous Income, ---	.007	.006	-	.013
TOTAL COST, -----	1.497	1.708	-	.211

Cost of Production:

The decrease in the cost of Production for 1930, as compared with the estimated figures was the result of our being able to conduct mining operations with comparatively little blasting, the water problem not being as troublesome, as we had anticipated, less track work than we had figured on and the handling of over 15,000 tons of direct shipping ore, whereas we had not estimated any.

The Concentrating cost was, \$.041 under our estimate. We were able to handle the rocky and painty material to better advantage than was anticipated.

The Ad Valorem taxes charged to 1930 ore were only about one half what we had figured on, due to the fact that we were able to hold this property in the inactive class, as of May 1st, 1930, and the Tax Commissions' engineers did not re-estimate the tonnage.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

9. EXPLORATIONS  
AND  
FUTURE  
EXPLORATIONS:

During January four crews of test-pitters were employed in the North Star Area "B" and one crew was employed putting down pits behind the taconite island stripping shovel, as the ore was uncovered. Test-pitting in the taconite island was suspended the middle of February as all the ground stripped had been tested. Test-pits were put down in the island area from time to time as the stripping shovel progressed.

The work in the North Star Area "B" was finished by February 15th and the four crews were moved to the North Star-Mt. Griffen area. Due to a considerable seepage of water, work had to be discontinued in the Mt. Griffen area the latter part of March.

An attempt was made to put down pits in the Holman bottom, but the heavy seepage of water made it impossible to get the pits down more than five feet.

Two crews of test-pitters started work in September in the Mt. Griffen area and they were still engaged here at the end of the year. This work is for the purpose of demonstrating the grade of ore to be secured from these areas for the 1931 requirements. Due to the saturated condition of the Holman pit bottom, it was necessary to test this ground with structure drilling rather than the usual method of pits. Starting in September and completing the work December 18th, twenty-nine structure drill holes were put down by the Schultze Brothers (drilling contractors). Some of these holes were put down with Schultze Brothers' regular drill rigs; the balance of them with special auxiliary equipment placed on our Armstrong drills.

Due to the saturated condition of the Holman-Brown #2 pit bottom, it will be necessary for us to test the ore from year to year by the use of structure drilling, rather than by putting down pits. Other than this work we do not contemplate any exploratory drilling in the Holman-Cliffs Mine during the year 1931.

10. TAXES:

The following statement shows the taxes for the Holman-Brown, Bingham, North Star, Holman-Cliffs auxiliary lands; Bingham-North Star Washing Plant lands; Holman-Brown lands; Holman-Cliffs shops and Holman-Cliffs Personal Property for the years 1930 and 1929:-

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

10. TAXES:  
(Continued)

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
Holman-Brown Mine, ----- \$	16,787.96	16,402.08	385.98	
Bingham Mine,-----	7,429.90	7,250.43	179.47	
North Star Mine,-----	5,642.58	5,538.60	103.98	
Holman-Cliffs Aux.Lands,--	2,815.04	278.05	2,536.99	
Bingham-N.Star W.P.Lands,-	44.64	84.81		40.17
Holman-Brown Lands, -----	20.80	-	20.80	
Holman-Cliffs Shops, -----	317.85	409.60	-	91.75
Holman-Cliffs Personal Property, -----	4,935.00	808.00	4,127.00	
 TOTAL, ----- \$	 37,993.77	 30,771.57	 7,222.20	
Rented Buildings, -----	1,255.05	1,647.44	-	392.39
 GRAND TOTAL, ----- \$	 39,248.82	 32,419.01	 6,829.81	
 Average Rate, -----	 .825	 .808	 .017	

The Tax Commission did not change the tonnage at the Holman-Brown, Bingham or North Star Mines in 1930 and the small increase in taxes for these properties is due to a higher rate of taxation.

The washing plant lands for 1930 include the Holman washing plant. This washer was not erected in 1929.

The relatively large increase under "Personal Property" is due to the quantity of equipment on hand May 1st, 1930. Only a small amount of track material was shown under "Personal Property" in 1929.

A proportion of the property rented from the Oliver Iron Mining Company is not included in the platted portion of the Village of Taconite. It is impossible to show this property at present, as there is no record of it in the County Auditor's office and the Oliver Company will bill us for this tax at the end of 1931 and it can be included in the 1932 taxes.

11. ACCIDENTS  
AND  
PERSONAL  
INJURY:

There were five lost-time accidents at the Holman-Cliffs Mine during the year 1930.

The accident record at this property was unsatisfactory the first few months in the year, but since that time there has not been a lost-time accident at this mine, so far as the Holman-Cliffs employees are concerned, and this property has held the banner flag for the Mesaba District, since the flag-raising ceremonies were held in August.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

11. ACCIDENTS  
AND  
PERSONAL  
INJURY:

The A. Guthrie Company had a number of serious accidents, one blasting accident resulting in the blinding of a blasting foreman and a second blasting accident in the death of four men engaged in loading deep churn drill holes on the taconite island.

A brief description of the five lost-time accidents at the Holman-Cliffs property during the year 1930 follows:

NAME: Ewald Schmidt DATE: January 26th.  
CAUSE: In carrying ties at Canisteco-Cliffs Mine from car to pile, Schmidt dropped tie on first and big toe of right foot.  
NATURE: Contusion of great and first toe on right foot.  
TIME LOST: 1-1/2 Days.

NAME: Joe Dargan DATE: January 30th.  
CAUSE: Unloading ties out of box car at Canisteco-Cliffs Mine. Dargan was pulling a tie out of a car when the tie from above, being pulled down by a man in the car, slid sideways and fell to floor, catching his arm between tie and the floor of car.  
NATURE: Contusion and slight fracture of left arm.  
TIME LOST: Not known because tie job finished and Dargan did not report back to work until spring of 1930.

NAME: Jerome Vanoverschelde DATE: March 24th.  
CAUSE: Was lifting timber in carpenter shop. Partner on opposite end slipped and dropped his end, causing injured man to lose his hold and timber fell, striking him on right knee.  
NATURE: Contusion of lower thigh and strain of ligaments.  
TIME LOST: 6 Days.

NAME: Peter Baril DATE: About 2nd week in January.  
CAUSE: Was taking care of fire in locomotive crane, under steam - night shift. Zero weather and steps icy to a certain extent. In climbing down from crane, Baril slipped and missed one step and dropped heavily to ground on his feet. Injured party is a heavy man and he sustained a strain and internal pains at the time of injury, later developing into hernia.  
TIME LOST: 34 Days.

NAME: Martin Fleisher DATE: March 29th.  
CAUSE: Slipped on path leading into pit. Slid some distance and turned left ankle under self.  
NATURE: Multiple fracture lower end of tibia and fibula left ankle.  
TIME LOST: 84 $\frac{1}{2}$  Days.



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION:

Due to unsatisfactory analytical work on the part of Lerch Bros., it was deemed advisable to provide laboratory facilities at the Holman-Cliffs Mine. A Quick Laboratory to handle determinations at the washing plant was constructed and equipped during the summer of 1930 and a Central Laboratory was established in the old Oliver Iron Mining Company's warehouse. The warehouse was remodeled and arranged for a Chemical Laboratory and also a Research Laboratory. This work was done and the Laboratories put in service in August.

The Pfeffer Construction Company were given the contract and this firm erected a caretaker's house at the washing plant during the summer of 1930.

The basement floor at the washing plant was partitioned and an office for the foreman provided.

A pump-house was constructed on the shore of Lawrence Lake and two pumps were installed here. One pump handles feed water in to the tailings basin as needed and the second pump takes care of water for the locomotives. A water tank was erected on the dump during the month of April to serve the locomotives.

A telephone line was constructed to the washing plant in August.

A four-stall garage was constructed near the shop building in December, to accommodate the mine truck, station wagon, laboratory truck and one extra car.

There are no plans for new construction for 1931. The bridge over the State Highway will have to be replaced in time. This bridge has a center pier, which is dangerous for motor traffic and should be removed, but we do not contemplate the placing of a single-span bridge here at least until 1932.

13. EQUIPMENT AND  
PROPOSED  
EQUIPMENT:

Two new No. 120-B electric shovels were received and erected during the months of February and March.

Sixteen 30-yard cars were delivered at the Holman-Cliffs Mine in February. Two Armstrong drills and drill sharpeners were received in March. In the month of April, five locomotives, three from the Boeing Mine and two purchased from the Oliver Iron Mining Company, were delivered to the Holman-Cliffs Mine. These engines had all received some repairs in the Hill-Trumbull shops.

In connection with the pit drainage, one 1200-gallon centrifugal pump was delivered to the Holman-Cliffs from the Wade Mine and an 800-gallon centrifugal pump, including a raft, was sent over from the Hill-Trumbull Mine during the month of March.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

13. EQUIPMENT AND  
PROPOSED  
EQUIPMENT:

In order to de-slime and de-water the log product at the washing plant, two vibrating screens were placed at the discharge end of the machines during the early part of the summer.

In the line of new equipment, the question of purchasing a gas-electric shovel has been discussed, but in view of the curtailed production at the Holman-Cliffs property in 1931, it will not be absolutely necessary to have this machine.

As the result of tests made with a Hydrotator machine on the fines from our Holman-Cliffs washing plant, it is recommended that one of these machines be placed in the Holman-Cliffs washing plant and experiments conducted during the season of 1931. Provided this machine is installed and experiments show its efficiency, no doubt a permanent installation of two Hydrotator machines will be made during the winter of 1931-1932.

14. MAINTENANCE  
& REPAIRS:

Repair work on the three locomotives from the Oliver Company were started February 3rd.

The boiler of locomotive #156 was jacked up from the frame and the sheets cut out of the fire-box and new ones put in. The flues of this engine were removed, re-tipped and replaced. The air equipment was overhauled; the running gear repaired; the trucks and tank of the tender repaired and a new steel frame built for the tender. This machine was painted and shipped to the Hill-Trumbull for final repairs on May 3rd.

The flues were removed from locomotive #148, new tips were welded on and the flues replaced in the boiler. The air equipment was overhauled; new running boards were put on; the front end of the boiler was repaired; new table grates installed and the tank was repaired. This machine was sent to Marble for final repairs on April 16th.

Work was started on locomotive #146 the latter part of February. The old paint was scraped off and the machine was re-painted. New table grates were put in; the valves were repaired; the air equipment overhauled; the front end of the boiler repaired; the flues re-tipped; the running gear repaired and the tender overhauled and provided with a new steel frame. This engine was shipped to the Hill-Trumbull for final repairs about the middle of April.

A crew started erecting the electric shovels March 17th and had completed the work by the fore part of April. The new 30-yard cars were checked, greased and made ready for service during April.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

14. MAINTENANCE  
& REPAIRS:

Upon conclusion of the ore season, locomotives Nos. 104 and 106 were taken into the shops for repairs. The running gear of these engines was overhauled; the piston rods turned down; the valves repaired; some new stay-bolts placed; the flues were caulked; the injectors repaired and the brake rigging overhauled.

Locomotive #104 was shipped to the Hill-Trumbull the middle of December for driver repair work.

New steel tender frames are being built for locomotives Nos. 148 and 180.

The 30-yard cars are being cleaned, greased and the necessary light repairs made.

Washing Plant Repairs:

Upon the conclusion of the ore season, the mill was cleaned, drained and winter repair work started.

Some of the pans were removed from the 8-ft. conveyor and sent to the shops to have wearing plates welded on and the hinges riveted.

The North Star rock track was extended to the West end of the stockpile ground.

The worn out perforated plates were removed from the trommel screen and this machine was given an overhauling. Some new parts are needed for this equipment.

The jaw crusher was taken apart and the pitman and shaft were sent to the Hill to have the bearing re-babbitted and the shaft turned down.

The Bowl Classifiers were inspected and minor repairs made.

The rock pockets in the crusher house were removed.

A water line was laid from the fresh water well to the washing plant.

The Symons crushers were opened up, cleaned and minor repairs made.

The office in the basement floor of the washer building was completed.

The 25-ft. logs were repaired and new paddle patches put on.

The rollers of the 36" belt conveyor were cleaned and greased.

The chutes above the Symons crushers were remodeled.

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

14. MAINTENANCE  
& REPAIRS:

The lining plates in the receiving bin were removed, as they were worn out, and new plates will be put in.

The washing plant pumps were overhauled.

The transformers were removed from the compressor room and installed outside of the building in line with instructions by the Fire Insurance Underwriters.

18. NATIONALITY  
OF  
EMPLOYEES:

<u>NATIONALITY:</u>	<u>NO. OF MEN</u> <u>1930</u>	<u>NO. OF MEN</u> <u>1929</u>
German, -----	17	0
Canadian, -----	5	0
English, -----	19	15
French, -----	15	4
Finnish, -----	12	13
Italian, -----	10	2
Irish, -----	11	15
Dane, -----	3	1
Belgian, -----	2	0
Bohemian, -----	1	0
Polish, -----	3	2
Scotch, -----	7	6
Dutch, -----	5	1
Swedish, -----	17	13
Norwegian, -----	11	4
Slovanian, -----	6	0
Serbian, -----	2	3
Austrian, -----	9	4
Jugo-Slav, -----	0	22
Croatian, -----	0	5
Bulgarian, -----	0	3
Welch, -----	0	2
<b>TOTAL, -----</b>	<b>155</b>	<b>115</b>

19. WASHING PLANT  
OPERATIONS:

The washing plant crew resumed work on April 2nd and undertook the following work between that date and May 10th.

The third log washer was assembled and with the exception of the motor, put in shape for service. While it was deemed advisable to have a third log available in case we were not able to get capacity from the two logs, this machine was not put in service during the season and we established, beyond any doubt, our ability to get out our scheduled requirements from this plant by the use of two logs.



HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

19. WASHING PLANT  
OPERATIONS:

The tailings discharge pipes were installed.

The water supply channels, leading to the washing plant pumps, were deepened and the pumps were moved to a point where comparatively clean water could be secured for washing operations.

The air compressor was put in service.

The chutes and cushion boxes for the various machines were installed.

The 36" conveyor belt was put on, the weighing machines installed; the various motors placed; the jaw crusher assembled; timber wings provided for the receiving bin and the grounds were cleaned.

Washing plant operations were started on May 12th and completed October 21st.

During May only a small tonnage was put through the plant, as the wet, sticky nature of the ore made it necessary to remodel the chutes under the grizzly and to make other changes. The pressure on the water supply line caused a breakage of joints and it was necessary to weld them.

There were numerous delays on account of over-feeding the Symons crushers and it was necessary to reduce the speed of the pan conveyor feed.

Operations were much improved in June, although there were some delays while necessary adjustments were being made.

On June 11th the shaft of one of the Symons crushers was stripped and a new one had to be put in. There was no shut-down on this account as a spare shaft was provided from one of the Hill-Trumbull Symons crushers.

On June 12th a bolt of lightning burned out a coil on the motor of the generator set. A duplicate set from the Boeing Mine was taken to the Holman-Cliffs plant and washing operations were resumed on the night of June 13th.

The vibrating screens were installed on the 4th and 5th of July, while the plant was shut down.

The service laboratory was put in operation August 4th.

After the various adjustments were made and the tracks in the pit were put in shape, the mill operations were quite satisfactory. At times the feed had to be cut down, due to the coarse material

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

19. WASHING PLANT  
OPERATIONS:

furnished, which taxed the crushing capacity of the plant, on account of the low grade painty ore, which could only be run through the mill in a limited quantity.

There was produced from the Holman-Cliffs washing plant during the 1930 season - 657,638 tons of Concentrates, divided: 540,508 tons of Holman; 10,346 tons of Brown and 106,784 tons of North Star ore.

The rock rejects from the mill during 1930 were as follows:

	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>
Holman, -----	69,397	33.06	.050	45.80
Brown, -----	1,053	26.44	.054	55.49
North Star, ----	14,832	32.28	.050	48.28

The gross recovery obtained in treating the Holman-Cliffs ores were as follows:

Holman -	68.41%
Brown -	65.00%
North Star	69.95%

This compares with an estimated gross recovery of 60.00%, assumed in setting up our ore estimate.

The iron unit recovery for 1930 is as follows:

Holman -	83.34%
Brown -	85.91%
North Star	83.92%

These iron unit recoveries are considerably lower than that obtained at the Hill-Trumbull property. This is due mostly to the painty character of the ore treated and in part to the higher Iron content in the rocky mill rejects.

The analyses of the product from the several machines for the year 1930 follows:

<u>Holman Mill Machines</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Screens, -----		53.23	.100	12.37
Logs, -----		55.54	.085	10.01
Classifiers, -----		53.98	.064	14.39
Tailings, -----		28.78	-	-
<u>Brown Mill Machines:</u>				
Screens, -----		--	--	--
Logs, -----		52.20	.080	14.35
Classifiers, -----		51.45	.067	19.83
Tailings, -----		20.38	-	-

HOLMAN-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

19. WASHING PLANT  
OPERATIONS:

North Star Mill Machines

	<u>Iron</u>	<u>Phos.</u>	<u>Silica</u>
Screens, -----	51.47	.101	15.75
Logs, -----	55.49	.060	11.83
Classifiers, -----	54.63	.049	15.13
Tailings, -----	26.94	-	-

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

1. GENERAL:

During the first two months of 1930 the only activities at the Canisteco-Cliffs Mine consisted in the de-watering of the pit and the handling of supplies and equipment received at the property.

In March it was decided that a temporary track should be put in from the D. M. & N., main line siding to the Canisteco-Cliffs property in order to expedite the carrying out of the opening and construction program, which had been approved for this property. The work on the temporary track was started on March 24th and completed by April 9th. The track was laid from the D. M. & N., siding to the point of depression for the approach, leading in to the Canisteco pit. From this point the main line track to the washing plant and the loading track for stripping operations were constructed.

When the track work had progressed to a point, where fills were to be started, the contractor began the erection of trestles.

When track facilities had been extended to the washing plant by August, construction work on the concentrator was begun, and the work on this structure was completed in November. The concrete job was undertaken by the E. W. Coons Company and the steel work by the Worden-Allen Company. The installation of machinery was started with our Hill-Trumbull washing plant crew November 1st and was well advanced by the end of the year. It is anticipated that the installing work will be pretty well completed by the first of February.

Stripping operations were started during the latter part of May. This work progressed quite satisfactorily, the excavation for the approach being completed by the middle of November and stripping operations on the East side of the North Bovey forty were well advanced by the end of the year. The stripping program will be carried forward into 1931, until such time as weather conditions become too severe and it is advisable to close it down.

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

No ore was produced from the Canisteco-Cliffs Mine during 1930.

g. Delays:

The following list of delays were reported in connection with the Canisteco-Cliffs operations during 1930:

<u>Date:</u>	<u>Time Lost</u>	<u>Cause:</u>
July 1st,	2 - Hrs.	Soft bottom in stripping bank, using mats.
July 2nd,	3 - "	" " " "
July 12th,	3 - "	No power - lightning storm.
July 15th,	1 - " 45 Min.	Main switch kicking out.
July 16th,	1 - " 45 "	Fuses burned out.



CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

g. Delays: (Continued)

<u>Date</u>	<u>Time Lost</u>	<u>Cause</u>
July 17th,	30 Min.	Cars off track.
July 20th,	45 "	Loose connection, hoist motor.
July 25th,	3 Hrs. -	Soft bottom in stripping bank.
August 1st,	2 " -	Repairing floats.
	- 30 "	Dipper trip cable broke.
August 6th,	2 " -	Water supply for locomotives in-adequate.
August 7th,	4 " -	Broken shovel cable.
August 11th,	1 " -	Switch lever disconnected.
August 12th,	1 " -	Cars off track.
August 19th,	- 30 "	" " "
August 19th,	- 30 "	No power, forest fires burned pole line.
August 20th,	1 " 30 "	Putting shovel on mats.
August 22nd,	- 30 "	No power.
August 28th,	- 30 "	Cars off track
August 29th,	1 " -	Trip motor cable broken.
September 3rd,	2 " -	Short circuit in generator.
September 11th,	4 " -	Electric storm, water on swinging engine motor; loading track washed out.
September 12th,	20 " -	Shut down account of rain.
September 17th,	2 " -	Collapse of dump trestle.
September 18th,	- 30 "	Trip motor cable broken.
September 22nd,	2 " 30 "	Broken hoisting cable.
September 26th,	1 " 30 "	Repairs to motor and resistance.
October 2nd,	1 " 30 "	Cars off track.
October 17th,	3 " -	Water supply line for locomotives frozen.
October 20th,	1 " 30 "	" " " "
October 23rd,	18 " -	Armature on hoist motor burned out.
October 26th,	2 " 15 "	Hoisting cable broken
October 24th,	2 " -	Trouble with hoist motor.
October 29th,	1 " -	Cars off track.
November 3rd,	3 " -	Broken axle locomotive #156.
November 10th,	2 " 30 "	Broken connection on cut-outs.
November 14th,	1 " -	Cars off track
November 15th,	- 45 "	" " "
November 20th)		
November 21st)	34 " -	Wet weather - track beds too soft.
December 4th,	- 30 "	Cars off track.
December 5th,	- 30 "	" " "
December 6th,	2 " -	No voltage on exciter.
December 11th,	4 " -	Locomotive off track (at shovel)
December 12th,	2 " -	Broken hoisting cable.

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

2. PRODUCTION,  
SHIPMENTS &  
INVENTORIES:

g. Delays: (Continued)

<u>Date</u>	<u>Time Lost</u>	<u>Cause</u>
December 16th,	1 Hr.	Locomotive #156 broke down.
December 19th,	1 "	Bank caved.
December 20th,	- - 30 Min.	Fuse burned out.
December 22nd,	2 " - -	Bank caved, caterpillars off track.
December 23rd,	2 " - -	Bank caved.
December 26th,	3 " - -	Frozen water line to locomotive supply.

Total, 179 Hrs. 15 Min.

3. ANALYSIS:

No ore was produced during 1930.

4. ESTIMATE OF  
ORE RESERVES:

a. Developed Ore:

Assumption: 14 cu. ft. per ton for Direct Ore.

16 cu. ft. per ton for Wash Ore.

A rock deduction of 10% was applied in this estimate.

The ratio of concentration was figured at 60%.

		<u>WASH</u>	<u>LOW GRADE</u> <u>WASH</u>	<u>LEAN</u> <u>WASH</u>	<u>MERCH.</u>
Snyder, SE $\frac{1}{4}$ -SE $\frac{1}{4}$ Sec.30, --	1,714,000	187,000	285,000		
" SW $\frac{1}{4}$ -SE $\frac{1}{4}$ " --	1,000,000	129,000	78,000		
" SE $\frac{1}{4}$ -SW $\frac{1}{4}$ " --	485,000	-	-		
Total, -----	3,199,000	316,000	363,000		
No. Bovey NW $\frac{1}{4}$ -SE $\frac{1}{4}$ Sec.30, --	302,800	35,900	13,500		
" NE $\frac{1}{4}$ -SE $\frac{1}{4}$ " --	597,500	-	-	229,400	
Total, -----	900,300	35,900	13,500	229,400	
So. Bovey NE $\frac{1}{4}$ -NE $\frac{1}{4}$ Sec.31, --	742,700	78,400	60,900		
Hammens SW $\frac{1}{4}$ -SW $\frac{1}{4}$ Sec.29, ---	1,356,500	178,800	148,000		
Total Wash Concentrates, -	6,198,500	609,100	585,400	229,400	
Total Low Grade Wash "	609,100				
Total Lean Wash	585,400				
Total Merch.,	229,400				
GRAND TOTAL ORE, -----	7,622,400				

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore: (Continued)

The ore estimate of January 1st, 1931 was made at the conclusion of our drilling campaign a year ago. The test-pitting and structure drilling undertaken during 1930 has been for the purpose of ascertaining the grade to be obtained in our 1931 ore operations and has in no way changed the previous estimate.

b. Prospective Ore:

We do not anticipate that future explorations at the Canisteco-Cliffs Mine will prove up any further typical wash ore, but it is quite likely that the ore reserve tonnage will be augmented by additions of lean wash and of the so-called jigging material. Our operations and test-pitting program during the next several years will prove or disprove this assumption.

c. Estimated Analyses:

	<u>Fe.</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Moist.</u>	<u>Fe.Nat.</u>
Bessemer, -----	58.00	.040	10.00	9.00	52.78
Non-Bessemer, -----	58.00	.095	10.00	9.00	52.78

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Labor conditions at the Canisteco-Cliffs Mine were very satisfactory during 1930. No change was made in the wage scale during the year.

b. Statement of Wages & Product:

<u>PRODUCTION</u> (Stripping)	790,711 Cu. Yds.
Number of Shifts operated:	
Single 10 hour shifts,	31
Double 10 hour shifts,	145
Cubic Yards per Shift Operated,	2,463
Average Number of Men Working,	143
Average Wages per Day,	\$4.78
Amount Paid for Labor,	\$ 159,973.28

6. SURFACE:

a. Buildings, Repairs:

Temporary office quarters were secured in Coleraine. A vacant building in the Village was rented from May until October for this purpose.

The residence occupied by F. E. Downing received some interior alterations and repairs; a new roof was put on and the interior was decorated and the outside of the house painted.

Interior decorations were made to the house occupied by Clerk Lemire.

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

6. SURFACE:

c. Tracks, Roads, Transmission Lines:

(1) Tracks:

The slow progress made by the Great Northern Railway Company in putting in their spur to the Canisteco-Cliffs Mine and washing plant, made it apparent that we could not depend on a delivery of supplies and equipment by the railroad in time to start our operations according to schedule. It was, therefore, decided to build a temporary track, 6,000 feet long, from the D. M. & N., siding to the point of depression of the proposed approach to the pit. This temporary track work was started on March 24th and completed April 9th.

From the North end of the temporary track, the construction of our main line to the washing plant was carried forward. Two thousand feet of single track had been laid by April 12th, using up all the rail that we had on hand at that time. While waiting for a further shipment of rail, the track crew was engaged in transferring the ties from the store piles in the old Oliver approach to the yards near the end of the temporary track. This gang was also engaged in clearing and grading the railway right-of-way to the washing plant and the approach.

Track laying was resumed on April 26th and one line constructed to the point where the fill started, by May 23rd. This track was raised to sub-grade, the trestle was constructed and the track was extended to the washing plant by July. On account of the height of the fill to the washing plant it was necessary to make two fills, a trestle for the first fill being filled and the track laid, as mentioned above, in July.

Work on the second main line track was started in June. The fill for this track was made by fanning from the first track. This track was laid from the approach to the trestle by August.

The ballasting of the tracks was started in August and finished during the fall months. There probably will be some additional ballasting to be done in the spring.

A section of the dump trestle was ready for use in September and a track was laid from the washing plant main line for the disposal of stripping. This track was extended from time to time as the construction of the trestle progressed.

Late in the fall a second track was laid along the South side of the stripping dump and fanning operations were started.

The second lift of the washing plant trestle was started in August and completed by the end of the year. The track was laid and filling operations carried on as the class of material handled warranted, throughout the fall months.

The laying of the loading track for the approach stripping was started early in May and was ready for use by the 24th of the month.



CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

6. SURFACE:

c. Tracks, Roads, Transmission Lines: (Continued)

As the work in the first cut advanced, the loading track for the next cut was laid behind the shovel. This method was followed for the entire approach stripping operation. When the excavation for the approach had been finished, a double track system was brought to final grade and lined and the ballasting material placed during the fall months.

A temporary track was laid in to the shop site early in the summer for the delivery of building material and equipment.

The tracks, leading from the main line to the shop buildings, were placed during December. A yard track was put in West of the main line and North of the point of depression during the latter part of the year.

The Great Northern connection was completed in the fall and 2,400 feet of the temporary line had been removed by the end of the year. It is the intention to remove the balance of this line as conditions warrant.

The construction of the Great Northern spur was started in the late spring and had reached the point of depression by the fore part of September. The construction and ballasting work had all been completed by the end of November.

(2) Roads:

A contract was let to N. P. Swanson for the building of a road, leading from the Arbo Highway to the shops and washing plant. This job was started early in May and completed in August.

(3) Transmission Lines:

A transmission line, leading from the sub-station on the South side of the property, was extended around the East and North sides of the pit to the shop site. This work was begun early in May and completed by the 21st of that month. This line was constructed to furnish power for the pit and shops and for general lighting purposes. A small power line was run North from the shop location toward the washing plant to provide power for the pump furnishing water to the locomotives.

The Minnesota Power & Light Company built a power line to the washing plant site during the fall.

A telephone line was constructed to serve the mine office and washing plant, during the fall.

7. OPEN PIT

The loading track for the first approach cut was laid on the surface, comparatively little grading being necessary. This track was laid along the North limits of the approach and was ready for service May 24th.

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

The electric shovel started loading on May 26th. The first cut was started near the old Oliver drainage ditch to provide dry material for track fills. If the cut had been started at the point of depression we would have encountered muskeg material, undesirable for fill for tracks and also the drainage condition would have been bad. A total of eight cuts were necessary to complete the approach excavation. Several of these cuts extended the full length of the approach, while others were shorter, as operations were carried down to the desired grade.

From the beginning of operations, to July 15th, progress was slow and the yardage relatively small. This work was conducted on day shifts only and the material loaded was used for raising the tracks. The disposal of the material was slowed up on this account.

Night shifts were started July 15th, and the first lift of the washing plant trestle being ready for filling at that time, the material was disposed of to much better advantage than previously. The stripping operation was slowed down at times on account of the hardpan encountered in the bottom of the approach cuts.

In connection with the digging of the approach, one stripping cut was taken along the West side of the North Bovey forty. At this time test-pitting had disclosed the fact that the ore in this area was not of high enough grade to be mined by itself and it was decided to strip along the East side of the North Bovey Bay for the first year's ore supply and further stripping on the West side of the Bay was abandoned for the time being.

The last approach cut was finished on November 13th and the shovel was moved to the East side of the North Bovey forty. The first stripping cut here was completed December 5th; the second December 19th and the third on December 31st. Loading conditions were very satisfactory in this area and no trouble of moment was encountered with the frost.

About the first of November a gasoline shovel was rented and was employed during the balance of the year in casting track benches in connection with stripping operations. This work was practically completed by the end of the year. It was necessary to provide two stripping track benches, as the bank was too high to be taken with a shovel of the capacity of 120-B, with one lift.

d. Timbering:

Statement of Ties & Timber used:

<u>Amount</u>	<u>Kind</u>	<u>Price</u>	<u>Total</u>
32,527	Standard Ties	.95 ea.	\$ 30,900.65
142	Undersized Ties	.50 "	71.00
20 Sets	Switch Ties	65.00 Set	1,300.00
7,214	Ft. Mud Sills	17.9¢ ft.	1,295.70
4,480	Ft. Stringers	.30 ft.	1,344.00
41,446	Ft. Trestle Legs	21.78¢ ft.	9,028.11
105,400	Ft. Poles	.035 ft.	3,688.99
711	Ft. Cap Timber	.30 ft.	213.30
	Grand Total,		\$ 47,841.75

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

f. Explosives, Drilling & Blasting:

<u>KIND</u>	<u>AMOUNT</u>	<u>PRICE</u>	<u>TOTAL</u>
1-1/8 x 8 - 35% Hercules L.F.Amm.Gelatin	8,150 lbs.	\$11.42	\$ 930.73
1 1/4 x 8 - 40% Hercules L.F.Amm.Gelatin,	1,600 "	12.00	192.00
1 1/4 x 8 - 40% Hercules L.F. Extra	7,750 "	11.49	890.63
7/8x8 - 40% Hercules L.F.Extra	750 "	11.25	84.38
1 1/4 x 8 - 35% Hercules L.F. Extra	1,000 "	11.00	110.00
#6 Hercules Blasting Caps,	11,500 "	15.45	133.25
8' #6 Hercules Elec.Blasting Caps,	2,300 "	8.95	154.39
Clover Fuse,	18,600 ft.	7.20	107.14
Crescent Fuse,	3,000 ft.	7.80	18.72
Hercules Blasting Machine, 1-50 Hole	1	35.00	35.00
2# Spools #20 Conn. Wire (55 Spools)	110 lbs.	38.78	42.64
1, 250 ft. Coil #16 Duplex Lead Wire,	6.8 lbs.	31.78	2.16
#2 Hercules Cap Crimpers & Fuse Cutters	6	.75	4.50
GRAND TOTAL, -----			\$ 2,705.54

g. Open Pit Mining & Loading:

No ore operations were undertaken in the Canisteco-Cliffs pit during 1930.

k. Drainage:

Pumping operations, which were started in December of 1929, were continued throughout the year 1930. From January 1st to May 5th, the two 7,000-gallon pumps were operated twelve hours per day, being from 7:00 P.M., to 7:00 A.M., and twenty-four hours on Sundays and holidays. Dump power rates were in force from April 1st to April 21st and from April 21st to May 5th we operated on second-class power. On May 5th, the dump power rates were restored and the pumps were operated twenty-four hours per day until the 26th of that month, when stripping operations were started. From this time to the end of the year, only one pump was in service, operating only at such times as the electric shovel was idle. This pumping program averaged about three hours per day, with the exception of Sundays and holidays, when the pumps operated twenty-four hours. The reason for carrying on the program in this manner was to secure the best power rates. It was not permissible to operate the pumps at the same time with the electric shovel as this would have raised the peak so high that the rates would have been increased. The water level in the pit was about maintained and it will be possible to entirely drain the pit at any time that this is necessary by working the two pumps constantly over a period of from two to three weeks. It is not necessary at this time, nor will it be during the summer of 1931, to drain all of the water from the pit in the conducting of our ore operations, as now planned.

During the year it was necessary to extend the pump discharge lines several times, as the rafts settled with the lowering water and it was necessary to push them away from the bank into the deep channel.

CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

7. OPEN PIT:  
(Continued)

k. Drainage: (Continued)

The total fall of the water during the year was 81.7 feet from an elevation of 1251.3 to an elevation of 1169.6. The total fall in the water since pumping operations were started in December, 1929 is 86 feet. The lowest level reached in the pumping operations was in August, since that time there has been a slight rising in the water level, due to our limited pumping operations.

8. COST OF OPERATIONS:

No mining operations were undertaken during 1930.

9. EXPLORATIONS AND "FUTURE EXPLORATIONS:

Test-pit work was started along the West bank of the North Bovey Bay early in July and completed October 23rd. A total of twenty-one pits were put down. During December, four shallow pits were sunk in this area to determine the quality of cretaceous material to be dug in connection with the approach.

Test-pitting was started in the West Snyder area to be mined in 1931, on October 25th and this work was completed at the end of the year. Forty-seven shallow pits were sunk here.

Test-pitting, to determine the character of the ore to be mined from the Bovey property in 1931, was started on the East side of the North Bovey Bay on November 30th and a total of forty-six pits had been put down when the work was completed December 11th.

A churn drill was moved from the Holman-Cliffs to the Canisteco-Cliffs and started putting down test holes the middle of December. Two holes were completed by the end of the year and four more will be sunk before the job is completed. It was necessary to put down these test churn drill holes, as water conditions prohibited the sinking of test-pits over a certain area.

10. TAXES:

The following statement shows the taxes and average rate for the years 1930 and 1929:

	<u>1930</u>	<u>1929</u>	<u>Increase</u>	<u>Decrease</u>
Canisteco-Cliffs Mine,	\$ 38,777.11	39,854.79		1,077.68
Washing Plant Lands,	282.93	304.92		21.99
Personal Property,	1,580.75	-	1,580.75	
<b>TOTAL, -----</b>	<b>\$ 40,640.79</b>	<b>40,159.71</b>	<b>481.08</b>	
Village Lots,	195.86	192.00	3.86	
<b>GRAND TOTAL, -----</b>	<b>\$ 40,836.65</b>	<b>40,351.71</b>	<b>484.94</b>	
Average Rate, -----	.0780	.0801		.0021



CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

11. ACCIDENTS  
AND  
PERSONAL  
INJURY:

**NAME:** Louis Meyer **DATE:** June 11, 1930.  
**CAUSE:** Meyer together with fellow workmen was engaged in raising track with track jacks. The injured party had just removed a piece of blocking from beneath the ties and had pulled back his right foot. Simultaneously a fellow workman dropped the jack to the ground just as Meyer placed his foot back in its original position. The jack landed on the injured man's foot.  
**NATURE:** Contusion of third, right toe.  
**TIME LOST:** None.

**NAME:** Harry Taylor **DATE:** Aug. 8, 1930.  
**CAUSE:** Taylor, employed as oiler on a 120-B Electric Bucyrus-Erie Shovel had oiled the boom engine and wished to grease the bull-gears which are located on either side of the boom, and between which run the shovel cables. In order to grease the gears, the cups being on the inside, it is customary to slacken the cables, when the oiler goes in between and does the greasing. The engineer had slackened the cables and noted that the dipper bail had "hung-up". He hollered to Taylor, but Taylor evidently did not hear him and stepped in between the gears. The dipper bail dropped and the cables tightened, striking Taylor and knocking him to the ground, a distance of approximately fifteen feet.  
**NATURE:** Contusion and laceration lower lip - Contusion of the lower chest posterior and left hip.  
**TIME LOST:** Twenty-nine and 1/2 Days.

**NAME:** Joe Skorich **DATE:** Sept.17, 1930.  
**CAUSE:** Skorich was engaged in dumping a 20-yard car of dirt. Three cars had already been dumped and the train moved ahead another three cars. The fourth car had been dumped by a fellow employe after which Skorich was to dump the fifth car. Immediately after dumping the fourth car, the trestle gave away and Skorich was caught and covered up with dirt when the cars tipped over. Death was instantaneous.  
**NATURE:** Fatal.

**NAME:** Dan Price **DATE:** Sept.17, 1930.  
**CAUSE:** Price was engaged in dumping cars on the trestle. Three cars had been dumped and the train moved ahead another three cars. Price had just dumped a car when he noticed a sway in the trestle and jumped. The trestle gave away and something struck Price on the head as he jumped.  
**NATURE:** Two inch laceration right occipital region. Minor sprain left wrist and left ankle. Laceration left wrist, radial aspect.  
**TIME LOST:** Four and 1/2 Days.

**NAME:** George LaCount **DATE:** Sept.17, 1930.  
**CAUSE:** LaCount was engaged in spiking rails on the trestle. A train of dump cars was being dumped on the trestle about three hundred feet back of where LaCount was working when the trestle gave away. This action caused a jerking and pulling effect on the track being laid on the trestle. LaCount lost his footing and fell through to the ground, a distance of twenty feet.



CANISTEO-CLIFFS MINE  
ANNUAL REPORT  
YEAR 1930

12. NEW CONSTRUCTION  
AND PROPOSED  
NEW CONSTRUCTION:  
(Continued):

In order to lay the tracks from the main line to the dumps it was necessary to build a bridge over the Great Northern Tracks. The trestling to the washing plant gave us some trouble. Part of the first low trestle collapsed when we began dumping in June and we found it was necessary to require more bracing. The second lift trestle collapsed on September 17th, due, in part, to a heavy strain put on the trestle by dumping the cars some distance out from the fill shoulder. After this accident, additional bracing was placed and all dumping was done from the fill shoulder. No further trouble was encountered with the trestle.

The E. W. Coons Company started the concrete work at the washing plant in August and finished this work in October.

The Worden-Allen Company began the erection of the washing plant during the third week in September, and finished all of the steel erection in connection with the washing plant and crusher structure by November 16th.

The Hill-Trumbull washing plant crew started installing machinery in the concentrator on November 1st, and the major portion of the job had been finished by the end of the year. It is anticipated that this installation work will be finished by the end of January.

13. EQUIPMENT AND  
PROPOSED  
EQUIPMENT:

Following is a statement showing equipment purchased during 1930:

	<u>Received:</u>
1 Steam Crane, Type L, 40' Boom,	1-30-30
3 Push Cars,	2- 6-30
17 30-yd. "Western" Drop Door Air Dump Cars,	2-18-30
1 120-B Bucyrus-Erie Electric Shovel,	2-28-30
2 Flat Cars,	2- -30
1 Type A Jordan Spreader,	4-14-30
1 1400 Gal. Self oiling Typhon pump, Gasoline engine driven,	5-19-30
5 19 x 26 Steam Locomotives,	5- -30
2 Four Feet Symons Coarse Cone Crushers,	6-25-30
1 Boiler for Heating Plant ( Locomotive Type),	6- -30
1 1-1/2 ton G.M.C. Truck with stake body,	7- 1-30
1 42" x 40" Superior Jaw Crusher,	8-30-30
2 Door Washers - Type"BDQ Redesign",	9- 4-30
2 Door Bowl Classifiers, "Redesign Special",	9- 4-30
2 8" x 6" Type S-1 Pumps with 120 HP Motors,	9- 4-30
1 "20" Caterpillar Tractor with Air Compressor and scraper,	9- 5-30
3 100 HP Motors to drive crushers,	9-17-30
2 #29 Armstrong All-Steel Blast Hole Drills,	9-30-30
1 Re-manufactured 20" Cincinnati Hy Duty Shaper,	10-15-30
1 No.2 Marble Power Hack Saw,	10-15-30
1 Four Foot Bickford Plain Radial Drilling Machine,	10-15-30