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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison: (Cont.)

Supplies Used - Operating Period:

	1932		1931	
Days Operating	51½		166	
Product	84,046		338,696	
	Total Cost	Cost Per Ton	Total Cost	Cost Per Ton
General Supplies	3,529.04	.042	16,751.58	.050
Iron and Steel	1,413.24	.017	4,664.30	.014
Oil and Grease	493.20	.006	1,584.04	.005
Machinery Supplies	1,773.14	.021	15,534.09	.046
Explosives	5,261.17	.063	21,635.33	.064
Lumber and Timber	10,638.06	.127	43,196.63	.128
Fuel	4,256.37	.051	4,470.26	.013
Electric Power	25,805.77	.307	68,083.03	.201
Sundries	873.54	.001	2,588.01	.008
Other Mines & Accts.	521.64	.006	1,119.59	.003
Total	53,521.89	.637	177,387.68	.524

Supplies Purchased:

	6 Mos. 1932	1931	
		June 1st to Dec. 31st	Jan. 1st to June 1st
Days Operated	51½	87	79
PURCHASES PER DAY:			
General Supplies	60.76	129.20	144.13
Iron and Steel	8.41	19.75	41.41
Oil and Grease	12.20	11.06	11.82
Machinery Supplies	21.23	84.89	198.21
Explosives	102.47	126.51	127.63
Lumber and Timber	76.60	67.53	423.29
Fuel	92.64	39.33	
Electric Power	486.90	436.53	434.47
Sundries	17.57	19.19	19.10
Total	878.80	933.99	1400.06
Average Tons per Day	1632	2046	2033
Purchases per Ton	.538	.456	.689
Less Purchases for Fuel & Power	.355	.232	.214
Purchases Per Ton, All Other Supplies	.183	.224	.475

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8. COST OF OPERATING: (Cont.) b. Detailed Cost Comparison: (Cont.)

Supply Balances:

	On Hand Dec. 31, 1932	On Hand Dec. 31, 1931	Increase	Decrease
General Supplies	6,046.07	8,113.04		2,066.97
Iron and Steel	1,675.00	2,703.57		1,028.57
Oil and Grease	387.70	334.38	53.32	
Machinery Supplies	8,801.43	9,884.13		1,082.70
Explosives	217.01	310.14		93.13
Lumber and Timber	14,887.44	23,561.82		8,674.38
Fuel	2,966.80	3,390.43		423.63
Total	34,981.45	48,297.51		13,316.06

9. EXPLORATIONS and FUTURE EXPLORATIONS:

There was no diamond drilling in 1932. The limits of the Negaunee ore body have been outlined, except for minor rolls in foot and hanging walls.

10. TAXES:

A comparison of taxes paid by The Negaunee Mine Company in 1932 and 1931 follows:

	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
Realty - 213.19 Acres	3,100,000	88,381.00	3,745,000	146,549.34
Personal-Stockpile, Equipt.	1,050,000	29,935.50	855,000	33,457.86
Total by Tax Commission	4,150,000	118,316.50	4,600,000	180,007.20
Collection Fees		1,183.16		1,800.07
Total Opt. Negaunee Mine	4,150,000	119,499.66	4,600,000	181,807.27
Rented Buildings:				
C.C.I. Co.'s First Addition	35,700	1,017.87	35,700	1,397.14
Collection Fees		10.18		13.97
Total Negaunee Mine Co.	4,185,700	120,527.71	4,635,700	183,218.38
Tax Rate		2.851		3.9132
Total City of Negaunee Tax		409,706.92		621,285.41
Negaunee Mine % of City Tax		29.41%		29.5%

The tax rate decreased in 1932, also the valuation as set by the State Tax Commission.

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11. ACCIDENTS AND PERSONAL INJURY:

The following table shows the number and classification of accidents for the years 1932, 1931, 1930 and 1929:

	1932	1931	1930	1929
Fatal	0	0	1	1
Time Lost - Over four months	1	1	2	2
" " - One to four months	1	4	5	4
" " - Less than one month	1	0	3	2
Total Accidents	3	5	11	9
Number of cases paid compensation for accidents prior to Jan. 1st, 1932	14	12	12	7
Number of cases being paid difference in wages (Included in above total.)	4	5	4	3

The nature of the injuries occurring in 1932 is as follows:

The man who lost over one month got an infection in one of his hands from a sliver of wood on the top tram.

The man who lost over four months lost his right eye due to his partner striking him with a bar while barring a puffer in place.

The less than one month accident was caused by a man getting his right leg caught between the car and chute on the top tram.

The Negaunee Mine has finally made a record of six months without a lost time accident and are now entitled to award of knife for each man.

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There were no active E & A.'s at the Negaunee Mine in 1932. There are also none in immediate prospect.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

Only minor repairs to shovel were necessary in winter 1931-1932. There was practically no loading in 1932 so no repairs are required this winter.

b. Stockpile Trestles:

(2) Wooden Trestle:

The wooden stocking trestle erected in 1930 and 1931 to the North of the East steel trestle was filled with ore in the spring of 1932. Ore was stocked from the East steel trestle until the mine closed. In November nine bents were erected at the end of the East steel trestle on ground that had been used in previous years for stocking. About 100 feet of additional ground to the East, was leveled so as to be ready for four more bents in case the present available space was filled before the mine closes at end of April 1933. The four bents will however not be erected unless it is absolutely necessary. The present tram would not take care of a large product as the distance from the shaft is too great, however, on basis of the present hoist there are no delays.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (Continued)

d. Scraper Hoists:

The mine is now supplied with the following scraper hoists: 1932

Company	On Hand 1/1/1932	Purchased 1932	Scrapped 1932	On Hand 1/1/1933	Repair Cost per Machine
Ing.-Rand 15 H.P. Elec.	6	-	-	6	.61
" " 10 " "	5	-	-	5	0
" " Air	11	-	3	8	0
Sullivan 25 H.P. Elec.	2	-	-	2	.92
" 20 " "	1	-	-	1	8.32
" 15 " "	10	-	-	10	2.13
" 6½ " "	10	-	5	5	0
Gardner-Denver 15 H.P. Elec.	2	-	-	2	0
" " 10 " "	3	-	-	3	0
" " 7½ " "	10	-	2	8	17.92
" " Air	4	-	-	4	0
25 H.P. Elec. Scraper Slide from Lake Shore Engine Works	1	-	-	1	0
Total	65	-	10	55	

The small air and electric units are being gradually scrapped and the other machines kept in repair by using parts from the scrapped machines. The use of air scraper hoists has been practically discontinued in 1932 due to high maintenance cost and reduction in number of working places. They are still in use in very wet places where it is impossible to properly protect the motor on an electric hoist.

14. MAINTENANCE AND REPAIRS:

There was no extraordinary maintenance or repairs made in 1932 to equipment or plant.

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15. POWER:

Electric power was supplied by The Cliffs Power & Light Company, a subsidiary of The Cleveland-Cliffs Iron Company. The rate charged for current was 1½¢ per K.W. hour, the same as last year.

The following statement shows a comparison in detail of the power cost for the years 1932 and 1931:

	1932			1931		
	K.W.	Cost	Per Ton	K.W.	Cost	Per Ton
Stoping	16,666	250.00	.003	114,000	1,710.00	.005
Timbering	1,552	23.28	.000	4,235	63.55	.000
Ventilation x	136,320	2,044.81	.024	234,146	3,512.20	.010
Pumping x	731,055	11,965.83	.142	1,615,618	24,234.27	.072
Hoisting x	297,561	4,463.42	.053	958,680	14,380.20	.042
Stocking Ore x	16,222	243.33	.003	50,686	760.29	.002
Dry House x	6,380	95.07	.001	8,887	133.31	.000
Telephones & S. Devices	12,072	181.08	.002	37,616	564.24	.002
Mine Office x	534	8.01	.000	684	10.26	.000
Electric Haulage x	51,453	771.80	.009	116,312	1,744.68	.005
Shops x	4,873	73.10	.001	3,340	50.10	.000
Opt. Compressors x	379,069	5,686.04	.068	1,394,663	20,919.93	.061
Total	1,720,384	25,805.77	.307	4,538,868	68,083.03	.201
Product		84,046			338,696	
K.W. per Ton of Ore		20.47			13.4	
Cost per K.W.		.015			.015	

x Metered Accounts

Ventilation, Pumping, Hoisting, Electric Haulage and Compressors all have continuous running units which combined with the smaller product in 1932 resulted in an increase in cost per ton and K.W. required per ton of ore.

17. CONDITION OF PREMISES:

The grounds around the mine were kept in good condition throughout the year. Expense was curtailed and only necessary work was done.

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18. NATIONALITY OF EMPLOYEES:

This report has been prepared under two statements. The first shows the nationality of the employee as to parentage; for instance, a man has been classified as a Finn when born in this country of Finnish parentage. This naturally shows only a few Americans employed. The second statement separates the nationalities into "Foreign born" and "American born."

As to Parentage	1932	%	1931	%
English	55	25	64	23
Finnish	87	39	102	38
Italian	22	10	32	12
Swedish	24	11	37	13
French Canadians	18	8	21	8
Germans	2	1	3	1
Austrians	4	1	4	1
Norwegians	4	1	4	1
Irish	2	1	3	1
Danish	6	3	6	2
Total	224	100	276	100

As to Birth	Total		American Born		Foreign Born	
	1932	1931	1932	1931	1932	1931
English	55	64	35	38	20	26
Finnish	87	102	31	36	56	66
Italian	22	32	4	6	18	26
Swedish	24	37	9	16	15	21
French Canadians	18	21	16	18	2	3
Germans	2	3	2	2	-	1
Austrians	4	4	2	2	2	2
Norwegians	4	4	2	2	2	2
Irish	2	3	2	3	-	-
Danish	6	6	5	5	1	1
Total	224	276	108	128	116	148
Percentage			48%	46%	52%	54%

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1. GENERAL:

The Maas Mine operated one 8-hour shift two days per week from Jan. 1st to June 1st and then closed down for five months, reopened on Nov. 1st and operated two days a week in November and December. Two crews work underground, four days a week on alternate weeks, and the regular surface crew works on Monday and Wednesday each week. The former night shift surface crew works on Tuesday and Thursday of each week. Each man works the equivalent of two days per week.

Mining operations in the first five months of the year were confined to the same areas as in 1931. These areas were, the footwall pillar at the East end of the mine between the second and third levels adjacent to the Negaunee boundary, the Race Course footwall pillar above the third level almost directly south of the shaft and several areas above the fourth level from the 185' sub, 90 feet above the level, down to the 140' sub, 30 feet above the level. Development work was confined to the Race Course pillar above the third level and to the fourth and fifth levels. A small amount of new ore was developed on the fourth level near the Negaunee boundary south of the Race Course.

Development work in 1932 on the fifth level was confined to completion of the sump and pumphouse and in November and part of December to the advance of the first and second crosscuts in the Race Course. Work was done here only in rock as it was not desirable to increase the ore reserves prior to the yearly examination by the State Tax Commission representatives. The development of the Race Course ore body on the fifth level should no longer be delayed from two standpoints, first, continued production of Bessemer ore, second, to finish mining within the life of the lease.

With the erection of a wood trestle for stocking Maas ore the mine was in shape to take care of stocking the product of the winter 1932-1933. Shipments from the Bessemer stockpile exceeded 70,000 tons and were the largest made from any of the Negaunee District mines. The production of Bessemer ore averaged about 38% of the product in 1932, as compared with 28% in 1931. At the end of the year there was 50,000 tons of Bessemer on stockpile and with a product of 5,000 tons a month for four months, the expected operating period before closing down for six months, there will be about 70,000 tons available for shipment in 1933.

Three crews of twelve timbermen each were employed during the five months idle period repairing on the fourth level and on the various sub-levels and in the raises. After mining ceased there was no pronounced movement of ground in any area, the pressure remained constant and there were only a few breakdowns and caves. Rotting of timber proceeded at an accelerated rate due to lack of air movement. The ventilation fan at the Negaunee Mine continued in operation, but there was no air circulating through the raises nor the sub-levels. The full effects of this condition were not apparent immediately on reopening, but are now showing up. The cribbing in the raises has rotted and is breaking and coming out with the ore. Several gangs are repairing raises during the week and additional crews work on the two idle days at the end of the week. Conditions are particularly bad in the long raises above the third level in the footwall pillar near the Negaunee boundary. Much time and expense will be necessary to keep these raises in condition for continued use.

There were two serious accidents in 1932, a much better record than in 1931 when there was one fatal, three serious and two minor accidents. Stricter observance of safety rules and stricter discipline for infractions are helping to reduce accidents. The hardest thing to overcome is carelessness of the individual which was responsible for most of the accidents in 1932.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

	1932	1931	Decrease
Maas Bessemer	21,106	72,563	51,457
Race Course Bessemer	2,840	14,916	12,076
Maas	63,187	201,960	138,773
Race Course	3,398	16,165	12,767
Total	90,531	305,604	215,073
Rock	6,779	26,780	20,001
Total Hoist	97,310	332,384	235,074

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Maas Bessemer	1,132	58,644	59,776	73,354
Race Course Bessemer		13,273	13,273	9,802
Maas		6,041	6,041	118,726
Race Course				31,485
Total	1,132	77,958	79,090	233,367
Total Last Year	71,662	161,705	233,367	
Decrease	70,530	83,747	154,277	

c. Stockpile Inventories:

Grade of Ore	Dec. 31, 1932	Dec. 31, 1931	Increase	Decrease
Maas Bessemer	37,308	75,978		38,670
Race Course Bessemer	12,469	22,902		10,433
Maas	298,392	241,246	57,146	
Race Course	4,826	1,428	3,398	
Total	352,995	341,554	11,441	

d. Division of Product by Levels:

	1932	%	1931	%
Third Level	25,930	28.6	83,871	27.3
Fourth Level	64,601	71.4	220,297	72.1
Fifth Level	0	0	1,936	.6
Total	90,531	100.0	305,604	100.0

e. Production by Months:

The production by months is as follows:

Month	Maas Bess.	Maas	R.C. Bess.	Race Course	Total	Rock
January	2,815	9,100	223	552	12,690	935
February	1,624	10,073	275	1,023	12,995	1,654
March	3,220	10,006	942	490	14,658	778
April	1,963	9,753	564	472	12,752	504
May	3,724	9,269	291	589	13,873	772
November	2,867	6,490	403	18	9,778	969
December	4,893	8,496	142	254	13,785	1,167
Total	21,106	63,187	2,840	3,398	90,531	6,779
Total 1931	72,563	201,960	14,916	19,737	309,176	26,780
Decrease	51,457	138,773	12,076	16,339	218,645	20,001

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Production by Months: (Cont.)

The product was distributed as follows:

	1932	1931	Decrease
George Maas Lease	68,152	215,309	147,157
Catholic Cemetery	8,084	33,654	25,570
C.C.I. Co. (Right of Way)	2,636	14,179	11,543
American Mining Co.	3,355	7,180	3,825
Race Course	6,238	34,653	28,415
City of Negaunee	2,066	4,201	2,135
Total	90,531	309,176	218,645

f. Ore Statement:

	Maas Bess.	Maas	R.C. Bess.	Race Course	Total	Total Last Year
On Hand Jan. 1, 1932	75,978	241,246	22,902	1,428	341,554	265,745
Product for Year	21,106	63,187	2,840	3,398	90,531	305,604
Overrun						3,572
Total	97,084	304,433	25,742	4,826	432,085	574,921
Shipments	59,776	6,041	13,273		79,090	233,367
Balance on Hand	37,308	298,392	12,469	4,826	352,995	341,554
Decrease in Output					215,073	
Increase in Ore on Hand					11,441	

1932 - 1 8-hour shift, 2 days per week, Jan. 1st to May 31st
Mine Idle June 1st to Oct. 31st
2 days per week, Nov. 1st to Dec. 31st

1931 - 1 8-hour shift, 5 days per week, Jan. 1st to May 1st
4 days per week, May 1st to June 8th
3 days per week, June 8th to Nov. 16th
2 days per week, Nov. 16th to Dec. 31st

1930 - 1 8-hour shift, 6 days per week, Jan. 1st to July 16th
5 days per week, July 16th to Dec. 31st

g. Delays:

There were no delays in 1932.

h. Delays From Lack of Current:

There were no delays from lack of current.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	1932			1931		
Grade	Iron	Phos.	Silica	Iron	Phos.	Silica
Maas Bessemer	63.24	.043	5.47	62.07	.040	6.64
Maas	61.35	.075	6.96	60.44	.074	7.76
Race Course Bessemer	62.72	.042	5.63	61.29	.042	7.95
Race Course	60.46	.073	7.94	59.98	.075	7.83

The average mine analysis on output was higher in 1932 on all grades.

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 12 cu. ft. equals one ton
10% deducted for rock
10% deducted for loss in mining
Percentage of Bessemer equals 10%

Between 2nd and 3rd Levels		1,114,530 Tons
Between 3rd and 4th Levels	- Maas Lease	2,966,338 "
Between 2nd and 4th Levels	- Race Course Lease	478,282 "
Total Above 4th Level	- Dec. 31st, 1932	4,559,150 "

The above estimate shows a decrease of 68,278 tons as compared with the estimate made a year ago. The difference, between this decrease and the product in 1932, 22,253 tons, represents new ore developed during 1932. The new ore was found south of a dike above the fourth level in an area near the Negaunee boundary, south of the Race Course.

Statement showing ore reserves and new ore development for the following years:

	1928	1929	1930	1931	1932
Ore in Mine Jan. 1st	4,502,460	4,787,424	5,975,050	4,651,362	4,627,428
Production	261,454	331,922	416,653	309,176	90,531
Balance	4,241,006	4,455,502	5,558,397	4,342,186	4,536,897
Ore in Mine Dec. 31st	4,787,424	5,975,050a	4,651,362b	4,627,428c	4,559,150
New Ore Developed	546,418	1,519,548	-907,035	285,242	22,253

a Race Course ore body, estimated at 1,500,000 tons, included this year.
b Decrease due to showing ore above 4th level only in Race Course estimate.
c Increase due to a larger outline of ore West of a dike above 3rd level.

c. Estimated Analysis:

Ore Reserves: Approximate Expected Natural Analysis:

	Iron	Phos.	Silica	Mang.	Alum	Lime	Mag.	Sul.	Igni	Moist
Maas & R.C. Bessemer	53.50	.040	6.40	.195	2.00	.80	.225	.008	1.10	12.00
Maas & Race Course	52.45	.060	6.63	.208	2.20	1.10	.320	.010	1.80	12.00

Ore in Stock: Average Natural Analysis:

	Iron	Phos.	Silica	Mang.	Alum	Lime	Mag.	Sul.	Igni	Moist.
Maas Bessemer	54.83	.040	6.01	.194	2.02	.88	.224	.008	.98	11.50
Maas	52.93	.066	6.92	.200	2.10	1.20	.350	.011	1.80	11.75
R.C. Bessemer	54.29	.041	6.69	.180	2.00	.75	.220	.009	1.00	11.50
Race Course	53.13	.062	7.22	.183	2.20	1.00	.250	.010	1.70	11.75

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

There was a 15% reduction in wages effective May 16th, 1932. Salaries were reduced in February and again on June 1st. Employment has been staggered as much as possible in an effort to provide two days labor per week for each man.

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5. LABOR AND WAGES: (Cont.)

a. Comments:

(2) New Construction:

Work was done on E & A. No. 548, Sinking Shaft and Developing 5th Level, during the year. No work was done on E & A. 614, Cleveland-Cliffs Iron Co.'s Second Addition, during 1932. A report of the progress of work under E & A. 548 will be made under heading No. 12, New Construction, Etc.

b. Comparative Statement of Wages and Product:

	1932	1931	Increase	Decrease
PRODUCT	90,531	305,604		215,073
No. Shifts and Hours				
AVG. NO. MEN WORKING:				
Surface	29½	42½		13
Underground	144	197		53
Total	173½	239½		66
AVG. WAGES PER DAY:				
Surface	3.89	4.38		.49
Underground	4.21	5.08		.87
Total	4.13	4.94		.81
AVG. WAGES PER MONTH:	10.16 Days	15.9 Days		
Surface	48.54	69.64		21.10
Underground	40.57	80.77		40.20
Total	42.04	77.65		35.61
PRODUCT PER MAN PER DAY:				
Surface	18.61	30.59		11.98
Underground	5.43	7.71		2.28
Total	4.20	6.16		1.96
LABOR COST PER TON:				
Surface	.209	.143	.066	
Underground	.774	.659	.115	
Total	.983	.802	.181	
AVERAGE PRODUCT MINING:				
Stoping	18.49	20.17		1.68
Ore Development	11.41	8.79	2.62	
Total	18.00	18.91		.91
AVG. WAGES CONTRACT LABOR	4.75	5.54		.79
TOTAL NUMBER OF DAYS:				
Surface	4,863¾	9,990		5,126¼
Underground	16,667¾	39,633		22,965¼
Total	21,531½	49,623		28,091½
AMOUNT FOR LABOR:				
Surface	18,930.29	43,777.81		24,847.52
Underground	70,108.91	201,316.51		131,207.60
Total	89,039.20	245,094.32		156,055.12

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5. LABOR AND WAGES: (Cont.)

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

AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL:

	9 Days per Month
Surface	43.43
Underground	39.36
Total	40.08

The last table giving average wages per month based on mine payroll omits the Captain and Clerk that are carried on the general payroll and are included in average wage statement No. 4 on preceding sheet.

Proportion of Surface to Underground Men:

1932 - 1 to 4.88	1 8-hr. shift, 2 days per week, Jan. 1st to May 31st
	Mine Idle June 1st to Oct. 31st
	1 8-hr. shift, 2 days per week, Nov. 1st to Dec. 31st
1931 - 1 to 4.63	1 8-hr. shift, 5 days per week, Jan. 1st to May 1st
	1 8-hr. shift, 4 days per week, May 1st to June 8th
	1 8-hr. shift, 3 days per week, June 8th to Nov. 16th
	1 8-hr. shift, 2 days per week, Nov. 16th to Dec. 31st
1930 - 1 to 4.49	1 8-hr. shift, 6 days per week, Jan. 1st to July 16th
	1 8-hr. shift, 5 days per week, July 16th to Dec. 31st
1929 - 1 to 3.84	1 8-hr. shift, 5 days per week, Jan. 1st to April 15th
	1 8-hr. shift, 6 days per week, April 15th to Dec. 31st
1928 - 1 to 4.11	1 8-hr. shift, 5 days per week

6. SURFACE:

a. Buildings, Repairs:

There was practically no expense for repair of buildings in 1932 with the exception of the engine house roof. The eaves of the roof of this building were reinforced with sheet iron to prevent tearing of roofing material by accumulation of ice at the eaves.

b. Stockpiles:

During the year the Maas stocking trestle was extended to the West a distance of 168 feet or seven bents. This may provide sufficient room for Maas Ore; it depends, however, on the proportion of Bessemer Ore hoisted. There is ample room available for extension of the trestle, but additional trestle legs will be required if an extension becomes necessary. There was only 6,041 tons of ore shipped from the Maas stockpile in 1932.

Shipments from the Maas Bessemer and Race Course Bessemer piles stocked east of the shaft from the steel trestles amounted to 71,917 tons and made room for the estimated product to be hoisted in 1933.

There is also ample space available for the estimated product of Race Course Ore.

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6. SURFACE: (Cont.)

c. Tracks, Roads, Etc:

The following table gives cost of City water used at the mine each year for the past four years. It shows the saving made by installing a cooling pond with proper regulation of water added to maintain the required temperature.

Year	Cost for Water	Product	Cost per Ton
1929	1946.83	331,922	.0058
1930	1011.19	416,653	.0024
1931	426.94	305,604	.0014
1932	133.58	90.531	.0014

e. Grounds:

Expense for the upkeep of grounds was reduced as far as possible this year. The shrubbery and lawns were kept in good condition throughout the summer, but no improvements were made.

7. UNDERGROUND:

a. Shaft Sinking:

None in 1932.

b. Development:

Development work in 1932 was curtailed due to operating schedule. It was mainly confined to the third and fourth level territory as the only work done on the fifth level was after the mine reopened in November.

Third Level Area:

Some ore and rock drifting was done on the 401 foot sub-level at the East end of the ore body near the Negaunee boundary to provide ventilation for the sub-levels above and a connection was made to the twelfth level Negaunee Mine. The drifts will also be used as a timber transfer and traveling roads.

At the West end of the third level area, development of the ore body on the footwall of the Race Course proceeded until the mine closed down at the end of May. On reopening in November work was not resumed in this area as the ore is all non-Bessemer and an increased product of Bessemer was necessary on account of sales of this grade.

The top of the ore body on the footwall of the Race Course was partially outlined by drifts and the third level haulage drift extended in the footwall so that raises could be put up directly from the third level to this area. All ore from development and mining operations in this territory has been transferred on the 401 foot sub-level and before work is again resumed here it is planned to complete one or more raises directly to this area and eliminate the transfer of the ore.

Fourth Level Area:

The fourth level drift parallel with and 105 feet distant from the Negaunee boundary was extended 115 feet, and a raise put up 75 feet to the 185 foot sub-level elevation. This drift passed through a dike and found ore south of the dike at the fourth level elevation. The raise passed through the dike and was stopped when it encountered the hanging on the North side of the dike. It was put up to mine a small ore body that extended about 25 feet above the 170 foot sub-level at a point beyond the limit of economical scraper haul. It could not be mined economically by a transfer so the main fourth level drift was extended and a raise put up. The new ore developed in 1932, 22,000 tons, was discovered by the drift on the fourth level.

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7. UNDERGROUND:
(Continued)

b. Development:

Fourth Level Area: (Cont.)

The only other development work on the fourth level was done after reopening the mine in November. It consisted of putting up a raise in the West drift, parallel with and 60 feet South of the Race Course boundary, to the 170 foot sub-level to replace a raise that had caved and could not be repaired. In addition to the above raise, a rock drift was started in November to the Southeast from the main crosscut to the shaft to intersect the new crosscut parallel with and 140 feet East of the main shaft crosscut. This rock drift advanced 70 feet and has 60 feet yet to go. When the main shaft crosscut in ore crushes due to mining operations on sub-levels above, haulage from the area South of the Race Course can be continued via the new crosscut.

Fifth Level Area:

There was no work done on this level prior to closing down in May other than work under E & A. No. 548, Sinking Shaft and Developing the Fifth Level. This work was confined to completion of the sump and pumphouse excavation. Work in the pumphouse was resumed in September during the idle period and covered concrete floors, dam in sump, foundation for pumps, etc.

In November upon reopening the mine it was decided to resume drifting in rock and to temporarily stop this work if the ground in the drifts indicated ore might be encountered in a few cuts. This plan would prevent the development of additional ore on the fifth level which might cause the assessed valuation of the mine to be raised when valuations are set by the State Tax Commission representatives on their inspection trip in February or March. Accordingly work was resumed in No. 5 Crosscut, the first one in the Race Course, which was advanced 35 feet through dike into rich jasper where it was stopped. The main footwall drift to the West was then advanced 10 feet and No. 6 Crosscut turned off to the South a distance of 10 feet. Signs in both drifts indicated ore would soon be reached so work was abandoned here also. It is planned to resume work here early in 1933.

The following table gives a summary of the drifting and raising done during the year and a comparison with 1931:

	Drifting		Raising		
Year	Ore	Rock	Ore	Rock	Total
1932	305'	315'	114'	22'	756'
1931	1562'	474'	849'	255'	3140'
Decrease	1257'	159'	735'	233'	2384'

There was an average of five contracts on development work during the first five months of the year, in November three and in December one as compared with an average of nine contracts during 1931. The delay in opening the fifth level in ore accounts for the decrease in number of gangs on development work since reopening the mine.

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7. UNDERGROUND:
(Continued)

c. Stoping:

1. General Remarks:

In 1931 when the mine went on a two day a week schedule, it was decided in the interest of economy, to gradually abandon half of the working places and work the mine four days a week with two crews of men working alternate weeks. The surface crew worked regularly only two days per week, on the other two days only the landing crew worked. This system has been in effect during 1932; it has many advantages over a straight two day a week schedule and has been instrumental in keeping costs down to a reasonable figure during the past year.

During the first five months of 1932, there was an average of 24 contracts mining and 5 on development work. When the mine reopened in November the number of working places were still further reduced and at the end of the year there were 23 contracts mining and 1 on development work.

Most of the ore produced both in 1932 and 1931 came from the fourth level territory. The percentage from the third level was practically the same in both years. Since the mine reopened in November the product from the third level territory has decreased and the fourth level increased. This change was made in order to increase the output of Bessemer ore.

2. Detail of Stoping:

SUBS BETWEEN THE 2ND & 3RD LEVELS:

485 Ft. Sub-Level: East Footwall Pillar:

Mining on this, the second sub below the second level, was started in June 1929, in the eastern end of the pillar and has been continuous until mining was completed in January 1932. One contract worked here about one month in 1932.

475 Ft. Sub-Level: East Footwall Pillar:

Mining started on this sub-level in September 1929 and has since been in progress. At the end of the year there was only one pillar left to mine, which lies in the Roman Catholic Lease. In the early months of the year four contracts worked on this sub-level, but since reopening no work has been done here.

465 Ft. Sub-Level: East Footwall Pillar:

This sub-level was opened in 1929 to serve as a distributing level for timber and other supplies, also at the East end as a transfer drift during the time raises were being put up from the third level. When the raises were completed early in 1930, work on this sub-level ceased until June 1931 when mining was started at the East end of the pillar on the Negaunee boundary. During the balance of 1931 and until the mine closed in May a number of contracts worked on this sub-level. In December 1932 three contracts were mining here, one in the Roman Catholic Cemetery Lease and two further to the West in the Maas Lease. The long raises from the third level to this sub-level were in bad condition following the five months shutdown. Due to drifting in this area many years ago at several elevations adjacent to this sub-level, the footwall pillar is broken and crushed, also the pressure has increased over the entire area of the pillar. The combination of loose ground and pressure makes it very difficult to maintain the raises and increases, very materially, the cost of keeping the raises in repair. For this reason mining should be continued here, otherwise the raises will be lost or, if kept in repair,

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7. UNDERGROUND:
(Continued)

c. Stoping:

465 Ft. Sub-Level: East Footwall Pillar: (Cont.)
will add to the dead work. Since reopening in November two gangs have been engaged in repairing raises and this work must be continued indefinitely.

General Remarks:
Mining on the three above sub-levels has been handicapped by loose ground, heavy pressure and, in several localities, by water. Mining conditions, except in a few places, are not favorable for low costs and even the good places are often delayed on account of repairing the raises.

435 Ft. Sub-Level: West Footwall Pillar:
This sub-level was opened in 1932 under the hanging from a raise, put up late last year, from the 401 ft. sub-level. Two drifts were driven to outline the ore at this elevation. It was found to be merely a small area extending above surrounding areas due to local enrichment in the hanging wall jasper. The ore from this development work was transferred on the 401 ft. sub to a third level raise. On reopening the mine in November work was not resumed here as all the ore here is Non-Bessemer grade. All openings are in new ground so there is no crushing, only rotting of timber to watch and repair as needed.

401 Ft. Sub-Level: West Footwall Pillar:
The West footwall pillar was opened in 1930 and under development during most of 1931. Mining was then started on the footwall and the ore mined by a modified stoping system. Two contracts worked here until the mine closed in May; on reopening work was not resumed in this area.

401 Ft. Sub-Level: East Footwall Pillar:
Considerable work was done on this sub-level many years ago when the ore body was cut up by drifts into small narrow pillars. Work was resumed at this elevation in 1931 when it became necessary to open another sub-level for ventilation and a timber transfer due to mining having reached the elevation of the 465 ft. sub-level. In 1931 and 1932 a connection was completed to the eleventh level Negaunee Mine and several raises connected at the West end of the pillar. There is still a section to connect in the center part of the footwall pillar which when completed will result in all the raises being connected by drifts, with two timber slides in rock from this sub-level to the rock drift in the footwall on the 465 ft. sub-level. This work has been done in anticipation of the continuation of mining in this territory.

365 Ft. Sub-Level: West Footwall Pillar:
Mining in this small area just East of the South extension of the crosscut from the shaft on the third level was started in August 1931 and completed in April 1932.

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7. UNDERGROUND:
(Continued)

c. Stoping:

355 Ft. Sub-Level: West Footwall Pillar:

Work was started on this sub-level in the above mentioned area (365 ft. sub) in May 1932, and one contract was mining here in December. When mining is completed at this elevation work in this area will be abandoned until mining in the area to the West has reached this elevation. This is the fourth sub-level mined in this small area since December 1930.

Third Level:

The only work done on the third level in 1932 was the continuation of the footwall drift 125 feet to the East beneath the Western end of the ore body. This was done to provide for two more raises that will be put up direct to the 401 ft. sub-level and sub above, after which it will no longer be necessary to transfer the ore on the 401 ft. sub-level to the raises near the hanging. This ore body is quite flat and was proven up by raises to the hanging, drifting to the footwall and repeating this plan. By the time the limit of the ore had been reached at the point where the foot and hanging came together the ore had extended 250 feet to the North of the original raises from the third level. The footwall drift was accordingly driven on the third level to eliminate the transfer of the ore on the sub-levels.

SUBS BETWEEN THE 3RD & 4TH LEVELS:

The bulk of the ore mined in 1932 came from the area to the East and South of the Race Course above the fourth level.

195 Ft. Sub-Level:

Mining at this elevation was started in December 1928 and was continuous until in May 1932, when it was completed in the territory available in the present mining limits.

185 Ft. Sub-Level:

This sub-level was opened many years ago to explore near the hanging which showed a considerable flattening over the Southwest part of the fourth level. Mining was resumed in this territory in August 1929 and has been in progress since. In December 1932 three contracts were mining here just North of the Negaunee boundary. Only two small pillars remain to be mined inside the present mining limits, one near the Eastern limit of the block and one, a small riser in the hanging, at the Western end.

170 Ft. Sub-Level:

Mining was started at this elevation in 1930 and in December 1932, nine contracts were mining between the South boundary of the Race Course and the Negaunee Mine boundary. About two thirds of the ore on this sub-level has been mined.

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7. UNDERGROUND:
(Continued)

c. Stoping: (Cont.)

160 Ft. Sub-Level:

Mining has been in progress at this elevation since 1929. The area of this sub-level is quite large as some ore was found under the hanging on the Race Course and directly East thereof. During 1932 one area was mined under the hanging on the North footwall just East of the Race Course, and two other areas South of the Race Course were partially mined. At the end of the year one contract was connecting raises near the Negaunee boundary and one was finishing the mining of the small area near the North footwall. There is a large area yet to be mined near the Negaunee boundary.

150 Ft. Sub-Level:

Work at the North and East end of this sub-level was started in 1930 and in 1932 was limited to a small area lying in and just South of the Race Course. Two contracts were working here in December. The main reserve of Bessemer ore available above the fourth level is on this sub-level.

140 Ft. Sub-Level:

This sub-level is only 30 feet above the fourth level and has only been opened in a few places where crushing of the fourth level haulage drifts was not likely to occur. As soon as the new crosscut on the fifth level just East of the Race Course has been completed and raises put up mining will be resumed on this sub-level. The only work done on this sub-level in 1932 was the mining of a small area near the North footwall along the East boundary of the Race Course.

Fourth Level:

Comparatively little work was done on this level during 1932. The drift parallel with the Negaunee boundary was extended West 115 feet, 20 feet in dike and 95 feet in ore. A raise was put up near the Western end of this extension to the 185 ft. sub-level elevation to mine a small area in the hanging which was found to extend above the workings on the 170 ft. sub-level. This ore was too far from existing raises for economical scraper haul and also would require a transfer.

A raise was put up in November and December in the drift parallel with the Race Course South boundary to the 170 ft. sub-level to replace a raise that had crushed beyond repair.

In November a crosscut was started in the footwall in the crosscut from the shaft, to connect with the new crosscut parallel to and 140 feet East of the Race Course boundary. The crosscut had 60 feet to go at the end of the year.

During the idle period several repair crews worked on the fourth level replacing broken timber in the main haulage drifts. Some areas are beginning to take weight due to mining on sub-levels a short distance above and in these areas the largest available timber was used. The fourth level drifts must be kept open until the fifth level is in commission.

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7. UNDERGROUND:
(Continued)

c. Stoping: (Cont.)

Fifth Level:

In the early part of 1932 excavation of the pumphouse and sump was completed. During the idle period the concrete work was done, covering dam in sump, concrete floors in pumphouse, foundations for pumps, walls in water ditch, cover of suction pit, etc.

Some work was done in November and early part of December in advancing No. 5 Crosscut in the Race Course a distance of 35 feet in dike and also the West footwall drift and No. 6 Crosscut each 10 feet. Work at all three places was temporarily stopped until after the valuations are set by State Tax representatives for 1933.

d. Timbering:

The cost per ton for timber increased in 1932, due to general use of 9' timber, which for safety requires larger size timber, to extra timber used for props in mine in month of May account of closing down June 1st. The timber in yards has been in stock from two to three years due to curtailment in operating schedule in 1931. It is dry and not as strong as green timber. As a safety measure the size of timber used has been stepped up about two inches. The smallest timber used for sets is now 10" in diameter as compared with 8" when green timber was available. The 8" and 9" timber in stock is being used for props and cribbing. The use of larger size timber in mining has increased the cost per ton. Since reopening in November repair work has been very much above normal, increasing the amount of timber used, also the labor cost. There was also a decrease of 100 tons in the average daily product which increased the cost per ton.

More poles were used in covering down on sub-levels to make a mat, due to opening new ground under the hanging and in an effort to make a more impervious covering to eliminate runs of rock. The use of wire fencing in covering down decreased in 1932 due to confining its use to areas under the jasper hanging and adjacent to dikes.

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7. UNDERGROUND:
(Continued)

d. Timbering: (Cont.)

Statement of Timber Used:

	Linear Feet	Avg. Price per Foot	Amount 1932	Amount 1931
6" to 8" Cribbing Timber	13,890	.050	690.37	2231.28
8" to 10" Stulls	19,458	.063	1221.05	3002.17
10" to 12" "	17,939	.085	1533.36	5087.88
12" to 14" "	16,821	.113	1904.88	4223.78
12" to 14" Treated Timber	711	.269	191.06	425.61
Total Timber - 1932	68,819		5540.72	
Total Timber - 1931	199,897			14970.72
		Per 100'		
7' Lagging	331,156	.593	1965.34	7096.63
9½' Poles	231,343	1.378	3188.99	9458.50
Total - 1932	562,499		5154.33	
Total - 1931	1,717,149			16555.13
Wire Fencing (190 rods) sq. ft.	8,896	.855 Rd.	162.45	1354.03
Grand Total - 1932			10857.50	
Grand Total - 1931				32879.88
Product			90,531	305,604
Feet of Timber per Ton of Ore			.076	.6541
Feet of Lagging per Ton of Ore			3.6579	3.4377
Feet of Poles per Ton of Ore			2.5554	2.1814
Feet of Wire Fencing per Ton of Ore			.0982	.3657
Feet of Lagging per Foot of Timber			4.8119	5.25518
Feet of Poles per Foot of Timber			3.3616	3.33500
Cost per Ton for Timber			.0612	.0490
Cost per Ton for Lagging			.0217	.0232
Cost per Ton for Wire Fencing			.0018	.0044
Cost per Ton for Poles			.0352	.0310
Cost per Ton for All Timber			.1199	.1076
Equivalent of Stull Timber to Board Measure			170,934	462,040
Feet of Board Measure per Ton of Ore			1.888	1.512

Total Cost for Timber, Lagging, Poles, Etc. and Cost per Ton:

Year	Amount	Cost per Ton
1932	10,857.50	.1199
1931	32,879.88	.1076
1930	42,731.94	.1025
1929	43,332.70	.1305
1928	28,083.62	.1074
1927	23,097.31	.0855

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7. UNDERGROUND:
(Continued)

f. Explosives, Drilling and Blasting:

The cost per ton for all explosives decreased from $ .0629 to $ .0593 per ton due to closer supervision and to use of Gelamite "A" at $ .1262 per lb. instead of 60% Ammonia Gelatin at $ .1398 per lb. This is the first year in the last six years that the cost for explosives has been below $ .06 per ton. There was also a slight reduction in the cost per lb. for nearly all grades of dynamite.

Statement of Explosives Used: (Ore Development and Stoping)

		Quantity Pounds	Average Price	Amount 1932	Amount 1931
1¼" 50% Ammonia Gel. Powder		17,675	.1207	2133.83	5159.73
1¼" 60% " " "		400	.1398	55.94	9706.70
1½" 50% " " "		250	.1225	30.62	
1¼" Gelamite "A"	"	16,840	.1262	2125.56	848.13
1¼" " 1X	"	300	.1275	38.25	172.12
Total Powder - 1932		35,465	.1236	4384.20	
Total Powder - 1931		119,695	.1327		15886.68
Fuse	Ft.	125,373	.575 C'	721.28	2399.91
Blasting Caps #6	No.	20,132	1.119 C	225.40	779.92
Powder Bags	Ea.	5	2.964	14.82	109.63
Tamping Bags		3,000	2.25 M	6.75	32.25
Fuse Lighters		2,500	7.83 M	19.57	18.90
Total Fuse, Caps, Etc.				987.82	3340.61
Total All Explosives				5372.02	19227.29
Product				90,531	305,604
Pounds of Powder per Ton of Ore				.3917	.3917
Cost per Ton for Powder				.0484	.0520
Cost per Ton for Fuse, Caps, Etc.				.0109	.0109
Cost per Ton for All Explosives				.0593	.0629

Rock Development & Filling:

1¼" 50% Ammonia Gel. Powder		75	.1225	9.19	190.40
1½" 50% " " "		200	.1253	25.06	695.21
1¼" Gelamite "A"	"	3,750	.1252	469.56	184.62
Total Powder - 1932		4,025	.1252	503.81	
Total Powder - 1931					1070.23
Fuse	Ft.	8,070	.59 C'	47.69	147.90
Blasting Caps #6	No.	1,535	1.119 C	17.18	46.44
Powder Bags					2.90
Total Fuse, Caps, Etc.				64.87	197.24
Total All Explosives				568.68	1267.47
Total All Explosives Used in Mine				5940.70	20494.76
Average Price per Pound for Powder				.12377	.13265

48% of All Powder Used in 1932 was 60%
65% of All Powder Used in 1931 was 60%

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7. UNDERGROUND:
(Continued)

f. Explosives, Drilling and Blasting: (Cont.)

Statement showing cost per ton for explosives exclusive of rock development for the period 1928-1932 inclusive:

Year	Cost per Ton	Product
1932	.0593	90,531
1931	.0629	305,604
1930	.0603	416,653
1929	.0654	331,922
1928	.0607	261,454

g. Idle Period:

An analysis of the year's operations shows five distinct periods as follows: operating, closing down, idle, reopening and operating periods. Under the heading idle period the three periods, closing down, idle and reopening, are grouped together.

The mine closed the last of May and for two weeks a crew of men were employed in removing to surface the miners' tools, scraper hoists, motors from haulage locomotives, in fact, all equipment that could not be left idle underground for a period of five months. Another group built bulkheads in drifts on the sub-levels near the raises and installed props. When this work was completed the three regular repair crews of twelve men each, each working two days per week were organized and continued to work during the idle period. Their work was largely on the main levels where rotten and broken timber was replaced. Toward the latter part of the idle period some work was done in repairing of raises. There was relatively little crushing on the sub-levels due to propping, bulkheads and no movement of ground. On reopening Nov. 1st, the equipment, which had been overhauled during the summer, was taken underground as needed. Men were taken back gradually and it was near the end of the month before the full crew was back at work. Due to deaths, rearrangement of work, etc. about 16 men have not been reemployed.

The effect of the five months idle period was not immediately apparent on reopening. Work was resumed on the sub-levels and for a short time proceeded as if there had been no idle period. Then rotted cribbing and hardwood lining planks started to come out of the raises and repairs had to be undertaken. The rotted cribbing had to be replaced and the raises lined with hardwood plank. The old hardwood plank in the raises rotted rapidly in the hot, moist air during the idle period, as also the cribbing. For the balance of the year several repair gangs as well as a number of mining contracts were engaged in this work and it will continue until most of the raises in use have been repaired. Aside from the cost of the repair work, it interferes with production as two or more ore contracts have been idle continuously since reopening.

The main ventilation fan at the Negaunee Mine was continued in operation during the idle period, but there was little or no circulation in the raises or on the sub-levels.

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7. UNDERGROUND:
(Continued)

h. Mining and Loading:

Larger scrapers are now in general use, as the doubling up of contracts reduced the number of scraper units in use so that all contracts now have the larger electric units, nearly all of which are 15 H.P. No change was made in mining practice, all contracts try to complete the cycle each shift, i.e. drill, blast, timber and muck. Due to crushing making repairs necessary it is not always possible to complete the cycle. Nine foot legs and caps are now in general use throughout the mine. Due to rotting of timber, especially in the raises, during the idle period, mining has been interrupted in many contracts while they were repairing the raises. The serious effects of reduced operating schedules and idle periods will continue for several years after operations again become normal and will increase the cost per ton in spite of every effort to effect economies. This condition applies to all three mines in the Negaunee District but particularly to the Maas, which has to maintain a large area of openings, as a result of the necessity in past years of maintaining the surface. In large mines like the Maas where the pressure is heavy and the level interval 200 feet making long raises necessary, economical mining demands rapid extraction of the ore in order to avoid excessive costs for repairs.

i. Ventilation:

The volume of air coming to the Maas from the jointly owned fan at the Negaunee Mine has been satisfactory during 1932. The problem has been to provide adequate ventilation on the sub-levels by means of booster fans and ventilation doors. This work is constantly underway, for the airways on the sub-levels crush due to mining and booster fans must be installed and new ventilation doors built.

j. Pumping:

The number of gallons pumped per minute during 1932, 1931, 1930 and 1929 are shown below:

Month	1932	1931	1930	1929
January	1103	925	1101	1076
February	1156	1114	1042	1089
March	1105	1124	1036	1075
April	1090	1149	1080	1009
May	1085	1147	1094	1023
June	1070	1134	1109	1014
July	1083	1135	1106	1018
August	1079	1061	1095	1030
September	1076	1091	1103	1062
October	1087	1115	1202	1102
November	1089	1113	1147	1064
December	1101	1232	1108	1058
Total Average	1094	1112	1102	1052

The average number of gallons pumped per minute over the last six years is as follows:

Year	Gals. per Min.
1932	1094
1931	1112
1930	1102
1929	1052
1928	1052
1927	1013

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7. UNDERGROUND:
(Continued)

k. Underground in General:

Several times already in this report comment has been made relative to conditions underground due to the curtailed operating schedule. Conditions are not good, as the proportion of cost of repairs to tons of ore mined is away out of line with a normal operating schedule.

The mine is kept clean and neat as this promotes safety and economy. Close watch is kept on the supplies in the mine to eliminate waste. Purchases of new material were sharply reduced in 1932, all usable supplies are salvaged and used again.

The use of wire fencing as a covering on floors of sub-levels decreased somewhat, as this material is now only used in areas near the hanging or where there is not a good mat. Poles were in general use for covering down and the mat is gradually getting much better. Runs of rock from the sub above are decreasing and as a result the grade of the ore is improving.

There is danger, however, that the mat in some areas, that are hot due to crushing, will rot before mining reaches them again.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1932	1931	Increase	Decrease
PRODUCT	90,531	305,604		215,073
Underground Costs	1.337	1.241	.096	
Surface Costs	.170	.156	.014	
General Mine Expenses	.428	.271	.157	
Cost of Production	1.935	1.668	.267	
Depletion - Original Cost	.073	.074		.001
Depreciation - Plant & Equipt	.046	.047		.001
Development	.039	.039		
Movable Equipt	.010	.003	.007	
Taxes	.635	.447	.188	
Loading & Shipping	.045	.020	.025	
Total Cost at Mine	2.783	2.298	.485	
Reopening Expense	.022		.022	
Idle Expense	.930		.930	
TOTAL COST	3.735	2.298	1.437	
No. of Days Operated	60½	191		130½
No. of Shifts & Hours	1-8	1-8		
Average Daily Product	1,496	1,600		104

COST OF PRODUCTION:

	1932	%	1931	%	Increase	Decrease
Labor	.838	43.3	.833	50.0	.005	
Supplies	1.097	56.7	.835	50.0	.262	
Total	1.935	100.0	1.668	100.0	.267	

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Worked	Shifts & Hours	Men Employed	Total Days Worked
1932	60½	1-8	173½	21,531½
1931	191	1-8	239½	49,623
Decrease	130½		66	28,091½

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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:

(2) Wages:

In 1932 wages were reduced 15% on May 16th, salaries were reduced on February 1st and again on June 1st.

In 1931 wages were reduced 10% on October 1st and salaries 16-2/3% on June 16th.

The total wage reduction in 1931 and 1932 was 23½%.

The total salary reduction in 1931 and 1932 was approximately 45%.

(3) Comparison of Production:

Production - 1932	90,531 Tons
" - 1931	305,604 "
Decrease	215,073 "

(4) Comparison of Number of Men and Wages:

	No. Men	No. Days	Amount	Rate per Day
1932	173¼	21,531½	89,039.20	4.13
1931	239½	49,623	245,094.32	4.94
Decrease	66	28,091½	156,055.12	.81

(5) Tons per Man per Day:

	1932	1931	Decrease
Surface	18.61	30.59	11.98
Underground	5.43	7.71	2.28
Total	4.20	6.16	1.96

(6) Cost of Production:

1932	$ 175,226.87	Cost per Ton	$ 1.935
1931	509,916.44	" " "	1.668
Decrease	$ 334,689.57		
Increase			$ .267

	Total Cost				Cost per Ton		
	Labor	%	Supplies	%	Labor	Supplies	Total
1932	75,903.16	43.3	99,323.71	56.7	.838	1.097	1.935
1931	254,735.56	50.0	255,180.88	50.0	.833	.835	1.668
Incr.				6.7	.005	.262	.267
Decr.	178,832.40	6.7	155,857.17				

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8. COST OF OPERATING: (7 Months - 1932 compared with 12 Months - 1931.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

	1932		1931		Increase		Decrease	
Days per Week	2		2-3-4-5					
Shifts and Hours	1-8		1-8					
Production, Tons	90,531		305,604				215,073	
Avg. Daily Product - Tons	1,496		1,600				104	
Number of Days Worked	60½		191				131½	
Underground Costs:	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	242.83	.003	687.78	.002		.001	444.95	
3. Development in Rock	2307.85	.025	5685.97	.018		.007	3378.12	
4. Development in Ore	2424.50	.027	12562.72	.041			10138.22	.014
5. Stoping	28848.96	.319	127005.71	.416			98156.75	.097
6. Timbering	27811.48	.307	96385.64	.315			68574.16	.008
7. Tramming	8443.13	.093	26167.04	.086		.007	17723.91	
8. Ventilation	2893.65	.032	5526.35	.018		.014	2632.70	
9. Pumping	28399.96	.314	51016.75	.167		.147	22616.79	
10. Compressors & Air Pipes	8741.11	.097	29204.50	.096		.001	20463.39	
11. Back Filling			557.70	.002			557.70	.002
12. Underground Superintend.	4017.78	.044	11970.37	.039		.005	7952.59	
13. Cave-In			7.60	.000			7.60	.000
14. Maint:Comps. & P. Drills	243.07	.002	2436.40	.008			2193.33	.006
15. Scrapers & M. Lders	3470.99	.038			3470.99	.038		
16. Electric Tram Eqpt.	1795.86	.020	5438.27	.018		.002	3642.41	
17. Pumping Machy	1405.60	.016	4609.68	.015		.001	3204.08	
Total U.G. Costs	121046.77	1.337	379262.48	1.241		.096	258215.71	
Surface Costs:								
18. Hoisting	5571.27	.062	18847.28	.062			13276.01	.000
19. Stocking Ore	2051.56	.023	7541.48	.025			5489.92	.002
21. Dry House	3169.64	.035	6090.99	.020		.015	2921.35	
22. General Surface Expense	1681.03	.019	4218.61	.013		.006	2537.58	
23. Maint:Hoisting Equipt.	1855.74	.020	4653.52	.015		.005	2797.78	
24. Shaft	182.51	.002	1131.28	.004			948.77	.002
25. Top Tram Equipment	182.51	.002	2615.14	.008			2432.63	.006
26. Docks, Tres. & Pkts	371.03	.004	2317.43	.007			1946.40	.003
27. Mine Buildings	313.71	.003	500.82	.002		.001	187.11	
Total Surface Costs	15379.00	.170	47916.55	.156		.014	32537.55	
General Mine Expenses:								
28. Insurance	169.55	.002	194.32	.001		.001	24.77	
29. Mining Engineering	1073.35	.012	2865.69	.009		.003	1792.34	
30. Mech. & Elec. Engineering	780.70	.009	2019.84	.007		.002	1239.14	
31. Analysis & Grading	3075.38	.034	11462.22	.038			8386.84	.004
32. Personal Injury	6501.74	.071	16132.28	.053		.018	9630.54	
33. Safety Department	439.22	.005	1332.21	.004		.001	892.99	
34. Telephones & S. Devices	631.36	.007	1292.61	.004		.003	661.25	
35. Local and General Welfare	2399.84	.027	5394.52	.018		.009	2994.68	
36. Spec. Exp., Pens & Allows	9399.33	.104	12174.33	.040		.064	2775.00	
37. Ishpeming Office	8623.55	.102	16322.22	.053		.049	7054.93	
39. Mine Office	5063.34	.056	13547.17	.044		.012	8483.83	
Total Gen. Mine Exps.	38801.10	.428	82737.41	.271		.157	43936.31	
COST OF PRODUCTION	175226.87	1.935	509916.44	1.668		.267	334689.57	
40. Taxes	57460.86	.635	136517.51	.447		.188	79056.65	
TOTAL COST	232687.73	2.570	646433.95	2.115		.455	413746.22	
5 Mos. Idle Expense	84191.66	.930						
Reopening Expense	1939.75	.022						
GRAND TOTAL COST	317819.14	3.522						

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Cont.)
(7) Detail of Accounts:

UNDERGROUND COSTS:

1. Exploring in Mine:
Geological increase in cost per ton due to less product in 1932.

3. Development in Rock:

	Drifting	Raising	Total Ft.	Cost Per Foot
1932	305'	62'	367'	$ 6.29
1931	478'	255'	729'	7.80
Decrease	173'	193'	362'	$ 1.51

Increased cost per ton due to curtailed production. Decreased cost per foot due to reduction in wages.

4. Development in Ore:

	Drifting	Raising	Total Ft.	Cost Per Foot
1932	114'	337'	451'	$ 5.37
1931	1562'	849'	2411'	5.21
Decrease	1448'	512'	1960'	
Increase				$ .16

Decreased cost per ton due to proportion of drifting less in 1932. Cost per foot increase due to greater proportion of raising in 1932.

5. Stoping:

	Labor	Cost Per Ton	Supplies	Cost Per Ton	Total
1932	22691.19	.251	6157.77	.068	.319
1931	87606.88	.287	39398.83	.129	.416
Decrease	64915.69	.036	33241.06	.061	.097

There were eight scraper hoists, cost $ 8831.32, and repairs and equipment for some charged to this account in 1931. In 1932 scraper hoists and mechanical loaders are shown under Account No. 15.

	Cost Per Ton
1932 - Stoping Including Scrapers & Mechanical Loaders	.357
1931 - Stoping, Scrapers & Mechanical Loaders Included	.416

There was one second-hand 25 H.P. hoist purchased in 1932, cost $737.50.
There were eight new 10 & 15 H.P. hoists purchased in 1931, cost $ 8831.32.
Decreased cost per ton due to reduction in wages and maintenance of scrapers, etc. charged to Account 15 in 1932.

6. Timbering:

	Labor	%	Supplies	%	Cost Per Ton
1932	15293.64	55	12517.84	45	.307
1931	57842.65	60	38542.99	40	.315
Decrease	42549.01	5	26025.15		.008
Increase				5	

Decreased cost per ton due to reduction in wages in 1932. Percentage of timber used in 1932 increased 5%.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Cont.)
(7) Detail of Accounts:

7. Tramming:
Cost per ton increased due to less product. 1932 cost per month $ 1206.00 and in 1931 $ 2180.00.

8. Ventilation:
Cost per ton increased due to less product. Monthly cost $ 413.00 in 1932 as compared with $ 460.00 in 1931.

9. Pumping:

	12 Months 1932	12 Months 1931	Decrease
Total gallons water pumped	576,727,573	585,922,823	9,195,250
Gallons pumped per minute	1,094	1,125	31
Cost of Electric Current	39,499.62	40,079.58	579.96

Increased cost per ton due to curtailed production.

10. Compressors and Air Pipes:

	7 Mos. 1932	%	12 Mos. 1931	%
Compressors	7844.39	89.75	25501.35	87.3
Air Pipes	896.72	10.25	3703.15	12.7
Cu. Ft. Air Compressed	179,460,000		756,405,000	
Cu. Ft. Air per Ton	1,982		2,475	

Increased cost per ton due to less product.

12. Underground Superintendence:
Increased cost per ton due to curtailed production.

14. Maintenance - Compressors and Power Drills:

	7 Months 1932	12 Months 1931
Compressors	36.55	971.82
Power Drills	170.00	1332.87
Air Lines	36.52	131.71

Decrease due to less proportionate compressor and air line repairs. There were only two second-hand RB 12 auger drills charged in 1932 as compared with seven new auger drills charged in 1931.

15. Maintenance - Scrapers & Mechanical Loaders:
New account in 1932. Actual cost for 1931 and 1932 as follows:
1932 - $ 3470.99
1931 - 8831.32 Included under Account #5 in 1931.
Decrease $ 5360.33

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Cont.)
(7) Detail of Accounts:

16. Electric Tram Equipment:

	7 Months 1932	12 Months 1931
Generator & Motor	54.44	85.36
Locomotives	529.71	1407.83
Wiring	216.47	806.90
Tracks	929.37	2566.86
Cars	65.87	571.32

There was one second-hand rocker dump car, cost $ 150.00, charged in 1931. Increase in cost per ton due to less product.

17. Pumping Machinery:

In 1931 unusual repairs were necessary to third level pumps, also installed five subway boxes, cost $ 1300.00. In 1932 48' 6½" of new rubber belting was put on the third level Aldrich pump, cost $ 122.00, and other minor repairs. The 1932 cost is for only seven months and the 1931 cost is for twelve months.

SURFACE COSTS:

18. Hoisting:

	7 Months 1932	12 Months 1931
Electric Current	4296.22	13559.62
Cost per Ton - Current	.0474	.0444

This account includes the current consumed by both the cage and skip hoist in the lowering of timber and men and the hoisting of ore and rock. The cost per ton for current increased in 1932 on account of the decreased product, but due to reduction in wages the cost per ton is the same in both years.

19. Stocking Ore:

	7 Months 1932	12 Months 1931
Tons Stocked	89,399	233,942

There were (7) bents erected in 1932 as compared with (24) in 1931. Decreased cost per ton due to reduction in wages and less portable trestles erected.

21. Dry House:

Entire Year	1932	1931
Tons Coal Used in Heating Plant	585.3	703
Cost per Ton	$ 4.62	$ 5.31
Cost of Coal	$ 2707.04	$ 3737.62

22. General Surface Expense:

Increased cost per ton due to curtailed production and comparative operating periods. The seven months operating period in 1932 includes five winter months as compared with six winter months in the twelve months operating period of 1931.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(7) Detail of Accounts:

23. Maintenance: Hoisting Equipment:

	7 Months 1932	12 Months 1931
Electric Hoist	126.04	750.81
Wire Rope & Sheaves	978.80	1703.05
Skips, Cages & Skip Roads	750.90	2199.65

Decrease due to proportionally less hoist, skip and skip road repairs. There were four hoisting ropes charged out in 1931 and two in 1932. Cost per ton increased due to less product.

24. Maintenance: Shaft:

Decrease due to less repairs to shaft and shaft pockets in 1932 operating period. The fourth level pocket was rebuilt during the August, September and October idle period at a cost of $ 1142.00 and charged under Idle Expense.

25. Maintenance: Top Tram Equipment:

	1932	1931
Engine & Motors	8.04	157.89
Tracks & Cars	148.87	579.01
Wire Rope	3.50	1144.44
Sheaves & Rollers	22.10	743.80
Total	182.51	2625.14

Increase in cost per ton due to decrease in production.

26. Maintenance: Docks, Trestles and Pockets:

Decrease in cost per ton due to decrease in repairs and replacements.

27. Mine Buildings:

	1932	1931
Office	15.74	59.71
Warehouse		43.34
Shops		29.97
Garage	4.11	
Engine House	289.66	50.99
Dry House		130.29
Coal Dock		54.26
Shaft House	1.88	108.36
Miscellaneous	2.32	23.90

Decrease due to less repairs to office, warehouse, shops, dry house, coal dock and shaft house buildings. There was an increase in cost for repairing the engine house roof.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:
(7) Detail of Accounts:

GENERAL MINE EXPENSES:

31. Analysis and Grading:

	7 Months 1932	12 Months 1931
Number of Determinations	6,520	29,811
Cost per Determination	.25407	.20135

Decrease in cost per ton due to reduction in wages and proportionally less determinations in 1932.

32. Personal Injury:

	7 Months 1932	12 Months 1931
Compensation Insurance - Reserve and Catastrophe	1578.11	5491.17
Compensation Dept. Expense	331.79	784.57
Ishpeming Hospital Loss	4588.55	9831.41

Increased cost per ton due to less product.

33. Safety Department:

	7 Months 1932	12 Months 1931
Salaries - Includes First Aid & Foremen's Meetings	368.75	1242.23
First Aid Supplies	37.47	80.20
Inspection Committees, Etc.		10.78

Cost per ton increased slightly due to less product.

34. Telephones & Safety Devices:

	7 Months 1932	12 Months 1931
Mine Telephones	27.35	38.70
Safety Gates, Etc.	7.20	48.81
Fire Protection		208.50
Lighting for Shaft & Levels	548.53	821.60
Sign-Boards, Signals, Etc.	48.28	175.00

There were less telephone and safety repairs in 1932. In 1931 there were three 2½ gal. Phister fire extinguishers charged under Fire Protection, one installed in engine house and one for each pumphouse.

36. Special Expense, Pensions and Allowances:
Large increase in cost per ton in 1932 due to charging to this account a proportion of the cost of garden and free wood expense in the Negaunee District, also other expenses arising from curtailed operations.

MAAS MINE
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YEAR 1932

8. COST OF OPERATING:

b. Detailed Cost Comparison:
(7) Detail of Accounts:

37. Ishpeming Office:
Large increase in cost per ton due to less product.

39. Mine Office:
Increase in cost per ton due to curtailed production.

40. Taxes:
Cash paid out for taxes decreased materially, but cost per ton increased due to curtailed production.

Analysis of Supplies Used:

	7 Months 1932		12 Months 1931		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
41. General Supplies	5482.41	.061	21514.65	.070			16032.24	.009
42. Iron and Steel	1177.71	.013	5268.13	.017			4090.42	.004
43. Oil and Grease	496.25	.005	2324.09	.008			1827.84	.003
44. Machinery Supplies	2338.20	.026	11833.44	.039			9495.24	.013
45. Explosives	5863.53	.065	20516.27	.067			14652.74	.002
46. Lumber and Timber	11726.57	.130	38467.30	.126		.004	26740.73	
47. Fuel	2671.68	.029	3536.92	.011		.018	865.24	
48. Electric Power	38065.08	.420	83713.98	.274		.146	45648.90	
49. Sundries	674.23	.007	3411.02	.011			2736.79	.004
50. Other Mines & Accts.	273.76	.003	2757.17	.009			2483.41	.006
51. Stoping			6306.32	.021			6306.32	.021
Total per Cost Sheet	68221.90	.753	194134.95	.635		.118	125913.05	

41. General Supplies:
Decreased cost per ton due to general curtailment, less replacements and decrease in commodity prices.

42. Iron and Steel:
Decrease in cost per ton due to general curtailment, less replacements and decrease in commodity prices.

43. Oil and Grease:
Decreased cost per ton due to saving on oils used on pumps. We now use Atlantic Red instead of Renown Engine and less of it; cost Renown Engine $ .194 per gal.; cost Atlantic Red $ .154 per gal.

44. Machinery Supplies:
Decrease in cost per ton due to no buying of new scraper-hoists or drill machines in 1932 and general curtailment.

45. Explosives:
Decreased cost per ton due to cut in price per lb. for powder and less development in 1932.

46. Lumber and Timber:
Increased cost per ton due to curtailed production. It was necessary to maintain the main levels, raises and sub-levels in both years.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(7) Detail of Accounts:

47. Fuel:

Increase in cost per ton due to curtailed production. Fuel consumption was slightly lower in 1932.

48. Electric Power:

Increased cost per ton due to curtailed production.

49. Sundries:

Decreased cost per ton due to less General Shop repairs and less City water consumed in 1932.

51. (Stoping - Scraper-hoists purchased on E & A. 610 charged in 1931.)

Supplies Used Per Day 1932 and 1931:

	1932	1931	
	Operating Period	Jan. 1st to June 1st	June 1st to Dec. 31st
Days Operated	60½	103	88
Cost per Day:			
General Supplies	90.61	104.66	122.00
Iron and Steel	19.47	30.91	23.70
Oil & Grease	8.20	11.10	13.30
Machinery Supplies	38.65	85.14	106.47
Explosives	96.92	103.18	112.37
Lumber and Timber	193.83	183.53	222.31
Fuel	44.16	17.91	19.22
Electric Power	629.17	398.81	484.50
Sundries	4.52	16.70	19.23
Total	1125.63	952.94	1123.10
Fuel & Electric Power	673.33	416.72	503.72
Balance All Other Supplies	452.30	536.22	619.38

The above table shows at a glance the saving in supplies since the drive to eliminate waste started in June - 1931.

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Cont.)
(7) Detail of Accounts:

Supplies Purchased:

	1932 Operating Period	1931 June 1st to Dec. 31st	1931 Jan. 1st to June 1st
Days Operated	60½	88	103
Cost per Day:			
General Supplies	101.68	200.06	155.01
Iron and Steel	17.54	19.54	47.01
Oil and Grease	10.01	26.08	12.81
Machinery Supplies	21.29	122.71	135.56
Explosives	106.14	130.01	151.44
Lumber and Timber	61.77	59.40	517.77
Fuel	7.49	43.68	0
Electric Power	609.92	485.54	399.05
Sundries	24.94	17.92	22.51
Total	960.80	1104.90	1441.18
Average Tons per Day	1496	1659	1550
Cost per Ton, Total	.642	.666	.930
Cost per Ton, Fuel & Power	.413	.319	.267
Cost per Ton, All Other Supplies.	.229	.347	.663

The above table shows clearly how purchases have been reduced since June 1st, 1931.

Balance Supplies on Hand:

	12/31/32	12/31/31	Increase	Decrease
General Supplies	4,873.45	5,891.70		1,018.25
Iron and Steel	1,532.12	1,785.07		252.95
Oil and Grease	454.34	410.41	43.93	
Machinery Supplies	6,563.93	7,481.94		918.01
Explosives	74.20	270.87		196.67
Lumber and Timber	20,632.81	29,936.14		9,303.33
Fuel	2,080.64	3,443.22		1,362.58
Total	36,211.49	49,219.35		13,007.86

Reduction of supply balance in 1932 - 26%.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

There were no explorations by diamond drilling in the Maas Mine during 1932.

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10. TAXES:

	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
Maas Mine	1,235,000	35,209.85	1,400,000	54,784.80
Race Course	760,000	21,667.60	800,000	31,305.60
Adams Strip	200,000	5,702.00	260,000	10,174.32
Stockpile and Equipment	950,000	27,084.50	975,000	38,153.70
Miscellaneous Parcels	13,900	396.97	19,100	747.44
Total Mine	3,158,900	90,060.12	3,454,100	135,165.86
Collection Fees		900.60		1,351.65
Total Opt. Maas Mine		90,960.72		136,517.51
Tax Rate		2.851		3.9132
Total City of Negaunee Tax		409,706.92		621,285.41
Maas Mine % of City Tax		22.20		21.97

Taxes decreased due to lower tax rate and decrease of nearly $ 300,000 in assessed valuation. Maas Mine proportion of City tax increased 00.23%.

Maas Mine Rented Houses and Miscellaneous Lands:

	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
Maas Rented Houses	255,000	7,270.73	242,200	9,478.40
Mineral Lands, Etc.	29,400	838.22	12,100	473.51
Total Houses & Lands	284,400	8,108.95	254,300	9,951.91
Collection Fees		81.09		99.52
Total		8,190.04		10,051.43

11. ACCIDENTS AND PERSONAL INJURY:

There were two serious accidents, both fracture of leg in 1932. This was an improvement over the previous year when there was one fatal, three serious and two minor accidents.

Accidents for 1932, 1931 and 1930 are shown below.

	1932	1931	1930
Fatal	0	1	0
Time Lost - Over 4 Months	1	1	2
" " - 1 to 4 "	1	2	7
" " - Less than 1 Month	0	2	1
Total Accidents	2	6	10
Number of cases paid compensation for accidents prior to Jan. 1st, 1932	7	7	9
Number of cases paid difference in wages (Included in above total.)	1	1	1

The first injury in 1932 was a fracture of tibia and fibula between lower and middle third, right leg.

The second accident caused a fracture of fibula, right leg.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

E & A. No. 614, Cleveland-Cliffs Iron Co.'s Second Addition to City of Negaunee was not active in 1932. It was cancelled on Dec. 31st, 1932 and a new E & A. will be made in 1933.

E & A. No. 548, Sinking Maas Shaft and Developing Fifth Level, was the only active E & A. in 1932.

A detail of expenditures under E & A. No. 548 follows:

E & A. No. 548:

Total Estimate	$ 133,160.00
Expended to Jan. 1st, 1932.	127,051.64
Balance Jan. 1st, 1932.	$ 6,108.36
Total Expended in 1932	4,381.31
Balance Dec. 31st, 1932.	$ 1,727.05

The only expenditures in 1932 were in Account No. 10D, Pump House and Sump, and Account No. 82, Pumping Plant.

Acct. 10 - Permanent Equipment:
D. Pump House and Sump:

Original Estimate		$ 8,750.00
Expended to Jan. 1st, 1932	$ 11,361.70	
Expended in 1932 (Work Completed)	1,423.83	12,785.53
Balance Dec. 31st, 1932.		$ 4,035.53

The work done in 1932, completed the excavation of the sump and pump house.

Acct. 82 - Pumping Plant:

Original Estimate		$ 4,800.00
Expended to Jan. 1st, 1932	$ 590.78	
Expended in 1932	2,957.30	3,548.08
Balance Dec. 31st, 1932.		$ 1,251.92

Work on Pumping Plant not completed in 1932. It is estimated it will cost about $ 600.00 to complete and should be finished in February - 1933.

The only other item not completed at the end of 1932, was the purchase of three additional rocker dump cars which has been deferred until they were actually needed. E & A. 548 was closed as of Dec. 31st, 1932 and a new E & A. will be made in 1932 to cover the balance of expense to complete the pump house. Later on, an E & A. will be made to cover the purchase of the three rocker dump cars.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

Very little expense was incurred in repairs to the Maas steam shovel last spring.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (Continued)

b. Stockpile Trestles:

The Maas stocking trestle West of the shaft was extended seven bents in 1932.

c. Scraper Hoists:

There was one second-hand 25 H.P. hoist purchased in 1932, costing $ 737.50.

The scraper hoists on hand on Dec. 31st, 1932 were as follows:

Ingersoll-Rand 15 H.P. Electrics	8
" " 10 " "	3
Sullivan 25 H.P. Electrics	2
" 20 " "	1
" 15 " "	12
" 7½ " "	2
" 6½ " "	6
Ingersoll-Rand Air	15
20 H.P. Electric (Lake Shore Slide)	1
Total Units	50

The second-hand 25 H.P. electric paid for in 1932, was shown as on hand in last year's Annual Report so the number of hoists are the same for both 1932 and 1931.

When the mines closed down all of the scraper hoists were brought to surface and overhauled during the idle period. In most cases only cleaning was necessary, in a few new gaskets were necessary. The armatures and rotors of all the electric hoists were painted with waterproof paint.

14. MAINTENANCE AND REPAIRS:

There was no extraordinary maintenance or repair expense during the year. The total maintenance cost in 1932 was $ 9,821.02, which included a charge of $ 3,470.99 for scraper hoists. In 1931, total maintenance was $ 23,702.54 which does not include any charge for scraper hoist maintenance as this was included in Acct. No. 5 "Stoping". Excluding the new charge for "Scrapers" in 1932, the two amounts were $ 6,350.03 and $ 23,702.54.

15. POWER:

Electric power was supplied by the Cliffs Power & Light Company, a subsidiary of The Cleveland-Cliffs Iron Co. The rate charged for current was 1½¢ per K.W. hour, the same as last year.

The boiler plant and steam turbine were not operated during the year.

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17. CONDITION OF PREMISES:

There was no expense for improvement of the grounds around the mine, other than upkeep of lawn and planted areas. This expense was curtailed as far as possible, but the premises were kept in good condition during the year.

18. NATIONALITY of EMPLOYEES:

This has been prepared under two statements. The first statement gives the report as has been ordinarily submitted to the Company, that is, it shows the nationality of employees according to parentage. The second statement divides the employees according to country of birth.

As to Parentage:	1932	%	1931	%
English	81	34.0	80	32.5
Finnish	82	34.5	86	35.2
Italian	21	8.8	22	9.0
Swedish	19	8.0	24	9.7
French Canadian	13	5.5	11	4.4
Americans (Mixed)	2	.8	3	1.2
Germans	8	3.4	7	2.8
Crotians	1	.4	1	.4
Norwegians	1	.4	1	.4
Irish	6	2.5	6	2.4
Danish	4	1.7	5	2.0
Total	238	100.0	246	100.0

	Total		American Born		Foreign Born	
As to Birth:	1932	1931	1932	1931	1932	1931
Americans	21	20	21	20		
English	81	80	24	24	57	56
Finnish	82	86	20	20	62	66
Italians	21	22	4	5	17	17
Swedish	19	24	11	13	8	11
Germans	8	7	7	6	1	1
Crotians	1	1			1	1
Norwegians	1	1			1	1
Danish	4	5	3	3	1	2
Total	238	246	90	91	148	155
Percentage			38%	37%	62%	63%

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19. MAAS CRUSHER:

The Maas Crusher only operated a few days in 1932 crushing some Cliffs Shaft Lump Ore and Negaunee Ore.

Product:	1932 Tons	1931 Tons	Increase	Decrease
Cliffs Shaft Lump	2,946	1,369	1,577	
Negaunee	1,785	2,658		873
Morris-Lloyd	0	7,728		7,728
Total	4,731	11,755		7,024

There were only a few repairs necessary, mostly changes necessary to crush the hard ore from Cliffs Shaft.

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1. GENERAL:

The Athens Mine operated on a two day per week schedule from Jan. 1st to June 1st. It was idle from June 1st to Nov. 1st, a five month period, and operated two days per week from Nov. 1st to Dec. 31st. It operated 60½ days in 1932, as compared with 182 days in 1931 and 282 days in 1930.

At the end of 1931 the number of areas being mined was decreasing due to concentration of gangs brought about by working two crews of men in each contract, four days a week, on alternate weeks. This concentration was completed early in 1932, but was only effective for a few months when the mine closed. It proved its value as it was necessary to prepare fewer areas for the idle period and to do less repairing during this period. During the shutdown crushing was less severe than was anticipated, but rotting of timber throughout the mine progressed more rapidly due to lack of air movement. The main ventilation fan was kept in operation throughout the idle period. Repair work was largely confined to the main levels, although on reopening much work had to be done in the raises. This work is still under way and will continue indefinitely; some of it would have developed on any operating schedule, but much of it is due to the operating conditions prevailing during 1931 and 1932. Production in November was only 50% of normal due to the time required to cut out at the raises and start drifting, retimber tops of other raises, etc., all of which work yielded very little product. Production increased in December, being 85% of normal.

An unusual and unexpected occurrence in 1932 was the cave to surface above the area being mined. It occurred without warning about 5:00 A.M. Sunday morning, June 19th, when only the pumpman and helper were in the mine. It did not have any immediate effect underground, but within ten days the water increased to double the quantity prior to the cave. The cave came to surface about 400 feet east of the west boundary line of the property in a fenced field and was about 200 feet in diameter. It occurred between two dikes, which extended nearly vertically upward from the underground workings 2000 feet below surface. It is thought that a solid block many hundred feet in thickness slipped away along the face of the dikes, otherwise the cave would not have reached surface as in all probability the open space above the mined area would have filled itself. The incoming water reached a maximum of about 600 gals. per min. in July, then started to recede and at the end of the year was down to about 400 gals. per min. The surface area adjacent to the cave is draining and as the water table recedes, less water is entering the mine through the cave. The decrease is growing less each month so that it seems probable that it will soon cease and the water remain stationary until the cave extends to the east. An extension of the cave may cause only a temporary increase or there may be a permanent increase, as apparently has been the case following the first cave. Most of the water comes in the mine along the South Slate footwall and not directly beneath the cave, however, the ore below the cave is now damp whereas it was formerly quite dry.

Development of the ore body on the South side of the ore trough above the sixth level on the Mitchell Lease was completed in 1932 and mining started under the jasper hanging. The hanging is very irregular, either due to minor folds or incomplete enrichment. Due to this condition development is progressing slowly and several months will be required to outline and mine the ore under the hanging over the entire area in the mining block.

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1. GENERAL: (Continued)

A wooden trestle was erected late in 1931 between the two steel trestles, as additional stocking capacity would be required before the spring of 1932. This trestle was located so that when it was filled with ore there would still be room for railroad tracks for loading from the two adjacent stockpiles under the steel trestles. It was equipped for stocking in March 1932 and the ore hoisted for the balance of the year was stocked from this trestle. On reopening in November additional ground was graded for a 200 ft. extension of this wood trestle, which was erected in November. This extension, with the filling of all the available space on the other trestles will provide stocking capacity until the opening of the shipping season in 1933.

The general condition of the mine is not as good as it was a year ago due to the reduced operating schedule and five months idle period. Timber on the levels and raises is in worse condition and more expense must be incurred for replacement of rotten timber.

Two accidents, causing loss of time from one to four months, occurred underground during the year, the same number as in the previous year. Constant efforts are made to make the men more safety conscious. Safety precautions, observance of the safety rules and mining standards are impressed on the foremen and bosses at the regular safety conferences held monthly. In spite of these two accidents in 1932 I feel sure that progress is being made and better results will be attained in future years.

The generous offer by the company of free garden lots, free seed, etc. was accepted by all the Athens employees that did not already have ample garden lots. The offer of wood was also accepted by nearly every employee. The men are very grateful for this material aid as it has been of great help to them.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Grade	1932	1931	Decrease
Athens Fee	68,716	243,722	175,006
Mitchell Lease	7,809	7,858	49
Total Ore	76,525	251,580	175,055
Rock	1,165	3,293	2,128
Total Hoist	77,680	254,873	177,183

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Athens Ore	--	6,055	6,055	159,616
Mitchell Lease	--			8,349
Total	--	6,055	6,055	167,965
Total Last Year	85,237	82,728	167,965	
Decrease	85,237	76,673	161,910	

c. Stockpile Inventories:

Grade of Ore	Dec. 31, 1932	Dec. 31, 1931	Increase
Athens Fee	236,318	173,657	62,661
Mitchell Lease	9,001	1,192	7,809
Total	245,319	174,849	70,470

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

d. Division of Product by Levels:

The ore hoisted from various levels was as follows:

	1932	1931
6th Level	25,250	107,620
8th Level	51,275	143,960
Total	76,525	251,580

e. Production by Months:

The production by months is as follows:

Month	Athens	Mitchell Lease	Total	Rock
January	10,452	537	10,989	253
February	10,735	770	11,505	51
March	12,836	1,048	13,884	133
April	9,467	896	10,363	230
May	12,022	739	12,761	203
November	4,852	1,648	6,500	180
December	8,352	2,171	10,523	115
Total	68,716	7,809	76,525	1,165
Total 1931	243,722	7,858	251,580	3,293
Decrease	175,006	49	175,055	2,128

The product was distributed as follows::

Grade	1932	1931	Decrease
Athens	68,716	243,722	175,006
Mitchell Lease	7,809	7,858	49
Total	76,525	251,580	175,055

f. Ore Statement:

	Athens	Mitchell Lease	Total	Total Last Year
On Hand Jan. 1, 1932	173,657	1,192	174,849	91,234
Product for Year	68,716	7,809	76,525	251,347
Overrun				233
Total	242,373	9,001	251,374	342,814
Shipments	6,055		6,055	167,965
Balance on Hand	236,318	9,001	245,319	174,849
Decrease in Product			175,055	
Increase in Ore on Hand			70,470	

1932 - 1 8-hour shift, 2 days per week, Jan. 1st to June 1st
Mine Idle June 1st to Nov. 1st
1 8-hour shift, 2 days per week, Nov. 1st to Dec. 31st

1931 - 1 8-hour shift, 5 days per week, Jan. 1st to Feb. 27th
4 days per week, Feb. 27th to June 8th
3 days per week, June 8th to Nov. 16th
2 days per week, Nov. 16th to Dec. 31st

g. Delays:

There were no delays in 1932.

h. Delays from Lack of Current:

There were no delays from lack of current.

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3. ANALYSIS:

a. Average Mine Analysis on Output:

	1932			1931		
Grade	Iron	Phos.	Silica	Iron	Phos.	Silica
Athens	61.66	.125	5.94	60.19	.124	6.41
Mitchell Lease	61.49	.131	5.59	60.99	.123	5.52

The percentage of iron in each grade increased in 1932.

c. High Sulphur Ore:
No high sulphur ore was encountered in mining or development work.

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:
Assumption: 12.75 cu. ft. equals one ton
10% deducted for rock
10% deducted for loss in mining
Percentage of Bessemer equals 0

4th Level and Above	972,016 Tons
4th Level to 6th Level	1,916,475 "
6th Level to 8th Level	1,351,401 "
8th Level to 9th Level	451,949 "
9th Level to 10th Level	354,812 "
Below 10th Level	49,236 "
Total Developed Ore Dec. 31st, 1932	5,095,889 "

No new ore developed in 1932. The estimate of ore reserves was obtained by subtracting product in 1932 from the estimate of 1931.

Statement showing ore reserves and new ore development for the following years:

	1928	1929	1930	1931	1932
Ore in Mine Jan. 1st	6,205,591	5,901,102	5,371,092	5,335,388	5,172,414
Production	241,590	343,147	385,461	251,580	76,525
Balance	5,964,001	5,557,955	4,985,631	5,083,808	5,095,889
Ore in Mine Dec. 31st	5,901,102	5,371,092	5,335,388	5,172,414	5,095,889
New Ore Developed	-62,899x	-186,863xx	349,757#	88,606#	0

x Decrease due to use of factor of 12.75 cu. ft. per ton instead of 12 cu. ft.
xx Decrease due to large roll in jasper hanging cutting off the ore.
Increase is mostly in the ore body south of dike between 4th and 6th levels.

b. Prospective Ore:
No prospective ore in the mine. All ore in mine considered developed since 1928.

c. Estimated Analysis:

Ore Reserves: Approximate Expected Natural Analysis:

	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Athens Ore	52.50	.115	5.90	.390	2.70	1.00	.900	.011	1.44	12.50

Ore in Stock: Average Natural Analysis:

	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Athens Ore	52.89	.107	5.45	.385	2.84	1.05	.788	.011	1.33	12.50

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5. LABOR AND WAGES:

a. Comments:

(1) Labor:

There was an excess of labor available during 1932 on account of the general lack of employment. The crew employed on reopening the mine in November has been kept below the number employed last spring.

With very few exceptions, the men employed at the mine worked the equivalent of two days per week during 1932. There was a reduction of 15% in wages effective May 16th and two reductions in salaries, one in February and one on June 1st.

(2) New Construction:

There were no active E & A.'s at this mine in 1932.

b. Comparative Statement of Wages and Product: (12 Mos. - 1932 & 1931)

	1932	1931	Increase	Decrease
PRODUCT	76,525	251,580		175,055
No. Shifts and Hours	1-8	1-8		
AVERAGE NO. MEN WORKING:				
Surface	36	45		9
Underground	120	166		46
Total	156	211		55
AVERAGE WAGES PER DAY:				
Surface	3.77	4.41		.64
Underground	4.16	5.03		.87
Total	4.05	4.89		.84
#AVERAGE WAGES PER MONTH:	10 Days	15.2 Days		
Surface	45.24	67.03		21.79
Underground	40.35	76.46		36.11
PRODUCT PER MAN PER DAY:				
Surface	14.58	25.87		11.29
Underground	5.49	7.78		2.29
Total	3.99	5.98		1.99
LABOR COST PER TON:				
Surface	.258	.171	.087	
Underground	.758	.647	.111	
Total	1.016	.818	.198	
AVERAGE PRODUCT MINING:				
Stoping	20.72	22.09		1.37
Ore Development	12.96	9.81	3.15	
Total	19.97	21.38		1.41
AVERAGE WAGES CONTRACT LABOR	4.82	5.75		.93
TOTAL NUMBER OF DAYS:				
Surface	5,249	9,723		4,474
Underground	13,939	32,347		18,408
Total	19,188	42,070		22,882

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5. LABOR AND WAGES: (CONT)

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

	1932	1931	Increase	Decrease
AMOUNT FOR LABOR:				
Surface	19,765.62	42,877.73		23,112.11
Underground	58,028.79	162,854.17		104,825.38
Total	77,794.41	205,731.90		127,937.49

#Includes Captain and Clerk each 26 days per month, also during five months idle period no surface labor except Electrician, Mechanic and Surface Foreman who were each allowed 13 days per month.

Proportion of Surface to Underground Men:

1932 - 1 to 3.59 - 1-8 hour shift, 2 days per week, Jan. 1st to June 1st
Mine idle June 1st to Nov. 1st
1-8 hour shift, 2 days per week, Nov. 1st to Dec. 31st

1931 - 1 to 3.48 - 1-8 hour shift, 5 days per week, Jan. 1st to Feb. 27th
4 days per week, Feb. 27th to June 8th
3 days per week, June 8th to Nov. 16th
2 days per week, Nov. 16th to Dec. 31st

1930 - 1 to 3.66 - 1-8 hour shift, 6 days per week, Jan. 1st to July 16th
5 days per week, July 16th to Dec. 31st

1929 - 1 to 3.41 - 1-8 hour shift, 6 days per week

1928 - 1 to 3.54 - 1-8 hour shift, 5 days per week

6. SURFACE:

a. Buildings, Repairs:

During the idle period new ties were installed on the rock trestle, also on a portion of the permanent steel trestle replacing rotten ones.

In April, several rotten legs were replaced on the coal trestle.

In January the iron and steel storage house was completed. This building is located near the blacksmith shop. Doors were also installed last spring in the storage building erected in 1931 to house plate, pipe, etc.

b. Stockpiles:

The wood stocking trestle erected late in 1931, was equipped with sheaves, rollers, etc. in March 1932, and stocking was started from this trestle in April.

Due to lack of shipments in 1932, it became necessary to provide additional stocking ground for the product that would be stocked by the opening of the shipping season in 1933. This work was started the latter part of October when news was received that the mines would reopen on Nov. 1st. A tractor and scraper was used to level the ground where the cut did not exceed three feet in depth, for the deeper cut, running from three to eight feet, the Cliffs Power & Light excavator was used. About 225 feet of additional ground was graded and about 18,000 feet of 2" hemlock sollar plank laid. In November nine bents were erected, making total length of wood stocking trestle (27) bents or 594 feet.

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6. SURFACE:
(Cont.)

c. Timber Treating Plant:

The timber treating plant did not operate in 1932.
The cost of treating timber in 1931 was as follows:

	Cost of Treating per Foot
Peeling	.0312
Treating	.0365
Decking	.0124
Zinc Chloride	.0681
Heat, Water, Etc.	.0075
Total	.1557
Maintenance Cost	.0118
Grand Total	.1675

No. of Pcs. Treated, 1931 - 1355 - No. of Feet - 11,763

	1932	1931
No. of Pcs. Used at Athens Mine	627	199
No. of Pcs. Shipped to Maas Mine	0	264
Total Pcs. Used & Shipped	627	463
Increase	164	

	Treated Timber On Hand 12-31-32	Peeled Untreated Timber on Hand 12-31-32
9' Pieces	997	80
8' Pieces	814	1248
Total	1811	1328
Total - 1931	2438	1348
Decrease	627	20

The untreated peeled timber on hand must be treated in 1933 or used in the mine without treatment.

d. Water Purchased from City of Negaunee:

The following table shows the cost of the water consumed in heating, cooling, etc. for the years 1930, 1931 and 1932:

	1930		1931		1932	
	Gallons	Amount	Gallons	Amount	Gallons	Amount
1st Quarter	1,385,000	105.00	1,570,000	117.77	508,000	43.40
2nd Quarter	1,849,000	140.59	1,715,000	131.63	441,000	40.07
3rd Quarter	2,483,000	186.65	1,695,000	131.73	159,000	19.29
4th Quarter	2,128,000	159.63	1,542,000	116.15	149,000	15.66
Total	7,845,000	591.87	6,522,000	497.28	1,257,000	118.42
Cost per Ton		.00154		.00197		.00155

The cost per ton including the idle period was lower than in the previous year and practically the same as in 1930. Economy can be effected by making the cooling pond larger and impervious to leaks.

e. Grounds:

The grounds at the mine were kept in neat condition, but no improvements were made in 1932.

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7. UNDERGROUND:

a. Shaft Sinking:

None in 1932.

b. Development:

There was relatively little development work done in 1932. In the seven operating months there was only 40% as much drifting and raising as in 1931. All of the development work in 1932 was confined to the ore body South of the fault dike between the fourth and sixth levels, on Mitchell Lease Lots 8 and 9 in Mining Block No. 3. Two raises, Nos. 625 and 626, in the new crosscut on the sixth level, that were started in 1931 were extended to the jasper hanging. This completed the six raises that are required for mining in this area. The intermediate sub-level -485 for traveling road and ventilation was extended South to No. 625 and 626 Raises.

A drift was started on the 550 ft. elevation from 621 Raise, the most northerly one in the group, to the East to connect with No. 609 Raise. No. 609 is a new raise, in Mining Block No. 4, which is now being put up from the sixth to the fourth level for an airway. This drift will be an airway from the new Raise No. 609 to the area being mined on Mitchell Lots 8 and 9.

The ore body referred to in the above paragraphs was being outlined under the hanging at the end of the year. The enrichment on the jasper hanging contact is quite irregular and it will probably be necessary to transfer the ore in certain areas. At the end of the year No. 623 Raise was being extended in the jasper hanging to explore for ore at the fourth level elevation shown up by an underground diamond drill hole. This ore may be only a seam in the hanging wall jasper or a local area of enrichment.

c. Stoping:

In 1932 mining was continued in the two blocks that were being mined during the past several years, i.e. Block 2 above the eighth level and Block 3 above the sixth level.

At the end of the year mining in Block 2 had progressed in one area to within 45 feet of the eighth level. Work was also underway in another area 60 feet above the eighth level. Mining above the sixth level in Block 3 decreased in 1932, and increased above the eighth level in Block 2. This was done in order that mining in the new area opened on Mitchell Lots 8 and 9 might catch up with mining further North in Block 3.

Mining in Block 3 above the sixth level North of the fault dike was completed in 1932 on the sub-level 90 feet above the sixth level and on reopening the mine in November was started with two gangs on the next lower sub-level, 75 feet above the sixth level.

The work done in the new territory above the sixth level, near the South footwall on Mitchell Lots 8 and 9 was largely confined to development and outlining of the ore under the jasper hanging. The enrichment is irregular, at two places it seems likely the ore will extend to the fourth level elevation and at others the jasper hanging was encountered at varying elevations from 60 feet to 10 feet below the fourth level. The area on the top subs was quite small, in one section two sub-levels have already been mined. The third or -430 Sub, where mining is now underway from two raises, gives indications of being much larger. It is probable that other chimneys of ore or local enrichments of the hanging may be found at other points within the mining limits of Block 3. If this occurs the ore will be developed by raises, mined up to the jasper hanging and transferred on the (-430 ft.) sub-level to the sixth level raises.

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7. UNDERGROUND:
(Continued)

c. Stoping: (Cont.)

During the first four months of the year doubling up of the contracts, which was started shortly after the two day a week schedule was adopted in November 1931, was continued and was completed in April. This resulted in a reduction of the number of working places by one half, the two crews of miners worked four days a week on alternate weeks. This reduced the maintenance expense as less openings had to be kept open on the sub-levels.

Since resuming operations in November after the five months idle period, it has been necessary to repair a number of raises in which the cribbing rotted. Crushing on the sub-levels was not as severe as when the mine was operating. Production was low in November and was not back to normal in December due to cutting out at raises, installing scraper hoists, repairing raises and chutes, etc.

At the end of May when the mine closed down, there were 19 double contracts mining and 2 single contracts developing. At the end of the year, there were 19 double contracts, 16 of which were mining and 3 repairing.

The detail of mining operations is as follows:

SUBS ABOVE THE 6TH LEVEL:

-404' Sub-Level (South Side of Dike): South Footwall:

In April a sub-level was opened under the jasper hanging from 624 Raise, but hanging wall jasper was encountered in a few cuts on all sides of the raise. The ore here appeared to be merely a small chimney extending into the hanging. This work was done on Mitchell Lease, Lot 8 in the ore body near the South footwall.

-415' Sub-Level (South Side of Dike): South Footwall:

Work started on this sub-level in April 1932 from No. 625 Raise and was resumed here in November when the mine reopened. The ore area was only slightly larger than on the -404' sub-level. It extended from No. 625 to 624 Raise, but did not average over 15 feet in width. Work was completed in this area in November 1932.

-430' Sub-Level (South Side of Dike): South Footwall:

This sub-level was opened for mining in November 1932 and by the end of December 623, 624 and 625 Raises were connected by drifts and crosscuts had been started from No. 624 and 625 Raises to the East toward the mining limit. The ore body is evidently somewhat larger at this elevation adjacent to 624 and 625 Raises, however at 623 Raise jasper has been encountered on both the foot and hanging wall sides, also a short distance South of No. 625 Raise. Raises will be put up near the mining limit to determine the height of the ore for it is possible the enrichment is irregular and the ore may extend above the elevation of this sub-level. Two contracts were working here at the end of the year.

-440' Sub-Level (South Side of Dike): South Footwall:

This sub-level was opened from No. 626 Raise in November directly under the jasper hanging. Drifting was started to the Southeast and in a short distance the jasper disappeared. There is evidently a considerable drop in the hanging between No. 625 and No. 626 Raises. The ore body is assumed to rise near the footwall contact or the South side of the ore trough and this is indicated by the disappearance of the jasper in the back of the drift a short distance South of No. 626 Raise. The ore that

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7. UNDERGROUND:
(Continued)

c. Stoping: (Cont.)

-440' Sub-Level (South Side of Dike): South Footwall:
lies above the elevation of this sub-level probably extends a short distance above the elevation of the fourth level in a small area in Mining Block No. 3. It will be mined from one or more raises located near the footwall in this drift and transferred on the -440' sub-level to No. 626 Raise.

-485' Sub-Level (South Side of Dike): South Footwall:
An intermediate sub-level connecting the raises above No. 620 Crosscut on the sixth level, was started in August 1931 and completed in May 1932. All the raises from 621 on the North end to 626 on the South end were connected by a drift. This drift will serve for transfer of timber and supplies, also help the ventilation.

-500' Sub-Level (North Side of Dike):
Mining operations above the sixth level were concentrated on this sub-level near the end of the year 1931. It had been planned to transfer the contracts as they completed work here to the subs above the eighth level, thereby slowing up mining above the sixth level in Block 3 and increasing the rate in Block 2 above the eighth level. Mining was practically completed in this area, except for two small pillars near No. 838 when the mine closed down on May 31st. These two pillars were mined in November and December.

-500' Sub-Level (South Side of Dike):
Mining of the area immediately South of the fault dike was started in December 1930 and completed in March 1932. Only two contracts worked here in 1932 and finished mining three pillars left here at the end of 1931.

-515' Sub-Level (North Side of Dike):
Just prior to closing the mine it was decided to connect several raises in this area to provide better ventilation during the idle period. Since reopening, the drift has been extended and at the end of the year four raises were connected.

-515' Sub-Level (South Side of Dike):
Three raises, Nos. 632, 633 and 644, were connected by drifts in 1932 to improve ventilation in the raises during the idle period.

-550' Sub-Level (South Side of Dike): South Footwall:
The most northerly raise (No. 621) above 620 Crosscut on the sixth level is about 75 feet South of the mining limit set for the series of raises South of the dike. At the elevation of this sub-level all the raises are connected both on the North and South sides of the dike and a connection was also completed to 621 Raise in 1931. This is known as an intermediate sub-level opened for ventilation and a timber transfer sub. The main air way raise from sixth to fourth level is on the North side of the dike and too far distant from the ore body being developed above No. 620 Crosscut on Mitchell Lots 8 and 9, to provide adequate ventilation in this area. A new airway Raise No. 609, located in Mining Block No. 4 which will not be disturbed for several years, was located

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7. UNDERGROUND:
(Continued)

c. Stoping:

-550' Sub-Level (South Side of Dike): South Footwall: (Cont.)
near the footwall 330 feet East of No. 621 Raise. A drift from No. 621 Raise was started in February 1932 toward this new raise and at the end of the year was in 200 feet. In the meantime No. 609 Raise was started and at the elevation of this sub-level was cut out and a drift started, after which it was continued. As soon as the raise reaches the fourth level, a drift will be driven from the raise to connect with the present breast of the airway drift.

Sixth Level: South Footwall:
During the year work was done in the following raises in No. 620 Crosscut to the South Footwall.
No. 623, advanced 10 feet in jasper in December. Total height 190 feet. Exploring for ore shown by underground diamond drill hole at fourth level elevation. Will be continued about 20 feet higher.
No. 625, advanced 50 feet in ore. Total height 215 feet. Completed in April 1932.
No. 626, advanced 80 feet in ore. Total height 170 feet. Completed in May 1932.

Sixth Level: South Side of Dike:
No. 609 Raise advanced 88 feet in ore. Total height 98 feet. Not completed, will be extended to the fourth level. This is a new airway raise, located near the footwall in Mining Block No. 4.

General:
During the idle period considerable repairs were necessary on the main level. They were due to rotting of timber and to crushing.

SUBS ABOVE THE 8TH LEVEL:

-695' Sub-Level: South Side of Dike:
The last pillar in this area was mined in January 1932. Mining started here in November 1930.

-710' Sub-Level: South Side of Dike:
Mining started in this wet area in July 1931 and was completed when the mine closed in May 1932. It was impossible to mine all of the ore here on account of water and three small pillars were left near the slate footwall where most of the water comes in.

-720' Sub-Level: North Side of Dike:
Mining was started in this area in April 1930 and was completed early in 1932, with the mining of three small pillars in the South central portion of the ore area.

-720' Sub-Level: South Side of Dike:
Mining was started in this area in December 1931 and was continued during the 1932 operating period. Water conditions are very bad and constant trouble is experienced in holding the drifts. For this reason mining advances slowly and operations have to be often shifted in the area. One contract worked here in November and December driving a new

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7. UNDERGROUND:
(Continued)

c. Stoping:

-720' Sub-Level: South Side of Dike: (Cont.)
traveling road to connect Nos. 835, 836 and 837 Raises replacing the old connecting drift that had caved. On completing this drift they will start mining the several small pillars remaining in this area. Since the cave to surface last June there is more water in this area and mining will be more difficult and costly.

-730' Sub-Level: North Side of Dike:
This sub-level was started in February 1931 and at the end of the year eleven contracts were mining here. The North end of the ore area was practically all mined in 1931, and in 1932 mining of the South part was started. When the mine closed in May, the central portion and part of the East and South portions had been mined. On reopening in November the raises were connected by new traveling roads replacing the old roads that could not be maintained during the idle period. Mining was started in December by two contracts. The Southwest part of this area is very wet especially near the slate footwall. Water conditions are worse since the cave to surface.

-730' Sub-Level: South Side of Dike:
This area has been opened for mining since operations were resumed in November. A drift has been driven from No. 838 Raise, just North of the dike, South through the dike to 839 and 836A Raises and in December mining was started by two gangs in the area South of the dike. This is the wettest area in the mine.

-745' Sub-Level: North Side of Dike:
Mining of this area was started in November 1931 when one contract cut out at No. 807 and started drifting to connect the Northwest line of raises. In 1932 the ore pillar North of three raises was nearly all mined, and the raises in the central line were being connected by drifts when work was stopped in May. Since reopening the mine work has been resumed here and at the end of December two gangs were mining from the Northwest line of raises and three from the central line. Prior to the cave to surface last June this area was dry, the ore is now damp and harder to handle in the raises. The area now being mined here is almost directly under the cave.

Eighth Level:
Repair work has been underway on this level during the entire year. Mining has reached a point about 60 feet above the level and crushing is more severe. Many timber sets were replaced during the idle period.

Ninth & Tenth Levels:
The usual repair work necessary for maintenance of the drifts and raises was continued during 1932. Most of the timber sets that had to be replaced in 1932 was due to rotting rather than breaking from pressure.

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7. UNDERGROUND:
(Continued)

c. Stoping: (Cont.)

Underground General:

The skips did not go below the eighth level pocket in 1932. Both skip ropes were shortened in 1931 and landing chairs installed in both skip compartments at the eighth level pocket. This prevented spillage when loading the skips due to stretch of the hoisting ropes, it also reduced the length of hoist.

The skip pit ore was caught in the shaft at the tenth level and loaded in cars, hoisted on the cage and dumped in the eighth level pocket.

d. Timbering:

Statement of Timber Used:

	Linear Feet	Avg. Price per Foot	Amount 1932	Amount 1931
6" to 8" Cribbing	47,401	.0377	1,787.70	4,215.35
8" to 10" Stulls	3,892	.0882	343.37	1,728.58
10" to 12" "	18,383	.0889	1,634.26	5,177.93
12" to 14" "	19,250	.1681	3,236.90	4,514.75
14" to 16" "	2,814	.1521	428.10	861.98
Total - 1932	91,740	.0809	7,430.33	
Total - 1931	211,426	.0780		16,498.59
		Per 100'		
Lagging - 7 Ft.	225,012	.7086	1,594.54	4,830.80
Poles - 9½'	212,661	1.3020	2,770.02	6,806.17
Total - 1932	437,673	.9972	4,364.56	
Total - 1931	1,174,786	.9906		11,636.97
Wire Fencing - Sq. Ft.			0	569.12
Grand Total - 1932			11,794.89	
Grand Total - 1931				28,704.68
Product			76,525	251,580
Feet of Timber per Ton of Ore			1.198	.840
Feet of Lagging per Ton of Ore			2.940	2.634
Feet of Poles per Ton of Ore			2.779	2.036
Feet of Lagging per Foot of Timber			2.453	3.134
Feet of Wire Fencing per Ton of Ore			0	.0466
Cost per Ton for Timber			.0971	.0656
Cost per Ton for Lagging			.0208	.0192
Cost per Ton for Poles			.0362	.0270
Cost per Ton for Wire Fencing			0	.0023
Total Cost per Ton			.1541	.1141
Equivalent of Stull Timber to Board Measure			225,484	472,951
Feet of Board Measure per Ton of Ore			2.946	1.880

Total Cost for Timber, Lagging, Poles, Etc. and Cost per Ton:

Year	Amount	Cost per Ton
1932	11,794.89	.1541
1931	28,704.68	.1141
1930	38,001.66	.0985
1929	35,086.43	.1015
1928	29,160.74	.1207
1927	23,288.37	.1001

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7. UNDERGROUND:
(Continued)

d. Timbering: (Cont.)

Operating Period	-	Amount	$ 10,246.34
Idle Period	-	"	1,548.55
Total			$ 11,794.89

The cost per ton for timber, lagging and poles was higher in 1932 than in any one of the previous five years due to curtailed operations and the idle period. Larger sizes of timber were used in 1932, as the timber in yards was dry and consequently less strong than when it was green. No wire netting was charged out during the year, but some was used in 1932 that was taken down and charged out in December 1931. It is used on top of poles on floors of sub-levels to make a tighter mat in areas near the jasper hanging and near dikes. Nine foot legs and caps are in general use throughout the mine. Eight foot timber is used for lining sets and in areas that are crushed.

e. Drifting and Raising:

The following table gives comparative figures of raising and drifting for the years 1932 and 1931:

	Raising		Drifting		
Year	Ore	Rock	Ore	Rock	Total
1932	250'	3'	268'	20'	541'
1931	1065'	78'	99'	142'	1384'
Increase			169'		
Decrease	815'	75'		122'	843'

Development work was curtailed in 1932. It was confined to the area above the new crosscut on the sixth level, Mitchell Lot No. 8.

f. Explosives, Drilling and Blasting:

The pounds of powder per ton of ore increased slightly in 1932, but due to decrease in cost of powder, the cost per ton decreased slightly. The cost for fuse and caps increased so that cost per ton for all explosives was $ .0005 higher in 1932. Only 50% powder was used in 1932, whereas in previous years some 60% was used. There is no apparent economy in using the lower strength explosive as the increased quantity necessary to break the ground offsets the decrease in price per pound.

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7. UNDERGROUND:
(Continued)

f. Explosives, Drilling and Blasting: (Cont.)

Statement of Explosives Used:

	Quantity	Average Price	Amount 1932	Amount 1931
50% Am. Gel.	28,000	12.29	3,442.38	4,568.75
60% " "				6,847.52
Total Powder - 1932	28,000	12.29	3,442.38	
Total Powder - 1931	86,350	13.22		11,416.27
Fuse	104,300	5.70	594.79	1,786.24
Caps - No. 6	17,300	11.14	192.87	542.29
Fuse Lighters	500	8.10	4.05	17.55
Tamping Bags				24.79
Total Fuse, Etc. - 1932			791.71	
Total Fuse, Etc. - 1931				2,370.87
Total All Explosives - 1932			4,234.09	
Total All Explosives - 1931				13,787.14
Product			76,525	251,580
Pounds of Powder per Ton of Ore			.3658	.3432
Tons of Ore per Pound of Powder			2.733	2.913
Cost per Ton - Powder			.0449	.0454
Cost per Ton - Fuse, Caps, Etc.			.0104	.0094
Cost per Ton - All Explosives			.0553	.0548
Sinking, Rock Development, Etc.				
Total Powder - 1932	200	12.31	24.63	
Total Powder - 1931	1,950	13.99		259.37
Total Fuse, Etc. - 1932			5.92	
Total Fuse, Etc. - 1931				46.70
Total All Explosives - 1932			30.55	
Total All Explosives - 1931				306.07
Total Explosives Used in Mine			4,264.64	14,093.21
Average Price per Pound for Powder			.1229	.1322

0% of all powder used in 1932 was 60% (All 50% Powder)
58% of all powder used in 1931 was 60%

The following statement shows the cost per ton for explosives exclusive of rock development for the period 1928-1932 inclusive:

Year	Cost per Ton	Product
1932	.0553	76,525
1931	.0548	251,580
1930	.0536	385,461
1929	.0588	343,147
1928	.0666	241,590

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7. UNDERGROUND:
(Continued)

g. Mining and Loading:

Nine foot timber is now used exclusively on the sub-levels in mining operations and the sub-level interval is 12½ feet. The operating schedule is now equivalent to four days per week, but three idle days in succession together with a five months idle period increases repair work and interferes with production. Some of the small air scraper hoists are still in use and should be replaced as soon as economic conditions warrant the expenditure. Larger scrapers are used with the 15 and 10 H.P. electric scraper hoists which makes a complete cycle per shift easier to attain.

i. Ventilation:

Maintenance of air ways was quite a problem during 1932, on account of rotting of cribbing in air raises and timber on main levels and sub-level drifts that are used for air ways. The main ventilating fan on the tenth level was in service during the idle period, but the movement of air was not as good as it is when the mine is operating. Also much of the timber had been in place for its normal life in the mine and was due for replacement. A new air way raise from sixth to fourth levels was being put up at the end of the year, as the area of air way in the old air way raise was restricted due to lining it with cribbing. During the year a number of booster fans were in service mostly on the eighth level forcing air to the sub-levels 60 feet above. More of these fans are needed in this area which is quite hot due to heat generated in the heavy timber mat.

The air was tested throughout the mine and found to be good in oxygen content and volume.

j. Pumping:

The number of gallons pumped per minute during 1932, 1931, 1930 and 1929 are shown below:

Month	1932	1931	1930	1929
January	278	243	230	219
February	286	244	230	218
March	296	250	233	211
April	307	253	231	216
May	312	255	228	221
June	326	282	228	223
July	597	262	222	222
August	542	263	234	226
September	486	262	239	225
October	431	263	233	228
November	402	268	239	231
December	391	274	242	232
Total Average	396	260	232	223

The average number of gallons pumped per minute over the last six years is as follows:

Year	Gals. per Min.
1932	396
1931	260
1930	232
1929	223
1928	228
1927	242

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7. UNDERGROUND:
(Continued)

j. Pumping: (Cont.)

The gallons pumped per minute, starting in December 1931 and continuing until the cave broke through to surface on June 19th, 1932, show a gradual increase. In the light of our present knowledge this was a warning that something unusual was to be expected shortly. The water did not change much for ten days after the cave when it increased to nearly 600 gals. per min. As the surface water table was lowered it decreased and at the end of the year was back to 391 gals. per min. The amount of decrease was much less in December so it may be near the figure at which it will remain nearly constant until the cave grows more extensive.

k. Shaft:

Repairs in the shaft were proportionally less in 1932 due to curtailed production. The use of hardwood filling pieces on the sides of the skip guides has proven very satisfactory and very few runners were replaced during the year. Several additional steel skip road dividers were installed in 1932, continuing the work started in 1930. They are installed in the circular concrete shaft where the steel sets were spaced ten feet apart which is too far to keep the sets rigid for any length of time.

l. Underground in General:

The mine is not in as good a condition as a year ago due to the curtailed operations in 1932. The reserve tonnage left in Mining Blocks Nos. 2 and 3 will have to carry increased charges for repairs and replacements due to slowing up of rate of mining. The cave to surface has increased the water in the mine, making mining more difficult in some areas and adding to the cost of production due to increase in cost for pumping.

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8. COST OF OPERATING:

a. Comparative Mining Costs: (7 Months Operating Period 1932 - 12 Months 1931)

	1932	1931	Increase	Decrease
PRODUCT	76,525	251,580		175,055
Underground Costs	1.233	1.183	.050	
Surface Costs	.279	.209	.070	
General Mine Expenses	.304	.180	.124	
Cost of Production	1.816	1.572	.244	
Depletion - Original Cost	.095	.101		.006
Increment	.205	.205		
Depreciation - Plant & Equipt	.166	.096	.070	
Development	.089	.089		
Movable Equipt	.001		.001	
Taxes	.538	.393	.145	
Loading & Shipping	.005	.018		.013
Total Cost at Mine	2.915	2.474	.441	
Administrative & Gen. Expense	.086	.076	.010	
Miscellaneous Income	.039	.023	.016	
Idle Expense	.991		.991	
Reopening Expense	.018		.018	
Total Cost	3.971	2.527	1.444	
No. of Days Operated	61	182		121
No. of Shifts & Hours	1-8	1-8		
Average Daily Product	1,255	1,382		127

COST OF PRODUCTION:	1932	%	1931	%	Increase	%	Decrease	%
Labor	.850	46.8	.842	53.6	.008			6.8
Supplies	.966	53.2	.730	46.4	.236	6.8		
Total	1.816	100.0	1.572	100.0	.244			

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Worked	Shifts Hours	Men Employed	Total Days Worked
1932	61	1-8	156	19,188
1931	182	1-8	211	42,070
Decrease	121		55	22,882

(2) Wages:

In 1932 wages were reduced 15% on May 16th, salaries were reduced on February 1st and again on June 1st.

In 1931 wages were reduced 10% on October 1st and salaries 16-2/3% on June 16th.

The total wage reduction in 1931 and 1932 was 23½%.

The total salary reduction in 1931 and 1932 was approximately 45%.

(3) Comparison of Product:

Production - 1932	76,525	Tons
Production - 1931	251,580	"
Decrease	175,055	"

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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison: (Cont.)

(4) Comparison of Number of Men and Wages: (Includes Idle Period)

	No. Men	No. Days	Amount	Rate per Day
1932	156	19,188	77,794.41	4.05
1931	211	42,070	205,731.90	4.89
Decrease	55	22,882	127,937.49	.84

(5) Tons per Man per Day:

The tons of ore mined per man per day were as follows:

	1932	1931	Decrease
Surface	14.58	25.87	11.29
Underground	5.49	7.78	2.29
Total	3.99	6.48	2.49

(6) Cost of Production: (Does not include Idle Expense)

1932	$ 138,961.20	Cost per Ton	$ 1.816
1931	395,513.40	" " "	1.572
Increase		" " "	$ .244
Decrease	$ 256,552.20		

	Total Cost				Cost per Ton		
	Labor	%	Supplies	%	Labor	Supplies	Total
1932	65,019.50	46.8	73,941.70	53.2	.850	.966	1.816
1931	211,767.15	53.6	183,746.25	46.4	.842	.730	1.572
Incr.				6.8	.008	.236	.244
Decr.	146,747.65	6.8	109,804.55				

Idle Expense - 1932 -	$ 75,836.35	Cost per Ton	$ .991
Reopening " - 1932 -	1,397.78	" " "	.018

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8. COST OF OPERATING: (7 Months - 1932 compared with 12 Months - 1931.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

	1932		1931		Increase		Decrease	
Days per Week	2		4-3-2					
Shifts and Hours	1-8		1-8					
Production, Tons	76,525		251,580				175,055	
Avg. Daily Product - Tons	1,255		1,382				127	
Number of Days Worked	61		182				121	
Underground Costs:	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	53.26	.002	175.37	.001		.001	133.79	
3. Development in Rock	192.09	.002	1663.27	.007			1471.18	.005
4. Development in Ore	2357.23	.031	5645.19	.022		.009	3287.96	
5. Stoping	22652.85	.296	95725.33	.381			73072.48	.085
6. Timbering	27376.37	.358	85875.19	.341		.017	58498.82	
7. Tramming	7377.90	.096	26942.07	.107			19564.17	.011
8. Ventilation	2683.30	.035	3324.37	.013		.022	641.07	
9. Pumping	15417.42	.201	21847.29	.087		.114	6429.87	
10. Compressors & Air Pipes	9254.77	.121	31625.36	.126			22370.59	.005
12. Undg. Superintendence	3310.99	.043	10043.33	.040		.003	6732.34	
13. Cave-In	46.53	.001			46.53	.001		
14. Maint:Comps & P. Drills	820.64	.011	539.39	.002	281.25	.009		
15. Scrapers & M Loader	1247.86	.016			1247.86	.016		
Electric Tram Eqpt	1233.81	.016	12797.78	.051			11563.97	.035
Pumping Machy	375.04	.005	1382.71	.005			1007.67	.000
Total U.G. Costs	94400.06	1.234	297586.65	1.183		.051	203186.59	
Surface Costs:								
18. Hoisting	8117.30	.106	22195.50	.088		.018	14078.20	
19. Stocking Ore	1857.59	.024	4382.12	.018		.006	2524.53	
21. Dry House	2341.99	.031	4438.40	.018		.013	2096.41	
22. Gen'l Surface Expense	1870.81	.024	5540.54	.022		.002	3669.73	
23. Maint:Hoisting Equipment	3823.05	.050	7830.84	.031		.019	4007.79	
24. Shaft	282.18	.004	1482.66	.006			1200.48	.002
25. Top Tram Equipt	806.95	.011	1504.36	.006		.005	697.41	
26. Docks, Tres & Pkts	2023.71	.026	4574.94	.018		.008	2551.23	
27. Mine Buildings	199.10	.003	529.80	.002		.001	330.70	
Total Surface Costs	21322.68	.279	52479.16	.209		.070	31156.48	
Gneral Mine Expenses:								
28. Insurance	174.57	.002	47.13	.000	127.44	.002		
29. Mining Engineering	809.12	.011	2086.87	.008		.003	1277.75	
30. Mech & Elec. Engineering	829.55	.011	1957.46	.008		.003	1127.91	
31. Analysis and Grading	1962.79	.025	5894.40	.024		.001	3931.61	
32. Personal Injury	6366.38	.083	11333.13	.045		.038	4966.75	
33. Safety Department	385.57	.005	1299.29	.005			913.72	
34. Tels. & Safety Devices	458.46	.006	1050.68	.004		.002	592.22	
36. Spec Exp., Pens & Allows.	5781.54	.075	3837.94	.015	1943.60	.060		
37. Ishpeming Office	2481.44	.032	8660.34	.034			6178.90	.002
39. Mine Office	3989.04	.052	9281.84	.037		.015	5292.80	
Total Gen Mine Exps.	23238.46	.304	45447.59	.180		.124	22209.13	
COST OF PRODUCTION	138961.20	1.816	395513.40	1.572		.245	256552.20	
40. Taxes	41182.97	.538	99041.51	.393		.145	57858.54	
TOTAL COST	180144.17	2.354	494554.91	1.965		.390	314410.74	
5 Months Idle Expense	75836.35	.991						
Reopening Expense	1397.78	.018						
GRAND TOTAL COST	257378.30	3.363						

ATHENS MINE
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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:
(7) Detail of Accounts:

UNDERGROUND COSTS:

1. Exploring in Mine:
Increase in cost per ton due to decrease in product.

2. Development in Rock:

	Rock Drifting	Rock Raising
1932	20'	3'
1931	142'	7'
Decrease - 1932	122'	4'

Decrease in cost due to less rock drifting and raising.

4. Development in Ore:

	Ore Drifting	Ore Raising
1932	268'	250'
1931	99'	1065'
Increase	169'	
Decrease		815'

Increase in cost per ton due to less daily product.

5. Stoping:

	Labor	Cost per Ton	Supplies	Cost per Ton
1932	17,618.35	.230	5,034.50	.066
1931	70,148.66	.279	25,576.67	.102
Decrease	52,530.31	.049	20,542.17	.036

Decrease in cost per ton for labor due to reduction in wages.
Decrease in cost per ton for supplies due to transfer to a new account of "Scrapers & Mechanical Loaders" formerly carried in the "Stoping" account. In 1931 four electric scrapers, costing $ 3953.00, were charged out.

6. Timbering:

	Labor	Cost per Ton	Supplies	Cost per Ton
1932	15,631.04	.204	11,745.33	.154
1931	51,974.71	.206	33,900.48	.135
Decrease	36,343.67	.002	22,155.15	
Increase				.019

Increase in cost per ton due to more expense "Timbering" in 1932, in proportion to product. Larger sizes of timber used account of timber in yards being old and dry and not as strong as when green. Curtailed operations increased repair expense.

7. Tramming:
76,525 tons trammed in 1932; 251,580 tons in 1931.
Decrease in cost per ton due to reduction in wages.

ATHENS MINE
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1. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:
(7) Detail of Accounts:

8. Ventilation:
One new booster fan purchased in 1932, cost $ 317.00. No fans charged in 1931. Increased cost per ton due to decrease in production and to use of more booster fans to force air into the subs above the eighth level.

9. Pumping:

	Total	Gals. per Min.	Cost for Power	Power Cost per Ton
7 Mos. 1932	99,099,423	328	12,349.81	.161
12 Mos. 1931	136,215,501	259	16,520.25	.066
Decrease	37,116,078		4,170.44	
Increase		69		.095

Increased cost per ton due to increase in gallons per minute and decrease in production.

10. Compressors and Air Pipes:

	Compressors	Air Pipes
7 Mos. 1932	8,722.99	531.78
12 Mos. 1931	28,497.49	3,127.87
Decrease	19,774.50	2,596.09

Cu. ft. air compressed	7 mos. 1932	-	140,760,000	Cu. ft. per ton 1828
" " " "	12 " 1931	-	686,750,000	" " " " 2730
Decrease		-	545,990,000	" " " " 902

Decrease in cu. ft. air per ton of ore due to fewer air scraper hoists in operation. There was also less air pipe expense.

12. Underground Superintendence:
Increase in cost per ton due to smaller product.

13. Cave-In:
Expense in 1932 due to cave to surface on June 19th.

14. Maintenance: Compressors and Power Drills:

	Compressors	Power Drills
1932	650.64	170.00
1931	539.39	0
Increase	111.25	170.00

1932 compressor expense covered $ 275.25 for pistons, etc. for Ingersoll-Rand compressor, $ 90.52 for new intake pipe, Hard Ore Shops and Miscellaneous Payroll $ 106.00. Power drill expense covers cost of two second-hand auger drills.

15. Maintenance: Scrapers and Mechanical Loaders:
In 1931 the charges to this account were included in "Stoping." There were no charges for new scraper hoists this year. 1932 charges cover wire rope, scraper head blocks and repairs to scraper hoists.

ATHENS MINE
ANNUAL REPORT
YEAR 1932

8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

16. Electric Tram Equipment:

	1932	1931
Generator	38.82	3395.43
Locomotives	407.66	1012.24
Wiring	195.46	441.23
Main Line Tracks	567.00	1808.43
Main Line Cars	24.87	6140.45
Total	1233.81	12797.78

No unusual expense in 1932; in 1931 purchased a second-hand generator set and installed it, also eight new rocker dump cars.

17. Pumping Machinery:

	1932 Expense
Hard Ore Shop Labor	$ 232.62
Porcelain Valve Seats	51.27

18. Hoisting:

1932 Electric Power $ 6,001.02 - Cost per Ton $ .078.
1931 " " 17,895.70 - " " " .071.

Increase in cost per ton due to decrease in product.

19. Stocking Ore:

76,525 Tons Stocked in 1932.
166,110 " " " 1931.

Increase in cost per ton due to decreased production.

21. Dry House:

498 tons of coal used in heating plant - 1932.
621 " " " " " " " - 1931.

In 1932 new brick arches were put in boiler and a new smoke stack foundation built. The old stack was also replaced with a new one.

22. General Surface Expense:

Increased cost per ton due to smaller product.

23. Maintenance: Hoisting Equipment:

	1932	1931
Electric Hoists	790.74	3072.22
Wire Rope	2056.62	2384.93
Skips & Skip Roads	797.68	2373.69
Sheaves	43.25	0
Total	3823.05	7830.84

1932: Extension of the cage drum - Lake Shore Engine Works - $ 298.60
Extra weight for counter balance from Archibald Mine - $ 100.00
3250' - 1-1/4" Rope for Cage Hoist - $ 1056.61
3000' - 1-3/8" " " Skip " - 1134.76

ATHENS MINE
ANNUAL REPORT
YEAR 1932

8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

24. Maintenance: Shaft:

	1932	1931
Steel Sets	41.21	469.13
Underground Pockets	240.97	1013.53
Total	282.18	1482.66

Decrease in cost per ton due to less expense for repairs.

25. Maintenance: Top Tram Equipment:

	1932	1931
Engines and Motors	199.58	226.82
Tracks and Cars	106.67	439.15
Wire Rope	377.06	387.83
Sheaves, Rollers, Etc.	123.64	450.56
Total	806.95	1504.36

Increase in cost per ton due to less product.

26. Maintenance: Docks, Trestles and Pockets:
Erected nine bents (198') of wood trestle.
Equipped wood trestle erected in 1931.
Graded 200' of additional stocking ground.

27. Mine Buildings:

	1932	1931
Warehouse		70.40
Shops		10.52
Shaft House	3.34	4.37
Engine House	10.60	111.54
Boiler House		1.16
Dry House	1.01	5.12
Coal Dock	31.09	
Timber Tunnel	4.98	3.38
Iron House	84.00	218.46
Hose House		13.17
Storage Building	64.08	91.68
Total	199.10	529.80

Increase in cost per ton due to less product.

GENERAL MINE EXPENSES:

28. Insurance:
Increase due to insuring additional buildings and contents in 1932.

29. Mining Engineering:
Increased cost per ton due to less product.

30. Mechanical and Electrical Engineering:
Increased cost per ton due to less product.

ATHENS MINE
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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

31. Analysis and Grading:

	No. of Determinations	Cost per Determination
1932	4,302	$ .25800
1931	12,840	.20135
Increase		$ .05665
Decrease	8,538	

32. Personal Injury:

	2% of Payroll	Catastrophe Insurance	Ishpeming Office Charges
1932	6366.38	1271.34	5095.04
1931	11333.13	4526.68	6806.45
Decrease	4966.75	3255.34	1711.41

33. Safety Department:

	Foremen's Meeting, Etc.	First Aid Supplies	Ishpeming Office Charges
1932	44.76	44.88	295.93
1931	289.55	119.46	890.28
Decrease	244.79	74.58	594.35

34. Telephones and Safety Devices:

	Lighting	Mine Telephones	Safety Devices	Fire Equipment
1932	388.68	34.28	23.37	12.13
1931	884.86	61.26	54.18	50.38
Decrease	496.18	26.98	30.81	38.25

36. Special Expense, Pensions and Allowances:

The increase in 1932 is due mainly to expense for "Gardens & Wood."

39. Mine Office:

	Mine Office Supplies	Mine Office Labor
1932	315.85	3673.19
1931	830.29	8451.55
Decrease	514.44	4778.36

Increase in cost per ton due to less product.

Salaries were reduced in February and June, making total reduction since June 16th, 1931, - 45%.

ATHENS MINE
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8. COST OF OPERATING: (Cont.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

Statement of Supplies Used:

	7 Months 1932	Cost per Ton	12 Months 1931	Cost Per Ton
General Supplies	4843.04	.063	15050.11	.060
Iron & Steel	1034.22	.014	3382.22	.013
Oil & Grease	450.49	.006	1218.28	.005
Machinery Supplies	1695.92	.022	9640.40	.038
Explosives	4264.64	.056	14093.21	.056
Lumber & Timber	12572.02	.164	32817.04	.130
Fuel	2683.12	.035	3174.59	.013
Electric Power	27873.16	.364	62603.43	.249
Sundries	1467.60	.019	4738.27	.019
Other Mines & Accts.	9.88	.000	6554.89	.026
Total	56874.33	.743	153272.44	.609

Average per Day - Supplies Purchased:

	7 Months Optg. 1932	Last 6 Mos. 1931	First 6 Mos. 1931
Days Operated	60½	88	94
Average per Day:			
General	91.42	35.44	113.73
Iron & Steel	5.76	11.74	28.64
Oil & Grease	4.86	6.75	7.61
Machinery	16.41	34.40	64.09
Explosives	60.24	81.20	78.87
Lumber & Timber	98.43	51.49	352.26
Fuel		20.92	
Electric Power	442.19	369.46	320.12
Sundries	22.81	24.63	29.61
Total	742.12	636.03	994.93
Avg. Tons per Day	1265	1403	1363
Purchases Amt. per Ton:			
Fuel & Power	.350	.278	.235
Other Supplies	.237	.175	.495
Total	.587	.453	.730

Total Purchases:

Year 1932	$ 67,369.57
Year 1931	149,493.88
Decrease	$ 82,124.31

The increase in electric power in 1932 is due to pumping more water following the cave to surface. Savings were effected in purchases of Iron & Steel, Oil & Grease, Machinery, Explosives and Sundries.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

There was no exploring by diamond drilling in 1932.

ATHENS MINE
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10. TAXES:

The comparison of assessed valuations and taxes for 1932 and 1931 are as follows:

Description	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
Realty (Tax Commission)	1,740,000	49,607.40	2,085,000	81,590.22
Ore in Stock, Equipt & Supplis.	490,000	13,969.90	415,000	16,239.78
Total by Tax Commission	2,230,000	63,577.30	2,500,000	97,830.00
Sterling Addition Lots	4,600	131.14	4,600	180.01
Harvey Plat Lots	1,300	37.08	1,300	50.89
Total	2,235,000	63,745.52	2,505,900	98,060.90
Collection Fees		637.45		980.61
Total Opt. Athens Mine		64,382.97		99,041.51
Harvey Plat Rented Bldgs.	7,900	225.23	7,900	309.18
Sterling Add. Rented Bldgs.	22,700	647.30	22,700	888.40
Total	30,600	872.53	30,600	1,197.58
Collection Fees		8.72		11.97
Total Rented Bldgs.		881.25		1,209.55
Total Athens Iron Mining Co.	2,266,500	65,264.22	2,536,500	100,251.06
Tax Rate		2.851		3.913
Total City of Negaunee Tax		409,706.92		621,285.41
Athens Mine % of City Tax		15.92%		16.13%

Taxes decreased due to decrease in assessed valuation of $ 270,000 and decrease in tax rate from $ 3.9132 to $ 2.851.

11. ACCIDENTS AND PERSONAL INJURY:

The following table shows accidents for years 1929 to 1932 inclusive:

	1932	1931	1930	1929
Fatal	0	0	1	0
Time Lost - Over 4 months	2	1	1	2
" " - 1 to 4 "	0	1	2	2
" " - Less than one month	0	0	2	0
Total Accidents	2	2	6	4
Number of cases paid compensation for accidents prior to Jan. 1st, 1932.	7	6	7	4
Number of cases being paid difference in wages	3	2	2	2

The nature of the injury of the first accident was a fracture of the left fibula, junction of middle and lower third.

The nature of the injury of the other accident was a fracture of the twelfth rib, right side, and a fracture-sprain of internal malleolus, right ankle.

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

There were no active E & A.'s in 1932, and none are in immediate prospect.

ATHENS MINE
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YEAR 1932

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

There was practically no repairs necessary to the Cleveland-Cliffs Iron Co.'s shovel rented to the Athens Mine.

b. Stockpile Trestles:

The new wood stocking trestle erected in the fall of 1931 was equipped for stocking early in 1932. In November 1932, nine more bents were erected on this trestle extending it 198 feet further to the South.

c. Timber Treating Plant:

Not operated in 1932.

d. Scraper Hoists:

Following is a list of scraper hoist equipment:

	On Hand 1/1/1933
Ingersoll-Rand Air	28
Sullivan 6½ H.P. Electric	2
Sullivan 15 " "	10
Ingersoll-Rand 10 H.P. Electric	2
Total	42

14. MAINTENANCE AND REPAIRS:

a. Hoisting Equipment:

The drum on the cage hoist was lengthened in 1932 to increase the rope capacity by three rounds. This was done in order that there would be three rounds of hoisting rope left on the drum when the cage was at the bottom of the shaft.

b. Compressors:

Repairs costing nearly $ 300.00 were made to the Ingersoll-Rand Compressors. It included turning down the piston, and lining up the compressor. A new steel intake pipe was installed at a cost of about $ 125.00.

c. Counterweight:

One length of 12" counterweight pipe was added above the landing in the shaft house and a 14 ft. section of 11-3/4 inch casting added to the counterweight. This balanced the cage which is heavier than it originally was due to additional safety devices.

ATHENS MINE
ANNUAL REPORT
YEAR 1932

15. POWER:

Electric power was purchased from the Cliffs Power & Light Company, a subsidiary of The Cleveland-Cliffs Iron Co. The charge for power was 1½¢ per K.W. hour, the same as last year. The total power consumed in 1932 was less on account of curtailed operations.

The following statement shows a comparison of the power cost for the years 1932 and 1931 in detail:

	1932 (7 Mos.)			1931 (12 Mos.)		
	K.W.	Cost	Per Ton	K.W.	Cost	Per Ton
Stoping	16,608	249.12	.0032	44,336	665.05	.0026
Ventilation	120,566	1808.49	.0236	140,242	2103.63	.0084
Pumping x	823,320	12349.81	.1614	1,101,350	16520.25	.0657
Compressors x	427,806	6417.08	.0838	1,551,016	23265.23	.0925
Hoisting x	400,068	6001.02	.0784	1,193,046	17895.70	.0711
Stocking Ore x	14,214	213.21	.0028	32,784	491.76	.0020
Dry House	862	12.93	.0002	1,620	24.30	.0001
Lights at Shafts & Levels	20,726	310.89	.0041	32,103	481.54	.0019
Mine Office x	350	5.25	.0001	778	11.67	.0000
Electric Haulage	30,310	454.64	.0059	70,469	1057.03	.0042
Heating Plant	368	5.53	.0001	700	10.50	.0000
Shops x	3,012	45.19	.0006	5,118	76.77	.0003
Total	1,858,210	27873.16	.3642	4,173,562	62603.43	.2488
Product	76,525			251,580		
K.W. per Ton	24.282			16.589		
Cost per K.W.	.015			.015		

x Indicates accounts that are metered.

The increase in cost per ton is mainly in two accounts, "Pumping" and "Ventilation."

18. NATIONALITY OF EMPLOYEES:

As to Parentage	1932	%	1931	%
English	39	25	48	23
Finnish	62	40	87	41
Italian	18	11	24	11
Swedish	13	8	16	8
French Canadians	13	8	17	8
Scotch	1	1	3	1
Germans	3	2	5	3
Austrians	1	1	2	1
Norwegians	4	2	6	3
Irish	1	1	2	1
Danish	1	1	1	
Total	156	100	211	100

ATHENS MINE
ANNUAL REPORT
YEAR 1932

18. NATIONALITY OF EMPLOYEES:

As to Birth	Total 1932	Total 1931	American Born 1932	American Born 1931	Foreign Born 1932	Foreign Born 1931
English	39	48	25	31	14	17
Finnish	62	87	24	39	38	48
Italian	18	24	4	7	14	17
Swedish	13	16	10	12	3	4
French Canadians	13	17	13	17		
Germans	3	5	3	5		
Austrians	1	2	1	2		
Norwegians	4	6	3	5	1	1
Irish	1	2	1	2		
Danish	1	1	1	1		
Scotch	1	3	1	3		
Total	156	211	86	124	70	87
Percentage			55%	59%	45%	41%

LUCY MINE
ANNUAL REPORT
YEAR 1932

1. GENERAL:

There were no changes at this property in 1932.

10. TAXES:

Description	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
Part of SW¼ of SW¼ Sec. 6, S. of LS & I Ry.	10,000	285.10	10,000	391.32
Part of SW¼ of SW¼ Sec. 6, N. of State Road	2,000	57.02	2,000	78.26
Part of SW¼ of SW¼ Sec. 6, Commm. at Gold St.	400	11.40	400	15.65
Part of SW¼ of SW¼ Sec. 6, W of W line Silver St. - 41 Acres	2,600	74.12	2,600	101.74
Part of SW¼ of SW¼, S. of State Rd. 5.64 A.	4,600	131.14	4,600	180.01
NW¼ of NW¼ Sec. 7-46-26	10,000	285.10	10,000	391.32
Lots 86 to 198 as per tax list, except those paid by Land Dept. and others	20,500	584.43	20,500	802.32
Total	50,100	1,428.31	50,100	1,960.62
Collection Fees		14.28		19.61
Total Taxes		1,442.59		1,980.23
Tax Rate		2.851		3.9132

NORTH JACKSON MINE
ANNUAL REPORT
YEAR 1932

1. GENERAL:

This mine has been idle since 1908.

6. SURFACE:

(1) The posts along road, adjacent to the West end of the open pits, were broken by snow plows during the winter. This fence was repaired in April, also all other fences around the caves inspected and necessary repairs made.

10. TAXES:

	1932		1931	
Realty	Valuation	Taxes	Valuation	Taxes
47% of Jackson Taxes, Sec. 1-47-27	211,500	6029.86	235,000	9196.02
Collection Fees		60.30		91.96
Total		6090.16		9287.98
Rented Buildings:				
Old Jackson Office	700	19.96	500	19.57
Collection Fees		.20		.20
Total		20.16		19.77
Total Taxes North Jackson		6110.32		9307.75
Tax Rate City of Negaunee		2.851		3.914

SOUTH JACKSON MINE
ANNUAL REPORT
YEAR 1932

1. GENERAL:

This property has been idle for a number of years and it is not likely that it will ever be operated again, at least, for many years.

4. ESTIMATE OF ORE RESERVES:

a. Available Ore:

Above present pit available by present system of mining:

On Southwest side	35,000 Tons
North of Lucy Pit	5,000 "
South and Southwest of Lucy Pit	3,000 "
Total	43,000 "

Below present pit and above drainage tunnel available by milling:

West of Crusher	186,000 Tons
Area below bottom of present pit shown by churn drilling	105,226 "
Total	291,226 "
Grand Total	334,226 "

c. Estimated Analysis:

	Iron	Phos	Silica	Alum	Mang	Lime	Mag	Sul	Igni	Moist.
Natural	34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

6. SURFACE:

There has been no watchman at this property since January 1931. All the equipment has been removed and stored with the exception of the crusher. The buildings are inspected weekly and are usually found to have been broken into between inspections. Lumber from the buildings and also the diagonal braces in crusher head frame are being removed. They are evidently stolen for building camps or for wood. There is not enough material of value to warrant the employment of a watchman and it will be advisable to dismantle the balance of the plant if a need for the material develops.

10. TAXES:

	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
53% of Sec. 1-47-27	238,000	6799.64	265,000	10369.98
Collection Fees		68.00		103.70
Total Taxes		6867.64		10473.68
Tax Rate		2.851		3.9132

Taxes decreased due to $ 37,000 decrease in assessed valuation and lower tax rate.

GWINN DISTRICT MINES
ANNUAL REPORT
YEAR 1932

1. GENERAL:

Conditions in the Gwinn District have been unfavorable during the past year due to the general unemployment. The population remains about the same as in the previous year. Some employment was provided by the County Road Commission and a few men have worked intermittently in the woods. The company provided garden plots for potatoes and those who did not already have gardens planted from one to three bushels of seed. Wood was also given free to 142 families. The men were transported free of charge by the railroad to Kellans Spur near Munising and the wood cut and loaded on flat cars by the men, then transported free of charge to Gwinn and delivered to the homes without cost. A total of 880¾ cords of wood was provided, which was a material help to the men.

Aid to needy families is handled through a very efficient local organization, working in conjunction with the County Poor Commission and as a result no suffering has occurred. Red Cross flour and clothing have been distributed by this organization and they also keep in touch with the unemployed and the County Road Commission employment agency. The task of finding work for the idle men and general charity relief work is better organized and administered than in any township in the county.

Saving deposits in the Gwinn Bank decreased more than in 1931, actual 1932 decrease $ 30,000 due to many families being forced to make withdrawals every month for living expenses.

Curtailment of the operating cost of the Gwinn Schools was effected by a 35% reduction in all salaries, by closing the Austin School and by elimination of some teachers. All pupils in the township now attend the Gwinn School, transportation being provided by three school buses.

a. Statement Showing Total Ore Produced in District, 1903 to 1932 Inclusive:

Year	Austin	Princeton	Stephenson	Gwinn	Francis	Gardner-Mackinaw	Total
Total to 1932	1,582,616	1,584,333	3,798,890	988,665	522,602	613,846	9,090,952
1932	0	0	0	0	0	24,769	24,769
Total	1,582,616	1,584,333	3,798,890	988,665	522,602	638,615	9,115,721

Total Ore Shipments to Dec. 31st, 1932 (None in 1932) 8,457,537

Total Ore in Stock on Dec. 31st, 1932 658,184

b. Ore in Stock at Mines Dec. 31st, 1932:

Princeton	Stephenson	Francis	Gardner-Mackinaw	Total
130,887	137,494	197,676	192,127	658,184

5. LABOR AND WAGES:

There were about 130 men employed by the Cleveland-Cliffs Iron Co. working part time during the first five months of the year, about 25 during the idle period and 60 since Nov. 1st. Less than 50% of the former employees are now working. Some employment is provided by the County Road Commission and local conditions are no worse than in other parts of the County.

Wages were reduced 15% on May 16th, 1932.

GWINN DISTRICT MINES
ANNUAL REPORT
YEAR 1932

10. TAXES:

The following statement shows taxes in detail for the two years for all property in the district except mines, where the totals only are shown in the summary, as the detail of taxes for each mine is shown in the report on the mine. The total tax, Cliffs Power & Light Company, is also included in the summary in order to show total tax paid by The Cleveland-Cliffs Iron Company in Forsyth Township.

Description:	1932		1931	
	Valuation	Taxes	Valuation	Taxes
Mineral Lands Gwinn Fee:				
SW¼ of SW¼ Sec. 26-45-25 - 40 Acres	80	2.57	80	3.02
S½ of SE¼ " 27-45-25 - 80 "	160	5.13	160	6.01
NW¼ of SE¼ " 27-45-25 - 40 "	80	2.57	80	3.02
NE¼ of SE¼ " 28-45-25 - 40 "	80	2.57	600	22.55
N½ of NE¼ " 34-45-25 - 80 "	160	5.13	160	6.01
SE¼ of NW¼ " 34-45-25 - 40 "	80	2.57	80	3.02
NE¼ of NW¼ " 34-45-25 - 40 "	80	2.57	80	3.02
NE¼ of SE¼ " 34-45-25 - 40 "	80	2.57	80	3.02
NW¼ of " 35-45-25, 160 "	320	10.26	320	12.02
Lots 1, 2 & 3 Sec. 36-45-25, 52 "	100	3.20	100	3.75
Lots 7, 8 & 9 " 36-45-25, 98.92 Acres	200	6.42	200	7.54
Lot 11 " 36-45-25, 13.3 "	20	.64	20	.75
S½ of N½ " 22-45-25, 160 "	500	16.02	500	18.80
S½ of NE¼ " 28-45-25, 80 "	130	4.16	130	4.88
N½ of NW¼ " 22-45-26, 87.08 "	90	2.88	90	3.38
NE¼ of " 2-45-26, 165.61 "	190	6.09	190	7.14
Total	2,350	75.35	2,870	107.93
Collection Fees		.75		1.08
Total Taxes		76.10		109.01
Gwinn Townsite - Surface Only:				
NE¼ of NW¼ Sec. 21-45-25 - 27.4 Acres	150	4.81	150	5.64
That part of S½ of NW¼ Sec. 21-45-25 not included in Plat of Gwinn, 25.01 Acres	200	6.41	200	7.51
E½ of SE¼ Sec. 21-45-25 - 65.84 Acres	140	4.48	400	15.05
That part of W½ of SE¼ Sec. 21-45-25 not included in Plat of Gwinn - 38.80 Acres	300	9.62	300	11.30
Gwinn Townsite Plat	86,245	2,764.67	96,185	3,617.56
Part of W½ of SE¼ Sec. 21-45-25 (Superintendent's Residence 1.2 Acres)	3,150	101.01	3,500	131.61
NW¼ of NE¼ Sec. 21-45-25 except 5 Acres in Cemetery, 35 Acres	100	3.20	100	3.76
Part of S½ of NE¼ Sec. 21-45-25, 50.88 Acres	300	9.62	400	15.05
Total	90,585	2,903.82	101,235	3,807.48
Collection Fees		29.04		38.08
Total Current Payment		2,932.86		3,845.56
Lot 16, Block 5, Bank, J. Entry	5,400	174.91	6,000	227.87
Total Townsite Group	95,985	3,107.77	107,235	4,073.43
Gardner-Mackinaw Dwellings:				
N½ of NE¼ Sec. 35-45-25	5,000	160.35	6,500	244.43
Collection Fees		1.60		2.44
Total Taxes		161.95		246.87

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10. TAXES:
(Cont.)

	1932		1931	
District Office and Crusher:	Valuation	Taxes	Valuation	Taxes
Personal	270	8.75	500	18.99
N½ of NW¼ Sec. 27-45-25, District Crusher	1,000	32.39	1,000	37.97
Total	1,270	41.14	1,500	56.96
Collection Fees		.41		.57
Total Taxes		41.55		57.53
Austin Location:				
Part of Lot 5, SW of NE Sec. 20-45-25	3,500	112.24	5,000	188.02
NW¼ of SE¼ of Sec. 20-45-25	6,500	208.45	10,000	376.04
NE¼ of SW¼ of Sec. 20-45-25	320	10.26	320	12.02
Part of SW¼ of SE¼ Sec. 20-45-25	30	.96	30	1.12
Total	10,350	331.91	15,350	577.20
Collection Fees		3.32		5.77
Total Taxes		335.23		582.97
Summary:				
Stephenson Mine	152,060	4,876.51	178,660	6,718.34
Princeton Mine	241,260	7,737.12	281,260	10,576.52
Francis Mine	175,500	5,631.27	186,000	6,997.47
Gardner-Mackinaw Mine	185,080	5,935.46	175,200	6,588.21
Mineral Lands	2,350	75.35	2,870	107.93
Gwinn Townsite	95,985	3,078.73	107,235	4,032.49
Austin Location	10,350	331.91	15,350	577.20
Gardner-Mackinaw Location	5,000	160.35	6,500	244.43
Gwinn District Office and Crusher	1,270	41.14	1,500	56.96
Total C.C.I. Co.	868,855	27,867.84	954,575	35,899.55
Collection Fees		276.49		359.00
Total C.C.I. Co.		28,144.33		36,258.55
Less Adjustments	5,400	177.95	6,000	230.99
Total Taxes, C.C.I. Co. Mines, Etc.	863,455	27,966.38	948,575	36,027.56
Cliffs Power & Light Co.	93,815	3,008.50	103,795	3,903.23
Cliffs Electric Co.	4,500	144.31	5,000	188.02
Total	98,315	3,152.81	108,795	4,091.25
Collection Fees		31.53		40.91
Total Taxes		3,184.34		4,132.16
GRAND TOTAL	961,770	31,150.72	1,057,370	40,159.72
Rate		3.207		3.7604

Taxes Levied - Forsyth Township:

	1932	1931	1930	1929
State	5,449.87	6,883.97	7,742.15	8,837.14
County	11,957.01	14,112.00	16,180.47	15,619.99
County Road		4,330.45	5,679.86	6,697.18
Contingent (Township)	4,500.00	4,504.14	4,007.74	3,016.00
Highway Improvement	2,500.00	4,327.50	5,009.91	4,008.95
Highway Repair	3,000.00	4,008.76	5,011.13	4,009.25
Library				100.00
School and One Mill	23,607.06	31,904.50	36,101.82	38,239.35
Cemetery	500.00			
Rejected	21.98	inc in roll	inc in roll	inc in roll
Total	51,535.92	70,071.32	79,733.08	80,527.86
Amount paid by C.C.I. Company	31,150.72	40,159.72	44,811.89	46,664.44
Percent paid by C.C.I. Company	60.44	57.30	56.20	57.96

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16. WATER SUPPLY:

The water supply was treated with chlorine during 1932, as in previous years and was kept safe for use at all times. Less chlorine was required in 1932.

The wood water mains continue to cause trouble and more leaks have to be repaired each year. The wood pipes are rotting in places and this year a new method of repair was adopted. Wire netting for reinforcing purposes is put around the section of wood pipe requiring repairs, then about six inches of concrete. The leaks at end of concrete pipe are calked with pine wedges after the concrete sets. This method has proven successful and avoids the expense of replacing the section of pipe.

The following statement gives a comparison of cost of operating the pump station in 1932 and 1931:

	1932	1931	Increase	Decrease
General Expense	72.07	56.55	15.52	
Maintenance Labor	503.45	651.13		147.68
Maintenance Supplies	428.49	90.64	337.85	
Operating Labor	1446.76	1773.29		326.53
Operating Supplies	4076.25	3885.79	190.46	
Total	6527.02	6457.40	69.62	
Cost per 1000 Gals.	.025	.027		.002
Gallons Pumped	262,780,000	240,460,000	22,320,000	

Included in maintenance supplies is a charge of $ 174.30 for new motor and $ 42.00 for repairs to motor, a total of $ 216.30. Most of the balance of this charge or $ 212.19 was expense incurred for supplies repairing wood water pipe and for fuel.

Labor maintenance and operating was lower on account of reduction in wages.

The 1932 and 1931 operating costs were charged off as follows:

	1932	1931	Increase	Decrease
1. C.C.I. Co. Mines	0	33.00		33.00
2. Water Rates Receivable	1858.56	2557.07		698.51
3. Gwinn Townsite Exp. Gen.	4668.46	3867.33	801.13	
Total	6527.02	6457.40	69.62	

1. Decrease due to no steam shovel loading at Stephenson or Princeton Mines.
2. Water rates receivable decreased due to no income from Archibald Mine in 1932, it operated three months in 1931, and also less collections for water.
3. Gwinn Townsite Expense General absorbs the balance of charges.

17. CONDITION OF PREMISES:

Gwinn Townsite:

The streets and alleys were kept clean at township expense. The general appearance of the town is gradually becoming less attractive due to the buildings needing paint and unkept yards at vacant houses, but this deterioration cannot be avoided.

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17. CONDITION OF PREMISES:

Gwinn Townsite: (Continued)

Expense for repairs were further reduced in 1932, as only absolutely necessary repairs were made.

The cost of repairs and rents accrued for 1932, 1931 and 1930 are shown in the following statement:

No. of Houses (123)	1932	1931	1930
Rents Accrued	8027.35	13150.05	14560.12
Cost of Repairs	597.54	2925.51	7587.12
Excess Rents over Rep. Cost	7429.81	10224.54	6973.00

Austin Location:

The alleys in this location were cleaned at company expense. One of the old boarding houses was dismantled and half the salvaged material reverted to the company. The same number of houses were occupied in 1932 as in 1931, namely 31 out of a total of 64. Damage by boys and stealing of doors and windows from the vacant houses became so bad, that all interior doors and window sash were removed in October and stored on the second floor at the General Office. The expense of this work was included in the cost of repairs.

The cost of repairs and rents accrued for 1932, 1931 and 1930 are shown in the following statement:

No. of Houses (64)	1932	1931	1930
Rents Accrued	1652.50	2654.00	3545.50
Cost of Repairs	151.23	348.91	535.59
Excess Rents over Rep. Cost	1501.27	2305.09	3009.91

Princeton Location:

The Township cleaned the streets and alleys at this location. There were two more houses vacant in 1932 than in 1931.

No. of Houses (14)	1932	1931	1930
Rents Accrued	480.50	694.75	781.00
Cost of Repairs	85.26	209.57	260.04
Excess Rents over Rep. Cost	395.24	485.18	520.96

Gardner-Mackinaw Location:

This location was kept clean at company expense. Material was being stolen from the vacant houses so that it became necessary to remove all interior doors, sinks, pumps and window sash.

No. of Houses (52)	1932	1931	1930
Rents Accrued	417.50	885.55	1300.00
Cost of Repairs	109.35xx	170.50x	716.46x
Excess Rents over Rep. Cost	308.15	715.05	583.54

x Includes cost of repairing sewers and fire protection expense.

xx Includes sewer and fire protection expense also cost of dismantling and removing doors, window sash, etc. from vacant houses.

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17. CONDITION OF PREMISES: (Cont.)

Statistical Statement of Rented Buildings for 1932:

Location	No. Vacant	No. Occupied	Total	Cost of Repairs 1932	Avg. Cost per House	1932 Rent Accruals
Princeton	6	8	14	85.26	6.09	480.50
Austin	33	31	64	151.23	2.36	1652.50
Gardner-Mackinaw	46	6	52	109.35	2.14	417.50
Gwinn Townsite	20	103	123	597.54	4.85	8027.35
Total	105	148	253	943.38	3.74	10577.85

The number of vacant houses increased only five in 1932.

19. GWINN ASSOCIATION:
GWINN HOTEL:

a. Gwinn Association:

The past year has been a very unusual year in that the club house has been used more by the people than at any time in its history due to the general lack of employment in the district. More interest has been taken in the activities sponsored by the Association and more than ever before has the value of Mr. Mather's gift to the community been appreciated by the people. The Association started the year with a balance of $ 1457.45 and finished with a balance of $ 1112.71. This good showing with a drop of paying membership to almost zero in the summer months when the mines were idle, on Dec. 31st, 1931 there were 169 paying members, and on Dec. 31st, 1932 - 98, was only possible by salary reductions, voluntarily assumed by the employees and rigid economy in cost of operation.

The payment by the School District of $ 2500.00 for supervision of athletic work by the Secretary of the Association and the use of the club house for class work and games is the main source of income. The Cleveland-Cliffs Iron Co. assisted by paying $ 50.00 per month towards salaries of employees and by paying one half the dues or 25¢ per month for each man working at the mine. A car of coal was bought in the fall and paid for by the Association and the next car has been donated by Mr. Mather. It will be taken from coal in stock at the Gardner-Mackinaw and will therefore involve no cash expenditure by the company as the Association will pay the cost of delivery. It is probable that the club house will have to close in the summer of 1933 and reopen in September unless additional financial assistance is provided by the Cleveland-Cliffs Iron Co. The 1½% limitation of the property tax may decrease the school funds and force them to abandon all supervised athletic work in which case it is almost certain that the club house will have to close. This would truly be a calamity and it is hoped will not become necessary. The report of the Secretary is included in full in the annual report of the Welfare Department and is deserving of careful study. In no other way can a true picture be obtained of the real value of the club house to the community. A brief summary of the various activities is given herewith in order to bring out clearly the important place it has attained in the life of the community.

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19. GWINN ASSOCIATION:
GWINN HOTEL:

a. Gwinn Association: (Cont.)

The physical and athletic work covers supervision of baseball, basketball, skating rink, tennis courts, horse shoe pitching courts, football, speed ball, soft ball and archery. People of all ages participate, as there are classes for women and men in many of these games. There were 398 supervised periods during the year.

During the year there were 255 meetings and social events held in the club house. These covered church socials, meetings of welfare committees, Health Department of Michigan, County Demonstration Agent, American Legion, Women's Study Club and others, there were also dances, card parties, social parties, etc.

There are two troops of Girl Scouts that use the building, the Scout Master is paid $ 10.00 monthly by the Association.

The library and reading room were used more than ever before, as over 2000 books were loaned during the year. There are (4) weekly magazines, (17) monthly magazines, (2) daily and (2) weekly papers available for reading in the club house.

b. Gwinn Hotel:

The hotel was in operation during 1932 under the same management as in previous years. The Manager made his living expenses and maintained the equipment; he did not pay the rent, light or water charge.

The Store building beneath the South 2/3 of the hotel, occupied since the building was erected by Koski & Company was vacated in the summer. Koski & Company moved to the building owned by Richard Quayle and formerly occupied by Quayle as a department store. It is on the main highway and was a much better location.

f. Gwinn District Crusher:

The crusher did not operate in 1932. No ore was shipped during the year.

STEPHENSON MINE
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YEAR 1932

1. GENERAL:

This mine was abandoned in 1927. The only building left on the property at the end of the year was the combined boiler and engine house and the shaft house. The dry house has been torn down and the brick sold. In December the skip hoist which was the only machinery left in the engine house was dismantled and moved to the central shop yard. This was done to prevent loss of parts by thieves that are very active in the Gwinn District. The building is in bad condition and if the demand for brick continues it will be wrecked and the brick sold. There are a few parts of pumps stored near the shaft house, they must be moved to the central shops as soon as the roads are open in the spring to prevent loss by stealing.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

b. Shipments:

1932	1931
0	24,623 Tons

c. Stockpile Inventories:

	1932	1931
Stephenson Lease - Sec. 20		
Stephenwood Ore	114,344	114,344
Total Stephenson Lease	114,344	114,344
C. & N.W. Ry. Co. Lease		
Northwood Ore	23,150	23,150
Total C. & N.W. Ry. Co. Lease	23,150	23,150
Grand Total	137,494	137,494

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1932	1931
Underground Costs	5.20	0
Surface Costs	727.71	1,176.52
General Mine Expenses	14.65	207.89
Total	747.56	1,384.41
Loading and Shipping	0	1,838.40
Taxes	4,925.28	6,785.52
Track Agreement with E.L.S. Ry.	0	615.58
Total Cost at Mine	5,672.84	10,623.47

Unerground Cost in 1932 covers expense of repairing fences around caves.

Surface Cost lower account of less expense for watchman.

General Mine Expenses less account of no insurance, no mining engineering expense, no analysis of ore and 2% reserve for personal injuries less.

Loading and Shipping - None in 1932.

Taxes lower account of decrease in assessed valuation of ore in stock and lower tax rate.

Track agreement with E & L.S. Ry. - No expense in 1932 as no ore was shipped.

STEPHENSON MINE
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10. TAXES:

Stephenson Mine Lease:	1932 Valuation	1932 Taxes	1931 Valuation	1931 Taxes
60 Acres S½ of SW¼, Sec. 20-45-25	1,000	32.07	3,000	112.83
80 Acres N½ of NW¼, Sec. 29-45-25	160	5.13	160	6.01
Personal (Ore in Stock)	150,000	4810.45	175,000	6599.50
Personal (Machinery)	900	28.86	0	0
Total	152,060	4876.51	178,660	6718.34
Collection Fees		48.77		67.18
Total Taxes		4925.28		6785.52

PRINCETON MINE
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1. GENERAL:

There were practically no changes in conditions at this idle property in 1932. Some further dismantling should be done, for the balance of permanent trestles and the shaft house are badly rotted, but this work has been postponed until general conditions improve. The buildings at the mine are often broken into by boys. It has been impossible to apprehend the ones responsible for this vandalism, as they evidently have a lookout. No great damage has been done except the breaking of doors and windows. The mine has been idle since August 27th, 1921.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

b. Shipments:

1932	1931
0	7,891 Tons

c. Stockpile Inventories:

	1932	1931
Cambridge	106,573	106,573
Princeport	9,160	9,160
Sec. 19 Cambridge	13,841	13,841
Sec. 19 Princeport	1,313	1,313
Total	130,887	130,887

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 12 cu. ft. equals one ton
10% deduction for rock
10% deduction for loss in mining
Percentage of Bessemer equals 0

	Princeport	Cambridge	Sec. 19 Princeport	Sec. 19 Cambridge	Total
Ore above 2nd level	2,552				2,552
" " 4th "		78,325			78,325
" " 5th "	20,000	58,778			78,778
" " 6th "	60,318	445,694	9,000	57,128	572,140
Total	82,870	582,797	9,000	57,128	731,795

b. Prospective Ore:

Ore below 6th level	20,000	418,815	5,000	46,921	490,736
TOTAL ORE					1,222,531

c. Estimated Analysis:

Grade	Iron	Phos	Silica	Mang	Alum	Lime	Mag	Sul	Igni	Moist.
Princeport										
Dried 212°	59.50	.300	7.73	.505	1.214	1.605	1.037	.023	2.235	
Natural	50.60	.256	6.57	.429	1.032	1.365	.882	.020	1.900	15.00
Cambridge										
Dried 212°	59.75	.853	4.42	1.193	.937	3.676	.840	.023	1.447	
Natural	50.80	.725	3.76	1.014	.797	3.125	.714	.020	1.230	15.00

PRINCETON MINE
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4. ESTIMATE OF ORE RESERVES: (Cont.)

d. Estimated Tonnage as required by State Tax Commission:
Non-Bessemer Ore:

Developed	1. Princeport	91,870 Tons	
	2. Cambridge	639,925 "	
	Total Developed		731,795 Tons
Prospective	1. Princeport	25,000 Tons	
	2. Cambridge	465,736 "	
	Total Prospective		490,736 "
	Grand Total		1,222,531 "

The above estimates of ore in the mine were made in December 1921.

8. COST OF OPERATING:

a. Comparative Costs:

	1932	1931	Decrease
Underground Costs	6.47	6.32	
Surface Costs	742.57	1,274.34	531.77
General Mine Expenses	14.79	403.10	388.31
Loading and Shipping	0	507.34	507.34
Taxes	7,814.49	10,682.29	2,867.80
TOTAL COST AT MINE	8,578.32	12,873.39	4,295.07

Underground Costs for both years cover expense of upkeep of fences around cave near No. 1 Shaft.

Surface Costs cover cost of watchmen, $ 729.72, dismantling top tram equipment, $ 8.20, and repairs to buildings $ 4.65. Expenses decreased in 1932 account of lower wages and less time worked by watchmen, and no expense dismantling trestles.

General Mine Expenses: Decrease due to no insurance charged, no analysis account of no shipments, 2% reserve less, and no pensions or allowances charged.

Taxes: Decreased account of valuation $ 40,000 less and lower tax rate.

PRINCETON MINE
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10. TAXES:

	1932		1931	
	Valuation	Taxes	Valuation	Taxes
NE¼ of NE¼, Sec. 19-45-25 (C & NW Lease)	10,000	320.70	10,000	376.04
158.27 Acres in Sec. 18-45-25	5,000	160.35	5,000	188.02
160 Acres in NW¼, Sec. 20-45-25	100,000	3206.97	120,000	4512.48
NE¼ of NE¼ Sec. 19-45-25 Location	420	13.46	420	15.80
S½ of NE¼ Sec. 19-45-25 Location	840	26.92	840	31.60
Personal Property	125,000	4008.72	145,000	5452.58
Total	241,260	7737.12	281,260	10576.52
Collection Fee		77.37		105.77
Total Taxes		7814.49		10682.29
Tax Rate		3.207		3.7604

GARDNER-MACKINAW MINE
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1. GENERAL:

The mine operated one 8-hour shift two days per week from Jan. 1st to June 1st, was idle five months and reopened Nov. 1st. In November and the first half of December three crews worked, each two days per week, and from Dec. 15th to the end of the year, a few men from each of the day shift crews were transferred to make three night shift crews. This was done to speed the sinking of the auxiliary incline shaft from the seventh to the eighth level, E & A. 566, which has been the only work done since the mine reopened in November. Sixty men have been employed since reopening as compared with ninety-five last spring when the mine closed.

Regular mining and development work was underway the first five months of the year, but since Nov. 1st work has been confined to sinking the auxiliary shaft. During November and the first half of December some ore was drawn from the seventh level stopes but since December 15th all the product has come from shaft sinking operations.

In 1931, sinking of a winze, located 200 feet northwest of the auxiliary shaft, was started and reached a depth of 160 feet on the incline at the end of the year. In 1932 the winze was sunk to a depth of 210 feet on the incline or 150 feet vertically below the seventh level and drifting started on the eighth level. The drift reached the site of the auxiliary shaft in April and a raise 8' x 8' in size was extended 110 feet above the eighth level in the line of the shaft when the mine closed on May 31st. Since reopening in November the raise has been completed to the bottom of the shaft and stripping of the shaft to full size and timbering has been underway since December 1st. At the end of the year the shaft was down 102 feet on the incline below the seventh level or one half way to the eighth level. The eighth level will be reached early in February after which sinking will be continued toward the ninth level. The formation is dipping at an angle of 48° and there is no sign of flattening at the elevation of the eighth level. The decrease in sulphur in the ore shown by the drift on the eighth level from the winze to the shaft, as compared with the seventh level drifts above seems to indicate the possibility of lower sulphur content in the ore body at greater depth. This information is of vital importance as a low sulphur ore would make this a valuable mine, while continuation of the high sulphur ore to the bottom of the deposit would immediately raise the question as to whether it was advisable to continue to operate the mine in view of the difficulty of selling the ore. It might be advisable to let the mine flood and remain idle for several years or abandon the property. The present program will give this information and the working schedule now in effect was designed to speed up the work so that as much information as possible would be gained in 1933.

The northwest limit of the ore body on the fifth, sixth and seventh levels has not been reached by drifting, as in each case drifting was abandoned in high sulphur ore running above 1%. This comment is made to indicate the possibilities of a worth while ore body with depth provided low sulphur ore is found.

In December 1931 there was 253 gallons per minute pumped. In 1932 one drill hole that leaked some water through cracked ground was reopened and plugged tight with cement and the mine water was reduced to an average of about 220 gallons per minute. The successful plugging of the diamond drill holes underground in 1931 against pressures, in some cases exceeding 500 lbs. per square inch, has materially reduced pumping costs.

It is very gratifying to report that no lost time accidents occurred in 1932. The splendid record of former years---546 days without an accident, then one lost time accident on May 19th, 1930, followed by 586 days without an accident, has now been extended to 951 days. This record only lacks 139 days of three years without an accident. This is an outstanding record for an underground mine and was made possible by the whole hearted cooperation of every man on the job. It proves that accidents can be

GARDNER-MACKINAW MINE
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YEAR 1932

1. GENERAL: (Cont.)

eliminated and is a record that should inspire the men at the other company mines to greater efforts in safety work.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Grade	1932	1931	Decrease
Gardner Ore	0	0	--
Mackinaw Ore	24,769	79,439	54,670
Total Ore	24,769	79,439	54,670
Rock	20	1,328	1,308
Total Hoist	24,789	80,767	55,978

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Gardner Ore	--	--	--	8,365
Mackinaw Ore	--	--	--	10,506
Total	0	0	0	18,871
Total Last Year	8,998	9,873	18,871	
Decrease 1932	8,998	9,873	18,871	

No ore was shipped in 1932.

c. Stockpile Inventories:

Grade of Ore	Dec. 31, 1932	Dec. 31, 1931	Increase
Gardner Ore	24,808	24,808	0
Mackinaw Ore	167,319	142,550	24,769
Total	192,127	167,358	24,769

The increase equals the product in 1932 as no ore was shipped.

d. Division of Product by Levels:

	1932 Mackinaw	%	1931 Mackinaw	%
Fifth Level			220	.3
Sixth Level	6,753	27.3	52,432	66.0
Seventh Level	14,465	58.3	25,613	32.2
Winze, 8th Level Drift & Shaft	3,551	14.4	1,174	1.5
Total	24,769	100.0	79,439	100.0
Decrease - 1932	54,670			

The ore from the sixth and seventh levels is hoisted in the auxiliary shaft and transferred on the fifth level to the main shaft. The ore from eighth level development work is hoisted in the winze, transferred to the auxiliary shaft, and again transferred on the fifth level to the main shaft.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

e. Production by Months:

The production by months is as follows:

Month	Mackinaw	Total	Rock
January	4,002	4,002	12
February	4,346	4,346	
March	5,024	5,024	
April	4,183	4,183	
May	4,376	4,376	
November	1,674	1,674	
December	1,164	1,164	8
Total	24,769	24,769	20
Total 1931	79,439	79,439	1,328
Decrease	54,670	54,670	1,308

f. Ore Statement:

	Gardner	Mackinaw	Total	Total Last Year
On Hand Jan. 1, 1932	24,808	142,550	167,358	106,790
Product for Year		24,769	24,769	79,439
Total	24,808	167,319	192,127	186,229
Shipments	0	0	0	18,871
Balance on Hand	24,808	167,319	192,127	167,358
Decrease in Output			54,670	
Increase in Ore on Hand			24,769	

1932 - 1 8-hour shift, 2 days per week, Jan. 1st to May 31st
Mine Idle June 1st to Nov. 1st
Three Crews 2 days per week each, Nov. 1st to Dec. 15th - E & A 566
Three Crews 2 days per week day and night shift, Dec. 15th to Jan. 1st - E & A. 566

1931 - 1 8-hour shift, 5 days per week, Jan. 1st to May 1st
4 days per week, May 1st to June 8th
3 days per week, June 8th to Nov. 16th
2 days per week, Nov. 16th to Dec. 31st

g. Delays:

There were no delays in 1932.

h. Delays From Lack of Current:

There were no delays from lack of current.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	1932			1931		
Grade	Iron	Phos.	Sul.	Iron	Phos.	Sul.
Mackinaw	61.80	.121	.786	60.73	.141	.903

The grade of output in 1932 shows an improvement in iron, phosphorus and sulphur over the output in 1931.

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3. ANALYSIS: (Cont.)

c. High Sulphur Ore:

The general area of high sulphur ore lies to the Northwest of the auxiliary shaft. On the sixth level the available ore in this area was mined, but on the seventh level mining has been underway a distance of only 100 feet northwest of the shaft. The ore body has been developed by a drift along the hanging for a distance of over 600 feet in this direction, but 500 feet of the drift is in high sulphur ore averaging above 1% Sulphur. The development work in winze, located 200 feet Northwest of the auxiliary shaft, and by drifts has proven up 200 feet of low sulphur ore Northwest of the shaft on the eighth level. The limits of the low sulphur ore were not determined at the end of the year, but it is evident the percentage of sulphur in the ore on the eighth level is lower than on the seventh level. How far this lower sulphur ore will replace the high sulphur ore on the seventh level can only be determined by drifting and raising. The results to date are quite encouraging. There are large reserves of high sulphur ore on the sixth and seventh levels, that are not now considered as available ore, however, at some future time this class of ore might be used at furnaces thus making this reserve of value.

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumptions: 12 cu. ft. equals one ton
10% deducted for rock
10% deducted for loss in mining
Estimate is of available ore only

Non-Bessemer:	Mackinaw	Total
5th Level to 6th Level	9,638	9,638
6th Level to 7th Level	8,555	8,555
Below 7th Level	53,119	53,119
Total Developed Ore Dec. 31st, 1932	71,312	71,312

Statement showing ore reserves and new ore development for the following years:

	1928	1929	1930	1931	1932
Ore in Mine Jan. 1st	625,425	439,725	282,785	139,349	135,992
Production	90,866	117,224	125,157	79,439	24,769
Balance	534,559	322,501	157,628	59,910	111,223
Ore in Mine Dec. 31	439,725	282,785	139,349	135,992	71,312
New Ore Developed	-94,834A	-39,716B	-18,279C	76,082D	-39,911E

A This decrease in estimate is due to ore pillars that have had to be left in mine.
B Estimate decreased on account of unavailable ore pillars not reported this year.
C Reported 50% of ore unavailable instead of 40%.
D Increase due to ore proved up on and below the seventh level.
E Decrease due to elimination of high sulphur ore areas.

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4. ESTIMATE OF ORE RESERVES: (Continued)

c. Estimated Analysis:

Ore Reserves: Approximate Expected Natural Analysis:

Developed Ore:

	Iron	Phos.	Silica	Mang.	Alum	Lime	Mag.	Sul.	Igni.	Moist.
Mackinaw	53.00	.125	3.00	2.20	1.64	1.88	1.08	.600	2.45	12.50

Ore in Stock: Average Natural Analysis:

	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni	Moist.
Gardner	50.94	.096	2.10	2.58	1.65	3.06	2.214	.597	4.20	12.50
Mackinaw	53.14	.126	2.80	2.07	1.64	1.88	1.078	.628	2.45	12.50

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

There has been an excess of available labor all year due to general unemployment in the district.

(2) New Construction:

During the seven months operating period work was done on E & A. 566, Sinking Mackinaw Shaft.

This will be taken up in detail under heading No. 12, New Construction and Proposed New Construction.

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5. LABOR AND WAGES: (Cont.)

b. Comparative Statement of Wages and Product:
(Based on labor statements for the year. Includes 7 months operating and 5 months idle expense.)

	1932	1931	Increase	Decrease
PRODUCT	24,769	79,439		54,670
No. Shifts and Hours	1-8	1-8		
AVERAGE NO. MEN WORKING:				
Surface	14	20		6
Underground	28	75		47
Total	42	95		53
AVERAGE WAGES PER DAY:				
Surface	3.84	4.47		.63
Underground	4.18	4.88		.70
Total	4.08	4.78		.70
AVERAGE WAGES PER MONTH:	9 Days	16 Days		
Surface	34.56	71.52		36.96
Underground	37.62	78.08		40.46
Total	36.72	76.48		39.76
PRODUCT PER MAN PER DAY:				
Surface	12.03	16.73		4.70
Underground	5.00	5.41		.41
Total	3.53	4.09		.56
LABOR COST PER TON:				
Surface	.319	.267	.052	
Underground	.838	.902		.064
Total	1.157	1.169		.012
AVERAGE PRODUCT MINING:				
Stoping	13.21	10.74	2.47	
Ore Development	10.94	8.71	2.23	
Total	12.94	9.88	3.06	
AVERAGE WAGES CONTRACT LABOR	4.46	5.08		.62
TOTAL NUMBER OF DAYS:				
Surface	2,059¼	4,749¼		2,690
Underground	4,957	14,679¾		9,722¾
Total	7,016¼	19,429		12,412¾
AMOUNT FOR LABOR:				
Surface	7,898.12	21,236.45		13,338.33
Underground	20,749.23	71,604.17		50,854.94
Total	28,647.35	92,840.62		64,193.27

AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL: (a)

	9 Days per Month	13 Days per Month (b)
Surface	34.65	50.05
Underground	36.72	53.04
Total Average	35.69	51.54

(a) Wages were reduced 15% on May 16th, 1932.

(b) The 13 days per month more nearly represents actual monthly earnings of surface men, account little or no common labor, and surface represents Chief Mechanic, Surface Foreman and Electrician who work three or four days per week.

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5. LABOR AND WAGES: (Cont.)

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

Proportion of Surface to Underground Men:

1932 - 1 to 2.00	- 1 8-hour shift,	2 days per week, Jan. 1st to June 1st Mine Idle June 1st to Nov. 1st 2 days per week, Nov. 1st to Dec. 31st
1931 - 1 to 3.09	- 1 8-hour shift,	5 days per week, Jan. 1st to May 1st 4 days per week, May 1st to June 8th 3 days per week, June 8th to Nov. 16th 2 days per week, Nov. 16th to Dec. 31st
1930 - 1 to 2.61	- 1 8-hour shift,	6 days per week, Jan. 1st to July 16th 5 days per week, July 16th to Dec. 31st
1929 - 1 to 2.83	- 1 8-hour shift,	6 days per week

6. SURFACE:

a. Buildings, Repairs:

When the mine was reopened on Nov. 1st, it was decided in the interest of economy not to operate the heating plant and to heat the buildings by stoves. Some expense was incurred in rebuilding chimney above the roof on the office building. In the dry a coil was placed in the heating stove and pipes run to two small steel tanks nearby, to provide hot water for washing.

b. Stockpile:

Aside from ordinary maintenance work, no expense was incurred in 1932 for stocking ore.

c. Tracks, Roads, Etc:

Some resurfacing was necessary on road across the swamp near the mine to maintain the grade.

d. Grounds:

There was no expense incurred in 1932 for grading around mine buildings.

7. UNDERGROUND:

a. Shaft Sinking (Auxiliary Incline Shaft):

Work preliminary to sinking this shaft from the seventh to the eighth level was underway during the seven months operating period. The winze, which was started in 1931, was extended to a vertical depth of 150 feet or 206 feet on the incline below the seventh level, a plat cut at the elevation of the eighth level and a drift driven to the site of the auxiliary shaft. An 8' x 8' raise was then put up in the line of the shaft, which holed to the bottom of the shaft the last day of November. In December stripping and timbering of the shaft was underway and at the end of the month the shaft was down 102 feet on the incline below the seventh level. The shaft is following the footwall which is dipping at 48° as compared with a dip of 42° on the seventh level. It is now down half way to the eighth level, which will be reached about Feb. 1st, 1933. Since reopening the mine on Nov. 1st all work has been confined to the shaft, with three crews of men, each working two days a week, until Dec. 15th since which time, part of the day shift crews have worked night shift in the shaft. This was done to speed up the work and the expense is the same as though the work was confined entirely to the day shift. The elevation of the eighth level is -238 or 1345 feet below surface.

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7. UNDERGROUND:
(Continued)

b. Development:

During the year development of the seventh level was underway. Southeast of the shaft in the low sulphur territory, development work was confined to putting up raises to the sixth level preliminary to stoping and to drifting on the intermediate sub-levels. Northwest of the shaft, the drift along the hanging was driven a distance of 335 feet in 1932. Near the breast a crosscut was started to determine the width of the ore body and the average sulphur content for the full width of the deposit. This crosscut was not completed when the mine closed in May and no further work was done here after reopening Nov. 1st. Prior to closing the mine some work was done in several raises located along this drift, but no ore running under 1% sulphur was found. Unless a demand develops for high sulphur ore it now appears that only 100 feet of the ore body northwest of the shaft is low enough in sulphur to be mined.

c. Stoping:

General:

There was no ore mined on the Gardner property in 1932.

The product in 1932 from the Mackinaw property came mainly from the seventh level, with some from the sixth level stopes and a small amount from the development work on the eighth level. Stoping of the low sulphur ore above the seventh level is well advanced and when operations are resumed can be completed in a few months. The opening of the eighth level, aside from the information it will give as to size of ore body and sulphur content, is necessary to insure a continuous supply of ore. Stoping was underway only the first five months of 1932.

The following is a detail of stoping operations in 1932:

Mackinaw Mine: Sixth Level:

Some mining was done in No. 18 Stope early in the year and this high sulphur stope was extended 20 feet to a height of 170 feet above the sixth level. There was no improvement in the sulphur content which averaged over 1% and work was again temporarily abandoned here. Most of the broken ore in the sixth level stopes was hoisted in 1932, the amount being 6,753 tons or 27% of the year's product. The total product to date from the sixth level has been 88,212 tons. There is still a large reserve of high sulphur ore which is not considered available, as the sulphur runs from one to two per cent.

Mackinaw Mine: Seventh Level:

The major part of the year's stoping operations were confined to this level. The low sulphur ore had been fully developed in 1931 by main level drifts and raising and stoping was underway at the end of 1931. When the mine closed several stopes were completed and others were in various stages of completion. The sub-level drift 55 feet above the seventh level had been extended to the end of the ore body, No. 4 Raise in the center line of No. 4 Stope had been completed to the sixth level and set aside as a permanent second outlet, and stoping was still in progress in No. 2, 3, 5, 6, 7 and 9 Stopes Southeast of the shaft and also in No. 12 Northwest of the shaft. No. 8 and No. 11 Stopes had been completed, while No. 7, 9 and 12 Stopes were nearly finished.

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7. UNDERGROUND:
(Continued)

c. Stoping:

Mackinaw Mine: Seventh Level: (Continued)

Development work Northwest of the shaft had proven that the low sulphur ore only extended about 100 feet in this direction except for a small area about 200 feet from the shaft near the hanging in the vicinity of the winze. This small area did not extend far enough above the level to warrant opening a stope. The two stopes operated Northwest of the shaft, Nos. 11 and 12, both came within the 100' limit. The ore mined in them averaged about .800 in sulphur and varied from 30 to 35 feet in thickness from foot to hanging.

The seventh level drift Northwest of the shaft in 1932, advanced 235 feet along the hanging in high sulphur ore running from 1.3 to 2% sulphur. This ore is not considered available for mining at this time due to the sulphur content. It is of interest to note that the breast of the drift is now over 600 feet Northwest of the shaft, 75 feet beyond the end of the sixth level drift, which in turn was 200 feet beyond the end of the fifth level drift. In other words, the ore body is extending further to the Northwest at depth and the total tonnage of ore is increasing on each successive level. Unfortunately this extension is entirely in high sulphur ore and is of no value at the present time.

Mackinaw Mine: Eighth Level:

Only development work was done on this level in 1932 in connection with sinking the auxiliary shaft from the seventh level to the eighth.

d. Idle Period:

The mine closed at the end of May and after being idle five months reopened Nov. 1st. A small crew worked a few days in June removing the miners' tools, scraper equipment and motors from the haulage locomotives. When this work was completed the men working underground were organized into three crews of four men, each working two days per week. The total men on a shift, surface and underground including pumpmen, hoisting engineers and watchmen were nine each day for six days per week, and six on Sundays. Repair work was confined for 3½ months to the auxiliary shaft where broken and rotted back lath were replaced and light lining sets installed between the main shaft sets from the fifth to the seventh level. General repair work throughout the mine was then started and completed early in October. The repair crew was then reduced from a total of 12 men per week to 5 men, which reduced the idle expense about $ 230.00 for the month. Idle expense at this mine is low due to the system of mining which requires very little timber. Ventilation is good and timber ordinarily lasts many years. Only a small crew was necessary during the idle period to keep the mine in good condition.

e. Timbering:

The cost per ton for timber confined to the main levels at this property was lower in 1932, due to only five months operation as compared with twelve in 1931. It was limited to the area on the seventh level, where stoping was underway and covered timbering near chutes in areas that were not timbered in 1931.

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7. UNDERGROUND:
(Continued)

e. Timbering: (Continued)

Statement of Timber Used:

	LINEAR FEET	AVG. PRICE PER FT.	AMOUNT 1932	AMOUNT 1931
8" to 10" Stull Timber	444	.0531	23.60	94.93
10" to 12" " "	463	.0744	34.45	68.91
12" to 14" " "				33.32
14" to 16" " "	775	.1005	77.86	173.35
Total - 1932	1,682	.0808	135.91	
Total - 1931	7,020	.0530		370.51
		Per 1000'		
Lagging - 5 Ft.	4,875	6.923	33.75	256.00
Poles - 9½ Ft.	4,957	13.948	69.15	250.16
Total	9,832		102.90	506.16
Grand Total	11,514		238.81	876.67
Product			24,769	79,439
Feet of Timber per Ton of Ore			.00680	.00884
Feet of Lagging per Ton of Ore			.19682	.05430
Feet of Lagging per Foot of Timber			2.8984	6.1450
Feet of Poles per Ton of Ore			.20013	.04875
Cost per Ton for Timber			.0055	.0047
Cost per Ton for Lagging			.0013	.0032
Cost per Ton for Poles			.0028	.0032
Total Cost per Ton - All Timber			.0096	.0111
Equivalent of Stull Timber to Board Measure			6,055.2	25,267.2
Feet of Board Measurer per Ton of Ore			.00244	.00318

Total Cost for Timber, Lagging and Poles and Cost per Ton:

Year	Amount	Cost per Ton
1932	238.81	.0096
1931	876.67	.0111
1930	2300.66	.0184
1929	1722.04	.0147

f. Drifting and Raising:

There was a decrease in both raising and drifting in 1932 due to most of this work having been completed on the seventh level. The work done in 1932 was confined to raising in line of stopes, drifting on intermediate sub-levels and to extension of the main haulage drift to the Northwest.

	Drifting		Raising	Total
Year	Ore	Rock	Ore	
1932	673'	15'	337'	1,025'
1931	2,123'	33'	3,154'	5,310'
Decrease	1,450'	18'	2,817'	4,285'

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7. UNDERGROUND:
(Continued)

g. Explosives, Drilling and Blasting:

The cost per ton for explosives was $ .0911 lower in 1932 due to less development, drifting and raising in ore, and more stoping. Due to use of more 40% powder, the average cost per lb. for explosives was nearly $ .005 lower. In 1931, the seventh level was opened and explosive costs average quite high during the period a level is being developed.

Statement of Explosives Used: (Ore Development and Stoping)

	QUANTITY	AVERAGE PRICE	AMOUNT 1932	AMOUNT 1931
40% Gelatin Special	4,575	.112	512.51	287.50
45% " "	750	.125	93.75	
50% " "	9,775	.123	1,202.69	13,630.92
60% Gelex "	2,190	.125	273.75	
Total Powder - 1932	17,290	.120	2,082.70	
Total Powder - 1931	111,590	.1247		13,918.42
Fuse	24,000	.0056	134.66	1,275.75
Caps - #6	4,000	.0112	44.90	337.67
Fuse Lighters				14.27
Tamping Bags	1,500	.0021	3.22	17.20
Total Fuse, Etc.			182.78	1,644.89
Total All Explosives			2,265.48	15,563.31
Product			24,769	79,439
Pounds of Powder per Ton of Ore			.6980	1.4047
Tons of Ore per Pound of Powder			1.4326	.712
Cost per Ton - Powder			.0841	.1752
Cost per Ton - Fuse, Caps, Etc.			.0074	.0207
Cost per Ton - All Explosives			.0915	.1959

Sinking, Rock Development, Etc.

Total Powder	0	6.40
Total Fuse, Etc.	0	1.00
Total All Explosives	0	7.40
Total Explosives Used in Mine	2,265.48	15,570.71
Average Price per lb. for Powder	.1200	.1247

27% of All Powder Used in 1932 was 40%
56% of All Powder Used in 1932 was 50%
97.8% of all Powder Used in 1931 was 50%

The following statement shows the cost per ton for explosives, exclusive or rock development, for the years 1932, 1931 and 1930:

Year	Cost per Ton	Product
1932	.0841	24,769
1931	.1959	79,439
1930	.1429	125,157

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7. UNDERGROUND:
(Continued)

h. Mining and Loading:

There was no important change in mining practice in 1932. In the narrow part of the ore body Southeast of the shaft on the seventh level, a few stopes are being extended full size and the usual raise in the center line of stope eliminated. Connections between stopes are made at two elevations by drifts through the pillars. This method reduced costs, as raising in a seven foot vein of ore was costly and it was considerable cheaper to carry the stope up full size. Scrapers were used to empty the stopes on the sixth level, where the fine ore was scraped off the footwall. They were also used for loading ore from drifts on the seventh level. The present scraper equipment is ample, unless the ore body flattens and more scraping of ore in stopes is required.

i. Ventilation:

A raise was put up from a point near the winze to the sixth level to improve the ventilation in the winze which was sunk to the elevation of the eighth level early in 1932. Ventilation in the mine is by natural means and due to the many openings between levels, there is a constant circulation of air.

j. Pumping:

The number of gallons pumped per minute for the past four years by months are given in the following statement:

Month	1932	1931	1930	1929
January	241	465	100	116
February	223	419	101	113
March	236	470	100	111
April	244	377	126	115
May	231	332	102	101
June	223	314	114	104
July	225	302	104	109
August	222	273	111	106
September	218	192	128	109
October	218	263	180	99
November	215	260	236	99
December	211	253	350	99
Total Average	225	327	142	107

One diamond drill hole that was plugged in 1931 started to leak in 1932 and was reopened in May and plugged tight with cement against a pressure of 700 lbs. per square inch.

The average number of gallons pumped per minute for the past four years is as follows:

Year	Gals. per Minute
1932	225
1931	327
1930	142
1929	107

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7. UNDERGROUND:
(Continued)

k. Underground in General:

There is ore in sight on the seventh level for about six or eight months operation on a two day a week schedule. The area of low sulphur ore was much less on this level, hence the total product will be less than on the upper levels.

As the mine will not operate in 1933, other than to sink the auxiliary shaft, the present available tonnage will carry over to future years. The iron content is uniformally better on the seventh level and in the small area opened on the eighth level than on the upper levels. The only disappointing feature is the sulphur content. The showing of ore on the sixth and seventh levels warrants exploration at depth to determine sulphur content. The present program is designed to give this information as quickly as possible. The steepening of the dip of the ore indicates its probable extent to considerably greater depth, and if the underlying black slate is replaced by jasper, there is an excellent chance of finding low sulphur ore. There are more than sufficient favorable factors to justify the sinking of the auxiliary shaft at this time. A brief summary of these factors follow:

1st Provide work for idle employees.
2nd As ore not wanted at this time, development work advisable.
3rd Information as to sulphur content at depth very important with reference to future plans for the property.

The mine is in good condition and mining can be resumed on a few days notice.

8. COST OF OPERATING:

a. Comparative Mining Costs:
(Based on 7 months operating period in 1932 compared with 12 months in 1931.)

	1932	1931	Increase	Decrease
PRODUCT	24,769	79,439		54,670
Underground Costs	1.223	1.646		.423
Surface Costs	.278	.265	.013	
General Mine Expenses	.493	.324	.169	
Cost of Production	1.994	2.235		.241
Depreciation - Plant & Equipt.	.265	.447		.182
Development	.584	.626		.042
Movable Equipt.	.002	.006		.004
Taxes	.140	.084	.056	
Loading and Shipping	.000	.025		.025
Total Cost at Mine	2.985	3.423		.438
No. of Days Operated	60	193		133
No. Shifts & Hours	1-8	1-8		
Average Daily Product	412	412		

COST OF PRODUCTION:	1932	%	1931	%	Decrease
Labor	1.157	58.0	1.214	54.3	.057
Supplies	.837	42.0	1.021	45.7	.184
Total	1.994	100.0	2.235	100.0	.241

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8. COST OF OPERATING: (Continued)

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Worked	Shifts & Hours	Men Employed	Total Days Worked
1932	60	1-8 hr.	78	5,596½
1931	193	1-8 hr.	95	19,429
Decrease	133		17	13,832½

(2) Wages:

Wages were reduced 15% on May 16th, 1932, following the 10% reduction on Oct. 1st, 1931.

Salaries were reduced on June 16th, 1931, in February 1932 and again on June 1st, 1932.

(3) Comparison of Production:

Production - 1932	24,769	Tons
Production - 1931	79,439	"
Decrease	54,670	"

(4) Comparison of Number of Men and Wages:

Year	No. Men	No. Days	Amount	Rate per Day
1932	78	5,596½	23,489.23	4.19
1931	95	19,429	92,840.62	4.78
Decrease	17	13,832½	69,351.39	.59

(5) Tons per Man per Day:

The tons of ore mined per man per day were as follows:

	1932	1931	Increase	Decrease
Surface	15.94	16.73		.79
Underground	6.12	5.41	.71	
Total	4.43	4.09	.34	

(6) Cost of Production:

1932	$ 49,375.57	Cost per Ton	$ 1.994
1931	177,494.76	" " "	2.235
Decrease	$ 128,119.19	" " "	$ .249

	Total Cost				Cost per Ton		
	Labor	%	Supplies	%	Labor	Supplies	Total
1932	25,017.87	50.7	24,357.70	49.3	1.157	.837	1.994
1931	96,404.32	54.3	81,090.44	45.7	1.214	1.021	2.235
Incr.				3.6			
Decr.	71,386.45	3.6	56,732.74		.057	.194	.241

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8. COST OF OPERATING: (7 Months - 1932 compared with 12 Months - 1931.)

b. Detailed Cost Comparison:

(7) Detail of Accounts:

	1932		1931		Increase		Decrease	
Days per Week	2		2-4-5-6					
Shifts and Hours	1-8		1-8					
Production, Tons	24,769		79,439				54,670	
Avg. Daily Product - Tons	412		412				0	
Number of Days Worked	60		193				133	
Underground Costs	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	68.95	.003	247.96	.003			179.01	.000
3. Development in Rock			104.60	.001			104.60	.001
4. Development in Ore	4006.33	.162	29051.44	.366			25045.11	.204
5. Stoping	8812.35	.357	37656.76	.474			28844.41	.117
6. Timbering	1505.37	.061	6428.66	.081			4923.29	.020
7. Tramming	4294.66	.173	15556.38	.197			11261.72	.024
9. Pumping	6646.67	.268	19010.86	.239		.029	12364.19	
10. Comps. & Air Pipes	2549.45	.103	10966.39	.138			8416.94	.035
11. Back Filling			1804.64	.022			1804.64	.022
12. Undg. Superintendence	1596.27	.064	4952.21	.062		.002	3355.94	
16. Maint:El. Tram Equipt.	603.09	.024	2791.36	.035			2188.27	.011
17. Pumping Machinery	194.63	.008	2205.05	.028			2010.42	.020
Total U.G. Costs	30277.77	1.223	130776.31	1.646			100498.54	.423
Surface Costs								
18. Hoisting	3211.97	.129	9038.68	.115		.014	5826.71	
19. Stocking Ore	935.71	.038	3124.73	.039			2189.02	.001
21. Dry House	1025.40	.042	2406.41	.031		.011	1381.01	
22. General Surface Expense	703.84	.028	2650.23	.033			1946.39	.005
23. Maint:Hoisting Equipment	584.40	.024	1980.68	.025			1396.28	.001
24. Shaft	102.72	.004	149.32	.002		.002	46.60	
25. Top Tram Equipment	236.13	.009	349.76	.004		.005	113.63	
26. Docks, Tres. & Pkts.	39.13	.002	994.79	.012			955.66	.010
27. Mine Bldgs.	45.30	.002	352.17	.004			306.87	.002
Total Surface Costs	6884.60	.278	21046.77	.265		.013	14162.17	
General Mine Expenses								
28. Insurance	389.58	.016	396.99	.005		.011	7.41	
29. Mining Engineering	492.44	.020	1686.34	.021			1193.90	.001
30. Mech. & El. Engineering	244.60	.010	565.62	.007		.003	321.02	
31. Analysis & Grading	692.40	.028	1980.12	.025		.003	1287.72	
32. Personal Injury	643.18	.026	2415.41	.030			1772.23	.004
33. Safety Department	199.25	.008	809.11	.010			609.86	.002
34. Telephones & S. Devices	168.83	.007	497.37	.006		.001	328.54	
35. Local & General Welfare	782.50	.032	1667.61	.021		.011	885.11	
36. Spec. Exp., Pens. & Allows.	3487.94	.140	4634.53	.059		.081	1146.59	
37. Ishpeming Office	2956.03	.119	6183.10	.079		.040	3227.07	
39. Mine Office	2154.45	.087	4835.48	.061		.026	2681.03	
Total Gen. Mine Exps.	12211.20	.493	25671.68	.324		.169	13460.48	
COST OF PRODUCTION	49373.57	1.494	177494.76	2.235			128121.19	.241
40. Taxes	3494.82	.140	6654.09	.084		.056	3159.27	
TOTAL COST	52868.39	2.134	184148.85	2.319			131280.46	.185
5 Months Idle Expense	16351.26	.661						
GRAND TOTAL COST	69219.65	2.795						