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6. SURFACE:

b. Stockpiles:

No change in stocking trestles or stocking grounds was made during the year.

c. Timber Treating Plant:

The comparative cost of treating timber for 1927 and 1926 is as follows:

	Cost for treating, per foot	
	1927	1926
Peeling	.0312	.0312
Treating	.0279	.0400
Decking	.0083	.0069
Zinc Chloride	.0325	.0345
Water, heat, and misc.	.0093	.0086
Total	.1092	.1212
Decrease, 1927 -	.012	

Number of pieces treated, 1927 - 2,661 Number of feet, 23,135
Number of pieces treated, 1926 - 2,762 Number of feet, 23,052

Number of pieces used at the Athens Mine -	524
" " shipped to Maas Mine -	425
" " shipped to Negaunee Mine -	286
" " shipped to Holmes Mine -	617
" " shipped to Morris-Lloyd Mine -	964
Total pieces used and shipped -	2,816 pieces
Total for previous year -	2,717 "
Increase in 1927 -	99 "

Treated timber on hand, December 31st, 1927:

9' pieces	945
8' pieces	794
7' pieces	19
Total	1,758
Total, 1926,	1,913

Timber on hand that has been peeled for seasoning, but not treated:

9' pieces	1,523
8' pieces	881
7' pieces	31
Total	2,435
Total, 1926	2,913

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking at the Athens Mine during the year.

b. Development:

The only development work done during the year was in the northeasterly portion of the sixth level, where five raises were put up to develop the ore below the fourth level, north of the fault dike and east of the block of ore previously mined.

On the sub levels immediately below the sixth level, in the southwesterly portion of the ore body south of the fault dike, the Jasper hanging continues to a lower elevation than had been anticipated, and the slate foot wall has not yet been encountered. It seems probable that further work in this territory will increase the estimate of ore reserves.

c. Stoping:

At the first of the year, ore was being mined in three different territories: (1) Above the fourth level on the south foot wall; (2) Below the sixth level

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7. UNDERGROUND:

c. Stoping: (Cont.)

both north and south of the fault dike; (3) Above the tenth level at the west end of the Athens property, adjoining the Bunker Hill pillar.

During the year, mining in this third territory was stopped, as the area became too small for economical operations, due to the convergance of the mining limit on the east and the Bunker Hill pillar on the west, and further due to the large amount of dike rock encountered. Work in the first and second territories continued without any decided changes either in the available area or the geological conditions, and a new territory was opened below the fourth level on the north side of the fault dike, as mentioned under "7-b."

The detail of the mining on the various levels and sub levels is as follows:

Subs above the fourth level:

-270' Sub Level:

This sub level was practically mined at the first of the year, and was completed in January. A small amount of high sulphur ore was found near the south foot wall.

-290' Sub Level:

Work had been started on this sub level in 1926, and was completed in June, 1927, the outline of the ore being practically the same as on the sub level above. No high sulphur ore was encountered, the -270' sub level being apparently the bottom of the sulphur bearing horizon.

-300' Sub Level:

This sub level was started in April and work has continued at this elevation throughout the year. The Jasper lying on the slate foot wall to the east is pitching rather flatly to the west, decreasing the area of ore on this sub level as compared to the sub levels above. This is probably the same mass of Jasper, mixed with dike stringers, which was found on the fourth level in #420 crosscut and in underground drill-hole #10.

Five contracts were working on this sub level in December.

-315' Sub Level:

Work was started at this elevation in October and a drift has been driven from #422 raise northeasterly through Jasper into ore. One contract was working on this sub level in December.

The sub levels below the -315' sub level, in this territory down to the fourth level, will decrease in area due to the encroachment of the Jasper on the south foot wall.

Most of the ore mined above the fourth level during the year came from Mitchell Lease Lot #11, with a small proportion from Athens Lot #12.

Subs above the sixth level:

-415' Sub Level:

This sub level is immediately below the fourth level, and was opened from the new raises put up from the sixth level. The ore body at this elevation is narrow, with the fault dike on the south and the Jasper hanging on the north, but should increase in width as mining is carried to lower elevations. A mining limit has been established to the northeast to protect raise #610, which is the ventilation raise from the sixth level to the fourth.

Two contracts were working on this sub level in December.

-480' Sub Level:

At this elevation a drift was driven connecting the new sixth level raises with ventilation raise #610.

Sixth Level:

Five raises, No. 638 to No. 642, inclusive, were put up from the northeast end of #4 Crosscut, of which four reached the elevation of the -415' sub level, raising in #642 being now in progress at a height of 55'. All of these raises are in ore.

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7. UNDERGROUND:

c. Stoping: (Cont.)

Subs above the eighth level:

-600' Sub Level:

Mining had been started at this elevation, which is the first sub level below the sixth level, in 1926, and was continued throughout the year, the territory north of the fault dike being completed in August, while mining was still in progress on the south side of the dike at the end of the year. The Jasper hanging was found to extend farther to the south than had been anticipated, and the slate foot wall was not encountered at this elevation.

The ore body south of the dike is so wet that scrapers cannot be used.

Five contracts were working on this sub level in December.

-615' Sub Level:

The ore north of the dike was all mined during the year, and mining was started on the south side of the dike in June. The available area and the geological conditions are practically the same as on the sub level above. Four contracts were working on this sub level in December.

-635' Sub Level:

Mining was started on the north side of the dike in April and has continued throughout the year. The conditions are practically the same as on the sub level above. In the northwest corner of the sub level the drifts encountered the cave from the old workings to the west. At the end of the year ten contracts were working on this sub level.

-660' Sub Level:

During the year a drift was driven from #857 raise eastward to #836 and #814 raises, providing an alternative traveling road, and utilizing #814 raise as a ventilation raise.

-730' Sub Level:

An intermediate sub level has been started at this elevation with a drift from #811 raise to #833 and #834 raises. This drift will be continued to connect with all the raises from the eighth level. This intermediate sub level will facilitate the handling of timber, and serve as an easy means of access to the various working places on the sub levels above.

Subs above the tenth level:

-920' Sub Level:

Mining at this elevation, which was in progress at the first of the year, was completed in February.

-940' Sub Level:

Mining had been started at this elevation in 1926, and was completed in May. No further mining is being done in this territory, as the available area is too small, as mentioned above. The old workings in this territory will serve to drain the water from the ore to the east, which will improve mining conditions in this territory in the future.

d. Timbering:

Statement of Timber Used:

	LINEAR FEET	AVG. PRICE PER FOOT	AMOUNT 1927	AMOUNT 1926
6" to 8" Crib. Timber	94,070	.0421	3,961.67	2,123.84
8" to 10" Stull Timber	74,096	.0625	4,631.85	4,221.06
10" to 12" Stull Timber	28,136	.0860	2,419.12	2,936.79
12" to 14" Stull Timber	11,129	.1816	2,020.71	3,020.17
Total Timber - 1927	207,431	.0628	13,033.35	
Total Timber - 1926	160,679	.0766		12,301.86
7' Lagging	768,658	.7056 C	5,423.86	4,767.31
Poles	246,753	1.5247 C	3,762.28	3,088.90
Total - 1927	1,015,411	.9047	9,186.14	
Total - 1926	929,852	.845		7,856.21
1" Covering Boards	59,100	18.086 M	1,068.88	1,479.63

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7. UNDERGROUND:

d. Timbering: (Cont.)

Statement of Timber Used: (Cont.)

	AMOUNT 1927	AMOUNT 1926
Product	232,748	226,415
Feet of Timber per ton of ore	.891	.710
Feet of Lagging per ton of ore	3.303	3.001
Feet of Lagging per foot of timber	3.706	4.229
Cost per ton for Timber	.0560	.0543
" " Lagging	.0233	.0211
" " Covering Boards	.0046	.0065
" " Poles	.0162	.0137
" " tbr., lagging, poles & cover boards	.1001	.0956
Equivalent of stull timber to board measure	333,603	295,386
Feet of board measure per ton of ore	1.433	1.305

Total cost for timber, lagging, poles, and cover boards, and cost per ton:

1927	$ 23,288.37	$.1001
1926	21,637.70	.0956
1925	27,082.05	.1288
1924	24,403.00	.0984
1923	23,356.15	.0951
1922	16,566.21	.0857
1921	23,169.19	.1316
1920	22,622.15	.1146

The number of feet of timber per ton of ore increased in 1927, due to more raising. There was 94,070 feet of 6" to 8" timber used in raises in 1927, as compared with 52,030 feet in 1926.

The amount of 8" to 10" timber used in 1927 increased 11%, the amount of 10" to 12" decreased 6 2/3%, and 12" to 14" decreased 47%. The decrease in 12" to 14" timber, which is all treated timber, was due to less repairing of main level drifts during 1927.

Due to the large increase in the amount of 6" to 8" timber used in 1927, the cost per ton for timber increased slightly.

The amount of lagging used in 1927 was greater than in 1926, due to a larger product, while the amount of poles used was practically the same as in 1926. The price per 100 feet for both lagging and poles was higher in 1927, resulting a small increase in the cost per ton for lagging and poles.

The total cost for timber, lagging, and poles increased 4.7% in 1927, due to the reasons enumerated above.

e. Drifting and Raising:

The following statement shows the drifting and raising for the years 1927 and 1926:

YEAR	ORE DRIFTING	ORE RAISING	ROCK DRIFTING	ROCK RAISING
1927	38 ft.	922 ft.	121 ft.	-
1926	301 ft.	604 ft.	24 ft.	42 ft.
Decrease	263 ft.			42 ft.
Increase		318 ft.	97 ft.	

Increase in ore and rock raising - 276 feet, or 42%.
Decrease in ore and rock drifting - 166 feet, or 51%.

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7. UNDERGROUND:

e. Drifting and Raising: (Cont.)

In 1927, five raises were put up from the sixth level to develop the ore below the fourth level on the north of the fault dike, and east of the section that had been previously mined. Very little development work was required in 1927.

f. Explosives, Drilling and Blasting:

Statement of Explosives Used:

	Quantity	Average Price	1927 Amount	1926 Amount
50% Ext. Powder				116.00
50% Gel. Powder				418.50
60% Gel. Powder				820.76
50% Am. Gel. Powder	60,350	14.25 C	8,599.92	8,855.40
60% Am. Gel. Powder	24,950	15.50	3,867.25	743.00
Total Powder - 1927	85,300	14.62	12,467.17	
Total Powder - 1926	75,100	14.59		10,953.86
Fuse	289,100	6.27 M	1,811.39	1,795.75
Caps	47,600	10.65	506.99	471.81
Cap Crimpers	16	8.00 dz.	10.67	19.33
Total Fuse, etc. 1927			2,329.05	
Total Fuse, etc. 1926				2,286.89
Total All Explosives - 1927			14,796.22	
Total All Explosives - 1926				13,240.55
Product			232,748	226,415
Pounds of powder per ton of ore			.3665	.3317
Cost per ton for Powder			.0536	.0484
" " Fuse, Caps, etc.			.0100	.0101
" " All Explosives			.0636	.0585
Average price per pound for powder			.1462	.1459

The above statement shows an increase of 13% in the total amount of powder used in 1927, while production increased only 2½%. More powder was used on account of ground being tougher to break, and to more raising. Due to an increased use of higher strength powder on account of tougher and harder ground, the average price per pound for powder increased slightly in spite of a small decrease in the cost per pound for explosives. The total cost per ton forall explosives increased about 8% as compared with 1926, due to the reasons enumerated above.

g. Mining and Loading:

The mining throughout the year was by the slicing method, the same as has been employed since the mine was opened. The slices averaged from eleven to twelve feet in thickness, as this distance between sub levels has been found by practice to give the best results.

The mine is now equipped with 24 double drum scraper hoists, 22 air and two electric, as compared with 17 in 1926.

The following is a statement showing the product handled by these mechanical loaders as compared with hand shoveling:

	No. of Men	No. of Days	Tons	Tons per man per day
Scrapers	33	8,570	173,385	20.23
Hand Shoveling	20	5,371	59,363	11.05
Total	53	13,941	232,748	16.70

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7. UNDERGROUND:

g. Mining and Loading: (Cont.)

This statement shows that 62.3% of the men were employed on scrapers, and mined 74.5% of the product, while 37.7% of the men were employed on hand shoveling and mined 25.5% of the product.

There were five Ingersoll-Rand double drum scraper air hoists and two Sullivan electric double drum scraper hoists purchased in 1927.

i. Ventilation:

The ventilating system worked very satisfactorily during the past year. Good air was available in all working places, with practically no booster fans in service. The latter part of the year improvements were made in the operating mechanism for opening and closing the ventilation doors on the various levels.

j. Pumping:

The number of gallons pumped per minute in 1927 as compared with 1926 is shown by the following report:

Month	1927	1926
January	261	262
February	257	243
March	251	274
April	239	285
May	232	274
June	233	280
July	239	274
August	238	274
September	236	277
October	236	277
November	235	254
December	234	256
Total Average	242	268

The average gallons pumped per minute for the last six years is as follows:

Year	Gals. per minute
1927	242 gals.
1926	268 "
1925	251 "
1924	218 "
1923	195 "
1922	164 "

The average number of gallons pumped per minute this year decreased below the average pumped in 1925 and 1926. This was the first decrease that has occurred in the six year period covered by the above statement.

k. Disintegration of concrete in shaft:

There is no evidence of disintegration of concrete in the section of the shaft from 200' to 400' below the collar that was gunited in 1926. Due to the unusually mild weather in December, no trouble has been experienced with ice in this section of the shaft so far this winter.

l. Underground in General:

Conditions in the mine have been good throughout the year. Mining is being conducted on a predetermined plan with excellent results. More scraper outfits will be added as operating conditions permit, and it is hoped in time to get the mine on a basis of 90% of the ore handled by mechanical loaders.

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7. UNDERGROUND:

1. Underground in General: (Cont.)

During the year the south foot wall was outlined below the sixth level on the south side of the fault dike on one sub level. The Jasper hanging was found at a lower elevation than had been anticipated, and the slate foot wall was not encountered. It seems probable that lower sub levels opened in this territory will find the ore to be wider than it was assumed to be in calculating the prospective ore here.

The replacements of treated timber in main level drifts was lower than in 1926, due to better ventilation in the mine during the past several years. A number of replacements were due to breaking of timbers by pressure.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT	232,748	226,415	6,333	
Underground Costs	1.245	1.244	.001	
Surface Costs	.235	.235		
General Mine Accounts	.075	.088		.013
Cost of Production	1.555	1.567		.012
Loading and Shipping	.031	.044		.013
Total Cost on Cars	1.586	1.611		.025
Depreciation - Plant and Equipment	.155	.174		.019
Development	.089	.089		
Depletion	.086	.078	.008	
Taxes	.434	.457		.023
Increment Depletion	.200	.203		.003
Central Office	.058	.063		.005
Welfare, Safety, Hosp.,	.015	.004	.011	
Cost Adjustment	.009	.006	.003	
Misc. Debits & Credits	.013(red)	.000	.013(red)	
Administrative Expense	.050	.050		
Total Cost at Mine	2.669	2.735		.066
No. of Days Operated	260	261		1
No. Shifts & Hours	1-8 hr.	1-8 hr.		
Average Daily Product	895	868	27	
COST OF PRODUCTION:				
Labor	.938	.972		.034
Supplies	.617	.595	.022	
Total	1.555	1.567		.012

Costs for the two years are remarkably close. The decrease in cost on cars of 2½ cents is due mainly to less personal injury expense and to less ore shipped.

Below the cost on cars, the main decrease is in Depreciation - Plant and Equipment, and in Taxes. The decrease in Taxes is due to less ore in stock in 1927.

b. Detailed Cost Comparison:

(1) Days and Shifts:

During 1927, the mine worked one eight hour shift for 260 days, and the average number of men employed during the year was 158, for a total of 43,234 3/4 days. During 1926 the mine worked one eight hour shift for 261 days, and the average number of men employed during the year was 159, for a total of 43,446½ days.

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8. COST OF OPERATING:

b. Detailed Cost Comparison:

(2) Wages:

Both years the mine operated on the same wage schedule.

(3) Comparison of Production:

Production, 1927 -	232,748 tons
Production, 1926 -	226,415 "
Increase -	6,333 "

(4) Comparison of Number of Men and Wages:

	No. Men	No. Days	Amount	Rate per day
1927	158	43,234 3/4	$ 213,719.82	$ 4.94
1926	159	43,446 1/2	215,025.31	4.95
Decrease	1	211 3/4	1,305.49	.01

(5) Tons per man per day:

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

	1927	1926	INCREASE	DECREASE
Surface	23.09	23.00	.09	-
Underground	7.02	6.74	.28	-
Total	5.38	5.21	.17	-

(6) Cost of Production:

1927 -	$361,978.43	Cost per ton,	$1.555
1926 -	354,771.28	" " "	1.567
Incr.-	7,207.15		
Decr.-		" " "	.012

	Total Cost				Cost per ton		
	Labor	%	Supplies	%	Labor	Supplies	Total
1927 -	$218,297.00	60.3%	$143,681.43	39.7%	$.938	$.617	$1.555
1926 -	220,020.29	62.0%	134,750.99	38.0%	.972	.595	1.567
	1,723.29		8,930.44		.034	.022	.012
	Decrease		Increase		Decr.	Incr.	Decr.

(7) Detail of Accounts:

UNDERGROUND COSTS:

Development in Rock

1927 Amount	$ 575.46	Cost per ton,	$.002
1926 Amount	344.67	" " "	.002
Increase	230.79		

	Sub Division.			
	Drifting	Cost per ft.	Raising	Cost per ft.
1927 -	121'	$4.36	-	-
1926 -	24'	5.25	42'	$4.75
Increase	97'			
Decrease		.89	42'	4.75

The increase in expenditures was due to more rock drifting on sub levels.

Development in Ore

1927 Amount	$4,990.76	Cost per ton,	$.021
1926 Amount	3,908.49	" " "	.017
Increase	1,082.27		.004

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8. COST OF OPERATING:

Development in Ore (Cont.)

In 1927, there were 5,222 tons of ore mined in development work at an average of 8.85 tons per man per day, while in 1926 there were 4,523 tons of ore mined, at an average of 8.24 tons per man per day, or an increase in 1927 of 699 tons and .61 tons per man per day. The principal development in 1927 was ore raising.

Stoping

1927 Amount	$102,455.27	Cost per ton,	$.440
1926 Amount	105,322.58	" " "	.465
Decrease	2,867.31		.025

Detail.

	Labor		Supplies	
1927 -	$ 79,559.01	77.7%	$22,896.26	22.3%
1926 -	83,131.28	78.9%	22,191.30	21.1%
Decrease	3,572.27	Incr.	704.96	

In 1927, there were 227,526 tons of ore mined in stoping operations, averaging 17.04 tons per man per day, while in 1926 there were 221,892 tons mined at an average of 15.87 tons per man per day. The increase in 1927 was 5,634 tons and 1.17 tons per man per day.

The increase in expenditures for supplies in 1927 was due to an increase in product, to more expense for explosives, amount $1,556.67, on account of tougher and harder ground, and to charging out two new Ingersoll-Rand scraper hoists early in the year, amount $1,346.17. None of the five scraper hoists added to equipment near the end of the year were charged out, while in 1926, the expense for new scraper hoists amounted to $3,351.52. There was also more expense in 1927 for repairs to scraper hoists and to drill machines.

Explosives.

	1927	1926
Total pounds of powder	85,300	75,100
Average price per pound	.1462	.1459
Cost of powder	$12,467.17	$10,953.66
Cost of Fuse, caps, etc.	2,329.05	2,286.89
Cost of all explosives	14,796.22	13,240.55
Lbs. of powder per ton of ore	.3665	.3317
Cost per ton for powder	.0536	.0484
Cost per ton for all explosives	.0636	.0585
Increase per ton, 1927	.0051	

The increase is due to the use of more 60% powder in 1927, due to tougher and harder ground encountered in mining operations

Timbering

1927 Amount	$78,122.88	Cost per ton,	$.336
1926 Amount	72,525.42	" " "	.320
Increase	5,597.46		.016

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Timbering (Cont.)

Detailed Cost of Timber.

	1927	1926
Cost of stull timber	$13,033.35	$12,301.86
Cost of lagging and poles	10,255.02	9,335.84
Total cost	23,288.37	21,637.70
Feet of timber per ton of ore	.891	.710
Feet of lagging " "	3.303	3.001
Cost per ton for timber	.0560	.0543
" " lagging	.0233	.0211
" " cover boards	.0046	.0065
" " poles	.0162	.0137
" " timber, lagging, poles, and cover boards	.1001	.0956
Increase, 1927	.0045	

In 1927, two single drum tugger hoists were bought from the Stephenson Mine equipment at a cost of $325.00, for hoisting timber up raises. A new timber treating plant was also built at a cost of $1,370.00, of which $730 was charged to Timbering, the balance to be charged in 1928. The cost for timber used in the mine increased in 1927 due to more 6" to 8" timber used in raises.

Tramming

1927 Amount	$25,517.08	Cost per ton,	$.110
1926 Amount	25,901.74	" " "	.114
Decrease	384.66		.004

Sub Division.

	1927	1926
Tramming	$20,768.02	$21,439.42
Skip Tenders & Bellman	3,157.41	2,962.56
Cleaning skip pit	1,591.65	1,499.76

Ventilation

1927 Amount	$2,944.71	Cost per ton,	$.013
1926 Amount	3,172.48	" " "	.014
Decrease	227.77		.001

The decrease in cost is due to less expense for primary ventilation. There were no additional blowers or vent tubes purchased in 1926 or 1927.

Pumping

1927 Amount	$21,713.16	Cost per ton,	$.093
1926 Amount	21,969.99	" " "	.097
Decrease	256.83		.004

	1927	1926
Total gallons pf water pumped	127,086,869	140,788,044
Gallons pumped per minute	242	268

In 1927 there was a decrease of 13,701,175 gallons of water pumped, or 26 gallons per minute. Labor cost remained the same, the decrease being in supply cost for current.

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Compressors & Air Pipes

1927 Amount	$32,735.38	Cost per ton, $.141
1926 Amount	28,028.87	" " " .124
Increase	4,706.51	.017

	Compressors	Air Pipes
1927 -	$28,425.68	$4,309.70
1926 -	23,945.75	4,083.12
Increase	4,479.93	226.58

Total cu. ft. of air used in 1927 - 679,815,000 cubic feet
" " " " " " " 1926 - 547,650,000 cubic feet
Cost per thousand cubic feet in 1927 - $.0418
" " " " " " 1926 - .0437

The increase in 1927 was 132,165,000 cubic feet, at a decrease in cost of $.0019 per thousand cubic feet.

In 1926, five more air scrapers were put in use about the middle of the year, while in 1927 they worked the whole year, and there were also seven additional scrapers in use the latter part of the year.

The increase in air pipes was due to more pipe and fittings used, on account of air scraper hoists added, and opening a new sub level below the fourth level with five new raises into this territory.

Underground Superintendence

1927 Amount	$11,930.83	Cost per ton, $.051
1926 Amount	11,819.86	" " " .052
Increase	110.97	Decrease .001

There were four bosses and an underground foreman employed throughout the year. The increase in 1927 was due to more overtime by bosses.

MAINTENANCE ACCOUNTS:

Compressors & Power Drills

1927 Amount	$1,471.22	Cost per ton, $.006
1926 Amount	658.53	" " " .003
Increase	812.69	.003

	Repairs to compressors	To Power Drills
1927 -	$1,471.22	none
1926 -	658.53	none
Increase	812.69	

The increase in repairs to compressors was due to replacing the piston rings in the Ingersoll-Rand Compressor twice during the year.

Hand Tramming Equipment

1927 Amount	$423.20	Cost per ton, $.002
1926 Amount	451.47	" " " .002
Decrease	28.27	

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Hand Tramming Equipment (Cont.)

	Sub Division. Cars	Tracks
1927 -	$209.97	$213.23
1926 -	327.34	124.13
Decrease -	117.37	
Increase -		89.10

The decrease in sub level cars is due to less repairs to cars on account of less cars in service.

The increase in sub level tracks is due to rail charged out during the year.

Electric Tram Equipment

1927 Amount	$5,827.03	Cost per ton, $.025
1926 Amount	6,223.15	" " " .028
Decrease	396.12	.003

Sub Division.	1927	1926	INCREASE	DECREASE
Generator and Motor	$ 109.90	$ 46.81	$ 63.09	
Locomotives	1,956.84	2,742.23		$785.39
Wiring	736.41	574.05	162.36	
Main Line Tracks	556.58	253.86	302.72	
Main Line Cars	2,467.30	2,606.20		138.90

Increase in Generator and Motor due to repairs to generator.

Decrease in Locomotives due to the purchase of a second-hand locomotive from the Francis Mine in 1926.

Increase in Wiring due to more repairs to trolley lines in 1927.

Increase in Main Line Tracks due to more repairs to tracks, and more expense cleaning tracks.

Decrease in Main Line Cars due to less repairs to cars in 1927.

Pumping Machinery

1927 Amount	$1,202.62	Cost per ton, $.005
1926 Amount	1,224.50	" " " .006
Decrease	21.88	.001

The decrease in 1927 is due to less replacements and repairs to pump valves.

Total Underground Costs

1927 Amount	$289,909.60	Cost per ton, $1.245
1926 Amount	281,551.75	" " " 1.244
Increase	8,357.85	.001

SURFACE COSTS:

Hoisting

1927 Amount	$21,921.80	Cost per ton, $.094
1926 Amount	21,406.94	" " " .094
Increase	485.14	

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Hoisting (Cont.)

In 1927 the tons of ore and rock hoisted were 233,221 tons, from an average depth of 2,109 feet. In 1926 there were 226,899 tons hoisted from an average depth of 2,145 feet. The increase in 1927 was 6,322 tons, and a decrease in depth of 36 feet.

Stocking Ore

1927 Amount	$5,139.13	Cost per ton,	$.022
1926 Amount	4,990.56	" " "	.022
Increase	148.57		

In 1927, there were 228,549 tons placed on stockpile, while in 1926 there were 207,179 tons stocked; an increase of 21,370 tons in 1927.

All the ore was stocked from the steel trestle in both 1927 and 1926.

Dry House

1927 Amount	$5,386.89	Cost per ton,	$.023
1926 Amount	5,437.07	" " "	.024
Decrease	50.18		.001

The heating charge to dry house in 1927 was $3,898.42; in 1926 it was $3,985.98; a decrease in 1927 of $86.56 due to less coal used.

General Surface Expense

1927 Amount	$6,119.16	Cost per ton,	$.026
1926 Amount	6,017.34	" " "	.027
Increase	101.82	Decrease	.001

The charges to improvement and care of grounds in 1927 were $636.42, while in 1926 they were $693.50; a decrease in 1927 of $57.08.

The increase in surface expense was for more expense for cleaning up surface and for repairs to roads and fences.

MAINTENANCE ACCOUNTS:

Hoisting Equipment

1927 Amount	$11,063.97	Cost per ton,	$.048
1926 Amount	8,560.12	" " "	.038
Increase	2,503.85		.010

	Sub Division.		
	Mach. Parts	Skips & Skip Roads	Wire Rope
1927 -	$1,885.07	$4,443.71	$4,735.19
1926 -	3,467.22	2,806.71	2,286.19
Decrease -	1,582.15		
Increase -		1,637.00	2,449.00

The entire increase was due to the accident that occurred on May 13th. The current was cut off by an electric storm while a skip of ore was being hoisted. The brakeman could not hold the skip of ore with the brake, which resulted in the loaded skip going to the bottom of the shaft, pulling the empty skip into the head sheave and breaking it. The rope on the empty skip also broke and lashed onto the pulley stand, and bent the top of it beyond repair. The girders supporting the head sheaves were buckled and had to be replaced. The

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Hoisting Equipment (Cont.)

cost for repairs were as follows: Labor, $1,163.01; Supplies, $3,588.61; Total, $4,751.62.

In 1927 one 8 ft. steel lined sheave, costing $475, was charged out, on account of the accident of May 13th, while in 1926 two 8 ft. steel lined sheaves, costing $475 each, and one cast iron sheave, costing $237, were charged out. In 1926 the cost of replacing the carbon brushes on the skip hoist generator set was $91.38; there was no expense for this item in 1927.

In 1927, two 1 3/8" hoisting ropes, costing $2437.70, and one special Leschen 1 3/8" rope, costing $2206.31, were charged out, while in 1926 only one 1 3/8" hoisting rope and one 1¼" hoisting rope were charged. One of the new ropes was put on to replace the rope that was broken in the accident of May 13th.

Shaft

1927 Amount	$1,749.92	Cost per ton,	$.008
1926 Amount	2,049.09	" " "	.009
Decrease	299.17		.001

In 1927 the steel sets in the circular shaft were repaired and in places new members were installed at a cost of $855.12. The balance of changes were due to repairs on underground pockets. In 1926 repairs were made to the concrete in the shaft, and replacing the timber front of the pocket on the tenth level with concrete.

In 1927, plats on the fourth, sixth, and eighth levels were whitewashed to improve the lighting, and to increase safety.

Top Tram Equipment

1927 Amount	$1,418.21	Cost per ton,	$.006
1926 Amount	3,226.92	" " "	.014
Decrease	1,808.71		.008

Sub Division.	1927	1926	INCREASE	DECREASE
Engine and Motors	$ 102.40	$ 393.96		$ 291.56
Tracks and Cars	904.36	1,982.85		1,078.49
Wire Rope	202.25	396.45		194.20
Sheaves, Rollers, etc.	209.20	453.66		244.46

Decrease in Engine and Motors in 1927 was due to less repairs.

Decrease in Tracks and Cars in 1927 was due to building one new top tram car and overhauling two other cars in 1926.

In 1927, there were 2200 feet of 5/8" wire rope charged to top tram, while in 1926 there were 4600 feet charged.

The Decrease in sheaves, rollers, etc., in 1927 was due to less rollers and sheaves replaced during the year.

Docks, Trestles & Pockets

1927 Amount	$1,231.19	Cost per ton,	$.005
1926 Amount	315.57	" " "	.001
Increase	915.62		.004

The large increase in 1927 was due to replacing the decking timbers on the north permanent steel trestle. Part of the steel trestle was painted, and $235.51 was expended for repairs to the skip dump and chutes.

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Mine Buildings

1927 Amount	$ 596.88	Cost per ton,	$.003
1926 Amount	1,234.96	" " "	.006
Decrease	638.08		.003

Detail of Mine Buildings.

	1927	1926
Office	$ 64.43	$ 45.79
Shops	68.53	9.01
Stables	18.97	33.00
Shaft House	6.11	715.93
Engine House	94.01	23.00
Boiler House	8.42	3.82
Dry House	229.90	156.79
Coal Dock	-	178.35
Storage Building	49.10	3.22
Laboratory	46.90	-
Transfer House	2.49	-
Tunnel	8.02	66.05

The charges to office, shops, engine house, storage building, and laboratory, were for painting the exterior woodwork.

The charges to stables were for repairs to the horse shed in the pasture.

The charges to shaft house, boiler house, transfer house, and tunnel were for replacing broken window lights.

The charges to dry house were for painting and installing new water tanks for the toilets.

Total Surface Costs

1927 Amount	$54,627.15	Cost per ton,	$.235
1926 Amount	53,238.57	" " "	.235
Increase	1,388.58		

GENERAL MINE ACCOUNTS:

Insurance

1927 Amount	$10.98(red)	Cost per ton,	$.000
1926 Amount	12.97	" " "	.000

Engineering

1927 Amount	$2,315.46	Cost per ton,	$.010
1926 Amount	3,184.27	" " "	.014
Decrease	868.81		.004

The decrease is due to assigning a younger engineer at a lower salary to do the engineering work at the mine. This was effective about nine months of the year.

Analysis

1927 Amount	$3,959.26	Cost per ton,	$.017
1926 Amount	4,195.63	" " "	.019
Decrease	236.37		.002

The Athens samples are worked at the Negaunee Mine laboratory. The number of determinations worked in 1927 was 16,622; in 1926 the number was 17,186; a decrease in 1927 of

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Analysis (Cont.)

564 determinations. The decrease was due to less ore shipped in 1927. The cost per determination was $.1430 as compared with $.1744 in the previous year.

Personal Injury Expense

1927 Amount	$2,521.81	Cost per ton, $.011
1926 Amount	4,231.93	" " " .019
Decrease	1,710.12	.008

There were no fatal accidents in 1927 or 1926. Accidents in 1927 showed a big decrease as compared with 1926, so that compensation payments decreased 40%.

Safety Department Expense

1927 Amount	$278.65	Cost per ton, $.001
1926 Amount	208.04	" " " .001
Increase	70.61	

Telephones & Safety Devices

1927 Amount	$838.09	Cost per ton, $.004
1926 Amount	741.34	" " " .003
Increase	96.75	.001

Sub Division.

	1927	1926
Lighting shaft and levels	$606.66	$499.75
Mine telephones	178.58	64.50
Safety Gates and U. G. Improvement	27.93	48.98
Sign boards, signals, etc.	4.35	-
Appliances for care of injured	-	27.25
Fire equipment	20.57	83.74
Shaft house	-	17.12

There was more expense in 1927 for lighting on levels, due to increasing the number of lights as a safety precaution, and more expense for maintenance of mine telephones.

Special Expense

1927 Amount	$95.65	Cost per ton, $.000
1926 Amount	75.86	" " " .000
Increase	19.79	

The charges for both 1927 and 1926 were for traveling expenses in connection with the drying of three cars of ore at the Wakefield Dryer.

Mine Office

1927 Amount	$7,443.74	Cost per ton, $.032
1926 Amount	7,330.92	" " " .032
Increase	112.82	

Sub Division.

	Direct Charges	Mine Office
1927 -	$837.29	$6,606.45
1926 -	837.65	6,493.27
Decrease	.36	
Increase		113.18

The increase is due to an increase in charges from Central Office.

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Total General Mine Accounts

1927 Amount	$17,441.68	Cost per ton, $.075
1926 Amount	19,980.96	" " " .088
Decrease	2,539.28	.013

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

There were no explorations at the mine in 1927.

10. TAXES:

The comparison of the total taxes for the Athens Iron Mining Company for the years 1927 and 1926 are as follows:

DESCRIPTION	1927		1926	
CITY OF NEGAUNEE	VALUATION	TAXES	VALUATION	TAXES
Realty (Tax Commission)	2,333,000	76,331.09	2,169,000	68,865.75
Ore in Stock, and Equipment and Supplies	715,000	23,393.37	1,061,000	33,686.80
STERLING ADDITION				
Lots #31 to #38 (C. C. I. Co. purchase, 1927)	4,600	150.48		
HARVEY PLAT				
Lots 1, 2, 3, Portion of	1,300	42.53	1,300	41.28
Total	3,053,900	99,917.47	3,231,300	102,593.83
Collection Fees		999.17		1,025.94
TOTAL OPERATING ATHENS MINE		100,916.64		103,619.77
Rented Buildings (Harvey Plat) Lots #5, 6, 7.	7,900	258.47	7,900	250.83
STERLING ADDITION				
Lots No.'s 1, 2, 3, 7, 8, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 72, 73, & 74.	22,700	742.68	15,400	489.01
Collection Fees		10.01		7.40
TOTAL RENTED BUILDINGS	30,600	1,011.16	23,300	747.24
TOTAL ATHENS IRON MINING CO.	3,084,500	101,927.80	3,254,600	104,367.01
Tax Rate		3.272		3.175
Total City of Negaunee Tax		589,686.71		587,398.44
Athens Mine % of City Tax		17¼%		17½%

Mine valuation was increased by the Tax Commission in 1927, while the personal assessment was decreased by the Tax Commission, due to less ore in stock.

11. ACCIDENTS AND PERSONAL INJURY:

There were no fatal accidents at the Athens Mine in 1927 or 1926. There were 15 minor accidents as compared with 31 in 1926, a decrease of 16 for the year. The 15 accidents were classified as follows:

Four were slight injuries, the men returning to work in less than a week.
Eight were injuries that kept the men at home for less than a month.
Two were injuries that kept the men at home for less than two months.
One was an injury that kept the man at home for three months, on account of the loss of one finger.

One man who was totally disabled in July, 1926, received compensation throughout 1927, and one man who received injuries in 1926 was paid the difference in wages during 1927.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

a. New Construction:

The only new construction during the year was the building of a new timber treating plant. This is fully described under "5 - a - 2, New Construction."

b. Proposed New Construction:

Proposed Drying Plant:

Plans and an estimate for a drying plant for Athens ore were prepared in 1926.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

The Athens Mine does not own a steam shovel.

b. Stockpile Trestle:

The east steel stocking trestle was painted during the summer.

c. Timber Treating Plant:

A new concrete vat for treating timber was built in 1927. This is described under "5 - a - 2, New Construction."

d. Tugger Hoists and Scrapers:

Two more double drum Ingersoll-Rand scraper hoists were purchased and charged out early in 1927, making the total owned by the mine 19. In addition, five were purchased the last of the year from second-hand equipment, Gwinn District, but have not yet been billed. The total at the mine at the end of the year was 24. The results of the use of this equipment is given in the table under "7 - g, Mining and Loading."

f. Steel Lined Head Frame Sheave:

The steel lined sheave ordered for the cage compartment in 1926 was received and placed in commission early in 1927. There are now steel sheaves for all three compartments. They have proven very satisfactory.

g. Hoisting Rope:

On account of the limited life of the hoisting ropes it was decided to purchase a special rope manufactured by the Leschen Rope Company. The outside wires on this rope are larger, and should give more wear before breaking. This special rope is used at the Newport Mine, where it has given much longer service. The cost is nearly double that of the plow steel regular, 6 x 19, ropes used heretofore at the mine.

It went into service May 22nd, and according to the wear should be turned soon, end for end. From present indications it will not give any longer service than the plow steel rope in use on the other skip. On account of the cost, it should give twice the service of the other rope.

14. MAINTENANCE AND REPAIRS:

b. Repairs to Shaft House and Pulley Stand:

These repairs were extraordinary, as they were due to an unusual accident described under "2 - g, Non-Electric Delays." The repairs are described under Detail of Accounts, "Maintenance - Hoisting Equipment."

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15. POWER:

Power was supplied by the Cliffs Power and Light Company, a subsidiary of the Cleveland-Cliffs Iron Company. The rate per kilowatt hour was 1½ cents, the same as in the previous year.

17. CONDITION OF PREMISES:

The grounds around the mine buildings were kept in good condition, and were very attractive. A flag pole was erected on the lawn east of the office, and the American flag is flown every day.

18. NATIONALITY OF EMPLOYEES:

This has been prepared under two statements. The first gives the report as ordinarily submitted to the Company. It shows the nationality of the employees as to parentage. The second separates the nationalities into foreign-born and American-born, the latter being shown as Americans.

As to Parentage	1927	Percent	1926	Percent
English	38	24	41	26
Finnish	58	37	55	35
Italian	20	13	22	14
Swedish	13	8	13	8
Irish	2)		2)	
Scotch	1)	2	1)	2
French	18	11	17	11
German	4	3	4	2
Austrian	-		1	
Norwegian	4	2	3	2
Total	158	100%	159	100%

As to Birth	Total	American born	Foreign born
English	38	23	15
Finnish	58	19	39
Italian	20	2	18
Swedish	13	9	4
Irish	2	2	-
Scotch	1	1	
French	18	18	
German	4	4	
Norwegian	4	4	
Total	158	82	76
Percentage	100%	52%	48%

NORTH JACKSON MINE
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1. GENERAL:

There were no important changes in conditions at this property in 1927. The only events worthy of comment are covered under "6-a, Buildings," and "6-c, Roads."

6. SURFACE:

a. Buildings:

(1) North Jackson Office:

The North Jackson Office has been leased for the past several years to the State of Michigan for a barracks for the detachment of State Constabulary stationed in the Upper Peninsula. The lease was surrendered in March, when the Constabulary was transferred to new barracks near the State Prison at Marquette. Some alterations were made to the office, and it has since been occupied as a dwelling house.

(2) Old engine house and top tram building:

The old Engine House and the top tram building at the pit near the Jackson monument were sold and dismantled by the purchasers.

Some of the machinery is still on the foundations, and as a safety measure this should be removed in the spring of 1928 and either scrapped or stored in the Hard Ore yard.

(3) North Jackson machine shop:

The City of Negaunee has leased the old North Jackson machine shop for warehouse purposes. The City made the necessary alterations to fit the building to their needs.

c. Roads:

The City of Negaunee asked permission to widen the road, twelve feet on the south side, leading from the old office and machine shop to the Jackson monument. An easement was given by the Company to the City for a strip twelve feet in width on the south side of the old roadway. The City started widening the road in August, and finished the work in September.

10. TAXES:

For a statement of taxes, see report of South Jackson Mine, under the heading "10 - Taxes."

SOUTH JACKSON MINE
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1. GENERAL:

The South Jackson Mine has not been operated during the past three years. The timber in the shaft house and crusher building is gradually decaying, so that on resumption of operations considerable expense will be incurred in getting the plant in good condition. The crusher plant was not operated during 1927, while in 1926 it crushed soft ores from other mines for a period of 18 days.

In April, a reinforced concrete seal was placed over the Lucy Shaft as a safety measure. It had been found that children were tearing down the protecting fence built around the shaft, and also were making holes in the cover over the shaft. The concrete seal will be a permanent safeguard from accidents.

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 tons

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 tons.

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

10. TAXES:

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
Realty as described, Sec. 1-47-27, including old office,	500,500	16,375.36	500,500	15,875.00
Collection Fees,		163.75		158.75
TOTAL TAXES, JACKSON MINE		16,539.11		16,033.75

14. MAINTENANCE AND REPAIRS:

The only item under this heading has been mentioned under "No. 1 - General", namely, the concrete seal over the Lucy Shaft.

AUSTIN MINE
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1. GENERAL:

The re-opening of the Austin Mine was started on March 15th, 1926, and it went on an operating basis on May 3rd, 1926. Operations were continued throughout 1926, and until Sept. 12th, 1927, when all the ore was mined.

The mine operated one 8-hour shift, five days per week, until March 1st, six days per week, single shift, from March 1st to July 11th, when it went on double shift, which was continued until the mine closed on September 12th.

Due to the use of more scraper outfits in 1927, the cost per ton decreased, and the tons per man increased. Comparatively little repairing and development work was required in 1927, which was also a factor in reducing the cost per ton.

All of the ore was removed from the mine when it closed. When it re-opened in 1926, after having been idle for three years, it was estimated that there was 89,888 tons remaining in the mine, with a possibility of 100,000 tons. The production exceeded these figures, as a total of 129,195 tons was produced. This figure will be further increased by the overrun when the 80,000 tons of ore in stock is shipped.

The work of salvaging the underground equipment was completed in a few days, after which the surface plant was dismantled and removed from the property. The lease was surrendered on November 26th, 1927. Provision was made for reserving the land on which the ore was stocked.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Austin Bessemer,	26,014 tons
Austinport,	53,053 "
Total Ore,	79,067 "
Rock,	2,619 "

The production for the year was 28,949 tons more than in 1926.

The production of Bessemer ore increased due to more ore of this grade encountered in the shaft pillar below the second level. The foot wall above the first level was very flat, and this area did not yield nearly as much Bessemer as had been expected.

The mine closed on September 12th, 1927.

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Austin Bessemer,	20,693	0	20,693	3,804
Austinport,	31,233	13,421	44,654	22,760
Total	51,926	13,421	65,347	26,564
Total Last Year,	26,564	0	26,564	
Increase, 1927	25,362	13,421	38,783	

c. Stockpile Inventories:

Austinport,	77,835 tons
Austinwood,	2,672 "
Total,	80,507 "

Due to the limited area of available stocking grounds, considerable difficulty was encountered in stocking the ore in February, March, and April. The stockpile trestle was raised, the sides cribbed to keep the ore off of the railroad tracks, and during the last thirty days, prior to shipping from pocket, room for stocking was made by moving the ore as it was dumped on the pile with a scraper outfit.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

d. Division of Product by Levels:

The ore hoisted from the various levels was as follows:

Second Level,	35,500	tons
Third Level,	43,567	"
Total,	79,067	"

e. Production by Months:

Month	Austin Bessemer	Austin-port	Total	Rock
January		6,367	6,367	483
February		7,390	7,390	306
March		9,855	9,855	245
April	2,394	5,251	7,645	324
May	5,892	3,261	9,153	232
June	2,712	5,912	8,624	228
July	7,439	4,060	11,499	384
August	5,811	8,621	14,432	385
September	1,766	2,336	4,102	32
Total	26,014	53,053	79,067	2,619

There was no stocking ground available for stocking Bessemer ore, so it was not possible to make any Bessemer product until shipments from pocket started in April.

f. Ore Statement:

	Austin Bessemer	Austin-port	Austin-wood	Total	Total Last Year.
On Hand Jan. 1, 1927		64,115	2,672	66,787	43,233
Output for Year	26,014	53,053		79,067	50,118
Transferred, from	5,321	to 5,321			
Total,	20,693	122,489	2,672	145,854	93,351
Shipments,	20,693	44,654	0	65,347	26,564
Balance on Hand	0	77,835	2,672	80,507	66,787
Increase in Output				28,949	
Increase in Ore on Hand				13,720	

1926 - Mine idle January 1st to May 3rd, 1926.
1 - 8-hour shift, 5 days per week, May 3rd to December 31st, 1926.

1927 - 1 - 8-hour shift, 5 days per week, January 1st to March 1st, 1927.
1 - 8-hour shift, 6 days per week, March 1st to July 11th, 1927.
2 - 8-hour shifts, 6 days per week, July 11th to September 12th, 1927.
Mine closed on September 12th, 1927.

g. Delays:

There were no non-electrical delays during the year 1927.

h. Delays from Lack of Current:

There were no delays reported at the Austin on the 3rd, 4th, and 9th of May, but there was some decrease in production due to the lack of air. On the 25th, 26th, and 27th of May there was a total delay of six hours and a total loss of product of 115 tons, due to lack of current, as there was no air available for drilling.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

h. Delays from Lack of Current: (Cont.)

The following table gives the dates, amount of time lost, and loss in tons:

May 25th,	2 hours	shortage	of	current,	45 tons lost.
May 26th,	2 "	"	"	"	30 tons lost.
May 27th,	2 "	"	"	"	40 tons lost.
Total	6 hours	shortage	of	current,	115 tons lost.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Mang.
Austin Bessemer,	63.85	.032	4.12	.284
Austinport,	61.79	.275	4.75	.314

b. Average Analysis on Straight Cargoes:

Grade	Iron	Phos.	Silica	Mang.
Austin Bessemer,		(All Mixed)		
Austinport,		(All Mixed)		

4. ESTIMATE OF ORE RESERVES:

All ore mined.

5. LABOR AND WAGES:

a. Comments:

There was no shortage of labor during the year. Men from the Stephenson Mine were available when the mine went on double shift on July 11th.

Month	Days Worked Surface	Days Worked Underground	Men Surface	Men Underground	Total Men
January	268 3/4	866 3/4	11	39	50
February	264 1/2	824 1/2	12	40	52
March	329 3/4	1,041	12	40	52
April	266 3/4	890	12	41	53
May	294 1/2	915 3/4	11	37	48
June	234 1/4	870 3/4	9	36	45
July	328 1/4	1,208	14	49	63
August	393 1/4	1,416 1/2	14	53	67
September	152 3/4	410 3/4	6	18	24
Average	281 1/2	938 1/4	11	39	50

b. Comparative Statement of Wages and Product:

	1927	1926	INCREASE	DECREASE
PRODUCT	79,067	50,118	28,949	
No. Shifts & Hours	1, 8-hr. 6 mo. 2, 8-hr. 2 mo.	1, 8-hr.		
AVG. NO. MEN WORKING:				
Surface,	12	11	1	
Underground,	42	40	2	
Total,	54	51	3	

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5. LABOR AND WAGES:

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

	1927	1926	INCREASE	DECREASE
AVG. WAGES PER DAY:				
Surface,	4.39	4.46		.07
Underground,	5.54	5.21	.33	
Total,	5.07	5.00	.07	
* WAGES PER MO. OF 25 DAYS:				
Surface,	109.75	111.50		1.75
Underground,	138.50	130.25	8.25	
Total,	126.75	125.00	1.75	
PRODUCT PER MAN PER DAY:				
Surface,	29.08	18.09	10.99	
Underground,	9.33	7.00	2.33	
Total,	7.09	5.04	2.05	
LABOR COST PER TON:				
Surface,	.148	.247		.099
Underground,	.593	.745		.152
Total,	.741	.992		.251
TOTAL NUMBER OF DAYS:				
Surface,	2,688¼	2,769½		81¼
Underground,	8,470	7,157¼	1,322 3/4	
Total,	11,158¼	9,926 3/4	1,231½	
AMOUNT FOR LABOR:				
Surface,	11,824.19	12,356.13		531.94
Underground,	46,924.92	37,353.36	9,571.56	
Total,	58,749.11	49,709.49	9,039.62	

Mine operated 1 - 8-hr. shift, 5 days per week, May 3rd to Dec. 31st, 1926.
1 - 8-hr. shift, 5 days per week, Jan. 1st to March 1st, 1927.
1 - 8-hr. shift, 6 days per week, March 1st to July 11th, 1927.
2 - 8-hr. shifts, 6 days per week, July 11th to Sept. 12th, 1927.

Proportion of Surface to Underground Men:
1927 - 1 to 2.90
1926 - 1 to 3.64
1925 - 1 to 0
1924 - 1 to 0
1923 - 1 to 2.52
1922 - 1 to 3.30

* Mine operated 22 days per month in 1926, and up to March 1st, 1927. Between March 1st and September 12th, 1927, the mine operated 25 days per month.

6. SURFACE:

a. Buildings, Repairs:

#1 Shaft was abandoned in January. The wooden headframe was dismantled, and the engine house was moved to a safe position.

The mine was shut down on September 13th. A concrete seal was placed in #2 Shaft at ledge, a few feet below surface. The wooden headframe and trestles were dismantled, and the timber piled for shipment elsewhere. The #2 Shaft engine house was sold to the Cataract Water Power job, and was taken down in sections and moved there. The top tram shanty was sold to the Forsyth Township School District, and moved to Princeton, to be used for shelter for school children waiting for bus transportation.

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6. SURFACE:

b. Stockpiles:

The stockpile area was filled by the end of March. During April, until pocket shipments began, a scraper and one man was employed spreading the ore as it was hoisted and stocked.

c. Roads, Caves, etc.

Just before the mine closed, #1 Shaft caved. Owing to the shaft still remaining open, the ground around the cave was blasted in, until the shaft filled and the caved area was made safe.

After the mine closed, fences were built around the individual caves and cracks, as well as around the entire mined area.

7. UNDERGROUND:

b. Development:

There was comparatively little development in 1927. The foot wall haulage drift on the second level was extended a short distance in rock, and a raise put up for mining the ore on the sub levels at the west end of the shaft pillar. Later in the year, two short raises were put up from the foot wall haulage drift to mine the ore on the first sub above the second level, replacing raises that had caved. On the third level there were four raises put up during the year for mining ore on different sub levels. These raises were necessary on account of using scraper outfits, also to permit mining the ore in several different blocks, which was necessary in order to finish mining in all the areas at practically the same time. In 1927 there was 225' of development in rock, and 119' in ore, or a total of 344' of drifting and raising. This compares with 490' of rock drifting and raising in 1926, and 146' of ore drifting and raising, or a total of 636 feet. The development work in 1927 was about 55% as much as in the previous year, and as stated before, was relatively small compared with the output.

c. Stoping:

During the year work was done on the following sub levels and main levels:

1st Level.
2nd, 3rd, and 4th subs below 1st Level.
2nd Level.
1st, 2nd, 3rd, and 4th subs below 2nd Level.
3rd Level.

First Level:

Two small pillars were mined on this level in January, the ore being hauled with scrapers to a raise from the second level. This completed the mining of all ore on this level.

First sub below the first level:

Mining on this sub level started in July, 1926, and finished in April, 1927. Due to the flattening of the foot wall most of the ore mined here came from the triangle of ore left between the foot wall drift on the sub level and the floor of the main level above. The pillar mined here on the foot wall was nearly 50' wide, showing the extreme flatness of the foot wall in this particular area.

Second sub below the first level:

Mining of the ore left in the shaft pillar on this sub level was started in 1926 and completed in June, 1927. This sub level had been developed in previous years by drifts and crosscuts, so that practically the only ore left here was in four pillars. In one area near the northeast end of the shaft pillar the foot wall flattened and considerable ore was obtained from the triangle lying on the foot wall.

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7. UNDERGROUND:

c. Stoping: (Cont.)

Third sub below the first level:
Mining was started on this sub level in February, and continued until all the ore was removed about the middle of August. The shaft pillar on this sub level yielded considerable ore, due to the fact that it had not been developed in previous years.

Fourth sub below the first level:
The southwest end of this pillar was mined in 1926. The balance of the ore remaining in the shaft pillar was mined in 1927, work being completed here the first week of September.

Second Level:
The haulage drift in the foot wall was extended 21' in rock, and a raise put up for mining ore from the first and second subs above the second level. Mining of the shaft pillar on the sill floor of the level was started in January and completed in June. In July two short raises were put up to the first sub above the second level to replace old raises that had caved.

First sub below the second level:
Mining of the shaft pillar on this sub level was started in 1926, and continued in 1927, work being completed here the latter part of July.

Second sub below the second level:
Mining was started in the shaft pillar on this sub level in December, 1926, and completed in September, 1927. This sub contained more ore than any sub level mined in 1927. It had not been developed to any extent by drifts or crosscuts, and on this sub level was approximately 350' in length.

Third sub below the second level:
Mining of the shaft pillar at the elevation of this sub level started in March and was completed in September. This sub level also yielded a considerable tonnage of ore, as the pillar was nearly 300' in length.

Fourth sub below the second level:
Some ore was mined from the old workings in the early part of the year at the elevation of this sub level beyond the southwest end of the shaft pillar. Mining of the shaft pillar was started in June and completed in September.

Third Level:
During the year four raises were put up from the third level to sub levels above, three of which were needed for development in order that the ore could be mined with scrapers, the fourth raise was put up to replace a raise that had crushed. Starting in July, considerable re-timbering was necessary on the third level to keep it open for tramming. This was due to mining of the pillar having reached a point close to the level, so that there was heavy pressure on the haulage drifts.

d. Timbering:
The cost for timber decreased in 1927, due to less 6" to 8" timber used in raises and less 8" to 12" used in repairing drifts. The mine was reopened in 1926, after having been idle for three years, so that considerable repairing was necessary on both the main levels and the sub levels. More lagging was used for covering down floors of sub levels in 1927, as much of the mining was in new territory under the hanging.

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7. UNDERGROUND:

d. Timbering: (Cont.)

Statement of Timber Used:

KIND	LINEAR FEET	AVG. PRICE PER FT.	AMOUNT 1927	AMOUNT 1926
4" to 6" Timber,	4,737	.0245	116.44	5.12
6" to 8" "	11,164	.0364	426.57	1,137.30
8" to 10" "	32,274	.0546	1,770.46	1,374.37
10" to 12" "	12,522	.0799	1,000.85	750.20
12" to 14" "				48.58
Total, 1927,	60,697	.0546	3,314.32	3,315.57
Total, 1926,	65,419	.05068	3,315.57	
		PER 100'		
5' Lagging,	187,000	.710	1,328.52	1,032.07
7' "	28,931	.687	198.73	457.18
8' "	264,900	.686	1,819.85	569.07
Total Lagging,	480,831	.717	3,347.10	2,058.32
Poles,	46,200	1.14	530.17	331.29
Total Lagging & Poles 1927	527,031	.735	3,877.27	2,389.61
Total Lagging & Poles 1926	304,562	.784	2,389.61	
5/8" Covering Boards,	5,752	.170	97.79	90.09
Product,			79,067	50,118
Feet of timber per ton of ore,			.767	1.305
" lagging " "			6.081	5.540
" lagging per foot of timber,			7.921	4.246
Cost per ton for timber,			.0419	.06615
" " lagging,			.0423	.04106
" " poles,			.0067	.0066
" " covering boards,			.0012	.00179
" " timber, lagging, poles & cover boards,			.0921	.1156
Equivalent of stull timber to board measure,			100,447	104,408
Feet of board measure per ton of ore,			1.27	2.083

Cost timber, lagging and poles,	1927		7,191.59
	1926		5,795.27
Cost of covering boards used in place of lagging,	1927		97.79
	1926		90.09

e. Drifting and Raising:

YEAR	ORE DRIFTING	ORE RAISING	ROCK DRIFTING	ROCK RAISING
1927	-	119 ft.	132 ft.	93 ft.
1926	12 ft.	134 ft.	378 ft.	112 ft.
Incr.				
Decr.	12 ft.	15 ft.	246 ft.	19 ft.

f. Explosives, Drilling and Blasting:

Statement of Explosives Used:

	QUANTITY	AVERAGE PRICE	AMOUNT 1927	AMOUNT 1926
40% Red Cross Powder,				19.50
50% Gelatin "				655.50
60% Gelatin "	21,400	.1550	3,317.00	1,573.25
Total Powder, 1927	21,400	.1550	3,317.00	
Total Powder, 1926	14,900	.1508		2,248.25

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7. UNDERGROUND:

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

Statement of Explosives Used:

	QUANTITY	AVERAGE PRICE	AMOUNT 1927	AMOUNT 1926
Fuse,	76,500	.624 C.	476.18	355.37
Caps,	14,200	1.065 C.	151.14	106.56
Cap Crimpers,	17	.417 ea.	7.09	4.95
Tamping Bags,	1,000	2.15 M.	2.15	6.45
Total Fuse, etc. 1927,			636.56	
Total Fuse, etc. 1926,				473.33
Total All Explosives, 1927,			3,953.56	
Total All Explosives, 1926,				2,721.58
Product,			79,067	50,118
Pounds of powder per ton of ore,			.2706	.336
Cost per ton for powder,			.0429	.0506
" " fuse, etc.			.00605	.00944
" " all explosives,			.0500	.0543
Average price per pound for powder,			.1500	.1508

The cost per pound for powder was higher in 1927, due to use of 60% Gelatin Powder only, while in 1926 about 39% of the powder used was 50% Gelatin, which cost $.1425 per pound as compared with a cost of $.1550 for 60% Gelatin. The pounds of powder per ton of ore decreased 20% in 1927, due to the use of higher strength explosive, and to better breaking ground. Due to the use of less powder, the cost per ton for all explosives decreased in 1927. On account of good results obtained by the use of 1½" powder at the Stephenson Mine, this size powder was used in both 1926 and 1927 at the Austin Mine.

g. Dismantling:

The last ore was removed from the Austin Mine on September 12th. The work of dismantling was then started and continued until it was completed the latter part of the month. The locomotive and rocker dump cars on the second level, trolley wire, pipes, and rail, together with all the miner's equipment, was first sent to surface. While this was being done, the material on the third level was dismantled and brought to the shaft. All material underground had been salvaged on September 21st.

The wood head frame over #2 Shaft was then dismantled, this work being completed early in October. The work of dismantling the trestles leading to the railroad pocket and stockpile ground was then started and completed in November. The good material was sorted out and piled adjacent to the railroad tracks ready for shipment, and in December was shipped to the Gardner-Mackinaw Mine. The engine house in #2 Shaft, which was recently constructed and in good condition, was dismantled in sections and sold to the Cliffs Power and Light Company for use at the Water Power job on the Escanaba River. The top tram engine house at the Austin was put on skids and sold to the Forsyth Township School District.

The material in the old boiler house at the Austin Mine was removed and stored in the General Shop building. The small air hoist used for lowering timber to #1 Shaft was taken off the property and stored near #3 Shaft at Princeton. All buildings of any value, with the exception of the railroad loading pocket, had been dismantled and practically all removed from the property prior to November 26th when the lease was surrendered. This does not include, however,

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7. UNDERGROUND:

g. Dismantling: (Cont.)
the transmission and water lines leading to the Stephenson Mine, which cross the Austin property. Easements have been requested covering these lines, as they will be needed until the ore is removed from stockpile and all equipment shipped from the property.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT	79,067	50,118	28,949	
Underground Costs	.918	1.325		.407
Surface Costs	.099	.167		.068
General Mine Accounts	.152	.137	.015	
Cost of Production	1.169	1.629		.460
Loading and Shipping	.053	.041	.012	
Total Cost on Cars	1.222	1.670		.448
Depreciation - Plant and Equipment		.069		.069
Taxes	.042	.066		.024
Central Office	.077	.083		.006
Welfare, Safety, Hosp.,	.018	.016	.002	
Cost Adjustment	.038	.031	.007	
Total Cost at Mine	1.397	1.935		.538
No. of Days Operated	202	174	28	
No. Shifts & Hours	1-8 hr. 2-8 hr.	1-8 hr.		
Average Daily Product	391	288	103	
COST OF PRODUCTION:				
Labor	.808	1.035		.227
Supplies	.361	.594		.233
Total	1.169	1.629		.460

b. Detailed Cost Comparison:

UNDERGROUND COSTS:

Development in Rock,

1927 Amount	$1,514.41	Cost per ton,	$.019
1926 Amount	3,236.85	" " "	.065
Decrease	1,722.44		.046

		Feet	Cost per foot
No. of ft. of rock dft. & raising,	1927	225'	$6.73
No. of ft. of rock " "	1926	398'	8.13
Decrease,		173'	1.50

There was less main level drifting in 1927, also less raising. This, with the increase in production, accounts for the decrease in cost per ton.

Development in Ore

1927 Amount	$602.53	Cost per ton,	$.007
1926 Amount	718.26	" " "	.014
Decrease	115.73		.007

There was less raising in ore in 1927. The cost per ton decreased on account of a larger product.

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Stoping

1927 Amount	$28,043.09	Cost per ton,	$.355
1926 Amount	25,082.65	" " "	.500
Increase	2,960.44	Decrease	.145

The following table gives labor cost of stoping, and the tons per man per day:

Month	Labor cost per ton	Tons per man per day
January	$ .324	17.56
February	.312	18.63
March	.318	19.03
April	.292	19.67
May	.262	21.82
June	.259	23.32
July	.265	22.30
August	.290	20.88
September	.306	18.77

The product in 1927 was 79,067 tons, as compared with 50,118 tons in 1926. The increase in product of 28,949 tons was obtained with an increase in expenditures of less than $3,000. The stoping cost was high in 1926, due to reopening the mine after a three year idle period and to the purchase of scraper hoists and accessories. The cost per ton for scraper hoists and accessories was $.119, and eliminating this item brings the stoping cost down to $.381 in 1926, as compared with $.355 in 1927. These low costs were made possible by the use of scraper hoists.

Timbering

1927 Amount	$20,478.09	Cost per ton,	$.259
1926 Amount	19,892.23	" " "	.397
Increase	585.86	Decrease	.138

	Amount	Cost per ton
Cost for timber, lagging, etc. 1927,	$7,191.59	$.0921
" " " " 1926,	5,795.27	.1160
Increase,	1,396.32	
Decrease,		.0239

There was an increase of 24% in the cost for timber, lagging, etc., in 1927, as compared with an increase of 57% in the product. Labor costs decreased in 1927, on account of the extraordinary expense in 1926 for retimbering when the mine was reopened.

Tramming

1927 Amount,	$9,148.07	Cost per ton,	$.116
1926 Amount,	6,773.84	" " "	.135
Increase	2,374.23	Decrease	.019

In 1927, approximately 45% of the ore was trammed by electric haulage and 55% by hand tramming. In 1926, approximately 75% was trammed by electric haulage, but over 50% of this ore had already been trammed by hand on the first level. The cost per ton was lower in 1927, due to more ore handled solely by electric haulage, also to lower cost for hand tramming on the third level on account of a larger product trammed per man per day.

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Pumping

1927 Amount	$2,003.28	Cost per ton,	$.025
1926 Amount	609.15	" " "	.012
Increase	1,394.13		.013

The cost for pumping in 1926 was due to a flat charge of $100 per month for six months, made by the Stephenson Mine for pumping the water that drains to the Stephenson Mine from the Austin. This charge was continued until in June, 1927, when it was increased to $500 per month, and was continued at this rate during July and August. The gradual abandonment of operations at the Stephenson started the middle of June and continued until July 29th, after which the underground equipment was salvaged, this work being completed in August. During this period the proportion of pumping cost charged to the Austin was increased.

Compressors & Air Pipes

1927 Amount	$5,714.33	Cost per ton,	$.072
1926 Amount	3,801.79	" " "	.076
Increase	1,912.54	Decrease	.004

The cost of operating the Central Power Plant 4000 cubic ft. compressor, after a few minor deductions, was divided between the Austin and Stephenson on the basis of tons of ore produced. The cost per ton for air for both mines was slightly lower in 1927, due to furnishing air to the Archibald Mine in June. The larger product at the Austin also lowered the cost per ton for air during the early months of the year, during which period it averaged about $.050 per ton. In July and August the cost per ton jumped to nearly $.110, due to a decrease in production at the Stephenson in July, and to the Austin being the only mine producing in August.

Underground Superintendence

1927 Amount	$4,275.70	Cost per ton,	$.054
1926 Amount	3,150.27	" " "	.063
Increase	1,125.43	Decrease	.009

The mine operated about the same length of time in each year, but 202 shifts were worked in 1927 as compared with 174 in 1926. This was due to working six days per week from March 1st and double shift in July, August, and September. An extra shift-boss was required when double shift started, also all of the mining captain's time was charged to the Austin Mine starting with July. Prior to July a portion of the mining captain's time was charged to the Princeton; this ceased when the Princeton Mine pumps were stopped in June. The decrease in cost per ton is due to a larger product.

Cave-In

1927 Amount	$117.40	Cost per ton,	$.001
1926 Amount	3.84	" " "	.000
Increase	113.56		.001

Increase due to the cost of filling the cave at #1 Shaft.

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MAINTENANCE ACCOUNTS:

Hand Tramming Equipment

1927 Amount	$20.17	Cost per ton,	$.000
1926 Amount	29.12	" " "	.001
Decrease	8.95		.001

The amount expended in both years represents the cost of repairing hand tramming equipment.

Electric Tram Equipment

1927 Amount	$ 730.35	Cost per ton,	$.010
1926 Amount	3,005.10	" " "	.060
Decrease	2,274.75		.050

The decrease is due to the purchase of six rocker dump cars in 1926, costing $2,208.50, as compared with two bought in 1927, costing $640.00. There was also an item of $341.86 in 1926, representing the cost of tail track and siding, which was incurred in April, before the mine started operating. The main part of the balance of the charges in both 1927 and 1926 cover the cost of repairs to locomotive.

Pumping Machinery

1927 Amount	$ 6.14	Cost per ton,	$.000
1926 Amount	111.67	" " "	.002
Decrease	105.53		.002

The charge in 1927 covers the cost of minor repairs to skip pit pump, the 1926 charge covers the cost of overhauling a Cameron air pump which was installed in the skip pit when the mine re-opened.

SURFACE COSTS:

Hoisting

1927 Amount	$1,936.92	Cost per ton,	$.025
1926 Amount	1,369.27	" " "	.027
Increase	567.65	Decrease	.002

The increase is due to larger production, which increased the charge for power, and to employing another hoisting engineer when the mine went on double shift in July.

Stocking Ore

1927 Amount	$1,560.80	Cost per ton,	$.019
1926 Amount	1,198.24	" " "	.024
Increase	362.56	Decrease	.005

The division of this account to October 1st, 1927, as compared with the full operating period in 1926, is as follows:

	1927	1926
Erecting portable trestles,	155.59	187.37
Operating tram system,	1,143.12	1,010.97
Picking rock,	88.52	-
Total,	1,387.23	1,198.34

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Stocking Ore (Cont.)

The figure for the full year of 1927 was $1,560.80, which shows that $173.57 was charged to this account after the mine was abandoned in September. The decrease in the cost per ton was due to a larger product.

Dry House

1927 Amount	$2,223.92	Cost per ton,	$.028
1926 Amount	1,697.15	" " "	.034
Increase	526.77	Decrease	.006

The cost of operating the Stephenson dry house is divided between the Austin and the Stephenson mines on the basis of the number of men working underground. Expense charged to the Austin increased in July and August due to a decrease in the number of men working underground at the Stephenson. The cost per ton decreased on account of a larger product.

General Surface Expense

1927 Amount	$1,312.49	Cost per ton,	$.016
1926 Amount	1,320.35	" " "	.027
Decrease	7.86		.011

The expense for the two years was practically equal, but the cost per ton decreased on account of the larger product.

MAINTENANCE ACCOUNTS:

Hoisting Equipment

1927 Amount	$ 115.02	Cost per ton,	$.002
1926 Amount	1,001.70	" " "	.020
Decrease	886.68		.018

The expense in 1927 covers minor repairs to electric hoist, to skips and cages, and for the inspection of the hoisting rope.
The expense in 1926 was much greater due to repairing bearing on the electric hoist, repairing air hoist used in lowering timber in #1 Shaft, and to building two light timber cages, one for #1, the old vertical shaft, and one for #2, the new incline shaft.

Shaft

1927 Amount	$ 55.76	Cost per ton,	$.001
1926 Amount	336.67	" " "	.007
Decrease	280.91		.006

The expense in 1927 was due to repairs to underground loading pockets. In 1926, the expense was high due to repairing #1 Shaft from the collar to the ledge, a distance of about 30 feet. This work was necessary in order to use #1 Shaft as a timber road.

Top Tram Equipment

1927 Amount	$554.46	Cost per ton,	$.007
1926 Amount	468.15	" " "	.009
Increase	86.31	Decrease	.002

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Top Tram Equipment (Cont.)

The expense in 1927 covers 2500 feet of 5/8" rope for the top tram, repairs to top tram cars, and replacements of sheaves and rollers. The expense in 1926 was for repair of cars and the replacement of sheaves and rollers.

Docks, Trestles & Pockets

1927 Amount	$ 74.89	Cost per ton,	$.001
1926 Amount	414.72	" " "	.008
Decrease	339.83		.007

The expense in 1927 was due to cribbing the side of the ore pile to keep the ore off the railroad tracks. This was necessary on account of the stockpile grounds being filled.

The expense in 1926 was high on account of raising the stocking trestle in early winter to make more stocking room, and to grading for widening the sollar, also for laying 1" sollar plank.

Mine Buildings

1927 Amount	$ 14.42	Cost per ton,	$.000
1926 Amount	566.75	" " "	.011
Decrease	552.33		.011

The expense in 1927 covers minor repairs to shaft house. In 1926, the expense was much greater, due to enclosing the head-frame at #2 Shaft. The interior was gunited to make it fire proof, and also to make it warmer. It was heated by a stove, as steam was not available.

GENERAL MINE ACCOUNTS:

Insurance

1927 Amount	$230.19	Cost per ton,	$.003
1926 Amount	135.96	" " "	.003
Increase	84.23		.000

Most of the increase in 1927 is due to an adjustment of fire and boiler insurance premiums that should have been charged out in 1926.

Engineering

1927 Amount	$1,320.95	Cost per ton,	$.017
1926 Amount	1,669.81	" " "	.033
Decrease	348.86		.016

The decrease is due to only one engineer employed in the district for 1927, while for part of the previous year there were two engineers.

Analysis

1927 Amount	$1,998.87	Cost per ton,	$.025
1926 Amount	1,193.86	" " "	.024
Increase	805.01		.001

The large increase is due to more determinations in 1927, on account of making more Bessemer ore and to more ore shipped from pocket and stockpiles.

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Personal Injury Expense

1927 Amount	$2,182.71	Cost per ton,	$.028
1926 Amount	925.19	" " "	.019
Increase	1,257.52		.009

The large increase is due to more compensation payments for personal injuries. There were six accidents in 1927, on which compensation was paid, as compared with two in 1926. In both years compensation was paid for an injury received in 1923. Payments to doctor were increased in August, 1927, from 40¢ to 50¢ per man.

Safety Department Expense

1927 Amount	$6.24	Cost per ton,	$.000
1926 Amount	5.00	" " "	.000
Increase	1.24		

Telephones & Safety Devices

1927 Amount	$ 11.97	Cost per ton,	$.000
1926 Amount	135.95	" " "	.003
Decrease	123.98		.003

The expense in 1927 was mainly for the replacement of lights at shaft and levels. The expense in 1926 was higher due to installing lights, mine telephones, sign boards, signals, and fire protection when the mine was re-opened.

Local General Welfare

1927 Amount	$971.51	Cost per ton,	$.013
1926 Amount	465.16	" " "	.009
Increase	506.35		.004

The increase was due to more charges against the Austin on account of a larger payroll, and to the abandonment of the Gwinn Mine and the flooding of the Princeton Mine, which increased the charges against the Austin.

District Office

1927 Amount	$3,908.08	Cost per ton,	$.049
1926 Amount	1,310.31	" " "	.026
Increase,	2,597.77		.023

The large increase is due to the Austin absorbing a larger proportion of district office expense, on account of abandoning the Gwinn Mine, flooding the Princeton Mine, etc., which increased the charges against the Austin.

Mine Office

1927 Amount	$1,469.34	Cost per ton,	$.019
1926 Amount	1,014.10	" " "	.020
Increase	455.24	Decrease	.001

The increase is due to a charge for mine clerk for more months in 1927 than in 1926, and to a different distribution of clerks' time in 1927, by which the expense of one clerk was all charged to the Austin as compared with only a part in previous months.

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10. **TAXES:**

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
346.37 Acres. in Sec. 20-45-25,	20,000	576.84	50,000	1,432.71
39.05 " " " 28-45-25,	280	8.09	280	8.02
Personal property,	92,000	2,653.20	64,000	1,833.20
Total,	112,280	3,238.13	114,280	3,273.93
Collection Fees,		32.38		32.74
Total Taxes,		3,270.51		3,306.67

11. ACCIDENTS AND PERSONAL INJURY:

There were no fatal accidents at the mine in 1927 or 1926. There were eleven minor accidents in 1927, as compared with two in 1926. The mine operated about the same length of time in both years.
The eleven accidents are classified as follows:
Three were accidents involving no loss of time.
Six were slight accidents involving less than 1 month's loss of time.
Two were more serious accidents, involving a loss of time of thirty days or more.
Of the two men involved in the more serious accidents, one was home for 90 days, and the other man received compensation from March to the end of the year.

One man was paid compensation in 1927 for an accident received in 1923.

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1. GENERAL:

The Stephenson Mine was opened in 1907, and was abandoned on July 29th, 1927. The life of the mine was twenty years, and the total product 3,792,429 tons (exclusive of the overrun which will be obtained when the ore in stock is shipped.) When the mine was closed it was estimated that there was 207,097 tons of ore left on the Stephenson Lease, and 39,426 tons on the C. & N. W. Ry. Co. Lease, Section 29, or a total of 246,523 tons.

Although mining might have been continued for a few months longer, it was decided to abandon the property due to the fact that the water was increasing at an alarming rate, and the cost of production mounting.

The ore body between the seventh and eighth levels, auxiliary shaft, on the C. & N. W. Ry. Co. Lease, Section 29, proved very disappointing in regard to size and grade of ore. It thinned out to a flat sheet about 10' in thickness just below the seventh level, and pinched out entirely 20' above the eighth level.

The water coming in on the seventh and eighth levels, auxiliary shaft, amounted to only 200 gallons per minute in December, 1926. In January, 1927 it increased to 405 gallons per minute, and in each succeeding month increased 100 gallons or more, so that when work was abandoned on these levels in June, it had reached 900 gallons per minute. The capacity of the plunger pump on this level was only 1000 gallons per minute, and the centrifugal pump 500 gallons, so that either additional pumping equipment had to be installed, or work on these levels abandoned. Due to this large increase in water, mining was carried on under constantly increasing difficulties, so that the cost of the ore produced in this area had increased to a point that practically eliminated all profit.

Contrary to expectations, the total water pumped from the mine increased from a total of 2,260 gallons in December, to over 2,600 gallons in June and July. It had been expected that the water on the seventh level largely represented water which had been diverted from the sixth level, but evidently 50% or more of the increase represented additional water that came in as new territory was opened under the hanging below the sixth level.

After the seventh and eighth levels were abandoned, mining was continued for about six weeks on the fifth and sixth levels. The areas available for mining, however, were constantly decreasing, due to the completion of mining operations and to trouble from water. It was finally decided to abandon operations on July 29th. Dismantling, however, had been started in June, when work was stopped on the seventh and eighth levels, so that it did not require much time to take out the balance of the equipment after work ceased on July 29th.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Stephenson Ore,	40,621	tons
Stephenwood Ore,	41,558	"
C.& N.W. Ry. Co. Lease Sec.29 Northdale,	3,317	"
" " " Northwood,	23,822	"
Total Ore,	109,318	"
Rock,	7,376	"

The production for the year was 118,258 tons less than in 1926. The mine closed on July 29th, 1927.

b. Shipments:

Grade of Ore:	Pocket Tons	Stockpile Tons	Total Tons
Stephenson Lease, Sec. 20:			
1. Stephenson,	19,729	87,750	107,479
2. Stephenwood,	2,346	14,519	16,865
Total Stephenson Lease,	22,075	102,269	124,344

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

b. Shipments: (Cont.)

Grade of Ore:	Pocket Tons	Stockpile Tons	Total Tons
C.& N.W.Ry.Co. Lease, Sec.29:			
1. Northdale,	2,001	0	2,001
2. Northwood,	1,226	0	1,226
Total C.& N.W. Ry. Co. Lease,	3,227	0	3,227
Grand Total,	25,302	102,269	127,571

Shipments decreased 85,856 tons in 1927. The decrease in Stephenson grade was 65,396 tons, and in Stephenwood, 21,813 tons. Shipments of Northdale increased 2,001 tons, and Northwood 352 tons.

c. Stockpile Inventories:

Stephenson Lease, Section 20:		
1. Stephenson Ore,	256,591	tons
2. Stephenwood Ore,	173,935	"
Total Stephenson Lease,	430,526	"
C.& N.W. Ry. Co. Lease, Section 29:		
1. Northwood,	44,008	"
2. Northdale,	34,204	"
Total C. & N. W. Ry. Co. Lease,	78,212	"
Grand Total,	508,738	"
" " 1926,	526,991	"
Decrease - 1927,	18,253	"

d. Division of Product by Levels:

The ore hoisted from the various levels was as follows:

Fifth Level,	25,601 tons	23.4%
Sixth Level,	52,942 "	48.4%
Seventh & Eighth Levels, Auxiliary Shaft,	30,775 "	28.2%
Total,	109,318 "	100 %

e. Production by Months:

Month	Stephenson Lease Sec. 20	C.& N.W.Ry.Co. Lease Sec. 29	Total	Rock
January	15,488	2,812	18,300	2,448
February	12,900	4,496	17,396	2,064
March	13,806	6,976	20,782	1,080
April	12,259	6,308	18,567	728
May	10,971	4,655	15,626	812
June	11,653	1,632	13,285	224
July	5,102	260	5,362	20
Total	82,179	27,139	109,318	7,376

Production decreased sharply in July, due to abandoning operations on the seventh and eighth levels in June, and on the sixth level in the middle of July.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

f. Ore Statement:

	Stephenson Lease		C.& N.W.Ry.Co. Lease, Sec.29			Total Last Year
	Stephenson	Stephenwood	Northdale	Northwood	Total	
On Hand Jan. 1,1927	323,449	149,242	32,888	21,412	526,991	512,842
Output for Year	40,621	41,558	3,317	23,822	109,318	227,576
Total,	364,070	190,800	36,205	45,234	636,309	740,418
Shipments,	107,479	16,865	2,001	1,226	127,571	213,427
Balance on Hand	256,591	173,935	34,204	44,008	508,738	526,991
Decrease in Output					118,258	
Decrease in Ore on Hand					18,253	

1926 - One 8-hour shift 5 days per week, January 1st to December31st, 1926.
1927 - One 8-hour shift 5 days per week, January 1st to July 29th, 1927.
Mine closed on July 29th,1927.

g. Delays:
There were no non-electrical delays during the seven months operating period.

h. Delays from Lack of Current:
During the month of May there was a total of 15 hours delay due to a shortage of electric current. The following table gives the dates, amount of time lost, and the loss in tons:

May	3,	2	hours	shortage	of current,	100	tons lost.
"	4,	4	"	"	"	200	" "
"	9,	3	"	"	"	100	" "
"	25,	2	"	"	"	100	" "
"	26,	2	"	"	"	60	" "
"	27,	2	"	"	"	60	" " .

There was also a loss which is not covered directly by the delay as noted above. This was due to the fact that there was not enough current to operate the compressor, so that there was no air available for drilling. This not only affected the production on the day that it occurred, but also reduced the production on the following day.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Mang.
Stephenson,	61.66	.184	3.93	.795
Stephenwood,	58.53	.649	4.52	.935
Northdale,	60.28	.218	6.44	1.265
Northwood,	58.30	.698	4.84	1.253

b. Average Analysis on Straight Cargoes:

Grade	Iron	Phos.	Silica	Mang.
Stephenson,		(All Mixed)		
Stephenwood,		"		
Northdale,		"		
Northwood,		"		

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3. ANALYSIS:

c. High Sulphur Ore:

Ore containing considerable sulphur was encountered in May, in a drift on the sixth level, in the southeast deposit. Sulphur had been found on several sub levels above this area. As soon as the samples showed sulphur on the sixth level, work was abandoned in this drift. The sulphur was in the form of gypsum or calcium sulphate.

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.

	Stephenson Lease		Lease Sec. 29 C.& N.W.Ry.Co.		Total
Main Deposit	Stephenson	Stephenwood	Northdale	Northwood	
Above 1st level	4,858				4,858
" 4th "	11,096				11,096
" 5th "	6,351				6,351
" 6th "	21,436		21,445		42,881
Southeast Deposit					
Above 5th level	20,694				20,694
" 6th "	40,500	39,487			79,987
" 7th "		62,675		8,487	71,162
" 8th "				9,494	9,494
Total,	104,935	102,162	21,445	17,981	246,523

Total Stephenson Lease, 207,097
Total C. & N.W. Ry. Co. Lease, Sec.29, 39,426

The above estimate shows the ore on each lease by grades when the mine was abandoned. The ore above the first level was left as a shaft pillar, the ore above the 4th level, and 6,351 tons of the ore above the fifth level were left to support the stocking grounds. The greater part of the balance of the ore in the mine on both leases was unavailable on account of water conditions.

b. Prospective Ore:

None.

5. LABOR AND WAGES:

a. Comments:

(1) Labor:

There was an excess of labor in the district throughout the year. When the Archibald Mine opened in June, there were some men who obtained work at this property, but there was no loss of men that affected operations at the Stephenson Mine.

Average Number of Men:

Month	Surface	Underground	Total
January	34	152	186
February	37	150	187
March	27	144	171
April	24	125	149
May	25	118	143

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5. LABOR AND WAGES: (Cont.)

a. Comments: (Cont.)

Average Number of Men:

Month	Surface	Underground	Total
June	26	91	117
July (1)	21	57	78
August	10	4	14
September	4	1	5
October	3	1	4
November	3	0	3
December	2	0	2
Total,	216	843	1,059
Average for year,	18	70	88

(1) Mine abandoned - ceased operating July 29th, 1927.

b. Comparative Statement of Wages and Product:

	1927 7 months	1926 12 months	INCREASE	DECREASE
PRODUCT	109,318	227,576		118,258
No. Shifts & Hours	1,8-hr. 5 ds.	1,8-hr. 5 ds.		
AVG. NO. MEN WORKING:				
Surface,	28	37		9
Underground,	120	149		29
Total,	148	186		38
AVG. WAGES PER DAY:				
Surface,	4.39	4.38	.01	
Underground,	5.13	5.06	.07	
Total,	4.94	4.91	.03	
WAGES PER MO. OF 22 DAYS:				
Surface,	96.58	96.36	.22	
Underground,	112.86	111.32	1.54	
Total,	108.68	108.02	.66	
PRODUCT PER MAN PER DAY:				
Surface,	22.15	20.86	1.25	
Underground,	5.77	5.79		.02
Total,	4.58	4.53	.05	
LABOR COST PER TON:				
Surface,	.197	.209		.012
Underground,	.884	.874	.010	
Total,	1.081	1.083		.002
AMOUNT FOR LABOR:				
Surface,	21,585.42	47,708.33		26,122.91
Underground,	96,586.45	198,810.32		102,223.87
Total,	118,171.87	246,518.65		128,346.78

The mine operated one 8-hour shift, five days per week, until it closed on July 29th.

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5. LABOR AND WAGES: (Cont.)

b. Comparative Statement of Wages and Product:

The proportion of surface to underground men was as follows:
1927 - 1 to 4.36
1926 - 1 to 4.03
1925 - 1 to 4.34
1924 - 1 to 3.95
1923 - 1 to 3.67
1922 - 1 to 3.62
1921 - 1 to 4.14

6. SURFACE:

a. Buildings, Repairs:

Following the closing of the mine in July, the underground equipment that was not shipped to other mines was inventoried and stored in the mine buildings, and in the general storage shed built at Gwinn.

Some of the trestles were dismantled during the fall. The remainder will be taken down next summer by shovel crews, when not engaged in loading ore.

A 16" concrete seal on top of 12" x 14" timbers was placed over the shaft at the timber tunnel floor, and the upper twelve feet to the collar was filled with sand. The timber tunnel entrance was dismantled, and filled.

b. Stockpiles:

Some additional sollar was laid during March for the Northwood grade, when the old sollar was filled.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking at the Stephenson Mine during the year 1927.

b. Development:

Considerable work was done during the early part of 1927 in developing the ore body on the C. & N. W. Ry. Co. Lease, Section 29, on the seventh level and between the seventh and eighth levels. The result of this development work was very disappointing, as the ore body was found to be only a thin sheet about ten feet in thickness. It was also irregular, due to rolls in the foot and hanging wall, and in some areas was low grade. This development work consisted of rock drifting on the eighth level, of rock raises through the foot wall above the eighth level, and ore and rock drifts to connect these eighth level raises and provide a second outlet to the seventh level. The large increase in water which was encountered as a result of this development work, forced the abandonment of all mining operations in this territory early in June.

Some development work was done on the sixth level in the southeast ore body, where two drifts were driven from the haulage drift in the foot wall to the ore body in the hopes that it would be possible to mine some ore here due to the diversion of the water to lower elevations. The greater part of this work was unsuccessful, due to finding sulphur in the ore developed by one drift, and to water conditions in the other.

c. Stoping:

On account of the abandonment of this mine in July, only brief comment will be made of the work done during the year. Due to the exhaustion of the ore body in certain areas of the mine, and to water conditions, work was carried on on a large number of sub levels during the year, as the following table shows:

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7. UNDERGROUND:

c. Stoping: (Cont.)

2nd, 3rd, 4th, and 5th subs below the fourth level.

Fifth Level.

1st, 2nd, 3rd, 4th, 5th, 6th, and 7th subs below the fifth level.

Sixth Level.

1st, 2nd, 3rd, 4th, and 5th subs below the sixth level.

Seventh Level.

1st, 2nd, 3rd subs below the seventh level.

Eighth Level.

This spreading out of the work on so many different elevations increased the cost of production due to more expense for handling the ore, also there was a considerable loss of time by miners due to changing the location of their working places so often. Operations were continued under more than ordinary difficulties, and yet the cost during the seven months that the mine operated did not show much of an increase, due to the use of scraper hoists for moving ore on the sub levels. The work in detail for the year was as follows:

Second sub below the fourth level:

Mining of the pillar left on this sub level to support the fourth level haulage drift was started in March, 1926, and completed in April, 1927. At the end of 1926 it was estimated that there was 6,230 tons to be mined on this sub level. Operating conditions here were better than at any other place in the mine, and scrapers were used entirely for loading the ore.

Third sub below the fourth level:

The pillar left on this sub level to support the haulage drift to the shaft was considerably smaller than on the sub levels above, due to flattening of the foot wall. It had an area of only 100' by 150'. Mining was started in February and completed in June.

At the southwest side of the Stephenson ore body, four small pillars were mined. These pillars were developed and partly mined in 1926. They were located near the point where the water came in and drowned out the mine in 1917. This water was diverted by a cave further to the west in 1924, after which mining was resumed in this area. The ore produced here cost more to break than the ore produced at other points in the mine, due to the formation lying horizontal, and the ore being considerably harder.

Fourth sub below the fourth level:

All ore on this sub level was mined in 1926. The pillar left to support the haulage drift on the fourth level only extends to the third sub below the fourth level.

Fifth sub below the fourth level:

This sub level was opened in March near the west end of the southeast ore body. A small area 20' by 70' in size was mined here with scrapers, and was completed in April. The ore was transferred through raises to the sixth level. This part of the southeast ore body was free from water, and working conditions were good.

Fifth level:

At the end of 1926 there was only one small pillar left to be mined on the Stephenson Lease. All other available ore on the fifth level had been mined. Mining of this pillar was completed in February.

During the early part of the year, some repairing of the main southeast haulage drift was necessary in order to keep this drift open as a timber road and outlet for water. About 700 gallons per minute came through this drift from the Southeast ore body.

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7. UNDERGROUND:

c. Stoping: (Cont.)

First sub below the fifth level:

Mining of the pillar, left near the southwest end of the mine for a number of years on account of water conditions, was started in 1926 and completed in May, 1927. It was estimated that there were between 5,000 and 6,000 tons of ore produced in the mining of the balance of this pillar.

Second sub below the fifth level:

The mining of the pillar, at the southwest end of the Stephenson ore body that had been left behind the limit of mining which was set following the flood that drowned out the mine in 1917, was started near the end of 1926 and all available ore mined out when the mine closed down in July. The south end of this pillar was not available on account of water. It was estimated that about 1,600 gallons per minute were entering the mine in this area.

Third sub below the fifth level:

A small pillar near the limit of mining on the southwest side of the Stephenson Lease was mined in the early part of the year. The balance of ore in the pillar was unavailable on account of water.

Fourth sub below the fifth level:

Just before the mine closed down, a raise was put up from #2 Crosscut, sixth level, and a drift driven in ore in the pillar that had been left behind the limit of mining on the southwest side of the deposit. The two sub levels immediately above had not been mined, as they were unavailable on account of water. The ore left in the back of this sub level held the water back, so that it was possible to mine some of the ore here under favorable working conditions. A drift was driven to the limit of the scraper outfit, or approximately 100' from the raise, and one side slice taken, work being continued until the mine was abandoned.

A small area, approximately 50' by 50' in size, was mined at the west end of the southeast ore body. Mining had been completed on the subs above in 1926.

Fifth sub below the fifth level:

Two small pillars left near the foot-wall in the main deposit were mined early in 1927. This completed the mining of all the ore in the main Stephenson deposit at the elevation of this sub level.

Two areas were mined during 1927 near the west end of the southeast ore body. These areas were both fairly free from water.

Sixth sub below the fifth level:

This sub level was opened in November, 1925, and mining was continued during 1926, work being completed here in May, 1927. This sub level is located at the bottom of the Stephenson deposit, and all ore was Stephenwood grade. The area of the sub level was approximately 240' by 200'.

Three small areas were mined in the southeast deposit. Due to water conditions, further mining in this part of the southeast deposit was impossible.

Seventh sub below the fifth level:

This sub level was opened in March at the west end of the southeast deposit. Two raises were put up from the sixth level haulage drift, and an area 200' in length by 60' in width was mined. The sixth sub level below the fifth level was not opened in this territory, and the ore from the fifth sub to the seventh was all taken out on the seventh sub level. This ore was mined with scrapers and during the greater part of the period a production of over 25 tons per man per day was obtained.

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7. UNDERGROUND:

c. Stoping: (Cont.)

Sixth level:

Some work was done in the southeast deposit at the elevation of the sixth level. Two drifts were driven from the foot wall haulage drift through the rock to the southeast ore body. In one of these drifts sulphur was found in the ore, and mining abandoned. The other drift was driven in ore along the foot wall, and several slices taken for a distance of about 75' before water came in and stopped further mining at this point. Near the east end of the southeast ore body, a drift was driven in ore along the foot from which two raises were put up to mine the ore on the seventh sub level. Further to the south in this same territory a drift was driven in ore, and some side slicing done just before the mine closed.

In addition to the work in the southeast deposit, a raise was put up in #2 Crosscut to the fourth sub below the fifth level, and some ore was mined here just before the mine closed.

First sub below the sixth level:

A small pillar on the C. & N. W. Lease, Sec. 29, was mined on this sub level in the early part of the year. This completed the mining of all the ore on this lease at the elevation of this sub level.

Second sub below the sixth level:

Three small areas were mined on the C. & N. W. Ry. Co. Lease at the elevation of this sub level, which completed mining of all the ore on this sub level. The hanging and foot came together over the greater part of this area, and there was very little ore.

Third sub below the sixth level:

This sub level had been opened on the Stephenson Lease in 1926 from a raise put up from the seventh level, auxiliary shaft. Mining was continued at this point, a drift being driven in 200' from the raise, and two side slices taken before water came in and stopped further work at this point. A 15 H. P. electric scraper outfit was used in mining this ore, and good results were obtained in tons per man per day up to the time that the water came in. It had been hoped that considerable ore would be obtained here, as the work was being done under new hanging, and there had been no mining in this part of the southeast deposit except a few drifts opened on the sixth level. The water that came in here was mostly new water which came from surface through cracks in the overlying rock.

In addition to the mining in this area, a small amount of ore was mined near the C. & N. W. Ry. Co. Lease, Sec. 29, boundary. The small area mined here caused a cave, which extended up to the sixth level and brought in a large amount of water, which stopped further work at this point.

Fourth sub below the sixth level:

This sub level was opened on the Stephenson Lease from raises put up from the seventh level in 1926, and mining was continued in the early part of 1927 until water came in and forced the abandonment of work in this territory. Ore was mined here with scraper outfits, and a considerable area under the hanging had been mined when work was abandoned.

Further to the south on the C. & N. W. Lease, a drift was driven for a distance of about 100' until the ore pinched out. The ore at this point was only drift wide. The foot and hanging which came together on the sub levels above had not yet opened out to any extent at the elevation of this sub level.

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7. UNDERGROUND:

c. Stoping: (Cont.)

Fifth sub below the sixth level:

Two areas were mined on this sub level on the C. & N. W. Ry. Co. Lease, Section 29, in 1927. Both these areas were near the Stephenson boundary, and mining had to be abandoned here before all the ore was removed, due to water. This water came in when a relatively small area had been opened under new hanging, and at least 50% of the water represented new water that came through the hanging rock.

Seventh level:

This level was opened in 1926, the main haulage drift from the auxiliary shaft being extended north across the C. & N. W. Lease and about 260' on the Stephenson Lease. A number of raises were put up in this drift, some of which were extended through to the sixth level. Mining from these raises was started on several sub levels on both leases. The ore body on the C. & N. W. Lease was practically pinched out over the greater part of the area between the seventh and sixth levels. Only relatively a small quantity of ore was obtained from the ore body on the Stephenson Lease due to water conditions.

In January, 1927, a crosscut was started from the haulage drift, which was extended to the east a distance of 200', following the foot wall of the ore body near the boundary line of the C. & N. W. Lease. When the raises from the eighth level were extended through to the seventh, drifts were driven to the south from this crosscut to connect with these raises. Some mining was done in the vicinity of the raises, and also above the foot to the northeast, at which point the workings crossed from the C. & N. W. Ry. Co. Lease on to the Stephenson Lease. Considerable ore was produced from the work done above the foot wall before water caused this territory to be abandoned. Further to the south, the drifts and mining attempted from the top of the eighth level raises showed that the ore was rather low grade here, and in conjunction with this information the amount of water suddenly showed a large increase, so that further work was abandoned here.

During the early part of the year when mining was in progress on the C. & N. W. Lease above the seventh level haulage drift, considerable repair work was necessary to keep the drift open for haulage. This drift was driven on the contact of the ore and foot wall rock, and it had been assumed that there would be very little trouble in keeping it open. The foot rock was arkose, and due to the swelling caused by the lime seams in this rock, the legs were thrown out of line, and the tracks elevated, so that constant work was necessary to keep the drift open. When water was encountered in mining operations on the sub level, conditions became much worse, and during the latter months of the life of the mine, no further repair work was attempted, and the drift crushed.

First sub below the seventh level:

Some development work was done on this sub level on the C. & N. W. Ry. Co. Lease, Section 29, from raises put up from the eighth level, but the ore found here was rather low grade, and before the work had advanced very far, water came in and forced the abandonment of any further explorations.

Second sub below the seventh level:

Two areas were opened on the C. & N. W. Ry. Co. Lease, Section 29, at the elevation of this sub level, from one of which some ore was obtained. One drift was started from an eighth level raise about 150' south of the Stephenson boundary, but the ore here was low grade and only about nine feet thick between foot and hanging. Near the south side of the ore body, approximately 400' south of the Stephenson boundary, the foot wall was found very irregular, and in part of this area the ore was only drift wide. It, however, was good grade, and mining was continued here until all available ore was removed.

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7. UNDERGROUND:

c. Stoping: (Cont.)

Third sub below the seventh level:

There was about 200' of drifting done on this sub level near the south limit of the ore body, approximately 420' south of the Stephenson boundary. The ore was only drift wide in this territory. An effort was made to follow the ore to the south to #42 diamond drill hole from surface, which showed 18' of ore at about the elevation of this sub level. At no point was the ore found to be over 10' in thickness between foot and hanging, and due to rolls in the foot wall it was not possible to drive a drift in ore from this sub level to #42 diamond drill hole. The information gained from this work forced the conclusion that the 18 ft. of ore shown up in #42 drill hole was due to the hole following one of the rolls in the foot wall, which indicated a much greater thickness of ore than actually existed.

Eighth level:

The development of the eighth level, auxiliary shaft, was started in 1926 and was completed in the early part of 1927. In 1927 the main haulage drift was advanced 250' to the north towards the Stephenson boundary. Work was abandoned when this drift had reached a point within 50' of the boundary, due to the fact that raises which had been put up as the drift advanced showed that there was only a thin sheet of ore between the eighth and seventh levels. During the year five raises were put up from the eighth level haulage drift, three of which were extended through to the seventh level. The others were stopped at intermediate sub levels when they encountered the hanging wall. Work was abandoned on both the seventh and eighth levels in June, and all equipment removed on July 1st.

d. Timbering:

The timber statement is a comparison of seven months in 1927 with twelve months in 1926, and is of little value except that it shows that less timber was used per ton of ore in 1927. This was due to the knowledge that the mine would be abandoned some time during the year, which decreased the amount of covering boards, lagging, and poles, used as covering for lagging down the sub levels. There was also less repairing done throughout the mine than in previous years. Due to the use of less timber, poles, and covering boards, the cost per ton for timber shows a decided decrease as compared with the previous year.

Statement of Timber Used:

KIND	LINEAR FEET	AVG.PRICE PER FT.	AMOUNT 1927	AMOUNT 1926
4" to 6" Timber,	5,000	.0223	111.50	1,002.29
6" to 8" "	15,248	.04387	669.06	2,031.28
8" to 10" "	19,364	.05370	1,135.70	5,519.50
10" to 12" "	27,952	.08218	2,297.10	3,588.79
12" to 14" "	6,564	.1103	724.00	1,066.83
Total 1927,	74,128	.0666	4,937.36	13,208.69
Total 1926,	230,007	.05744	13,208.69	13,208.69
		PER 100'		
5' Lagging,(218 cds. @ 3.50)	185,300	.7496	1,387.26	6,649.13
7' "	5,579	.6780	37.83	2,431.55
8' "	227,899	.7678	1,750.02	2,028.07
Total Lagging,	418,778	.7599	3,175.11	11,108.75
Poles,	18,600	1.16	217.07	765.94
Total Lagging & Poles 1927	492,906	1.64	8,112.47	11,874.69
Total Lagging & Poles 1926	1,538,927	.771		11,874.69
5/8" Covering Boards,	16,380	17.97	292.45	736.31

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7. UNDERGROUND:

d. Timbering: (Cont.)

Statement of Timber Used: (Cont.)

	AMOUNT 1927	AMOUNT 1926
Product,	109,318	227,557
Feet of timber per ton of ore,	.679	1.010
" lagging " "	3.83	6.45
" lagging per foot of timber,	5.64	6.39
Cost per ton for timber,	.0451	.0580
" " lagging,	.0290	.0488
" " poles,	.00198	.00336
" " covering boards,	.00267	.00323
" " timber, lagging, poles & boards,	.0789	.1134
Equivalent of stull timber to board measure,	171,732	405,770
Feet of board measure per ton of ore,	1.570	1.783

Cost of timber, lagging and poles,	1927	8,621.99
	1926	25,083.38
	1925	26,526.55
	1924	22,233.75
	1923	21,898.23
Cost of covering boards used in place of lagging,	1927	292.45
	1926	736.31
	1925	969.71
	1924	655.63
	1923	492.31

e. Drifting and Raising:

YEAR	ORE DRIFTING	ORE RAISING	ROCK DRIFTING	ROCK RAISING
1927	170 ft.	151 ft.	589 ft.	211 ft.
1926	51 ft.	298 ft.	2,362 ft.	517 ft.
Incr.	119 ft.			
Decr.		147 ft.	1,773 ft.	306 ft.

Ore and rock raising decreased in 1927, also rock drifting, while a small increase occurred in ore drifting. This increase was due to developing the Southeast ore body on the main sixth level, in the hope that water conditions would permit mining in this territory. Water was encountered, however, and very little ore was mined.

f. Drilling and Blasting:

Statement of Explosives Used:

	QUANTITY	AVERAGE PRICE	AMOUNT 1927	AMOUNT 1926
40% Gelatin, Spl.	2,500	.1325	331.25	
50% " "	15,950	.1425	2,272.89	
60% " "	12,000	.1550	1,859.87	
Total Powder, 1927,	30,400	.1468	4,464.01	
Total Powder, 1926,				10,436.18
Fuse,	113,500	.624 C.	708.79	1,667.74
Caps,	21,000	1.065 C.	223.68	491.03
Cap Crimpers,	11	.414 ea.	4.56	9.66
Tamping Bags,	14,000	2.15 M.	30.10	40.27
Total Fuse, etc. 1927,			967.13	
Total Fuse, etc. 1926,				2,208.70

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7. UNDERGROUND:

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

Statement of Explosives Used: (Cont.)

	AMOUNT 1927	AMOUNT 1926
Total All Explosives,	5,431.14	12,644.88
Product,	109,318	227,576
Pounds of Powder per ton of ore,	.2780	.3119
Cost per ton for Powder,	.0408	.0446
" " Fuse, etc.	.0103	.0097
" " All Explosives,	.0496	.0556
Average price per pound for Powder,	.1468	.1430

The mine operated five shifts weekly up to July 29th, at which time time the mine was abandoned. The decrease in pounds of powder per ton of ore, and in cost per ton for powder, was due to less development work in ore in 1927, and to more ore mined near the bottom of the deposit on the C. & N. W. Ry. Co. Lease, Section 29, where the ore is soft and less powder is required.

There is one interesting fact in connection with the powder statement at the Stephenson Mine, namely, that experiments at this property showed that it was more economical to use 1½" powder than 1¼". The change was made in 1926, in which year the cost per ton for powder showed a decrease. Most of the ore in the Stephenson Mine is very soft, and less powder is required at this property than at the mines in other districts where the ore is harder. It might readily be assumed that the soft ores could be broken with 1¼" powder with a consequent saving due to the fact that the 1¼" powder runs more sticks to the box. Experiments, however, proved that less powder of the 1½" size was actually required than when the 1¼" size was used.

g. Mining and Loading:

There was no change in mining methods in 1927. Due to the abandonment of areas caused by water conditions, it was necessary to frequently change the locations of contracts; this reduced output in tons per man per day. It also affected the output of the contracts using scraper outfits, so that the results from scrapers in 1927 were not as good as in 1926. It should be borne in mind that the product from the seventh and eighth levels, representing 28% of the output, was handled twice. It was loaded and trammed on these levels to the auxiliary shaft, hoisted to the seventh level, dumped in a pocket; it was then loaded in motor cars, trammed to the Stephenson shaft, and hoisted. Working conditions were unfavorable in many parts of the mine, due to water which affected the handling of the ore from the time it was broken until it reached the stockpile. Water conditions made it necessary for a crew of men to work throughout the year cleaning tracks and ditches, repairing cars and motors, re-timbering, relaying tracks, etc., all of which extra work was made necessary by water conditions. The following table gives data on the use of scrapers during the year.

Month	No. of Scrapers	Days	Tons	% of Product	Tons per man Per Day
January	22	878	13,026	72.0	15.89
February	21	752	11,809	68.0	15.70
March	18	824	12,968	62.4	15.74
April	15	638	11,194	60.2	17.55
May	14	584	9,134	60.1	15.64
June	10	426	7,600	57.2	17.12
July	4	160	2,570	50.7	16.06

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7. UNDERGROUND:

g. Mining and Loading: (Cont.)

The results obtained from the use of scraper outfits were not as good as the previous year, due to operating conditions not being as favorable as in the previous year, but on the other hand, they were at least 50% better than it would have been possible to obtain by hand shoveling.

k. Dismantling:

Mining on the eighth level was abandoned on June 14th, at which time all but one gang stopped working on the seventh level; production on the seventh level continued until June 17th. Salvaging of the equipment from the eighth level was started on June 14th, and on the seventh level on June 17th. The rail, pipe, and all other equipment was removed from these two levels and sent to surface. After this was completed, dams were built on both the seventh and eighth levels to increase the water storage, so that there would be sufficient time to remove the pumps. The work of removing the eighth level pumps was started on the morning of June 27th, and completed by midnight. The work of stripping the auxiliary shaft, which covered the removal of the pipes, electric cables, skips, etc., was started on the morning of June 28th and completed June 30th. The seventh and eighth levels, including the auxiliary shaft, were filled with water on the first day of July, and during the balance of the life of the mine this water flowed through the sixth level drifts to the sump near the shaft on the sixth level.

Mining continued on the sub levels above the sixth level until July 15th, when work was stopped in this territory, and the salvaging of equipment started. During the early part of the month of July, salvaging of the equipment on both the fifth and sixth levels was underway from all drifts and crosscuts where mining was not in progress. By the end of July all equipment on the sixth level had been salvaged with the exception of the pumping plant and a track leading from the pumphouse to the shaft. Stop logs were put in the concrete frame in the main sixth level haulage drift, and in addition a foot of concrete was put in behind the stop logs. This provided a temporary dam which would hold the water back from the pump house and give sufficient time to remove the pumps and discharge lines.

All mining on the fifth level was abandoned on July 29th, and the salvaging of the balance of equipment was completed early in August. A dam was then installed on the sixth level, the stop logs being re-inforced with concrete the same as was done on the seventh level, but this dam was only built about 5' 6" high. It was left open on the top so that when the water reached this elevation it would run out to the shaft. On August 9th the 1600 gallon Aldrich pump and the 1000 gallon centrifugal pump, both of which were spare pumps, were dismantled in the fifth level pump house and sent to surface. On August 13th the balance of the pumps in the fifth and sixth level pump houses were stopped and dismantling started. The pumps at these two station consisted of a 1500 gallon Prescott pole pump, and a 1000 gallon centrifugal pump in the fifth level pumphouse, two 750 gallon Cameron centrifugal pumps and a 2000 gallon centrifugal pump in the sixth level pump house. The work of dismantling this equipment was done on three eight-hour shifts, which were continued until all the pumps had been sent to surface. On August 17th, after the pumps were all on surface, the skips and skip ropes were removed, and the work of stripping the shaft was started. The pipes in the shaft, consisting of an 8" and 10" discharge line, 8" counter-balance pipe, 6" air line and 4" steam line were all removed from the shaft, this work being completed on August 27th. On August 29th the electric cables were removed, which completed the removal of all the equipment in the Stephenson Mine.

The water did not reach the fifth level until August 20th, by which time the workings on the sixth and fifth levels were filled. Water continued to rise in the shaft at a rate of seven feet in each 24 hours. The pipe between the fifth

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7. UNDERGROUND:

k. Dismantling: (Cont.)
and sixth levels and above the fifth level had been loosened so that it was possible to remove all of it without any danger to the men engaged in this work. The water had filled the Stephenson Mine and was in the Austin Mine early in September, but it did not reach the third level until work had been completed and all the equipment had been removed from the Austin.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	7 months 1927	12 months 1926	INCREASE	DECREASE
PRODUCT	109,317	227,576		118,259
Underground Costs	1.444	1.472		.028
Surface Costs	.215	.223		.008
General Mine Accounts	.322	.164	.158	
Cost of Production	1.981	1.859	.122	
Abandonment Expense	.039		.039	
Loading and Shipping	.112	.084	.028	
Total Cost on Cars	2.132	1.943	.189	
Depreciation-				
Plant and Equipment	.012	.054		.042
Taxes	.176	.086	.090	
Central Office	.118	.106	.012	
Welfare, Safety, Hosp.,	.025	.019	.006	
Cost Adjustment	.156	.043	.113	
Total Cost at Mine	2.619	2.251	.368	
No. of Days Operated	153	260		107
No. Shifts & Hours	1-8 hr.	1-8 hr.		
Average Daily Product	714	865		151

The above comparison is of relatively little value due to closing the mine on July 29th. The small product in 1927 increased taxes and the expense for loading and shipping. Cost adjustment expense increased on account of the cost of dismantling and storing equipment, and loss on supply inventory. The underground cost was lower than in 1926, as was also the surface cost, but general mine accounts increased on account of more expense for insurance, due to adjusting premiums that should have been charged out prior to 1927, and to a large increase in personal injury expense on account of fatal accidents, Report #790, Lorenzo Delbello, killed in June, 1927, and Report #767, Basilio Paris, injured in 1926, died in April, 1927.

The detail of accounts is omitted on account of the mine closing in July, which makes a comparison of expenditures for the two years of little value.

10. TAXES:

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
80 Acres S½ of SW¼ Sec. 20-45-25	55,000	1,586.32	80,000	2,292.32
80 Acres N½ of NW¼ Sec. 29-45-25	5,000	144.22	20,000	573.08
Personal Property	602,000	17,360.34	579,250	16,600.00
Total	662,000	19,090.88	679,250	19,465.40
Collection Fees		190.90		194.65
Total Taxes		19,281.78		19,660.05
Tax Rate per $100		2.885		2.865

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11. ACCIDENTS AND PERSONAL INJURY:

There was one fatal accident in 1927. There was a total of 22 accidents during the year, as compared with 27 in the previous year.
The 22 accidents are classified as follows:
Four were accidents causing no disability, the men returning to work with not to exceed one day's loss of time.
Eleven were slight injuries, the men returning to work in less than a month.
One was an injury that kept the man at home for less than two months.
Five were injuries that kept the men at home over three months.

One was a fatal accident that occurred on June 20th, when Lorenzo Delbello, a pocketman, was instantly killed by being crushed between a railroad car and one of the steel members of the shaft house. No one saw the accident, but an investigation showed defective brakes on one of the railroad cars, which probably caused the accident.
Delbello was dropping two empty cars down to the pocket, the cars got beyond control, and he evidently set the brake, climbed down and ran ahead to apply the brake to the other car. He had climbed the ladder on the side of this car and was about to step across to the brake stand when he was caught between the car and the side of the shaft house.

During 1927, three men were paid compensation on account of injuries received in prior years.

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1. GENERAL:

The Princeton Mine closed on August 27th, 1921, and has been idle since. In January word was received to remove the pumps and let the mine flood. The flooding of the mine would reduce the idle expense to a minimum, and it was not considered that it would prove a handicap on re-opening the mine. On account of repairing a number of caves northwest of #2 shaft and installing props in several foot-wall drifts, it was not possible to remove the pumps for several months. This work was practically completed in April, at which time it was decided to postpone the removal of the pumps, as there seemed to be a chance of selling an interest in the mine, which might render it advisable to re-open the property. It was, however, decided early in June to remove the pumps, which work was done on June 18th, and the mine is now filling with water.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production:

The mine was idle in 1927. There were 810 tons of rock and 508 tons of ore produced from repair work in 1927. No record is kept of this ore, and it goes on the stockpile as overrun.

b. Shipments:

Grade	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Cambridge Ore,	None	11,507	11,507	6,540
Princeport,	"	-	-	-
Total,		11,507	11,507	6,540
Total last year,		6,540	6,540	
Increase, 1927 -			4,967	

c. Stockpile Inventories:

Grade	Tons
Cambridge Ore,	126,175
Princeport Ore,	9,160
Sec. 19 Cambridge,	16,386
Sec. 19 Princeport,	1,313
Total,	153,034 tons.
Decrease in 1927 -	11,507 tons.

f. Ore Statement:

	Princeport	Sec. 19 Princeport	Cambridge	Sec. 19 Cambridge	Total	Total Last Year
On Hand Jan. 1, 1927	9,160	1,313	136,359	17,709	164,541	171,081
Output for Year	-	-	-	-	-	-
Transferred,	-	-	1,323	1,323	-	-
Total	9,160	1,313	137,682	16,386	164,541	171,081
Shipments	-	-	11,507	-	11,507	6,540
Balance on Hand	9,160	1,313	126,175	16,386	153,034	164,541
Decrease in Ore on Hand			11,507	-	11,507	

1927 - Mine idle during year.
1926 - Mine idle during year.

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3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Mang.
Princeport,		(No Production)		
Cambridge,		(No Production)		

b. Average Analysis on Straight Cargoes:

Grade	Iron	Phos.	Silica	Mang.	Lake Erie Iron	Lake Erie Moist.
Princeport,		(No Shipments)				
Cambridge,	59.59	.906	-	-	59.16	12.95

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.	Sil.	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

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 "		
	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.

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6. SURFACE:

a. General:

The only work done on surface at this property in 1927, aside from shipping from stockpile and stocking of ore and rock that came from repair work in the mine, consisted of putting the surface equipment in shape for an indefinite idle period, and the covering of the various shafts on this property. The timber above ledge at #1 Shaft had rotted and caved, so that to prevent an accident, the ledge was uncovered and a reinforced concrete seal put over the shaft.

#2 Shaft and also #3 Shaft were covered with 3" plank and 40 pound rail. No. 2 was also enclosed with a fence, while at #3 shaft the doors were nailed shut.

The hoisting ropes at #2 and #3 shafts were removed from the headframe, thoroughly oiled and put on reels near the engine house, which were covered.

The heating plant building was painted in June.

Since flooding the mine, the only charge against the property is for a portion of the policeman's time.

7. UNDERGROUND:

d. Timbering:

When orders to flood the mine were received in January, a thorough examination was made of the entire mine. Five caves were found in the haulage drift northwest of #2 Shaft, that it was considered advisable to repair. All the caves were in the same drift, so that it was possible to repair only one at a time. A night repair crew of three men was started on January 14th. The repair work in this drift was continued on double shift until it was completed about the middle of April. The six timbermen then worked day shift repairing in other parts of the mine, and installing props in several arkose drifts to prevent caving. This work was completed on April 28th.

In June, when final authority was received for flooding the mine, an inspection showed one cave which was repaired. Over 200 additional props were installed in the footwall drifts near #3 Shaft.

The shaft openings on the plats of the fifth, sixth, and seventh levels were sealed with 3" plank. This was done to prevent loose material from getting into the shaft and interfering with the operation of bailers when the mine was unwatered.

The following is a detail of timber, etc., for the year 1927:

	Sets of Timber	Single Legs	Props	Old Sets Lagged	Tons of Ore from Repair work	Tons of Rock from Repair work
Fifth Level	0	0	40	0	0	0
Sixth Level	79	4	644	5	508	810
Seventh Level	0	0	12	0	0	0
Total	79	4	696	5	508	810

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT	0	0		
Total Cost at Mine, as per Cost Sheet,	17,906.92	26,324.48		8,417.56
Taxes,	8,775.80	9,672.87		897.07
Central Office,	0	10,084.86		10,084.86
Welfare, Safety, Hospital, etc.,	2,371.39	0	2,371.39	
Contingent Expense,	0	2,135.88		2,135.88
Cost Adjustment	1,056.48	.21(red)	1,056.69	
Total Cost at Mine,	30,110.59	48,217.88		18,107.29

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8. COST OF OPERATING:

a. Comparative Mining Costs: (Cont.)

The cost at the mine in 1927 was lower, due to flooding the mine in June, since which time there has been very little expense.

10. TAXES:

DESCRIPTION:	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
NE¼ of NE¼ Sec. 19-45-25 (C.& N.W.)	10,000	288.42	10,000	286.54
158.27 Acres in Sec. 18-45-25,	10,000	288.42	10,000	286.54
160.00 " in NW¼ of Sec. 20-45-25,	115,000	3,316.84	139,000	3,982.91
NW¼ of NE¼ Sec. 19-45-25 Location,	420	12.11	420	12.04
S½ of NE¼ " 19-45-25 "	840	24.22	840	24.07
Personal Property,	165,000	4,758.90	174,000	4,985.00
Total,	301,260	8,688.91	334,260	9,577.10
Collection Fees,		86.89		95.77
Total Taxes,		8,775.80		9,672.87

GWINN MINE
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1. GENERAL:

The lease on this property was surrendered by the Cleveland-Cliffs Iron Company on March 22nd. Pumping was continued until May 23rd by request of the fee owners, on which date the property was leased by the C. K. Quinn Company.

On account of the uncertainty connected with the future operation of this property, very little expense was incurred in 1927. On surrender of the lease preparations were made for dismantling, but owing to the probability of another company taking over the lease, the equipment was left in place. A sale was made to the C. K. Quinn Company of practically all of the mine equipment.

All other equipment that was stored at the mine was removed before the new owners took possession.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

There was no ore produced by the Cleveland-Cliffs Iron Company in 1927.

b. Shipments:

Grade of Ore	Stockpile Tons (Includes overruns)	Total 1927
Gwinn Silica	67	67
Gwinnport	6,986	6,986
Total	7,053	7,053

The ore in stock was loaded in cars and removed from the property before the lease was surrendered on March 22nd. Most of this ore was overrun.

c. Stockpile Inventories:

Grade of Ore	1927	Previous Year
Gwinn Silica	0	0
Gwinnport	0	1,745
Total	0	1,745

No ore was in stock when the lease was surrendered.

f. Ore Statement:

	Gwinn Silica	Gwinnport	Total	Total Last Year
On Hand Jan. 1, 1927	0	1,745	1,745	1,745
Output for Year	0	0	0	0
Overrun	67	5,241	5,308	-
Total	67	6,986	7,053	1,745
Shipments	67	6,986	7,053	0
Balance on Hand	0	0	0	1,745

1927 - Mine idle.

1926 - Mine idle.

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.

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore: (Cont.)

	Gwinnport Tons	Gwinnwood Tons	Total Tons
Ore above 5th Level,	18,413		18,413
" " 6th "	170,734		170,734
" " 7th "	21,617		21,617
" " 8th "	118,663		118,663
" " 9th "	101,067		101,067
" " 10th "	155,077		155,077
Total developed ore,	585,571		585,571
b. Prospective Ore:			
Ore below 10th Level,	80,159	40,079	120,238
Total all ore,			705,809

The above estimate was made on December 31st, 1921, the only ore mined since has come from repair work. It is now assumed that only 200,000 tons of the ore can be mined at a profit.

It is also assumed that there are only 500,000 tons of available ore in the mine; the balance, or 205,809 tons, is unavailable on account of danger of the cave working through to surface and letting water in to the mine.

c. Estimated Analysis:

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Gwinnport:										
Dried 212°	58.00	.233	7.67	.243	1.761	1.026	.886	.074	1.500	
Natural	51.04	.205	6.75	.214	1.550	.903	.780	.065	1.320	12.00
Gwinnwood:										
Dried 212°	56.00	.625	11.20	.243	1.761	1.026	.886	.110	1.534	
Natural	49.28	.550	9.86	.214	1.550	.903	.818	.097	1.350	12.00

6. SURFACE:

The surface crew consisted of a hoisting engineer, a surface foreman, and a night watchman. When the lease was surrendered, additional surface labor was employed in removing equipment that was not included in the sale to the C. K. Quinn Company. After March 22nd the expense for the hoisting engineer was charged to the fee owners. The watchman was retained by the Company until May 23rd, when the new owners took possession. All equipment belonging to the Cleveland-Cliffs Iron Company was removed by May 20th.

7. UNDERGROUND:

Three timbermen were employed until January 14th, when it was decided to stop all repair work on account of the uncertainty of the future operation of this property by the Company. Later in the month the Company decided to surrender the lease. In February some repair work was done on the tenth level, where several sets of timber had broken down. This work was necessary in order to remove the rail on the main level in case it developed that the Company would dismantle the property. The ladder sollars in the shaft were also repaired so as to make it safe to dismantle the pipe lines.

The sale of the underground equipment to the C. K. Quinn Company made it unnecessary to remove the equipment from the mine.

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT	0	0		
Total Cost at Mine as per Cost Sheet,	7,458.99	33,357.35		25,898.36
Depreciation - Plant & Equipment,	1,599.83	0	1,599.83	
Development,	806.82	0	806.82	
Taxes,	0	8,276.97		8,276.97
Central Office,	0	8,849.70		8,849.70
Welfare, Safety, Hospital, etc.,	524.29	0	524.29	
Cost Adjustment,	6,223.67	12.35(red)	6,236.02	
Contingent Expense,	0	1,596.77		1,596.77
Total Cost at Mine,	16,613.60	52,068.44		35,454.84

The large decrease is due to surrender of the lease on March 22nd, 1927.

10. TAXES:

	1927		1926	
DESCRIPTION	VALUATION	TAXES	VALUATION	TAXES
153.37 Acres in Sec. 28-45-25	-	-	276,000	7,908.52
Personal Property,	-	-	10,000	286.50
Total,	-	-	286,000	8,195.02
Collection Fees,		-		81.95
Total Taxes,		-		8,276.97

Due to the surrender of the lease, there were no taxes paid by the Cleveland-Cliffs Iron Company on this property in 1927.

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1. GENERAL:

The mine was closed on November 30th, 1920, and in November, 1923, the pumps were removed and the mine filled with water. On November 30th, 1927, orders were received to re-open the mine. This work was started on December 1st, and continued for the balance of the year.

The water is being removed by bailing, which was started on December 14th. The water level in the shafts was three feet below the floor of the tunnel, or about twelve feet below the collar of the shaft. Rapid progress was made in lowering the water for the first few days, using only one bailer of 850 gallons capacity. In four days, or at midnight, December 18th, the water was out to a depth of 441 feet below the collar. Slower progress was made with only one bailer as depth increased, and on December 24th the second bailer was put in service at a depth of 525 feet below the collar. This bailer was smaller, with a capacity of 640 gallons. This small bailer was replaced within two days by a large bailer of 1,600 gallons capacity that was borrowed from the Morris-Lloyd Mine.

The first level was reached on December 24th, and at the end of the year the water was out to a depth of 616 feet, or 71 feet below the first level. The larger part of the open space in the mine is below this depth, so that it will probably require 50 more days to completely unwater the mine. The fourth level, Gardner Shaft, is 845 feet below the collar, the Mackinaw is 852 feet. The bottom of the Mackinaw Shaft is 949 feet below the collar, or 97 feet below the fourth level. The unwatering of the shaft below the fourth level can be done very quickly.

In conjunction with bailing out the water, the re-equipping of the surface plant has gone forward, and good headway has been made, considering the short days and winter weather.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

There was no ore produced at this mine in 1927.

b. Shipments:

Grade	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Gardner,	None	0	0	0
Gardner High Sulphur,	"	40,972	40,972	0
Mackinaw High " ,	"	8,472	8,472	0
Total,		49,444	49,444	0
Total last year,			0	
Increase,			49,444	

c. Stockpile Inventories:

None.

f. Ore Statement:

	Mackinaw Hi Sulphur	Gardner	Gardner Hi Sulphur	Total	Total Last Year
On Hand Jan. 1, 1927	6,125	1,557	42,880	50,562	50,562
Output for year	0	0	0	0	0
Overrun & Shortage	2,347		3,465(red)	1,118(red)	
Transferred,		1,557(red)	1,557		

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

f. Ore Statement: (Cont.)

	Mackinaw Hi Sulphur	Gardner	Gardner Hi Sulphur	Total	Total Last Year
Total,	8,472		40,972	49,444	50,562
Shipments,	8,472		40,972	49,444	0
Balance on Hand,	0	0	0	0	50,562
Decrease in ore on Hand,				50,562	

1927 - Mine idle during year.

1926 - Mine idle during year.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica	Mang.
All Grades,		(No Production)		

b. Average Analysis on Straight Cargoes:

					Lake Erie		
Grade	Iron	Phos.	Silica	Sulp.	Iron	Moist.	Sulp.
Gardner High Sulphur	59.07	.107	3.15	.842	59.49	9.26	.795

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.

Estimated Tonnage as required by the State Tax Commission:

Non-Bessemer:				
Developed,	1. Mackinaw,	10,000 tons		
	2. " High Sulphur,	60,285 "		
	3. Gardner,	80,000 "		
	4. " High Sulphur,	106,348 "		
	Total Developed,		256,633	tons
Prospective,	1. Mackinaw,	92,198 tons		
	2. " High Sulphur,	276,594 "		
	Total Prospective,		368,792	"
	Total All Ore, ...		625,425	"

c. Estimated Analysis:

Grade	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
1. Developed:										
Gardner Ore:										
Dried 212°	58.30	.100	2.85	.290	1.530	3.030	1.350	.720	4.350	
Natural	53.05	.091	2.60	.264	1.392	2.757	1.228	.655	3.958	9.00

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4. ESTIMATE OF ORE RESERVES:

c. Estimated Analysis: (Cont.)

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
1. Developed:										
Mackinaw:										
Dried 212°	58.20	.138	3.24	.346	1.771	3.080	1.414	.560	4.808	
Natural	52.98	.126	2.95	.315	1.622	2.803	1.287	.510	4.375	9.00
Mackinaw High Sulphur										
Dried 212°	58.50	.138	2.92	.350	1.800	3.136	1.418	.867	4.560	
Natural	53.20	.126	2.66	.318	1.640	2.854	1.290	.789	4.150	9.00
2. Prospective:										
Mackinaw:										
Dried 212°	58.10	.156	3.24	.346	1.771	3.080	1.414	.560	4.808	
Natural	52.85	.142	2.95	.315	1.622	2.803	1.287	.500	4.375	9.00
Mackinaw High Sulphur										
Dried 212°	58.50	.138	2.92	.350	1.800	3.136	1.418	.867	4.560	
Natural	53.20	.126	2.66	.318	1.640	2.854	1.290	.789	4.500	9.00

Analysis of only one grade of ore in the Gardner Mine is given under the estimated analysis, as it is planned to make one grade when the mine re-opens. These figures represent a composite of previous analysis of separate grades, together with the analysis of the shipments made this year. Analysis of the two grades can be found in previous annual reports.

Analysis of high and low sulphur grades for both the developed and prospective ore in the Mackinaw Mine are given.

6. SURFACE:

a. Buildings, etc.

The buildings at the mine were in fairly good condition, and the only repairs made thus far consisted of a new roof for the office building and warehouse building, and redecorating the office. All the buildings required a general cleaning on account of the long period of idleness.

The shaft house and trestles at the Gardner were found to be in poor condition and not safe, due to dry rot. Most of the old permanent trestles were dismantled and new trestles will be erected. The few bents left intact will be reinforced with additional legs, and all poor planks on the trestle floor will be replaced. On account of installing an endless rope haulage plant at the Gardner, the new trestle has been laid out on a much larger curve to improve operating conditions. Material for the new trestle has been shipped to the Gardner from the Stephenson and Austin Mines. The work of framing legs, etc., was under way at the end of the year. If the weather permits, the new trestle will be erected in January.

The concrete foundations for the endless rope haulage engine and motor was completed the last of December. On account of cold weather, it was necessary to enclose the foundations in a temporary building and install a stove. Both the sand and water used in mixing the concrete were also heated. After the concrete has set, the temporary building will be dismantled and a permanent shed built. Material for this shed was obtained by cutting up a shed, over a similar plant at the Stephenson Mine, in sections and teaming it to the Gardner.

GARDNER-MACKINAW MINE
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6. SURFACE:

a. Buildings, etc. (Cont.)

On account of the decision to operate the Gardner skip with the Mackinaw hoisting engine, it was necessary to install three angle sheaves between the Mackinaw engine house and the Gardner shaft. One of these sheaves is set on a timber foundation, the other two on concrete foundations. The one on the ground near the Gardner shaft required quite heavy piers to carry the bearing, and a temporary building was constructed over the forms, and a stove installed when they were filled with concrete. Foundations for these three sheaves were completed and the sheaves installed by the end of December. The intermediate pulley stands, of which there are about fifteen, are being made up of pipe and they will be installed in January.

In order to carry the water from the bailers away from the Mackinaw shaft, it was necessary to install about 200 feet of launders. Sections of the old Stephenson launder were used for this purpose. In order to prevent splashing and loss of water when the bailers discharged, it was necessary to box in a section of launder for each bailer. On account of below zero weather it was necessary, later, to make this enclosure as near air tight as possible to prevent ice from forming in this enclosure and also on the bailers.

The Gardner hoist was sold to the Pickands, Mather Company, and shipped to the Isabella Mine at Palmer. The engine house was sold to the Cliffs Power and Light Company. It was dismantled in sections and shipped by truck to the Water Power job on the Escanaba River.

Compressor:

The electrical equipment of the Nordberg compressor was removed and shipped to the Cliffs Shaft Mine when there was a shortage of current several years ago on account of the small rainfall. This equipment was returned in December, and is now being installed.

Hoist:

The grids and also some other parts of the electrical equipment of the hoist had been taken and used at the Stephenson Mine. They were returned early in December. After bailing started, trouble developed with the grids, and to avoid the possibility of a delay, another set was obtained from the Barnes-Hecker Mine, where the same hoists were used.

Steam Lines:

The pipe in the launders leading from the boiler plant to the engine house, shops, office, and dry were rusted through in places and considerable replacements have been necessary. The launders had rotted, and they were rebuilt when new pipe was installed.

Heating Plant:

The piping at the boiler had to be nearly all replaced before the boiler could be used. The covering of the boiler was nearly all off, and it was again covered.

General Surface:

The crew working at the mine since re-opening started and bailing has gotten underway consisted of the following:

Three hoisting engineers on eight hour shifts, and three men watching bailers.

Three carpenters and several helpers, building launders, forms for concrete, working on trestles, etc.

Three chaingang men with foreman, working on the installation of bailers, on the hoist and compressor, heating plant, piping, etc.

A foreman and a surface crew of about twelve men, unloading supplies, excavating for concrete forms, mixing concrete, tearing down trestle, etc.

A mining captain and two men, near the last of the month, inspecting the shaft, cutting ice, building an air door on the first level to stop the draft between

GARDNER-MACKINAW MINE
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6. SURFACE:

a. Buildings, etc. (Cont.)

General Surface: (Cont.)
the shafts, and available for any trouble that may develop underground with the operation of bailers.

Daily Record of Bailing.

Date	Bailers in 24 hours	Water Lowered	Remarks
December 14	642	185'	One bailer of 840 gallons capacity.
" 15	356	67'	6 hours, 30 minutes, delay repairing bailer trip.
" 16	658	73'	2 hours delay repairing grids.
" 17	508	50'	
" 18	576	66'	
" 19	577	36'	
" 20	541	27'	
" 21	517	14'	
" 22	508	5'	
" 23	514	1'	
" 24	413	5'	10 hours delay putting on 2nd bailer and rope, capacity 640 gallons.
" 25	774	15'	
" 26	655	10'	3 hours 30 minutes delay lengthening hoisting rope.
" 27	389	8'	10 hours 30 minutes delay changing skip runners and putting new brake blocks on hoist.
" 28	788	16'	
" 29	516	8'	6 hours changing skip bailers. Put on a 1600 gallon bailer.
" 30	727'	15'	4 hours repairing grids and switch board.
" 31	691	15'	1 hour 30 minutes delay lengthening skip rope.
Total	10,350	616'	Total delays, 44 hours.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
PRODUCT	0	0		
Underground Costs	0	0		
Surface Costs	2,378.86	2,782.14		403.28
General Mine Accts.	5,321.51	6,308.08		986.57
Cost of Production	7,700.37	9,090.22		1,389.85
Loading & Shipping	4,607.31	0	4,607.31	
Total Cost at Mine as per Cost Sheet	12,307.68	9,090.22	3,217.46	
Taxes	1,520.58	2,031.54		510.96
Central Office	0	11,959.12		11,959.12
Welfare, Safety, etc.	2,632.50	0	2,632.50	
Contingent Expense	0	2,143.30		2,143.30
Cost Adjustment	2,432.13	3.06(red)	2,435.19	
Total Cost at Mine	18,892.89	25,221.12		6,328.23

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8. COST OF OPERATING:

a. Comparative Mining Costs: (Cont.)

Surface costs decreased $1,395.34 in 1927, due to only one policeman employed as compared with two for ten months in 1926. This decrease was offset by an expense of $969.03 on account of cleaning up scattered ore on the Gardner and Mackinaw stockpile grounds.

The expense of General Mine accounts decreased in 1927, due to **less** expense for local general welfare, on account of the visiting nurse being dispensed with in the summer, and to less expense for district office on account of closing operations in the district and transfer of the superintendent to the Negaunee District.

Loading and shipping expense was quite heavy in 1927, due to shipping all of the ore in stock.

Expense for taxes decreased due to lower valuations.

Expense for Central office was eliminated in 1927.

Welfare, safety, etc., expense was handled in other accounts in 1926, so no direct comparison is available. The expense in this account is higher due to closing the Gwinn Hospital, and adjustment of account with the physician in charge.

Cost adjustment is high due to charging off obsolete equipment and supplies.

Re-Opening Gardner-Mackinaw Mine:	1927
Underground costs,	$1,101.40
Surface Costs,	2,507.08
General Mine Accounts,	356.88
Total cost,	3,965.36

The above statement covers re-opening expense incurred in the month of December, 1927. The cost of re-opening and re-equipping the property has been estimated as $20,000. This expense will be spread over the months of December, January, and February, and may extend through March. The progress of this work depends on the speed made in bailing out the water.

10. TAXES:

	1927		1926	
DESCRIPTION	VALUATION	TAXES	VALUATION	TAXES
C. & N. W. Lease, Gardner:				
SE¼ of SE¼, Sec. 35-45-25 -	10,000	288.42	10,000	286.54
NW¼ of NE¼, Sec. 2-44-25 -	200	5.77	200	5.73
Personal property,	20,000	576.80	20,000	573.00
Total,	30,200	870.99	30,200	865.27
Collection Fees,		8.71		8.65
Total Taxes,		879.70		873.92
D.M. & M. Lease, Mackinaw:				
N½ of SE¼ & SW¼ of SE¼ Sec. 35-45-25,	22,000	634.53	40,000	1,146.16
Collection Fees,		6.35		11.46
Total Taxes,		640.88		1,157.62
Gardner-Mackinaw Dwellings,	5,000	144.22	1,000	286.54
Collection Fees,		1.44		2.86
Total Taxes,		145.66		289.40
Total Taxes Gardner-Mackinaw Mine and Location,		1,666.24		2,320.94
Decrease, 1927 -		654.70		

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10. TAXES: (Cont.)

The valuation set on the Mackinaw Mine by the State Tax Commission was reduced in 1927, while the Gardner was kept at the same figure as in 1926. The valuation of the Gardner-Mackinaw Location was reduced 50% by the local assessor.

The re-opening of these mines for the purpose of mining the ore on the Gardner property will re-open the question of valuation. The Tax Commission will doubtless raise the valuation in 1928.

FRANCIS MINE
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1. GENERAL:

There were only a few minor changes at this abandoned mine in 1927. The skip and cage hoists were removed from the engine house, after which this building was sold and dismantled. These hoists were sold to the Ford Motor Company in October, 1926; they were loaded and shipped by the purchaser in March, 1927.

The air line from the Gwinn Mine to the Francis Mine was dismantled, and has been stored at the General Storage Shed that was built this year near the track leading to the Gwinn Mine. The air receiver at the Francis Mine was taken to the Gardner-Mackinaw Mine in December, 1927, to replace the air receiver formerly at this property.

The air line running from the Francis Mine to the Gwinn District Crusher was dismantled and removed during the summer.

The following is a list of the buildings now on the property:

Steel shaft house.
Steel pulley stands.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

b. Shipments:

Grade of Ore	Stockpile Tons	Total Tons
Franport,	21,686	21,686

c. Stockpile Inventories:

Grade of Ore	Tons
Franport Ore,	381,349

f. Ore Statement:

	Franport	Total	Total Last Year
On Hand Jan. 1, 1927	403,035	403,035	403,035
Output for Year	0	0	0
Total,	403,035	403,035	403,035
Shipments	21,686	21,686	0
Balance on Hand	381,349	381,349	403,035
Decrease in Ore on Hand		21,686	

1926 - Mine Idle

1927 - Mine Idle

6. SURFACE:

b. Stockpiles:

In 1927, there were 21,686 tons of ore shipped from stockpile. It was necessary to install a water line to the shovel from the electric pump installed a few years ago near the engine house. This electric pump is connected to a 6" drive well.

All loading was done from the north side of the stockpile, which contains the first ore produced at the mine. Future loading will be arranged so that ore can also be obtained from the south side of the pile where higher grade ore is available.

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1927	1926	INCREASE	DECREASE
Underground Costs,	0	0		
Surface Costs,	0	0		
General Mine Accounts,	1,066.93	749.08	317.85	
Total	1,066.93	749.08	317.85	
Abandonment Expense	140.74	0	140.74	
Loading and Shipping	1,676.16	0	1,676.16	
Total as per Cost Sheet	2,883.83	749.08	2,134.75	
Taxes	11,550.23	11,480.53	69.70	
Cost Adjustment	3,897.51	90.06	3,807.45	
Total	18,331.57	12,319.67	6,011.90	

General Mine Accounts expense increased in 1927 due to more expense for insurance on account of adjusting fire and boiler insurance premiums that should have been charged out in previous years. There was an expense for analysis in 1927, on account of shipping ore from stockpile.

There was a charge for abandonment expense in 1927; none in 1926. Loading, shipping, and crushing expense amounted to $1,676.16 in 1927; there was no expense in this account in the previous year.

Expense on account of cost adjustment showed a large increase in 1927, due to closing up accounts connected with dismantling and storing equipment.

10. TAXES:

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
S½ of NW¼ Sec.27-45-25 80 Acres,			120	3.44
SW¼ (Ex. R.of W.) " " 153.56 "	500	14.43	1,500	42.98
SW¼ of NE¼ Sec. 27-45-25 40 "			120	3.44
Personal Property (Bldgs. $2,000. 1925)	396,000	11,421.44	395,000	11,317.00
Total,	396,500	11,435.87	396,740	11,366.86
Collection Fees,		114.36		113.67
Total Taxes,		11,550.23		11,480.53

GWINN DISTRICT MINES
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1. GENERAL:

The past year has been a memorable one in the history of the Gwinn District. During the year work was completed at the Stephenson and Austin Mines, pumping was stopped at the Princeton Mine, the lease of the Gwinn Mine was surrendered, and for several months it appeared that the Cleveland-Cliffs Iron Company would abandon all work in the district for a period of several years. The Gwinn Mine, however, was leased by the C. K. Quinn Company, renamed the Archibald Mine, and re-opened in June, and on November 30th orders were received to re-open the Gardner-Mackinaw Mine.

The year has been one of deep depression for the residents, and particularly for those who owned their homes. A better sentiment prevailed at the close of the year, and everyone looks forward to 1928 with confidence and the hope that Gwinn has passed through its worst period of depression.

At the end of the year the number of men employed had dropped only 25% as compared with last December. This was due to the Archibald Mine operating double shift, to the re-opening of the Gardner-Mackinaw Mine, and to the starting of work by the Cliffs Power and Light Company at the Cataract water power project on the Escanaba River.

a. STATEMENT SHOWING TOTAL ORE PRODUCED BY YEARS FROM 1903 to 1927 INCLUSIVE:

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER-MACKINAW	TOTAL
1903	1,086						1,086
1904	30,118						30,118
1905	57,210	(a) 8,224) 48,889)					114,323
1906	160,049	175,752					335,801
1907	192,424	174,457	8,333				375,214
1908	197,525	124,346	78,419				400,290
1909	203,129	144,882	142,816				490,827
1910	64,705	115,782	214,500				394,987
1911	145,221	96,670	226,022	537			468,450
1912	115,934	22,567	209,282				347,783
1913	68,259	74,884	255,979				399,122
1914		3,256	214,608	48,389			266,253
1915		122	207,724	127,300			335,146
1916	16,193	145	303,562	144,066			463,966
1917	51,659	(b) 1,106	253,266	161,963	1,778		467,560
1918	1,069	148,265	4,245	155,534	41,535	2,405	353,053
1919	14,896	193,228	2,402	137,847	80,528	69,326	498,227
1920	73	156,746	174,782	96,595	80,056	130,388	638,640
1921		97,150	196,539	63,501	71,075	159	428,424
1922	50,905	74	213,223	(c) 20,085	98,049	0	382,336
1923	82,976	00	247,212	27,334	110,550	0	468,072
1924	0	0	249,428	0	39,031	0	288,459
1925	0	0	253,193	(d) 206	0	0	253,399
1926	50,118	0	227,576	0	0	0	277,694
1927	79,067	0	109,318	(c) 5,308	0	(b) 1,118	192,575
Total	1,582,616	1,584,333	3,792,429	988,665	522,602	201,160	8,671,805

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1. GENERAL:

a. (Continued)

(a) On hand when mine was taken over August 1st, 1905.

(b) Stockpile shortage.

(c) Stockpile overrun.

(d) One-hundred and eleven tons produced from repair work; ninety-five tons stockpile overrun.

b. STATEMENT SHOWING SHIPMENTS FOR EACH YEAR FROM 1905 TO 1927, INCLUSIVE:

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER-MACKINAW	TOTAL
1905	44,653	47,290					91,943
1906	173,182	166,894					340,076
1907	195,950	177,863	6,305				380,118
1908	111,229	36,033	52,588				199,850
1909	125,727	42,935	64,206				232,868
1910	188,587	89,442	225,726				503,755
1911	107,394	28,189	128,839	230			264,652
1912	102,529	162,137	214,386				479,052
1913	107,365	53,477	96,298				257,140
1914	30,491	13,607	93,796	20,159			158,053
1915		17,171	243,458	57,910			318,539
1916	64,521		368,739	143,708			576,968
1917	44,420	150,375	496,712	188,070			879,577
1918	8,533	66,244	75,162	182,541	30,775		363,255
1919	2,334	111,617	1,965	56,666	26,936	32,332	241,850
1920	3,665	153,609	110,924	196,593	34,199	49,051	548,041
1921		23,916	77,077	64,515	16,220	19,889	201,617
1922	5,065	26,145	202,522	26,436	11,437	40,180	311,785
1923	94,553	25,642	74,368	28,529	0	10,264	233,356
1924	0	7,453	186,899	4,935	0	0	199,287
1925	0	13,213	216,089	980	0	0	230,282
1926	26,564	6,540	213,427	0	0	0	246,531
1927	65,347	11,507	127,571	7,053	21,686	49,444	282,608
Total,	1,502,109	1,431,299	3,277,057	988,325	141,253	201,160	7,541,203

c. STATEMENT SHOWING ORE IN STOCK AT THE CLOSE OF EACH YEAR, FROM 1903 TO 1927, INCLUSIVE:

1903	1,086						1,086
1904	31,204						31,204
1905	43,761	8,923					52,684
1906	30,628	18,681					49,309
1907	27,102	15,275	2,028				44,405
1908	113,398	103,588	27,859				244,845
1909	190,800	205,535	106,469				502,804
1910	66,918	231,875	95,243				394,036
1911	104,745	300,356	185,792	307			591,200
1912	118,150	160,786	180,688	307			459,931
1913	79,044	182,193	340,369	307			601,913
1914	48,553	171,842	461,181	28,537			710,113
1915	48,553	154,793	425,447	97,927			726,720
1916	225	154,793	360,270	98,285			613,573
1917	7,464	3,457	116,824	72,178	1,778		201,701

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1. GENERAL:

c. STATEMENT SHOWING ORE IN STOCK AT THE CLOSE OF EACH YEAR, FROM 1903 TO 1927, INCLUSIVE: (Cont.)

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER-MACKINAW	TOTAL
1918	0	85,478	45,907	45,171	12,538	2,405	191,499
1919	12,562	167,089	46,344	116,352	66,130	39,399	447,876
1920	8,970	170,226	110,202	16,014	111,987	120,736	538,135
1921	8,970	243,360	229,664	15,000	166,842	101,006	764,942
1922	54,810	217,389	240,365	8,649	253,454	60,826	835,493
1923	43,233	191,747	413,209	7,454	364,004	50,562	1,070,209
1924	43,233	184,294	475,738	2,519	403,035	50,562	1,159,381
1925	43,233	171,081	512,842	1,745	403,035	50,562	1,182,498
1926	66,787	164,541	526,991	1,745	403,035	50,562	1,213,661
1927	80,507	153,034	508,738	0	381,349	0	1,123,628

5. LABOR AND WAGES:

The number of men employed in the district by the Cleveland-Cliffs Iron Company on December 30th, 1927, was 36; on December 31st, 1926, there were 274; the loss for the year was 238. To offset this heavy drop in employment, the Archibald Mine is employing 175 men, the Cliffs Power and Light Company, 21 men, and a number are working in the woods getting out pulp timber. The total population in the district has not decreased. The Gardner-Mackinaw Mine will eventually employ about 80 men, loading by steamshovel and operation of the Gwinn District Crusher next summer, 16 men, so that with the expected increase in the crew at the Cataract Water Power next spring there will be as many, if not more, men working in the district than were employed in 1925 or 1926.

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, Cliff Power and 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	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
MINERAL LANDS GWINN FEE:				
Lots 1, 2 & 3, Sec. 36-45-25, 52 Acres ---	100	2.92	80	2.30
" 7, 8 & 9 " 36 " 98.92 " - -	200	5.77	200	5.73
" 11, " 36 " 13.3 " - -	20	.58	20	.57
SW¼ of SW¼ " 26-45-25, 40 " - -	80	2.30	80	2.30
NW¼ of SE¼ " 27, " 40 " - -	80	2.30	80	2.30
NW¼ of " 35 " 160 " - -	320	9.23	320	9.18
N½ of NE¼ " 34 " 80 " - -	160	4.61	160	4.58
SE¼ of NE¼ " 34 " 40 " - -	80	2.30	80	2.30
NE¼ of NW¼ " 34 " 40 " - -	80	2.30	80	2.30
S½ of SE¼ " 27 " 80 " - -	160	4.61	160	4.58
NE¼ of SE¼ " 28 " 40 " - -	600	17.31	600	17.19
S½ of NE¼ " 28 " 80 " - -	130	3.75	130	3.73
S½ of N½ " 22 " 160 " - -	500	14.43	550	15.76
N½ of NW¼ " 2-45-26, 87.08 " - -	90	2.60	90	2.58
NE¼ of " 2 " 165.61 " - -	190	5.48	190	5.44
NE¼ of SE¼ " 34 " 40 " - -	130	3.75	130	3.72
Total - - - - - - - -	2,920	84.24	2,950	84.56
Collection Fees - - - - - -		.84		.85
Total Taxes,- - - - -		85.08		85.41

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10. TAXES: (Cont.)

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
GWINN TOWNSITE - SURFACE ONLY:				
LOT 5 BLOCK 19 for 1924 & 1925.				
Lot 17, Block 5, Nyquist Lot, - - - - - -		14.94		
NE¼ of NW¼ Sec. 21-45-25, 27.40 Acres - -	150	4.33	150	4.31
That part of S½ of NW¼ Sec. 21-45-25 not included in plat of Gwinn, 25.01 Acres, -	200	5.77	200	5.73
E½ of SE¼ Sec. 21-45-25, 65.84 Acres, - -	400	11.53	400	11.46
That part of W½ of SE¼ Sec. 21-45-25 not included in plat of Gwinn, 38.80 Acres, -	300	8.66	300	8.59
Gwinn Townsite Plat,- - - - - - - - - - -	101,935	2,942.85	140,670	4,031.92
Part of W½ of SE¼ Sec. 21-45-25 Superintendent's Residence, 1.2 Acres - -	3,500	100.95	5,000	143.28
NW¼ of NE¼ Sec. 21-45-25, except 5 acres in cemetery, 35 " - -	100	2.91	100	2.87
Part of S½ of NE¼ Sec. 21-45-25, 69.69 A.	400	11.53	400	11.46
Total,- - - - - - -	106,985	3,103.47	147,220	4,219.62
Collection Fees, - - - -		30.89		42.20
Total Taxes,- - - -		3,134.36		4,261.82
AUSTIN LOCATION DWELLINGS: - -	20,000	576.84	24,000	698.69
Collection Fees, - - - -		5.77		6.88
Total Taxes,- - - -		582.61		694.57
GARDNER-MACKINAW DWELLINGS:				
N½ of NE¼ of Sec. 35-45-25, - - - - - - -	5,000	144.22	10,000	286.54
Collection Fees, - - - -		1.44		2.86
Total Taxes,- - - -		145.66		289.40
GWINN DISTRICT OFFICE AND CRUSHER:				
Personal, - - - - - - - - - - - - - - - -	1,832	55.71	2,191	63.47
N½ of NW¼ Sec. 27-45-25, Dist. Crusher- -	1,000	28.85	240	5.89
Total, - - - - - -	2,832	84.56	2,431	70.36
Collection Fees,- - - -		.84		.70
Total Taxes, - - -		85.40		71.06
Total C. C. I. Co., Forsyth, except mines and C. P. & Light Co. - - - - - - - - - -	1,661,977	48,432.01	2,067,331	59,830.89
SUMMARY:				
Austin Mine,- - - - - - - - - - - - - - -	112,280	3,238.13	114,280	3,273.93
Stephenson Mine,- - - - - - - - - - - - -	662,000	19,090.88	679,250	19,465.40
Princeton Mine, - - - - - - - - - - - - -	301,260	8,688.91	334,260	9,577.10
Gwinn Mine - - - - - - - - - - - - - - -			286,000	8,195.02
Francis Mine - - - - - - - - - - - - - -	396,500	11,435.87	396,740	11,366.86
Gardner-Mackinaw Mine,- - - - - - - - - -	50,200	1,505.52	70,200	2,011.43
Mineral Lands, - - - - - - - - - - - - -	2,920	84.24	2,950	84.56
Gwinn Townsite, - - - - - - - - - - - - -	106,985	3,103.47	147,220	4,219.62
Austin Dwellings, - - - - - - - - - - - -	20,000	576.84	24,000	687.69
Gardner-Mackinaw Dwellings, - - - - - - -	5,000	144.22	10,000	286.54
Gwinn District Office and Crusher - - - -	2,832	84.56	2,431	70.36
Cliffs Power and Light Co., - - - - - - -	36,490	1,052.75	35,465	1,016.33
Total,- - - - - - - - - -	1,696,467	49,005.39	2,102,806	60,254.84
Collection Fees, - - - - - - -		489.90		602.54

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10. TAXES: (Cont.)

DESCRIPTION	1927 VALUATION	1927 TAXES	1926 VALUATION	1926 TAXES
SUMMARY:				
Total Taxes, C. C. I. Co., Mine Dept., Forsyth Township, -	1,696,467	49,495.29	2,102,806	60,857.38
Rate per $100.00 Valuation, - -		2.885		2.865

TAXES LEVIED - FORSYTH TOWNSHIP	1927	1926	1925	1924
State,	8,670.96	7,322.08	7,739.33	7,195.35
County,	13,232.64	15,365.44	11,989.62	12,506.05
County Road	6,101.27	7,459.59	7,272.94	9,491.70
Contingent,	4,000.00	4,500.00	4,500.00	4,000.00
Highway Improvement,	3,000.00	4,000.00	3,000.00	1,000.00
Highway Repair,	4,000.00	2,000.00	7,000.00	7,000.00
Library,	100.00			
School and One Mill,	34,469.00	40,948.00	42,892.65	49,276.73
Cemetery,	500.00			
Bridge,			1,000.00	
Rejected,	13.07	5.76	351.76	18.72
Fire Fund,	--			
Total,	74,086.94	81,600.87	82,746.30	90,488.55
Amount paid by C. C. I. Co.,	49,005.39	60,254.84	61,940.86	68,459.83
Percent " " C. C. I. Co.,	66.14	73.84	74.84	75.75

This statement is interesting in showing the decrease in taxes since 1924. It shows the main decrease to have occurred in the School and One Mill Tax.. The taxes paid by the Company have decreased each year, also the proportion of total tax paid by the Company.

16. WATER SUPPLY:

a. Pump Station:

With the decrease of operations by the Company, it became advisable to provide some cheaper method of supplying the district with water. It was decided to put down several drive wells near the Archibald Mine dry house and locate the pumps in the dry, where they would be taken care of by employees of the Archibald Mine, without any labor expense to the Cleveland-Cliffs Iron Company. In return for this service the Archibald Mine was to receive water without any charge. This work was started in September and abandoned in October, due to the fact that it proved impossible to find a supply of water. The water level was only three feet below surface, but fine sand clogged the weinboro, and on continued pumping caused the surface to cave, due to pumping sand with the water. One pipe was driven 86' to ledge, the other between 30 and 40 feet.

It was then decided to install the 500 gallon Cameron Pump, that was purchased for the water supply system, at the old pump station on the Escanaba River. This 500 gallon electric pump was purchased to replace the 1,000 gallon electric pump, as less capacity was needed on account of closing the Austin and Stephenson Mines. The 1,000 gallon pump would be retained as a spare in case of an accident to the new 500 gallon pump, or for large fires. The installation of the 500 gallon pump was completed the latter part of November, and after a weeks trial, two of the three pumpmen were laid off, since which time the pump has operated steadily with only ten hours service by a pumpman. In December the 1,000 gallon and the 500 gallon pumps were enclosed with asbestos board to retain heat and prevent freezing. The following table shows saving in labor and current in the month of December by the use of the 500 gallon pump, with one pumpman

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16. WATER SUPPLY:

a. Pump Station: (Cont.)
working instead of three.

	Labor	Electric Power	Total
November, 1927 -	$295.75	$375.45	$671.20
December, 1927 -	131.95	294.90	426.85
Monthly Saving -	163.80	80.55	244.35

Total saving per month, $244.35
Indicated total saving per year, $2,932.20.

The following table gives the cost of operating the pump station in 1927 and 1926:

	1927	1926	INCREASE	DECREASE
General Expense	72.57	83.06		10.49
Maintenance Labor	741.27	1,475.32		734.05
Maintenance Supplies	834.22	235.04	599.18	
Operating Labor	3,974.70	4,236.36		261.66
Operating Supplies	5,424.60	6,256.16		831.56
Total	11,047.36	12,285.94		1,238.58
Cost per 1000 gals.	$.035	$.039		

General Expense decreased in 1927 due to no charge for insurance.

Maintenance Labor decreased due to less expense in 1927 for repairing wooden water mains, and for thawing and repairing frozen water lines.

Maintenance Supplies increased in 1927 on account of installing a 10" steel pipe line on piers across the Escanaba River on the main pipe line to Gwinn Townsite. This steel pipe replaced a wooden main that was leaking very badly and could not be repaired, due to rotting of the wood. The launder enclosing the pipe line across the river had to be rebuilt, due to rotting caused by the leaking wooden water pipes.

Operating Labor decreased due to laying off two pumpmen on December 1st, and to less extra labor required during the year.

Operating Supplies decreased due to less coal burned, 21½ tons in 1927, as compared with 68½ tons in 1926, for heating the pump station and for operating the plant with steam power when electricity was not available, due to accidents to the power lines. The decrease amounted to $244.46. There was also less electric power required in 1927, the decrease being $606.00. This was due to the use of a 500 gallon pump in December, while for the previous eleven months a 1,000 gallon pump was in service. Less water was pumped during the summer, due to more rainfall which decreased the use of water for lawns and gardens. The closing of the Stephenson Mine in July also decreased the consumption of water.

The total cost in 1927 was $11,047.36. The decrease as compared with the previous year was $1,238.58. The 1927 and 1926 operating cost was charged off as follows:

	1927	1926
C. C. I. Co. Mines	$7,092.19	$9,897.59
Gwinn Townsite Expense General	866.81	-
C. K. Quinn & Co.	725.00	-
Water Service Accounts Receivable	2,363.47	2,388.35
Total	11,047.36	12,285.94

The following table shows the probable expense and disposition of charges in 1928:

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16. WATER SUPPLY:

a. Pump Station: (Cont.)

Probable cost in 1928 -		$8,000.00
Probable charge-off, C. K. Quinn & Co.,	$1,200.00	
Water Service Accounts Receivable,	2,375.00	
Loading by Steam Shovels,	600.00	
Gwinn Townsite Expense, General,	3,825.00	
Total,	8,000.00	8,000.00

The probable cost for current will be $3,600.00, or about the amount charged to Gwinn Townsite General Expense.

17. CONDITION OF PREMISES:

General Office Grounds:

On account of the decrease of operations in the Gwinn District, it was decided to abandon the General Office and Shops. This step eliminated the necessity of further expenditures for the upkeep of the General Office grounds. After freezing weather, part of the shrubbery was transferred to the Maas Mine, and the balance will be moved as needed to other districts. There will be little, if any, future expense for maintenance of grounds.

Gwinn Townsite:

The streets and alleys in Gwinn were cleaned during the summer at regular intervals by the Township, so that they were in a neat condition.

The Norway Pines in the parkway on Pine Street made a good growth in 1927, and in a few years will add very materially to the appearance of this, the main street of the town. It will be necessary to replace less than one-half dozen that were broken or died during the year.

Necessary attention was given the many parks throughout the town to keep them in good condition.

Austin Location:

The streets and alleys in this location were cleaned several times during the summer by the Company. This work was less expensive due to the increase in the number of vacant houses.

Princeton Location:

This location was cleaned in the spring by the Township. The Company only owns a few houses in this location, most of which were vacant. There are also a number of privately owned homes here that are vacant. The windows are boarded up on all vacant houses. Conditions in the district in 1927 have affected this location more than any other.

Gardner-Mackinaw Location:

All houses were unoccupied in 1927. The fire line around the location was kept free of grass, and the location was patroled regularly every day. The reopening of the mine will make it necessary for several families to move to this location, but it is expected that nearly all the employees will live in town. This will simplify the problem from the standpoint of the schools, will make it easier to maintain the Club House, and in fact, from every viewpoint it is the logical way to handle the situation. The location is, therefore, not needed for operating the mine due to the change in the local situation. It is available for sale for summer homes if a buyer can be found.

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19. CLUB HOUSE:
COUNTY PARK:
GWINN HOTEL:
FUTURE OF GWINN; ETC:

a. Gwinn Association:

The report of the activities of the Gwinn Association for the year 1927 will be included in full in the report of Mr. W. H. Moulton, so that it is omitted from this report. In spite of the general feeling of depression that has prevailed in the Gwinn District, particularly in the early part of the year, the Club House has continued to function in a very satisfactory manner. It occupies a very important place in the life of the community, as it is the center of all recreational activities, and both physical and moral training for the young people.

The important question confronting the directors of the Association in 1927 was the one of finance. Considerable thought was given this subject, and eventually a plan was evolved that to all appearances will work out satisfactorily. It was realized that payment of salaries by the Cleveland-Cliffs Iron Company could not be expected to continue beyond the time necessary to finish dismantling and storing equipment from the Austin and Stephenson Mines. Without this financial assistance the money to pay salaries to employees had to be raised by other means. The proposition was explained to the Board of Education of Forsyth Township at their annual meeting in July, and in August the School Board appropriated $2,500 to be paid in a ten months period to the Association, in return for which the Association assumed full responsibility for the physical training of the school children. This work has been done by the Club House employees for the past several years, but with practically no payment for these services. The proposition was next put up to the C. K. Quinn Company, and their District Superintendent, Mr. R. S. Archibald, agreed to collect dues of 50¢ per man per month from their employees, also to make an appropriation of a like amount by the Company. From this source, the Club House during the past several months has received an income of about $140 per month. The dues of Cleveland-Cliffs Iron Company employees in the Gwinn District were raised to 50¢ per man per month, but owing to the small number employed by the Company, the returns from this source have not averaged over $25 per month. A few of the local residents engaged in other lines of business have voluntarily signed pledge cards to pay dues of $1.00 per month.

In November, the matter of a small payment to apply on salaries of the Club House employees was taken up with the Cleveland-Cliffs Iron Company, and arrangements were made to pay a total of $50 per month towards the salaries of the three employees. The charge for Doctor is deducted from the salary paid by the Company.

Economies have been effected in the cost of operating the Club House, and, due to the spirit of co-operation shown by everyone in the District, the Club is proceeding along the same lines as heretofore, with every prospect of having sufficient money to meet all expenses. The result of the change in the way of financing has on the whole been of decided benefit in that the wage earners are taking a greater interest in the Club than heretofore. Credit for the successful outcome of a rather difficult situation is largely due to the efforts of the Secretary, Mr. E. L. Miller.

b. Gwinn County Park:

This beautiful park is becoming better known throughout the Upper Peninsula, and a greater number of people visited it than in previous years. The warm summer made it more popular as a bathing resort, and during the season there were 50 or more people in the water every day. The swimming pool at this park, together with the pool at the Club House, have resulted in every physically able child in Gwinn becoming an expert swimmer. Supervision of swimming at the Park

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19. CLUB HOUSE, ETC:

b. Gwinn County Park: (Cont.)
has been continued by the Club House employees. It is hoped that additional acreage will be acquired by the Park Board, for it is only a question of a few years until the present area is inadequate. The surrounding area can not be properly protected unless it is included in the park, for even now the larger birch and pine trees are being cut for wood.

c. Gwinn Hotel:
During the past year the hotel has established a good name for its table, and for its clean and quiet rooms. Patronage by tourists and the regular traveling public has increased in a gratifying manner, and there is every reason to anticipate that within a year or so it will become self-sustaining. Contacts are being established with tourists from all over the United States, and this will result in increased trade for the hotel and advertising for Gwinn Townsite. For the past several years the Company has donated the rent and electric light. These expenses will probably be met, in part, in 1928.

d. Future of Gwinn Townsite:
The immediate future has been taken care of by the opening of the Archibald and the Gardner-Mackinaw Mines. The method of mining being followed at the Archibald, and the known tonnage of the ore reserves, will give this property a probable life of not more than three years, and the Gardner-Mackinaw will be mined out in about the same period of time. There is, therefore, a period of three years in which to advertise the town and attract a purchaser. It is recommended that efforts to find a solution of the future of the town be continued, and that a systematic campaign of advertising be started in 1928. The following statement was made in last years' report; "There is no reason why Gwinn should not become the summer residence place for a thousand or more Mid-West people. It has houses, streets, lights, water, bank, post-office and stores, lakes nearby, fishing, canoeing, swimming and a wonderful climate. Vacant houses might be rented to summer residents for $25.00 a month, bringing in an income to help defray the expense until a purchaser for the entire townsite has been found."

e. Storage Shed, Gwinn Townsite:
In order to provide storage facilities for the equipment salvaged from the Austin and Stephenson Mines, also the equipment from the Francis Mine that was stored at the Gwinn Mine, it was decided to build a storage shed on the warehouse lots at Gwinn Townsite, adjacent to the railroad track leading to the Gwinn Mine. A platform was first built to the level of the railroad cars, a floor laid, and this was later enclosed with galvanized sheet iron. The building when completed was over 300' in length by 12' in width. The height to eaves was 8'. The entire building is filled with equipment, consisting largely of pumps, valves, pipe fittings, small hoists, motors, etc. The contents have been inventoried and tagged. Shipments can be made at any time by freight or by truck. The total cost of the building was $1,229.47.

f. Gwinn District Ore Crusher:
Summary of Crusher Operations for 1927 and 1926:

	1927		1926		INCREASE		DECREASE	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
General Expense	1,389.04	.005	1,016.84	.005	372.20	-		
Maintenance	1,789.76	.006	829.80	.004	959.96	.002		
Operating	6,442.73	.023	5,249.20	.022	1,193.53	.001		
Total Optg. Cost	9,621.53	.034	7,095.84	.031	2,525.69	.003		
Switching	2,053.50	.007	2,394.00	.010			340.50	.003
Grand Total	11,675.03	.041	9,489.84	.041	2,185.19	-		

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19. CLUB HOUSE, ETC:

f. Gwinn District Ore Crusher: (Cont.)

Summary of Crusher Operations for 1927 and 1926:

Grade	1927 Tons	1926 Tons	INCREASE	DECREASE
Stephenson	118,401	206,447		88,046
Austin	33,270	26,564		6,706
Gardner-Mackinaw	48,798	-	48,798	
Francis	11,822	-	11,822	
Gwinn	7,053	-	7,053	
Archibald	31,938	-	31,938	
Total	284,288	233,011	51,277	
Average tons crushed per day,	1,883	1,664	219	
No. days operated,	151	140	11	
No. days idle,	95	225		130
Shifts and hours,	1-9 hr.	1-9 hr.		
Rated capacity per ten hour shift,	1,000	1,000		

The amount of ore crushed in 1927 increased 51,277 tons, as compared with 1926. The tons crushed per shift increased 219, due to crushing more non-plastic ore.

The Gardner-Mackinaw and Archibald ores amount to 80,763 tons, or 28% of the product, while in the previous year all of the ore crushed was plastic. The crusher operated more days at full capacity in 1927, which also increased the average tons crushed per day.

The material for covering the Railroad pocket, the steel belt conveyor, the grizzly, and crusher, was received in the fall, and this work was partially completed before the plant closed down for the winter. It will be completed in the spring of 1928 before the plant reopens.

g. Company Houses:

The following table shows the number of houses in each location, vacant and occupied, for the year 1927.

	1927 Vacant	Occupied	Total
Princeton Location	7	8	15
Austin Location	30	38	68
Gwinn Townsite	28	92	120
Gardner-Mackinaw Location	51	0	51
Total	116	138	254

In 1926 there were 108 vacant, and in 1925 there were 111 vacant houses.

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1. GENERAL:

At the beginning of the year, conditions were most discouraging as we had a very small tonnage in sight and all exploratory and development work had been stopped. The 2840' Level was exhausted during January and only a small tonnage remained above the 2910' Level, the lowest workings in the Pascoe Shaft. On January 17th, we had to discontinue hoisting on the night shift as we were pulling the dirt from under the feet of the miners in three working stopes. The majority of the gangs were drifting and raising from which we realized only a small tonnage. Finally in February, we had to limit the number of cars loaded even on the day shift, which cut down the product and made the costs excessive.

Conditions in March reached a point where it looked as though the end was near. The ore lens on the 1335' and 1500' Levels began to pinch out and we did not believe we could develop the ore on the 1570' Level fast enough so stoping would be well advanced before the other places were exhausted. In order to keep the costs down as much as possible, a drastic cut was made in the surface crew and men underground in April. It was decided on account of the life of the mine, only repairs incident to actual operations would be made and thirteen men were laid off, eight from surface and five from underground. In May, mining was stopped in the 1335' Level and 1500' Level stopes as the ore vein had pinched out. There was a large tonnage of broken ore on stulls in these places which kept up the production until the drift on the 1570' Level was well into the ore and the raise from the 1570' Level reached the 1500' Level.

In order to secure as large a product as possible and decrease the cost, we loaded ore on the night shift holding it in cars on the transfer level underground. We had 50 to 58 cars ready to hoist every morning as soon as the men were down.

The June production was 9043 tons, with 3.47 tons per man per day, the best showing in the history of the Republic Mine. The ore was secured from stopes in which mining had been stopped as there were only three gangs mining, one drifting on the 1570' Level, one raising from the 1570' Level to the 1500' Level and one at the Pascoe Scram.

The 1570' and 1710' Levels continued to open up so that an increased tonnage could be filled from these stopes as others were exhausted. By October these two levels together with the Pascoe Scram were furnishing the entire product. The latter place was exhausted early in November. Again it was necessary to discontinue filling on the night shift and limit the cars loaded during the day from these two stopes and as a result, we only hoisted a small tonnage and the cost was very high.

Early in October, the development of the stope above the 1570' Level indicated that there was ore ahead of the breast of the foot wall stope on the 1500' Level. The gang from the Pascoe Scram was transferred to this breast on October 24th and has proven up this ore. Part of it is badly mixed with Jasper, while that to the Southeast is high grade and clean. We are pushing this place as much as possible as the life of the mine depends on how this place develops. The stope above the 1570' Level is all mined out except for the 1500' Level floor pillar. We estimate between 4,000 and 5,000 tons of broken ore on the stull

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GENERAL:

During the past two months, we have secured about three-quarters of our tonnage from this place, which when exhausted must be made up from the 1710' Level and this place on the 1500' Level. If this cannot be done, we will have to mine the 1500' Level floor pillar and abandon the mine when we fail to show a profit on our operations.

All the broken ore was cleaned out of the 2910' Level in April and work of dismantling all equipment with a salvage value was started immediately. That portion of the Pascoe Shaft below the 2050' Level was operated from an auxiliary hoist on this level. The timbermen removed all pumps, rail, pipes and other equipment to the 2050' Level and then to surface. This work was completed in July and this portion of the shaft abandoned and allowed to fill with water. A bulkhead has been built just below the 2050' Level to prevent lowering the skip below this point. This part of the mine is not making much water and it will probably take several years for the water to reach the 2050' Level.

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

Basic Lump,	32,769	tons
Basic Crushed,	23,541	"
Basic Run-of-Mine,	7,540	"
Total Ore	63,850	"
Rock	8,997	"

The product for the year, 1927, was 63,850 tons compared with 54,719 tons in 1926, an increase of 9,131 tons. This was due to the slightly improved conditions, and concentrating of mining to the upper levels of the Pascoe Shaft. The number of working places was limited but the stopes were larger and output per gang greater.

There was very little rock work undertaken during the year. The winze at the Pascoe Scram was sunk 45 feet in rock and the drift on the 1570' Level driven 125 feet through Jasper to the ore. The ore hoisted from the Pascoe Scram was stockpiled as Run-of-Mine. The ore hoisted through No. 9 Shaft was screened and the Lump and fines stocked separately.

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year Tons
Bessemer Lump	440		440	
Basic Lump,	18,065	5,040	23,105	33,244
Bessemer Crushed,				52
Basic Crushed,	14,252	8,806	23,058	85,585
Pascoe Crushed,	160		160	9,814
Total	32,917	13,846	46,763	128,695
Total last year,			128,695	
Decrease,			81,932	

The large decrease in total shipments for the past year was due to our limited production and impossibility to estimate in advance the expected tonnage. Further, during 1926, we cleaned up all stockpile ore, except a small tonnage of Pascoe Run-of-Mine. There was a large tonnage of Basic Crushed ore on hand, an accumulation of several years.

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b. Shipments: (Continued)

Small shipments of Bessemer and Basic Lump ore were made intermittently throughout the year from pocket, for all rail shipments. A total of 44 cars were loaded for ten different Steel Casting Companies.

We started shipping Basic Crushed ore on April 20th and Basic Lump May 12th. The entire output of both Lump, and Crushed was loaded from pocket all season. The Crushed ore requirements were filled by October 1st and Lump ore by October 10th when stockpiling was resumed in each case.

The first loading from stockpile was done on April 21st. We operated the Steam Shovel for three days in the Basic Crushed ore pile loading 4699 tons. The Shovel was moved into the Lump pile on May 12th and operated three days, shipping 2563 tons. During the balance of the Shipping season the Shovel was only worked thirteen days. The Basic Crushed pile was enturely cleaned up showing an over-run of 1128 tons or 13.4% of the total tonnage stocked.

It will be recalled that last year after all the stockpile ore had bean shipped, there was a shortage of 28,389 tons, an accumulation of a number of years. We are quite positive that had the Lump pile been all loaded out, it would have shown even a larger over-run than the Crushed ore. The pocket over-run for the five months, May to October, when both grades were shipped from pocket, averaged 21%. We are watching the loading of our underground cars and know we are getting good weight.

c. Stockpile Inventories:

The following is the tonnage of various grades in stock on December 31st, 1927:-

Grade	Tons	Last Year Tons
Basic Lump,	13,360	4,136
Basic Crushed,	4,523	3,017
Basic Run-of-Mine,	8,627	1,087
Pascoe Run-of-Mine,	3,371	3,371
Total tonnage in stock,	29,881	11,666

There is an increase of 18,215 tons over the balance carried in stock on December 31st, 1926.

d. Division of Product by Levels:

The tonnage trammed from the various Levels during 1927 is as follows:-

Level	Tonnage	Percentage of Product.
1335'	3,387	5.4%
1500'	17,535	27.6%
1570'	16,695	26.2%
1710'	8,080	12.8%
1950'	431	.8%
2050'	6,150	9.7%
2840'	868	1.4%
2910'	3,140	4.1%
Pascoe Scram	7,564	12.0%
Total,	63,850	100.0%

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PRODUCTION
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d. Division of Product by Levels: (Continued)

While we show a production from nine different levels, at no time during the year were we able to tram from more than four at one time. The product for the months of October, November and December was secured from the 1500', 1570' and 1710' Levels. We find it very difficult to keep up a uniform production when we are restricted as to the number of filling places. Early in the year the fillers were shifted from place to place loading a few cars on the different levels and in this way, we kept up our production.

It will be noted that the largest percentage of the year's product was secured from the 1500' and 1570' Levels. The 1570' Level stope will be exhausted of the broken ore on stull early in February unless we mine the floor pillar of the 1500' Level. This cannot be done as long as we continue to work above this level. At the present time, the out-look for a very large stope being developed above the 1500' Level, is not encouraging. This leaves the 1710' Level to furnish the major portion of our hoist.

e. Production by Months:

The production by months, days operated, average daily product and tons per man per day are shown in the table below:-

Month	Tons Rock	Tons Ore	Days Operated	Average Daily Product	Tons per man per day
Jan.	987	4,148	22	189	1.32
Feb.	1,052	2,389	21	114	.89
Mar.	875	4,000	23	174	1.33
Apr.	856	5,335	22	243	2.06
May,	592	7.292	22	331	2.97
Jun.	838	9,043	24	377	3.47
Jul.	693	7,166	25	287	2.56
Aug.	678	6,769	27	251	2.19
Sep.	546	5,387	23	234	1.82
Oct.	978	5,043	25	202	1.78
Nov.	383	2,374	24	99	.88
Dec.	519	4,904	25	196	1.74
Total,	8,997	63,850	283	225	1.89
Stockpile over-run		1.128			
Grand Total	8,997	64,978	283	230	1.93

The extremely low production in the months of February and November were due to the fact that the stopes from which we were pulling ore were limited and in order not to pull the dirt from under the miners, we had to stop filling on the night shift and restrict the tonnage loaded days. The condition that existed early in the year improved in April when we realized that mining in the stopes above the 1335' and 1500' Levels was near an end and the ore could be exhausted as rapidly as possible. These stopes were stopped early in May and the large tonnage for the months of May, June, July and August, is due to the broken ore drawn from these stulls. Toward the end of the year, a similar condition existed as at the beginning and we were again forced to discontinue loading ore night shift and limit the cars filled days. As we are pulling the broken ore above the 1570' Level as rapidly as possible, we will show a fair production for the next several months.

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PRODUCTION SHIPMENTS & INVENTORIES:

e. Production by Months: (Continued)

At the present time we are employing about 115 men. With this number on our Pay-Roll, we must hoist a sufficient tonnage to average better than 1.80 tons per man per day to make a paying proposition out of our operation. The entire operation is watched very closely as we are working from month to month only with an endeavor and hope to keep going as long as possible.

f. Ore Statement:

	Run-of-Mine Basic	Run-of-Mine Pascoe	Basic Lump	Bessmr. Lump	Basic Crushed	Pascoe Crushed	Total	Total Last Year
On hand Jan. 1, 1927,	1,087	3,371	4,136		3,072		11,666	113,732
Output for Year,	7,540		32,769		23,541		63,850	54,720
Stockpile Over-run,					1,128		1,128	298
Stockpile Shortage,								28,389
Transferred,			440	440	160	160		
Total	8,627	3,371	36,465	440	27,581	160	76,644	140,361
Shipments,			23,105	440	23,058	160	46,763	128,695
Balance on hand,	8,627	3,371	13,360		4,523		29,881	11,666
Increase in Output,	6,453		1,492		5,870	4,685	9,130	
Increase in Ore on hand,	7,540		9,224		1,451		18,215	

1926 -- 2-8 hr. Shifts, 5 days per week, Jan.1st to Dec. 31st, 1926.

1927 -- 2-8 hr. Shifts, 5 days per week, Jan.1st to June 15th, 1927.
2-8 hr. Shifts, 6 days per week, June 15th, to Dec. 31st, 1927.

g. Delays:

Production was interrupted several times during the year on account of non-electrical delays. While none were of a serious nature, still on several occasions, the delays covered several days and though the tonnage lost seems small with the limited production at the Republic Mine, the cost was affected materially. The following table shows the various delays:-

DELAYS

Date	Duration	Cause	Tonnage Lost
May 23	2 hours	Trouble with Screen Motor,	None
Jun.15	1½ days	Trouble with Screen Motor,	300
Sep.29	2 days	Received orders to stock ore before Trestle erected,	400
Oct.29	1 day	Erecting new smoke stack at Central Boiler Plant,	150
Dec. 6	6 hours	Skip Fan broke at 1570' Level,	100

The first mechanical delay of the year occurred on May 23rd when the motor which drives the revolving screen in the Shaft House burnt out, causing a delay of two hours at the end of the shift. The ore was held in cars underground and hoisted the next day, therefore no loss in product was reported.

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g. Delays: (Continued)

On June 15th, we had trouble again with this motor and while we were able to finish the shift, it was discovered, when repairs were started that night, that the motor was in a very bad condition and it was necessary to install another one sent from Ishpeming. The installation of the new motor was not completed until the morning of the 17th, causing a delay of 36 hours and a loss in product of 300 tons.

We were unable to do any hoisting on September 29th and 30th, on account of receiving orders to discontinue shipments of Crushed ore to the Dock and not having our stocking trestle completed. On Tuesday, September 27th, we cleaned up our Crushed ore stockpile and were notified that we had approximately 2000 tons of this grade to go forward from pocket to complete our season's requirements. At 7:30 P.M., on September 28th, we received word to discontinue shipment of Crushed ore to Dock and start stocking. A crew of men were started erecting a trestle on the 29th and we were able to resume hoisting on October 1st. There was a loss in product of 400 tons due to this delay.

We were forced to shut down on Saturday, October 29th, in order to have two days including Sunday, to erect a new Smoke Stack at the Central Boiler Plant. This caused a loss in product of 150 tons.

On the night shift of December 5th, the skip-tender at the 1570' Level rang the bells too quickly and the loaded skip was lowered on the Fan and broke the timber to which it was attached. It took six hours on the 6th to repair same so hoisting could be resumed. The loss in product amounting to 100 tons.

h. Delays from Lack of Current:

The most serious electrical delay occurred on May 4th when the McClure Power Plant was struck by lightning and both generators burnt out; the other delays were of minor importance.

The following are the delays account of no current:-

Date	Duration	Cause	Tonnage Lost
May 4	2 days	Lightning stricking McClure Plant,	None
Sep. 1	4 hours	Tree across line,	75
Nov. 12	12 "	Transmission line down due to wind storm	25

The McClure Plant was struck by lightning on May 3rd but the Republic Mine was not cut off of current until the 4th. During the two days that the Ishpeming line was dead, we operated our own Water Power Plant for generating current and ran the mine pumps. A schedule was finally worked out for the working of the mine on current supplied from the other Water Power Plants and the steam-electric plants. At the Republic mine, we hoisted nights instead of days for several weeks until repairs on one generator was completed. We made up the time lost on May 4th and 5th by working Saturdays, May 7th and May 21st, so there was no loss of product due to this delay.

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PRODUCTION SHIPMENTS & INVENTORIES:

h. Delays from Lack of Current: (Continued)

There was a delay of four hours on September 1st, due to no current. An independent Power Company was clearing a right-of-way to connect with our transmission line at Clarksburg and a tree fell across one of our wires. Our hoisting was delayed from 11:30 A.M. for the balance of the day shift, causing a loss in product of 75 tons.

There was a high wind on Saturday, November 12th which broke one of the wires on the high power line near Clarksburg about 11:30 A.M. It took until 5:45 P.M. to locate the trouble and get current back on the line. As our night shift on Saturday starts work at 5:00 P.M. and we were unable to tell when the line would be repaired, we did not work. The loss in product only amounted to 25 tons.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	Iron	Phos.	Silica
Bessemer Lump,	65.82	.058	2.09
Basic Lump,	65.55	.062	5.23
Basic Run-of-Mine,	65.30	.044	3.93
Basic Crushed,	62.57	.058	7.72
Pascoe Crushed,	56.50	.055	15.08

b. Average Analysis on Straight Cargoes:

Grade	Mine			Lake Erie		
	Iron	Phos.	Silica	Iron	Phos.	Moist.
Bessemer Lump,	64.22	.051	7.20	63.93	.041	.69
Bessemer Crushed,	(No Shipments)					
Basic Run-of-Mine,	(No Shipments)					
Basic Lump,	64.79	.062	5.54	64.24		.21
Basic Crushed,	62.61	.057	7.93	62.92		1.80
Pascoe Crushed,	(No Shipments)					

d. Complete Analysis of Season's Shipments:

Lake Erie Chemist

	Bessemer Lump	Basic Lump	Basic Lump
Iron,	63.93	64.70	63.45
Phosphorus,	.041	.065	.056
Silica,	7.80	6.30	7.70
Manganese,	.03	.06	.05
Alumina,	.69	.63	.83
Lime,	.30	.30	.57
Magnesia,	.22	.11	.21
Sulphur,	.006	.005	.006
Loss,	None	None	.05