Mine Data File

AGENTS' ANNUAL REPORTS

AND STATISTICS - YEAR ENDING NOV. 30,

1904

Mine & Tree - Dept

#2077

ANNUAL REPORTS AND STATISTICS

DEPARTMENT OPERATIONS

YEAR ENDING NOV. 30, 1904.

I N D E X

THE CLEVELAND-CLIFFS IRON COMPANY.

ISHPEMING, + + + MICHIGAN.

AGENT'S ANNUAL REPORT

FOR

YEAR ENDING NOVEMBER 30th,1904.

I N D E X.

I N D E X, Continued.

THE CLEVELAND-CLIFFS IRON CO.

Ishpeming, Michigan.
December 1st, 1904.

Mr. Wm. G. Mather, President,

Cleveland, Ohio.

Dear Sir:

I beg to submit herewith my annual report of the operation and condition of the mines of The Cleveland-Cliffs Iron Co.

The inventory, maps and detailed cost statements relating to this report, go to you under separate cover.

NEGAUNEE MINE.

The past year at this property has been one of reconstruction and development. The condition of the mine when we took it over in September 1903, was fully explained in last year's report, so that it is unnecessary to repeat it. At the same time these conditions must be fully understood to realize the excessively large amount of dead work required to get the property in shape for safe and economical mining.

Filling in the large open stopes has continued during the year, and this work is now completed, except in old No.25 room at the extreme East end of the mine. Every effort is being made to break the capping, but so far without success. Until this caves there is constant danger of a sudden collapse, which might result disastrously if it occured without warning. Every precaution is being taken to protect the men, and we do not anticipate any trouble. At present there is an opening 1,000 feet long, and from 100 to 150 feet wide, which has been filled within 20 feet of the back; the hanging of which is supported by a few pillars left by the old management. During the past year these pillars have been attacked, starting at the extreme West end, and falling back towards the shaft. As soon as the pillars are mined, the filling slowly runs down from above, and fills the space originally occupied by the ore. This method of mining is expensive, but under the existing conditions, it would be impossible to remove the ore with safety to the men had no filling preceded it. The maps show the pillars still standing and the total area filled. Up to this time the timbers on the 3rd level show no weight. In a month or six weeks the capping of this level will be on a swing for a distance of 700 feet, and it is hoped it will then take weight, and slowly cave to the surface.

Negaunee.

NEGAUNEE MINE.

In October 1903 the retimbering of No.1 shaft was begun. Close timbers 12 x 12" were put inside the old timber reducing the size to 8'3" x 8'3". This work was completed to the 4th level, a distance of 539 feet early in January. The shaft was then sunk 96 feet to the 6½ level. There are two compartments, one used for a cage, and the other for a ladderway. All the timber for the mine goes down on the cage, and it is also used for lowering and hoisting men. This shaft provides a second outlet to the mine, which did not exist when we took the property; this shaft being out of commission.

No.2 shaft was sunk 96 feet to the 6½ level. An old incline shaft from the 4th to the 6th level, called No.5, was sunk 40 feet. At the elevation of the 6½ level a rock drift was driven to No.2 shaft, a distance of 526 feet. Excellent progress was made, and in April it was holed. Considering the nature of the ground this work constituted a record. The feet driven per month is as follows:

January 112 feet.

February, 134 feet.

March, 169 feet.

April, 111 feet.

A cross cut was also driven towards No.1 shaft; all the rock being hoisted through No.5 shaft.

The total rock drifting for the year was 3882 feet.

NO.2 SHAFT.

In order to increase the hoist, a second skip will be put in No.2 shaft, taking the place of the cage. During the coming year both shafts will be sunk to a point 20 feet below the 9th level, which is at present the bottom level of the mine. Owing to the gentle pitch and dip of the deposit, the rock drifts to the ore body will be long and expensive.

UNDERGROUND PUMPS.

An 8" x12" x 20" x 10" x 24" Prescott, Duplex, Triple pump was installed in the pump chamber cut last year in No.2 shaft, 140 feet from surface.

The 12" x 22" x 8" x 24" Duplex Chandler Compound pump which had been in use at the ledge was overhauled, and has been erected as an auxilliary. The change has effected a saving of 150 tons of coal per month, and will pay for itself in less than two years.

Negaunee.

NEGAUNEE MINE.

On the 6½ level a large pump house has been cut and a 13" x 21" x 34" x 9" x 24" Prescott, Duplex, Triple is now being installed, and will soon be in operation. This should effect a relatively greater saving of fuel than the ledge pump, as at present the water is being pumped from the 6½ to 540 foot level, and from there is thrown to surface by a Worthington Compound pump. The old pumps will be overhauled and replaced as auxilliaries.

It is probable that a large tonnage of ore exists South and West of No.1 shaft, which has never been developed. Diamond drill hole "A" located 830 feet South of the North West corner of Section 5, and on the section line between 5 and 6, which was drilled some years ago by Captain Sam Mitchell showed 185 feet of ore at a depth of 700 feet below the surface. Farther West the ore undoubtedly occurs nearer surface.

The following estimate of ore in sight was made by Mr. S. R. Elliott. The figures are very conservative, every allowance having been made for inaccuracies in the old maps. No ore below the 6½ level has been considered, although the old developments show a very large tonnage. A separate estimate has been made, showing the amount of ore which has been developed by us since taking hold of the property. Most of this is ore which would have been left by the former owners of the lease by their method of mining.

ORE IN SIGHT ON DECEMBER 1ST., 1904.

No.1 shaft,	Tons.	
6½ level to old part of 6th level (area 1),	150,000	
6th level (area 1) to 5th level (area 2),	143,000	
5th level (area 2) to 4th level (area 3)	100,000	
4th level (area 3) to top of deposit,	50,000	
Total for No.1 shaft,		443,000 tons
No.2 shaft.		
6½ level to 6th level (area 4),	148,000	
6th level (area 4) to 4th level (area 5),	354,600	
4th level (area 7) to top of ore,	77,500	
4th level between 4th and 3rd in area of subs, between faults "A" and "B",	70,000	
4th level to South of Fault "B" to No.2 shaft, and 3rd level to East of 1500' coordinate,	235,000	

NEAGUNEE MINE.

ORE IN SIGHT, Continued.

4th level to the North of fault "B" and to East of 1200' coordinate, and to the West of the 1500' coordinate on the 3rd level,	100,000	
Total above 3rd level in old deposit,	100,000	
Total above 400' level,	120,000	
Total,		1,737,700
Ore which should be left to support No.1 and No.2 shafts,		453,000
Total ore which could be mined,		1,284,700 tons.

ORE DEVELOPED BY THE CLEVELAND-CLIFFS IRON CO.

	Tons	Mined
New find above 4th level area, 7,	107,500	30,000
In sublevels between 4th and 3rd to West of 1200' coordinate,	136,000	66,000
Above the 400' level,	128,000	8,000
Total,	371,500	104,000
Excess developed over mined, 267,500		
Partially developed ore in floors,		
New find area 7 below 4th level,	238,000	
Continuation of old 4th level, and area below level,	89,000	2,000
Total ore below floors,	327,000	2,000
Grand total of probable ore developed,	698,500	106,000
Ore mined from old deposit,		36,264
Total ore mined,		142,264
Excess of Probable ore developed over mined, 556,236 tons.		

SURFACE.

The landing platform at No.2 shaft was only 28 feet above the surface, which necessitated a long and expensive hand tram, as the stockpile ground was narrow. In order to do away with hand tramming and substitute a gravity system, the shaft house has been raised 12 feet. A 7 x 10" duplex hoist has been installed, and the new system will shortly be in operation. The change will save four men per day.

Negaunee.

NEGAUNEE MINE.

S H O P S.

A new carpenter, machine and blacksmith shop has been built. The main building is 56' x 24', with an L 24' x 24'. A drill press and pipe cutter have been installed. No lathe has been put in, as it would require the services of a machinist, and there is not work enough at this mine to keep a man busy. The lathe work for this mine is done at the Maas, which is only a short distance away. The building is of stone, and cost with equipment $3908.08.

LABORATORY.

The old carpenter shop has been remodeled, and is now being used for a laboratory. It was found inexpedient to send the samples to the main laboratory at Ishpeming, on account of the time lost in getting returns. The stopes vary so in this mine from day to day that it is important to get results as soon as possible after samples are taken, in order to secure the largest possible amount of Bessemer.

The total cost of the building and equipment was $920.81.

RECOMMENDATIONS.

NEW SHAFT.

No.1 shaft passes directly through the ore body, and for this reason ties up a large tonnage of ore. Both No.1 and No.2 shafts are on the East side of the ore basin. The deposit pitches gradually to the West, and on this account the length of the rock drifts to reach the ore will increase rapidly with depth. The cost of developing the lower levels will therefore be high, and the time required long. Besides this the additional lenth of tram will be expensive.

I therefore recommend sinking a new shaft farther to the West, and near the slate outcrop. Work to begin as soon as drilling can be done to determine the proper location. The new shaft will also require, either new equipment, or a change in the location of the present plant. The old plant, however, will have to be moved sooner or later, as when the ore around No.1 shaft is taken out, it will probably cave the ground where this plant is situated.

NEGAUNEE MINE.

TRAMMING.

The average length of the tram at present is 1,000 feet, as compared with 1,069 feet at the Lake Mine. The length will increase on the lower levels. Men and mules are now used, but owing to the long haul the tramming cost is excessively high. While the result for the past year cannot be considered normal, at the same time it indicates that the tramming cannot be economically done in this way. The cost for the year has been .187 per ton as against .047 at the Lake Mine. This comparison cannot be taken as representing the relative value of the two systems, as under ordinary conditions the cost at the Negaunee Mine should not exceed 13¢ per ton. Even on this basis, however, on an estimated output of 300,000 tons for this year, the saving would amount to $24,900.

Eventuallythis mine will be producing 500,000 to 600,000 tons per annum, and the saving would be correspondingly greater. The cost of an electric plant, new cars, relaying the track on the 6½ level with 40 lb. rails, and building an addition to the engine house for engine and dynamo would be approximately $20,000. One great advantage of electric tramming which cannot be computed in dollars and cents is the regularity with which a maximum product can be handled. It is a well established fact that miners do better work with empty than with full chutes. When labor is in demand trammers are difficult to keep, and the production of a mine is often curtailed by a shortage of this class of men.

I recommend that electric tramming be installed at the earliest possible moment.

NEW OFFICE.

The building at present occupied as an office and warehouse is too small . In order to properly take care of the supplies, the Captain's change room should be added to the storeroom.

I recommend that a new office be built for the Superintendent and Mining Captain, at an estimated cost of $1200.00.

The following description of the present condition of the mine was prepared by Mr. S. R. Elliott, Superintendent.

The tinted portions of the maps represent the extensions for the year. The locations of the contracts are indicated by numbers.

NEGAUNEE MINE.

400' LEVEL.

The only contract on this level is No.32 which is raising to the subs above. It is a four compartment raise, two chutes for ore, one for timber, and one for ladderroad. When completed it will be 150 feet high, and the ore from the six sublevels above the 400' level will be handled through it. At a height of 70 feet the raise struck ore, and should continue in it for the remainder of its distance. In order to push this work so that we can begin to block out the upper subs, four miners are working here on each shift.

333' SUBLEVEL.

This is the second sub above the 400' level. The deposit here is about 50 feet wide on an average, and extends to the East and West about 500 feet connecting with the deposit found in the Barasa.

Contract No.28 drifted to the hanging, and followed it to the North East, holing into contract No.34, which is now into the hanging.

Contract No.33 has holed into No.32 raise. In a few days we will be forced to stop work on this sublevel as the ore is already blocked out, and it would not be wise to cut up the level until more work has been done on the subs above. The 260 and 280 foot subs have rock in the breast, the drifts in both cases being in the hanging. By drifting to the North we will undoubtedly get into ore. The only objection to working in these subs and the 295 foot sub, is the fact that the ore will have to be transferred. In a short time No.32 raise will be connected with these subs and the ore can be handled direct to the 400 foot level.

Standpipe No.2 which is over 200 feet away from No.32 raise, shows a depth of 138 feet to the ledge. As the surface in the direction of the Barasa is more shallow than this, it is presumed that there is not more than 138 feet of sand over these sublevels. If the ledge is level there would be 105 feet of capping above the back of the drift. It is possible that the distance to the ledge may be greater than 138 feet.

THIRD LEVEL--480'.

Contract No.21 is working at a height of 130 feet above the 3rd level, cutting away the hanging and trying to fill a large room. This work is conducted in the following way: A raise is put up in the hanging to a height of 20 or 25 feet above the back of the room, a drift is then driven out to the room, the floor blasted down, and an underhand stope worked to the East and West, when the bench of rock below the floor of the drift has all been blasted down for a suitable distance in both directions, the work is repeated by

raising up and drifting out to the room again. The men are protected by the hanging, which is always directly back of them.

Contract No.24 is three sets above the 3rd level, taking out a pillar.

Contract No.30 is 25 feet above the 3rd level, working in a pillar. The drift to the South found the hanging at 15 feet from the raise, when the drift was turned to the East. The other gang in this contract drifted North for about 25 feet to the foot and are now following it to the East.

Contract No.26 is about 30 feet above the 3rd level, taking out apillar on the foot. This contract will complete its work in a few shifts, after having worked in this place on the footwall for over a year.

Contract No.29 on the 3rd level is drifting West in a pillar. When the drift is through the pillar they will raise up and mine the three sets of ore, which are above the floor of the level.

NEW DEPOSIT ON 4TH LEVEL--540'.

On the top sublevel, or 440 foot, all of the ore was mined except a small pillar near "O" raise. The ground was so heavy at this point that it was impossible to take this pillar; it was therefore drilled and blasted so that it could be run down to the next sub.

Contract No.14 is raising from the 454 foot sub to run the ore referred to above.

Contract No's 13 and 14 have been working on the hanging side of the 454 foot sub, on top timbers. These contracts have been moved to the footwall, as it was not considered safe on account of Contract No.12, which is filling the large opening in the sub level directly over them. As soon as the room above is filled the operation of slicing back toward the foot will be continued.

The drifts are being lagged in the bottom and also lagging is nailed on the inside of the timbers. When the ore on the sides of the drift and the bottom is taken out, the lagging will keep the ore free from the rock which is used as filling.

Contract No.7 on the 454 foot sub is taking out a pillar, the filling following them as the ore is removed.

It is the intention to start to slice back on the 474 foot sub when a slice three sets wide has been taken out on the 454 foot sub. The plan is to keep the slicing on the upper sub about two sets ahead of the work on the lower.

In this way as the filling runs down to the lower sub and they start to slice back toward the foot they will always be protected by at least two sets of solid ground above them.

On the 474 foot sub, Contract 15 is slicing back on a pillar; the ore above them having been mined, and the room filled.

Contract No's 5 and 16 have both been drifting, but are now against rock. In No.5 the hanging and foot have come together.

489 foot sub. Old Deposit.

Contract No.6 is mining a pillar to the West of the raise, and No's 11 and 18 are taking out the small amount of ore which is on each side of the drift. To the North there is some ore on the foot, while to the South we have the old rooms with a small amount of ore left near the drift.

505 foot SUBLEVEL.

Contract No.10 is drifting West in very hard ore. They will probably run against rock in a short time, as the limits of the deposit in this direction have been fairly outlined.

Contract No.4 raised in a small pocket of ore which extended into the hanging. At about 25 feet above the level rock was found in the raise. A drift 10 feet to the West also struck rock, showing the pocket to be small. This ore will be taken out as rapidly as possible, as other contracts near it which are falling back towards the foot will have to be delayed until this place is finished.

Contract No.3 is taking out another slice from the pillar as shown on the map. They are also trying to get a small amount of ore which was left in the old room.

This sub is taking considerable weight on the hanging side.

6½ or 620 foot level.

There is a certain amount of sand in the rooms on the 6th level. As this sand is resting directly against the ore on this level it will be necessary to make some arrangement, so that the ore can be mined without becoming mixed with the sand.

Contracts No's 1 and 14 on the 6½ level are cutting out two rooms, which are directly under two rooms on the 6th level. When these rooms on the 6½ level are completed they will be close lagged on the bottom and also on the inside of the timbers. The sand in the room on the 6th level over room No.1 will then be taken through a raise to room No.1. When the room on the 6th level has been thoroughly cleaned of sand, it will be close lagged on the bottom and also on the inside of the timbers. The sand from the next room on the 6½ level, adjacent to the one which has been cleaned and close lagged, will then

be taken into the lagged room, thus cleaning up another room, which in turn will be lagged making a place to put in sand from the room next adjacent. This operation will be repeated until all of the rooms have been cleaned. The object of making two rooms on the 6½ is to hasten the work by being able to attack the level at two different points some distance apart.

Contracts No.1, 5, 7 and 19 are drifting in ore. Contract No.1 (old) was stopped in lean ore.

Contracts 4, 6 and 8 all struck the foot and have been stopped.

Contract No.3 was stopped in ore and breasted up on account of water coming down from the 6th level.

Contract No.17 is carrying a double drift in rock.

Contract No.15 is putting up a three compartment raise from the 6½ level to the 4th.

TRAMMING ON THE 3RD AND 4TH LEVELS.

At the present time no hoisting is done on the 3rd level. The ore is trammed by hand to a rock raise near No.2 shaft where it is dumped to the 4th level, thus doing away with the landers on the 3rd level. It is the present intention to reduce this cost still further by stopping the hoisting on the 4th level. Three raises will be put up from the 6½ level, two to connect with the 4th level, the third to connect with the rock raise from the 4th to the 3rd. In order to connect with the rock raise to the 3rd level it will be necessary to drive a drift in rock on the 6½ level a distance of about 100 feet before we will be in position to raise. This raise will be in rock, while the other two will be in ore, after raising a short distance above the 6½ level. Owing to the bad grades on the track on the 4th level and the poor condition of the drift the tramming cost is very high. The ore is trammed by hand for a maximum distance of 700 feet. Here the cars are taken by the mules and pulled to the shaft, a distance of 1200 feet. When the raises which I have referred to above, are completed we will be able to do away with on this level five mules, four drivers, two helpers, and six men at the shaft. The same trammers who take the cars to the point where the mules begin their work will be able to tram the ore direct to the raises from the 6½ level. In addition to the saving in the number of men employed to do the same work, there will probably be a saving in time, as the least number of levels that we have to hoist from the more, the more rapidly it should be done.

Negaunee.

On the 6½ level the force will have to be increased slightly. Two extra mules, two drivers, one helper and two men to fill the cars will be necessary, thus making a saving of seven men and three mules, provided the system of tramming is not changed.

SURFACE.

In time the 3rd level will surely cave; whether it will come this month or next month, this year or next year, no one knows, but cave it must sooner or later. When the 3rd level caves I see no reason why it should not extend to the 4th and make a part of that level collapse also. When this happens there will be a large cave made on the surface, which will probably take down our tail room track at No.2 shaft. I would suggest that this question be taken up at once, and provision made for the changing of the location of this track.

The surface crew is now busy laying the plank on the stockpile ground, which has been made fairly level. The small irregularities on the surface are being levelled by using ashes from the boiler house.

The laboratory has been completed and we have been doing our own work since Tuesday December 13th. We expect to be able to get the returns of the underground samples by noon each day. As the ore is so exceedingly changeable it will be a great advantage in grading it, by getting the returns as early as possible.

A new water pipe is being put in from the heater in No.1 boiler house to supply the boilers at No.2 with hot water. The wooden pipe was leaking badly in a number of places.

Telephones are now in good working order in the following places: Office, Engine House, No.1 shaft landing, No.2 shaft landing and the following levels in No.2 shaft. 400 foot, 4th and 6½.

NEGAUNEE MINE.

The cost of mining for the year has been as follows:

	1904	1903	Increase	Decrease.
PRODUCT.	142,264	17,292		
General Expense,	.063	.095		.032
Maintenance,	.165	.382		.217
Mining Expense,	1.525	2.604		1.079
Cost of Production,	1.753	3.081		1.328
EXPLORATORY.	.006	.066		.060
DEPRECIATION.				
Inventory,	.122	.002	.120	
Improvement,	.110		.110	
New Construction,	.028		.028	
Total,	.260	.002	.258	
Less credits,	.002			.002
Total Depreciation,	.258	.002	.256	
Taxes,	.118	1.349		1.231
Central Office,	.049	.104		.055
Cost on stockpile,	2.184	4.602		2.418
Loading and shipping,	.022	.007	.015	
Total cost,	2.206	4.609		2.403

The cost for the year is high due to the fact that the mine has been practically reopened. Most of the ore came from drifting and scramming. It will take at least another year to get this property into first class shape. At the end of that time the cost will be as low, if not lower, than any of our other mines.

ORE SHIPMENTS FOR 1904.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR.
Negaunee Bessemer,	49,962	65,257	115,219	10,909
Negaunee	5,613	12,195	17,808	0
Total,	55,575	77,452	133,027	10,909

Negaunee.

NEGAUNEE MINE.

AVERAGE ANALYSIS OF MINE SAMPLES.

	Iron	Phos.
Negaunee Bessemer,	60.47	.054
Negaunee,	59.28	.112

ORE STATEMENT NOVEMBER 30th, 1904.

	Negaunee Bessemer.	Negaunee	Total	Total Last year. (3 Mos.)
On hand December 1st, 1903,	2,355	4,028	6,383	
Output for year,	118,157	24,107	142,264	17,292
Total,	120,512	28,135	148,647	17,292
Shipments,	115,219	17,808	133,027	10,909
Balance in stock,	5,293	10,327	15,620	6,383

AVERAGE CARGO ANALYSIS FOR 1904.

	Iron.	Phos.
Negaunee,	60.34	.055

AVERAGE WAGES AND PRODUCT.

Product 1904, 142,264 tons.	SURFACE		UNDERGROUND		TOTAL	
Product 1903, (3 mos) 17,292 tons.	1904	1903	1904	1903	1904	1903
Average number men working,	49	53	217	138	266	191
Average wages per day,	1.91	1.90	2.16	2.19	2.11	2.11
Average wages per Mo. 25 days,	47.75	47.50	54.00	54.75	52.75	52.75
Average product per man per day,	9.30	4.25	2.20	1.62	1.78	1.18
Labor cost per ton,	.205	.446	.982	1.346	1.187	1.792
Difference in labor cost per ton,	-.241		-.364		-.605	
Average product breaking and tramming,			3.71	3.274		
Average wgaes for miners,			2.29	2.27		
Average wages for trammers, (Co.acct)			1.86	1.86		
Average wages for Contractors,			2.29	2.27		

NEGAUNEE MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVG. PRICE	AMOUNT	AMOUNT 1903.
50% powder,	51,376	.117	6016.14	823.17
Fuse,	113,550	4.14	469.80	66.49
Caps,	32,825	5.74	188.45	28.48
Total,			6674.39	918.14
Product,			142,264	17,292
Pounds powder per ton ore,			.361	.416
Cost per ton for explosives,			.047	.053

STATEMENT OF COMPARATIVE WAGES.

	1904	1903 (3 mos)	Increase or Decrease
SURFACE			
Total number days,	15297½	4065½	
Average rate,	1.91	1.90	Inc. .01
Amount,	29178.39	7710.48	
UNDERGROUND.			
Total number days,	64694¼	10650½	
Average rate,	2.16	2.19	Dec. .03
Amount,	139704.24	23283.51	
Total days,	79991¾	14716	
Average rate,	2.11	2.11	
Total amount,	168882.63	30993.99	

STATEMENT OF TIMBER USED FOR YEAR ENDING NOVEMBER 30,04.

KIND	Lin. feet.	Avg.price per ft.	Amount.
6" to 8" timber,	29910	.02	598.20
8" to 10" "	29192	.0335	978.65
10" to 12"	28112	.0516	1452.27
12" to 14"	22220	.0698	1549.89
Total,	109434	.0419	4579.01
7' lagging,	510097	.594	3030.97
8' lagging,	32200	.600	193.20
Poles,	93525	.01	935.25
Total,	635822	.654	4159.42

NEGAUNEE MINE.

TIMBER STATEMENT, Continued.

	1904.
Feet of timber per ton of ore,	.769
Feet of lagging per ton of ore,	3.812
Feet of lagging per foot of timber,	4.96
Cost per ton for timber, lagging and poles,	.061
Equivalent of stull timber to board measure,	272831
Feet board measure per ton of ore,	1.918
Total product,	142264

FATAL ACCIDENTS.

There have been two fatal accidents during the year, neither of them, however, even remotely attributable to the negligence of the Company's officials.

On July 11th., Rock Vitali was killed by falling from a ladder in /6 raise, 4th Level. No one was present, and he was found lying at the bottom of the raise with his skull fractured.

On October 24th., Charles Vanska, was dumping a car at No.2 shaft 4th level, and when partially raised, it fell, striking his back and breaking it. He lived for a short time after the accident.

LUCY MINE.

This mine was closed December 1st, 1903, and is now full of water. Owing to its proximity to Negaunee it has been necessary to keep a watchman to protect the plant and equipment.

Should there be a demand for this class of ore it could be unwatered in sixty days, and mining started immediately.

MAAS MINE.

During the year the shaft was sunk 334 feet, making the total depth November 30th., 544 feet.

The following table shows the progress made per month:

Date.	Sunk during month.	Total depth.	Remarks.
1903 Nov.30,		210'0"	
Dec.	14'6"	224'6"	Began for pump house at 220'below datum.
Jan.04,	0'0"	224'6"	Cutting pump house and sump.Pump house 45 x 35 x 10 Sump 12 x 25 x 12½' deep.
Feb.	31'0"	255'6"	Two drift sets in drift to pump house.
March	9'9"	265'3"	Seven sets of timber on top of shaft, raising pipes above new collar of shaft.Started to work on foundation for pump.
April	28'0"	293'3"	Erecting new ledge pump.
May	42'6"	335'9"	
June	44'0"	379'9"	Four feet sunk Company account, 40 feet sunk by contract at $25.00 per foot. Made $2.68 per day.
July	41'0"	420'9"	Contract at $25.00 per foot paid $2.35 per day.
August	39'3"	460'0"	Contract at $25.00 per foot, paid $2.35 per day.
September	23'6"	483'6"	484 feet below datum cut 2nd pump house size 9' x 20 x 9', sump 8 x 8 x 6' deep. Company account to end of November at $2.35 per day.
October	30'0"	513'6"	Put six sets on top of shaft.
November	30'6"	544'0"	
Total year	334'		

Rate of sinking per month 27'10".

From November 30th, 1903 to June 6th, 1904, the shaft men worked Company account, the rate per day being $2.50. On June 6th they were given a contract at $25.00 per foot, which included the cost of supplies and repairs to machines.

In June by sinking 40 feet the men made $2.68. The cost of supplies was much heavier the next month for the men did not make wages with the total sinking of 393 feet. The contract was continued during August with the same result as the previous month. Beginning with the first of September, up to November 30th., the men have been working Company account at $2.35 per day.

Up to October the rock in the shaft was a slate, which was dipping to the South at a steep angle of about 75 or 80°. After October the material contained a large quantity of quartz, and was much more difficult to drill. Owing to the fact that the rock is standing at such a steep angle, it is difficult to put the holes across the formation. The consequence is that unless a great many holes are drilled for each cut, the ground will not break when blasted. At the present time the ground is as hard as it has ever been, and the dip of the rock is practically the same. During the early part of December 1904 some little trouble was experienced with frozen air pipes, but this has been remedied. The compressor was too small to run the sinking pumps and drills. For this reason the old compressor at the Lake Mine was installed, and is now doing satisfactory work. A small cheap addition was built on the engine house to make room for this machine.

The only surface work done during the year, was filling in the sand which came from the shaft into the cave caused by the sinking.

The rate of sinking has been less than anticipated, but the formation, standing as it does, on edge, has been very unfavorable.

I am unable to prepare an estimate of the cost of opening this mine, as we have no information of the character of the ground through which the drifting will be done. The first cross cut will be at 695 feet, corresponding with the 6½ level elevation, Negaunee Mine. The system of mining on the first level will depend on the occurence of the ore. The formation at this depth is faulted, as in the Negaunee Mine, and the extent of the ore bodies is not known. A second level 200 feet below will reach the main ore body, which will be mined by the caving system.

I have already sent you an estimate of the cost of equipment based both on the use of coal and electric power to be furnished from the Carp River.

IMPERIAL AND WEBSTER MINES.

No work has been done at these mines during the past year. 726 tons of ore were shipped from the Imperial stockpile to Pioneer Furnace No.2.

ASHLAND MINE.

Mr. H. F. Ellard, Superintendent, has prepared the following report of the operation and present condition of this Mine:

The month of November has been quite successful in point of product and costs, though owing to the short working month (24) days, the showing in this respect is not quite so favorable as last month. We lost two days,"election and Thanksgiving", which effected our returns proportionately. Our analyses have not been as good as ordinarily, and considerable high phosphorus ore has been mined, but it will be easily taken care of as it has been held in cars or dumped in stock in such a way as to be readily "sweetened", and our average for the month and for the season has been O. K.

We have been endeavoring during the past three weeks to increase our force of miners, but find this a matter of considerable difficulty. So far less than half the desired number of men have been secured and several of those unsatisfactory. The miners who have gone from this range during the past year are evidently employed profitably at other points, and we find that those on the rolls of other mines here do not care to change even for the increased wage. Some have come and after working a few days have given up owing to the greater amount of rock to be handled here. So far practically no benefit has resulted from our increase.

On the suggestion of Captain Rough we made a test of our safety clutches on our cage at No.9 shaft and found them to work perfectly. Substituting a section of manila rope for the cable, we hoisted it up twenty feet above the 13th level and cut the rope with an axe. The clutches acted immediately, and prevented the fall of the cage. It settling by a few inches until the clutches became inbedded in the wooden runners. This is the second time we have made this test and the results were the same in both cases.

Underground conditions continue fairly favorable.

NO. 3 SHAFT.

2ND LEVEL.

Contract No.30 is still drifting West on the second sub above the level and immediately underneath the old level in very hard steel ore of high grade, but very

The next sub below this will be much easier and probably larger.

On the 3rd level Contract No.28 has straightened and retimbered the drift West where necessary, and have pushed ahead along the footwall toward No.1 shaft, which it was expected would be reached by this date. A long hole has been kept ahead of the drift during the last few feet, making the work slightly slower. This drift is still in good ore, but very hard and slightly high in phosphorus at some points. It opens up quite a prospect at this end of the Mine.

In the new deposit at the North above this level we have drifted East almost 100 feet on the first sub, and East and West for 80 feet on the sub above, all in high grade ore but very narrow and hard. We are now cross cutting South at Contract No.38 in search of the slatey ore developed on the level below, and have encountered some caved ground. This is a surprise as no mining has previosuly been done in this territory, and it seems that we may have cross cut immediately above the edge of the dyke at this point and the measures are breaking off to the South from the effects of work done along the footwall on this dyke at greater depths.

We have also tried to raise at two points but struck rock and the rock is crowding very close now at both ends of the drift. We may yet find an outlet upward or an enlargement toward the West, but the deposit is probably small. It is of great importance, however, as, being entirely new and being high grade, it helps maintain our grade. The sub below will be quite productive, as the floor of this upper sub is all in ore.

FOURTH LEVEL.

We are back-stoping the ore above the large room West of the shaft and above this level, and also filling the room with rock as the work proceeds. This is a very satisfactory way to recover the ore and also dispose of our rock, and we are able to make very cheap ore at this point.

On the 7th level we have repaired the drift West to and through the large open stope, and have bulkheaded a couple of rooms in preparation for further development work in this territory. The ore is rather high in phosphorus, but we are anxious to take a portion of it to enable us to explore the dyke to the North and also develop the deposit of which the stope has taken a part. There is apparently a large deposit here and some, or a great deal, of Bessemer ore will probably be obtained from it. To the East we are still drifting through old workings, reopening the main level through No.3 and No.4 shaft territory, but the work is slow and tedious.

ASHLAND MINE.

NO.4 SHAFT.

The subs above the 4th level West are doing very well, and large quantities of good ore are obtained, but, of course, the whole is a scram and conditions in the different contracts change very often and very materially. The footwall strip has been completed above this level, and below it is not so large or so clean. There is nothing new to report from this shaft, except that on the 5½ level we have gotten well toward the East on the North of the horse of rock. This place looks very well, and the prospects are good for recovering a nice block of caved ore. The miners on the 7th level No.9 shaft, are now immediately underneath this contract, and caving operations at that point must be suspended for a time until the ground above is thoroughly gone over.

NO.9 SHAFT.

SECOND LEVEL AND SUBS ABOVE.

On the second sub above old 1st level, No.7 shaft, Contract No.27 has drifted West under old No.6 rock pile and have a pretty good scram for some distance. There is much sand, boulders and timbers, but such ore as is recovered is good, and the powder cost is low.

On the sub below, No.3 we have had a very good scram and there is still considerable ore on this sub. They have been in an old square set room for some time and are looking for a pillar. Another good scram in this territory is No.14 where a raise was put up from our "homestead" or footwall ore on the second level. This has reached a height of 60 feet above old 1st level, No.7 shaft. The ground is all caved and mixed, but some good ore is recovered. No.16 is in the same deposit, having worked out the small sub above. There are spots of high phosphorus here, which must be taken now or completely lost.

Contract No.7 has drifted West along the footwall in the new or "homestead" ore for 250 feet on the 2nd sub above the second level. The ore is excellent but not over eight feet in width on the average. We are drifting along the foot on the main level opening this for our main gangway, but at the East end No.38 the phosphorus is high and gives us considerable trouble, as the opening is urgent, — we try to take as much of this ore as possible.

In the main deposit East, Contracts No.8 and No.9 are on the first sub above the 2nd level and have a large quantity of ore yet to remove. Some of this is also high in phosphorus.

ASHLAND MINE.

Contracts No.2 and No.10 are caving close to the Eastern boundary in old workings getting fair returns.

In the North East deposit Contract No.18 has had a good month in a small but high grade lense to the West of our main mill, and at a point where several previous attempts has failed to locate a paying find. The ore is very narrow and tight, but is all high grade.

On the 3rd sub above the 2nd level two parties are rapidly working out the ore at the West end. They are taking it in blocks, using very little timber as the deposit is very narrow and the walls hard.

One contract, No.13, is still on the 3rd sub and will finish this within a few days. Above, all is finished and this entire deposit to the 2nd level will probably be exhausted by spring or earlier unless something new is developed. The ore is all high grade, and being in place, is rapidly cut up and removed. The deposit to the North West on this level being all in caved ground and not so large or so good, will require much longer to remove. Contract No.7 in this deposit is on the 2nd sub and caving immediately North of the main cross cut. The sub will soon be finished.

Contract No.14 is splitting the block between the 2nd and 3rd subs going West and has nice, clean ore. No.6, farther West and drifting East on sub below, is also in good ore, but considerably mixed. At the West end of this deposit Contract No.1 is under the rock dump from No.9 shaft, and is now rapidly caving out the ore, the small deposit worked from the open pit having been completed. Contracts No.2 and No.3 are in the 1st and 2nd subs, South, and caving in fairly good ground, but at times very badly mixed with rock.

Throughout this entire level we have relaid the tracks with 20 lb. rails, surfacing with cinders. The horses and heavy cars had badly cut up the lighter track, and delays and mishaps were frequent. We find the system of tramming by horse power very satisfactory and economical, and for our purposes probably as efficient as any. The horses are perfectly healthy and in good condition and handle loads of from 10 to 12 tons apiece in regular work.

FIFTH LEVEL.

Below the 2nd., we are reopening and repairing drifts and rearranging for direct transferring of the ore from the several subs to the 5th level. This will all be completed and ready for active mining by spring, or as soon as the North East deposit is worked out.

ASHLAND MINE.

From the main drift North East, Contract No.39 has cross cut South for 70 feet in mixed rock and ore, some very hard and coarse material now showing in the breast. This is to thoroughly explore this old region and for the time being the drift on the footwall East and the main drift North East are not being pushed. The level has been connected to one of the subs from the 6½ level East and No.32 is stoping up the bottom of this old drift in dyke. This will simplify the tramming from this North territory and increase the 5th level hoist.

Contract No.16 is still drifting West North of the dyke as the broken ground South was found impossible to work on account of large, loose broken rocks and boulders. They are now in 150 feet from the main gangway, and we will connect through the dyke to the South at some convenient point, and endeavor to work over this caved ground.

Contract No.17 is caving a small amount of hard ore on the dyke farther West, and has about finished. The ground is hard and the opening is filled with rock.

Contract No.21 is caving one sub above and on the dyke through which No.32 is working.

The footwall strip above this level continues to look very good, and we are starting the 4th sub, 75 feet above the level. The ore in all is hard and narrow. On the 3rd sub we are still drifting East, and on the level Contract No.10 is drifting West. The ground here is caved and much timber, rock etc., are coming in. The whole makes a nice, but small deposit of rich ore, which, of course, cannot be mined out before the 2nd level has been completed.

SEVENTH LEVEL.

Contracts No.19 and 29 are caving East and West of the main cross cut North from the shaft. Some of the ore here is very lean and requires careful picking. No.23 is to the West caving along the main dyke from which so much ore has been taken during the past year. There is still a large amount of ore on this level, but it is very hard to maintain, as the deposit has been so worked over, and the ground above being wide, and all cut up, it is very expensive and difficult keeping the drifts etc., open. There is considerable ore in the West part of this level which will have to be left for a time, or until the parties working from No.4 shaft on 5½ level have finished.

THIRTEENTH LEVEL.

We have taken all the ore to the East in the stope above this level and have timbered up the mills for ore and rock through this stope to the raise to the 11th level. We are still mining in the West end of the stope, and will fill both with rock from the

llth level development work now to commence.

The ore in this stope has been very good, and it has helped materially in keeping up our product the past three months. We hope to develop an equally good or better find on the llth level East.

THE WINZE.

The work has not made the progress we expected, and the total depth to date is 84 feet, 39 feet having been sunk during November. The rock is extremely hard and broken up, some seams of steel ore among the quartz and jasper, making very difficult sinking. There is considerable water which delays the work somewhat. We have had difficulty in keeping men in the place, and have tried to put our best miners on the work, but we are not at all satisfied with the way it has progressed. Each change, though imperative, has tended to delay and on the whole poor progress has been made.

Underground conditions generally continue very promising, and the only factor which may prevent our complete success during the ensuing year, is the condition of the labor market. Skilled miners are extremely hard to find, and it is evident that a decided shortage will continue to exist in this line throughout the year. Several mines here are now endeavoring to add largely to their forces and are meeting with very little success. It is reported that the Colby and Yale mines at Bessemer, and the Brotherton and Sunday Lake mines at Wakefield have restored their schedules of wages as in force during the early part of 1903 and it is expected that all of the properties will be compelled to do likewise.

SURFACE.

The month has witnessed the completion of our stockpile shipments, and the resumption of stocking at both shafts, where ample grounds and trestles have been prepared and placed in excellent condition for winter. All work in this connection and all such work as can be better attended to during open weather has been completed and our surface force reduced to winter proportions.

We have made arrangements for such timber as will be required during the coming year at the same prices as prevailed last year, and this is already being received.

Our new heating system has been given a fairly severe test during the past few days, and I regret to report that it has not proved equal to the requirements. Our dry is so old and dilapidated that an expensive supply of steam is the only way to make it habitable during zero weather, and, as we have several miners whose clothing is thoroughly saturated at the close of the shift, it is necessary to maintain a high

temperature in the building to properly dry these for the following shift. It has therefore been necessary to substitute live for exhaust steam in the coils, but with milder weather we will return to the use of the exhaust.

The year just closed has been unsatisfactory in that we have been restricted in our product owing to market conditions; otherwise it has been our most successful year. Our product has all been shipped as Ashland ore and was, on the whole, quite uniform in grade.

Our shipments have been heavier than during any previous year, and this in spite of the fact that we commenced two and a half months later than usual owing to the Lake Captain's strike.

The dispatch by lake and rail has been much better than during previous years. This, and the fact that we were not compelled to switch our shovel to maintain grades so much as formerly, enabled us to reduce our stockpile loading expenses almost one half.

Working during the year on one shift only and being closed entirely during April and May, necessarily increased our costs considerably above the normal, but I am pleased to report that our final figures will show a lower cost per ton than for any previous year. Several factors have contributed to this result, and it is difficult to estimate the comparative value of these, but undoubtedly the most important has been the wage schedule. All other mines on this range have been operated upon a schedule approximately ten per cent lower than ours, and this fact has enabled us to obtain very exceptional returns from our forces in every department. We have impressed it very frankly upon them that nothing but the very best efforts of which they were capable would be satisfactory under the circumstances, and they have responded heartily as the results prove.

Then we have had the advantage of better physicial conditions underground, and practically perfect mechanical arrangements both underground and on surface, including main drifts, raises, mills, pockets and haulage devices, permitting the handling of the product with the minmum of manual effort. In this respect, I believe our property will compare very favorably with the best in the field, and this condition, of course, has not been brought about without a heavy expenditure in time and money.

We have expended a considerable sum during the year in improving and repairing our buildings and plant, and all except our Dry House and Office are now in very good condition.

These improvements include a complete new exhaust steam heating system; new brick and stone wall, cement floor and new roof on our boiler house; new roof, plaster, paint and general repairs on our engine house; new roof on our blacksmith shop; new floors in machine and carpenter shops, tankhouse and barn; new haulage engines for ore at No.3 shaft and for rock at No.9 shaft, with small buildings for both; also complete new steam and exhaust piping in our engine and boiler house; at a total cost of $7,750.04. Charges of this nature are particularly noticeable on our costs this year on account of our reduced product.

Our zone of operations has been considerably extended, especially at the West end of the mine, with the result that it has become necessary to close the street leading South West from the Office, and a new location has been selected and the roadbed prepared by the city. The tracks of the Wisconsin Central and the C & N W railways are also found to overlie deposits of ore and both have been notified to remove. Notice to the same effect has been served upon the School Board with reference to the Ashland School.

We have received very heavy supplies of timber and coal during the year, much of which remains in stock.

Our development work during the year consisted of sinking 84 feet, and drifting and raising 5900½ feet, and our Estimate of ore in Sight shows that 283,233 tons have been developed during the year.

As to prospects for the ensuing year, of course everything depends upon conditions, which, with us, are subject to continual changes. We have no large and uniform ore bodies which can be accurately considered for a period in advance of actual mining, and the only estimate possible is based on our past experience. With conditions as at present, our costs will probably not be reduced below our figures for the past month, but we hope, and I may say, confidently expect to close the year 1905 with a Cost of Production below 85 cents per ton. If an ore body of considerable size should be developed during the year, this figure might be reduced to 75 cents, but this is more to be hoped for than expected, and in all probability we will not see the annual cost fall below 80 cents for several seasons.

A summary of our product for the year is as follows: Hoist, 253,878 tons; Overrun 12,355 tons; Total 266,233 tons. Of this, 640 tons was Taylor and 794 tons Globe.

Our shipments all Ashland, were 341,072 tons, including 8,553 tons Taylor and 794 tons Globe transferred to Ashland grade.

ASHLAND MINE.

We have in stock:-Ashland ore 13,793 tons; Taylor ore, 58,739 tons; Total 72,532 tons.

The mine has worked 254 days, and our average hoist per day was 1,048 tons. Our total rock hoist for the year was 19,549 tons, but large additional quantities of rock were broken and dumped into old rooms and various openings underground.

Our relations with our neighbors and with the city and county continue harmonious, but owing to the city's financial condition our taxes continue high. This year they will be $18,880.52 a slight reduction from the figure of 1903. The following statement gives a detail of our tax matters for the years 1901, 1902, 1903 and 1904. The fluctuations have been caused chiefly by increased shipments, reduction in the valuation of the Newport Mine, and variations in the amount of State, County and total city taxes.

TAXES ASHLAND MINE.

	1901	1902	1903	1904
Valuation,	650,064.00	652,014.00	724,701.00	697,509.00
" City of Ironwood,	5,393,310.00	5,395,435.00	5347,027.00	5190,209.00
Proportion, Ashland Mine,	12.05%	12.08%	13.55%	13.43%
" Other mines,	65.19%	65.52%	64.15%	63.57%
" City property,	22.76%	22.4 %	22.3 %	23. %
TAXES.				
State,	2,171.22	1,445.52	2,413.26	1,757.72
County,	2,931.80	2,746.29	3,732.22	3,487.55
School and one mill,	5,863.58	5,720.15	6,674.31	7,393.60
Agricultural society,	32.51	30.65	72.48	69.76
General city,	3,822.37	3,898.41	4,572.87	4,045.86
Certificate Sinking fund,	2,054.21	1,944.97	2,050.91	1,869.34
Indigent Soldier,		61.30		69.76
Collection fees,	168.75	158.47	195.16	186.93
Total--Ashland Mine,	17,044.44	16,005.76	19,711.21	18,880.52
Total--City of Ironwood,	138,890.75	131,169.73	145,220.84	140,719.36
Rate per cent,	2.60	2.44	2.72	2.68

ASHLAND MINE.

Mr. Lucien Eaton, who has been resident Engineer at the Ashland Mine for the past two years, was transferred to Ishpeming on December 1st. Before leaving Ironwood he prepared for me the report which follows, and which gives in detail the work for the year:

The following is a report on the condition of the Ashland Mine at the end of November, 1904, and a statement of the progress made during the past year:

NO. 1 SHAFT.

No.1 shaft was drained from the 3rd level in No.3 shaft, and the shaft cleaned out to the 3rd level and cribbed down from surface to the ledge.

The second level at 140 feet is the highest level. It extends 175 feet West of the shaft, three sets wide and three high, nearly all the way. A small pillar is left by the shaft, and another stope 100 feet long extends East. The floor of this is mined from the level below for 60 feet back from the breast.

The 3rd level at 160 feet extends West 82 feet, and climbs up 7 feet on the dyke. It is here about 10 feet wide and 12 feet high. East of the shaft pillar the stope was opened out 130 feet from the shaft; three sets wide and up to the 2nd level. The breast is mixed. There is 22 feet of ore between the floor of the 3rd level in No.1 shaft and the floor of the 3rd in No.3. This ore is mostly high in iron, but some of it is high in phosphorus. It should be cheaply mined.

NO. 3 SHAFT.

FIRST LEVEL: Cross cutting was tried directly in front of the shaft, but only caved rock encountered, and the work was stopped.

SECOND LEVEL: No.24 raised in a small pillar just West of the cross cut from the shaft and opened out a narrow sublevel at an elevation of 111 feet for 40 feet West. They caved this back, and opened another sub at 126 feet, for 165 feet West, following a narrow strip of ore directly on the foot. 105 feet from the chute they raised again, and opened another sub just under the old 1st level. The foot is faulted 20 feet South on the West side at this point, adding to the width of the ore body, and enough ore has been shown up here to last this gang probably another year. This contract has been numbered 30 for about three months. They are now caving back on the top sub, 200 feet from the shaft. No.36 raised 15 feet in dyke from a sublevel above the 3rd level, and drifted 70 feet East to come under the West raise of No.30. When this raise holes No.30 will send their ore down to the 4th level, and save waiting at the shaft.

THIRD LEVEL: No.28 is driving West in ore, 510 feet along the foot West of the shaft. They are within 10 feet of No.1 shaft, and 18 feet below the bottom level of No.1. The dyke has been struck in the right side of the breast, but the ore is still wide enough for a drift. This drift was started from a raise put up on the foot from the 4th level by No.32. From this raise the level was driven both ways, East 75 feet in ore

and then through the dyke, holing with a gang driving West from cross cut from No.3 shaft, and West nearly 100 feet in ore, 100 feet more in mixed stuff, and then 130 feet in ore again. As soon as this drift holes to No.1 shaft, the shaft will be fixed up for a transfer, and the floors and pillars in No.1 shaft mined. The same raise mentioned above was put up 40 feet above the level in clean ore, till the dyke was met, and then a sub opened 40 feet long on the West side. This is all good ore. East of the shaft No.24 caved back within 80 feet of the shaft, working mostly in old ground. This place is stopped. In the North vein the drift West of the cross cut was continued 60 feet further and holed with a rock raise from the 4th level. A cross cut was driven 60 feet to the dyke and a drift 30 feet long driven West along the dyke. A raise was then put up 30 feet, and a sublevel 120 feet long opened out East in a narrow vein of ore in the fault zone. Another raise was carried up 32 feet, 110 feet East of the chute, but the ground was rocky, and work at this place was topped. East of the cross cut No.33 drove 120 feet in rock and ore, and holed toa sublevel from No.4 shaft. The sublevel above this had been opened out last year. Two raises were put up, one for rock and ore, and one for men and timbers. A sublevel 110 feet long was opened at 155 feet elevation, another at 135 feet, 120 feet long, one 40 feet long at 125 feet, and one 90 feet long at 110 feet. On this top sub No.24 is driving West in ore and No.38 cross cutting South. No.31 caved back the 125 and 135 foot subs, within 10 feet of the raise, and are now getting ready to mine the East end of the 155 sublevel. All this ore is in the fault zone. The boundary on the East side has been old caved ground, and on the West hard rock. There is still 50 feet of ground under the sand, and it is hoped the ore will continue all the way up.

FOURTH LEVEL: On the old 4th level East of the shaft, the old drift to No.4 shaft has been repaired for 130 feet, and a new drift driven in steel ore between two dykes, holing to cross cut from No.4 shaft at the foot of the raise to the 220 foot sublevel. West of the shaft old 4th level stope was holed from the sub started last year, and a raise put up from it to the 3rd level. This is used as a rock transfer in filling the stope. This stope extends 170 feet West of the shaft and is 15-40 feet wide and 20-40 feet high. The ore is about 12 feet wide in the back. The stope is two thirds full of rock now.

Further West, 190 feet from the shaft No.32 put up a raise in ore on the foot, and opened out the 3rd level as described above. They also drove West 30 feet in ore at 200 feel elevation. This raise was later connected with the 4th level, and is now used as the main transfer. The ore was followed on the 1st sublevel 90 feet West of the chute, Ashland.

but rock here cut it off. No.39 is backstoping here now, standing on the rock broken with the ore. They have broken down a slice 180 feet long and about 20 feet high.

The only other work done on this level is a raise in rock to the 3rd level. This was put up from the back of the raise started last year.

FIFTH LEVEL.

The only work done on the 5th level was repairing the drift between No.3 and No.4 shafts. This is now badly crushed and will need repairing shortly.

SEVENTH LEVEL.

West of the shaft No.5 is repairing in a big stope mined before the Cleveland-Cliffs Iron Co., took the mine. This stope extends 315 feet West of the shaft, climbing the dyke at the West end until the back is 60 feet above the level. It is 15 to 20 feet wide and 20 to 25 feet high. Ore shows in the stope 50 feet above the level on the foot, indicating the extension of the ore body considerably above the back of the stope. A large number of bulkheads have been put in this stope under the old timber, and it is now in good condition. The back is very strong.

EIGHTH LEVEL.

The work done on the 8th level consists of a single raise for a rock transfer, now used in filling the old open stope. This stope extends from 40 feet under the 7th level West of No.3 shaft to the 10th level between No.4 and No.5 shafts. It is 20 to 40 feet wide. A small pillar 20 feet wide was left in front of the shaft, but all the rest of the ore was mined on square sets. These have in most part rotted out and fallen, leaving the room open. Twenty feet above the 8th level in a drift through the pillar a raise was put up to the 7th level, showing ore all the way to the dyke under the 7th level. On passing through the dyke the raise holed to the bottom of old No.3 shaft. All the rock from the 5th and $5\frac{1}{2}$ levels in No.4 shaft and the 7th In No's 3 and 4 is dumped down this raise and used to fill the 8th level West of the shaft. At the present rate of filling it will be eight or nine months before the back is in reach. As the ore shows 20 feet wide over the stope, and the raise proves it to extend up to the 7th level dyke, a good product is expected from this territory. The ore is high in iron and phosphorus.

NO.4 SHAFT.

Third Level.

No.4 finished caving the ore round the chute to the 4th level, leaving only a small pillar to hold the raise.

ASHLAND MINE.

Further West No.18 and No.8 caved back the ore they opened out last year, and moved down to the 220 foot sublevel, the top sub above the 4th level. The ore mined here was from a few pillars left by the old Company and from the old caved stopes.

FOURTH LEVEL.

West of the shaft No.20 and No.8 are opening out the West end of the 220 foot sub in a pillar left on the dyke. This ore is in the South vein. It has been followed for 160 feet this year and shows up 40 feet wide in the pillar; most of the drifting was in caved ground. Besides this work on the sub No.20 has cross cut 70 feet and drfited 20 feet nearly all in ore.

On the 235 foot sub North of the shaft in the fault zone, No.2 drifted East 90 feet in ore, and have caved back within 25 feet of the raise. This ore is very narrow.

On the footwall vein two subs have been opened behind the shaft at 240 and 250 feet, 130 and 170 feet long respectively. No.15 is driving West on the first sub up. These subs were started from a cross cut 20 feet in ore 15 feet East of the shaft.

Further East No.11 is caving back 340 feet East of the shaft on the sill floor. All inside has been caved back as far down as the floor of the level, and between No.11 and the shaft as far down as the first sub.

FIFTH LEVEL.

In the footwall vein a sub has been opened out 16 feet below the 4th level for a distance of 315 feet. Rock cut out the ore at the East end. No.10 is starting to cave back and No.19 is driving West.

On the sill floor No.1 drifted 55 feet in one place and 60 feet in another, along the dyke, and cross cut 30 feet in ore from No.7's drift to the fault zone. Here they raised 16 feet, and drifted 100 feet West and 30 feet from the chute East, caving back on the East side. They are now driving West just over the crossing on the sill floor.

No.7 started 100 feet East of the shaft and cross cut 60 feet South, drifted 100 feet East, and cross cut 90 feet North again, going through 40 feet of broken dyke. The ore on the North side was lean, and they have started to cave back 60 feet from the breast.

5½ LEVEL.

In the North cross cut No.16 went ahead 100 feet and cut through the second fault zone. Some lean ore and a good deal of water were found, but no dykes. This

Ashland.

place has been stopped. 140 feet East of the shaft along the drift No.9 drifted East 70 feet in ore to hole to the main haulage way from the East. This was necessary on account of sinking of the drift.

No.11 finished the first sub 250 feet East of the shaft, and caved back a pillar of ore 50 feet long and 20 feet wide on the sill floor. They are now on the 4th level. No.14 drove North East 200 feet through the caved ground on the hard dyke, and found considerable caved ore. They are now starting to cave back at the breast.

No.21 finished the sub next East, and drifted East 150 feet along the fault, coming under the sub from the 5½ in No.6 shaft. They are getting ready to cave back at the breast. No.4 caved back a pillar left on the dyke just inside old No.21 chute. They are now opening a sub 25 feet above the sill floor 100 feet farther East. This work was all in ore.

SEVENTH LEVEL.

No.17 has reopened the drift East of the shaft, breaking down the back so that the grade goes to No.3 shaft. This has been 130 feet in rock and 40 feet in ore. They are now at the North cross cut.

TENTH LEVEL.

The drift under the old stope extending up to the 8th level was repaired between No's 4 and 5 shafts, but it is now caved again, and impassable.

NO.9 SHAFT.

SECOND LEVEL.

In the North vein No.1 mined a body of low grade ore by the bottom of the pit in front of No.9 rock pile, 80 feet by 20 feet wide, and drifted 40 feet in ore, all at an elevation of 75 feet. They also drove 100 feet in ore along the dyke just underneath at -95 feet.

The 88 foot sub was also opened during the year, from the same chute, showing 50 feet of drifting in ore and 100 feet of rock. All above this sub is mined.

The 121 foot sub has been mined 70 feet West and 30 feet East of the chute. The 138 foot sub has been driven 100 feet West in ore and the East end mined for 130 feet. The 153 foot sub hold to the 160' from the East end in No.7 shaft and has been caved back as far as the drift on the dyke. No.3 chute has been recribbed and No.3 is repairing on the 153 foot sub. No.1 is repairing farther West on the 138 foot sub by No.2 chute.

ASHLAND MINE.

Farther East No.14 has opened out a small sub just above the main level in No.5 chute the next one outside. Previously they worked with No.7 in No.8 chute next East caving back the 147 and 171 foot subs. The 147 foot sub is all finished. The 171 foot sub was extended West 90 feet along the dyke, and West 70 feet at 165' elevation in No.5 chute. It is now caved back on the West side within 30 feet of the chute. No.7 is taking the pillar South of the chute.

In the fault zone a cross cut was put in, 70 feet South at the West end of the level, and a small sub opened, but very little ore developed. Further East No.2 crosscut South 40 feet in rock, and struck 10 feet of ore. They then raised 20 feet and opened a sub along the fault 150 feet West and 100 feet East. The East side is all mined, and No.5 has mined back 30 feet on the West. On the sill floor No.2 drove 80 feet East from the raise, and caved back 45 feet.

FIFTH LEVEL.

On the footwall West of No.6 shaft on the first sub below the 4th level, No.10 drove 60 feet ahead to caved ground and caved back to the shaft. They then opened out the sublevel for 100 feet West of the chute and caved back. They are now driving West on the sill floor in caved rock to get the floor under the sub just above. Just North No.4 caved back the pillar within 40 feet of the shaft.

East of No.6 shaft the first and second subs have been extended in ore 220 and 180 feet along the foot. A raise was also put up on the foot from the sill floor 80 feet East of the shaft. In this raise No.4 has opened a sub 65 feet long at 260 feet, and are driving East, and No.3 is raising 20 feet above the sub.

Further East behind No.7 shaft No.5 drove along the foot 100 feet in ore and 120 feet in rock. This place is not working.

In the North vein No.16 is driving West in rock. They have driven West 80 feet in rock and 70 feet in ore. They also cross cut 60 feet and drifted East 80 feet in rock. This drift was extended 140 feet further in ore and rock, and holed to the old 6½ sub at 312 feet. This has been repaired for 110 feet further. Two cross cuts were put in South, the first showing 30 feet of ore and the second 60 feet of caved ore and rock. There is ore now in the breast. No.29 is working here. This is probably an extension of the 2nd level ore in No.7 shaft, but the East end seems to have been caved from below. Immediately below the 330' sublevel shows 40 feet of clean ore which is all caved.

5½ LEVEL.

In the old 5½ level the cross cut and drift in the fault were repaired, and

two cross cuts put into the dyke 40 and 65 feet long. In the West one a riase was put up 27 feet, and a drift driven 240 feet West along the dyke. For 50 feet this was in rock and the remainder in ore. No.28 is now caving back here taking the floor of the 5th level North West, and are 90 feet from the breast. The floor of this sub will be taken by No.21 in No.4 shaft 5½ level.

6½ LEVEL.

No.28 caved out a small bunch of ore in front of No.6 shaft and about 100 feet of drift West of the transfer. No one has worked here for ten months.

SEVENTH LEVEL.

No.24 has drifted 25 feet East of No.6 shaft, and 25 feet South to the foot in ore and is now driving East again in old workings.

North of No.6 shaft No.19 holed through from the main cross cut to their old chute in ore, and cross cut 30 feet South. They have finished the sub above the level and have caved back on the sill floor about 40 by 60 feet in area, and are now working 40 feet from the cross cut. West of the cross cut No.29 is caving back the old rooms and pillars 40 feet in. They also cross cut North 50 feet and holed to the top of a square set raise from the 8th level sub. This raise shows a floor of ore 20 feet thick under the 7th level at this point.

The 420 and 433 foot subs in the North vein are all finished, except at the last chute, where No.23 is caving on the 433 foot sublevel.

No.25 is repairing by the end of the long cross cut West of No.6 shaft, and No. 21 is caving the old rooms by the chute next East. No.17 is driving North East along the hard dyke in the old workings.

In the South vein No.22 and No.27 drifted and cross cut through caved ground at 431 feet for about 600 feet, all in ore. No.22 raised and opened a small sub just under the 6½ level by No.5 shaft. They are just opening this out. No.27 is not working. Three raises were put up in this territory this year, aggregating 55 feet.

EIGHTH LEVEL.

Nineteen feet below the 7th level in No.6 shaft a small sub was driven 50 feet East to hole to the top of the rooms opened from the 8th level sub in No.6 shaft. Repairing has been done on the sill floor between No.6 and No.7 shafts.

ASHLAND MINE.

TENTH LEVEL.

A dam was put in just West of No.6 shaft to hold the water from No.1 shaft when the stopes were holed. It was not used.

THIRTEENTH LEVEL.

No.30 drove 150 feet West on the foot and 230 feet North in jasper. The fault zone was cut at 190 feet from the foot and followed 35 feet East tracing a stringer of dyke. This place is not working now.

NO.7 SHAFT.

FIRST LEVEL.

During the summer a small body of ore was stripped and mined at -30 feet, extending from No.7 shaft 100 feet West. This lay on the foot and was left behind when the upper subs in the pillar were mined. Twenty feet lower a small sub was opened out, going East 65 feet from the raise to surface. It is very narrow. Twenty eight feet lower yet No.9 is opening another sub. They are in 30 feet East from the chute, and have cross cut 10 feet North.

On the 93 foot sublevel No.27 drove West 150 feet along the dyke, mostly in caved ground. They are now caving back 80 feet from the breast.

On the 110 foot sub No.14 drove North East 90 feet to the dyke and raised, opening out a sub at -88, driving West 40 feet and East 110 feet, and cross cut 60 feet. This has been caved back within 10 feet of the chute. No.3 is cross cutting North 50 feet East of the shaft at -110 feet, and are just raising on the dyke. Thye have gone 60 feet. Everything is caved beyond 20 feet West of the cross cut from the shaft.

Further East No.16 raised on the foot from the second level and cross cut to the foot 20 feet at -103 feet, driving West 20 feet and East 100 feet. Ten feet North of the chute they drifted 60 feet East and cross cut South almost to the footwall deposit. A raise was put up at the corner North of the chute, holing to the 88 foot sub opened by No.14. No.16 is driving West now 40 feet from the chute and No.14 driving East 45 feet from the chute. A small sub was opened and mined 10 feet above this. North of the shaft and 20 feet West three subs were opened 55 feet long, in a narrow piece of ore between two dykes at -123, -109 and -94. No.39 is caving the top sub 10 feet East from the chute. This ore goes to the second level, in one chute put up by No.39.

ASHLAND MINE.

SECOND LEVEL.

North East. In the North vein the ore was followed up close to the sand, and a sub opened at -65 feet. The sand here is 15 feet thick and the surface elevation -17. A vertical raise was holed under a pit sunk from surface. Timber was sent down here till late in the summer. For convenience this was called No.10 shaft.

The top sub was opened for 100 feet West from No.10 shaft. It is all finished. The next sub down at -78 feet developed two seams of ore about 10 feet wide in the second fault zone. The North vein was mined for 200 feet and the South for 240 feet. This sub is finished.

On the next sub below No.13 drove West 100 feet and No.31 East 80 feet from the breasts on December 1st, 1903. No.12 and No.31 are just finishing caving the last ore on this sub. Between this sub and that next below the ore narrows to four feet, but widens again further down.

No.18 is caving a small sub opened out just above the 140 foot sub. They drove 100 feet West from the West chute, (No.13) along the dyke in mixed ore and opened several small pockets of ore.

On the sill floor No.29 drove East along the dyke 270 feet and cross cut in two places 25 and 35 feet respectively in mixed ground. They then cross cut North through the dyke, but found no ore, and the work was discontinued.

South East: The 160 foot sublevel South of the fault is finished. On the 180 foot sub next below, No.1 mined two seams of ore in the fault 60 and 80 feet long, and caved back within 30 feet from the chute. They are now following another seam between bands of rock 50 feet in from the chute. From here the ore has all been mined, 180 feet long and 80 feet wide, except one small strip near the North edge, which No.8 is taking now. A cross cut was put in through 40 feet of ore from the drift opposite No.10 chute, the last chute in. Farther East No.39 cross cut 80 feet and drifted West 40 feet through old workings. Raising 10 feet they took out a pillar of ore 80 feet by 20 feet. No.10 is now taking the floor of this sill 40 feet South of the chute. No.2 drove East 40 feet from the cross cut and is scramming out along the boundary. On this sub 350 feet East from the shaft the horse of jasper between the ore and the foot was cross cut and 8 feet of ore found. In this on the foot two subs were opened, one 80 feet long at -180 feet and one 265 feet long at -153. No.7 has been working here, but the dyke has cut them off in the floor and jasper in the breast.

Ashland.

ASHLAND MINE.

On the sill floor No.42 cross cut through 80 feet of ore and 20 feet of rock to the footwall, and put up a raise under that between the 153 and 160 foot subs. This was carried up to the 103 foot sub on the first level. Behind No.7 shaft No.5 is driving East in rock to hole under this raise. This drift will then be the main haulage way. No.5 has gone 230 feet. No.37 is driving East along the horse of rock from the cross cut put in by No.42. They are in 110 feet in ore. In the North vein of the fault zone No.6 drove 45 feet in ore and rock; and then opened out a small sub at an elevation of -175 feet, starting from the raise at the corner of No.5 drift on the foot. Another small sub was opened just East at -164 in the same body of ore. No.42 is cross cutting South in ore under the 180 foot sub.

THIRD LEVEL.

On the sill floor No.21 is caving around the next to the last chute in. Two or three weeks will finish the large deposit at the East end, on which they have worked for the past year.

No.13 is raising from the West end of the 270 foot sublevel, and has just holed to the 242 foot sub. They have retimbered the West end of the sub and recribbed the raise. No.20 is fixing the rock drift on the same sub East from the chute.

During the year an open room on the foot wall was filled with rock from the second level.

6½ LEVEL.

No.17 has caved back a large room along the boundary. They are now taking pillars North of this room in ground opened up by No.25. No.25 raised here three sets and drifted in ore 40 feet East to rock, then backstoped and filled with rock from a cross cut 90 feet long driven through the dyke by No.15. The dyke is very flat here, and 70 feet wide. No ore was found on the North side. This work is shown on the 3rd level map.

On the 315 foot sublevel No.25 drove 165 feet West from the chute along the dyke in ore, and holed to the 5th level. They holed high and the same gang, now called No.32, is cutting out the floor to make the drift passable for timber tracks.

TENTH LEVEL.

No.34 drove West 220 feet along the foot at -645 under the 9th level, and 100 feet East to the dyke at the same elevation. This place is not working now.

In No.23 stope in the North vein No.26 is driving East in the pillar at -615 ft.

Ashland.

ASHLAND MINE.

During the year they have taken out a slice three sets wide, seven sets high and five sets thick. This place has not been worked until now since last winter.

On the sill floor along the foot No.28 took out some ore one set high, 50 feet West of No.7 shaft. This ore lies on the same dyke that cuts the 11th level East of the shaft.

Fifty feet East of No.34 raise by No.8 shaft a raise was put up in rock under the sub and stopped 40 feet from the rail.

ELEVENTH LEVEL.

No.30 drove East along the fault zone 60 feet in rock, and cross cut North East 15 feet. The dyke just shows in the left corner of the breast. This is the dyke under No.23 stope on the 10th level. No.30 also drove East along the foot 40 feet in ore and 60 feet in rock. They are working here now.

THIRTEENTH LEVEL.

The two rooms West of No.7 shaft have been filled with rock and the ore stoped out three sets high on either side above the filling. No.26 mined the West stope and No. 34 the East.

No.33 cut out a room 8 feet wide and 16 feet high for a plat over the winze. The winze has been sunk N 13° W at -57°, ten feet off the footwall directly in front of No.7 shaft. It is $4\frac{1}{2}$ x 8 inside timbers. The material sunk through to date follow:

	Total.
Ore 18 feet,	18
Dyke 28 feet,	46
Jasper 4 feet,	50
Dyke 6 feet,	56
Jasper 24 feet,	80

The 14th level will be turned off 90 feet down on the East side.

In general the mine is looking very well. The ore bodies are closely developed and the timbering is in good condition. With the sinking of the winze new ore ought to be developed in the bottom very soon.

Ashland.

ASHLAND MINE.

ORE SHIPMENTS 1904.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Ashland,	136,235	195,485	331,720	264,134
Taylor,	640	7,913	8,553	10,004
Globe,		794	794	0
Total,	136,875	204,192	341,067	274,138
Last year,	226,165	47,973	274,138	
Increase 24%,			66,929	

AVERAGE ANALYSIS OF MINE SAMPLES.

	Iron	Phos.
Ashland,	60.00	.046
Taylor,	57.55	.053
Globe,	59.90	.080

ORE STATEMENT NOVEMBER 30th, 1904.

	ASHLAND	TAYLOR	GLOBE	TOTAL	TOTAL LAST YEAR
On hand December 1st, 1903,	80,719	66,652		147,371	46,497
Output for year,	264,799	640	794	266,233	375,012
Total,	345,518	67,292	794	413,604	421,509
Shipments,	331,720	8,553	794	341,067	274,138
Balance in stock,	13,798	58,739	0	72,537	147,371
Decrease in ore in stock,				74,834	
Decrease in product, 29%,				108,779	

Note:-

1904: One ten hour shift. Mine idle during April and May.

1903: Two ten hour shifts to October 1st,

One ten hour shift October 1st, to December 1st.

AVERAGE CARGO ANALYSIS 1904.

	Iron.	Phos.
Ashland,	60.08	.042

Ashland.

ASHLAND MINE.

AVERAGE WAGES AND PRODUCT.

Product 1904, 266,233 tons.	SURFACE		UNDERGROUND		TOTAL.	
Product 1903, 375,012 tons.	1904	1903	1904	1903	1904	1903
Average number men working,	51	86	199	391	250	477
Average wages per day,	2.10	2.00	2.17	2.19	2.15	2.16
Average wages per month,25 days,	52.50	50.00	54.25	54.75	53.75	54.00
Average product per man per day,	17.06	14.29	4.39	3.15	3.49	2.58
Labor cost per ton,	.123	.140	.493	.696	.616	.836
Difference in labor cost per ton,	-.017	-.049	-.203	-.141	-.220	-.190
Average product,Breaking & Tramming,			6.84	5.33		
Average wages for miners,			2.29	2.40		
Average wages for trammers,			1.97	2.08		
Average wages for Contractors,			2.26	2.35		

At none of the other mines has the increase in ore per man per day been so marked. The product per man per day underground is 39.36% greater than in 1903, and the total product per man per day has increased 35.27%.

All the reasons advanced for the increase in product per man per day at the Cliffs Shaft Mine are applicable to this mine, but to these should be added the better physical condition of the property, and the arrangements which have been completed underground for the more economical handling of the ore. It is also true that there was a greater percentage of inferior men at the Ashland than our Marquette Range mines, so that the decrease in the force made a more favorable showing. It will be noted that the product per man per day underground is still much lower than the Lake.

THE MINING COST FOR THE YEAR IS AS FOLLOWS;

	1904	1903	Increase	Decrease.
PRODUCT	266,233	375,012		
General Expense,	.057	.046	.011	
Maintenance,	.071	.072		.001
Mining Expense,	.762	1.011		.249
Cost of Production,	.890	1.129		.239
EXPLORATORY,	0	0		

Ashland.

ASHLAND MINE.

MINING COST, Continued.

	1904	1903	Increase	Decrease
DEPRECIATION.				
Inventory,	.010	.008	.002	
Improvement,	.007	.000	.007	
New Construction,	.000	.038		.038
New Coal Dock,		.003		.003
Total, Depreciation,	.017	.049		.032
Taxes,	.072	.053	.019	
Central Office,	.030	.035		.003
Cost on stockpile,	1,009	1.266		.257
Loading and shipping,	.019	.012	.017	
Total cost,	1.028	1.278		.250

The decrease in cost is due to the reasons given under the head of "Average Wages and Product".

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVG.PRICE	AMOUNT	AMOUNT 1903.
27% Powder,	48850	.092	4494.20	9434.60
30% "				427.50
40% "	22450	.105	2357.25	2021.25
50% "	17100	.119	2035.50	697.00
Fuse,	198000	4.00	793.01	1230.38
Caps,	55500	5.80	379.85	516.45
Total,			10059.81	14327.18
Product,			266233	375012
Pounds powder per ton ore,			.332	.352
Cost per ton for explosives,			.0378	.0382

Ashland.

ASHLAND MINE.

STATEMENT OF COMPARATIVE WAGES.

	1904	1903	Increase or Decrease 1904.
SURFACE.			
Total number days,	15607¼	26242¾	
Average rate,	2.10	2.00	Inc. .10
Amount,	32742.98	52439.64	
UNDERGROUND.			
Total number days,	60635	119129½	
Average rate,	2.17	2.19	Dec. .02
Amount,	131362.21	260986.41	
Total days,	76242¼	145372¼	
Average rate,	2.15	2.16	Dec. .01
Total amount,	164105.19	313426.05	

STATEMENT OF TIMBER USED FOR YEAR ENDING NOVEMBER 30th,1904.

Kind	Lin.Feet	Avg.price Per foot.	Amount	Amount 1903.
Cribbing,	98,150	.011	1,064.47	1,341.40
6' - 8' timber,	161,909	.030	4,867.51	6,110.33
12' - 14' timber,				66.01
Total,	260,059	.0228	5,931.98	7,517.74
Total 1903,	339,405	.02213		7,517.74
7'Lagging,(224 cu.ft)	731,938	.00372	2,718.63	3,419.10
8' " (256 " ")	98,000	.00350	343.00	1,363.63
12' "	528	.0125	6.60	
Poles,	76,167	.01323	1,007.74	777.06
Total,	906,633	.00450	4,075.97	5,579.79
Total 1903,	1,377,093	.00404		5,579.79

	1904	1903
Lin.Feet of timber per ton of ore,	.977	.905
Lin. " " Lagging " " " " ,	3.394	3.546
Lin.Feet lagging per Lin.Foot timber,	3.486	3.922
Cost per ton for timber and lagging,	.03759	.03487
Equivalent of stull timber to board measure,	210482	297868
Feet Board measure per ton of ore,	.791	.794
Total product,	266233	375012

Ashland.

ASHLAND MINE.

The following estimate of ore in sight was made by our Resident Engineer, Mr. Eaton:

	ESTIMATE OF ORE IN SIGHT NOVEMBER 30th, 1904.					Nov 30
LEVEL	NO.3 SHAFT	NO.4 SHAFT	NO.7 SHAFT	NO.9 SHAFT	TOTAL.	1903
1			13,000		13,000	11,000
2	2,500		85,000	26,000	113,500	101,000
3	23,500		29,000		52,500	36,500
4	17,000	23,000			40,000	55,000
5		24,000		95,000	119,000	46,500
5½		45,000		12,500	57,500	55,000
6½			99,000	10,000	109,000	143,000
7	13,500	50,000	30,000	32,000	157,500	110,000
7-Floor,				32,000		32,000
8	12,000	8,000	49,000	72,000	141,000	121,000
8½				20,000	20,000	20,000
9			20,000		20,000	20,000
10			3,000		3,000	19,000
11			10,000		10,000	5&10 50,000 4&10 10,000
13			5,000		5,000	14,000
Total,	68,500	150,000	343,000	299,500	861,000	844,000

The increase during 1904 of 17,000 tons over and above the production is due to a closer development of the ore bodies, and in particular of the footwall deposit East of No.7 shaft on the second level. This has been crosscut on the fifth level and shows every indication of extending down as far as the 330' sublevel in No.7 shaft.

The narrow footwall vein on the 2nd and 5th levels of No.9 shaft is being opened up rapidly and has shown considerable ore. The great decreases have been in the North vein deposits on the 2nd and 7th levels.

In No.3 shaft ore has been opened up as far as No.1 shaft on the footwall, and the 7th and 8th levels have shown considerable ore over the old stopes.

In No.4 shaft the footwall deposit is worked out as far down as the 4th level. Below the 4th it is not as high grade as above, but continues to hold out very regularly.

No ore has yet been encountered in the winze below the dyke of the 13th level, but it is expected daily.

Ashland.

ASHLAND MINE.

FATAL ACCIDENTS.

There have been two fatal accidents during the year. On August 15th., Louis Holzok, a miner employed for seven years, was killed by a fall of ground, in the first sub above the 7th level. There were no eye witnesses to the accident. It is presumed that he cut away too much dirt from one of the posts in the set of timber in order to place cribbing, thereby letting down the entire set of timber, which resulted in a cave.

On September 23rd., John Carlson was killed by suffocation. About ten minutes after blasting Carlson went back into the drift. About half an hour afterwards his partner found him dead. His right leg was broken above the knee, and there was a small cut on his head. As the cut had not bled Dr. Kelly thinks that he was suffocated from the smoke, and that the ore fell on him afterwards.

It will be seen that neither of these accidents were attributable to negligence of the management.

AUSTIN MINE.

Mr. G. R. Jackson, Superintendent of the Austin Mine, has prepared the following report of the Austin and Stephenson Mines:

Our product for the month of November was 2777 tons, or slightly less than the October output. Of this 83% was Bessemer, which is the best record we have shown in this grade. It is gratifying from the fact that most of the ore was from the footwall drifts, where the phosphorus has been high.

During the first part of the month we had considerable rock; this with the time lost around election had a telling effect on the output.

FIRST LEVEL.

No.9 contract running South West on the West side of the level has been in mixed ore and jasper all month, averaging 50% perhaps, but low in phosphorus. We have attempted to locate the ore in the sublevel drift immediately below this drift, but so far have found only mixed material.

FIRST LEVEL FOR YEAR.

During the year the work of developing has been pushed along the footwall as fast as possible in both directions from the main North East drift.

The drift to the North West following the footwall, led to more or less mixed material, immediately on the slate, with now and then runs of clean ore. In July the ore pinched out, leaving the jasper lying directly on the Black slate. A drift was cut to the North West in the foot and a raise started to surface. This was successfully holed in about a month and one half, ore being struck about 15 feet above the back of the first level, and although not thick, alternate strata of ore and jasper followed above this, until the raise was nearly to surface. The drift to the South West was started after the ore pinched out in the main breast. Here for 150 feet we have been in ground which will average about 50%, and of low phosphorus. It looks now as though all of the ore at this end of the mine was below the 1st level.

The main drift to the South East had ore in the slate foot until along in February when mixed ore and jasper was struck; at the same time the footwall made a sudden turn to the left, leaving a full breast of jasper. The drift was turned to the left, but when the slate was again found the jasper was lying directly on it. Since then we have driven off to the South only to be cut off by the jasper again.

If the ore is found beyond the limits we have explored on the 1st level, it will have to be done by means of raises from the 2nd level, and sublevels. The ore at the East side is small, while at the West end a very large body of low grade low

phosphorus ore exists which could be cheaply mined if there is a demand for it.

SECOND LEVEL.

No.3 contract on the main drift West had hard jasper the early part of November, but toward the latter part of the month got a full breast of ore again. Back of No.3 No.8 cut into the footwall 16 feet and started to raise, making 22 feet. Here they had hard ore on the jasper, and headway is made slowly.

On the East side No.4 has drifted almost Southerly for 80 feet. The entire distance being in grey ore, which is quite similar in structure to the "putty" ore of the Lake Mine. This ore shows weight almost immediately after the sets are put in place. In a month No.4 at its present rate of drifting will reach the Stephenson line.

Back of No.4 about 100 feet No.1 has started to raise to find the thickness of the ore at this point. The stub drift in the foot can be extended in case raises are needed to get ore, which cannot be reached by the raises from the main drift. In the stub rock drift 100 feet South East of No.1 drill hole No.2 is raising. They are now 18 feet above the second level and have had jasper all of the way. It was expected that the ore would cut across the top of the raise in this.

WORK FOR THE YEAR SECOND LEVEL.

During the year the main drift to the West has followed the ore along the foot wall, losing it only once, and that when the ore was replaced on the slate by jasper. This was discovered in time, and we have had no trouble since. Considerable of the time the jasper on the foot has cut out into the ore standing in an almost vertical position. This has made the drifting slow, as we were afraid to leave the jasper fearing we might cut across the formation, and into the hanging. On the left side of the 550 foot of drifting in this direction, there is an almost continuous stretch of ore. One raise has been put up to a sublevel 14 feet below 1st level, and this sublevel is holed through to the 1st level.

On the East side the formation has been much more regular than on the West. The slate and jasper foot has been followed without trouble. During part of May and June the oreapparently pinched out, but by drilling test holes we finally located it to the South, and following a room the vein opened out in a short time, and we have had no trouble since. Before we struck the rock in May, we had found the grade of the ore on the foot constantly changing, one day Bessemer and the next non-Bessemer, but the ore beyond the rock has all run low phosphorus, except that immediately in contact with the slate.

AUSTIN MINE.

On this side of the shaft besides the raises mentioned in the work for November one was put up in April to a sublevel 14 feet below 1st level, and a drift driven to the foot and holed to 1st level. These raises have given excellent ventilation to the mine, and have afforded a means of escape in case of an accident or fire in the shaft.

THIRD LEVEL.

On the West side , No.6 went 53 feet in the main drift to the South West and 10 feet in the stub drift to the North West (about 100 feet back from their breast) in November. Near the breast of the main drift there has been considerable trouble on account of the weight of the ground breaking off the poles while a new set is being placed in position. We have shortened up the studdles which will help somewhat and we may have no trouble in the future.

No.7 on the the East side drifted 53 feet South along the slate to the Stephenson line. The contract was then taken back 100 feet and a raise started. They are now up some 20 feet or more in grey ore. This is the same ore we had in No.4 drift, all of the month, on the 2nd level. The raise we have put up in two compartments, each one separate. This method allows the raise to advance without opening much more than half the ground that is necessary with the double compartment. In ore of the nature we have at this point we need to take every precaution to prevent runs.

No.5 started a raise 150 feet from the Stephenson line, after cutting out 15 feet in the foot wall, and now are ready to cut out for the sublevel drift 14 feet below 2nd level. This we consider a good month's work.

THIRD LEVEL FOR YEAR.

The main drift to the West and South West followed the slate to a point nearly South of No.7 drill hole where jasper was found on the foot. From this point to the present breast the ore has nearly all been of Bessemer grade. Now and then bunches of mixed ground have crossed the drift, but we have had clean ore for the most part.

At a point slightly East of No.7 drill hole a raise to the sublevel was put up, and a drift across the formation to the footwall drift on the 2nd level. This makes a clear passage from the 3rd level to surface without going to the shaft.

On the East side No.7 had one continuous drift of 610 feet all in Bessemer ore. There has not been a single bunch of rock in the entire distance. The boundary to the South has been reached which fortunately is the North boundary of the Stephenson, and which we hope to some day mine, but through another shaft than the Austin.

AUSTIN MINE.

The grey ore at the extreme South end of this South East drift has taken so much weight already that it has been necessary to put in lining sets and studdles the centers of the caps in order to hold the drift open for future work.

UNDERGROUND IN GENERAL.

The November work on the first level failed to help in locating the ore on the West end, but makes it almost certain that it is below the level at this point.

On the 2nd level No.3 to the West and No.4 to the East, have both made big strides in the direction of the Stephenson boundary. It is probable that No.4 will reach it this month. On the West No.3 and No.6 on the 2nd and 3rd levels respectively are still separated by a greater interval than the natural slope of the formation has shown, which must mean a flattening or rolling of the formation at this point.

UNDERGROUND DEVELOPMENT FOR YEAR.

Taking the three levels into consideration, the exploratory work on the 2nd and 3rd has been very gratifying. The formation has been quite regular and the ore for the most part of good grade. On the first level the territory proved up is small when compared with the other levels, and its position is such that it cannot be mined without effecting the surface in a place where we cannot disturb it. The ore lying flat as it does makes it dangerous to mine, as it slabs off in large pieces, but I think it will come readily away from the hanging when we start stoping. The jasper though lying flat also is hard to drill as the holes fissure and do not break well. The drifts along the foot have cost considerable more than if it had been ordinary drifting. Most of the time we have kept the rock from one to two feet high on the foot side, but a slight upheaval might make nearly a whole breast of rock, and a consequent mining of the drift to again get on its margin.

AUSTIN SURFACE.

During November but little was done on the surface about the mine. Laying of the solar plank being about all. During the year however the two stockpile solars have been graded, ore trestles built etc. The grading of the non-Bessemer solar has been very expensive as ledge has had to be removed to a depth of from three to five feet. At the boiler house a second tank for water supply has been erected and connected, and the fire pump installed in the engine house. All the supplies, coal, oil, iron, steel etc., have had to be handled by team, either from Princeton or Swanzy, making them very expensive by the time they reached the mine. It is hoped that by this time next year there will be a railroad into the mine.

AUSTIN MINE.

The water as it is pumped from the mine runs to the East near No.1 drill hole, and then passes South directly over No.4 contract 2nd level. At this point it runs into a test pit and from there evidently a great portion back into the mine, as all of the contracts in this neighborhood are very wet. As we are developing this territory we will have to turn the water in a different direction on surface. A launder will have to be constructed running from the shaft to a point a little North of the Boiler House. Here, if the water is emptied it will go down through the Austin Location to the river.

AUSTIN-GENERAL.

In tabulating the work done at the mine underground for the year we have the following:

Description	Feet	Cars
Sinking,	5½	0
Rock raising,	157	0
Rock drifting,	1194½	145
Ore raising,	159	0
Ore Drifting,	2283	1875
Stoping,	0	0

The material hoisted is as follows:

Material	Tons	Iron	Phos.
Bessemer,	12022	64.32	.059
Austin,	18096	61.60	.357
Rock,	7270		

The cost per ton for the first eleven months of the year was $1.81. This is high, but one fifth of all the material hoisted was rock, and the main drifts were delayed throughout the year, as we held them against the footwall, and winding with it. Here too must be taken into consideration the cost of the fuel which is something over 50 cents aton more than where there is a railroad into a mine. As I have mentioned above there is also the other supplies which are more expensive. We have had a great deal of trouble in keeping trammers and where miners have to tram their own cars while their drifts stood idle means a loss which we would gladly save if possible.

ACCIDENTS ETC.

In regard to accidents we were unfortunate enough to have one fatality, an explosion when a miner was at his powder box, which was so terrific that he was blown Austin.

to pieces, and the timber in the drift all knocked down within fifty feet of where the box stood.

Only one other accident occured, which was serious, the miner losing his leg.

STEPHENSON.

Early in the fall orders were received to clear off the surface on the West end of the Stephenson tract. This was started as soon as possible, and on the 20th of September a standpipe crew began work on sinking pipes to ledge. By these we tested the material from the surface to the ledge, and the ledge itself, and located the water level.

These holes were all located on the Western side of the property about 400 feet from the Chicago & North Western boundary. In all eight pipes were sunk, and it has practically been decided to locate the shaft on hole 43. Here we had water level at 57 feet from surface; top of hardpan at 78 feet, and ledge (jasper) at 79'10". Hole 47 sunk to ledge, 33 feet East of 43 found the ledge dipping to the East from 43, it being 5.8' deeper in that distance. If the ledge is regular this would make about two feet difference in elevation, in the width of the shaft.

At 47 feet through the ledge was slate instead of jasper. We succeeded in chopping through to this, and found the thickness to be about three feet. I think it will be wise to take advantage of this knowledge and locate the shaft so as to anchor in the slate rather than the jasper, which is extremely hard at this point.

The location of these holes are all shown by the report from the Engineering Department. All have been carefully located by transit survey.

On the surface men are still engaged in cleaning, saving what is worth anything for blocking and lagging. A map showing the surface topography has been made covering the whole Western area, to assist in the location of railroad tracks and buildings. This map shows very plainly the great irregularity of the ground.

The materials are being received for the shaft and buildings and I expect the boilers to be taken to the site for the boiler house next week. The shaft timber is on the ground now.

It has been necessary to construct a road from the main road running between the Austin and Princeton, over which the boilers can be hauled. They have to be taken over a mile, but we do not anticipate much trouble. The snow over this road is a little thin, but by next week it may be all right. As soon as the boilers are in place and the hoist arrives, we will be ready to start work.

Austin.

AUSTIN MINE.

We expect to start framing the shaft timbers very shortly.

In picking hole No.43, or its immediate vicinity, as the best location for a shaft, all possible conditions were taken into consideration. Hole No.43 showed ore existing at this point, but if a position were chosen farther West it would have left no room for buildings on the property. As it is the tracks will cross only a small portion of the ore near the outcrop, and we can arrange the stockpiles so that they will be wholly off of the ore. The grading for these tracks will cost a great deal on account of the rolling ground, and the widths necessary for the stockpiles.

GENERAL SURFACE.

We have now under construction at the Austin Location seven buildings. A Captains house, four double dwellings, and two boarding houses. These are all progressing favorably, and will be ready for occupancy shortly after the first of January. The street through the location has been graded and has added much to the appearance of the place. At the Superintendent's house, the yard has been graded and several improvements made.

A pipe line, (four inch wood) has been run from the location past the Austin and over to the Stephenson mine. This new line has done away with a great deal of friction, and has made the work for the pump station much lighter. During the year a second tank has been placed alongside of the old one, and from the two we supply the mine and Location. By using this gravity system we have cut the cost of pumping to half of what it used to be.

While the usual statements have been made for the Austin Mine it cannot be strictly considered as an operating property. The work for the year has consisted entirely of drifting and raising, no actual mining having been done.

This property is in excellent condition for mining, and is ready for production as soon as a rialroad reaches it. It is hoped that the question of transportation will be settled soon, so that the heavy charges for hauling fuel and supplies can be done away with.

AUSTIN MINE.

The cost of mining has been as follows:

	1904	1903	Increase
PRODUCT.	30,118	1,086	29,032
General expense,	.175	.017	.158
Maintenance,	.071		.071
Mining Expense,	1.566	1.000	.566
Cost of Production,	1.812	1.017	.795
DEPRECIATION.			
Inventory,	.019		.019
Opening Mine,	.250		.250
Total,	.269		.269
Taxes,	.029		.029
Central Office,	.035		.035
Cost on stockpile,	2.145	1.017	1.128
Total cost,	2.145	1.017	1.128

ORE STATEMENT NOVEMBER 30th., 1904.

	AUSTIN BESSEMER	AUSTIN	TOTAL	TOTAL LAST YEAR.
On hand December 1st, 1903,	1,055	31	1,086	
Output for year,	12,022	18,096	30,118	1,086
In stock December 1st, 1904,	13,077	18,127	31,204	1,086

AVERAGE ANALYSIS OF MINE SAMPLES.

	Iron	Phos.
Austin Bessemer,	64.32	.059
Austin,	61.60	.357

AUSTIN MINE.

AVERAGE WAGES AND PRODUCT.

Product 1904, 30,118 tons.	SURFACE		UNDERGROUND		TOTAL	
Product 1903, 1,086 tons.	1904	1903	1904	1903	1904	1903
Average number men working,	28	25	38	12	66	37
Average wages per day,	1.93	2.05	2.19	2.48	2.08	2.19
Average wages per Mo, 25 days,	48.25	51.25	54.75	62.00	52.00	54.75
Average product per man per day,	3.62		2.71		1.55	
Labor cost per ton,	.535		.810		1.345	
Average wages for Contractors,			2.14			

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVG.PRICE	AMOUNT.
50% Powder,	11980	.1165	1396.30
Fuse,	28150	4.12	116.06
Caps,	8160	5.82	47.51
Electric exploders,	596	30.00	17.88
Wire,	10#	.306	3.06
Total,			1580.81
Product,			30118
Pounds powder per ton ore,			.397
Cost per ton for explosives,			.053

STATEMENT OF COMPARATIVE WAGES.

	1904	1903	Increase or Decrease 1904
SURFACE.			
Total number of days,	8318¼	7247¾	
Average rate,	1.93	2.05	Decrease .12
Amount,	16104.58	14832.82	
UNDERGROUND.			
Total number of days,	11129½	3676	
Average rate,	2.19	2.48	Decrease .29
Amount,	24396.21	9113.31	
Total days,	19447¾	10923¾	
Average rate,	2.08	2.19	Decrease, .11
Total amount,	40500.79	23946.13	

AUSTIN MINE.

STATEMENT OF TIMBER USED FOR YEAR ENDING NOVEMBER 30th, 1904.

KIND.	LIN.FEET.	AVG.PRICE PER FOOT.	AMOUNT.
6" to 8" Timber,	2390	.0315	75.50
8" to 10" "	6096	.0438	267.48
10" to 12" "	10330	.0576	595.16
12" to 14"	1586	.08	126.88
Total,	20402	.0522	1065.02
5' Lagging,	125234	.377	471.82
Poles,	45695	.01	456.95
Total,	170929	.543	928.77
		1904	1903
Feet of timber per ton of ore,		.678	
Feet of lagging per ton of ore,		4.16	
Feet of lagging per foot of timber.		6.14	
Cost per ton for timber, lagging and poles,		.066	
Eqivalent of stull timber to board measure,		50159	
Feet board measure per ton of ore,		1.665	
Total product,		30,118	1,086

ORE IN SIGHT.

Following is an estimate of the ore developed to date in the Austin Mine, prepared by Mr. G. R. Jackson.

Description.	Tons	Less 10% rock.	Net tons.
First level and above,	58,333	5,833	52,500
Sub, 14' below 1st level,	36,342	3,634	32,708
Sub, 28' below 1st level,	72,488	7,249	65,239
From 28' below 1st to 2nd level,	183,546	18,355	165,191
Between 2nd and 3rd levels,	341,775	34,177	307,598
Totals,	692,484	69,248	623,236
	Ore mined,		31,204
Balance in mine to date as shown by development,			592,032

This estimate is very conservative, and next year will show a considerable gain, especially on and above the 2nd level East side. The development does not warrant an estimate by grades

CROSBY MINE.

Mr. S. R. Elliott, former Superintendent of the Crosby Mine, has prepared the following report of the operations at that property, from Noevmber 30th., until the time we suspended operations in April.

On April 23rd., the drifting, raising and test pitting necessary to thoroughly explore the property was completed. At this time all miners, testpitters and surfacemen were laid off. Only enough men being kept to run the boiler and look after the pumps. On May 8th., word was received to pull the pumps. This was finished on the 9th., and the mine commenced to fill with water. All machinery, boilers, piping etc., were put into such shape that the mine could be shut down for an indefinite time. Supplies and equipment which would have been damaged by exposure were stored in the different mine buildings and all work was finally completed on May 27th.

UNDERGROUND WORK.

Accompanying this report, blue prints are colored to show the extensions made during the year. All of the drifts may be considered as being in rock. As a rule the material was soft, being composed of small seams of ore and decomposed taconite. At times however, we encountered solid taconite as hard as any rock I have ever seen in any mine. The progress made in this material was slow, and expensive, as it was difficult to make any impression on it with hand drills.

Contract No.1 was originally intended to drive for the ore found in diamond drill hole No.116. In sinking a test pit directly on this hole, it was found that the drilling was entirely wrong, and that no ore existed at this point. The drift was therefore stopped. Raise No.35 showed 20 feet of low grade ore, while No.41 was stopped in solid taconite at a height of 39 feet. The amount of ore over this drift was small. The raising throughout the mine was all done by contracts No's 2 and 5, the result of which is clearly shown on the blue prints.

Contract No.4 was stopped when it had reached a point about 20 feet to the South of the Noth boundary line. The raises in this drift show up well with the exception of No.39 and No.40. Raise No.39 is apparently on the West edge of the ore body, which extends to the North to hole No.463.

The miners from Contract No.4 were moved in the early part of February to Contract No.3 making four men on each shift. It was thought best to crowd as many men into this place as possible,as the whole mine had to be run for this one drift and two contracts which were raising.

The length of tram at this time was 1200 feet, and the number of trammers were increased from two to three gangs on each shift.

After the drift was turned to the East much trouble was experienced on account of powder gas. This was rectified to a great extent by building a ventilating launder from raise No.30 which was holed to the surface; the end of the launder being kept within about 30 feet of the breast. The current of air was made to pass down raise No.22, then into the breast of No.3 drift, back through the launder to raise No.30, then to the surface. A stack 30 feet high was built over raise No.30 to increase the draft. In this way a current of fresh air was continually rushing toward the breast and passing back through the launder and up raise No.30 to the surface, sucking the foul air out of the drift.

It was the intention to put up raises at intervals of 50 feet, in the part of the drift running parallel to the North boundary line, but owing to the hardness of the rock and the great trouble with powder gas raises No.42 and 43 were abandoned, and a few extra pits sunk from the surface to explore this territory. In the latter part of April No.3 drift reached a point under pit No.482, the bottom of which was 25 feet above the floor of the level. A raise was then successfully holed into this pit, this giving a positive check on the underground survey and also the elevations. It was found that the ore only extended 5 feet below the bottom of the pit.

As far as our information goes all of the ore which could be mined lies above our level, the drifts then may be considered as being permanent.

I beg to submit the following statement which shows the rate of drifting and the cost for labor and supplies, as taken from the Contract Statements from November 30th, 1903, to April 23rd, 1904.

	Feet	Amount	Per Foot.
Contract No.1 Drifting.			
December,	160	360.84	2.253
January,	209	375.95	1.80
February	138	267.87	1.94
Total,	507	1,004.66	1.98

CROSBY MINE.

Contract No.2 Raising.

	Feet	Amount	Per Foot.
December,	131	84.70	.646
January,	303½	197.66	.65
February,	127	125.46	.987
March,	90	102.10	1.134
April,	23	21.48	.94
Total,	674½	531.40	.787

Contract No.3 Drifting.

December,	196	370.66	1.89
January,	173	358.41	2.07
February,	131	419.50	3.20
March,	150	603.60	4.024
April,	201	517.00	2.522
Total,	851	2,269.17	2.666

No.4 Drifting.

December drift,	26	53.22	2.045
February raise,	182	89.53	.49

No.5 Raising.

December,	97	44.06	.454
January,	79	55.08	.697
February,	270	232.88	.86
Total,	446	332.02	.744
Total feet drifted year 1904,	1384	3,327.05	2.403
Total feet raised,	1302½	952.95	.731

The following statement shows the cost of test pitting on Leases 1, 2 and 3 for the year 1904, as taken from the cost sheet:

Leases 2 and 3.

December, 1903,	137½	286.22	2.08
January, 1904,	113	210.77	1.86
February,	153½	453.43	2.95
March,	183½	481.38	2.50
April,	171½	578.68	3.37
Total,	759	1,988.88	2.62
December, Winze,	6½	51.25	7.88

Lease No.1.

February,	34	292.76	8.61
March,	172	565.79	3.29
Total,	206	858.55	4.17

Crosby.

CROSBY MINE.

The following statement shows the underground work and testpitting from June, 1903 to May 1904:

	Feet	Amount	Per Foot.
Total drifting from June 03 to May 1904,	3022	8,813.88	2.916
Total raised Do.	2059½	1,597.33	.777
Total in winze, Do.	45	225.57	5.01
Total testpitting Leases 2 and 3,	1986	4,945.46	2.49
Total testpitting Lease No.1,	280½	1,014.56	3.62
Total Sublevels,	90	348.90	3.875

The cost of putting in 90 feet of a sublevel in ore is high, owing to the fact that this work had just been started and all of the preparatory work, such as building chutes and timbering up around the raises etc., had to be charged in the first month.

Lease One: (W½ of S W ¼ of section 31, 57-22.)

The drilling on this land had shown a small body of ore. Owing to the fact that a considerable amount of water was found near the surface,pits could not be sunk deep enough to check the drilling.

As the drilling at the Crosby had been found so greatly in error, it was decided to sink some pits on Lease One, by keeping the water out with a small pump. All of the pits showing ore were finally checked with the result that hole 206 alone showed ore, but of an inferior grade to that found in the drill hole. The cost of testing these drill holes was high, on account of having to pump, but the money was certainly spent to the advantage of the Company.

SURFACE WORK.

On February 11th., at about two o'clock the boarding house caught on fire, presumably from the kitchen stove. In a remarkable short time the whole building was ablaze, and it was impossible to put it out. It burned so rapidly that the night shift men who were sleeping, scarcely had time to put on their clothes and get out of the building. It was a complete loss to the Company, and there was not a stick of timber left standing. Every precaution had been taken against fire, and a stream of water was playing on it in a short time, but seemed to do no good. The wood was so dry that it seemed to almost explode.

CROSBY MINE.

With the exception of a small amount of labor put on the roads around the Location, and the extension of the stockpile ground, no work of importance was done on the surface.

AITKIN COUNTY + MINNESOTA LANDS.

Mr. J. E. Jopling submits the following report of explorations by other parties near the Aitkin Lands.

It is to be noted that no explorations have been carried on upon the Company's lands during 1904. The agreement with Mr. Snider specified that such explorations should be begun but it was mutually agreed to delay the work. It was thought best to put off the work for various reasons; that all lands wanted had not been secured; that no work could be done on many of the descriptions except in the winter, which means starting not later than December 1st; that further information of other explorations might be gained. In February the explorations then being made by the Oliver Iron Co., were visited and reported upon. This work was to the South and East of Aitkin and to the North of the quartzite at Dam Lake. Although it was impossible at that time to learn exactly what had been found, it is now generally understood that no merchantable ore was discovered, and that the leases that Company then held were given up. These explorations were based on the few outcrops visible and the theory advanced by the U S Geological Survey that the iron formation would be found in that district. It is understood that Mr. Ayers who had worked on that Survey was instrumental in persuading the Company to do the work.

The Oliver Iron Co., having stopped work, public interest in securing and offering land for exploration died out as far as that particular locality was concerned, but to the West in Crow Wing County where Mr. Cuyler Adams' explorations have met with some success there has been considerable work done.

CROW WING COUNTY.

During November Mr. Kirby Thomas of Superior brought to this Company's notice the explorations of Mr. Cuyler Adams. A visit to Duluth was made, and many notes on the work obtained and a report submitted. In general terms, two iron ranges have been found with associated rocks similar to others in Minnesota, one range on either side of the Northern Pacific Railway between Aitkin and Brainerd. There is no known outcrop in Crow Wing county, and as the sand is deep the ranges were traced owing to their magnetic attraction of the compass needle. Up to date about twenty or thirty drill holes were put down scattered over several miles. Some ore resembling Mesabi has been brought up, but the knowledge as to commercial value of the deposits is small so far as obtained to that date. Mr. Adams has succeeded in getting some parties to explore part of the range, and the outlook is encouraging.

It is doubtful whether this Company could afford to expend money in such work, owing to the terms of the options. The cost of drilling and the chances of hitting the best spots on the range, the expense of opening ore bodies that might be found, and the cost of transportation. At the same time these discoveries may throw light on the value of lands already owned by it in Aitkin County.

CHANGE OF SHIFTS.

The following statement shows the results obtained by the change of shifts. The comparison is made from the actual date of the change, and therefore does not correspond with the yearly statement.

The figures are so interesting that I thought it worth while to give you this additional information.

ASHLAND MINE.

	December 1st,1902, to Sep.30, 1903 10 months. Two ten hour.	Oct.1st, 1903 to Nov.30, 03 2 months One Ten Hour	Nov.30, 1903 to Nov.30,1904 12 months One Ten Hour
Total product,	327,347	45,665	266,233
Average product per month,	32,734	22,832	26,623
Decrease in monthly product,		9,902 7,902	6,111
Product per man per day.			
Surface,	14.08	15.22	17.55
Underground,	3.09	3.51	4.43
Total,	2.53	2.85	3.55
Increase per man per day Underground,		.42	1.34
Cost of Production per ton.			
Labor,	.840	.779	.605
Supplies,	.292	.385	.257
Total,	1.132	1.164	.862
Total cost on cars,	1.255	1.501	.982
Average number men employed,	510	314	245
Average wages per day,			
Surface,	2.00	2.05	2.10
Underground,	2.19	2.21	2.17
Total,	2.16	2.18	2.15

Note:-

Figures for 12 months areexclusive of April and May, while mine was closed down.

LAKE MINE.

Comparative statement showing product and cost of two ten hour, and one ten hour shift, as compared with three eight hour shifts.

	Dec.1st 1902, to Sept,30,1903 10 Months Three eight hour	Oct.1st,03 to Nov,30,03 2 months Two Ten Hour	Dec.1st 1903 to Nov,30,04 12 months One Ten Hour
Total product,	411,064	65,757	298,684
Average product per month,	41,106	32,878	24,890
Decrease in monthly product,		8,228	16,216
Product per man per day.			
Surface,	16.72	9.62	12.00
Underground,	3.88	4.29	4.91
Total,	3.16	2.97	3.48
Increase in product per man per day , U.G.		.41	.32
Cost of production per ton.			
Labor,	.629	.629	.580
Supplies,	.190	.245	.247
Total,	.819	.874	.827
Increase in cost,one and two ten hour shifts compared with three eight hour, (+)		.053	.008
Total cost on cars,	.963	1.092	1.188
Average number men employed,	535	437	283
Average wages per day.			
Surface,	1.95		1.97
Underground,	2.22		2.27
Total,	2.16	2.19	2.18

(+) The increased cost shown for the two months of two ten hour shifts is due to adjustment of taxes for 1903, also depreciation charges being made in November increasing the cost above normal.

Should have fixed charges added Oct

SALISBURY MINE.

Comparative statement showing product and cost of Two Ten Hour shifts as compared with Three Eight Hour Shifts.

	Dec.1st,1902 to Sep,30,1903 10 Months Three Eight Hour	October 1st,03, to Nov,30,1903 2 Months Two Ten Hour	Dec.1st,1903 to Nov,30,04 12 months Two Ten Hour
Total Product,	152,947	25,383	150,326
Average product per month,	15,295	12,692	12,527
Decrease in monthly product,			2,768
Product per man per day.			
Surface,	15.36	13.34	12.98
Underground,	3.48	4.06	4.22
Total,	2.84	3.11	3.19
Increase in product per man U G,			.74
"Cost of Production" per ton,			
Labor,	.794	.730	.671
Supplies,	.199	.255	.220
Total,	.993	.985	.891
Decrease in cost two ten hour shifts compared with three eight hour,		.008	.102
Total cost on cars,	1.069	(+) 1.133	.990
Decrease in cost on cars,2-10 hr shifts,			.079
Average number men employed,	217	162	158
Average wages per day, total,	2.28	2.30	2.16
Surface,	1.87	1.88	1.89
Underground,	2.37	2.42	2.24

(+) Total cost on cars 1.133 is high by reason of adjustment of taxes for 1903 coming in the November accounts.

Memo:- From the total product for 10 months, 1903 is deducted the shortage on stockpile of 1318 tons, hence does not agree with cost sheet of 10 months.

CLIFFS SHAFT MINE.

Comparative statement showing cost etc., resulting in change of shifts as follows:

	Dec.1st,1902 to Sep,30,1903, 10 months. Two Ten Hour	October 1st, 1903 to Nov,30, 1904, 13 Months One Ten Hour
Total product,	230,982	199,047
Average product per month,	23,098	15,311
Decrease in monthly product,		7,787
Product per man per day.		
Surface,	11.77	12.48
Underground,	3.73	4.63
Total,	2.89	3.39
Cost of Production per ton,		
Labor,	.716	.596
Supplies,	.234	.270
Total,	.950	.866
		Dec.1st,1903 to Nov,30,1904, One Ten Hour.
Average number men employed,	311	167
Average wages per day,		
Surface,	1.87	1.91
Underground,	2.18	2.16
Total,	2.11	2.09
Total cost on cars,	1.069	1.047
Depreciation and Exploratory,	.014-	.020
Net total exclusive of Dep,	1.055	1.027

THE CLEVELAND-CLIFFS IRON COMPANY.

ISHPEMING, MICHIGAN.

AGENT'S ANNUAL REPORT

SWANZY EXPLORATIONS.

YEAR ENDING NOVEMBER 30th, 1904.

I N D E X.

SWANZY EXPLORATIONS.

I submit herewith the following report of the Swanzy Explorations for the past year, which has been prepared by Mr. Jackson, Superintendent of the Austin Mine, who is in charge of this work:

During November we were a little more fortunate in our drilling on section 27, than we have been for some time, finding ore in two holes. One was extremely disappointing No.8, as caving of the sides made it necessary to abandon the hole before the bottom was reached. The other, No.10, passed through 37 feet of high iron, non-Bessemer ore.

Outside of this section practically no drilling was done during the month, except a little on the Stepehenson in the test hole at the shaft location..

Section 27, Hole No.8.

This hole located on the Noth West side of Johnson Lake had ledge at 232 feet and started drilling in slate which continued to 553 feet, where conglomerate was struck and extended to 688 feet, where slate was again found. This slate was of the ferruginous variety and standing at 35° to 70°. At 888 feet the slate was mixed with lean ore, which was apparently in layers atanding on edge, and which started caving almost immediately. At 921 feet soft iron ore alone was found, and this material to 972 feet was called ore by the drill runners. Its assay average is somewhat under 50%. After pulling the rods from this depth the hole caved above the soft material, or just at the bottom of the slate. When the rods were again lowered it was found impossible to get them below the caving slate and the hole was abandoned.

The results of the analysis being so unsatisfactory may be attributed to the following reasons. The material may have been only a lean ore body ; whether there was richer material below could not unfortunately be determined, or what is more probable, the caving ground from 888 feet to 921feet contaminated the samples as they were washed up.

Section 27,45-25, Hole 10.

The slate reported in October at this hole continued to 207 feet with a belt of conglomerate jasper below it, to a depth of 260 feet, and ferruginous slate at this point to 339 with jasper following to 486 feet. This jasper was quite rich from the beginning. The thickness of the ore bands increasing with the depth. Ore from 486 to 522 feet was all very high in iron, but it was also high in phosphorus and outside of the Bessemer limit.

SWANZY EXPLORATIONS.

Section 27, 45-25. Hole No.11.

This hole is to the North West of hole No.7 at a distance of 400 feet. Ledge 102 feet with water level 9 feet. The hole has just started drilling. From 102 to 220 feet the material is grey, slate dipping at 60°.

Section 27, 45-25. Hole No.12.

No.12 has been located about 300 feet due West of No.2. The standpipe crew has the pipe 106 feet deep at present. It is hoped that this hole will find a continuation of the ore at No.2 and help prove the material in No.8.

Section 28,45-25. Hole No.5.

But little progress was made by the standpipe crew at this place. They tried to reach the ledge by the use of the five and three inch pipes, the ones used in all the holes on this section, when it was found impossible; the 6", 4½" and 3" were substituted, but boulders or sloping ledge were encountered, and it has been constant trouble ever since. They intend making one more determined effort to reach ledge, and if unsuccessful the location of the hole will be slightly changed.

SUMMARY OF DRILLING FOR YEAR.

In taking up the summary I think it will be best to go over the work in sections, viz, West or section 25,45-26, North or the Smith lands on section 18, 45-25, East on sections 23, 27, 34 and 35, and South East on the lands bordering the section corner 20-21, 28-29, in 45-25. This arrangement will cover the territory more satisfactorily than any other way.

W E S T.

Only one hole was drilled in this section this year. Hole No.2 section 25,45-26. This hole was located about 900 feet West and 900 feet South of the North quarter post of section 25 on the North edge of Shag Lake. Ledge was found at 166 feet which proved to be granite.

Section 25, No.1 hole, and section 30, No.1, on the West ½ of the South West ¼ had both found granite ledge, and as there were no outcrops to guide us in locating an ore formation work in this locality was stopped with No.2 section 25. The area is large and further exploration might show the existence of iron formation.

N O R T H.

The work of exploring the Smith lands on section 18, 45-25, which was begun last year was carried on until near the middle of May. In all eleven holes were drilled.

Swanzy.

These holes showed the existence of two troughs containing iron formation. The one to the North was tested principally in the immediate vicinity of the old Swanzy pit, looking for a continuation of the Princeton Mine lense; the one to the South West tested in several places all of which showed the iron formation.

All of the holes near the old pit showed a great deal of distortion in the structure, such as folding, sliding and faulting, but no well defined ore body was found.

In the other though, which we hoped might correspond to the Austin lense, we found the formation very lean and hard, and where we might expect a concentration, we found the crystalline schist.

Prof. Smyth is of the opinion that the two lenses come together South of the North West corner of section 18 near the 1/16 post. He thinks this a good place to drill as well as in the valley to the North West of No.9 between this hole and the granite.

As a whole the exploratory work in this particular region was very unsatisfactory and disappointing. The drilling was expensive on account of the extremely hard nature of the ground, and no ore was found.

E A S T.

At the beginning of the year we were moving our outfit from section 14, 45-25 to section 23, 45-25. The holes on sections 15 and 14 had shown granite and now we were beginning to work South on the lands which we had under option. We had tested Hillyer's hypothesis that the ore formation was apt to exist in bays in the granite, but had found only granite. On the plains to the South there was nothing to go by, and it was a question of having a chance hole striking the formation , if it crossed the plain. Of this however, we are practically certain, on account of evidence shown some six miles East in the vicinity of Little Lake.

The hole on section 23 was no exception to the above mentioned rule found granite ledge. Our next move was to section 27, a little to the South East. Here our possibilities were a little better for we knew of the existence of the formation at the South East corner of section 20. Section 27 lies almost in a line from this point and Little Lake, although a little to the South. It was necessary to loate near water, so Hole 1 on section 27 was placed on the North shore of Johnson Lake, about 1350 feet East of the West ¼ post of this section. This hole was started about the middle of January, and the ledge found at a depth of 264 feet, ferruginous slate under 30 feet of this, jasper was found and six feet of ore from 363 to 369. This was something which

gave us an idea of the strike of the formation, as well as its probable dip. Other holes have been drilled about No.1, viz, No.2, No.8 and No.7 on the North West side of the Lake, and No.11 is now drilling. No.2 about 300 feet South West of No.1 found the dip very high. It ran into ore at 725 feet which continued to 847, the upper 41 feet averaging over 60%, while the balance went about 55%, all ran high phosphorus from.300 to .500, except the top ten feet which ran Bessemer.

Holes drilled in ground that caves are always unsatisfactory on account of the question of the true samples; very seldom is there core to be had; the sludge is almost sure to contain material from the caving ground. If this is high in iron the samples will show it and vice versa. No.8, 250 feet South West of No.2 I have mentioned in detail above, suffice it to say that the results were disappointing. The holes 7 and 11 were put along the formation to closely define the strike, but holes will be started at once on the Lake to find if possible the extent and direction of the chute which contains holes 2 and 8.

As soon as No.1 on section 27 was drilled, and the position of the formation determined our drill was taken to the South East side of Johnson Lake to follow the strike in that direction, and about the first of July one was taken to the section corner $\frac{27|26}{34|35}$.

The holes 3 and 5 on section 27, South East of the Lake cut the iron formation but found no concentration. Near the section corner the first hole, called No.4, section 27, located 144 feet North of the South East corner of section 27, had six feet of ore, only 126 feet below surface. The other holes in this immediate neighborhood were indicative of rich formation, with ore at No.1 section 34, lean ore 55%, with phosphorus averaging over .600, for fourty four feet and only 148 feet below the surface. The 16 feet found at No.1 section 35 was also low in iron and high in phosphorus. This hole was 400 feet South East of the North West corner section 35, and showed high dip, so that the 16 feet may have been only a narrow seam.

Hole 2 section 35 about 700 feet East of the North West corner of the section was very near the outcrop and showed only a few feet of jasper. No further work has been done following the formation to the Eastward, on account of orders to stop exploring on the Isaac Johnson lands.

Holes 3 on section 34 and 9 on section 27 to the West of section corner $\frac{27|26}{34|35}$ both found good thickness of jasper with rich ore bands, while No.10 section 27, some

Swanzy.

950 feet West of this corner had ore from 486 to 522, high phosphorus. We are now starting a hole 300 feet North of No.10 and will try to follow the chute or lense which contains No.10. I have an idea that it will extend over into 34, a little to the West of hole 3. The formation is similar to that in the immediate neighborhood of the ore body at the Austin and Stephenson mines.

To this Eastern drilling then, might be said in conclusion, there is considerable hope with two distinct places to work from, but I expect ore bodies will be shown inside of a year to at least warrant our taking out a lease on the property.

Exploring to the South East or near section corner $\frac{20|21}{29|28}$.

When hole 13 of the general exploratory work, in discovering the Austin and Stephenson mines, was drilled, a considerable thickness of lean ore was found on top of the ledge. Hole 38 was located between 13 and No.27 cut a little jasper, but no ore. No.39 located 300 feet South of the North East corner section 29 found jasper at 542 to 638, but no ore, while holes 1 and 2 on section 21 located 175 and 554 feet East, respectively, of the section corner, and a little to the North, passed through rich jasper and each got a little ore. No.1 had 6 feet 260-266, while No.2 had two seams of about the same thickness.

The Smith lands on section 28, the North East $\frac{1}{4}$, we had got under option, and have drilled four holes to date, one West of the Escanaba about 280 feet South of No.2, section 21 and three to the East of the river. The one West showed no ore, but a rich formation while to the East all of the holes have shwon ore at great depth 740 to 1000 feet, and of a thickness of from 20 to 30 feet, with the iron running slightly less than 60%, ore, mixed Bessemer and non-Bessemer. We are now testing the formation nearer the outcrop to see if we can find the ore without so much drilling. The hole we are working on at present is 1317 feet East of the North West corner of section 28. This will determine whether or not the ore crosses onto section 21.

Exploring in general: Practically all of the exploring for the year has been done to the South East of the Austin Mine, with the exception of the work on the Stephenson, which I have mentioned under that head, and the work on section 18, 45-25. We have followed the formation from the Austin to beyond the South East corner of section 27 with the exception of the North East $\frac{1}{4}$ of section 28. Part of this we are negotiating for, the South $\frac{1}{2}$. Over this the formation has to pass. Out to the extreme South East we have a knowledge of the general trend on the North West $\frac{1}{4}$ of section 35.

Swanzy.

SWANZY EXPLORATIONS.

During the past year there have been no explorers in this district, but I understand now that the Niagara Mining Co., has been trying to secure options on the Richardson homestead on section 24, 45-25, and other adjacent lands. I have seen slate on or near the East section line of section 19, 45-24 between the East $\frac{1}{4}$ post and the 1/16th post North, which I reported in my examination of the Moressette option in the summer of 1902. This slate bears a close resemblance to the overlying ferruginous slate on section 27 and to the underlying slate at the Austin. The Richardson homestead lies on a direct line or slightly to the North of the line between this slate and our operations on section 35. I would suggest everything be done that is possible to keep others out, until we are, ourselves through with this particular district.

We have had practically no trouble so far with the men in any way, and I am positive that the Company reaps a big benefit by keeping old hands at the drills. During the summer wire bridges were thrown across the Escanaba and the East branch which shortened up the men's walk by nearly a mile and one half each way.

Surveys have been run from section corner $\frac{20|21}{29|28}$ out onto section 27, and all holes have been accurately located and their elevations determined.

For the cost of drilling, reference is made to the annual statement, entitled "Swanzy Explorations", From April 1st, 1902 to November 30th, 1904.

While it cannot be said that any bodies of ore of merchantable extent have been shown, at the same time the results of the drilling in section 27 indicate that there will be at least two mines developed in this section.

On the North $\frac{1}{2}$ of the North East $\frac{1}{4}$ of section 35, the results are also very encouraging. On the lands under option from Smith, Cummings et al in the North East $\frac{1}{4}$ of section 28, ore has been found, but at great depth. An extension of this option has been secured, and further drilling will be required before it can be determined whether it is worth while to take out a lease.

The options from the Northwestern Railroad covering their entire holdings in Township 45-25, which expired November 30th., have been renewed for one year.

The North East $\frac{1}{4}$ of the South East $\frac{1}{4}$ of section 28, has been purchased outright, and also the following lands from the Isaac Johnson estate:

Swanzy.

SWANZY EXPLORATIONS.

South West ¼ of the South West ¼ section 26.

North ½ of the North East ¼ section 34.

South East ¼ of the North East ¼ section 34.

North East ¼ of the North West ¼ section 34.

North ½ of the North East ¼ section 35.

North West ¼ of section 35.

All in Township 45 North Range 25 West.

The original deed from the Northwestern Railroad to Conley and Hartley for the North West ¼ of section 35 was never recorded, and there is therefore no record of whether the mineral interest was retained by them, or not. Mr. Cleveland claims that there is no record on their books. They have however acquired all the outstanding tax titles, and I take it for granted they propose to claim the mineral interest. Mr. Belden is now endeavoring to secure the original deed, but the chances of finding it are slim. However, the other lands on which there is no question as to title to the ore, are of sufficient value to warrant the purchase price, which is $8,000.

We have also secured an option for lease on the half interest owned by D. F. Wadsworth in the South ½ of the North East ¼ of section 28, and have an option for the purchase of one half the fee.

As far as possible all the lands that were known to have any mineral value have been secured.

The drilling on the option held on the Old Swanzy Mine, from Angus Smith and others was completed without finding a merchantable body of ore. The option was therefore allowed to lapse.

Respectfully submitted,

M. M. Duncan

Agent.

7

T A X E S.

You will note from the comparative statement of taxes sent you, that the taxes this year are less than for last.

The difference in the valuation in the city of Ishpeming is due entirely to the decrease in personal property.

In the city of Negaunee we were able to secure a reduction of $100,000 in the valuation of the Negaunee Mine, while the Ironwood taxes have been referred to by Mr. Ellard in his report.

In the city of Marquette the valuation was reduced, by the difference in the value of the ore at Presque Isle.

In Forsyth township the increase in the valuation was due to the enhanced value put upon the Austin Mine, and also the personal property represented principally in the stockpile.

+:+:+:+:+:+:+:+:+:+:+

In order to increase the efficiency of the organization, it was decided in November to divide the mines into groups, and appoint Local Superintendents, slected as far as possible from our Engineering Department.

Mr. S. R. Elliott, who has been with the Company for the past six years, was made Superintendent of the Negaunee and Maas Mines.

Mr. W. W. Graff, who has been employed for four years, was placed in charge of the Cliffs Shaft and Moro Mines.

We had no third man with sufficient experience to put in charge of the Lake and Salisbury, and up to this time I have been unable to find a suitable man for the position.

This change will not only give us more intelligent personal supervision of the properties, but will also enable the mining captains to spend the entire day underground. This has heretofore been impossible, owing to the fact that they were practically Superintendents, and had to look after the surface as well as the underground operations. In order to get the full benefit of their practical knowledge their time should be devoted wholly to the direction of the underground work.

The costs for the past year on the restricted output have been very gratifying, and are largely due to the close supervision of every detail of the work by each man in charge.

P R I Z E S.

The system of awards for Well Kept Premises etc., has been continued, and more interest was shown in the past year than for several years previous. The results were correspondingly better, and the general improvement of the entire town more noticeable.

I recommend that the plan be continued.

I beg to transmit herewith the report of our Master Mechanic, on the operations of his Department for the past year.

Respectfully submitted,

M. M. Duncan

Agent.

CLEVELAND CLIFFS IRON CO.
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DETAIL OF STOCK USED.

Ore	1904 Tons	Lbs.	Price	Amount	Cost Per Ton	Percent Ore Used	1903 Tons	Lbs.	Price	Amount	Cost Per Ton	Percent Ore Used
Lake	19738	530	3.067	60545.01	4.265	73.8	48544	918	2.894	140508.97	3 614	67.0
Bedford							7489	580	2 688	20142.18	518	10 3
Salisbury	3707	1238	2 988	11079.52	780	13 9	4163	1776	2 962	12335.26	317	5 7
Foster							720	1150	1 843	1327.23	034	1 0
Cliffs Shaft	2760	1728	3 965	10948.93	771	10 3	6490	1595	3 854	25011.01	644	8 9
Verona							202	150	2 071	418.46	011	3
Lake Silica	534	2142	1 678	897.73	063	2 0	3098	118	1 536	4759.95	122	4 3
Pewabic							1812	1773	5 566	10085.03	260	2 5
Wood for thawing ore				417.92	030					142.77	004	
Dr.a/c yrs. analysis ore				1180.67	083					1127.99	029	
Total	26741	1158	3 181	85069.78	5 992	100 0	72521	1340	2 970	215858.85	5 553	100 0
Cr.a/c yrs. analysis ore										399.06	010	
Total	26741	1158	3 181	85069.78	5 992	100 0	72521	1340	2 970	215459.79	5 543	100 0
Limestone	1117	720	884	987.48	070		3198	910	903	2890.11	074	
Charcoal (Bu)	1252064		091	102339.15	7 208		3364675		073	247931.23	6 377	

THE CLEVELAND-CLIFFS IRON COMPANY.
Pioneer Furnace No. 1

COMPARATIVE STATEMENT OF PIG IRON COST SHEETS FOR 1903 AND 1904.

Blast No. 2 / Tons Made This Blast 176062	IRON MADE IN 1904, 14198 TONS								IRON MADE IN 1903, 38875 TONS							
	Labor		Supplies		Total		Cost Per Ton		Labor		Supplies		Total		Cost Per Ton	
GENERAL EXPENSE:																
Insurance			73	45	73	45		005			354	29	354	29		009
Taxes			3150	88	3150	88		222			3254	52	3254	52		084
Analysis	421	89	74	93	496	82		035	671	82	78	28	750	10		019
Salaries and Other Expenses	6695	70	2672	32	9368	02		660	8382	30	3290	13	11672	43		300
Total	7117	59	5971	58	13089	17		922	9054	12	6977	22	16031	34		412
MAINTENANCE:																
Piping	86	94	70	20	157	14		011								
Tracks and Yard	106	42	147	43	253	85		018	1735	22	1408	27	3143	49		081
Trestles and Dock	437	34	367	84	805	18		058	1336	47	3237	53	4574	00		118
Buildings	397	76	2416	93	2814	69		199	2424	94	3512	64	5937	58		153
Machinery	723	01	766	36	1489	37		105	660	48	607	06	1267	54		032
Tuyeres	40	62	11	61	52	23		004	48	87	646	61	695	48		018
Relinings and Renewals			1420	50	1420	50		100			3890	20	3890	20		100
Water Supply	35	19	70	93	106	12		007	51	17	85	56	136	73		004
Pig Iron Trucks, Coal & Ore Buggies	376	36	243	00	619	42		044	279	03	101	21	380	24		009
Stack	102	33	129	29	231	62		016	28	54	18	88	47	42		001
Stoves	214	23	415	28	629	51		044	127	64	58	72	186	36		005
Cleaning Up	584	07	28	39	612	46		043	177	26	16	00	193	26		005
Equipment			2886	79	2886	79		203								
Total	3104	27	8974	81	12078	88		852	6869	62	13582	68	20452	30		526
OPERATING:																
Machinery	2362	23	267	25	2629	48		184	2364	85	724	39	3089	24		079
Electric Light	57	94	86	03	144	87		010	244	30	169	25	413	55		011
Bottom Fillers	3032	58	39	95	3072	53		217	8729	26	135	91	8865	17		228
Top Fillers	1025	95	2	40	1028	35		072	2612	67	13	98	2626	65		068
Handling Iron	1950	42			1950	42		137	5407	45		57	5408	02		139
Handling Cinder	1053	84	102	34	1156	18		082	2848	27	200	98	3049	25		079
Weighing and Grading Iron	625	30			625	30		044	654	60			654	60		016
Founders, Keepers & Helpers	4730	36	16	80	4747	16		334	9653	27	15	00	9668	27		249
Coal Forkers	4015	82	82	96	4098	78		289	9401	03	156	47	9557	50		246
Casting Tools	70	17	152	02	222	19		016	201	19	278	01	479	20		012
Sand and Clay	234	02	299	13	533	15		038	903	80	1032	50	1936	30		050
Filtering			140	81	140	81		010	4	00	471	55	475	55		012
Wood	170	72	418	39	589	11		041	48	02	278	50	326	52		008
Cleaning Stoves	739	82	984	95	1724	77		121	346	15	281	06	627	21		017
Fuel	108	50	3699	64	3808	14		268								
Total	20177	67	6293	57	26471	24	1	863	43418	86	3758	17	47177	03	1	214
STOCK USED:																
Ore	34	36	85035	42	85069	78	5	992			215459	79	215459	79	5	543
Charcoal			102339	15	102339	15	7	208			247931	23	247931	23	6	377
Limestone			987	48	987	48		070			2890	11	2890	11		074
Total	34	36	188362	05	188396	41	13	270			466281	13	466281	13	11	994
Cost Of Production	30433	89	209601	81	240035	70	16	907	59342	60	490599	20	549941	80	14	146
DEPRECIATION:																
Equipment			3105	51	3105	51		218								
Construction			7102	50	7102	50		500			19451	00	19451	00		500
Improvement			130	37	130	37		009			2849	25	2849	25		073
Total			10338	38	10338	38		727			22300	25	22300	25		573
Credits			**19**	**29**	**19**	**29**		**001**			**887**	**85**	**887**	**85**		**023**
Total			10319	09	10319	09		726			21412	40	21412	40		550
Total Cost On Yard	30433	89	219920	90	250354	79	17	633	59342	60	512011	60	571354	20	14	696
LOADING & SWITCHING — 1904 / 1903																
Loading Cars, Tons 8740 / 26922½			524	40	524	40		060	1461	66	153	66	1615	32		060
Switching 8740 / 26922½	90	28	166	10	256	38		029	173	15	181	84	354	99		013
Total Loading Cars	90	28	690	50	780	78		089	1634	81	335	50	1970	31		073
Loading Vessel 7161 / 6337	197	54	898	61	1096	15		153	57	62	769	82	827	44		131
Grand Total	30721	71	221510	01	252231	72	17	765	61035	03	513116	92	574151	95	14	769
Construction Acc't. Not Sunk Off					27153	91							34256	41		
Improvement Acc't. Not Sunk Off					66401	61							3515	03		
Cost Per Ton For Labor							2	163							1	570

SUMMARY OF COST PER TON.

	On Yard	On Cars	On Vessel	On Yard	On Cars	On Vessel	Yield 04	Yield 03
Cost on yard, as above	17 633	17 633	17 633	14 696	14 696	14 696	Ore 531	Ore 536
Cost to load, as above		089	153		073	131	Coal 882	Coal 863
Total	17 633	17 722	17 786	14 696	14 769	14 827	Flux 176	Flux 184
Com. and Expenses, Cleveland Office	350	350	350	350	350	350		
Total Cost	17 983	18 072	18 136	15 046	15 119	15 177		

THE CLEVELAND CLIFFS IRON COMPANY
Pioneer Furnace No. 1.

COMPARATIVE STATEMENT OF REFINED ALCOHOL COST SHEET FOR 1903 AND 1904.

Plant No.1.	GALLONS PRODUCED YEAR 1904, 50124½ Labor	Supplies	Total	Cost per Gal.	GALLONS PRODUCED YEAR 1903, 225052. Labor	Supplies	Total	Cost. per Gal.
GENERAL EXPENSES:								
Office Expense	1078 86	412 53	1491 39	030	1500 60	479 18	1979 78	008
Fire Insurance		3270 00	3270 00	065		4950 00	4950 00	022
Analysis	322 33	67 30	389 63	008	623 68	67 73	691 41	003
Taxes		654 43	654 43	013	000 00	550 00	550 00	003
Accident	6 71	370 35	377 06	007				
Total	1407 90	4774 61	6182 51	123	2124 28	6046 91	8171 19	036
MAINTENANCE:								
Tanks and Stills	288 46	996 02	1284 48	026	842 65	1180 14	2022 79	009
Condensers	503 58	343 19	846 77	016	176 63	1296 48	1473 11	007
Machinery	72 41	27 40	99 81	002	188 83	190 81	379 64	002
Boilers	1008 13	828 99	1832 12	037	203 50	395 59	599 09	003
Fans and Pulleys	27 05	121 96	149 01	003	120 97	315 50	436 47	002
Smoke Mains	768 59	515 75	1284 34	026	502 33	3231 24	3733 57	017
Buildings	80 74	126 15	206 89	004	587 24	238 36	825 60	003
Water Supply	23 36	93	24 29	001	21 95	76 39	98 34	000
Cleaning Up	10 36	6 72	17 08	000	221 61	6 46	228 07	001
Total	2777 68	2967 11	5744 79	115	2865 71	6930 97	9796 68	044
OPERATING:								
Superintendent	608 00		608 00	012	687 50		687 50	003
Stillmen	1609 61		1609 61	032	5306 06		5306 06	024
Engineers	393 05		393 05	008	1412 53	25	1412 78	007
Firemen	505 97	35	506 32	010	2375 86	49	2376 35	010
Machinery		51 21	51 21	001		210 31	210 31	001
Boilers	81 17	18 98	100 15	002	290 11	291 59	581 70	002
Fuel	250 47	6616 68	6867 15	137	1046 26	30581 80	31628 06	140
Electric Light	11 93	62 94	74 87	001	215 88	141 24	357 12	002
Lime	47 20	684 60	731 80	015	132 04	6260 00	6392 04	028
Chemicals		84 30	84 30	002		546 80	546 80	002
Hose	1 12	2 26	3 38	000	6 38	401 51	407 89	002
Total	3508 52	7521 32	11029 84	220	11472 62	38433 99	49906 61	221
Cost of Production	7694 10	15203 04	22957 14	458	16462 61	51411 87	67874 48	301
DEPRECIATION:								
Construction Account		3139 08	3139 08	062		4177 80	4177 80	019
Improvement Account		9105 44	9105 44	182		12833 26	12833 26	057
Over-run Chemical Supplies		**110 05**	**110 05**	002				
Total		12134 47	12134 47	242		17011 06	17011 06	076
Total Cost	7694 10	27397 51	35091 61	700	16462 61	68422 93	84885 54	377
LOADING AND SWITCHING:								
Barrels, Cal. 1904 1903 56362½ 13573		1853 70	1853 70	033		6752 50	6752 50	032
Loading " " 221610	23 25		23 25	000	103 25	000 00	103 25	000
Switching " "	4 90	4 22	9 12	000	10 92	11 52	22 44	000
Total	28 15	1857 92	1886 07	033	114 17	6764 02	6878 19	032
Total Cost on Cars Year	7722 25	29255 43	36977 68	737	16576 78	75186 95	91763 73	
Cost per Callon Year								407
Construction Account not Sunk off			2580 87				9494 56	
Improvement Account not Sunk off			40089 62				80175 48	
Smoke Rec'd from 11682 Cords Year								
Yield of Alcohol per cord of Wood				429	Impossible to determine yield for year on account allowing smoke to to escape in air while plant was not ready to receive it.			

The Cleveland-Cliffs Iron

PIONEER FURNACE No. 1

COMPARATIVE STATEMENT

REFINED ALCOHOL

PLANT NO. 1

1903
&
1904

F. 23. 200. 4-04. N.

THE CLEVELAND CLIFFS IRON CO.

PIONEER FURNACE.

CRUDE ~~Refined~~ Alcohol Cost Sheet.

PLANT NO 1 MONTH OF YEAR 190

93,190.

Gallons Produced, 1 Month,

Gallons Produced, 2 Months 47579½

		Labor	Supplies	Total	Total Months	Cost per Gallon Year	Cost per Gallon Mos.
GENERAL EXPENSES							
Office Expense		224 25	139 07	363 32		008	
Fire Insurance			915 00	915 00		019	
Analysis		99 56	7 60	107 16		002	
Taxes			133 34	133 34		003	
Accident							
MAINTENANCE	Total	323 81	1195 01	1518 82		032	
Tanks and Stills		411 19	2364 98	2776 17		057	
Condensers		104 79	71 89	176 68		004	
Machinery		24 55	8 64	33 19		001	
Boilers		36 56	36 88	73 44		002	
Fans and Pulleys		148 97	484 80	633 77		013	
Smoke Mains		566 02	506 92	1072 94		022	
Buildings		52 30	18 90	71 20		002	
Water Supply							
Ditch Gas Main		238 30	1 61	239 91		005	
Cleaning Up							
	Total	1582 68	3494 62	5077 30		106	
OPERATING							
Superintendent		125 00		125 00		003	
Stillmen		1030 59		1030 59		022	
Engineers		251 10		251 10		005	
Firemen		332 50	21	332 71		007	
Machinery			48 31	48 31		001	
Boilers		36 77	11 82	48 59		001	
Fuel		169 10	5116 86	5285 96		111	
Electric Light		50 77	55 89	106 66		002	
Lime		32 06	657 00	689 06		014	
Chemicals			75 00	75 00		002	
	Total	2027 89	5965 09	7992 98		168	
Cost of Production		3934 38	10654 72	14589 10		306	
DEPRECIATION			759 60	759 60		016	
Construction Account			2333 32	2333 32		049	
Improvement Account							
	Total		3092 92	3092 92		065	
Total Cost		3934 38	13747 64	17682 02		371	
LOADING AND SWITCHING							
Barrels	Gals. 50247½		554 51	554 51		011	
Loading	" "	19 16		19 16		000	
Switching	" "	2 23	2 44	4 67		000	
	Total	21 39	556 95	578 34		011	
Total Cost on Cars 1 Month							
Cost per Gallon 1 "							
Total Cost on Cars 2 Months		3955 77	14304 59	18260 36		383	
Cost per Gallon "							

Construction Account not sunk off

Improvement " " " "

Smoke Rec'd from Cords, 1 Mo.

" " " 9702 " 2 Mos.

Yield of Alcohol per Cord of Wood 4 90

" Pyroligneous Acid per Cord of wood

Average cost per gallon, plants No. 1 and 2,

The Cleveland-Cliffs Iron Co.

PIONEER FURNACE.

Crude ALCOHOL COST SHEET.

Plant No. 1

MONTH OF YEAR 1904.

H. Niedecken Co., Mfg. Stationers, Milwaukee. 90,190.

THE CLEVELAND-CLIFFS IRON COMPANY.
Pioneer Furnace No. 1

COMPARATIVE STATEMENT OF ACETATE COST SHEETS FOR 1903 AND 1904.

Plant No. 1	POUNDS PRODUCED 1904, 809650 Average Per Day 6882							POUNDS PRODUCED 1903, 2022208 Average Per Day 5777						
	Labor		Supplies		Total		Cost Per Lb.	Labor		Supplies		Total		Cost Per Cwt.
GENERAL EXPENSE:														
Office Expense	510	43	201	32	711	75	088	645	37	198	15	843	52	042
Analysis	70	34	12	51	82	85	010	111	96	13	06	125	02	006
Fire Insurance			2	45	2	45	000			11	00	11	00	000
Total	580	77	216	28	797	05	098	757	33	222	21	979	54	048
MAINTENANCE:														
Buildings	5	52	3	62	9	14	001	45	99	1	68	47	67	003
Tanks	25	71	3	19	28	90	003	14	83	48	86	63	69	003
Conveyor	9	47	22	38	31	85	004	9	57	13	14	22	71	001
Dryer	52	98	30	92	83	90	010	15	47	6	04	21	51	001
Piping	3	48	8	89	12	37	002	23	97	74	46	98	43	005
Boilers	341	24	297	79	639	03	079			4	67	4	67	000
Generator	2	29		39	2	68	000	10	20		93	11	13	001
Motors	16	70	1	74	18	44	002	5	19		84	6	03	000
Cleaning Up	6	30			6	30	001							
Total	463	69	368	92	832	61	102	125	22	150	62	275	84	014
OPERATING:														
Raking	270	34			270	34	034	742	82		15	742	97	037
Skimming	448	18			448	18	055	1250	17	7	48	1257	65	062
Engineers		00				00			00				00	
Firemen	279	45		06	279	51	034	622	23	1	25	623	48	031
Fuel	148	21	3703	71	3851	92	476	214	77	7176	49	7391	26	365
Electric Light	7	55	15	96	23	51	003	39	62	35	94	75	56	004
Boilers	31	35	9	06	40	41	005							
Pumps	6	40			6	40	001							
Total	1191	48	3728	79	4920	27	608	2869	61	7231	31	10090	92	499
Cost Of Production	2235	94	4313	99	6549	93	808	3752	16	7594	14	11346	30	561
DEPRECIATION:														
Improvement			1500	00	1500	00	186			1500	00	1500	00	074
Total	2235	94	5813	99	8049	93	994	3752	16	9094	14	12846	30	635
LOADING & SWITCHING: 1904 1903														
Sacks 809650 2022208			309	50	309	50	038	1	66	719	55	721	21	036
Loading 791930 2022208	33	86			33	86	004	74	14			74	14	004
Switching 791930 2022208	4	61	4	13	8	74	001	8	53	8	78	17	31	001
Storing 412095								231	44	24	70	256	14	015
Total	38	47	313	63	352	10	043	315	77	753	03	1068	80	053
Total Cost On Cars	2274	41	6127	62	8402	03	1 037	4067	93	9847	17	13915	10	688
Improvement Acc't. Not Sunk Off					10224	60								
Yield Per Cord Of Wood							69							
Smoke Received from 1904														
Cords 11682														

The Cleveland-Cliffs Iron Co.

PIONEER FURNACE No. 1

COMPARATIVE STATEMENT

A C E T A T E

PLANT NO. 1

1903
&
1904

THE CLEVELAND-CLIFFS IRON COMPANY.
Pioneer Furnace No. 1

COMPARATIVE STATEMENT OF ACETATE COST SHEETS FOR 1903 AND 1904.

Plant No. 2	POUNDS PRODUCED 1904, 740910 Average Per Day 5348				POUNDS PRODUCED 1903, 1061433 Average Per Day 4005			
	Labor	Supplies	Total	Cost Per Cwt.	Labor	Supplies	Total	Cost Per Cwt.
GENERAL EXPENSE:								
Office Expense	510 42	201 30	711 72	096	645 37	193 53	838 90	079
Analysis	70 28	12 49	82 77	011	111 94	13 06	125 00	012
Total	580 70	213 79	794 49	107	757 31	200 59	963 90	091
MAINTENANCE:								
Buildings		2 93	2 93	001	20 83	28 00	54 83	005
Tanks	2 07	57	2 64	000	76 60	45 12	121 72	012
Dryer					74 81	25 04	99 85	010
Ovens					2 12	30	2 42	000
Piping					10 44	14 84	25 28	002
Boilers	20 24	48 30	74 54	010	62 78	81 68	144 46	014
Pumps					4 27	43	4 70	000
Total	28 31	51 80	80 11	011	257 85	195 41	453 26	043
OPERATING:								
Raking	304 32	1 14	305 46	041	702 12	4 30	706 42	067
Skimming	487 77		487 77	066	1195 85	22	1196 07	112
Engineers	198 36		198 36	027	456 61		456 61	043
Firemen	187 51	04	187 55	025	304 26	1 67	305 93	028
Fuel	98 07	3704 97	3803 04	513	181 41	6672 28	6853 69	645
Electric Light	7 53	15 29	22 82	003	39 58	19 13	58 71	006
Boilers	52 80	27 26	80 06	011	9 12	8 23	17 35	002
Pumps						9 00	9 00	001
Total	1336 36	3748 70	5085 06	686	2888 95	6714 83	9603 78	904
Cost of Production	1945 37	4014 29	5959 66	804	3904 11	7116 83	11020 94	1 038
DEPRECIATION:								
Construction		741 00	741 00	100		741 00	741 00	070
Total Cost	1945 37	4755 29	6700 66	904	3904 11	7857 83	11761 94	1 108
LOADING & SWITCHING: 1904 1903								
Sacks 740910 1061433		379 50	379 50	051		527 79	527 79	050
Loading 766794 1068849	39 40		39 40	005	64 87		64 87	006
Switching 766794 1068849	5 37	5 03	10 40	001	5 43	5 28	10 71	001
Total	44 77	384 53	429 30	057	70 30	533 07	603 37	057
Total Cost On Cars	1990 14	5139 82	7129 96	962	3974 41	8390 90	12365 31	1 165
Improvement Acc't. Not Sunk Off			5308 15				6049 15	
Yield per Cord of Wood				123				120
Smoke Received from 1904 1903								
Cords 6020 8872								

The Cleveland-Cliffs Iron Co.,

PIONEER FURNACE No. 1

COMPARATIVE STATEMENT

ACETATE

PLANT NO. 2

1903
&
1904

THE CLEVELAND CLIFFS IRON COMPANY.
Pioneer Furnace No. 1

COMPARATIVE STATEMENT OF REFINED ALCOHOL COST SHEET FOR 1903 AND 1904.

PLANT NO. 2	GALLONS PRODUCED 1904, 43912½ Labor	Supplies	Total	Cost Per Gal.	GALLONS PRODUCED 1903, 66588 Labor	Supplies	Total	Cost Per Gal.
GENERAL EXPENSE:								
Office Expense	1309 11	543 30	1852 41	042	1612 34	663 27	2275 61	034
Fire Insurance		2250 00	2250 00	051		2250 00	2250 00	034
Analysis	421 88	74 91	496 79	011	671 78	78 26	750 04	011
Taxes		787 77	787 77	018		813 63	813 63	012
Total	1730 99	3655 98	5386 97	122	2284 12	3805 16	6089 28	091
MAINTENANCE:								
Tanks and Stills	176 51	153 72	330 23	007	290 45	1238 98	1529 43	023
Condensers	3 60	14 04	17 64	001				
Machinery	75 38	199 57	274 95	006	24 40	58 80	83 20	001
Boilers	54 99	98 10	153 09	004	196 31	402 26	598 57	009
Gas Mains	4 09	79	4 88	000	213 78	436 28	650 06	010
Buildings	31 17	10 13	41 30	001	31 09	7 70	38 79	000
Water Supply	41	07	48	000				
Ditch	46 87		46 87	001	100 14	12	100 26	002
Cleaning Up	14 85		14 85	000	4 67	26	4 93	000
Total	407 87	476 42	884 29	020	860 84	2144 40	3005 24	045
OPERATING:								
Superintendent	733 00		733 00	016	750 00		750 00	011
Stillmen	1371 22		1371 22	032	2042 51	5 00	2947 51	044
Engineers	396 74		396 74	009	914 05		914 05	014
Firemen	375 07	14	375 21	009	612 75	3 57	616 32	010
Machinery		100 48	100 48	002		159 04	159 04	002
Boilers	105 92	54 57	160 49	004	96 65	159 67	256 32	004
Fuel	192 22	7472 73	7664 95	175	367 86	15333 01	15700 87	236
Electric Light	45 71	63 34	109 05	002	243 45	109 35	352 80	005
Lime	2 46	1331 30	1333 76	030	5 00	2697 00	2702 00	041
Chemicals		114 80	114 80	003		359 90	359 90	005
Hose	1 50	78	2 28	000	6 74	49	7 23	000
Total	3223 84	9138 14	12361 98	282	5939 01	18827 03	24766 04	372
Cost of Production	5362 70	13270 54	18633 24	424	9083 97	24776 59	33860 56	508
DEPRECIATION:								
Construction		5834 88	5834 88	133		5834 88	5834 88	087
Improvement						319 00	319 00	005
Total		5834 88	5834 88	133		6153 88	6153 88	092
Over-run Chemical Supplies		**110 05**	**110 05**	**003**		**160 12**	**160 12**	**002**
Total		5724 83	5724 83	130		5993 76	5993 76	090
Total Cost	5362 70	18995 37	24358 07	554	9083 97	30770 35	39854 32	598
LOADING AND SWITCHING: 1904 1903								
Barrels, Gallons 37631½ 65219		1246 89	1246 89	033		1554 95	1554 95	030
Loading " 47635 65219	22 65		22 65	001	31 47		31 47	000
Switching " 47635 65219	3 55	3 26	6 81	000	3 04	3 60	7 24	000
Total	26 20	1250 15	1276 35	034	35 11	1558 55	1593 66	030
Total Cost On Cars	5388 90	20245 52	25634 42	583	9119 08	32328 90	41447 98	622
Construction Acc't. Not Sunk Off			40233 58				46068 46	
Yield of Alcohol per Cord of Wood				729				751
Smoke Received From 1904 1903								
Cords 6020 8872								

The Cleveland-Cliffs Iron Co.,

PIONEER FURNACE No. 1

COMPARATIVE STATEMENT

REFINED ALCOHOL

PLANT NO. 2

1903
&
1904

THE CLEVELAND-CLIFFS IRON COMPANY.
Pioneer Furnace No. 1

COMPARATIVE STATEMENT OF WOOD COST SHEETS FOR 1903 AND 1904.

	P A R S O N S								M A T H E W S								L I M E S T O N E							
			Amount				Cost Per Cord				Amount				Cost Per Cord				Amount				Cost Per Cord	
	1903	1904	1903		1904		1903	1904	1903	1904	1903		1904		1903	1904	1903	1904	1903		1904		1903	1904
Cords Produced	31469 1/2	23505 1/2							21130 1/2	23109 7/8							8592 5/8	7033						
Chopping			28085	77	17774	91	887	756			18884	62	17283	66	894	748			7698	65	5209	26	896	741
Stumpage #			39	95	97	06	100	100			2370	95	2574	18	112	111			945	20	773	53	110	110
Foreman & Measuring			1014	32	790	77	032	034			765	71	788	36	036	034			345	30	398	33	040	057
Traveling Expense			190	18	202	36	006	009			167	25	188	92	008	008			100	99	130	34	012	018
Exchange			33	65	28	10	001	001			52	45	24	60	002	001			8	75	7	85	001	001
General Expense			374	11	198	36	011	008			396	53	235	28	019	010			131	15	91	17	015	013
Fire Protection			159	26	25	36	005	001			63	52			003									
Superintendent			664	56	608	30	021	026			664	63	741	94	031	032			320	81	299	76	037	043
Taxes			2103	60	1133	28	067	048			1664	54	2961	33	080	129					874	46		124
Spurs & Barns			1051	27	1217	12	033	052			1276	49	3466	35	060	150			850	26			100	
Total			33716	67	22075	62	1 065	939			26306	69	28264	52	1 245	1 223			10401	11	7784	70	1 211	1 107
Cords Shipped	11143 1/2	14269							48968 1/2	10419							4950 1/4	4162 1/2						
Cost of Wood at Stump			11187	38	15167	93	1 004	1 063			52089	72	12971	65	1 064	1 245			5926	30	5050	22	1 197	1 214
Hauling and Loading			8763	17	12139	30	786	850	###		45705	71	10429	73	933	1 001			3905	69	3492	52	789	839
Freight			4821	00	5988	00	432	419			13719	06	2837	00	279	272			1631	00	1436	00	329	345
Swg. in Furnace Yard			404	47	747	39	037	052			1632	82	442	47	033	042			185	74	171	21	037	041
Piling - Furnace Yard		##	50	39	378	48	303	227	##		924	32	294	57	389	257		##	14	40	171	21	400	312
Total			25226	91	34421	10	2 264	2 412			114071	63	26975	42	2 329	2 589			11663	22	10321	16	2 356	2 480

	WOOD BOUGHT FROM JOBBERS								WOOD ALONG WHITEFISH SHIPPED							
			Amount				Cost Per Cord				Amount				Cost Per Cord	
	1903	1904	1903		1904		1903	1904	1903	1904	1903		1904		1903	1904
Cords Shipped	405 3/4	123 1/2							35 1/4							
Cost of Wood on Cars			683	18	204	32	1 682	1 650			53	84			2 094	
Freight			151	78	41	46	374	335			6	00			233	
Switching-Furnace Yard			16	98	8	27	042	073					96		033	
Total			851	94	254	05	2 098	2 058			60	80			2 360	

REMARKS:

\# < 1903 - 399 1/2 Cords cut on J. I. Hardy's land
1904 - 970 5/8 Cords cut on J. I. Hardy's land

< 1903 - Optg. Portable .181
1903 - Loading & Hauling 752

< 1903 - 166 cords
1904 -1669 1/2 cords

< 1903 - 2376 1/2 Cords
1904 - 1143 3/8 Cords

< 1903 - 36 Cords
1904 - 549 1/2 Cords

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