Mine Data

AGENT'S ANNUAL REPORTS AND

STATISTICS

YEAR 1901.

Mine & Prac. Eng.

#2067

ANNUAL REPORTS AND STATISTICS

DEPARTMENT OPERATIONS

YEAR ENDING NOV. 30, 1 9 0 1

I N D E X

CLEVELAND-CLIFFS IRON COMPANY,

ISHPEMING, MICHIGAN.

AGENT'S ANNUAL REPORT

FOR

Year ending November 30th, 1901.

INDEX.

THE CLEVELAND-CLIFFS IRON COMPANY.

Ishpeming, Michigan, Jany. 14,1902.

Wm. G. Mather, Esq., President,

Cleveland, Ohio.

Dear Sir,-

I beg to submit herewith my annual report of the operation and present condition of the mines of the Cleveland-Cliffs Iron Company. The detailed Cost Statement, Inventory, and maps forming a part of this report, have been sent you.

MICHIGAMME MINE.

AVERAGE ANALYSES OF MINE SAMPLES.

	IRON	PHOS.
Michigamme ore	59.46	.103

AVERAGE ANALYSES OF SHIPMENTS.

	IRON
Michigamme ore	59.17

ORE STA TEMENT NOV. 30, 1901.

		LAST YEAR
On hand Dec. 1, 1900	748	0
Output for year	34867	19842
Total	35615	19842
Shipments	24537	19094
Bal. in stock Nov. 3o, 1900	11078	748

MICHIGAMME MINE.

ORESHIPMENTS FOR YEAR 1901.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Michigamme ore	15019	9518	24537	19094
Increase 29%			5443	

AVERAGE WAGES AND PRODUCT.

Product 1901 - 34867 tons	SURFACE		UNDERGRD.		TOTAL	
Product 1900 - 19842 tons	1901	1900	1901	1900	1901	1900
Average no. men working	34	52	91	90	125	142
" wages per day	1.95	1.93	2.08	2.07	2.04	1.99
" " per mo. 25 days	48.75	48.25	52.00	51.75	51.00	49.75
" prod. per man per day	3.38	1.29	1.54	1.55	1.06	.69
Labor cost per ton	.578	1.565	1.352	1.332	1.930	2.897
Diff. in labor cost per ton						
Average prod. Breaking & Tramm.			2.72	3.07		
" wages for miners			2.23	2.16		
" " " trammers			1.80	2.17		
" " " contractors			2.23	2.06		

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	PRICE	AMOUNT	AMOUNT 1900
50% Powder	37250	.12	4470.00	2671.40
Fuse	44600	3.75	167.20	139.78
Caps	9600	5.00	48.00	31.25
Exploders				4.72
Wire				2.49
			4685.20	2849.64
			1901	1900
Product			34867	19842
Lbs. of powder per ton of ore			1.07	1.12
Cost per ton for explosives			.135	.144

MICHIGAMME MINE.

STA TEMENT OF COMPARATIVE WAGES.

	1901	1900	Increase for 1901
SURFA CE:			
Total number of days	10329	16061	
Average rate	1.95	1.93	.02
Amount	20146.94	31065.79	
UNDERGROUND:			
Total no. of days	22688	12777	
Average rate	2.08	2.07	.01
Amount	47155.95	26430.04	
Total days	33017	28838	
Average rate	2.04	1.99	.05
Total Amount	67302.89	57495.83	

MICHIGAMME MINE.

The cost of mining 34867 tons of ore this year has been as follows:

	1901	1900
Product	34867	19842
General Expense	.191	.165
Maintenance	.140	.137
Mining Expense	2.300	2.382
Cost of Production	2.631	2.684
Exploratory	.075	
DEPRECIATION		
Inventory		.003
New Construction		
Opening Mine	.350	.350
Closing Mine	.140	
Total	.490	.353
Less Credits	.001	.013
Total Depreciation	.489	.340
Cost on Stockpile	3.195	3.024
Loading and Shipping	.012	.028
Total Cost	3.207	3.052
Averages wgaes 1901 204		
" " 1900 199		
Difference .05		
Increased wages over 1900 per ton	.047	
Comparative total	3.160	3.052

Michigamme

MICHIGAMME MINE.

The maps accompanying this report show the extensions made by the the Cleveland-Cliffs Iron Company since reopening the mine in 1899. Practically no new ore bodies were discovered, all the ore mined coming from the extensions of the old workings, except on the 13th level. The developments in this mine were extremely discouraging and after two years' work, the showing and prospects did not warrant keeping it in operation.

The output gradually decreased from the beginning of operations and when we closed down, there was but one clean stope of ore in the mine and not to exceed 10,000 tons of ore in sight. In order to verify the conclusions reached by the Agent and Mining Engineer of the Company, a careful examination of the underground workings was made by Prof. Smyth of Harvard and Mr. Walter Fitch, Agent of the Champion Iron Company. Both of these reports, which were sent you, agreed with our conclusions, and acting under your instructions, the mine was closed Sept. 1st.

In addition to the underground work, surface explorations were carried on during the summer. East of No. 4 shaft, half way to the railroad water tank, an old pit was reopened. This was reported to have shown a good sized body of rich ore. The vein was found to be only three or four feet wide and badly mixed. No extensive exploring was possible, as the pit was under the Chicago & Northwestern Ry. tracks and below the lake level. To the west of No. 6 shaft, a number of test pits were sunk, but nothing but mixed ore was found and that only a few feet wide. In many cases no ore was found on the contact of the quartzite and jasper. The former Company drilled several holes west of the mine, but none of them showed merchantable bodies of ore.

The new machinery which was installed when the mine was reopened has all been shipped to Ishpeming.

Following is a description of the work done during the year:

Michigamme.

MICHIGAMME MINE.

NO. 4 SHAFT.

On the third level, connection to No. 3 shaft was made by drifting through 10 ft. of the shaft pillar and holing into an old cross-cut. The floor of this level for 75 ft. east of No. 3 had been removed and it was necessary to bridge across the opening. From this point a drift was driven 50' east to reach the ore shown by a diamond drill hole from surface. From the face of this drift a cross-cut was driven south 100 ft. to the hanging. No ore was found, showing that the ore did not reach to this depth. A raise was put up from this cross-cut and struck the ore at 30 ft. The deposit was only 8 ft. wide. It was opened up 60 ft. long and 20 ft. high. When work was suspended, the ore in the breast was only 4 ft. wide, with jasper on both sides. The east end of this sublevel was only a few feet from the first large open pit east of No. 3 shaft, so that at best but a few tons of ore were left. At No. 3 a cross-cut was driven 40 ft. northeast under the raise and four feet of ore found next the foot. There wasso little ore to be had that we continued to work this place until the mine closed down, although the cost was necessarily excessive, on account of the size of the vein.

10TH LEVEL.

Shortly after the date of the last annual report, work on this level was stopped, the ore in the face of the drift having pinched down to 2 ft.

11TH LEVEL.

During the year this level was extended 90 ft. east, all in rock. Considerable ore was mined from the old stope at 11, but it was practically exhausted when the mine closed down.

12TH LEVEL.

This level was extended 60 ft. east and reached the ore shown on the level above. In the face of the drift the ore was cut off by a crossing or fault of quartzite.

Michigamme.

MICHIGAMME MINE.

At No. 6 the ore was 15 ft. wide and at the date of suspension was stopped out, with the exception of a few tons left on the bottom of the 11th level.

13TH LEVEL.

This level was very disappointing. At the beginning of the year there was 10ft. of ore in the face of the drift, but after drifting 50 ft. west the ore was entirely cut out by jasper.

A stope 50 ft. long was put up 40 ft., where the foot and hanging came together, pinching out the ore. It was expected that the ore would go as high as the 11th level. The formation at the west end of this level was cross-cut to the foot, but no sign of ore was found.

The stope at 12 was exhausted a month before the mine closed.

On the 10th and 11th levels immediately above this stope, the largest body of ore in the mine was found and it was therefore doubly disappointing to get practically nothing here. It is possible that there may be some ore farther west, but it is not probable that it is of any size.

14TH LEVEL.

This level was exhausted early in the year. Before closing down, a diamond drill hole was put directly south, all in quartzite and schists.

15TH LEVEL.

At No. 14 a cross-cut 165 ft. long was driven northwest across the fault to the ore. Only a very small deposit was found and it was very badly mixed with hornblende and pyrites. A drift was driven from the end of this cross-cut 50 ft. northwest across the formation, but no ore was discovered. The ore directly above on the 13th level was 10 ft. wide and clean. Apparently the ore instead of improving with depth, is getting smaller and leaner.

MICHIGAMME MINE.

NO.6 SHAFT.

8TH LEVEL.

At No. 2 the stope was carried 130 ft. west. Going west the ore increased in width but decreased in quality, the average being not more than 45% in iron. The breast of the stope was evidently close to another fault. This contract was worked until the mine closed, but the ore had to be carefully picked, full one-half the material broken being thrown away.

10TH LEVEL.

At No. 5 stoping continued during the year and advanced as far west as No. 2. Fifty feet from the breast the ore was 15 ft. thick, but at the breast it had entirely cut out.

11th LEVEL.

This was the only clean stope that was left in the mine when operations were suspended. The ore was 10 ft. wide and was being stoped 50 ft. high. The breast of this stope was 150 ft. east of No. 2 and 5. When it is as far west, this ore will undoubtedly cut out just as it has on the levels above.

When it was decided to close the mine, the bottom of this level east of the shaft was beaten away, only about 1000 tons remaining when mining was suspended.

NO.6 SHAFT.

Is completed to the 13th level, the distance sunk during the year being 45 ft. The ground is extremely hard, being a mixture of hornblende and jasper. Two cross-cuts were driven from the bottom of the shaft! No. 15 went 85 ft. west and then 50 ft. south to the hanging and no ore was found. No. 13 was driven 95 ft. southeast, also to the hanging and continued along the hanging for 25 ft. without the slightest sign of ore.

MICHIGAMME MINE.

FATAL ACCIDENTS.

There was one fatal accident during the year, Pat Powers having been killed on January 28th by falling down NO. 6 shaft while enggged in sinking. He was an old miner and must have missed his footing, as he was perfectly familiar with the place, having worked there for some months.

MICHIGAMME.

ASHLAND MINE.

The lease of this property was bought in April and the mine was turned over to the Cleveland-Cliffs Iron Company May 1st. The work however continued under the management of the Hayes Brothers until June 10th. On that date, Mr. H. F. Ellard was appointed Superintendent and Capt. G. A. Anderson, Mining Captain. They occupied the same positions at the Aragon Mine. As this is a new proposition, it will be in place to describe briefly the equipment of the mine before considering the underground workings.

The machinery consists of

One Webster Camp & Lane 5 drum hoist, each drum having a diameter of 10 ft., driven by two Corliss engines 26" x 42"

One small hoist with two six foot drums driven by a 13 x 26 slide valve engine

One 35 drill Ingersoll-Sargent Compressor with Corliss Condensing Engine

One 10 drill Ingersoll-Sargent Straight Line Compressor

Six return tubular boilers; two 16 x 52, two 16 x 60, two 16 x 64

Two Stirling Water Tube Boilers

The underground pumping plant, as at present arranged, requires a larger amount of fuel than the work warrants, as the water is handled in relays and not ffom a central station. It is impossible to improve on the present plan until the new shaft is completed and the 13th level connected at the line of the shaft. A triple expansion direct acting pump will then be installed of sufficient capacity to handle all the mine water. It is estimated that this will make a saving of fully one third in the cost of pumping.

At present there are four one compartment shafts in use, all in the hanging, numbered respectively 3,4,6,and 7. With the exception of No. 3, which has only recently been retimbered, they are in very bad condition and require constant repairs.

At No. 4, 6, and 7, the shaft pillars alone prevent the complete

Ashland.

collapse of the shafts, and a large tonnage of ore is thus tied up and no mining can be done in the vicinity of the shafts.

Immediately after taking charge of the property, steps were taken to locate a new shaft in the footwall to reach the large bodies of ore tributary to No. 4, 6, and 7 shafts. The underlying quartzite is only 75 ft. thick and below this, and lying on the granite, are siliceous slates. The quartzite foot had shown cracks in the Norrie Mine and it was not thought safe to sink the shaft in this material.

Careful explorations were made with a diamond drill from the 3rd, 8th, and 10th levels, which showed a uniform thickness of quartzite with a sufficient thickness of slates to warrant sinking the shaft 155 ft. back in the footwall. As finally located the shaft is immediately south of the present No. 6.

On Sept. 23rd ground was broken. The following week a headframe was erected and on the 30th hoisting was started with the bucket. For two weeks after the shaft was begun, there was almost constant rain, which caused serious delay and for several days stopped work entirely. The saturated condition of the ground loosened the slates near the surface and on Oct. 19th after blasting, a run occurred, which brought down over a hundred tons of material and extended to surface. Since that time work has progressed satisfactorily and rapidly. Cross-cuts were driven from the 3rd, 5th, and 7th levels to the line of the shaft and raises are being put up to meet the sinking.

On Nov. 14th the raise from the 3rd level was holed and stripping is now progressing rapidly. The raise from the 5th level was within a few feet of the 3rd level on the 1st of December. As soon as this raise is holed, the miners will sink from the 5th level to meet the raise from the 7th.

While the shaft is progressing with unusual rapidity, even better

Ashland

work could be accomplished if the rock could be handled expeditiously. All of the rock from the shaft has to be hoisted to surface, and with only one skip in No. 6 to handle both the rock and ore, the shaft work is governed by the capacity of the skip. The shaft is being sunk by the day, miners being paid $2.50 for a shift of eight hours.

Following is the cost of the work to date:

Drifting to shaft	1178.75
Sinking	2582.84
Raising	1432.59
Compressors	98.30
Hoisting	178.33
Timbering	1487.61
Skip Road, Ladderway, Temp.Hoist,etc	311.32
Moving old pump house	475.59
Surface grading, etc.	38.75
Pumping	103.81
Diamond Drill	847.93
	8735.82

If no unforeseen accidents occur, this shaft will be the quickest and cheapest ever sunk on the Gogebic Range. The dimensions and timbering are shown in the Book of Maps.

I wish to call your attention to the size of the cage, which is made so that the timber can be loaded on a car in the timber yard and lowered without transferring, and delivered to any part of the mine on the same car, thus saving rehandling.

SURFACE.

When we took charge of the mine, the buildings were in bad repair, the ground was littered with old timbers and scrap of all kinds, and the prop-

erty had the appearance of being in a dilapidated condition. The whole of the surface equipment has been overhauled, the buildings repaired and painted, the ground cleaned up, and everything is now in good condition.

COAL TRESTLE.

The coal trestle has been rebuilt and its capacity increased 25%. The old Cornish Pump House, which was in the way of the new shaft, has been moved and fitted up for a supply house. The cost of this work has been as follows:

Coal Trestle	$964.73
Warehouse	220.80 (Not completed.)
Total	1185.53

Two horizontal tubular boilers 18 x 72" have been bought and will be erected in the spring. They will carry 140 lbs. of steam and will be used exclusively for pumping. From the time the Ashland Mine was opened until we took charge of it, the system of mining consisted in taking the ore from between the levels on square sets and leaving pillars between each stope. The stopes were carried as high as the nature of the ground permitted, and when they showed weight, were allowed to come together. The ore in the pillars was then mined by putting up raises and running it. This was done on several different levels at the same time and resulted in premature caves and loss of ore.

The caving of the ground has allowed the sand to come down and mix with the ore, and the dykes being soft and easily broken, have also added their share to the mixture. By referring to the maps you will see that a large part of this year's product has come from these old caves and there is still an extensive territory that has not been explored.

It has required a large amount of drifting to reach these bodies of crushed ore and when found they have been so badly mixed that it has often

happened that one car of rock was hoisted to every car of ore. It is putting it conservatively to say that the crushed ore is one fourth rock. With such conditions to contend with, it has been impossible to mine the ore cheaply. Of course a cheap product could be obtained by only taking the clean ore, but your instructions have been to treat this mine as if we owned it in fee.

Before mining the ore on the lower levels, the ground on the upper levels must be thoroughly explored, so as not to repeat the mistakes that have already been made.

Two diamond drills have been exploring for the past two months, but so far nothing has been found, except 10 ft. of ore north of the 10th level. One drill is now on the 3rd level No. 3 shaft drilling north and the second on the 6½ foot level No. 6 shaft, drilling northeast. Contrary to the generally accepted opinion, the dykes on which the ore is deposited are very irregular and complicated, which greatly increases the difficulty and expense of exploring. Add to this the faulting of the measures, and it can readily be understood why large bodies of ore have been overlooked on levels which were thought to be exhausted.

By examining the cross-section through No. 4 shaft you will see that there are two dykes directly below the 6th level. From information gathered from the old maps, no work has been done between these dykes, except one drift on the 7th level, which plats on the section directly below the first dyke. The territory between No. 4 and 5 shafts below the 7th level has never been explored. This will be done later by drilling or drifting west through the dyke from the 7th or 8th levels near 5 shaft.

In No. 6 shaft a drift north from 15 should find an extension of the ore which contract 2 is working.

In No. 7 shaft, with the exception of the drift which went north from the 292 foot level and struck the north vein, no exploring has been done beyond the dykes.

Ashland.

ASHLAND MINE.

The three dykes to the north of the fault lying on the section through A A have never been found in 7 shaft. With the exception of the work done on the north vein, no ore has been mined beyond the fault line, that can be distinctly traced on the old cross-sections through No. 7 shaft. This ground will be tested with a diamond drill.

On the 10th level No. 6 shaft an old diamond drill hole shows 25 ft. of ore 130 ft. north of the main drift. It has been impossible to drift for this ore, as No. 6 shaft is too busy to handle any extra rock.

Prof . Smyth made a careful geological study of this mine last September and when his report is received, it will no doubt indicate further places where ore is likely to occur.

It has not been customary to desribe the underground workings of the Hematite Mines by referring to the contracts by number, but in this case, they are so scattered and on so many levels that for the sake of clearness, it has been thought best to do so.

Following is a description of the mine and the present condition of the work:

NO. 3 SHAFT.

3RD LEVEL.

Contract 1 is working east of the shaft on a small pillar on the footwall which was left by the former management. It is reported that there are several pillars east of this, which we expect to reach later. Some caved ore may also be encountered in this drift.

Contract 2 is drifting west from the shaft on the same level. This contract is taking ore from an old cave by running.

Soon after taking over the mine a drift was driven 260 ft. north. First through a dyke 40 feet wide, then through 160 ft. of jasper, the balance in dyke material. This work was done following the policy which was adopted Ashland.

when the mine was acquired, to explore the upper levels before doing any mining below. At present we are just starting a horizontal diamond drill hole north from the face of this drift. This will be continued to our north boundary. No other exploring has been done in this shaft during the year, owing to the large amount of dead work being prosecuted in the east end of the mine.

NO. 4 SHAFT.

4TH LEVEL.

Contract 1 is drifting south, expecting to find an ore body on the footwall, which from all information that we can obtain, was not worked by the former management.

Contract 2 east of the shaft is taking ore which was left on the dyke, and is also getting some crushed ore from the old workings.

Contract 3 is working on the same dyke as 2. There is only a small amount of ore at this point.

Contract 4 is working on a new find of ore between No. 5 and 6 shafts close to the footwall and apparently on the same dyke. A raise has been put up 8 sets all in ore, the back stopping in sand. From the top a sublevel was opened 110 ft. east and west, the ore being 35 to 40 ft. wide. This sub is now exhausted and a second sub has been opened 18 ft. below. It is expected that this ore body will extend 300 to 400 feet west. East no work can be done, as it would injure the shaft pillar at No. 6 shaft. This ground was undercut on the 6th level and it is presumed that this caused the cave, and no attempt was afterwards made to reach it.

Contracts 6 and 7 are working on the same ore body as No. 4.

At contract 9 the old drift was cleaned up and started southeast. In one set good ore was struck. The indications here are very favorable.

ASHLAND MINE.

Contract 10 west of No. 4 shaft is now taking a small pillar left by the old Company. Previous to this they were working on a sublevel immediately below where they now are, but had to stop on account of caved ground.

5½ LEVEL.

Contract 14 has drifted through 80 feet of good ore with a dyke to the north corresponding to dyke at No. 2 on the 4th level, and is now raising to test the ore. There has been no work done at this point, but the ore is crushed as a result of mining below it.

It is claimed by old miners that several pillars were left between the 3rd and 4th levels on this dyke; and if so, No. 14 will find them.

NO. 6 SHAFT.

1ST LEVEL.

Contract 1. One gang of miners is working on a sub two sets below the old sub west of No. 6 shaft. The old sublevel is so near the sand and the crushed ore so badly mixed that it did not pay to mine it. The drift is going west along the foot. It is now in badly mixed ground, but is expected soon to reach clean ore. There should be quite a tonnage of ore at this point. The Mine Inspector, Capt. Taylor, who was formerly Captain of the Ashland Mine, thinks we should get at least 35,000 tons from this point. The ground below was mined before this ore was taken, causing it to cave, and they never went back after it.

5TH LEVEL.

Contract 15 is working directly south of the shaft. The drift first went through a dyke 35 feet wide, then 15 feet of mixed ore and the same width of good ore, before striking the dyke. They have now started to climb the dyke.

ASHLAND MINE.

6½ LEVEL.

Contract 12 is raising on a hard dyke in ore northwest of the shaft. The ore is being taken two sets wide and is of Ashland grade.

Contract 17 is scramming out what ore is left on the extreme northern part of the level.

Contracts 13, 18, and 23 are scramming out some small pillars on the sub above this level. 18 and 23 will be stopped at once for fear of running the ore on the 4 and 6½ levels No. 4 shaft.

7TH LEVEL

Contract 20 is climbing the dyke to the 6½ level.

Contract 14 drifted north until it struck No. 5 shaft and found the dyke in the bottom of the drift just to the south of the shaft. A raise was put up three sets in ore and encountered a second dyke over the main drift.

The drift is now starting west and when it gets beyond this dyke the raise will be continued. There is quite a block of ore at this point, being the shaft pillar at old No. 5 shaft, which was abandoned some years ago. It was probably left because it was too hard to be mined cheaply.

8TH LEVEL.

Contract 26 is drifting west through the shaft pillar in mixed ground and will hole to 25.

Contract 24 is on a sublevel 7 sets above the 8th level west of the shaft. The drift was driven south under the main dyke on the 7th level and the ore was cut out by a capping of rock. To the west the drift went through a bar of rock 8 ft. wide and is again in good ore.

Contract 25 is going under the dyke on the 7th level. There is a little rock on the east side of the stope, but both the south and west sides are in ore and there is ore in the back. This is entirely new ground and is

probably the same ore as in 22 on the 8½ level.

24 and 25 were put up to reach the ore shown on the 7th level, but this deposit is evidently north of the present workings.

27 has just been started north from the top of 24 raise to reach this ore.

8½ LEVEL.

Contract 22 has drifted 40 ft. east from the shaft. It is being carried two sets wide on account of the very hard ground. The east side and back are in steel ore, but the main drift is badly mixed. A diamond drill hole from the 8th level showed 47 feet of ore west of the shaft and the outlook here seems very favorable. No work was ever done on this body of ore.

NO. 7 SHAFT.

1ST LEVEL.

Contracts 1, 2, 6, 8, and 9 are all stoping on the sub levels above the first level. This is all crushed ground, but the ore is of good quality and fairly clean.

No. 3 is stoping ore from under the hanging east of the shaft. This is nearly exhausted.

Contract 4 on the second sub has drifted through the dyke and has opened up a fine body of ore 100 feet wide. This sub is so close to the sand that it is not thought very much ore will be obtained on this level, although there are places where the ore extends three sets above the sub. The dyke here seems to have swung very rapidly to the south, the drift being only three sets away from it.

On the next sublevel the ore should all be clean. The greater part of the ore from No. 7 shaft has been coming from the first level and it was being rapidly exhausted. This new development will greatly increase the life of this level. It is expected that this ore will continue to the Ashland.

west, although no work has yet been done on it.

6½ LEVEL.

Contract 16 is working on the extreme east end of the level. They are running the ore next the Norrie line and will gradually fall back towards the shaft. A drift was put into the boundary, but no ore found.

Contract 17 is climbing the dyke west of 16 and is now up three sets. The back of the raise is in ore and the prospects are fairly good.

Contract 18 south of 17 has been mining from an old room. They have just started to raise to test the ore in the back. The ore is apparently about 25 feet wide and of fair quality.

9TH LEVEL.

Contract 26 has holed to the drift from Contract 23. More ore should be found here north of the dyke. This contract is very near the large stopes on the 8th level.

Contract 25 is working in an old room east of the shaft. There is very little ore left at this point.

Contract 24 is on a sublevel 7 sets above this level. It was driven as far towards the line as the caved ground would permit, and they are now falling back to the raise. The ore has been badly mixed and continues poor.

10TH LEVEL.

Contract 30 is working on a sublevel 36 feet above this level next the Norrie line. They are climbing the dyke, which at this point, is very flat.

The old maps show the ore on the 9th level at the boundary line to be about 80 ft. wide with a horse of rock in the center about 15 ft. wide. The ore on the 9th level extended about 200 feet west on this dyke.

Contract 33 is working in an old room east of the shaft. They are following the dyke to the east.

Ashland.

ASHLAND MINE.

Contract 29 has just started to the east of 33 to follow the ore on the footwall. The ore here looks well, but is only about 16 feet wide.

Contract 28 is practically exhausted.

Contract 31 is west of the shaft pillar and is drifting west to reach the ore shown on the 9th level.

13TH LEVEL.

Contract 22 has just struck the dyke, but it is so near the footwall that there is no room for ore. They have just begun to raise and it is too soon to say what they will find.

ORE SHIPMENTS YEAR ENDING NOV. 30, 1901.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YR.
Ashland	127983	116401	244384	167391
Taylor	30493	9855	40348	31078
Globe	2600		2600	33623
Total	161076	126256	287332	232092

ASHLAND MINE.

AVERAGE ANALYSES OF SHIPMENTS.

	IRON	PHOS.
Ashland Ore	60.76	.040
Taylor Ore	58.88	.046

ORE STATEMENT NOVEMBER 30TH, 1901.

	ASHLAND	TAYLOR	GLOBE	TOTAL (11 mos)	TOTAL LAST YR. (12 mos.)
In stock Jany 1st, 1901	31391	11053		42444	5565
Output for year	221271	55875	2600	279746	268971
Total	252662	66928	2600	322190	274536
Shipments	244384	40348	2600	287332	232092
Bal. in stock Nov.30,01.	8278	26580	0	34858	42444

AVERAGE WAGES AND PRODUCT.

	SURFACE	UNDERGROUND	TOTAL
Product 1901 - 162638 Tons	1901	1901	1901
Average no. men working	85	353	438
" wages per day	1.98	2.11	2.09
" " " mo. 25 days	49.50	52.75	52.25
" product per man per day	10.51	2.55	2.05
Labor cost per ton	.189	.827	1.016
Aver. Product Breaking & Tramming		4.54	
Average wages for miners		2.38	
" " " trammers		2.04	
" " " contractors		2.25	

Ashland.

ASHLAND MINE.

STA TEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVER. PRICE	AMOUNT
27% Powder	40750	.092	3736.70
30% "	500	.095	47.50
40% "	6850	.105	719.25
Fuse	111100	3.90	432.89
Caps	37900	5.23	198.20
			5134.54

	1901
Total Product	162,638
Pounds powder per ton of ore	.295
Cost per ton for explosives	.032

STATEMENT OF WAGES.

	1901
SURFACE:	
Total number of days	15473
Average rate	1.98
Amount	30644.48
UNDERGROUND:	
Total number of days	63681
Average rate	2.11
Amount	134510.87
Total Days	79154
Average rate	2.09
Tptal Amount	165155.35

Ashland Mine.

ASHLAND MINE.

STATEMENT OF TIMBER USED FROM JUNE 1ST TO NOV. 30, 1901.

TIMBER

127981 Feet Timber @ .036 $4650.61

Lagging

18613 Feet Poles		.98	282.07
276288 " 7' Lagging - 640 cords - @	$3.25	.75	2072.16
35933 " 8' " 77 " - @	3.85	.75	269.50
5810 " 10' "		.75	43.57
		.79	2667.30

	1901.
Feet of timber per ton of ore	.787
Feet of Lagging per ton of ore	2.07
Feet of lagging per foot of timber	2.63
Cost per ton for timber and lagging	.045

The cost of mining 162638 tons of ore has been as follows:

	1901.
Product	162638
General Expense	.184
Maintenance	.079
Mining Expense	1.115
Cost of production	1.378
Exploratory	.030
DEPRECIATION	
Inventory	.036
Improvemnet	.015
New No. 6 Shaft	.054
Total	.105
Total Depreciation	.105
Cost on stockpile	1.513
Loading and Shipping	.032
Total Cost	1.545

ASHLAND MINE.

The following estimate of ore in sight, including the crushed ore, was made by our Mining Engineer, Mr. Elliott.

SHAFT	LEVEL	TONS
3	3	10,000
4	4	40,000
4	5	67,500
4	5½	88,000
4	6½	50,000
4	9&10	10,000
6	1	20,000
6	5	40,000
6	6½	128,000
6	6½sub	35,000
6	7	138,000
6	7floor	50,000
6	8½	20,000
7	1&sublevels	84,000
7	1floor	12,000
7	6½	20,000
7	7	30,000
7	8 & subs between 6 & 7	75,000
7	9	28,500
7	10	25,000
7	13	2,000
		973,300 Tons

Mr. Elliott remarks "The 5 and 6½ levels No. 4, the 6½, 7, and 8 levels No. 7 and the ore above the 8th level between 6 and 7 shafts, I have estimated by measurements on the maps. Such a small part of these levels are open that I could form no idea of how much ore was present by an examination. The actual ore areas on these levels, according to the maps, show much more ore than I have estimated, but I do not know how much has been mined since the maps were posted. I do not feel justified in putting on a larger estimate for these levels, as the ore cannot be seen at the present time. The mine is in good shape and I feel that we will not be disappointed with the property."

IMPERIAL MINE.

No mining was done at this property during the year. After the mine closed down in October, 1900, everything was kept in readiness to begin mining at any moment. The pumps were kept going until the 11th of July. No ore having been sold, it was not deemed advisable to continue the expense of pumping, and acting under your instructions, the mine was allowed to fill. It will take about 30 days to pump out the water and to prepare the mine for resumption of work.

WEBSTER MINE.

This mine was closed at the same time as the Imperial. The workings are only a few feet below water level and there is consequently only a small amount of water to pump when the mine starts up again. A watchman is employed to look after the houses and machinery at this property and the Imperial.

TITAN MINE.

This mine is held under a twenty year lease from the Michigan Land & Iron Company at a yearly rental of $250.00 and taxes. The ore is of the same quality as that produced at the Imperial and Webster. This property has not been operated since it was acquired two years ago. The low rental however warrants holding it until such time as there is a demand for this class of ore. The Beaufort Mine east of this property has been reopened and extensive exploring has shown a large body of ore. Most of the development has been towards the east. The old mine adjoining the Titan has been retimbered and, according to report, is capable of producing 100,000 tons next year.

VOLUNTEER MINE.

Our lease to this property expired June 1st, 1900. No ore was shipped during the year and there still remains in stock

18723 tons of Volunteer
23329 tons of Comrade ore.

Respectfully submitted,

W. L. Duncan Agent.

CLEVELAND IRON MINING COMPANY,

ISHPEMING, MICHIGAN.

AGENT'S ANNUAL REPORT

FOR

Year ending November 30th, 1901.

INDEX.

CLEVELAND IRON MINING COMPANY.

Ishpeming, Michigan, Jany. 12, 1902.

Wm. G. Mather, Esq., President,

Cleveland, Ohio.

Dear Sir,-

I beg herewith to submit my annual report of the operation and present condition of the mines and locations of the Cleveland Iron Mining Company. The detailed statements, inventory, and maps forming a part of this report have been sent you.

HARD ORE MINES.

MORO.

The maps have been numbered to show the location of the different stopes. The tinted portions are the extensions for the year. Work in the different parts of the mine has been as follows:

1ST LEVEL.

50 feet west of the shaft a cross-cut has been driven north 325 ft.; the first 250 ft. in rock, the balance in mixed ore running about 56% in Iron. On the west side the drift is following the hanging and has the foot on the east, showing a width of about 20 ft. This is probably the apex of the lense and not much can be expected at this point, although the drift will be continued north to test the ground beyond the soapstone dyke.

2ND LEVEL.

This level is exhausted.

3RD LEVEL.

No. 3 contract referred to last year has mined all the available ore west of the shaft and has been moved to the 6th level. The cross-cut west from the main north drift referred to last year struck the ore 40 feet west instead of 50 feet, as expected from the diamond drill hole. The depos-

it proved very small, being only 40 x 25 ft. There is good ore in the bottom and it is likely that it will be found of larger dimensions at greater depth. The footwall is dipping almost perpendicularly to the southwest. 75 ft. north of this deposit a second lense was crossed 50 ft. in width. This has been mined 100 ft. west, at which ppint the ore is cut out by the hanging.

At this writing No. 1 Contract is taking out the small amount of ore left in the bottom, the ore at this point averaging only 57% in Iron.

No. 8 Contract is drifting east on the same lense. The ore is only 25 ft. wide, but the stope has ore both in the back and the breast and is of better quality than to the west.

50 ft. north of this drift another lense was crossed 17 ft. wide on the west side, but only 6 ft. on the east. This has not yet been tested, but the probability is that it is the point of a deposit which will not be large on this level, but promises well for greater depth.

No. 12 is still drifting north in soaprock and is 525 ft. from the shaft. The end of the drift is 120 ft. south of Division Street and should reach the ore shown by the diamond drill holes in the meadow in about 350 ft.

While no very large or rich bodies have been encountered in this drift, enough has been found to more than pay for it and opens possibilities for good sized bodies of ore on the lower levels, which if found, will add immensely to the valye of the mine.

5th LEVEL.

Contract No. 4 has been working on this level continuously during the year. The ore is of good quality, but is now practically exhausted. The miners are now drifting southeast to reach the ore shown on the level above. At present there is about 3 ft. of ore in the breast.

6th LEVEL.

No mining has been done on this level during the year. At No. 3 a drift has just been started north to develop the ore which was found on the Moro.

third level.

7th, 8th, and 9th LEVELS.

These levels are exhausted, except the shaft pillars, which cannot be touched while the mine is in operation.

10th LEVEL.

Shortly after the date of the last annual report, the south stope was cut out by jasper and a drift was driven 75 ft. in rock before striking the ore again. When found however it had widened to 30 ft. and has been followed west 125 ft. There is ore both in the breast and the back. The quality of the product at this point is excellent, running from 62 to 64% in Iron. The face of the stope is 175 ft. from the Lake Superior line.

At No. 11 the north stope has continued in ore for the entire year, the average width being 30 ft. There is still ore in the back and the breast which at this time is about 200 ft. from the Lake Superior line. The ore coming from this stope is what is usually known as slate ore and averages 65% in Iron.

12th LEVEL.

During the year a rock cross-cut was driven 200 ft. west and struck the ore shown on the north deposit on the 11th level. On the south the stope is following the hanging, on the north there is still ore, showing at present a width of 35 ft. The ore is making back towards the shaft and it is already farther east than on the 11th level, and it is hoped, will continue for some distance farther. The ore has not yet been developed sufficiently to show its dimensions, but everything points to a larger deposit than on the level above. The quality of the ore is the same as that on the north deposit of the 11th level. We still have 400 ft. before reaching the Lake Superior line on this level. The south deposit has not yet been opened, but will be during the coming year. The developments on the 12th level are so encouraging that we have begun to sink the shaft another level, and it is

Moro.

now down 20 ft. on the underlay. The material is siderite and jasper, which is extremely hard and makes the sinking slow. It is proposed to sink 85 ft/ before opening out the new level.

SURFACE.

No ore has been shipped from this mine during the year and it was found necessary to extend the stockpile ground west to provide sufficient room for the winter's hoist. The ground at this point is 9 ft. below the dock level and has been filled 170 ft. long and 110 ft. wide. The material was taken from the old rock pile and from the rock drifts underground. The total cost was $2485.62.

In addition to the ground to the west it will probably be necessary to use a portion of the land lying between the coal dock and the South Shore rightof way. The ore at this mine will have to be moved next season, if the property is to be kept in operation.

FATAL ACCIDENTS.

There has been one fatal accident during the year; namely, Matt Makie, May 29th. Makie was barring down a piece of loose ore with a ladder resting against it, when the pumpman happening to pass, noticed the danger and told him to move the ladder, which he helped him to do. As soon as he left however, Makie put the ladder back and shortly after the ground fell, striking and killing him instantly. The man's death was entirely due to his own carelessness.

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

Stopes and Breasts	11,000 tons
Floors	38,500 "
Around "J" Shaft	15,500 "
Partly developed	48,000 "
	113,000 tons

MORO MINE.

AVERAGE ANALYSES OF MINE SAMPLES.

	IRON	PHOS.
Moro Mine - Scotch Ore	59.99	.155

The cost of mining 76085 tons of ore this year has been as follows:

	1901	1900	INCREASE	DECREASE
Product	76085	74459	1626	
General Expense	.117	.173		.056
Maintenance	.078	.067	.011	
Mining Expense	1.098	1.074	.024	
Cost of Production	1.293	1.314		.021
DEPRECIATION.				
Inventory	.030	.008	.022	
Improvement	.003	.110		.107
Steam Shovel	.005	.002	.003	
Reopening Mine		.413		
Total	.038	.533		.495
Less Credits		.026		
Total Depreciation.	.038	.507		.469
Cost on Stockpile	1.331	1.821		.490
Loading and Shipping		.025		
Total Cost	1.331	1.846		.515

Moro.

MORO MINE.

ORE STATEMENT NOVEMBER 30TH,1901.

	SCOTCH	LAST YEAR.
On hand Dec. 1, 1900	3147	812
Output for year	76085	74459
Total	79232	75271
Shipments	0	72124
Balance in stock Nov. 30, 1901	79232	3147
Increase in Output - 2% -	1626	

STA TEMENT OF COMPARATIVE WAGES.

	1901	1900	Increase for
SURFACE;			1901.
Total no. of days	9302¾	17074¾	Decrease
Average rate	1.77	1.80	.03 (1.6%)
Amount	16475.50	30764.19	
UNDERGROUND:			Decrease
Total no. of days	24014½	23673	
Average rate	2.10	2.12	.02 (.9%)
Amount	50532.74	50211.15	
			Increase
Total Days	33317¼	40747¾	
Average Rate	2.01	1.99	.02 (1%)
Total Amount	67008.24	80975.34	
Increase	666.34		

MORO MINE.

STATEMENT OF EXPLOSIVES USED FOR BEARKING ORE.

KIND	QUANTITY	AVER.PRICE	AMOUNT	AMOUNT 1901.
50% Powder	52663	.12	6319.56	5184.00
Fuse	81850	3.92	321.05	277.40
Caps	18950	5.69	107.80	98.00
Exploders	150	29.76	4.46	12.76
Battery Wire	12	.30	3.60	7.41
			6756.47	5579.57

	1901	1900
Total Product	76085	74459
Pounds powder per ton ore	.089	.58
Cost per ton for explosives	.089	.075
Increased cost per ton of ore	.014	

AVERAGE WAGES AND PRODUCT.

Product 1901 -76085 tons	SURFACE		UNDERGRD.		TOTAL	
Product 1900 -74459 tons	1901	1900	1901	1900	1901	1900
Average number men working	30	58	80	81	110	139
" wages per day	1.77	1.80	2.10	2.12	2.01	1.99
" " per mo. 25 days	44.25	45.00	52.50	53.00	50.25	49.75
" product per man per da	8.18	4.36	3.17	3.14	2.28	1.83
Labor cost per ton	.217	.413	.664	.674	.881	1.088
Diff. in labor cost per ton	.196	.84	.010	.078	.207	.789
Aver. Prod.breaking&tramming			4.89	4.51		
Aver. wages for Contractors			2.34	2.31		
" " " Miners			2.34	2.31		
" " " Trammers			1.85	1.85		
Amt. pd. in increased wages		1365.98		1893.84	666.34	8557.02

Moro.

NO. 3 MINE.

This mine was closed in June, 1892 and the workings are now filled with water. When operations were suspended 150,000 tons of ore were reported in sight, and it was producing at the rate of 95,000 tons per year.

LOCATION.

No extensive repairs to houses have been made during the year, with the exception of a bath room at Capt. Collick's house. He was the only one of the mining capatains without this convenience, and on account of his occupation, it was proper that he should have one.

The minor repairs are shown on the Summary of House Repairs accompanying this report. The houses are all old and the maintenance correspondingly high.

Owing to swampy ground, the alley between Jasper and High Streets has always been in bad condition and the regular spring and fall cleaning only temporarily improved it. The seepage from the outhouses kept it in an extremely unsanitary condition. During the year this has been remedied by a rock dressing and launders which keep it well drained.

The location as a whole is in an excellent condition and in point of cleanliness is an object lesson to other parts of the town.

CLEVELAND HEMATITE.

This mine has been permanently abandoned.

NO.3 MINE, H.O.LOCATION, HEMATITE.

[redacted]

LAKE MINE.

Cost of mining 468883 tons of ore this year has been as follows:

	1901	1900	INCREASE	DECREASE
Product	468883	497204		28321
General Expense	.079	.062	.017	
Maintenance	.047	.061		.014
Mining Expense	.818	.808	.010	
Cost of Production	.944	.931	.013	
EXPLORATORY	.004	.005		
DEPRECIATION				
Inventory	.006	.002	.004	
Improvement	.018	.027		.009
New Construction	.034	.008	.026	
Lake Angeline Drainage Accts.	.006	.002	.004	
Total	.064	.039	.025	
Less Credits	.000	.001		
Total Depreciation	.064	.038	.026	
Cost on Stockpile	1.012	.974	.038	
Loading and Shipping	.011	.013		.002
Total Cost	1.023	.987	.036	

A comparison with the cost for last year shows an increase of one cent in the mining expense. This is entirely accounted for in the Lake Angeline Pumping Expense, which was 1.2c higher than in 1900. The Lake Superior Iron Co. rendered a bill for three years pumping at the West End Emergency Plant and the cost of building a launder across caved ground to the scow pump, which has all been charged out this year.

It is proper to say that we had repeatedly asked for this account, but were unable to get it. Arrangements have been made for a monthly statement hereafter.

The increase in taxes per ton of ore was 1.1c. If these two items are considered the cost in 1901 was less than in 1900.

Lake.

LAKE MINE DIVISION OF MINING COST FOR THE YEAR ENDING NOV. 30, 1901.

	AMOUNT	COST
General Expense	36950.22	.079
Maintenance	22221.87	.047
Mining Expense		
Air Pipes	815.21	.002
Compressors	8550.29	.018
Hoisting	7943.69	.017
Wire rope, skips, & pulley stands	148.07	.000
Steam Pumps	10733.35	.023
Sinking "Repairs of shaft"	1880.94	.004
Mining Captain and Bosses	6922.11	.015
Dry House	962.29	.002
Top Landing and Tramming	5926.07	.013
Stocking and sorting	2581.85	.006
Lake Angeline Drainage Pumping Expense	9016.88	.019
TOTAL	114652.84	.245
YEAR 1900	106877.85	.214

OUTPUT BY GRADES	LAKE BESS.	LAKE	TOTAL
South Deposit	169703	17281	186984
2nd Level	6559	192384	198943
3rd Level	9941	73015	82956
Total	186203	282680	468883
YEAR 1900	184115	313089	497204

	SOUTH DEPOSIT 186984 Tons		2ND LEVEL 198943 Tons		3RD LEVEL 82956 Tons		TOTAL 1901 468883 Tons		TOTAL 1900 497204 Tons	
	AMOUNT	COST	AMOUNT	COST	AMOUNT	COST	AMOUNT	COST	AMOUNT	COST
Drifting	7462.20	.040	13155.49	.066	9537.23	.115	30154.92	.064	41412.23	.083
Breaking ore	74310.66	.398	79686.75	.401	31621.79	.381	185619.20	.396	205372.65	.413
Tramming	16890.10	.090	14592.86	.073	6023.11	.073	37506.07	.080	40702.37	.082
Filling			5294.40	.027	2024.87	.024	7319.27	.016	4216.77	.009
Timbering	21771.97	.116	29028.89	.146	11610.03	.140	62410.89	.133	59470.67	.120
Cave In	2037.06	.011	148.73	.001	2639.68	.032	4825.47	.010	5111.61	.010
TOTAL	122471.99	.655	141907.12	.714	63456.71	.765	327835.82	.699	356286.30	.717
YEAR 1900	136912.24	.703	200025.89	.688	19348.17	.685		.717		
Add. Cost per ton Accts above		.245		.245		.245		.245		
Cost of Production 1901		.900		.959		1.010		.944		
Cost of Production 1900		.917		.902		1.899		.931		.931
Increase				.057				.013		
Decrease		.017				.889				

SUMMARY / Mining Cost - 1901 - 699 - 1900 - 717
Gen. Expense It. 1901 - 245 - 1900 - 214
Total 944 931 Inc.over 1900 .013

Lake Mine.

ORE STATEMENT NOVEMBER 30th, 1901.

	BESSEMER	LAKE	TOTAL	TOTAL LAST YEAR
On hand Dec. 1, 1900	19400	40319	59719	19968
Output for year	186203	282680	468883	497204
Total	205603	322999	528602	517172
Shipments	203329	203454	406783	457453
Balance in stock	2274	119545	121819	59719
Dec. in product - 6% -			28321	

AVERAGE WAGES AND PRODUCT.

Product 1901 - 468883 tons -	SURFACE		UNDERGRD.		TOTAL	
Product 1900 - 497204 tons -	1901	1900	1901	1900	1901	1900
Average no. men working	90	90	434	445	524	535
" wages per day	1.96	1/90	2.19	2.33	2.15	2.26
" " per mo. 25 days	49.00	47.50	54.75	58.25	53.75	56.50
" product per man per day	16.69	17.19	3.73	3.83	3.05	3.13
Labor cost per ton	.117	.111	.588	.610	.705	.721
Diff. in labor cost per ton	.006	.023	.022	.037	.016	.060
Aver. Prod. Breaking & Tramming			5.83	6.02		
" Wages for Miners			2.24	2.45		
" " " Trammers			2.24	2.45		
" " " Contractors			2.24	2.45		
Diff. Decreased wages					16927.02	

AVERAGE ANALYSES MINE SAMPLES.

	IRON	PHOS.
Lake Bessemer	63.89	.037
Lake	57.29	.115

Lake

LAKE MINE.

AVERAGE ANALYSES OF SHIPMENTS.

	IRON	PHOS.
Lake Bessemer	64.03	.039
Lake	59.81	

ORE SHIPMENTS FOR 1901.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR.
Lake Bessemer	117855	85474	203329	179957
Lake	151900	51554	203454	277496
Total	269755	137028	406783	457453
Decrease - 11% -			50670	

COMPARATIVE WAGES.

	1901	1900	Increase for 1901.
SURFACE:			
Total number of days	28096	28923	
Average rate	1.96	1.90	.06 (3.1%)
Amount	55009.30	55135.66	
UNDERGROUND:			
Total number of days	125786	129729	
Average rate	2.19	2.33	Decrease .14 (6%)
Amount	275631.68	303388.48	
Total Days	153882	158646	Decrease
Average rate	2.15	2.26	.11 (4.9%)
Total Amount	330640.98	358524.14	
Decrease in amount	16927.02		

Lake.

LAKE MINE.

STATEMENT OF TIMBER USED FOR THE YEAR 1901.

	STULL TIMBER.				
Size	Lineal Feet	Price	Amount	Amount 1900	Feet Brd. meas.
6 to 8"	28072	.02	561.44	2743.84	
8 to 10"	219610	.03¼	7137.44	6780.23	321,987
10 to 12"	138658	.04¾	6586.17	5942.80	418,747
12 to 14"	28430	.06½	1847.95	953.50	142,150
14 to 16"	8334	.09	750.06	491.52	62,505
16 to 18"	908	.11	99.88	592.58	9,534
Total	424012	.040	16982.94	17504.47	954,923
"1900	508574	.034	17504.47	13046.03	944,208

	Feet	Price	Amount
LAGGING.			
Poles	61607	.01	61607
7 foot lagging	422003	.60	253202
1533 cords= 625x1533=			
5 foot lagging	958125	.52	498225
Total	1441735	.56	813034
" 1900	1348234	.55	739148

	1901	1900
Feet of timber per ton of ore	.904	1.023
" " lagging " " " "	3.075	2.71
" " " " foot of timber	3.400	2.65
Cost per ton for timber and lagging	.054	.041
Equivalent of stull timber to brd. measure	954923	944208
Feet Board Measure per ton of ore	2.04	1.89

Lake.

LAKE MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVG. RATE	AMOUNT	AMOUNT 1900
50% Powder	11660	.12	1399.20	2663.40
40% "	70150	.105	7365.75	5865.31
35% "				220.00
Fuse	225610	4.00	903.07	936.23
Caps	78829	5.60	441.69	414.60
			10109.71	10099.54

	1901	1900
Total Product	468883	497204
Pounds powder per ton of ore	.174	.161
Cost per ton for explosives	.021	.0203
Increased cost per ton	.0007	

Lake.

LAKE MINE.

ESTIMATE OF ORE IN SIGHT DECEMBER 1ST,1901.

OLD MINE,EAST SIDE.		
Above 190	6,000	
" 206	40,000	
" 223	27,000	
" 237	25,000	
" Second Level	31,000	129,000
WEST SIDE.		
NW from 6th Room above 2nd Level	10,000	
SW from Main to 21st room	59,000	69,000
Left to support Machy,Shaft,etc.		
East Above 1st L. to 6th	53,000	
" 2nd L. to 7th	150,000	
West " 1st L. to 6th	53,000	
" 2nd L. to 6th	155,000	411,000
1897 Est. between 2nd & 3rd L.	2,000,000	
Less mined	31,000	1,969,000
		2,578,000
SOUTH SIDE.		
Above 2nd Level	175,000	
" 300 ft. Level	222,000	397,000
		2,975,000

The decrease in the estimate from year to year may be misunderstood unless explained. When the mine was first opened, the shaft was sunk to the 3rd Level and was developed far beyond an economical standpoint. This is shown by the large expenditures for retimbering the main drifts. At the end of this year the ore had only been mined to the 2nd level and there yet re-

Lake.

mains the entire ore body between the 2nd and 3rd levels to be taken out, estimated to contain 2,000,000 tons. For this reason no development work has been done for several years and it will not be necessary to sink another level for sometime.

COMPARATIVE STATEMENT MAINTENANCE ACCOUNT.

	1901	1900	INCREASE	DECREASE
Tracks and Yards	3146.56	3415.51		268.95
Docks, Trestles, and Pockets	1194.48	3635.30		2440.82
Buildings	307.12	1129.36		822.24
Shop Machinery	109.53	167.74		58.21
Boilers	429.91	251.76	178.15	
Hoisting Machinery	1059.90	1118.29		58.39
Compressors and air pipes	410.40	672.55		262.15
Steam pumps	231.77	427.82		196.05
Top Tram engine and cars	905.99	753.34	152.65	
Skips and Skip Roads	801.26	617.06	184.20	
Underground tracks and cars	1087.54	1583.03		495.49
Electric Tram Plant	12199.88	13896.26		1696.38
Testing boilers and engines	105.68		105.68	
Repairs of stokers	73.23	247.45		174.22
Fire in Coal Pile	158.62	2192.08		2033.46
Total	22221.87	30107.55	620.68	8506.36
Decrease for 1901.				1885.68

The totals as above show a marked decrease for 1901. This occurs in the following accounts:

DOCKS? TRESTLES AND POCKETS. Decrease $2440.82 There was very little work done in filling in the surface where the ground has been settling, which Lake

was the cause for the large expenditure in 1900.

BUILDINGS. Decrease $822.24 The Comparative Statement below shows the cost on various buildings. The Dry Houses were repiped at a cost of $75.77 and the laying of new floors was completed this year.

	1901	1900	INCREASE	DECREASE
Office	26.71	72.24		45.53
Warehouse		2.20		2.20
Shops	11.02	149.82		138.80
Shaft House	60.45	66.47		6.02
Engine House	70.02	717.21		647.19
Dry House	138.92	121.42	17.50	
Total	307.12	1129.36	17.50	839.74
Decrease for 1901				822.24

BOILERS.

Increase $178.15 During the year the stokers were removed which necessitated some changing of the settings. Safety Water Columns were also put in for each of the five boilers.

TOP TRAM ENGINE AND CARS.

Increase $152.65. This includes cost of new belt for engine which cost $49.00; Castings for engines and labor - $111.45; also the expense of maintaining two plants for stocking and the other for loading cars during the winter.

SKIPS AND SKIP ROADS.

Increase $184.20. One skip was entirely rebuilt during the year and manganese wheels bought to replace the cast iron ones.

Lake.

LAKE MINE.

ELECTRIC TRAM PLANT.

Decrease $1696.38.

Following is a detailed statement of the various items making up this account.

ELECTRIC TRAM PLANT 1901.

	1901	1900	INCREASE	DECREASE	
Engine	35.47	13.09	22.38		
Dynamos	2.69	.06	2.63		
Motors	2961.23	4048.69		1087.46	
Wiring	675.91	441.31	234.60		
Tracks and Cars	7503.15	5488.82	2014.33		
Total	11178.45	9991.97	2273.94	1087.46	
Wiring Third level	303.81	694.44		390.63	
Tracks Third Level	717.62	3209.85		2492.23	
Total	12199.88	13896.26	2273.94	3970.32	
Net Decrease 1901 from 1900				1696.38	
Net Increase 1900 " 1899			5922.93		
Total Labor	7050.63	7445.92			
Total Supplies	5149.25	6450.34			

ENGINE.

New drip pans cost $17.38; other charges being for ordinary repairs.

MOTORS.

Decrease $1087.46 The comparative cost for each motor and extraordinary repairs is as follows:

Lake.

LAKE MINE.

	1901	1900
Motor No. 1	466.52	584.21
2	752.16	882.12
3	450.12	1104.44
4	255.19	684.17
5	218.91	
General Expense	818.33	793.75
	2961.23	4048.69
Extraordinary Expense:-		
New parts, etc. included in above amts.	627.94	1087.94

WIRING.

Increase $234.60. In August the trolley wire on the 2nd level was encased with planking which cost $135.00. New wiring on the third level in drift to South Deposit cost $130.00.

TRACKS AND CARS.

Increase $2014.33. The expenditures for the year were as follows:

		1901	1900
Tracks, repairs and alterations		1798.76	1418.47
Cars - Repairs to old cars	4621.93		
Alterations W.W.Cars	1057.60		
Repairs "	24.86		
		5704.39	4070.35
Total		7503.15	5488.82

The increase in repairs, etc. to cars is	1634.04
" " " " " " tracks	380.29
Total	2014.33

During the year 13 of the old main line cars were rebuilt in addition to ordinary repiars,this being an increase of $551.58 over last year.

Lake

LAKE MINE.

The alterations to new cars was to increase the capacity. The increase in track expense is due almost entirely to equipping the drift on the 3rd level going to the South Deposit.

The construction work on the 3rd level was as follows:

	1901	1900	DECREASE	
Wiring	303.81	694.44		
Tracks	717.62	3209.85		
Total	1021.43	3904.29	2882.86	

The work of installing the system on this level was begun in May,1900 and completed in June,1901. The material was nearly all new.

The following statement shows the Cost Per Ton for Maintenance of Electric Tram Plant as compared with 1900, exclusive of product from 3rd level trammed by hand and work done on the 3rd level.

Product 1901 467712 Tons	1901		1900		
Product 1900 485719 Tons	Amount	Per Ton	Amount	Per Ton	
Engine	35.47	.000	13.09	.000	
Dynamo	2.69	.000	.06	.000	
Motors	2961.23	.006	4048.69	.008	
Wiring	675.91	.002	441.31	.001	
Tracks and Cars	7503.15	.016	5488.82	.011	
Total	11178.45	.024	9991.97	.020	

TESTING BOILERS AND ENGINES.

Total expenditure $105.68. This was for an efficiency test of the stokers made during the summer before taking them out. Also a fuel test.

Lake.

LAKE MINE.

The drifting and raising for the year has been as follows:

OLD MINE.			DEVELOPMENT	MINED IN THE STOPES	TOTAL
NE	139'	Sublevel	99½	281½	
	1st	"		216½	
	170'	"	120	341	
	190'	"	86	551½	
	210'	"		50	
	240'	"	82		
SE	170'	"	27	75	
	206'	"	325	95	
	224'	"	139		
	238'	"		190	
	2nd	"	36		
NW	237'	"	130	57	
	2nd	"	131½	115	
	271'	"	424	129	
SW	190'	"	65½	74	
	224'	"		17	
	240'	"	594	806	
	2nd	"	112	224½	
	3rd	"	151		
			2522½	3223	
SOUTH SIDE.					
	116'	Sublevel	90	240½	
	122'	"	36		
	139'	"	133	330	
	168'	"	15	61½	
	195'	"		72	
	202'	"	139	203½	
	214'	"	15	391½	
	240'	"	48		
	2nd	"	13		
	268'	"	86	75	
	280'	"	5		
	300'	"	133½		
	3rd	"	616		
			1329½	1374	
			3852	4597	8449
NO. 4 SHAFT.					
		From Open Pit	359		
		Second Level	240		
		Third Level	96		695
		GRAND TOTAL.			9144

LAKE MINE.

FATAL ACCIDENTS.

There have been four fatal accidents during the year; namely,

Joseph Maddock	February 23rd
John Koski	May 13th
Thomas Nicholls	June 12th
John Roberts	Sept. 27th

Joseph Maddock had been working at the Lake Mine off and on for two or three years. He had been away for several months and only began work on the 9th. When he came back he was feeling unwell and asked for an easy place. He was working on a sublevel above the 2nd level northwest, and according to the evidence of his partner, he went down the raise to see how many cars the motorman had left under the chute. It was presumed he started to fill the car, as his body was found shortly after he left his stope, by the chuteman standing on the bottom of the drift, leaning over the side of the car and resting on his left arm. There is no evidence to show what caused his death, and it is presumed that it was due to heart trouble, although it is possible that he may have come in contact with the trolley wire.

John Koski, in company with his partner, was cleaning up the track under their chute. After finishing this work, Koski took up a bar and started to fill a motor car. In some way this came in contact with the trolley wire and he received the full force of the current. He immediately collapsed and died shortly afterward.

While it is generally considered that a current of 250 volts is harmless, there have been several deaths in this mine which can only be traced to an electric shock. The trolley wires are run in inverted troughs and every precaution taken to prevent accidents of this kind.

Thomas Nicholls was killed by a run of mud on the 2nd level. His partner, who left the stope after him, escaped, but Nicholls fell down a

raise to a sublevel 16 feet below. The fact that the mud did not reach this point until some minutes after he fell, shows that he was stunned by his fall, and when in that condition, buried by the incoming mud.

The Accident Report sent you gives full particulars of each occurrence and the evidence before the Coroner's Jury.

From a personal examination made at the time of each accident, I found that no blame could attach to the Captain or any of the sub-bosses.

John Roberts was helping the pipeman to run a pipe down the raise to carry off water and while cutting a hole through the timbers, he slipped and fell to the bottom, a distance of 75 feet. It is usually the custom when doing this work to put a plank across the raise to stand on, but in this instance Roberts did not take this precaution and slipped from one of the rounds of the ladder.

Work in the different parts of the mine has been as follows:

SOUTH AND NORTHEAST.

Everything above the 190 foot sublevel has been mined from the 6th room northeast to the 10th room southwest.

206 FOOT SUBLEVEL SOUTH & NORTHEAST.

During the year the ore between the first room northeast and the 10 room northeast has been mined. There is still left a small block of ore from the 10th to the 18th room northeast. Beyond the first room southeast the level has been opened to the 5th room southwest and the bulk of the ore mined. About three months work will exhaust this level. The ore in this part of the mine is badly mixed and the proportion of rock drifting to ore has been heavy.

When blasting in a stope at the 10th room northeast in November, there was a slight run of mud, but it was easily stopped and no serious damage resulted. The shock of the blast loosened the back of an old raise which had been put to fill the rooms, and through this the mud came.

LAKE MINE.

223 FOOT SUBLEVEL SOUTHEAST.

This sublevel has been opened up from the first to the ninth room southeast. The footwall at the east end of the mine is extremely flat and the ninth room is only a short distance from the foot. Most of the ore between the rooms mentioned had been mined on this level, only the pillars between the old rooms being left. This level is now being opened east and west but no more mining will be done until the 206 foot sublevel is exhausted.

There yet remains a body of ore from the 12th to the 22nd room southwest. The old rooms are now being filled preparatory to taking out this ore, but when mining operations are begun, it will be necessary to move the scow pump, which is directly over this part of the mine.

271 FOOT SUBLEVEL NW & SW.

This sub has been opened from the 7th to the 26th room southwest. Stoping has just begun and the ore is going to the 3rd level. The ore in this part of the mine has been much higher in Phosphorus than last year and a very small amount could be used in the Bessemer mixture.

There has been no mining between the 2nd and 3rd levels in this part of the mine, so that the difficulty and expense of maintaining the drifts on the 3rd level will not be so great as when mining above the 2nd level.

SECOND LEVEL.

Owing to crushing ground and the impossibility of maintaining the old drifts, a rock drift was driven from the 17th room northwest to the 23rd room southwest. The timber in the old drifts was so decayed that it required constant repairing and $7804.50 was spent for this purpose. The plat on this level was also retimbered at a cost of $575.55.

3RD LEVEL.

At the west end of the main west drift a new drift has been driven 250 ft. to within 35 ft. of the Lake Superior line and two raises put up to Lake.

take the southwest ore above this, on the 2nd level.

The drift that was started last year to reach the South Deposit from this level has been carried to within 140 ft. of the Lake Angeline line. Work was stopped temporarily to permit driving east and west to reach the ore body. Later it will be driven to the line. The drift is immediately under the dyke shown on the 2nd level by the diamond drillm which accounts for our not having struck the ore before.

The east cross-cut is in 50 ft. and has just reached the ore body. The west cross-cut is in 80 ft. and has not yet reached the ore. This is accounted for by its being 50 ft. north of the east cross-cut, which makes the difference in the distance. to be drifted to reach the ore. At the same time it indicates that the foot is much flatter than expected and that there will not be as much ore as anticipated. A raise has been put up from the end of this drift and has just holed to the 300 foot level, only the last 10 feet being in ore. It is probable that the deepest part of the basin is to the west and as there is still 450 ft. to the Lake Superior line, there is a chance for an ore body of considerable dimensions.

SOUTH DEPOSIT.

The ore referred to last year as having been discovered above "G" raise was followed to within 110 ft. of the surface or 35 ft. above the first level. The ore was so near the sand that extreme care has been necessary to prevent mud runs. 30 ft. has been mined from the top and there is now less danger from this source. The mud run referred to in another part of this report did not occur from work at this point.

The 139 foot sublevel is 230 ft. long and 30 ft. wide, and the ore body slightly increases in size as it goes down. The two small ore bodies in the southwest corner of the property have been mined to the 217 foot sub, leaving 17 ft. of ore above the 2nd level which will be mined from the main 2nd level drift.

LAKE MINE.

NO. 3 SHAFT.

All the ore west of the shaft has been mined to within 25 ft. of the 300 foot level, and 180 ft. west of the shaft to within 16 ft. of the level. No more ore can be mined west of the shaft until the ore above the 2nd level is exhausted. By the 1st of February, the ore from this level will go to the 3rd level through raises and the auxiliary hoist abandoned. The cost last year for hoisting was $3482.40, and for hand tramming to the shaft, $3786.01, so that the new method of handling the ore will make a substantial saving.

NO. 1 SHAFT.

During the year constant repairs have been necessary and it has cost us $1349.59 for retimbering. This item of expense will continue until the new shaft is completed.

NO. 4 SHAFT.

After thoroughly testing the ground by diamond drilling, the new shaft was located 700 ft. east of the Lake Superior line. This is as near the center of the ore body as it was possible to put it and will reduce the cost of tramming to a minimum.

The cross-cut put north, from the cave south of the tracks, and 60' below them, crossed lean ore and the diamond drill from the 2nd level passed through the same material slightly to the west of the proposed shaft. It is hoped that most of the sinking to the 2nd level will be in this material. A cross-cut has been driven from the 2nd level 200 ft. north towards the line of the shaft and will reach it in 100 feet more. On the 3rd level the cross-cut to the shaft is in 125 ft. and still has 325 ft. to drift before reaching the shaft. The rock is very hard and drifting correspondingly slow.

MUD RUNS.

During the year two serious runs of mud occurred, in spite of every precaution taken to prevent them. Instead of using the ordinary breasting Lake.

when blasting in stopes, wooden pillars from 8 to 16 ft. thick are built in the drifts, and where danger is anticipated, two pillars are built 6 to 8 ft. apart and packed with dirt between. The blasting is done by the timbermen, thus avoding the possibility of miners omitting the proper precautions in order to save time.

All the miners in the immediate neighborhood of the stope are withdrawn to a safe place and the leading wires taken so far away that it would be impossible to injure anybody, should a mishap occur and the breasting break. With all these precautions we have not been able to prevent a recurrence of mud runs.

On the 14th of February mud broke through an old stope 200 ft. west of "B" raise, which had been worked out several years ago. Sometime before the rock drifts leading to this stope had been breasted and blocked up as a matter of precaution, and not because there was any probability of danger. A few weeks previous to this time several stopes 150 ft. west had been blasted in, the cave extending to surface. This no doubt weakened the capping of the old stope and it finally gave way. The pressure of the mud was so great that it carried away the breastings and several hundred carloads went through to the 2nd level before it could be stopped.

The second and most disastrous run of mud occurred at the 10th room northwest in June, which was accompanied by the loss of one life. The ore in this part of the mine had all been taken out to within 16 ft. of the 2nd level, and from the beginning of caving operations up to the time of the accident, there had been no sign of any mud. At 3 o'clock on the afternoon of the 12th, the stope was blasted in, all the usual precautions having been taken. The men all left their places and went to the main second level drift, remaining there for 20 or 30 minutes after the blast. Everything being apparently safe, they returned to their stopes. They had only been at work a short time when the breasting broke, letting in the mud and sand.

The men had ample time to escape, but the wind from the cave blew out their lights and the poor fellow who was lost, fell through one of the raises, and being stunned by his fall, was covered with mud and killed. There were more bowlders and sand than mud in the run, and I can only explain it on the supposition that a large amount of water had accumulated on top of the gob and rock, which broke through when the stope was blasted. The cost of cleaning up these two runs was $4825.47.

FILLING.

The following rooms have been filled during the year:

4th, 5th, and 6th rooms -	2nd Level	Southeast
11th	"	Southwest
½ of 12th	"	"
9th and 10th	3rd "	"

The total filling for the year amounted to 24148 yards, of which 15332 was handled by motors and 8816 yards put away by contractors. There is very little difference between the filling this year and last.

The following statement shows the number of days worked on Sundays and Holidays:

Sunday time	4911 days
Holiday time	393 "
Total	5304 "

The regular Sunday work requires firemen, pumpmen, and watchmen, a total of 13, which equals for the year

Sunday time	676 days
Holiday time	143 "
Total	819 "

Deducting this from the total Sunday and Holiday work leaves 4485 days extraordinary labor. As compared with last year, this shows a decrease

Lake.

of 411 days. It has been explained in previous reports that the large amount of Sunday work is the direct result of the eight hour system, which prevents the repairing of drifts and cleaning of tracks during the week, the mining being continuous.

SURFACE.

The cave at the old Bessemer stockpile has been partially filled from the rockpile. Later on the balance will be filled from the bank, which has to be removed to make room for the new shaft. It is proposed to do this work as soon as possible after the first of the year, so that in the event of our not having room to stock the Bessemer ore east of the shaft, we shall have a place to put it.

There has been a slight fire in the coalpile, but we were able to put it out before it had done any serious damage.

The conditions at this mine are all favorable to spontaneous combustion.

First,- The coal is not covered

Second,- The depth of the pile is about 35 feet

Third,- The coal is very fine, not permitting any circulation of air.

Fourth,- It is high in Volatile Combustible Matter

Fifth,- The sulphur is high

Sixth,- The coal is frequently stored during wet weather

Seventh,- The coal has been recently mined

When the new shaft is in commission, we shall be able to have a covered dock for the coal and I hope we will have no further trouble from fire.

LAKE ANGELINE DRAINAGE.

The tunnel to carry the launder around the caved ground on the south side of the lake was completed in time to take the spring freshets and no

Lake.

trouble was experienced from this source during the year. The cost of the new work was $7908.47. The ditches which were dug at the east end to divert the water into Lake Mennie proved very efficient. The discharge pipe from the scow pump has been moved east on account of caving ground on the Lake Superior side of the line. The emergency pump has been moved 600 ft. east from the caving ground and the discharge changed. It will probably be necessary to move the scow pump during the coming year, on account of our mining operations directly under it.

STOCKING AT PRESQUE ISLE

The stockpile room at the Lake Mine has always been limited, and although increased 25% last year by the installation of a power tram, the end of the shipping season found us with 119,545 tons of non-Bessemer ore in stock, and no room for our winter's hoist. This state of affairs was foreseen early in the season and after careful consideration of the available stockpile ground, it was decided that the most economical planewould be at Presque Isle. In any case the ore would have to be moved some distance and the opportunity offered to test the practicability of taking the ore to the docks during the winter and at less cost than if it were stocked at the mine end of the line. If successful this would greatly increase the capacity of the railroad, and having a stockpile at the point of lake shipment, would prevent any delay to vessels. Aside from the convenience to the railroad, it will be a distinct saving to them, as the ore will dump much more readily than if carried 20 miles

I have no hesitation in saying that twice as many cars from the Presque Isle stockpile can be dumped in a given time than if shipped direct from the mine. The advantages were so evident to Mr. Harris that he agreed to take the ore to Presque Isle and switch it during the summer for the same price; namely, 32c a ton, as if shippied direct to the dock. Even with this concession it is not economicl as compared with stocking at the mine, on account of the extra expense of unloading it during the winter. In order to keep Lake.

LAKE. [redacted]

the mine in operation however there was no alternative. There is apt to be more or less delay from frozen ore and heavy snows. Taking the experinece of the Gladstone Furnace as a basis, it will probably cost between 4 and 5c per ton to unload and stock the ore.

A description of the plant at Presque Isle is given by our Master Mechanic, Mr. McKee, in his annual report, and it is unnecessary to repeat it here. The cost to date has been $ 15178.16. The enginehouse, boiler, and engine are to be purchased by the L. S. & I., so that the actual cost to us will be $10996.$\frac{80}{100}$

GENERAL REMARKS.

There have been nine fatal accidents during the year as against five in 1900. At first glance the increased number of fatal accidents might appear open to criticism, if only the comparative figures are considered, but an examination of the Accident Reports will show that in no case was the Company to blame and no amount of care on the part of the Captains could have prevented them. I can only repeat what I have said in former reports, that every precaution possible is taken to prevent accidents. Our mining operations are conducted with this end in view and it is never a question of getting cheap ore by endangering the men.

At the Lake Mine extraordinary watchfulness is exercised and every precaution that can be devised is adopted and yet the greatest number of accidents have occurred here.

TAXES.

Owing to the arbitrary action taken by the State Tax Commission in increasing the valuation of the mining properties without any regard to the relative values which have been agreed on from year to year by the mining Companies themselves, or the intrinsic value of the mines, a meeting of the Agents from all the Ranges in Michigan was held at Ishpeming in May, to con-

Lake.

TAXES

sider this question. After an exhaustive discussion, it was decided that it would be impossible to lay down any general rule by which the actual cash value of a mine could be arrived at. It was recommended that this question be left to the Managers on each Range to adjust among themselves. It was agreed that all stockpiles should be valued on a basis of the price of each grade at Lake Erie ports. From this price is to be deducted the rail and lake freight plus 25c per ton for commission, insurance, loading, etc. and from the remainder 25% deducted for penalties, deferred payments, and possible decline in the price of unsold ore, the result to be the value on stockpile. Prior to this agreement each Manager fixed an arbitrary value on his ore in stock, which could not be defended before the Tax Commission, if it were ever questioned.

Under the present arrangement every mine is treated alike and those producing the higher grades of ores pay a correspondingly higher tax for the ore in stock. As you will note from the Cost Sheets, the taxes have been much higher this year than for sometime past. This has been due to the action of the State Board of Equalization, which raised the equalized value of Marquette County from $18,000,000 to $30,000,000 for State Taxation purposes and also to the larger amount of money that has been required for schools and other city purposes.

PRIZES.

The prizes for well kept premises have been continued this year and have resulted in further improvement in the general appearance of our locations and other parts of the city. A new feature was the prize for boys' gardens and the results warrant continuing them.

Interest in the Cleveland-Cliffs' and Mechanics' Clubs continues and theynhave become potent factors in increasing the esprit de corps of the employes.

It is gratifying to be able to report that our men all seem contented and satisfied with their wages and the relations of the Captains and miners are more cordial than for m any years, which augurs well fo r the future.

Before closing my report I wish to express my appreciation of the hearty cooperation and loyal support of the heads of the different Departments in the work of the past year.

Respectfully submitted,

M. M. Duncan
Agent.

PRIZES. C.C.CLUBS.


3

C L E V E L A N D I R O N M I N I N G C O .

I N V E N T O R Y

of

P E R S O N A L P R O P E R T Y ,

November 30th, 1901.

I S H P E M I N G , M I C H I G A N .

CLEVELAND IRON MINING CO.

Index to Inventories, November 30th, 1901.

GENERAL ACCOUNTS.

--- I N D E X ---

---I N D E X ---

CLEVELAND IRON MINING CO.

Hard Ore Mine Inventory, Nov. 30th, 1901.

----oOo----

B U I L D I N G S .

1 Brown Stone Machine, Carpenter and Blacksmith Building

1 Brown Stone Engine and Boiler House, with Brick Smoke Stack #3

1 Corrugated Brick Enclosed Engine and Boiler House, with Brick Smoke Stack #4

1 Corrugated Brick Enclosed Engine and Boiler House, with Brick Smoke Stack #5

1 Stone Engine House #2 -Not in use

1 Shaft House, Pocket and Trestle at #3 Mine

1 Shaft House, Pocket and Trestle at Moro Mine
New Pocket built in 1899.

1 Two Story Frame Warehouses

1 Frame Round House

1 Frame Barn

1 Frame Laboratory

1 Stone Powder House

1 Stone Office and Horse Shed

2 Frame Dry Houses, Two Story

1 Stone Harness House

31 Dwelling Houses

1 Dwelling, President's Cottage

1 Dwelling, Agent's Residence

20 Dwellings in C.I.M.Co. 2nd Addition
Built in 1901 Expenditures to Nov. 30th $20330.35

Hard Ore Mine.

P L A N T .

ENGINE HOUSE No. 3

1 6' Hoisting Drum

2 22" x 42" Automatic Lane Engines

4 8' Hoisting Drums

1 10" x 20" Electric Light Engine

1 32" Arc Light, Brush Dynamo

1 Pr. 15" x 30" Rand Air Compressor

4 Air Receivers

1 Pr. 6"x 6" x 3 3-8 Earl Pump for Feed

1 Knowles Pump , W.G.M.

6 6' x 16' Boilers

1 40" x 10" 8" Heater at Lake Mine

1 Field Magnet for Dynamo

2 Double Brush Lamps

18 Single Brush Lamps

4 Galvanized Lamp Cones

1 Heater-in #3 from Lake Mine.

ENGINE HOUSE #4

1 16" x 24" Merritt Engine with Connections, for Cornish Pumps in Hard Ore Yard

1 #7 Earl Pump for Fire

1 #5 Earle Pump for Feed

1 5'8" x 16' Boiler

1 5' x 16' Boiler

1 18" x 60" Reynolds Corliss Engine with Connections for Cornish Pumps from #5 Engine House.

ENGINE HOUSE #5.

2 6' x 18' Boilers

1 #5 Knowles Pump

1 #8 Blake Pump at Moro Engine House.

Hard Ore Mine.

P L A N T (Continued)

BLACKSMITH SHOP.

1 Two Wheeled 14" Emery Grinder

1 650#-Steam Hammer

1 Fagot Furnace

4 Open Forges

1 #4 Fan

CARPENTER SHOP.

1 Boring and Interlocking Machine

1 #2 Universal Trimmer

1 15" Circular Saw Machine

1 26" Emery Grinder

1 36" Band Saw

1 20" Wood Laths

1 20" Planer.

MACHINE SHOP.

1 4" Pipe Cutter and Threading Machine

1 8" Pipe Cutter and Threading Machine

1 10" x 10" Westinghouse Engine

1 20" Two Wheel Emery Grinder

1 30" One-wheel Emery Grinder

1 Center Drill Machine

1 30" Drilling Machine

1 12" Drill Press

1 #2 Twist Drill Grinder

1 Bolt Cutter- 2"

1 24" Shaper

1 24" x 24" x 5' Planer at Cliffs Shaft

1 Bolt Cutter in Yard (No Good)

1 15" Engine Lath

1 20" Engine Lath at Cliffs Shaft

1 24" Engine Lath

1 26" Engine Lath

Hard Ore Mine

P L A N T (Continued).

MACHINE SHOP (Continued)

1 36 Engine Lath

1 Engine Lath ~~at~~ (S.Hoar.)

1 Large Planer in Shop , Belongs to Cliffs Shaft

1 Star Power Hack Saw

1 2 1-2" Combination Radial Drill with tapping Attachments.
Worm Swiveling Table and arranged to receive Round Table. Bgt 1901

1 Wells Bros. Universal Gringer Complete with Graduations on Base and Slide. Bgt 1901

1 No. 1 1-2 Universal Miling Machine. Bgt 1901.

Hard Ore Mine

G E N E R A L S U P P L I E S .

42#	Babbit Metal, Diamond	.24	m10.08
1034#	" Genuine	.32	330.88
229#	" Nickolene	.25	57.25
50#	" Graphite	.20	10.00
348#	" Mixed	.15	52.20
142#	Antimony	.15	21.30
2	Brooms, Warehpuse	4.20	.70
10	Brushes, Scrubbing	3.75	3.13
1	" Sash		.10
2	" File	.20	.40
16	Burners, #3 Street Lamp	3.80	5.07
5	1400 Tons Coke	5.54	31.58
62	470 Tons coal Bloss.	3.80	236.49
30#	Chain	.04 1/2	1.35
19	Chimneys, #2 Rochester	.85	1.35
52	" #3 "	1.90	8.23
2	Gross Chalk	.30	.60
7 1/2#	Copper Rod	.35	2.63
55	Cotters Spring	.001/2	.28
25	Cans, 1 Gal New	2.50	5.21
3	" 1 " Old	.10	.30
8	" 2 " " "	.15	1.20
25	" 2 " New	3.25	6.77
1	" 5" " "		.50
2	" 10 " "	.60	1.20
2	" 10 " Odd	.25	.50
1	" Squirt	2.50	.21
21	" 1 qt. Gal. Oilers	3.00	5.25
69	Sheets Emery Cloth	.30	1.73
29#	Emery, Ground	.10	2.90
48	Coils Belt Wire	.50	24.00
1	8 Day Clock		4.00
32	Insulators	.02	.64

For'd 5

628.03

G E N E R A L S U P P L I E S (CONTINUED).

			Amount Bro't For'd		828.03
73	Pins		.02	1.46	
1	Blasting Battery	Rock Bar		2.00	
10	"	Commutators	.50	5.00	
3	"	Clutches	.35	1.05	
2	"	Cases	2.50	5.00	
3	"	Frames Each 10&11	.75	2.25	
5	"	Spindle Heads 13 & 14	.75	3.75	
5	"	Pinions	.50	2.50	
2	"	Guide Plates	.35	.70	
1	"	Guide Rod		.65	
8	"	Guide Yokes	.20	1.60	
8	"	Guide Screws	.10	.80	
2	"	Guide Yokes	.20	.40	
6	"	Spindle Screws	.03	.18	
39	Lantern Globes		.60	1.95	
9	Chimneys, #2 Common		.05	.45	
6	" "		.05	.30	
20	Lanterns		6.50	10.83	
20	Miner's Lamps, Moonshine		.27	5.40	
13	"	Old	.10	1.30	
186'	Ladders		.04	7.44	
367'	"		.08	29.36	
1346'	Ladder Rounds		20.00	26.92	
12#	Marline		.12	1.44	
1	Time Book, Small			.20	
4	Books, Memorandum		.20	.80	
906#	Rope, Manilla		.11 1/4	101.92	
149#	"	1/2 Price	.06	8.94	
500#	Rope, 1/2" Steel Wire		7.40	37.00	
700'	" 1/2" "		7.40	51.80	313.39
		For'd			1141.42

Hard Ore Mine

G E N E R A L S U P P L I E S (CONTINUED).

	Amount Bro't For'd			1141.42
2400'	1 1/8" Steel Wire Rope	24.60	590.40	
206	Sheets Sand Paper	.09	1.55	
153#	Sal. Soda	.90	1.38	
6#	Salamoniac	.12	.72	
184#	Chloride of Lime	.03	5.52	
120#	Ammonia Soap	.06	7.20	
115	Boxes Ivory Soap	.07 1/2	8.62	
7#	Tacks , Sweede	.15	1.05	
12 1/2#	Compound Welding	.15	1.87	
45#	Wicking Candle	.29	9.00	
34	Do z. Common Wicks	.05	1.70	
1	Doz. #2 Rochester Wicks		.25	
1	Doz. #3 "		.60	
73#	Wire Brass Spring	.20	14.60	
5#	Wire Staples	.05	.25	
518#	Waste White	.07	36.26	
162#	Waste, Colored	.05	8.10	
6 1/2#	Brass Rod	.25	1.63	
15	16 C.P. Incandescent Lamps	.25	3.75	
16	32 C.P. "	.50	8.00	
9	50 C.P. "	.75	6.75	
15	Pails , Barn	3.00	3.75	
22	Pails , Fibfe	3.00	5.50	
4	Pails , Water	2.75	.92	
3	Blocks, 1/2" Single Iron	.50	1.50	
7	Blocks, 3/4" Double Iron	.85	5.95	
17#	Green Seal Anti Oil Powder	.38	6.46	
12	Crow Foot Battery Zincs	.27	3.24	
12	" Coppers	.08	.96	
24	Zincs for Sampson Cells	.12	2.88	
6	Bags Charcoal	.60	3.60	
				743.96
	For'd			1885.38

Hard Ore Mine.

GENERAL SUPPLIES (CONTINUED).

	Amount Bro't For'd			1885.38
73	Bbls. Salt	.95	69.35	
2#	Borax	.12 1/2	.25	
4#	Resin	.05	.20	
2 1/2#	Solder	.20	.50	
2#	Chalk Line	.30	.60	
2#	Copper Tacks	.40	.80	
26	Fire Extinguishers	1.50	39.00	
2	Small Spike Bars	.75	1.50	
1	Pinch Bar		1.50	
11	Axes, Single Bit	6.50	5.95	
6	Hammer, Striking	1.00	6.00	
9	Hammers, Small	.50	4.50	
4	Sledges	1.50	6.00	
1	Sledge		1.00	
30	Handles, R.R.Picks	1.25	3.13	
25	Doz. Handles, Sledge	1.10	27.50	
45	Doz. Pall Picks	1.00	45.00	
85	Only Handles , Hammer	.85	6.02	
10	Only " Single Bit axe	1.30	1.08	
37	Only " File	.24	.74	
12	Only " Hand saw		1.00	
2	Picks, Pall	.50	1.00	
23	Picks, Pall	1.00	23.00	
1	Pick, Railroad		1.00	
7 1/2	Doz. Shovels Ajax Rd. Pt.	8.25	4.81	
11	11/12 Doz. Shovels J. E. S.	9.00	107.25	
2	Doz. Shovels Sq. Pt.	9.00	18.00	
18	Shovels, Old	.25	4.50	
3	11/12 Coal Shovels	9.75	38.19	
1	Counter Scales & weights		3.60	422.97
	Total Amount For'd			2308.35

Hard Ore Mine

GENERAL SUPPLIES (CNTINUED).

			Amount Bro't For'd				2308.35
15	6"	Coes K.H. Monkey Wrenches		4.50	Doz.	5.63	
24	8"	"		5.00		10.00	
24	10"	"		6.00		12.00	
11	12"	"		6.50		5.96	
8	15"	"		13.20		8.80	
2	18"	"		18.00		3.00	
1	15"	"	Old			.50	
2	8"	Stillsons Wrench Jaws		.30		.60	
1	10"	"				.35	
1	14"	"				.45	
1	18"	"				.60	
1	8"	"	Net			.15	
1	10"	"	"			.15	
1	14"	"	"			.20	
1	18"	"	"			.25	48.64
16	12"	Files Half Round Bastard		11.30	Doz.	15.07	
21	14"	"		14.80		25.90	
11	16"	"		19.60		17.97	
14	12"	"	2 cut	13.00		15.17	
16	14"	"	"	17.00		22.67	
16	6"	Files Round Bastard		3.50		4.67	
17	8"	"		4.30		6.09	
23	10"	"		5.60		10.73	
19	12"	"		7.50		11.88	
8	14"	"		10.60		7.07	
5	16"	"		14.60		6.08	
17	8"	Files Square Bastard		5.50		7.79	
18	10"	"		7.40		11.10	
15	12"	"		10.00		12.50	
11	14"	" "		14.00		12.83	
2	16"	"		18.40		3.07	
		Total Amount For'd				48.59	2356.99

Hard Ore Mine

G E N E R A L S U P P L I E S (CONTINUED).

	Amounts Bro't For'd		190.59		2356.99
14	10" Files, Hand Bastard	7.60	8.87		
2	12" "	10.70	1.78		
4	10" Files, Flat Bastard	7.00	2.33		
15	12" "	9.60	12.00		
17	14" "	13.30	18.84		
2	16" "	17.50	2.92		
6	12" " Smooth	10.50	5.25		
6	6" Files, Mill Bastard	3.50	1.75		
39	8" "	4.30	13.98		
31	10" "	5.60	14.47		
21	12" "	7.50	13.13		
19	14" "	10.60	16.78		
12	12" " 2 Cut	8.60	8.60		
3	3" Files, Taper	2.20	.55		
16	4" "	2.50	3.33		
14	5" "	3.00	3.50		
5	5 1/2" "	3.50	1.46		
21	6" "	4.10	7.18		
7	8" "	5.80	3.38		
14	10" "	8.40	9.80		
			340.49		
	Less 75%		255.37	85.12	
3	16" Horse Rasps	.45		1.35	86.47
	Total General Supplies				2443.46

Hard Ore Mine

I R O N AND S T E E L.

1293#	Hand Steel	.06	77.58
4712#	Machine Steel	.06	282.72
81#	Sleigh Shod Steel	.02 1/2	2.02
290#	Tap Steel	13.75	39.88
267#	Lathe Steel	12.50	33.38
156#	Spring Steel	.10	15.50
36#	Chisel Steel	12.50	4.50
146#	Pick Steel	.07	10.22
504#	Drill Steel	.06	30.24
506#	Hammer Steel	.07	35.42
991#	Imported Tool Steel	.37 1/4	369.15
2594#	Machinery Steel	2.15	55.77
190#	3" Round Steel	3.55	6.75
276#	3 1/2" Round Steel	3.55	9.80
338#	4" Round Steel	4.50	15.21
743#	4 1/2" Round Steel	4.50	33.43
653#	5" Round Steel	.06	39.18
28#	5/8" Square Steel	3.75	1.05
98#	3/4" "	3.50	3.43
60#	1" "	3.50	2.10
180#	3 x 1" Steel	.02 1/4	4.05
82#	2 1/2 x 5/8 "	.2 1/4	1.84
132#	6 x 1" "	2.35	3.10
21905#	Merchant Bar Iron	1.95	427.15
2268#	"	2.05	46.90
7280#	"	2.15	156.52
2354#	"	2.25	52.97
4148#	"	2.45	101.63
401#	"	2.55	10.23
435#	"	2.65	11.53
407#	"	2.85	11.60
143#	Fagoted Iron	.02	2.86
		Total Amount For'd	1897.71