

#### CHASE MINE.

The raise was continued to an elevation of 50 ft., and a sub opened. A drift was driven 12 ft. to the North, where an 8 ft. seam of good ore was encountered. This ore was followed 40 ft. to the S.E. and 20 ft. to the West, for a total distance of 60 ft. The South wing or branch of the S.W. stope had been originally extended into this territory, where a little ore was found beneath the dike hanging wall. By blasting out some rock at the South end of this wing, it was possible to make a connection to this sub level. Two incline raises were also put up from the end of the wing, connecting to this sub level at other points. A shrinkage stope was then opened, and all the ore mined out up to the rock. As they gained in elevation, the ore was found to extend further to the East above the rock,, but dikes came in and it soon pinched down to only 3 ft. in width. Mining was completed here early in November, and by the end of the year all the ore had been drawn off and hoisted. The ore at the West end of the stope was narrow, being only 7 ft., in width, in the East 30 ft. of this stope it was 20 ft. wide. There was about 2000 tons of 57% ore obtained here.

No. 21 drill hole from surface was found, and as the work progressed, it was discovered that the drill hole had followed the narrow seam of ore between the dikes, indicating a greater amount of ore in this territory than was found.

#### SMALL EAST SHRINKAGE STOPE.

On the first of the year a contract was raising in a narrow seam of hard blue steel ore at a point 80 ft. East of the crosscut to the shaft in a drift which had been driven in this territory the latter part of 1913. This raise followed the ore up to a sub 25 ft. below the 1st level. On completing the raise, the contract came to the 2nd level and drove a drift further to the East, putting up two more raises in this same ore. These raises were connected a short distance above the 2nd level, and a narrow shrinkage stope was opened here. As they gained in elevation above the 2nd level, the ore was found to extend further to the West, where a connection was made to the shrinkage stope which had been opened near No. 17 diamond drill hole. Part of the ore broken in the small shrinkage stope, fell into the old stope, but by always working back under the brow, it was possible to continue work

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here without any danger to the men. The ore was mined out to a point 25 ft. below the 1st level, where jasper came in and lowered the grade so that work was abandoned here. The ore broken in this small stope averaged 60% iron, and has been of great value in keeping the grade of the output up to 57%.

When the stope was first started, it was about 7 ft. wide and 30 ft. long, and as it gained in elevation, the ore became wider, so that for the greater part of its height, the stope was 60 ft. in length and 10 ft. in width. The raise which was put up in this ore to the sub 25 ft. below the 1st level, served as a traveling road to and from the stope. All the ore broken here was drawn out during the shipping season.

In addition to the small lenses which were mined as reported above under different small shrinkage stopes, two small stopes have been opened directly West of the crosscut to the shaft, and a short distance South of the main East-West stope. These two stopes were carried up independent of each other and the main stope, in order that pillars might be left here, as it was not thought safe to make a direct connection with the main stope. These stopes were roughly 20 ft. in diameter at the top, the bottom being 20 ft. long and 10 ft. in width. They were stopped just below the 1st level, as it was desired to maintain a traveling road to the territory further West until work had been completed there. As soon as this traveling road can be abandoned, these stopes will be finished up to the 1st level by underhand stoping out the floors of the 1st level, which will complete all mining West of the crosscut to the shaft. The ore in these two stopes averaged about 55.50 iron, due to small bunches of jasper in the ore.

#### 64 ft. SUB LEVEL.

During the greater part of 1913, one contract with four miners on a shift, were working on and above this sub level, mining the ore out by underhand stoping down from the 1st level. This is the ore which was found above the jasper at the East end of the mine, and which was outlined by drifts and crosscuts on the 1st level, good size pillars being left to

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support the capping, as the ore extends through to the quicksand. In 1914 one contract worked here stoping out the floors down to the jasper until in August, when work was practically completed at this point. A number of the pillars on the 1st level, were very much larger on the sub level below, as the ore body was wider near the jasper footwall. In several cases, it was possible to drive stopes through the pillars, the back of the stopes being kept 10 ft. or more below the 1st level floors. The floor of the 64 ft. sub level near the West end where it holed to the main shrinkage stope, was also mined out. All the ore broken here was either shoveled directly into the main shrinkage stope, or trammed and dumped there. The contract that worked here, also carried the East end of the main shrinkage stope through to the 1st level, after outlining one more pillar on the 1st level.

In December work was started on this sub again, scrambling out a little ore that had been left near the point where the sub holed to the shrinkage stope. The pillars here were very large, and it was thought safe to blast off a small amount of ore at several points. The grade of the ore obtained from this end of the mine will average in the neighborhood of 60% iron. The main shrinkage stope at its Eastern end is now nearly emptied of ore, so that practically all the ore broken here during the past year has now been hoisted.

#### 70 ft. SUB LEVEL.

In the latter part of 1913 a sub level had been opened 30 ft. below the West end of the 1st level. This was in a seam of ore which lay parallel with the main stope and about 25 ft. South of it. A sub was driven to the East in order to develop this ore preliminary to mining but the 1st level floors. The ore was found to extend 150 ft. to the East, or within 60 ft. of the crosscut to the shaft. The ore body was irregular and did not follow the fault line all the way; at some places jasper came in along the fault, and made it necessary to turn the drift in order to follow the ore. While the drift was being driven, several raises were put through to the 1st level in order to keep the drift located so that it might not undercut any of the pillars which had been left on the 1st

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level. Before starting to break any of the 1st level floors, two crosscuts were driven to the North, connecting this sub with the main shrinkage stope. These crosscuts holed in the jasper slightly above the back of the shrinkage stope, and a hole was blasted through the jasper down into the stope. One gang then started mining the 1st level floors, cutting around the pillars so as to leave them intact. For a few months two contracts worked here, one at the extreme West end and another one at the East end of the subs, mining out 1st level the/floors. As this left a considerable opening directly South of the shrinkage stope, it was thought best to leave several sections of the floors to act as a brace for the pillars. The amount of ore left here, however, was comparatively small, the estimate showing only about 1,000 tons in all the pillars and braces.

At the West end where a sub was first opened, the ore connected directly with the shrinkage stope, and later in the year a contract started mining out the floor of the sub, underhand stoping out the ore, the greater part of which fell directly into the shrinkage stope. Work was continued here for several months, as the ore was found to come down within 40 ft. of the 2nd level at the West end. The jasper which cut off the ore to the East, dipped to the West, so that each succeeding stope was shorter. All the ore has now been mined here except in the 60 ft. space between this sub and the crosscut to the shaft. Here there are perhaps 2,500 tons of ore left in 1st level the/floors which can be mined.

## 3rd LEVEL.

Drifting was in progress on the 3rd level at the close of 1913, the breast of the main drift being 123 ft. West of the crosscut from the shaft. The drift was continued to the West for the first four months of the year, and had advanced 400 ft. when work was stopped the last of April. During January the drift advanced 145 ft. in soft ore jasper. The following month the ground became harder and the drift continued in very hard ground until it was stopped in April, the last 5 ft. being in dike. In March a contract drove a crosscut 45 ft. to the North at a point 180 ft. West of the crosscut to the shaft, in order to test the ground here. The ground proved to be soft,

with some seams of dike, the jasper averaging 45% iron. In May a crosscut was driven to the North of the main West drift at a point 280 ft. West of the crosscut to the shaft. After advancing 45 ft. in jasper, a dike 3 ft. thick was passed through, beyond which 3 ft. of 55% ore was found. The crosscut was then continued through rich jasper 20 ft. further to the North, where another dike was encountered, beyond which jasper was found again. Work was stopped here when the crosscut was in 90 ft., as this carried the crosscut beyond the territory where ore was expected to be encountered. The discovery of ore above the 3rd level at the West end of the drift rendered it necessary to strip the side of the drift at a point 400 ft. West of the crosscut to the shaft in order to permit of raises being located directly beneath the ore body. The drift was stripped here, being made 9 ft. wider for a distance of 75 ft.

This covers all the drifting which was done on the 3rd level during 1914, viz., 610 ft. of rock drifting. In June the contract which was driving the <sup>2nd</sup> crosscut, started a raise towards the 2nd level at a point 65 ft. North of the main drift, which holed to the 2nd level early in July. Ore was encountered 30 ft. up in the raise, the ore continuing to an elevation of 60 ft., when jasper was encountered, in which the raise continued until it reached a point 5 ft. below the 2nd level, when ore was again encountered. After completing the raise, the contract opened a sub at a point 55 ft. above the 3rd level. They drifted South in ore for 12 ft., then turned to the West where they struck rock after advancing 40 ft. The drift on the sub was continued 33 ft. further to the West in jasper, when work was temporarily stopped and the contract brought back to the raise, where they followed the ore to the East, which pinched out after advancing 20 ft., the drift being continued 15 ft. further in jasper. The total length of ore developed here was 70 ft. At the raise its width was 20 ft., but from the jasper which was encountered in the West drift, it is thought that the ore narrows up rapidly, and it is not expected that it will average over 10 ft. in width over the entire length of 70 ft. This sub is located directly beneath the 2nd level drift, and indicates that at this point the ore extends some distance below the 2nd level. As the raise passed into jasper just above this sub level, it is thought that there is a jasper horse here which separates the 2nd level ore from the ore shown

up on the sub level. The contract then returned to the West drift and continued it to the Southwest beneath the line of the S.W. drift on the 2nd level. The drift was in rich jasper, and after advancing 50 ft. to the S.W., a raise was put through to the 2nd level in mixed ore and jasper. This raise holed near a point where several drill holes had been put down in the floor of the 2nd level, one of which showed ore, but the raise proved that the ore was badly mixed with jasper and rock, and that it would be impossible to mine it. Before abandoning work here entirely, it was decided to continue the drift on the sub level further to the South, as there was a slight chance of finding ore in this territory. After advancing 15 ft., they struck ore which proved to be about 12 ft. in width. A drift was started to the West following the ore, which was stopped after showing up 40 ft. of ore. A drift was also driven to the East, following the ore, which pinched out in 10 ft. the drift being stopped. This work showed up an ore body 65 ft. in length, with a probable width of 12 ft. From the ore shown up here, it was decided that a shrinkage stope should be opened above the 3rd level, and the contract was then taken to the 3rd level and stripped 9 ft. of rock from the North side of the main haulage drift. This permitted raises to be located directly beneath this ore body. At the close of the year they had put up two raises which had holed to the sub. The first raise passed a little too far to the North, and only showed a small amount of ore near the top of the raise; the second raise 25 ft. further to the West struck ore 20 ft. above the 3rd level, or 35 ft. below the sub level. The jasper beneath this ore is extremely hard, and pitches to the West at a fairly flat angle, forming the footwall of the ore body.

From the work done in these two raises, it is evident that this ore body is wedge shaped like the other Chase ore bodies, the bottom of the wedge resting on the jasper. The top of the ore body at the East end connects with the narrow seam of ore which had been mined out above the 2nd level in the small stope opened between the main stope and the S.W. shrinkage stope. It has a proven length of 70 ft., and a proven width of 12 ft. on the sub, so that from present knowledge it is safe to assume from 2500 to 3000 tons of ore here. The ore in the main body is free from rock, and will average about 58.50 iron. The two ore bodies developed by these raises and subs, constitute

practically all the ore which has been found between the 2nd and 3rd levels. Explorations have been conducted at two other points, but in both cases only a very small amount of ore was found.

In June a raise was put up at a point 220 ft. North of the shaft, where the drift turns to the West. This raise was put up to develop the ore shown up below the 2nd level in No. 17 diamond drill hole from surface. The raise holed to the 2nd level in July at a point 40 ft. East of the crosscut to the shaft. A little ore was encountered in the footwall of the raise at a point 75 ft. above the level, but the raise continued all the way through in jasper. After holing to the 2nd level, the contract was brought down to a point 30 ft. below the 2nd level, and a sub opened to the East of the raise. This raise followed the ore, which proved to be from 3 to 5 ft. in width. It is evidently the bottom of another wedge of ore, but as the ore was only 10 ft. wide on the 2nd level, it can be seen that practically no ore will be available at this point.

In November a contract was brought into this raise to a point 22 ft. below the 2nd level, and drove a drift 20 ft. to the North to come under the 2nd level ore body near the crosscut to the shaft. This drift was driven in mixed ore and jasper, and proved that the ore did not extend down even 20 ft. below the 2nd level at this point.

Four hundred sixty feet West of the crosscut from the shaft, a raise was started towards the 2nd level in August to come under the S.W. ore body. This raise holed to the 2nd level in September, the last 20 ft. being in ore. The raise was located well to the West, and was put up inclining towards the East, as the 2nd level ore body was known to pitch to the West, it was thought that this would give a better opportunity of encountering the ore on its pitch. After holing the raise, the contract was brought down 50 ft. below the 2nd level, and started an incline raise to the West across the slips. They raised 25 ft. here, and then drove a drift 20 ft. to the West following a small seam of ore between two dikes. At the breast of this drift they put up a raise to the 2nd level, showing that this small seam of ore continued all the way through. On completing this they came back to the raise and drove a drift 30 ft. to the Northeast from the breast of which they put up another raise

to the 2nd level; this showed only 15 ft. of ore. As work was still in progress above the 2nd level in the S.W. shrinkage stope, it was decided to abandon work at this point for the time, returning here to mine out the 2nd level floors as soon as work was finished above the 2nd.

The work done here proved that the main S.W. ore body pitches to the West between the jasper footwall and the dike or slate hanging wall. From the work done above the 2nd level, we know that the hanging pitches more steeply than the footwall, and from the work done above the 3rd, it is evident that the ore body is entirely cut off just below the 2nd level. It is not thought that over 1000 tons of ore will be obtained at this point.

The following is a list of the total feet of drifting and raising in rock and ore during the past year:

	FEET	TOTAL.
ORE DRIFTING, . . . . .	1,016	
ORE RAISING, . . . . .	<u>958</u>	<u>1,974</u> ORE.
ROCK DRIFTING, . . . . .	1,127	
ROCK RAISING, . . . . .	<u>748</u>	<u>1,875</u> ROCK.
GRAND TOTAL, Drifting and Raising	3,849	3,849

UNDERGROUND DRILLING.

On August 8th, a drill was brought to the 3rd level and a hole drilled North, 54°-40' West, from the breast of the 3rd level drift, this being 220 ft. North and 500 ft. West of the shaft. The hole was stopped at a depth of 140 ft., the last 26 ft. being in dike. From 95 to 100 ft. there was 5 ft. of lean ore averaging 49% iron; the hole was completed the 23rd of August.

Hole No. 14 was started on August 24th and completed on Sept. 4th at a depth of 122 ft. This hole was also started in the breast of the 3rd level drift, and was drilled North 12°-26' West. After passing through 5 ft. of jasper and 35 ft. of slate, it again struck soft ore jasper, in which it continued to a depth of 112 ft., the last 10 ft. being in dike.

Hole No. 15 started on Sept. 17th, and was completed on Sept. 28th at a depth of 178 ft. This hole was also located at the breast of the 3rd level drift, and was drilled on a course of North, eighty degrees West. It

showed 115 ft. of ore formation, then passed into slate, in which it was stopped.

These three holes were drilled in an endeavor to locate ore to the North and West of the 3rd level drift. It had been proven at this time that the 2nd level ore bodies at the West end of the mine dipped or pitched to the West above the flat jasper footwall. The ground was very hard on the 3rd level, and drifting was expensive, so that it was thought advisable to diamond drill this territory rather than to drift. The holes all failed to show any ore, indicating without any doubt that the 2nd level ore bodies did not extend down to the 3rd level.

The mine water was handled during the past year by the Gould electric driven plunger pump on the 3rd level. During the early part of the year, an Alberger Centrifugal Pump was located near the bottom of the shaft, and both pumps were utilized to throw the water to surface. When the unwatering of the Dexter Mine was started, it was necessary to take the Alberger pump away from this work, and for the balance of the year the Gould pump has handled all the water to surface. The water which goes to the bottom of the shaft is pumped by a number 5 Cameron up to the sump on the 3rd level, where the Gould pump is located. The mine pump is now operated six hours on the day shift, and four hours on night shift. The day shift pumpman in addition to taking care of the pump, does the underground air piping and takes care of the electrical signal system, telephones and surface lights. The night shift pumping is done by the shift boss two hours before midnight and two hours after midnight. In January 1914 the mine made 90.5 gallons per minute; in December 1914, 119 gallons per minute. The increase is due to the increased openings in the mine.

#### ACCIDENTS TO EQUIPMENT.

During the past year there has only been one accident to the electric equipment at the mine, this occurring on July 26th during a severe electric storm, when lightning entered the building over the wires, a small amount passing the lightning arrestor and burning out one coil on the air compressor. It required one half day to repair the coil, but there was no delay in the mining operations.

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Two rock pickers have been employed the greater part of the past year, picking rock from the stockpiles. In this way a large proportion of the rock hoisted with the ore has been removed, and it is thought that the ore in stock will grade somewhat higher than the stockpile analysis.

In May the alleys and streets of the location were cleaned up, and every two weeks throughout the summer all garbage was removed.

During the summer the safety devices recommended by the Mechanical Inspection Committee, were installed around the mine.

Preparation of the stockpile grounds to take care of additional ore, was started in June, and during the summer they were extended about 100 ft. further to the West. The stockpile grounds are roughly 200 ft. in width North and South, so that the additional space provided for about 40,000 tons of ore. Two and one half carloads, or 56,130 ft. of 3 in. hemlock plank were laid. Only one extra surface hand was employed on this work, as he was helped by one rock picker during the shipping season.

Of the 19,708 tons of ore shipped during the past year, 13,029 tons were crushed at the South Jackson and 6,680 tons were shipped direct from the mine to the docks. This 6,680 tons of ore came from the Southwest shrinkage stope on the 2nd level, where the ore broke up much finer than in the other stopes. During the shipping season, one rock picker worked with the landers breaking chunks and picking rock.

## SURFACE EXPLORATIONS.

## PETERSON OPTION.

On Jan 11th, 1913, an option was taken from Sophie Peterson, on the N.W.  $\frac{3}{4}$  of the S.W.  $\frac{3}{4}$ , and the South half of the S.W. quarter of Section 2, T-47, R-28. This parcel of land fills out the South half of Section 2, the balance being under lease from Moore and Chase.

Seven holes were put down and drilled a short distance into ledge during 1913. Six of these holes were put down in the center line of the N.W. quarter of the S.W. quarter near the North side of the forty. The last hole put down in Dec. 1913, was located on the East line of this forty, and after locating the hard ore contact, was continued in hard ore jasper to the North line of the forty, where it was stopped on Jan. 10th at a depth of 352 ft. The last 49 ft. was in lean hard ore jasper. The next hole, located near the Northeast corner of the forty, was started on Jan. 17th, and completed on Feb. 27th at a depth of 400 ft. It struck ledge at a depth of 206 ft., drilled 152 ft. in quartzite, striking the contact at a depth of 358 ft. Just below the quartzite, it passed through 3 ft. of 50.10% ore, then 9 ft. of 64.37% ore, then 5 ft. of 52.35% ore, into hard ore jasper to a depth of 400 ft., where it was stopped.

The next hole was located 200 ft. to the East; it was started on March 6th, and completed April 9th at a depth of 319 ft. It was drilled 26 ft. in lean hard ore jasper, and showed that the ore struck in the previous hole did not extend this distance to the East. The next hole was located halfway between these holes; it was started April 16th, and was completed on May 15th at a depth of 306 ft. This hole located the contact, but did not show any ore. The next hole was located on the West line of the forty, and was a union hole between the Peterson and Lake Superior Land Co. options, the Lake Superior Land Co. Option covering the North half of the South half of Section 3, and was taken out in the spring soon after ore was found in the hole on the Peterson Option. The union hole was started on May 23rd and was finished on June 20th at a depth of 376 ft. It struck quartzite ledge at depth of 211 ft., and was drilled 132 ft. in ferruginous, slaty quartzite, striking the hard ore contact at a depth of 343 ft. The next 10 ft. was in 57.47% ore, then 5 ft. of dike, then 7 ft. of 62.17% ore, then in lean hard ore jasper for 11 ft., to a depth of 376 ft., where it was stopped.

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The next hole drilled here was also a union hole, and was located a short distance South of the first union hole. It was drilled at a steeper angle in order to strike the hard ore contact at greater depth, being started on August 1st, and stopped on Sept. 18th at a depth of 721 ft., after drilling 32 ft. in lean hard ore jasper. This hole was very disappointing, as it failed to strike ore, and apparently indicates that the ore encountered higher up in the other union hole did not continue down on the contact.

This drill was used to locate the hard ore contact South of the Chase Mine until in December, when another union hole was started. This hole was located near the previous hole drilled here, but was drilled North, 10 degrees East, dipping  $79\frac{1}{2}$  degrees, while the previous hole was drilled North, 15 degrees West, dipping  $80\frac{1}{2}$  degrees. It was started Dec. 15th, and at the end of the year was down to a depth of 262 ft., 45 ft. below ledge in slate, which was struck at a depth of 217 ft.

The drilling of 1914 on the Peterson Option, showed a small amount of hard ore on the contact in the Northwest corner of the option. The ore is merely a narrow seam just under the quartzite. The contact here is either faulted to the North at depth, or is very irregular. If the contact dips to the North here, as is indicated, the ore would soon pass off of this option over on the Barnes & Hecker, Lease No. 31. If the hole now being drilled here is blank, or shows the ore to dip to the North, there is no use of retaining this option any longer.

The following is a summary of the work done here:

STANDPIPING,	1,247 ft.
DRILLED IN ROCK,	1,152 "
DRILLED IN LEAN ORE,	8 "
DRILLED IN GOOD ORE,	<u>26 "</u>
GRAND TOTAL,	2,433 "

BARNES & HECKER, LEASE NO. 31.

Early in 1914, it was decided that it would be advisable to put down a few holes on the Barnes & Hecker Lease, in order to prove if the ore body was continuous between the old drill holes which had shown ore. If the ore body was found to be continuous, it would increase the estimate of developed ore to a figure that would warrant the opening of the property.

Prior to this, it had been assumed that the drilling on the Barnes

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& Hecker Lease had developed sufficient ore to warrant opening a mine here, but the results at the Chase and Morris mines had shown that it was impossible to rely on a few drill holes in estimating an ore body, so three holes were authorized, and later in the summer three more, as the first three did not prove successful. Four holes of the six were completed in 1914; the other two are now down near the place where ore is expected, and both should be completed within sixty days.

Hole No. 60, was started on Feb. 27th, and was stopped September 1st at a depth of 730 ft. in soft ore jasper. It showed lean ore from a depth of 530 to 675 ft., but did not strike the main ore body; it is thought that it probably passed to the North above the ore.

Hole No. 61, was started Feb. 26th, and was stopped on June 13th at a depth of 862 ft. in soft ore jasper. It was in lean ore from a depth of 485 to 655 ft., in high grade ore from 655 to 690 ft., and from 690 to 862 ft., was in lean ore and jasper. It showed some good ore, but not nearly as much as was expected.

Hole No. 63 was started on April 4th, and abandoned on June 29th at a depth of 485 ft. on account of caving ground.

Hole No. 67 was started July 2nd, and was stopped on Dec. 21st, at a depth of 1150 ft. in soft ore jasper. It showed a large amount of lean ore, with two small runs of 15 and 20 ft. respectively of good ore.

Hole No. 68 was started on July 8th, and on Dec. 31st was down 835 ft. in soft ore jasper.

Hole No. 69 was started Sept. 24th, and on Dec. 31st was down to a depth of 514 ft. in soft ore jasper.

A great deal of trouble was experienced in drilling these holes, due to caving ground, very hard, rough material and to the losing of the water. The cost of drilling has been higher than any previous drilling done in this district, due to the unusual amount of difficulty in getting the holes down.

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The following is a summary of the drilling and standpiping done on the Barnes and Hecker Lease:

NUMBER OF HOLES DRILLED,	(6)	
FEET STANDPIPING,	1,093	Ft.
DRILLED IN ROCK,	2,725	"
DRILLED IN LEAN ORE,	320	"
DRILLED IN 2ND CLASS ORE,	335	"
DRILLED IN ORE,	<u>105</u>	"
TOTAL, DRILLING AND STANDPIPING,	4,576	"

These holes have not been successful in proving that the ore body was continuous between the old drill holes. The last three holes, two of which are still drilling, were located further to the South, with the idea that the ore encountered in the old drill holes represented the tops of ore chimneys coming up from the South. This theory was given consideration after the first three holes had shown that the ore body was not continuous between the old drill holes.

The Section 6 ore body, as also the ore body at the Lloyd Mine, are found in the trough between a fault and the slate footwall. The Morris ore body on the other hand, seems to be an enrichment paralleling the formation, for which there are no structural reasons; this is also true of the ore body developed on the Barnes & Hecker Lease. From the drilling done on Section 2 during the past year, it would appear that the ore body on the Barnes & Hecker Lease is irregular, and it is possible that it may consist of pockets of ore, which may or may not be connected.

The drilling done to the East in North Lake several years ago, showed that there was a fault in this territory with a S.W. strike, which on its Westward continuation, passed several hundred feet South of the ore body. It now seems probable that the only hopes of finding any merchantable ore body on the Barnes & Hecker Lease would be confined to the trough between this fault and the slate footwall. Before abandoning the proposition, it is hoped that two or more holes will be drilled in this trough, where it is possible that a large ore body may exist.

CHASE, SECTION 3 EXPLORATIONS.

It was known that the Chase Mine would be exhausted early in 1915,

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and with the explorations in the Dexter Mine proving unsuccessful, it was deemed advisable to explore the hard ore contact on Section 3, South of the Chase Mine, in the hopes that hard ore might be found here. This work was started the 6th of August, with one drill standpiping to locate the ledge, and has been continued throughout the balance of the year. There has been a total of eleven holes put down, one of which is not yet completed.

Work started S.W. of the Chase Mine, where the hard ore contact was finally located after putting down five standpipes to ledge. It was also located near the S.E. corner of the lease near the Peterson Option, and at the close of the year had been located at three points between. The drilling to the Southeast of the Chase Mine did not show up any ore, but in one of the holes Southwest of the mine, over towards the old Dexter Mine, 17 ft. of high grade ore was shown up. At the close of the year no further work had been done to prove up this ore body, as it was first desired to locate the contact further to the East at this point. One drill is now working here, and it is possible that ore may be found in this hole, which is about 300 ft. Southeast.

On completing the hole where the drill is now working, it will be moved into the territory further to the North and West along the contact, where it is hoped that an extension of the ore body will be found. If ore is found in one or more drill holes in this territory, it will prove up sufficient ore to warrant a drift over from the Chase Mine, which is about 600 ft. distant.

Following is a summary of the above work:

NUMBER OF HOLES,	(11)	
STANDPIPING,	1,433	Ft.
DRILLED IN ROCK,	470	"
DRILLED IN ORE,	<u>17</u>	"
TOTAL DRILLING,	1,920	"

CHASE MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 4	1 9 1 3	INCREASE	DECREASE
<u>PRODUCT</u>	72,405	54,743	17,662	
General Expense	.060	.087		.027
Maintenance	.044	.102		.058
Mining Expense	1.016	1.396		.380
<u>Cost of production</u>	1.120	1.585		.465
Exploratory	.075	.053	.022	
<u>DEPRECIATION</u>				
Plant	1.229	1.548		.319
Equipment		.001		.001
<u>Total Depreciation</u>	1.229	1.549		.320
Taxes	.008	.014		.006
Central Office	.068	.076		.008
Sundry Expense	.041	.080		.039
<u>COST ON STOCKPILE</u>	2.541	3.357		.816
Loading & Shipping	.036	.181		.145
<u>Total Cost on Cars</u>	2.577	3.538		.961
Number days operating	299	300		1
Number Shifts and hours	2-8hr	2-8hr		
<u>Avg. daily product</u>	242	182	60	
<u>COST OF PRODUCTION</u>				
Labor	.773	1.054	.281	
Supplies	.347	.531	.184	
<u>Total</u>	1.120	1.585	.465	

## CHASE MINE.

COST DATA FOR YEARS 1914-1913.

	YEAR 1914	YEAR 1913	INCREASE	DECREASE.
Shifts and hours per day,	2 - 8 hr.	2 - 8 hr.		
Product,	72,405	54,743	17,662	
Average Daily Product,	242	182	60	
Number of Days Operated,	299	300		1
Number of days idle,	14	13	1	
Number of Men Surface,	17	15	2	
Average Rate Surface,	2.40	2.39	.01	
Tons per man per day Surface,	13.41	12.02	1.39	
Number of Men Underground,	51	52		1
Average Rate Underground,	2.83	2.83	---	----
Tons Per Man Per Day Undg.,	4.62	3.35	1.27	
Tons per man Undg. & Surface,	3.43	2.62	.81	
Total Average Men,	68	67	1	
Total Average Rate,	2.72	2.75		.03
General Expense, Per Ton,	.060	.087		.027
Maintenance, " "	.044	.102		.058
Mining Expense, " "	1.016	1.396		.335
COST PRODUCTION, " "	1.120	1.585		.465
Average Daily Cost Labor,	187.13	192.33		5.20
" " " Supplies,	83.86	96.92		13.06
" " " Total,	270.99	289.25		18.26

COST OF PRODUCTION.	LABOR	PER TON	SUPPLIES	PER TON	TOTAL	PER TON.
Year 1914,	\$55,951.77	.773	25,064.57	.347	81,016.34	1.12
Year 1913,	<u>57,699.70</u>	<u>1.054</u>	<u>29,076.33</u>	<u>.531</u>	<u>86,776.03</u>	<u>1.585</u>
DECREASE 1914,	<u>1,747.93</u>	<u>.281</u>	<u>4,011.76</u>	<u>.184</u>	<u>5,759.69</u>	<u>.465</u>

## WAGE RATES.

Increased Feb. 1st, 1913.

Decreased Oct. 1st, 1914.

Chase Mine started on operating basis January 1st, 1913.

## CHASE MINE.

ANALYSIS OF COST SHEETS, EXPLAINING INCREASE OR DECREASE IN  
VARIOUS ACCOUNTS BETWEEN YEARS 1914-1913.GENERAL EXPENSE.

## ANALYSIS:

(Acct. No. 127.)	Year 1914,	\$1,109.11	Cost per ton	.015
	Year 1913,	<u>1,248.60</u>	" " "	<u>.023</u>
	Decrease 1914,	139.49	" " "	.008

The decrease is due largely to a large decrease in the number of determinations in 1914, on account of fewer contracts working, and smaller amount of ore shipped. In 1913 considerable ore was shipped from the stockpile as well as from the pockets; in 1914 there were only a small shipment from pockets.

DISTRICT OFFICE;  
(Acct. No. 30-b.)

Year 1914,	\$2,338.92	Cost per ton	.032
Year 1913,	<u>2,647.98</u>	" " "	<u>.048</u>
Decrease 1914,	309.06	" " "	.016

The decrease is due to the Chase Mine paying a smaller proportion of the 1914 charges on account of more men being employed on other work in the District.

## SUMMARY GENERAL EXPENSE.

	LABOR	SUPPLIES	TOTAL	COST PER TON.
Year 1914,	\$3,134.76	\$1,171.85	\$4,306.61	.060
Year 1913,	<u>3,438.94</u>	<u>1,320.53</u>	<u>4,757.47</u>	<u>.087</u>
Decrease 1914,	304.18	148.68	452.86	.027

MAINTENANCE.TRACKS AND YARDS;  
(Acct. 125.)

Year 1914,	\$234.61	Cost per ton	.004
Year 1913,	<u>87.74</u>	" " "	<u>.002</u>
Increase 1914,	146.87	" " "	.002

The increase is due to a charge of \$170.80 taken up in Dec. 1914, which covers bill of Bell Telephone Co., for raising their wires at two points where they cross the L. S. & I. Tracks near the mine, so that they would clear the boom of the North Lake steam shovel. Considerable trouble was experienced in 1913 when taking the shovel in and out of the mine due to breaking some of the telephone wires.

DOCKS, TRESTLES & POCKETS;  
(Acct. No. 126.)

Year 1914,	\$1,178.46	Cost per ton	.016
Year 1913,	<u>1,665.06</u>	" " "	<u>.030</u>
Decrease 1914,	486.60	" " "	.014

The 1914 charges cover the cost of extending the stockpile grounds to the West about 100 ft. The 1913 charges cover the cost of new trestle on account of 2nd Class ore, and extensions to stockpile grounds.

BUILDINGS;  
(Acct. No. 127.)

Year 1914,	\$15.42	Cost per ton	.000
Year 1913,	<u>171.69</u>	" " "	<u>.003</u>
Decrease 1914,	156.27	" " "	.003

The 1914 charges are for a few minor repairs to buildings; the 1913 charges are higher, due to repairs to chutes and pockets at the shaft house, and to galvanized iron covers for exposed steam heating lines to the various mine buildings.

## CHASE MINE.

MAINTENANCE CONT'D.

SHOP MACHINERY:				
(Acct. No. 128.)	Year 1914,	\$26.72	Cost per ton	.000
	Year 1913,	<u>471.70</u>	" " "	<u>.009</u>
	Decrease 1914,	444.98	" " "	.009

The 1914 charges are nominal, representing small repairs to blacksmith shop equipment; the 1913 charges are high due to charging out to shop machinery, a small electric pump purchased for supplying water to boiler house, compressor and blacksmith shop. This pump when installed, cost \$445.78.

BOILER PLANT:	Year 1914,	-----	Cost per ton	----
(Acct. No. 129)	Year 1913,	<u>\$78.32</u>	" " "	<u>.001</u>
	Decrease, 1914	78.32	" " "	.001

There were no charges in this account in 1914, while the charge of \$78.32 in 1913, is for covering the hot water tank in the heating plant with asbestos, and for a new smoke stack.

HOISTING MACHINERY:	Year 1914,	\$151.94	Cost per ton	.002
(Acct. No. 130.)	Year 1913,	<u>458.14</u>	" " "	<u>.008</u>
	Decrease 1914,	306.20	" " "	.006

The 1914 charge covers the cost of small repairs to the hoist and electrical equipment; the large charge in 1913 is due to a charge of \$311.33 for a new set of coils for the stator of the hoist motor. The hoist motor caused a great deal of trouble until these new coils were put in.

COMPRESSORS & POWER DRILLS:	Year 1914,	\$377.30	Cost per ton	.005
(Acct. No. 131.)	Year 1913,	<u>969.69</u>	" " "	<u>.018</u>
	Decrease 1914,	592.39	" " "	.013

The decrease in 1914 is due mainly to the purchase of less new drill equipment. In 1913 the charges cover the cost of five stopping drills, \$599.01, and drill steel \$73.00, also one lightning arrester \$108.19, two transformers \$131.43, the balance being for repairs to compressor motor, where it was necessary to replace several of the coils. The 1914 charges cover the cost of one stopping drill \$122.51, and a compensator \$176.68, the balance of charges are for minor repairs to compressor.

PUMP MACHINERY:	Year 1914,	\$150.50	Cost per ton	.002
(Acct. No. 132.)	Year 1913,	<u>492.50</u>	" " "	<u>.009</u>
	Decrease 1914,	342.00	" " "	.007

The 1914 charges are for repairs to electric pumps. The larger charges of 1913, are due to setting up a permanent pump on the 3rd level, which including all fittings and electrical supplies, brings the total of this job to about \$400.

UNDG. TRACKS & CARS:	Year 1914,	\$324.87	Cost per ton	.005
(Acct. No. 135.)	Year 1913,	<u>513.36</u>	" " "	<u>.009</u>
	Decrease 1914,	188.49	" " "	.004

In 1913 there was more track laid than in 1914, <sup>and</sup> practically all of the charges are for track laid in 1913. In 1914 fully half of the charge is for repairs to tram cars, as it was necessary to put new bottoms in all the main level cars. The balance of the 1914 charge

CHASE MINE.  
MAINTENANCE CONT'D.

UNDG. TRACKS & CARS (Cont'd.)

is for new tracks on the 2nd and 3rd levels.

SUMMARY: MAINTENANCE.

	LABOR	SUPPLIES	TOTAL	COST PER TON.
Year 1914,	\$718.91	\$2,461.26	\$3,180.17	.044
Year 1913,	<u>1,376.20</u>	<u>4,235.41</u>	<u>5,611.61</u>	<u>.102</u>
Decrease 1914,	657.29	1,774.15	2,431.44	.058

The decrease of 1914 is distributed over all the maintenance accounts; in general, it can be said to be due to purchase of less new equipment, and to fewer repairs to the operating equipment.

MINING EXPENSE.

AIR PIPES:	Year 1914	\$608.29	Cost per ton	.008
(Acct. No. 150.)	Year 1913	<u>771.71</u>	" " "	<u>.014</u>
	Decrease 1914,	163.42	" " "	.006

In 1913, the 2nd level was being developed for ore production and the main 3 inch air line was installed. The last of the year when drifting was started on the 3rd level, the main 3 inch air line was installed as the drift advanced. The balance of the 1913 charges were for air lines to contracts. The 1914 charges cover the cost of extensions to the main air line on the 3rd level, and air pipes to contracts.

COMPRESSORS:	Year 1914,	\$5,020.77	Cost per ton	.070
(Acct. No. 151.)	Year 1913,	<u>5,835.88</u>	" " "	<u>.107</u>
	Decrease 1914,	815.11	" " "	.037

There was less air used in 1914, on account of fewer contracts working.

HOISTING:	Year 1914,	\$1,800.76	Cost per ton	.025
(Acct. No. 152.)	Year 1913,	<u>1,375.07</u>	" " "	<u>.025</u>
	Increase 1914,	425.69	" " "	----

The increase is in power cost only, which is twice as large as in 1913. The total hoist in 1913, ore and rock, was 60,844 tons, in 1914 it was 82,675 tons. More tons were also hoisted in 1914 from the 3rd level, and as this increased the depth, more power was used.

PUMPING:	Year 1914,	1,912.29	Cost per ton	.027
(Acct. No. 153.)	Year 1913,	<u>1,615.18</u>	" " "	<u>.030</u>
	Increase 1914,	307.11	" " "	.003

In 1913, the mine averaged 90 gallons of water per minute, in 1914, 101 gallons per minute. The increase in 1914 is divided equally between labor and supplies, and is due entirely to the increased amount of water.

SINKING & SHAFT REPAIRS:	Year 1914,	\$78.02	Cost per ton	.001
(Acct. No. 154.)	Year 1913,	<u>12.51</u>	" " "	<u>.000</u>
	Increase 1914,	65.51	" " "	.001

The increase in 1914 is due to more repairs being necessary to underground loading pockets. The plates on the 2nd level chute leading from pockets to skip, were replaced in 1914, and some new plates were put in the bottom of the pocket.

CHASE MINE.  
MINING EXPENSE CONT'D.

ROCK DRIFTING:

(Acct. No. 155.)

Year 1914	\$11,735.18	Cost per ton	.162
Year 1913	<u>6,586.55</u>	" " "	.120
Increase 1914,	5,148.63	" " "	<u>.042</u>

The increase is due to more rock drifting in 1914. In 1913 there was 992 ft. of rock drifting, costing \$6.64 per ft., while in 1914 there was 1865 ft. costing \$6.29 per foot. In 1913 the rock work was mainly on the 2nd level, and in 1914 on the 3rd level.

BREAKING ORE:

(Acct. No. 156.)

Year 1914,	\$30,046.25	Cost per ton	.415
Year 1913,	<u>37,967.15</u>	" " "	.694
Decrease 1914,	7,920.90	" " "	<u>.279</u>

The large decrease in this account is due to the mining system followed here. In 1913 thousands of tons of ore were broken in the shrinkage stopes, of which only thirty percent was hoisted, while in 1914 this broken ore was hoisted along with the ore obtained from mining operations conducted at other places. On Jan. 1st, 1914, it was estimated that there was 20,000 tons of broken ore available in the shrinkage stopes, all of which was hoisted during the year. Also the ore in the new Southwest shrinkage stopes on the 2nd level which was hoisted during the year 1914, was much softer than any other ore in the mine. The cost per ton of this ore was much lower in both labor and supplies, than for any other ore at the mine. In Jan. 1914, the cost of breaking ore was \$.798, in Feb. \$.685, the high cost for these two months being due to all ore hoisted coming from mining operations. In March some ore was drawn from the shrinkage stopes where mining had been finished, and the cost dropped to \$.567. It continued to cost about this amount until in June, when a larger amount of reserve ore was taken, the cost dropping to \$.359. It reached the low figure of \$.235 in Sept., when shipments were being made from pocket. The average for the last seven months of the year was \$.309, for the first five months it was \$.632.

TRAMMING:

(Acct. No. 157.)

Year 1914,	\$11,478.20	Cost per ton	.158
Year 1913,	<u>11,121.59</u>	" " "	.203
Increase 1914,	357.61	Decrease 1914	.045

The increase in money cost is small, but owing to the large increase in output, the decrease in cost per ton is large, which is due principally to less ore drifting in 1914, hence less shoveling, also to less company account tramping on sub levels in 1914. The trammers now employed have worked a long time at the mine, and have become expert in handling ore from the shrinkage stopes, so that during the latter months of the year, two gangs did the work of three. The ore from the shrinkage stope at the S.W. end of the 2nd level, was much softer than the ore from the rest of the mine, making it much easier to load from the chutes; this also helped to reduce the cost per ton for tramping. The combination of the above differences in conditions as compared with 1913, resulted in the decrease in the cost per ton.

TIMBERING:

(Acct. No. 159.)

Year 1914,	\$2,761.65	Cost per ton	.038
Year 1913,	<u>3,312.81</u>	" " "	.061
Decrease 1914,	551.16	" " "	<u>.023</u>

The decrease in this account is mainly due to building less chutes in 1914. The main ore bodies were opened in 1913, and shrinkage stopes started. Part of the 1914 charges are for repairs to the chutes, necessary on account of blasting chunks, which finally wrecked a number of them.

CHASE MINE.  
MINING EXPENSE CONT'D.

CAPTAINS & BOSSES:  
(Acct. No. 160.)

Year 1914,	\$3,240.14	Cost per ton	.045
Year 1913,	<u>3,515.80</u>	" " "	<u>.064</u>
Decrease 1914,	275.64	" " "	.019

The decrease is due to the change made in mining captains in June 1913, the new captain being paid a lower salary.

DRY HOUSE EXPENSE:  
(Acct. No. 161.)

Year 1914,	\$1,460.76	Cost per ton	.020
Year 1913,	<u>2,034.22</u>	" " "	<u>.037</u>
Decrease 1914,	573.46	" " "	.017

The decrease in labor of \$276.46, is due to a change in method of caring for the dry on day shift. The day shift dryman takes the samples to North Lake for analysis, and during his absence from the Chase, in 1914, the dry was closed, while in 1913 the rock picker looked after the dry during his absence. This resulted in a saving of four hours each day in 1914 from the time charged to dry house on day shift in 1913. The decrease in supplies of \$297.00 is due to crediting this account with its proportion of the overrun of coal piles at the Chase. As there was no scales at the Chase Mine, the coal was charged out by the load, which was guessed to run two tons. When the coal piles were measured up by the engineers last spring, it was found that there was several hundred tons more of coal on hand than was shown by the books. The load has since been figured as one and one half tons.

TOP LANDING & TRAMMING:  
(Acct. No. 162.)

Year 1914,	\$2,302.40	Cost per ton	.032
Year 1913,	<u>1,877.43</u>	" " "	<u>.034</u>
Increase 1914,	424.97	" " "	.---
Decrease 1914,	-----	" " "	.002

The increase in money cost is due to less ore shipped from pocket in 1914. In 1913, 29,005 tons were shipped from pocket, while in 1914 only 19,708 tons. The decrease in cost per ton in 1914, is due to a larger hoist for the year.

SORTING ORE:  
(Acct. No. 164.)

Year 1914,	\$966.33	Cost per ton	.013
Year 1913,	<u>231.51</u>	" " "	<u>.004</u>
Increase 1914,	734.82	" " "	.009

The increase is entirely in the labor charge, and is due to more time spent in picking rock from the ore. There were two rock pickers employed the greater part of 1914; in 1913 only one part of the time. An effort has been made to pick the rock from the 2nd grade ore pile, so that this ore will average up to the 1st grade pile, also all the ore hoisted in 1914 has had to be watched more carefully to eliminate the rock, as it was not as clean as the ore hoisted in the previous year.

## CHASE MINE.

ANALYSIS OF MINING COSTS FOR 1914 - 1913.

	1914		1913		1914.	
Product,	72,405		54,743			
Average Daily Product,	242		182			
Number of shifts and hours,	2-8hr.299		2-8hr.300			
	-1914-	COST	-1913-	COST	INCREASE	DECREASE
	AMOUNT.	PER	AMOUNT.	PER	PER	PER
		TON		TON.	TON	TON
<u>MAINTENANCE.</u>						
150-Air Pipes,	\$608.29	.008	771.71	.014		.006
<u>SUPERINTENDENCE.</u>						
160-Capt. & Bosses,	3,240.14	.045	3,515.80	.064		.019
161-Dry House Exp.	1,460.76	.020	2,034.22	.037		.027
TOTAL,	4,700.90	.065	5,550.02	.101		.046
<u>POWER.</u>						
151-Compressors,	5,020.77	.070	5,835.88	.107		.037
152-Hoisting,	1,800.76	.025	1,375.07	.035		----
153-Pumping,	1,912.29	.027	1,615.18	.030		.003
TOTAL,	8,733.82	.122	8,826.13	.162		.040
<u>MINING EXPENSE.</u>						
156-Breaking Ore,	30,046.25	.415	37,967.15	.694		.279
157-Tramming,	11,478.20	.158	11,121.59	.203		.045
159-Timbering,	2,761.65	.038	3,312.81	.061		.023
164-Sorting Ore,	966.33	.013	231.51	.004	.009	----
TOTAL,	44,252.43	.624	52,633.06	.962		.338
<u>DEVELOPMENT.</u>						
154-Sinking & Shaft Rep.	78.02	.001	12.51	.000	.001	
155-Rock Drifting,	11,735.18	.162	6,586.55	.120	.042	
TOTAL,	11,813.20	.163	6,599.06	.120	.043	
<u>HANDLING OUTPUT.</u>						
162-Top Landing & Tramming,	2,302.40	.032	1,877.43	.034		.002
163-Stocking Ore,	118.52	.002	147.54	.003		.001
TOTAL,	2,420.92	.034	2,024.97	.037		.003
TOTAL MINING.	73,529.56	1.016	76,404.95	1.396		.380

CHASE MINE

AVERAGE MINE ANALYSIS OF OUTPUT FOR YEAR-1914

GRADE	IRON	PHOS.
Chase Ore,	56.79	.334
Chase No. 2,	53.93	.428

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1914

GRADE	Mine		Lake Erie	
	IRON	PHOS.	IRON	MOIST.
Chase Ore,	57.41	.327	57.74	6.88
Chase No. 2,	No shipments.			

ORE STATEMENT - DECEMBER 31ST, 1914

	CHASE NO. 1	CHASE NO. 2	TOTAL	TOTAL LAST YEAR
On Hand January 1st, 1914	6,806	1,431	8,237	6,424
Output for Year,	65,638	6,767	72,405	54,743
Total,	72,444	8,198	80,642	61,167
Shipments,	19,708	0	19,708	52,930
Balance on Hand,	52,736	8,198	60,934	8,237
Increase in Output - 32%			17,662	
Increase in Ore on Hand,			52,697	

2 - 8 Hr. Shifts during 1913 and 1914.

SHIPMENTS FOR YEAR - 1914

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Chase No. 1,	19,708		19,708	52,930
Chase No. 2,	-		-	-
Total,	19,708		19,708	52,930
Total Last Year,	29,005	23,925	52,930	
Decrease - 63 %			33,222	

CHASE MINE.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '14 72,405 Tons.	SURFACE.		UNDERGROUND.		TOTAL.	
	1914	1913	1914	1913	1914	1913
PRODUCT '13 54,743 "						
Avg. no. Men working	17	15	50	52	67	67
Avg. wages per day	2.40	2.47	2.83	2.83	2.72	2.75
Avg. wages per month 25 days	60.00	61.75	70.75	70.75	68.00	68.75
Avg. product per man per day	13.39	12.02	4.62	3.35	3.43	2.62
Labor cost per ton	.180	.206	.614	.846	.794	1.052
Diff. in labor cost per ton	-.026	-	-.232	-	-.258	-
Avg. product breakg. & tramng.			6.33	4.33		
Avg. wages for miners cont.			2.85	2.83		
Total wages for contract			2.85	2.83		

	1914	1913	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	5,408½	4,553	855½	.07
Average rate	2.40	2.47		.07
Amount	13,000.34	11,252.33	1,748.01	
<u>UNDERGROUND</u>				
Total number of days	15,688½	16,355-¾		667½
Average rate	2.83	2.83		
Amount	44,463.16	46,309.41		1846.25
Total days	21,096-¾	20,908-¾	188	
Average rate	2.72	2.75		.03
Total Amount	57,463.50	57,561.74		98.24
Labor cost per ton	.794	1.052		.258

No. shifts and hours                      2-8hr                      2-8hr

Tons per man per day      SURFACE      INCREASE      1.37 tons -      10.2%

   UNDERGROUND      "      1.27 " -      27.5%

   TOTAL      "      .81 " -      23.7%

Proportion Surface to Underground men: 1914 - 1 to 2.89  
 1913 - 1 to 3.59

Decrease Wages per day: Surface      .07      2.83%

   Underground      same

   Total      .03      1.09%

CHASE MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1914.

KIND	LINEAL FEET.	AVG. PRICE PER FOOT.	AMOUNT 1914	AMOUNT 1913
6" to 8" Timber	1,258	.02	25.87	214.26
8" to 10" "	1,302	.04	52.08	77.91
10" to 12" "	2,370	.06	144.43	145.56
12" to 14" "	380	.08 $\frac{1}{4}$	31.36	196.89
Total 1914	5,310	.048	253.74	
Total 1913	17,049	.039		634.62
	LINEAL FEET.	PER 100'	1914	1913
5' Lagging	1,700	.47	8.00	28.00
7' "	3,080	.55	16.94	3.62
8' "	1,600	.55	8.80	
Total Lagging	6,380	.53	33.74	31.62
Poles	3,962	.95	37.63	3.25
Total 1914	10,342		71.37	
Total 1913	7,010	.497		34.87
			1914	1913
Feet of timber per ton of ore			.073	.311
Feet of lagging per ton of ore			.088	.122
Feet of lagging per ft. of timber			1.2	.393
Cost per ton of timber, lagging and poles			.0044	.0122
Equivalent of Stull timber to board measure			12,385	34,972
Feet board measure per ton of ore			.171	.639
Total product			72,405	54,743
Total cost of timber and lagging - 1914				325.11
Total cost of timber and lagging - 1913				669.49

CHASE MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY.	AVERAGE PRICES.	AMOUNT 1 9 1 4	AMOUNT 1 9 1 3
40% Powder	750	.095	70.00	63.00
50% "	47,400	.105	4,957.50	4,884.30
80% Giant Powder	13,336	.14	1,885.55	4,503.93
<u>Total Powder</u>	61,486	.1125	6,913.05	9,451.23
Fuse	133,450	3.84	510.77	641.80
Caps	20,675	6.14	126.61	175.23
Cap Crimpers	21	25	5.25	5.70
Tamping Bags				.66
Connecting Wire				2.49
<u>Total Fuse, etc.</u>			642.63	825.88
<u>Total</u>			7,555.68	10,277.11
Product			72,405	54,743
Pounds powder per ton ore			.8492	1.44
Cost per ton for powder			.0954	.173
Cost per ton for fuse, etc.			.009	.015
Cost per ton for explosives			.1044	.188
Avg. price per lb. for powder			.1125	.12

## UNWATERING AND EXPLORING--DEXTER MINE.

The work of unwatering the old Dexter Mine and exploring for ore by diamond drilling, was authorized the last of January. The material necessary for the work was ordered the first of February, and some work was done during the latter part of the month. In March an air line was put in from the Chase Mine over to the Dexter shaft, and a temporary engine house built. A pole line was also put in from the Chase engine house over to the temporary engine house at the Dexter, and the wires strung for carrying the current for operating the unwatering pumps. Before the work of unwatering could start, it was necessary to re-timber the old shaft down to ledge, which was 18 ft. below surface. This work was started the last of March and completed April 20th. During this time a temporary head frame was put up over the shaft, and in April the sheaves were put in and the skip road extended up into the head frame. Two air hoists were set up in the temporary engine house, one to operate the platform on which the unwatering pump would be set up, and the other to be used for hoisting and lowering material into the mine. A discharge line to carry the water away from the shaft, was put into a point 400 ft. West of the shaft; from this point a ditch was made 1000 ft. to the S.W., which carried the water to a point from which it drained from the mine.

From all reports, it was concluded that the Dexter Mine made about 500 gallons of water per minute. There was several pumps on hand at North Lake of 300-gallon capacity, but these, however, were too small to be used for this work. A water end for a centrifugal pump with a capacity of 600 gallons per minute, 200 ft. head, was ordered, and when it arrived, was fitted on to the frame and motor of one of the 300 gallon, 400 ft. head pumps which were on hand at North Lake. The latter part of April this pump was set up on the platform of the cage which was to be used in unwatering, a connection made to the discharge line through a 4 in. discharge hose, and the work of unwatering was started April 27th. In order to carry the current to this pump as it was lowered into the mine, an armored cable was purchased and rigged up on a reel on the cage above the unwatering pump. The water level in the shaft was 40 ft. from surface on the incline. The work

of unwatering started on the morning of the 27th, and the water was lowered 25 ft., on the 28th 30 ft., or to a point 95 ft. below the collar of the shaft. At 3 o'clock on the morning of the 28th, the transmission line broke a half mile West of Ishpeming, shutting off the current, and as it was impossible to hoist the unwatering pump, it was soon covered with water. Repairs were made to the transmission line on the 29th, and the pump was pulled to surface, the motor taken off and brought to North Lake to be dried out. Work was resumed on May 4th, but on account of a number of accidents to the motor and starting box, the actual unwatering did not start until 12:30 P.M. May 5th.

The 1st level, 150 ft. below surface on an incline, was reached on May 25th. The 2nd level was reached early in June, and the 3rd level a week later. This was as far as the 600 gallon 200 ft. head pump could be used. It was then decided to set it up on the 2nd level, where there was a large sump, and to use a 300 gallon 400 ft. head pump for unwatering. The old stopes on the 1st and 2nd levels were opened a considerable distance to the East, where they connected with the old "Dey" shaft. Near this point the ore had been mined out up to the surface, which had caved in, and it was here that fully 80% of the water came in. It was thought for a time that it would be possible by means of concrete dams to shut off this water, but when the old stopes had been surveyed, it was found that it would be impossible to do this, as they connected with the lower levels.

It was also decided to put in a pump on the 3rd level, and a 300 gallon, 400 ft. head centrifugal pump was installed here the last of June, a separate 4 in. discharge line being put in for it. Unwatering was completed on July 18th, when the 8th level was reached 482 ft. vertically below surface. Until a point about 375 ft. below surface was reached, the pump used for unwatering, pumped the water to surface, it then discharged the water to the pump on the 2nd level. On completing the work of unwatering the mine, the pump used for this purpose was taken off the cage and installed on the 7th level, where previous operators had made a small sump. A small Cameron pump located at the bottom of the mine, pumped the water which came in here to the pump on the 7th level, which pumped it to the 2nd level sump, from which point it was then thrown to surface. The pump on the 3rd level was only

operated during the time that the 7th level pump was in operation, as the pump on the 2nd was not able to handle all the water which came in here, and the additional water pumped by the 7th level pump.

The actual work of unwatering required seventy five days to complete. The timber in the old shaft was found to be in very bad condition, and in order to lower the cage on which the unwatering pump was placed, it was necessary to block up and repair the old skip road. At every level the old sol-  
lers had to be taken out and new ones put in. As the pump was lowered, it was necessary to bar down all loose pieces from the back of the shaft, some of this ground would fall to the foot of the shaft and lodge on the old sills under the skip road. The balance would go down the shaft and accumulate on the sollers of the level below. Every time a level was reached, it required about two days to hoist the dirt, tear out and put in the new sollers. A substantitial ladder road was put in as the unwatering progressed, which was located near the back of the shaft; beneath the ladder road a slide was built of 2 in. plank, on which all the old timber and rock was hoisted out. This slide was also used for lowering pipe and other supplies into the mine.

During the time that unwatering was in progress, surveys and maps were made of those portions of the old levels which it was possible to penetrate. Large falls of ground had occured in the old stopes, so that it was impossible to explore some of them. As soon as unwatering was completed, the work of cleaning up the 7th and 8th levels was started, and this work was in progress on July 26th, when a severe electric storm occured, lightning setting fire to the temporary engine house, burning it to the ground. On the 27th a temporary connection was made to the pole line so that the current could be gotten to the pumps and pumping resumed before any of the pumps were drowned out. The hoists were badly damaged by the fire, and it was necessary to renew all packing <sup>brake</sup> bands, etc., before they could be used. Material for rebuilding the engine house was ordered, and it was re-built as soon as possible. The hoists were repaired on Aug. 6th, and a diamond drill was taken into the mine to the 7th level, where it had been decided to start exploring work while sampling was being done on the 8th level. On the 6th level there was a number of large stopes of ore which had been mined out

above the 6th, and of which no downward extension had been found in the exploratory work done by the previous operators on the 7th level.

Hole No. 1 was located 280 ft. East of the shaft on the 7th level, and was drilled to the Northeast. This hole was started on August 8th, and was completed on August 17th at a depth of 125 ft. It passed through dike and lean jasper without encountering any ore. This drill was then moved further in on the 7th level to a point 430 ft. Northeast of the shaft, and a hole drilled to the Northwest.

Hole No. 2 was started on August 19th, and completed on Sept. 1st at a depth of 170 ft. From a depth of 55 ft. to 60 ft., the material analyzed Iron 46.65, Phosphorous .128. From 60 to 65 ft. this hole showed material which ran Iron 54.28, phosphorous .142, from 65 to 85 ft., Iron 48.38, phosphorous .110. The hole then passed into jasper to a depth of 114 ft., where there was 6 ft. of material averaging 50.19 Iron, .133 phosphorous, then into jasper to 151 ft., and slate from 151 to 170 ft. It showed bands of lean ore in the jasper without any indications of a concentration at this point.

While No. 2 was being drilled, sampling was in progress on the 8th level. Three ore stopes were found here, which have been designated on all reports as stopes "A" "B" and "C". Stope "A" was located at the East end of the 8th level workings about 260 ft. from the shaft, and was roughly 25 x 20 ft. in area. The average of three hand picked samples in this stope ran Iron 53.70, Phosphorous .082, Manganese 3.80, Silica 5.60. One diamond drill hole in the floor, No. 6, showed 5 ft. of ore averaging 53.60 iron, .133 phosphorous, 1.60 manganese.

Stope "B" is another small stope 170 ft. East of the shaft, and is roughly 20 x 30 ft. in size. The average of three hand picked samples here ran Iron 57.50, Phosphorous .065, Manganese .37, Silica 10.10. Drill hole No. 5 was put down in the floor for the purpose of sampling ore, and showed 35 ft. of ore averaging Iron 61.91, Phosphorous .052.

Stope "C", the main ore stope on the 8th level, roughly 65 x 60 ft. in size, was located to the North and East of the shaft, the shaft being bottomed in this ore at the West end of the stope. As this was the main ore area, very careful sampling was done here. A line of six machine drill holes each 5 ft. deep, were put in the bottom of the stope in a line North and South,

UNWATERING AND EXPLORING DEXTER MINE.

the average of these holes being Iron 53.50, Phosphorous .088. The average of three carefully hand picked samples across the entire ore body, gave an average of Iron 53.60, Phosphorous .088, Silica 8.80, Manganese 1.60. Two diamond drill holes were put down also in this stope for sampling purposes, the first being No. 3 hole, which struck quartzite at a depth of 35 ft., the average analysis of the 35 ft. of ore was Iron 52.90, Phosphorous .155, Manganese 1.88. Diamond drill hole No. 4, was also drilled in the floor of this stope at a point 20 ft. West of hole No. 3, and struck quartzite at a depth of 37 ft. The average analysis of the 37 ft. of ore was, Iron 54.90, Phosphorous .099, Manganese 1.70.

Drill holes No. 3, 4, 5 and 6, were drilled on the 8th level between August 10th and 20th. They were all put down for the purpose of determining the average analysis of the ore in the stopes, and also to show the depth of the ore to the quartzite. It was not possible to thoroughly explore for ore below the 8th level from the 8th level workings. It was therefore decided to drive a crosscut about 75 ft. North of the main ore stope near the shaft, and do considerable drilling from the end of this drift, which would permit of crosscutting the ore body at greater depth. This drift was started on August 20th, and completed on Sept. 7th. The North end of the drift was widened to 15 ft., and the back raised to a height of 15 ft. for a distance of 10 ft. back of the breast. The drift was in dike and jasper, and as there was no facilities for hoisting the material broken in this drift, it all had to be disposed of on the 8th level in the ore stope which had been opened here by former operators.

Hole No. 7 was located on the 7th level and was drilled immediately after hole No. 2 was completed on this level. It was located 140 ft. East of the shaft, and was drilled to the North to test the hanging. It started on Sept. 2nd, and was completed on Sept. 16th at a depth of 162 ft., passing through jasper and dike. The drilling which was done on the 7th level indicated that the 6th level ore bodies did not extend down to this level. It was decided that the results on the 7th level did not warrant any further drilling in this territory, and for the balance of the year drilling was confined to the 8th level.

Drilling was started on the 8th level from the new crosscut on Sept. 8th, Hole No. 8, a vertical hole being drilled to a depth of 80 ft. This hole passed through the ore formation, striking quartzite at a depth of 61 ft., and was continued in this material to a depth of 80 ft. It indicated a roll in the quartzite which forms the footwall of the Dexter ore body, and rendered it more likely that an ore body would be found here than would have been the case if the quartzite had maintained its regular dip to the North.

Hole No. 9 was drilled from the same station, dipping 45 degrees South, 28 degrees East. It was started on the 16th of September, and was stopped on the 21st at a depth of 77 ft. It was in dike to 31 ft., and in soft ore jasper and dikes to 50 ft., from 50 to 63 ft. was in ore averaging 52.10 iron, .156 phosphorous, 4.02 manganese, and then passed into dike, striking quartzite at 70 ft. This hole, with Hole No. 8, proved beyond question that there was a big roll in the quartzite footwall just below the 8th level.

Hole No. 10 was located at the West end of the 8th level stope in a small drift that had been driven about 20 ft. West of the shaft into the hanging by the former operators. It was drilled on a course of South 81 degrees West, dipping at 45 degrees; it was started on Sept. 22nd, and completed on the 16th of October at a depth of 223 ft. It showed considerable lean material averaging about 46% iron, striking the quartzite at a depth of 219 ft. It was assumed that this hole was drilled in a lean run of material which lies between the quartzite foot and the main ore body.

Hole No. 11 was drilled from the North side of the main ore stope, dipping 70 degrees. This hole was planned to go down through the quartzite roll into the underlying formation with the expectation that it would strike the underlying hard ore jasper where there was a possibility of finding ore. This hole was started on the 30th of September, and was completed on the 28th of October at a depth of 300 ft. The first 25 ft. showed ore running 55.04 iron, .147 phosphorous, 2.22 manganese, the next 10 ft. ran 57.59 iron, .100 phosphorous, 1.58 manganese, and the next 5 ft. showed iron 53.70, Phosphorous .153, Manganese 1.58. It then passed through jasper and dike to a depth of 56 ft., when it struck quartzite, in which it was continued to a depth of 110 ft. It passed through 10 ft. of soft ore jasper, and then back into quartzite,

in which it was continued to a depth of 230 ft. It then struck soft ore jasper to 255 ft., the next 40 ft. being in hard ore jasper, and the last 5 ft. in soft ore jasper. This drill hole showed an irregularity in the quartzite, either folding or faulting, as shown by the band of jasper encountered between 110 and 120 ft. After passing through the quartzite at a depth of 230 ft., it evidently continued close to the contact, as shown by the soft and hard ore jasper. It was not considered advisable to continue this hole to a greater depth, as it was evidently located practically on the fault. From the results of Hole No. 11, it was thought advisable to return to Hole No. 8 and drill it deeper.

Drilling was started again in hole No. 8 on the 30th of October at a depth of 80 ft., the hole being stopped on Nov. 4th at a depth of 138 ft. It showed a corresponding formation to that encountered in hole No. 11, the drill hole passing through quartzite into soft ore jasper, and back again into the quartzite, in which it was stopped.

Hole No. 12 was drilled from the same station as hole No. 10, i.e., the small drift West of the shaft on the 8th level, dipping forty degrees, and drilled on a course of North, eighteen degrees West. It was thought that this hole would intersect the main ore body on its pitch to the West. The hole was started on the 19th of October and completed on the 28th at a depth of 124 ft. From a depth of 35 to 65 ft., it showed ore averaging Iron 50.73, Phosphorous .035, Manganese 5.22.

Hole No. 13 was then drilled from the same station, dipping 35 degrees, on a course of North, 59 degrees 30' West. It was thought this hole would strike the ore body at a considerably greater depth than hole No. 12. It was started on the 28th of October and completed on the 14th of November, at a depth of 189 ft. It passed through soft ore jasper and dike, striking lean ore at a depth of 150 ft., which only averaged 45.63 iron. It indicated that the ore chute did not continue to the West to the line of this drill hole, but the evidence was not considered conclusive, as it was drilled nearly ~~in line~~ with the strike of the ore body.

Hole No. 14 was located near the West side of the main ore stope, and was drilled with the idea of following the ore down to the West on its

pitch. It was thought that this hole would not only tend to prove up the length of the ore chute, but would be valuable as giving analysis along the strike of the ore body. It showed low grade ore to a depth of 85 ft., passing into jasper at this point, in which it was continued until it was stopped at a depth of 135 ft. The general average of the ore in this hole was about 50% iron, .032 phos., 4.50 manganese.

Hole No. 15 was located in stope "B", and was drilled in order to prove up the depth of this high grade ore body, to assist in determining the tonnage, and also to give analysis of the ore below the 8th level. It was started on the 16th of November, and completed on the 18th at a depth of 61 ft. It was drilled on a dip of  $22\frac{1}{2}$  degrees North, 82 degrees West, and showed 30 ft. of high grade Bessemer ore and 30 ft. of low grade ore.

Hole No. 16 was located at the end of the crosscut North of the ore body near the shaft, and was drilled to intersect the ore chute on its pitch to the West at a point in advance of where it had been located by other drill holes. This hole was drilled on a dip of 28 degrees South, and a course of  $37^{\circ}$ -30' West. It was started on the 16th of November and completed on the 30th at a depth of 194 ft. From 75 to 90 ft., it was in ore averaging 50.42 iron, .033 phos., 4.31 manganese. It then continued in lean ore and jasper to a depth of 158 ft., where 17 ft. of high grade ore was encountered, averaging Iron 60.22, Phosphorous .123, Manganese .19. The last run of ore was evidently not the extension of the main ore chute, but is another lense of ore lying near the footwall. When the direction of the drill hole is taken into consideration, it was thought that this 17 ft. of ore was really only a narrow seam, possibly not more than 7 or 8 ft. in width. It was not given any consideration in figuring the tonnages developed by drilling below the 8th level.

Hole No. 17 was located in the high grade ore stope designated as stope "B", to further prove up the downward extension of this ore body. It was drilled at a dip of forty degrees, on a course of North, 76 degrees West. The first 35 ft. averaged about 62% iron, then 5 ft. of lean ore, then 15 ft. of ore averaging 59.63 iron, .064 phosphorous, with 5 ft. of lean ore beneath, running 52.70 iron. This hole passed into quartzite at a depth of 72 ft. It showed this stope to extend on its strike a distance

of 60 ft. below the 8th level.

Hole No. 18 was located on the 8th level in the breast of the cross-cut driven to the North of the main ore stope, and was drilled on a dip of 62 degrees North, 15 degrees East, in an endeavor to test the heresay reports of previous operators, who claimed to have struck material which did not make core, and which they thought was ore. In addition to testing these reports, it also served to show the geological features in the territory at depth to the North and East of the crosscut. This hole was started on the 24th of November, and was completed on the 22nd of December at a depth of 288 ft. It was in jasper and dikes to a depth of 194 ft., where it struck quartzite and continued in quartzite to a depth of 209 ft. It passed into jasper to a depth of 221 ft., then back into quartzite to a depth of 254 ft., then into soft ore jasper, in which it was continued until it was stopped at a depth of 288 ft. It merely proved that the ore formation continued and that the quartzite footwall at depth was irregular, the same as in the territory farther to the West.

It was also decided to drill hole No. 8, a vertical hole located at the end of the crosscut North of the main ore stope, which was already 138 ft. deep, on down through the quartzite to the underlying hard ore formation. This hole was started again on Dec. 1st, and was continued until Dec. 23rd, when it was necessary to stop drilling and ream the hole for casing to a depth of 106 ft., where it was caving. From 138 ft. to 218 ft. it was in quartzite, then in soft ore jasper for 18 ft., and back into quartzite again to a depth of 254 ft., when reaming was started.

The drill which had been working on hole No. 18, on completing this hole was taken to surface and sent back to the Republic Mine, from whom it had been borrowed when work at the Dexter was started.

In the report made on November 24th covering the work done to this date, it was shown that there was not sufficient ore developed by the drilling to warrant opening the mine for ore production. It was decided, however, before abandoning the proposition, to drill hole No. 8 deeper to test the underlying formation, and to drill hole No. 18 to test the heresay reports of former operators as to certain material which they encountered below the quartzite.

Altogether, there will be a total of eighteen holes drilled on the

property, fifteen on the 8th level, and three on the 7th. Up to Dec. 31st, there had been 2505 ft. of drilling done here, 1791 in rock and 914 in ore and lean ore. Three ore lenses can be seen on the 8th level, only two of which are large enough to be given consideration. The Eastern one of these two, stope "B", is a high grade Bessemer ore stope which is estimated to contain 3,920 tons of ore below the 8th level, and 1,224 tons above, a total of 5,144 tons. It is separated from the main ore stope by 70 ft. of jasper, and from the drilling done, there is no evidence to show that these stopes connect below the 8th level. The main stope, or stope "C", lies near the shaft on the 8th level, and was shown by the estimate to contain 14,688 tons of ore below the 8th level, and 2,856 tons above, a total of 17,544 tons. The total developed ore is 22,688 tons, the average analysis being as follows: Iron 54.72, Phosphorous, .097, Manganese 2.26. Combining the iron and manganese units, on the assumption that they are of equal value, gives 56.98 iron units. From a comparison of this ore with the Chase ore, it was assumed that the moisture would not exceed 7%, which makes the net iron content of this ore 53.01.

As there was not enough ore developed to warrant opening the property, it was a question whether the development of this ore body by sinking a shaft and drifting, would lead to the discovery of other ore bodies. After careful consideration of all the facts, it was decided that the chance of finding ore bodies at depth would not warrant the opening of the property. It is probable that the work will be abandoned here, and the equipment removed from the mine during the coming month.

The cost of the work, deducting the salvage from equipment purchased for this work, will be about \$19,000, this amount being about \$10,000 below the estimated cost.

I beg to submit my report on the work done in the Gwinn District for the year ending December 31st, 1914.

I have taken the various subjects under the following heads, viz:

GENERAL REMARKS

AUSTIN MINE

STEPHENSON MINE

PRINCETON MINE

GWINN MINE

JOPLING MINE

FRANCIS MINE

MACKINAW MINE

GARDNER MINE

GENERAL SURFACE

ACCIDENTS

ANALYSIS OF COST SHEETS

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GENERAL REMARKS

MINES

The principal work in the district has been that of the mines.

There was no work done at the Austin Mine during the year.

The Stephenson Mine worked two eight hour shifts from January 1st to May 31st and one eight hour shift from May 31st to September 30th, at which time the mine was put on four eight hour shifts per week and so continued.

The work at the Princeton Mine was confined to a few surface improvements and excavating for pocket on 6th Level No. 2 Shaft.

The Gwinn Mine worked two eight hour shifts throughout the year.

The product for the different mines for the year was as follows:

Stephenson Mine product for the year was 214,608 tons,

Gwinn Mine product for the year was 48,389 tons,

Princeton Mine product repairing drifts was	768 tons,
Stockpile over-run -	<u>2,488</u> tons,
Total,	3,256 tons,

Total Product for the year was 266,253 Tons,

At the Jopling Mine there was no work done during the year.

At the Francis Mine there was no work done during the year.

At the Mackinaw Mine the work was confined to surface improvements and sinking the shaft. The Mine was worked on two eight hour shifts up to September 30th at which date work was stopped.

At the Gardner Mine the principal work consisted in sinking the shaft. This shaft was also worked on two eight hour shifts up to the time of closing down which occurred on September 30th.

The Princeton and Austin Mines being closed and Stephenson Mine working only one eight hour shift the greater part of the year and finally being put on four eight hour shifts per week and the closing down of the Mackinaw and Gardner Mines has had a very depressing effect on the district.

In the Gwinn Townsite we have twelve empty houses and in the Austin Location four empty houses.

At the Mackinaw-Gardner Location five double houses were erected this season and before the mines were closed on September 30th all of the above houses were occupied as well as the five that were erected the year before. At present eighteen of these houses are empty as well as the boarding house.

At the Gwinn Townsite very few changes occurred during the year.

AUSTIN MINE

There was no work done at the Austin Mine during the year 1914.

13,202 tons were shipped from Austin Bessemer Stockpile.

440 tons were transferred to Austin from Stockpile.

16,813 tons were shipped from Austin No. 2 Stockpile.

36 tons were transferred from Bessemer to Austin No. 2 Stockpile.

AUSTIN MINE.

No ore produced in 1914.

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1914

GRADE	Mine			Lake Erie	
	IRON	PHOS.	MANG.	IRON	MOIST.
Austin Bessemer,	All mixed				
Austin,	"	"			
Austin No. 2,	58.99	.261	.555	60.37	13.97

ORE STATEMENT - DECEMBER 31ST, 1914.

	AUSTIN BESSEMER	AUSTIN	AUSTIN NO. 2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1, 1914	14,220		64,824	79,044	118,150
Transferred from Bessemer Grade,	476	440	36		
Output for Year,	0	0	0	0	68,259
Total,	13,744	440	64,860	79,044	186,409
Shipments,	13,202	440	16,849	30,491	107,365
Balance on Hand,	542	0	48,011	48,553	79,044
Decrease in Ore on Hand,				30,491	

Mine Idle during Year-1914.

SHIPMENTS FOR YEAR-1914

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Austin Bessemer,		13,202	13,202	63,823
Austin,		440	440	6,195
Austin No. 2,		16,849	16,849	37,347
Total,		30,491	30,491	107,365
Total Last Year,	33,388	73,977	107,365	
Decrease - 72%			76,874	

AUSTIN MINE.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '14 Tons	SURFACE		UNDERGROUND		TOTAL	
	1914	1913	1914	1913	1914	1913
PRODUCT '13 68,259 "						
Avg. no. men working	1	15	0	48	1	63
Avg. wages per day	2.28	2.47	0	2.85	2.28	2.75
Avg. wages per mo. 25 days	-	61.75	-	71.25	-	68.75
Avg. product per man per day	-	14.89	-	4.80	-	3.63
Labor cost per ton		.166		.593		.759
Diff. in labor cost per ton		-.007		-.026		-.093
Avg. product breakg. & trammg.				6.64		
Avg. wages for miners contract				2.92		
Avg. wages for trammers contract				2.58		
Total avg. wages for contract				2.84		

	1914	1913	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	315½	4,584½		
Average rate	2.28	2.47		
<u>Amount</u>	717.96	11,302.64		
<u>UNDERGROUND</u>				
Total number of days	34½	14,231½		
Average rate	2.43	2.85		
<u>Amount</u>	10.95	40,487.56		
Total days	320	18,815½		
Average rate	2.28	2.75		
<u>Total amount</u>	728.91	51,790.20		
Labor cost per ton		.759		

No. shifts and hours

2-8hr-74  
.-8hr-174

Only an average of one man employed at Austin during 1914.

### STEPHENSON MINE

The product for December, taken from daily reports, was as follows:

Stephenson Bessemer,	2,900 tons,
Stephenson No. 2,	<u>9,827</u> "
Total,	12,727 "

The product for the year was as follows:

Stephenson Bessemer,	52,309 tons,
Stephenson No. 2,	<u>162,299</u> "
Total Ore,	214,608 "
Rock,	<u>28,421</u> "
Total Ore and Rock,	243,029 "

40,096 tons were shipped from Stephenson Bessemer Stockpile.

6,457 tons were transferred to Stephenson from Stockpile.

15,216 tons were shipped from Stephenson No. 2 Stockpile.

20,628 tons were shipped from Stephenson Bessemer Pocket.

3,421 tons from Stephenson Bessemer Pocket were transferred to Stephenson.

50 tons from Stephenson Bessemer Pocket were transferred to Stephenson No. 2.

7,948 tons were shipped from Stephenson No. 2 Pocket.

### THE MINE

The work for the year consisted in developing sub. levels above the 5th Level, extending the foot wall drift and cross-cuts on East side of the 5th Level, extending the rock tramming drift on Southwest side of 5th Level to the boundary and then across the boundary on to Section 29 - 45 - 25. Driving a rock drift to the West parallel with and about 125 feet North of the boundary and also extending the rock tramming drift to the North to connect with the cross cut from shaft.

Work was also started late in the year on 6th Level.

The mining was principally confined to 3rd and 4th Levels and Sub.

Levels above the 4th Level.

The estimated ore in sight December 31st, 1914, was 899,872 tons as against 573,802 tons shown a year ago.

#### THIRD LEVEL

There is no work being done on the 3rd level at the present time.

#### WORK FOR THE YEAR

Contracts No's 16 and 3 removed the balance of the ore left on 3rd Level North and East of No. 2 Raise early in the year.

No. 2 Contract extended its drift from 40<sub>2</sub> Raise Southeast 80 feet thence Southwest 50 feet and holed to the top of W. Raise from 4th Level.

#### SUB. LEVELS BELOW 3RD LEVEL

##### 1ST SUB. BELOW 3RD LEVEL

#### WORK FOR YEAR

At the close of last year all of the ore had been removed on this sub. level East of M<sub>1</sub> Raise. The balance of the ore on this Sub. Level between M<sub>1</sub> and A<sub>3</sub> Raises was removed early in the year by Contract No's 25, 15, 8 and 36.

No. 32 Contract extended its drift from 4 C<sub>1</sub> Raise 37 feet Southeast, thence Southwest 20 feet, it then started at a point 19 feet Southwest of its raise and drifted Northwest 23 feet to foot, thence Southwest 22 feet.

No. 33 Contract started at a point 17 feet from its cross-cut from 4 C<sub>1</sub> Raise and drifted Northwest 24 feet, thence Southwest 29 feet and caved back its drift, then from raise drifted Southwest 28 feet and Southeast 12 feet to its old drift.

##### 2ND SUB. BELOW 3RD LEVEL

The greater part of the ore on this Sub. Level on the East side of the deposit had been removed last year East of A<sub>4</sub> Raise. The pillar that remained Northeast of M and A<sub>4</sub> Raises was mined by Contracts No's 15 and 36, after they had finished their work on 1st Sub. Level below 3rd Level.

##### 3RD SUB. BELOW 3RD LEVEL

#### WORK FOR YEAR

At the close of 1915 very little work had been done on this Sub. Level

on the East side of the Mine North and West of 4 R Raise. During the year this Sub. Level was developed and practically all the ore mined East of M<sub>7</sub>, M and No. 30 Raises - very little ore is now left on this Sub. Level out side of the "Limit of Mining".

The development work and mining on this sub. level was done by Contracts No's 26, 11, 22, 16, 10, 38, 40, 8, 23, 17, 37, 18, 32, 31, 42, 33, and 38

#### WORK FOR DECEMBER

No. 15 Contract, M<sub>7</sub> Raise,

No. 15 removed ore along the limit of mining at the end of its last months drift and is now starting another slice to the South from a point 21 feet South of its raise.

No. 10 Contract, M<sub>7</sub> Raise,

No. 10 extended its last months drift 30 feet to the South and is now caving back.

No. 11 Contract, M<sub>6</sub> Raise,

No. 11 removed pillar South of its raise.

#### FOURTH LEVEL

#### WORK FOR YEAR

Not much work was done on the 4th Level in the early part of the year but as fast as the contracts finished mining on Sub. Levels above the 4th Level they were brought down on the main level and cross-cuts were driven from the foot and hanging wall drifts and holed to raises which were put up from 5th Level. Mining was then started in the Southeast end of the deposit and the greater part of the ore has been removed along the foot South and East of Q Raise.

On the Southwest end of the 4th Level a body of ore has been developed to the West of the old 4th Level drift. This ore was developed from 10 A Raise which was put up from the foot on the 1st Sub. below 4th Level.

The work for the year in detail was as follows:

Fourth Level Southwest side No. 44 Contract started 15 feet North of

10 A Raise and drifted Northwest 104 feet, thence Southwest 50 feet to foot and Southeast along foot 42 feet thence Southwest along foot 75 feet. It then moved to No. 14's drift on Sub. Level above 4th level and extended this drift 15 feet to the West.

No. 21 Contract cut out from top of No. 12 Raise and drifted 45 feet North and 20 feet Northwest to Contact of ore, thence Northwest along the hanging 63 feet and holed to 10 A Raise.

No. 13 Contract put up 10 A Raise from 1st Sub. below 4th Level at a point about 220 feet North of boundary and from top of raise drifted Northeast 57 feet, thence Northwest 14 feet and stoped ore between foot and hanging to a point 40 feet Northeast of 10 A Raise.

No. 30 Contract cut out on Southwest side of 10 A Raise and drifted Southwest 61 feet thence South 35 feet, thence Westerly 50 feet and Southeast 25 feet to hanging. Then came back 10 feet and drifted Southwest along hanging 57 feet.

No. 14 Contract drove cross-cut up on foot from No. 44's drift at a point 220 feet North of boundary and from this cross-cut raised 14 feet and from top of raise drifted West 16 feet. This drift was then extended by No. 44 Contract 15 feet Southwest.

#### FOURTH LEVEL - NORTHEAST SIDE

No. 16 Contract started five feet East of R<sub>5</sub> Raise and drifted Northeast 14 feet and holed to No. 31 Raise. Then from raise drifted Northeast 60 feet and holed to No. 32 Raise, then from No. 32 Raise drifted North 40 feet and holed to old foot wall drift. Then started at No. 32 Raise and drifted Southwest 60 feet and holed to No. 41, then moved North of No. 32 Raise and drifted Northeast along the foot 50 feet.

No. 33 Contract from 4 P Raise drifted Southwest 66 feet to old drift, then starting in cross-cut at O<sub>8</sub> Raise drifted South 20 feet to old foot wall drift, then Southeast along old drift 91 feet and holed to No. 36, then caved back stoping ore from foot. It then started in cross-cut at O<sub>8</sub> Raise and drifted South 75 feet.

No. 36 Contract started 15 feet Northeast of No. 37 Raise and drifted Northeast 40 feet, thence North 10 feet and holed to caved ground. It then caved back its drift. Then drifted South from No. 37 Raise 15 feet.

No. 35 Contract started 42 feet Northwest of cross-cut to 42 Raise and drifted Northwest 68 feet along old foot wall drift and holed to No. 27, then caved back its drift stopping ore from foot. Then moved to a point 51 feet Northeast of No. 37 Raise and drifted Southeast 44 feet and caved back removing ore from foot, then starting at No. 38 Raise drifted Southwest 20 feet.

No. 23 Contract from a point 12 feet Southeast of No. 49 Raise drifted Northeast 80 feet and holed to drift driven by No. 31 Contract. It then drifted Northwest from No. 49 Raise 20 feet and holed to cross-cut driven by No. 1 Contract. It then moved 20 feet Northeast of its raise and drifted Northeast along old drift for 40 feet and holed to No. 42 Contract.

No. 1 Contract cut out in No. 50 Raise and drifted Southwest 55 feet and holed to old hanging wall drift, then from raise drifted Northeast 82 feet, thence Northwest 40 feet. It then extended drift started by No. 23 Contract and holed to No. 38 Raise and also extended this drift to the East 30 feet and holed to No. 42 Contract. It then moved to a point 40 feet Southeast of No. 49 Raise and drifted Northeast 45 feet.

No. 7 Contract from a point 15 feet Northwest of No. 34 Raise drifted Northeast 58 feet, thence South 36 feet and holed to No. 35 Raise.

No. 40 Contract started 10 feet West of  $R_3$  Raise and drifted Northwest 15 feet and holed to No. 34 Raise, then from raise drifted Northwest 40 feet, thence Northeast 40 feet and holed to old foot wall drift at  $O_5$  Raise.

No. 24 Contract extended No. 44 Raise from 1st Sub. below 4th Level to 4th Level and from top of raise drifted 10 feet North and holed to old hanging wall drift.

No. 15 Contract 15 feet Northeast of No. 41 Raise drifted Northeast 34 feet and holed to No. 40 Raise.

No. 42 Contract started 19 feet Northeast of No. 38 Raise and drifted Northeast 60 feet to old foot wall drift, then with No. 17 Contract stopped up 2 feet of the floor. This drift caved and it then started at raise and with

No. 17 drifted Southwest 20 feet and holed to drift driven by No. 23 Contract from No. 49 Raise.

No. 31 Contract 10 feet North of V<sub>2</sub> Raise drifted West 13 feet and Southwest 69 feet to No. 37 Raise. Then came back 20 feet in its cross-cut and drifted South 41 feet to No. 38 Raise, then Southeast 50' to No. 17's drift, then came back 16 feet and drifted Northeast 37 feet and holed to No. 42 Contract. It then started 20 feet Northeast of No. 40 Raise and drove cross-cut 45 feet Northeast to foot and caved back to its raise. Then from No. 38 Raise it drifted Northwest 15 feet and then removed pillar between No. 37 and 38 Raises.

No. 25 Contract started on Northwest side of No. 37 Raise and drifted Northwest 58 feet and holed to No. 36 Raise. Then from raise drifted North east 77 feet and holed to drift driven by No. 33 Contract, came back 10 feet and drifted Southeast 40 feet and caved back its drift. Then from a point 15 feet East of No. 36 Raise drifted East 35 feet and then removed small pillar Northeast of its drift.

No. 17 Contract cut out in No. 39 Raise and drifted Southwest 30 feet to cross-cut North of No. 41 Raise, then from Northeast side of No. 39 Raise drifted Northeast 21 feet thence East 44 feet to foot and caved this drift. It then started at No. 39 Raise and drove cross-cut Northeast 60 feet to foot and caved back. It then worked with No. 42 Contract and stoped up floor of No. 42's drift then starting at No. 39 Raise drifted Southwest 20 feet and then removed pillar Southeast of No. 49 Raise.

No. 38 Contract cut out from No. 49 Raise and drifted Southeast 67 feet and holed to No. 41 Raise. Then opposite No. 3 Cross-cut drifted Northwest 44 feet and then caved back to cross-cut. It then drove another drift Southwest of No. 40 Raise and took slice in pillar Southeast of its raise.

No. 3 Contract started at top of No. 43 Raise and stoped up floor of old drift for 18 feet, then drifted Northwest 68 feet and holed to cross-cut from foot wall drift just West of V Raise, then came back and stoped up floor and then started 15 feet Southeast of No. 40 Raise and drifted East 19 feet thence Northeast 55 feet to old foot wall drift. It then extended its

drift 20 feet Northeast and stoped ore from foot also took ore on both sides of its drift. Then at turn drifted Northeast 49 feet to foot, stoped ore from foot and caved back its drift.

No. 2 Contract started from a point 55 feet Southwest of W. Raise and drifted Southwest 18 feet, thence Northwest 20 feet. Then came back and drifted Southwest 23 feet, thence Northwest 31 feet holing to No. 42 Raise, thence Westerly along hanging 39 feet, thence North 29 feet and Northeast 81 feet to No. 35's drift along old foot wall drift. It then came back 10 feet and drifted Northwest 19 feet to foot wall drift. It then started 45 feet from drift to No. 43 Raise and drifted Northeast 30 feet and caved back. Then at cross-cut drifted North 15 feet and caved back and then starting 10 feet Northwest of No. 42 Raise took slice in pillar for 25 feet to Northeast and caved back. It then moved to North side of No. 37 Raise and drifted North 15 feet, thence East 30 feet. It then came back 20 feet and drifted North 8 feet and holed to No. 25's stop.

No. 8 Contract started in No. 2's cross-cut 20 feet Southwest of old foot wall drift and drifted Southeast 14 feet.

No. 27 Contract from a point 20 feet North of No. 43 Raise drifted Northeast 42 feet towards foot, then came back and from a point 19 feet from No. 3's drift drifted Southeast 20 feet, thence Northeast 45 feet to foot and stoped ore from foot. It then came back to cross-cut and drifted Northeast 17 feet, thence Southeast 36 feet to caved ground, then came back 10 feet and drifted Northeast 30 feet to foot and stoped ore from foot. Then from a point 25 feet Northwest of No. 43 Raise drifted Northeast 70 feet and caved back.

#### WORK FOR DECEMBER

No. 26 Contract, No. 31 Raise,

No. 26 extended its last months drift 40 feet East to old cross-cut, then returned to its raise and drifted Northwest 12 feet.

No. 41 Contract, No. 31 Raise,

No. 41 extended its drift 35 feet East to cross-cut and then caved back 15 feet.

No. 28 Contract, No. 33 Raise,

No. 28 holed its last months drift, Southwest of No. 46 Raise, to old hanging wall drift. Then moved to No. 33 Raise and drifted Northwest 20 feet.

No. 16 Contract, No. 32 Raise,

No. 16 started from a point 60 feet North of No. 32 Raise and drifted Easterly 50 feet along foot.

No. 7 Contract, No. 34 Raise,

No. 7 started 40 feet Northwest of its raise and drifted North 48 feet.

No. 40 Contract, No. 34 Raise,

No. 40 started at a point 45 feet Northwest of its raise and drifted Northeast 35 feet.

No. 6 Contract, No. 35 Raise,

No. 6 started at a point 15 feet West of P Raise and drifted Westerly 35 feet.

No. 32 Contract, No. 35 Raise,

No. 32 started at a point 55 feet Southwest of P. Raise and drifted Northwest 25 feet, thence West 20 feet and is stoping ore from foot.

No. 29 Contract, No. 45 Raise,

No. 29 extended its drift North 10 feet and holed to old workings, then drifted Northeast 50 feet along old drift.

No. 25 Contract, No. 36 Raise,

No. 25 stoped ore all the month near the end of the last months drift.

No. 2 Contract, No. 37 Raise,

No. 2 started 15 feet North of its raise and drifted East 30 feet, then came back 20 feet and drifted North 8 feet and holed to No. 25's stope.

No. 36 Contract, No. 37 Raise,

No. 36 started 10 feet North of No. 37 Raise and drifted

West 30 feet.

No. 31 Contract, No. 38 Raise,

No. 31 removed the pillar between No. 37 and 38 Raises.

No. 35 Contract, No. 38 Raise,

No. 35 extended its drift along old cross-cut 35 feet to Southwest, then caved back and is now taking pillar North of No. 39 Raise.

No. 3 Contract, No. 50 Raise,

No. 3 worked part of the month South of No. 39 Raise. It then moved to a point 25 feet South of No. 37 Raise and drifted North 10 feet.

No. 17 Contract, No. 49 Raise,

No. 17 removed pillar East of No. 49 Raise

No. 27 Contract, No. 42 Raise,

No. 27 Contract, stopped ore on East side of hanging wall drift - Northwest of No. 42 Raise.

No. 30 Contract, No. 12 Raise,

No. 30 extended its drift 40 feet Southwest along the hanging.

No. 44 Contract, No. 12 A Raise,

No. 44 extended drift from top of 12 A Raise 15 feet to the West.

#### SUB. LEVELS BELOW 4TH LEVEL

##### 1ST SUB BELOW 4TH LEVEL

#### WORK FOR YEAR

The work on this Sub. Level consisted in developing the ore body in the Southwest end of the deposit. Mining the greater part of the ore between foot and hanging that was left between No. 10 and No. 5 Raises and the ore along foot Northwest of No. 10 Raise. Ore was also mined along the boundary Southwest of No. 9 Raise.

On the Southeast side of the Mine raises are now being put up from 5th Level to develop the ore in this end of the deposit.

The work in detail was as follows:

No. 44 Contract in 1st cross-cut from No. 9 Raise drifted Northeast

24 feet and holed to 2nd cross-cut, then continued this drift Northeast 31 feet to hanging. It then moved to cross-cut from No. 10 Raise and starting 210 feet Northwest of No. 10 Raise drifted Southwest 59 feet and South 44 feet to hanging and caved back 19 feet then East 26 feet to hanging and caved back, then took another slice for 26 feet and caved this back. Then moved to No. 13's drift and starting 35 feet from turn drifted Southwest 45 feet to hanging.

No. 13 Contract from a point 5 feet West of No. 9 Raise drifted Southwest 43 feet, thence West 35 feet. Then moved to No. 44's drift and starting at a point 200 feet Northwest of No. 10 Raise drifted Northwest 157 feet to hanging and from end of this drift put up 10 A Raise to 4th Level.

No. 9 Contract in early part of year stoped ore Northwest of No. 7 Raise. Then moved to No. 13's drift from No. 9 Raise and drifted South 23 feet to boundary. Then came back 12 feet North of boundary and drifted West 90 feet to hanging and then caved back taking ore on both sides of its drift between the hanging on the North and the boundary on the South.

No. 12 Contract extended its drift from No. 10 Raise 50 feet Northwest to foot and 40 feet up on foot. It then stoped ore from foot and mined the ore for 30 feet on the Southwest side of its drift back to a point about 200 feet Northwest of No. 10 Raise.

No. 43 Contract extended its drift from No. 10 Raise 30 feet Northwest to foot and 40 feet up on foot. Then with No. 4 Contract stoped the ore from foot back to a point 70 feet Northwest of No. 10 Raise.

The greater part of the ore that was left in the pillars between No. 10 and No. 5 Raises was mined during the year by Contracts No's 30, 19, 43 and 9.

No. 34 Contract started 25 feet Southwest of No. 4 Raise and drifted Northwest 30 feet, thence Southwest 30 feet to caved ground on the Southeast side of the mine.

No. 24 Contract cut out from No. 44 Raise and drifted Southeast 40 feet, thence South 15 feet and Southeast 90 feet.

No. 8 Contract cut out from top of No. 51 Raise and drifted North-

east 54 feet to foot.

WORK FOR DECEMBER

No. 34 Contract, No. 4 Raise,

No. 34 removed small pillars on either side of its last months drift.

No. 43 Contract, No. 7 Raise,

No. 43 removed pillar on North side of drift Northwest of its raise.

No. 4 Contract, No. 10 Raise,

No. 4 started on West side of cross-cut opposite its last months drift and drifted Northwest 20 feet, thence Southwest 15 feet and holed to main drift from its raise, it then caved back taking pillar to the Northwest.

No. 12 Contract, No. 10 Raise,

No. 12 took slice on Northeast side of its drift and holed to No. 4 stope, caved this slice and then starting on Southwest side of the main drift, drifted Southwest five feet.

No. 19 Contract, No. 10 Raise,

No. 19 took a slice for 15 feet to the East on the North side of its last months drift, then starting 20 feet North of No. 13 Raise drifted South 5 feet.

No. 14 Contract, No. 10 Raise.

No. 14 extended its drift 40 feet to the Northeast.

No. 13 Contract, No. 13 Raise,

No. 13 extended its raise 10 feet to 1st Sub. below 4th Level and then drifted North 8 feet from the top of its raise.

No. 1 and 23 Contracts, No. 41 Raise,

No's 1 and 23 finished mining on main 4th Level in early part of the month and then came down in No. 41 Raise and cut out on elevation of 1st Sub. below 4th Level, and drifted South 30 feet.

No. 24 Contract, No. 44 Raise,

No. 24 extended last months drift 55 feet East along hanging.

No. 8 Contract, No. 51 Raise,

No. 8 drifted Northeast from top of No. 51 Raise, 54 feet to the foot.

No. 33 Contract, No. 51 Raise,

No. 33 stoped the greater part of the month on 4th Level South of Q Raise, then came down on 1st Sub. below 4th Level and starting 18 feet Northeast of No. 51 Raise drifted Northwest 5 feet along the hanging.

#### 2ND SUB. LEVEL BELOW 4TH LEVEL

#### WORK FOR YEAR

The work on this sub. level for the year was as follows:

No. 30 Contract cut out on Southwest side of No. 5 Raise and drifted South 10 feet, thence Southeast 40 feet to hanging, thence Westerly 40 feet to No. 7 Raise.

No. 19 Contract started at No. 8 Raise and drifted Northerly 140 feet, thence Northwest 100 feet and holed to No. 7 Raise.

No. 14 Contract started at No. 8 Raise and drifted Southeast 90 feet and holed to No. 6 Raise, then started 25 feet Northwest of No. 6 Raise and drifted Westerly 75 feet and holed to No. 19's drift from No. 9 Raise. It then drifted South 20 feet to the boundary.

No. 19 Contract cut out on Southeast end of No. 9 Raise and drifted Easterly 75 feet and holed to No. 14's drift from No. 6 Raise.

No. 34 Contract cut out on Northeast end of No. 5 Raise and drifted Northeast 70 feet to hanging, thence Northwest 95 feet and West 15 feet and from end of drift put up raise to 1st Sub. below 3th Level.

No. 9 Contract started in stub drift on Northwest end of No. 9 Raise and drifted Westerly 50 feet.

No. 15 Contract cut out from No. 13 Raise and drifted South 20 feet.

No. 39 Contract cut out from No. 32 Raise and drifted North 80 feet in rock and then raised and holed to cross-cut on 4th Level.

#### WORK FOR DECEMBER

No. 9 Contract, No. 9 Raise,

No. 9 extended its drift 35 feet to the West.

No. 13 Contract,

No. 13 from top of its raise drifted South 20 feet.

FIFTH LEVEL

WORK FOR YEAR

On the Northeast side of the 5th Level the work for the year consisted in extending the cross-cuts from the rock tramming drift towards the contact and putting up 15 raises from these cross-cuts to mine the 4th Level ore and to develop sub. levels above the 5th Level.

The rock tramming drift was also extended 312 feet Southeast to contact and thence along the foot 378 feet to Southeast.

The work in detail on this side of the 5th Level was as follows:

No. 2 Cross-cut was extended East 40 feet by No. 20 Contract. No. 30 and 31 Raises were then put up to 1st Sub. above 4th Level by No. 24 Contract.

No. 3 Cross-cut was extended 235 feet to the Southwest and holed to main cross-cut from shaft.

From this cross-cut raises No. 34, 45 and 46 were put up to 4th Level by No. 24 Contract.

No. 20 Contract extended No. 4 Cross-cut 60 feet to Southwest and No. 1 Contract put up No. 36 Raise to 4th Level.

No. 5 Cross-cut was extended 125 feet to Southwest by No. 20 Contract and from this cross-cut Raises No. 37, 38, 49 and 50 were put up to 4th Level by No. 1 Contract.

No. 6 cross-cut was extended 155 feet Southwest by No. 20 Contract.

No. 1 Contract put up Raises No. 39 and 40 and No. 24 Contract put up No. 41 Raise from No. 6 cross-cut to 4th Level.

No. 7 cross-cut was extended to the Southwest 50 feet by No. 20 Contract, 60 feet by No. 39 Contract and 10 feet by No. 8 Contract, making a total of 120 feet.

From No. 7 Cross-cut No. 43 raise was put up by No. 1 Contract to 4th level and No. 43-A Raise to 1st Sub. below 4th Level by No. 39 Contract.

Raises No's 42 and 44 were also put up to 4th Level from main rock trammig drift to 4th Level by No. 1 Contract and No. 51 raise put up in 1st Sub. below 4th Level by Contracts No's 39 and 21.

No. 20 Contract extended the main rock trammig drift 75 feet South east, then came back 30 feet and drifted Southwest 50 feet thence South 20 feet, thence Southeast 160 feet, thence South 64 feet,. This drift was then extended Southeasterly 321 feet by No. 37 Contract.

On the Southwest side of the 5th Level the rock trammig drift was extended by No. 5 Contract 28 feet to the boundary. Then across the boundary on to O. & N. W. Lease Section 29 - ,45 - 25, 160 feet to Southwest, thence Westerly 60 feet. No. 5 then came back in its drift 100 feet and drifted Southeast 43 feet. It also put up a raise from a point 25 feet Southwest of the forks of its drift. This raise was extended to a point about 8 feet above the back of the 5th Level.

No. 5 Contract then moved to a point 155 feet Northeast of the boundary and drove a rock drift 235 feet to the West at the end of this drift No. 12 Raise was put up to the 4th Level by No. 21 Contract and from a point 95 feet East of No. 12 Raise No. 13 Raise was put up to 1st Sub. below 4th Level by Contract No's 21 and 13.

No. 5 Contract also drove rock drift 95 feet to Southeast from a point 45 feet Southeast of winze from 4th Level and extended the rock trammig drift 70 feet to Northwest to connect with the above drift.

#### WORK FOR DECEMBER

No. 21 Contract,

No. 21 only worked part of the month. It started No. 52 Raise from a point 150 feet East of No. 32 Raise, Raising 30 feet.

No. 45 Contract,

No. 45 only worked part of the month. It is putting up No. 53 Raise from main rock trammig drift at a point 300 feet Southeast of No. 52 Raise. It raised 23 1/2 feet.

No. 5 Contract,

No. 5 extended its North drift 12 feet to the South.

. It then extended No. 5 Cross-cut on East side of 5th Level 44 feet to Southwest.

No. 39 Contract,

No. 39 Raised 50 feet from a point 20 feet Southwest of No. 43 A Raise.

No. 37 Contract,

No. 37 extended its drift 30 feet Southeast and then came back 20 feet from its breast and raised 7 feet.

#### SIXTH LEVEL

##### WORK FOR YEAR

The work of cutting 6th Level plat was started in September by No. 20 Contract. The plat opposite the skip compartment was excavated and tail drift extended to the West 25 feet. The main drift was then driven to the East 130 feet.

##### WORK FOR DECEMBER

No. 20 Contract,

No. 20 extended its drift 75 feet to the East.

#### UNDERGROUND IN GENERAL

All the ore has now been mined on main 3rd Level with the exception of a small pillar at the end of cross-cut East from Shaft at the forks of the foot wall drifts.

On the Sub. Levels below the 3rd Level practically all the ore has been removed North and East of A<sub>4</sub> Raise and from a point 60 feet South of C<sub>1</sub> Raise.

The greater part of the ore on the Sub. Levels above the 4th Level had been mined by the later part of July. The Contracts were then brought down on main 4th Level and cross-cuts driven from foot and hanging wall drifts to raises which were put up from 5th Level. Mining was then started in the Southeast end of main 4th Level and the greater part of the ore removed along the foot. South and East of Q Raise as mentioned above as "Work for the Year on Main 4th Level".

A deposit of ore was developed West of the old 4th Level drift in the

Southwest end of the deposit. Foot and hanging wall drifts were driven along the contact and at the present time these drifts are about 80 feet North of Section 29 boundary. A raise was also put up from the above foot wall drift to a point 18 feet above the 4th Level and cross-cut driven to the West 30 feet. So far this cross-cut has only cut lean ore.

The ore developed by these drifts cannot be mined at the present time as it is under the Stephenson Stockpile ground.

The rock tramming drift on the East side of the 5th Level was getting too far back into the foot and was turned Southwest for a distance of about 40 feet and then extended to the Southeast and cut the ore at a point about 50 feet Southeast of No. 44 Raise, from this point the drift was extended along the contact and struck the hanging along the right side of the drift at a point about 90 feet Southeast of No. 51 Raise and followed along the hanging for about 20 feet, showing that the deposit at this point is very narrow. The drift was then turned slightly to the East and extended along the foot for a distance of about 50 feet at which point it again lost the foot and at the present time has again got the hanging on the Southwest side of drift.

The drift South of No. 51 Raise is taking weight badly and it will probably be necessary to go back to the contact and extend the drift back in the foot.

The foot wall drift on the Southwest side of the 5th Level is also taking weight between No. 1 and No. 3 Raises, so it was decided to extend the rock tramming drift from a point 40 feet Southwest of No. 2 Raise to the Northwest and connect with the cross-cut from shaft at a point about 40 feet Southeast of 4th Level winze.

From a point 125 feet North of the boundary a cross-cut was driven into the foot for a distance of about 225 feet to develop and mine the ore above the 5th Level at this point.

The rock tramming drift on the Southwest side of the 5th Level was also extended on to C. & N. W. Lease Section 29 - 45 - 25. This drift was driven Southwest from the boundary for 125 feet and from this point one drift was driven to the Southwest and another to the Southeast. A raise was also

put up from a point about 20 feet beyond the forks of the drift and cut the ore about 8 feet above the back of the drift.

Work of cutting 6th Level plat was started late in the year and the drift opposite the skip compartments is now being extended to the East.

The water being pumped at the Stephenson at the close of last year was 1,578 gallons per minute. This amount decreased, reaching its lowest point in September when it averaged 1,401 gallons per minute.

The water pumped during November averaged 1475.1 gallons per minute with the average for December 1451.5 gallons per minute.

## STEPHENSON SURFACE

### WORK FOR YEAR

At the close of 1913 timbers had been framed for the Northwestern Ore pockets and one pocket erected West of the Stephenson Shaft House, the second pocket was erected early in 1914 and both pockets lined with plank and steel plates installed. Platforms and railings were then constructed on pockets for Safety device, stringers were laid from landing floor of Shaft House across pockets and connected with the new permanent trestle.

Three bents were erected for the above trestle and the 3rd bent connected with the last bent of the old permanent trestle. Railings were then erected on this trestle from last permanent bent to shaft house.

The puffer shanty on the landing floor was shifted to the North and tracks laid so that the top tram cars approach the shaft from the side instead of from the end.

Very little ore was shipped from the Stephenson No. 2 stockpile this year and as the stocking ground for this grade of ore South of the shaft was practically filled up early in the year, it was necessary to provide more stocking ground.

The area Northeast of the shaft and North of the rock pile was graded, solar plank laid and a trestle for gravity tram erected from the rock trestle to the North, eight bents being erected for this trestle. This new stocking ground will accommodate about 75,000 tons of ore.

Considerable trouble was experienced during the summer with cattle breaking through the old fences around the caved areas and during the berry season it was also difficult to keep the women and children from going on to the dangerous ground. To overcome this a new boundary fence was erected starting at the fence North of the open pit at the Austin Mine, thence West along the South side of the Stephenson Mine road 600 feet, thence Southwest to a point about 200 feet North of W $\frac{1}{4}$  Post Section 20 - 45 - 25, thence South along the West side of Sections 20 and 29 to a point about 800 feet South of N. W. Corner Section 29 - 45 - 25, thence West 725 feet to Stephenson Mine launder. Wires were strung along the bents of this launder for 600 feet to

the North and from this point a fence was constructed to the East about 2000 feet and connected with the fence which encloses the field Southwest of the M. M. & S. E. Ry. This enclosing all the dangerous ground on both the Stephenson and Austin Mines.

A new wagon road was constructed from the point where the Stephenson Mine road turns South along the Stephenson Mine tracks on Section 20 and extended to the Southwest about 1000 feet and connected with the main traveled road along the East boundary of Section 19 - 45 - 25. This road was constructed to keep the public travel outside of the Stephenson boundary fence. There is a good deal of travel over the road on Section 19, especially in the summer time during the fishing season.

The timber tunnel at the Stephenson Shaft was extended 28 feet to the Northwest to accommodate the proposed tracks to Northwestern ore pockets located just West of the Shaft House.

500 feet of pipe and 4" hydrant connections were placed along the Northwest side of Stephenson Mine Coal Dock approach for fire protection.

New spreaders and walks were placed on Stephenson Coal Dock.

The ground North of the Stephenson Mine Dry was plowed and seeded down and a catch basin constructed to drain the water which accumulates after heavy rains.

The West stocking trestle was repaired and 7 new bents erected.

STEPHENSON MINE

AVERAGE MINE ANALYSIS OF OUTPUT FOR YEAR-1914

GRADE	IRON	PHOS.	MANG.
Stephenson Bessemer,	61.86	.057	
Stephenson,	61.22	.086	
Stephenson No. 2,	59.60	.667	

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1914

GRADE	Mine			Lake Erie	
	IRON	PHOS.	MANG.	IRON	MOIST.
Stephenson Bessemer,	All mixed				
Stephenson,	"	"			
Stephenson No. 2,	59.34	.638	.873	59.42	14.43

ORE STATEMENT - DECEMBER 31ST, 1914.

	STEPHENSON BESSEMER	STEPHENSON	STEPHENSON NO. 2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1914,	74,723		265,646	340,369	180,688
Output for Year,	42,401	9,858	162,349	214,608	255,979
Total,	117,124	9,858	427,995	554,977	436,667
Transferred to Lake Stockpile at Presque Isle,					19
Shipments,	60,724	9,858	23,214	93,796	96,279
Balance on Hand,	56,400	0	404,781	461,181	340,369
Decrease in Output - 16%				41,371	
Increase in Ore on Hand,				120,812	

1914 -- 2-8 Hr. Shifts from Jany. 1st to May 31st,  
 1-8 Hr. Shift from June 1st to September 30th,  
 1-8 Hr. Shift from Oct. 1st to Dec. 31st, 4 days per week only.

1913 -- 2-8 Hr. Shifts during Year.

STEPHENSON MINE

SHIPMENTS FOR YEAR-1914

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Stephenson Bessemer,	20,628	40,096	60,724	47,683
Stephenson,	3,421	6,437	9,858	9,562
Stephenson No. 2,	7,998	15,216	23,214	39,034
Total,	42,047	61,749	93,796	96,279
Total Last Year,	78,772	17,507	96,279	
Decrease - 2.6%			2,483	

STEPHENSON MINE.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '14 214,608 Tons	SURFACE		UNDERGROUND		TOTAL	
	1914	1913	1914	1913	1914	1913
PRODUCT '13 255,979 "						
Avg.no. men working	62	70	184	220	246	290
Avg.wages per day	2.48	2.50	2.79	2.78	2.70	2.71
Avg.wages per mo.25 days	62.00	62.50	69.75	69.50	67.50	67.75
Avg.product per man per day	11.83	12.25	4.11	3.86	3.05	2.94
Labor cost per ton	.210	.203	.678	.719	.888	.922
Diff.in labor cost per ton	+0.007	+0.042	-0.041	-0.130	-0.034	-0.088
Avg. product breakg.& trammg.			7.49	7.14		
Avg.wages for miners contract			2.92	2.88		
Avg.wages for contract			2.92	2.88		

	1914	1913	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	18,156½	20,921½		2,765
Average rate	2.48	2.50		.02
Amount	45,031.16	51,870.25		6,839.09
<u>UNDERGROUND</u>				
Total number of days	52,205½	66,248¼		14,042-3/4
Average rate	2.79	2.78	.01	
Amount	145,548.20	184,095.74		38,547.54
Total Days	70,362	87,169-3/4		16,807-3/4
Average rate	2.70	2.71		.01
Total Amount	190,579.36	235,965.99		45,386.63
Labor Cost per ton	.888	.922		.034

No. shifts and hours	2-8hr	2-8hr		
	1-8hr			
Tons per man per day	SURFACE	DECREASE	.42 tons	3.5%
	UNDERGROUND	INCREASE	.25 "	6.1%
	Total	INCREASE	.11 "	3.7%

Proportion Surface to Underground Men; 1914 - 1 to 2.88  
 1913 - 1 to 3.13  
 1912 - 1 to 4.69  
 1911 - 1 to 4.18  
 1910 - 1 to 4.03

INCREASE WAGES PER DAY: SURFACE Decrease .02  
 Underg. Increase .01  
 Total Decrease .01

## STEPHENSON MINE.

## TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1914.

KIND.	LINEAL FEET.	AVG. PRICE PER FOOT	AMOUNT	
			1 9 1 4	1 9 1 3
6" to 8" Timber	1,036	.02	20.72	185.72
8" to 10" "	57,731	.04	2,309.24	3,345.62
10" to 12" "	50,039	.06	3,002.36	3,482.22
12" to 14" "	14,118	.0882	1,245.92	2,114.27
14" to 16"				10.56
Total 1914	122,924	.0535	6,578.24	
Total 1913	176,402	.0518		9,138.39
	LINEAL FEET	PER 100'	1 9 1 4	1 9 1 3
5" Lagging	557,065	.465	2,591.00	2,036.00
7" "	22,050	.55	121.30	75.00
8" "	272,728	.55	1,500.00	1,590.99
Total Lagging	851,843	.495	4,212.30	3,701.99
Poles	165,271	.95	1,571.59	2,213.16
Total 1914	1,017,114	.568	5,783.89	
Total 1913	972,972	.608		5,915.15
Feet of timber per ton of ore			.572	.689
Feet of lagging per ton of ore			3,962	2.89
Feet of lagging per foot of timber			6,925	4,19
Cost per ton of timber.lagging and poles			.0576	.0588
Equivalent of stall timber to board measure			298,105	412,636
Feet Board Measure per ton of ore			1.388	1.612
Total product			214,608	255,979
Total cost of timber and lagging - 1914				12,362.13
Total cost of timber and lagging - 1913				15,053.54
Total cost of timber and lagging - 1912				11,897.82
Total cost of timber and lagging - 1911				9,696.65
Total cost of timber and lagging - 1910				7,855.24
Total cost of timber and lagging - 1909				5,428.62
Total cost of timber and lagging - 1908				4,918.31

## STEPHENSON MINE.

## STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY.	AVERAGE PRICES.	AMOUNT 1 9 1 4	AMOUNT 1 9 1 3
40% Powder	750	.0950	71.25	166.50
30% "	13,700	.0876	1,200.67	2,556.36
50% "	44,800	.1042	4,751.89	3,399.25
80% "	3,550	.1397	496.00	162.00
Total powder	62,800	.1038	6,519.81	6,284.11
Fuse	209,100	3.836	802.26	785.54
Caps	54,700	6.375	348.76	334.08
Cap Crimpers	42	25	10.50	10.50
Total fuses, etc.			1,161.52	1,130.12
Grand Total			7,681.33	7,414.23
Product			214,608	255,979
Pounds powder per ton ore			.293	.265
Cost per ton for powder			.0304	.0245
Cost per ton for fuse, caps, etc			.0054	.0044
Cost per ton all explosives			.0358	.0289
Avg. price per lb. for powder			.1038	.0927

### PRINCETON MINE

The product for the year was as follows:

Princeton,	2,488 Tons (Stockpile over-run)
Cambridge,	<u>768</u> "
Total,	3,256 "
Rock,	<u>4</u> "
Total Ore and Rock,	3,260 "

10,840 Tons were shipped from Princeton Stockpile.

687 Tons were shipped from Cambridge Stockpile.

2,080 Tons were transferred from Princeton Stockpile to Bessemer.

### THE MINE

There was no mining done at the Princeton Mine during the year.

The work being confined to repairing drifts up to December 1st, at which time preparations were made for sinking No. 2 Shaft from 6th to 7th Levels.

#### WORK FOR DECEMBER

The work for December consisted in cleaning up skip pit and excavating ground on West side of shaft for 6th Level Pocket, as soon as this pocket is completed, sinking the shaft will be started. It is the intention to sink the shaft 80 feet at the present time, this depth being required to mine the ore on C. & N. W. Lease Section 19 - 45 - 25.

### PRINCETON SURFACE

There were very few changes made on the surface during the year.

One new bent was erected on permanent trestle East of the Shaft. Tracks were laid and railings erected on permanent trestle to the Southeast. A temporary landing floor with two sets of doors and chute constructed in North skip compartment of Shaft House. The above work being necessary for hoisting with bucket while sinking the shaft.

A wood head frame was erected at No. 3 Timber Shaft.

The land along the Stephenson spur of M. M. & S. E. Ry. on East side of Princeton Road was plowed and seeded down. This field was also enclosed by a fence.

PRINCETON MINE

AVERAGE MINE ANALYSIS OF OUTPUT FOR YEAR-1914

GRADE	IRON	PHOS.	SILICA	MANG.
Cambridge,	58.49	.809	5.63	1.226

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1914

GRADE	Mine		Lake Erie	
	IRON	PHOS.	IRON	PHOS.
Princeton Bessemer,	All	mixed		
Princeton,	"	"		
Cambridge,	"	"		

ORE STATEMENT - DECEMBER 31ST, 1914.

	PRINCETON BESSEMER	PRINCETON	CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1914	687	10,432	171,074	182,193	160,786
Stockpile Overrun,	2,080	408	-	2,488	
Output for Year,			768	768	74,884
Total,	2,767	10,840	171,842	185,449	235,670
Shipments,	2,767	10,840	0	13,607	53,477
Balance on Hand,	0	0	171,842	171,842	182,193
Decrease in Ore on Hand,				10,351	
Mine Idle during 1914.					

NOTE:-- The 768 tons shown as output was sent to surface by the few men engaged in keeping drifts open.

SHIPMENTS FOR YEAR - 1914

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Princeton Bessemer,		2,767	2,767	593
Princeton,		10,840	10,840	21,943
Cambridge,		0	0	30,941
Total,		13,607	13,607	53,477
Total Last Year,	20,461	33,016	53,477	
Decrease - 75%			39,870	

PRINCETON MINE.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '14 3,256 Tons. PRODUCT '13 74,884 "	SURFACE		UNDERGROUND		PRODUCT.	
	1914	1913	1914	1913	1914	1913
Avg. no. men working	4	19	6	61	10	80
Avg. wages per day	2.76	2.51	3.25	2.80	3.04	2.73
Avg. wages per mo. 25 days	69.00	62.75	81.25	70.00	76.00	68.25
Avg. product per man per day	-	13.55	-	4.15	-	3.18
Labor cost per ton	-	.185	-	.674	-	.859
Diff. in labor cost per ton	-	-.159	-	-.219	-	-.378
Avg. product breakg. & trmmg.			-	7.08		
Avg. wages for miners contract			-	2.90		
Total avg. wages for contract			-	2.90		

	1 9 1 4	1 9 1 3	INCREASE	DECREASE
<u>SURFACE.</u>				
Total number of days	1,394½	5,525		4,130½
Average rate	2.76	2.51	.25	
<u>Amount</u>	3,853.88	13,872.46		10,018.56
<u>UNDERGROUND</u>				
Total number of days	1,833-3/4	18023-3/4		16,190
Average rate	3.25	2.80	.45	
<u>Amount</u>	5,966.59	50,451.42		44,484.83
Total days	3,228	23548-3/4		20320-3/4
Average rate	3.04	2.73	.31	
<u>Total Amount</u>	9,820.47	64,323.88		54,503.41
Labor cost per ton	-	.859		

No. shifts and hours - 1-8hr

No mining done during 1914. Ore extracted was from development work only.

PROPORTION SURFACE TO UNDERGROUND MEN: 1914 - 1 to 1.31  
 1913 - 1 to 3.13  
 1912 - 1 to 4.69  
 1911 - 1 to 4.18  
 1910 - 1 to 4.03

INCREASE WAGES PER DAY: Development Surface .35 --- .10%  
 Underground .45 --- .16%  
 Total .31 --- .11%  
 Increase in wages due to proportion of higher paid men employed in development.

GWINN MINE

The product for December, taken from Daily Reports, was as follows:

Gwinn Bessemer,	2,848	Tons,
Gwinn No. 2,	<u>4,030</u>	"
Total,	6,878	"

The product for the Year was as follows:

Gwinn Bessemer,	30,392	"
Gwinn No. 2,	<u>17,997</u>	"
Total Ore,	48,389	"
Rock,	<u>49,632</u>	"
Total Ore and Rock,	98,021	"

Instead of dumping the lean ore with the rest of the rock two piles were started to the East of the regular rock pile where the Bessemer and Non-Bessemer lean ores are stocked. On December 31st, these piles contained:

TONS	IRON	PHOS.	SILICA	MANGANESE
9,910	42.74	.061	28.11	
4,428	47.05	.318	20.38	.183

13,551 tons were shipped from Gwinn Bessemer Pocket.

4,501 tons from Gwinn Bessemer Pocket were transferred to Gwinn.

2,107 tons were shipped from Gwinn No. 2 Pocket.

THE MINE

The work for the year consisted in developing the 5th, 6th, 7th and 8th Levels, sinking a winze from the 7th Level to a point 148 feet below the 7th Level, completing the sump level, constructing concrete drains in sump level and mining in square set rooms above the 7th and 6th Levels.

The estimated ore in sight December 31st, 1914 was 333,677 tons.

WORK FOR YEAR

The 5th Level cross-cut which at the close of 1913 had reached a point about 65 feet Northwest of shaft was extended North to the boundary and across the boundary on to C. & N. W. Lease Section 21, a stub drift was

driven about midway between the shaft and the boundary and holed to raise from Pump Room.

From a point near the contact of the ore formation two drifts were driven, one to the East and one to the West. The East drift being extended about 150 feet from cross-cut while the drift to the West was driven about 150 feet Southwesterly and cut diamond drill hole No. 11, it was then extended to the North about 80 feet and then from a point about 40 feet South of this breast a drift was driven to the West about 70 feet and holed to drift from top of 6th Level Raise. It was then extended to Southwest 110 feet, thence West 40 feet.

Three raises were put up from the West side of the 6th Level to 5th Level elevation and cross-cuts driven from the top of these raises. These were exploratory only to locate the ore at the 5th Level elevation.

A drift was also driven to the Northwest from main cross-cut from shaft. This drift started at a point about 235 feet South of the Section 21 boundary and was extended 90 feet Northwest to the foot.

The work for the year in detail was as follows:

No. 7 started 51 feet Northwest of shaft in its drift from skip compartments and drifted 39 feet holing into drift off of ladder and cage compartments. Then from a point 65 feet Northwest of shaft extended main cross-cut 88 feet Northwest, thence North 491 feet, from which point No. 11 Contract extended the cross-cut 183 feet North, thence West 56 feet, thence North 10 feet to boundary and North 60 feet across the boundary into C. & N. W. Lease Section 21.

No. 11 then moved back to a point about 250 feet South of the boundary and drifted Northwest 90 feet.

No. 7 from a point 375 feet South of the boundary drove stub drift 10 feet to the West and holed to Man Raise from Pump Room.

From a point about 325 feet Northwest of shaft a drift was driven 155 feet to the East by No. 7 Contract and starting at a point 5 feet North of this drift No. 7 drifted West 50mfeet, thence Southwest 70 feet, thence

West 30 feet and North 75 feet. No. 7 then moved to 2nd Cross-cut from 6th Level foot wall drift and raised to 5th Level elevation and from top of raise drifted North 60 feet and Southerly 19 feet. It then moved to a point 40 feet South of the breast of its old cross-cut and drifted West 110 feet crossing its drift off the raise from 6th Level, also took up the bottom in this drift to the North for 12 feet. It then drifted Southwest 110 feet, thence West 40 feet.

No. 6 Contract put up raise from 6th Level foot wall drift opposite No. 4 room. This raise was extended to 5th Level elevation and from top of raise drifted South 35 feet, then came back to raise and drifted North 60 feet.

No. 5 Contract put up raise from 6th Level foot wall drift at a point 200 feet East of No. 6 Raise. This raise was also extended to 5th Level elevation and from top of raise it drifted Northwest 33 feet.

#### WORK FOR DECEMBER

No. 7 Contract,

No. 7 extended its drift Westerly 117 feet, also extended the drift to the North 12 feet. Total 29 feet of drifting.

No. 6 Contract,

No. 6 from the top of its raise drifted Northerly 63 feet.

#### SIXTH LEVEL

#### WORK FOR YEAR

The main cross-cut from shaft was extended North about 179 feet to the foot and about 33 feet into the foot from which point a stub drift was driven to the Northeast 40 feet and a drift was driven in the foot to the East about 140 feet, thence Southeast 210 feet to the contact and Easterly in ore about 130 feet, thence Southeast through lean ore 140 feet and from a point 10 feet back of the breast of this drift a raise was put up to explore the ground above the 6th Level at this point. Two cross-cuts were driven from this foot wall drift and extended South to the hanging.

A drift was also driven to the East from main cross-cut from shaft. This drift was started just North of the contact and was extended East about

160 feet and from a point 60 feet West of the breast of this drift a cross-cut was driven to the North 55 feet.

Mining was also started in square set rooms in No. 1 and 2 cross-cuts.

The work in detail was as follows:

No. 5 starting at a point 155 feet Northwest of shaft drifted Northwest 48 feet, thence North 181 feet and from a point 25 feet South of its breast it drifted West 13 feet and holed to water raise. Then starting at end of its cross-cut drifted Northeast 30 feet and Northwest 40 feet, thence Westerly 88 feet, thence Southwest 220 feet, thence Westerly 115 feet, thence Southwest 156 feet. It then came back 22 feet and put up raise to the North raising 116 feet.

From a point about 80 feet South of the breast of the main cross-cut from shaft No. 7 drifted East 63 feet. This drift was then extended by No. 10 Contract 113 feet to the East and from a point 65 feet West of the breast of this drift No. 10 drove cross-cut to the North 61 feet. No. 7 started in foot wall drift 120 feet West of main cross-cut from shaft and drove cross-cut No. 1, 127 feet South to the hanging and 12 feet West of cross-cut. No. 1 drove cross-cut No. 2 113 feet South to the hanging 72 feet West of cross-cut No. 1. No. 7 started cross-cut No. 3 and extended it South 30 feet and holed to raise from 7th level.

From a point 85 feet Southwest of cross-cut No. 3, No. 6 Contract put up raise to 5th Level.

The mining on 6th Level was as follows:

Room No. 3,

No. 8 Contract put in 15 sets on sill floor,  
19 1/2 " Tier No. 2,  
17 " " " 3,

Room No. 2,

No. 2 Contract put in 19 sets on sill floor,  
13 1/2 " " Tier No. 2,  
10 1/2 " " " " 3,

Room No. 3,

No. 3 Contract put in 16 1/2 sets on sill floor, Room No. 3.

WORK FOR DECEMBER

No. 11 Contract,

No. 11 for the first half of the month worked on the 5th Level extending its drift, started last month, to the Northwest for 47 feet, then moved to the Southwest end of 6th Level and with No. 5 extended it 29 feet making a double drift for raise turnout. Total 76 feet.

No. 5 Contract,

No. 5 for first half of month extended its raise started last month 23 feet to the 5th Level elevation, then drifted Northwest from the top of its raise for 28 feet, then moved to the 6th Level and with No. 11 extended the main drift to the Southwest 29 feet, making a double drift for raise turnout. Total 23 feet Raising, 57 feet Drifting.

No. 2 Contract, Room No. 2,

No. 2 put in 1 set	on 11th Tier	or 6th Level,	Center,
$3\frac{1}{2}$ "	" 11th "	" 6th "	Right side,
$1\frac{1}{2}$ "	" 11th "	" 6th "	Left "
$4\frac{1}{2}$ "	" 12th "	Center,	
$4\frac{1}{2}$ "	" 12th "	Right side,	
$4\frac{1}{2}$ "	" 12th "	Left "	
$3\frac{1}{2}$ "	" 13th "	Center,	
$3\frac{1}{2}$ "	" 13th "	Right "	
$3\frac{1}{2}$ "	" 13th "	Left "	

Total 30 sets or equivalent of 210 feet of Drifting.

No. 8 Contract, Room No. 3,

No. 3 put in 1 set	12th Tier,	Center,
$2\frac{1}{2}$ "	12th "	Right Side,
2 "	12th "	Left "
$5\frac{1}{2}$ "	13th "	Center,
$5\frac{1}{2}$ "	13th "	Right "
$5\frac{1}{2}$ "	13th "	Left "
$3\frac{1}{2}$ "	14th "	Center "
$3\frac{1}{2}$ "	14th "	Right "
$3\frac{1}{2}$ "	14th "	Left "

Total 32 1/2 Sets equivalent to 227 feet of drifting.

No. 3 Contract, Room No. 4,

No. 3 put in $\frac{1}{2}$ set	on 10th Tier,	above 7th Level,
$5\frac{1}{2}$ "	" 11th "	6th Level, Center,
$5\frac{1}{2}$ "	" 11th "	6th " Right Side,
$5\frac{1}{2}$ "	" 11th "	6th " Left "

Total 17 sets, equivalent 119 feet of drifting.

No. 9 Contract, Room No. 5,

No. 9 put in	$\frac{1}{2}$	Set on 9th Tier above 7th Level, Right,
	$\frac{1}{2}$	" " 9th " " 7th " Left,
	5	" "10th " " 7th " Center,
	$4\frac{1}{2}$	" "10th " " 7th " Right,
	5	" "10th " " 7th " Left,
	4	" "11th " 6th Level, Center,

Total 19 1/2 Sets, equivalent 136 feet of drifting.

SEVENTH LEVEL

WORK FOR YEAR

On the West side of the 7th Level 10 cross-cuts were driven from the foot wall drift South to the hanging and from cross-cuts No's 1, 2, 3, 4 and 5 mining was carried on with square set rooms. The foot wall drift was extended to the Southwest about 300 feet, thence West 450 feet, thence Southwest 70 feet and from this point a cross-cut was driven to the South 100 feet.

On the East side of the 7th Level the cross-cut was extended 127 feet to Northeast and from a point 25 feet South of the breast of this cross-cut a drift was driven to the East 90 feet at which point a cross-cut was driven to the North 40 feet. The drift was then extended 180 feet East and from a point 35 feet West of the breast of this drift a cross-cut was driven to the North 95 feet. From this point a drift was driven East about 320 feet to the boundary of the Jopling Mine, thence North along the boundary 20 feet. The cross-cut was then extended North 55 feet from which point a drift was driven West 45 feet. The cross-cut was again extended 180 feet North, thence Northwest 65 feet and North 110 feet.

From a point 80 feet Southeast of shaft a cross-cut was driven to the South 235 feet and from a point 25 feet North of the breast of this cross-cut a winze was sunk to a depth of 148 feet below 7th Level.

A concrete launder 10 feet long was constructed to carry the water from main ditch on 7th level into the West Branch of the sump.

A concrete launder 20 feet long was constructed to carry the water from main ditch on West side of 7th Level into the East Branch of the sump;

A concrete dam 7 feet thick was constructed in the pipe drift on 7th level near the entrance to pump room.

A concrete floor was laid in Pump room. The plunger pump was installed early in the year.

The work in detail was as follows:

On the West side of 7th Level No. 4 Contract extended the foot wall drift Southwest 325 feet, thence Westerly 524 feet and South 60 feet.

No. 1 Cross-cut was extended to the South 137 feet to the hanging by No. 12 Contract.

No. 12 then removed the ore between the foot and hanging with square sets for three sets wide and four tiers high.

No. 2 Cross-cut was driven to the South 141 feet to the hanging by No. 2 Contract and all the ore removed for three sets wide from the 7th to the 6th Level. No. 2 is now mining the ore above 6th Level.

No. 3 Cross-cut was driven to the South 83 feet by No. 4 Contract and then extended 76 feet to the hanging by No. 2 Contract.

No. 8 Contract then removed the ore for three sets wide from sill floor of 7th Level to 6th Level and is now mining above 6th Level.

No. 4 Cross-cut was driven South 19 feet by No. 4 Contract, 52 feet by No. 1 Contract and 59 feet by No. 3 Contract.

No. 3 Contract then removed the ore for three sets wide to 6th Level.

No. 5 Cross cut was driven 76 feet South by No. 4 Contract and then extended 28 feet by No. 9 Contract.

No. 9 then <sup>re</sup> moved the ore for three sets wide and 10 tiers high, and is now mining on 6th Level elevation.

No. 6 Cross-cut was driven South 30 feet by No. 4 Contract and then extended 98 feet by No. 11 Contract.

No. 10 put up a raise to the North in No. 6 cross-cut from a point 20 feet South of foot wall drift. It raised 115 feet to 6th Level.

No. 7 Cross-cut was driven to the South 48 feet by No. 4 Contract and 68 feet by No. 12 Contract.

No. 8 Cross-cut was extended to the South 34 feet by No. 4 Contract and 101 feet by No. 11 Contract.

No. 9 Cross-cut was started by No. 4 Contract. No. 4 drifted 27 feet

and it was then extended South 128 feet by No. 9 Contract.

Turn-outs were made for cross-cuts No's 10 and 11 by No. 4 Contract and cross-cut No. 12 was driven to the South 106 feet by No. 4 Contract.

From the end of No. 12 Cross-cut No. 10 Contract raised 40 feet to hanging.

No. 1 Contract, in Sub. off of water raise, started 70 feet North west of Raise and raised 45 feet to 6th Level.

On the East side of the 7th Level No. 1 Contract started at a point 70 feet South-east of shaft and drifted Southerly 244 feet, then came back 24 feet and cut into the East for 13 feet for puffer room and to the West 13 feet and from this point sank a winze 148 feet below 7th Level.

No. 6 extended its cross-cut 130 feet Northeast to foot, then came back 25 feet and drifted East 90 feet from which point it drove 2nd cross-cut 40 feet North to foot, then extended its drift East 176 feet, and 30 feet West of the breast of this drift drove a 3rd cross-cut North 90 feet from which point it again drifted East 299 feet, thence North along the boundary of Jopling Mine 47 feet. Then came back 16 feet West of where drift turned to North and put up raise to the South. It raised 63 feet.

No. 3 Cross-cut was extended North, from this drift to the East, for 175 feet by No. 6 Contract and 60 feet by No. 10 Contract. No. 10 then drifted Northwest 88 feet to foot, then 16 feet East of its breast drifted North 102 feet.

No. 6 also drifted West 41 feet to foot from a point in No. 3 cross-cut 50 feet North of where it drifted East to Jopling boundary.

#### WORK FOR DECEMBER

No. 12 Contract, Room No. 1,

No. 12 put in	$\frac{1}{2}$	set on 3rd tier, right side,
	$2\frac{1}{2}$	" " 3rd " left "
	5	" " 4th " center "
	6	" " 4th " right "
	6	" " 4th " left "

Total 20 sets, equivalent to 140 feet of drifting.

It also started a raise along the foot from its top tier,

raising five feet.

No. 10 Contract,

No. 10 extended its raise 49 feet to 6th Level and from top of raise drifted North 25 feet and holed to main 6th Level drift. It stopped up three feet from the bottom of this drift, then drifted Southwest 52 feet. It then moved to West end of 7th Level to continue the raise started by No. 4. Total drifting 87 feet. Total Raising 49 feet.

No. 4 Contract,

No. 4 extended the main 7th Level drift to the West for 16 feet making turnout for raise. Then started raise at this point raising 28 feet, also extended the cross-cut South 42 feet. Total raising 28 feet. Total Drifting 58 feet.

SUMP LEVEL

WORK FOR YEAR

The drifting on Sump Level was completed early in the year and a timber retarding dam constructed about 20 feet West of the bottom of the West winze to sump.

Two concrete dams were constructed at the entrance of the main sump under the pump room and a concrete dam 2 1/2 feet thick constructed in sump 57 feet Southeast of Shaft to block drift to cage compartment.

EIGHTH LEVEL

WORK FOR YEAR

The winze that was sunk from 7th Level was stopped on September 9th at a depth of 148 feet below the 7th Level. It was then decided to open up for the 8th Level at the present bottom of the shaft which is 70 feet below the 7th Level and explore the ore at this elevation before making further explorations from the above winze.

The stub drift off the Northwest side of the shaft was extended and a turn made to the West. This drift was then extended 325 feet to the West and at a point about 180 feet West of the shaft a cross-cut was driven to the South 129 feet. The shaft was cut out from cage compartment on Southeast side and a drift driven to the Southeast 315 feet.

The rock and ore from this level is being hoisted on the cage.

The work in detail was as follows:

No. 1 Contract extended the stub drift off Northwest side of shaft, 15 feet, thence Southwest 98 feet, thence Westerly 290 feet.

No. 1 started a cross-cut from its West drift at a point 185 feet West of shaft and drifted South 129 feet.

On the Southeast side of shaft No. 1 cut out from cage compartment and drifted Southeast 183 feet, thence Southerly 100 feet, thence Northeast 28 feet.

#### WORK FOR DECEMBER

No. 1 Contract,

No. 1 extended its drift to the West 66 feet, its drift to Southeast 86 feet and its cross-cut to the South 80 feet. Total drifting 232 feet.

#### UNDERGROUND IN GENERAL

The development work to date on the 5th, 6th and 7th Levels has developed only 240,000 tons. The cross-cuts driven North from the shaft on the 5th and 6th Levels cut practically no ore. The area to the East of these cross-cuts is full of twists and folds and the only development in this area was on the 7th Level when drifts were driven in the iron formation to the Jopling boundary. It was decided last fall to suspend further explorations here until a diamond drill could be secured. No drill holes from surface cut this area except at the Northeastern corner.

On the 5th Level the cross-cut from the shaft cut the formation at a point about 300 feet Northwest of the shaft and about 25 feet North of the contact of the Slate and Jasper passed through about 30 feet of second class ore. The drift then cut about 200 feet of Jasper and then passed through about five feet of good ore, from this point the drift was extended North through Jasper and lean ore 255 feet to the contact of Graphitic Slate. The drift was then extended to a point about 60 feet North of the boundary on C. & N. W. Lease Section 21. The formation in this cross-cut is badly folded.

The general dip of the formation from the contact with the Graphitic Slate being to the North.

The drift which was driven to the East passed through about 80 feet of Lean ore. The West drift was extended 154 feet Southwest through lean ore and a cross-cut was then driven North 37 feet through lean ore.

The raise put up from the 6th Level by No. 7 Contract was in Bessemer ore and the drift from the top of Raise cut 50 feet of good ore when the formation took a dip to the North and the drift passed into Jasper. The main West drift was then extended to the cross-cut from No. 7's raise and cut about 50 feet of good ore. The drift was then driven to the Southwest 60 feet through 2nd Class ore and 80 feet through 1st class ore, the greater part being of Bessemer grade.

The raise put up from 6th Level about midway between No. 11 and No. 1 drill holes had good ore all the way to the 5th Level. At this elevation it was cut off from the North by a Jasper seam dipping to the North. A drift was driven to the South 38 feet to the hanging. This drift cutting 1st class ore its entire length.

The raise put up from 6th Level South of No. 1 drill hole found the ore shown in the drill hole and started to drift through it cutting 23 feet of ore. This raise was put up along the formation which is too flat to handle any quantity of dirt through.

The main 6th Level drift has been extended to the Southwest making a turnout for a new raise through which the ore explored by No. 5's old raise will be mined.

The drift started in November from main 5th Level cross-cut at a point about 250 feet South of the boundary was extended Westerly 88 feet at which point it encountered the contact of Graphitic Slate.

The 6th Level cross-cut struck the formation about 225 feet North of the shaft and passed through about 80 feet of lean ore and Jasper and then cut about 25 feet of ore. It then passed through 10 feet of Jasper and struck the Slate foot. The cross-cut was then extended 25 feet North in Slate from which point foot wall drifts driven to the East and West. The

East drift being driven 35 feet in Slate while the drift to the West was extended Northwest 20 feet to the Arkose. It was then extended in the Arkose 120 feet West and 170 feet Southwest to the contact of the Slate, and 30 feet in the Slate to the contact of the ore. This drift then passed through about 130 feet of Bessemer Ore and then Westerly through 160 feet of lean ore.

The five cross-cuts driven to the South from the West foot wall drift all cut the ore, the average width being about 43 feet.

The raise put up from No. 6 cross-cut, 7th Level, only cut lean ore up to about six feet below the 6th Level elevation. The cross-cut driven North from this raise passed through first class ore while the drift to the Southwest has been in ore with seams of Jasper.

The drift driven to the East from main 6th Level cross-cut followed the formation for about 75 feet in first class ore and then passed through second class ore and was stopped in Jasper, while the cross-cut to the North from this drift cut only second class ore and has also stopped in Jasper.

The mining on the 6th Level has been confined to square set rooms from cross-cuts No's 1, 2, 3 and 4 on the West side of the Level. In cross-cut No. 1, Room No. 2, was brought up from the 7th Level and is now two tiers above the 6th Level. In cross-cut No. 2, Room No. 3 is three tiers above 6th Level. In cross-cut No. 3, Room No. 4, Contract No. 3, has stoped out the room on sill floor and has been stopped, while in cross-cut No. 4, No. 9 Contract stoped out ~~one~~ set wide on sill floor.

On the 7th Level the merchantable ore so far developed is confined to the area cut by main cross-cut from shaft and cross-cuts No's 1, 2, 3, 4 and 5 driven across the formation from West foot wall drift. The main cross-cut passed through 30 feet of ore while cross-cuts No's 1, 2, 3, 4 and 5 cut 56, 35, 47, 36 and 49 feet respectively. The cross-cuts West of this area only cut lean ore. A raise is now being put up from the West end of the foot wall drift which is about due South of No. 3 drill hole to explore the ground above 7th Level at this point.

On the East side of the 7th Level ~~no~~ merchantable ore so far has

been found. The mining on 7th Level has been carried on through square set rooms. In room No. 1 the ore has been stoped for four tiers high and has now been stoped. On account of its distance from the shaft it is deemed unsafe to continue to a greater height in this room. In rooms No. 2 and 3 and 4 all the ore has been removed between the 6th and 7th Levels, while in room No. 5 the ore has been removed for nine tiers high.

On the Eighth Level the drift to the West has been following the foot which is now turning more to the Southwest. The drift to the Southeast encountered the hanging and is now turning with the hanging to the Northeast. This drift has cut good ore the entire distance. The total length of the ore body thus far is about 600 feet.

The cross-cut off the West drift still continues in good ore. The width of the ore at this point at the present time being 146 feet. The development on this level shows the formation very flat and it is hard to determine at this time what can be expected with depth. From the fact that the winze from the 7th Level cut no ore is not encouraging. It is possible this was only in a lean area and does not necessarily indicate that all of the formation is lean at that depth.

The developments to the East and West will be continued and it is hoped a large sized ore body will be found.

The water pumped at the Gwinn Mine during the month of December averaged 209.2 gallons per minute. The total gallons pumped during the month was 9,341,080.

#### GWINN MINE SURFACE

##### WORK FOR THE YEAR

Concrete piers for three bents of permanent trestle were constructed Southwest of Shaft and permanent trestle consisting of 10 bents erected and from the South side of this trestle a single temporary trestle, consisting of 12 bents, was erected during the year. Seven more bents were erected on permanent trestle Northeast of shaft and from the South side of this trestle a single temporary trestle, consisting of 14 bents, was erected during the year.

Additional grading to the Northeast and to the Southwest of the shaft was done during the year to accommodate the temporary trestles erected during the year. Solar plank was also laid.

The endless rope tram was put in commission early in April.

A new electric driven rock puffer was installed early in the year.

Tracks were laid from timber tunnel to the East to timber yard.

On account of the insufficient capacity of dry heating plant one of the boilers in old boiler house was started up January 14th and dry heating plant closed down. The heating plant in dry was started again on August 14th. A second boiler was installed in dry for heating purposes, one boiler not being sufficient.

The air compressor was removed from Princeton No. 2 engine house and installed at the Gwinn Mine and started up January 26th. The air consumption at the mine was more than could be delivered through the old four inch line. A new 6" line was constructed from Central Power Plant to the mine, a distance of 8500 feet. This was completed on August 14th, at which time the compressor at mine was closed down.

Timber stairways were constructed in pulley stands for safety device. A portion of the stairway in the shaft house was reconstructed.

The gears on cage hoist were changed and cage now travels at the same speed as the skips.

Soil was hauled and ground seeded down around mine buildings.

Vines were planted about the dry and engine house.

GWINN MINE

AVERAGE MINE ANALYSIS OF OUTPUT FOR YEAR-1914

GRADE	IRON	PHOS.
Gwinn Bessemer,	58.20	.054
Gwinn,	58.12	.084
Gwinn No. 2,	57.17	.316

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1914

GRADE	Mine		Lake Erie	
	IRON	PHOS.	IRON	PHOS.
Gwinn Bessemer,	All mixed			
Gwinn,	"	"		
Gwinn No. 2,	"	"		

ORE STATEMENT - DECEMBER 31ST, 1914.

	GWINN BESSEMER	GWINN	GWINN NO. 2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1914	26		281	307	307
Output for Year,	25,891	4,501	17,997	48,389	0
Total,	25,917	4,501	18,278	48,696	307
Shipments,	13,551	4,501	2,107	20,159	0
Balance on Hand,	12,366	0	16,171	28,537	307
Increase in Ore on Hand,				28,230	

1914 -- 2-8 Hr. Shifts during Year.

1913 -- Mine Idle during Year.

SHIPMENTS FOR YEAR-1914

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gwinn Bessemer,	13,551		13,551	0
Gwinn,	4,501		4,501	0
Gwinn No. 2,	2,107		2,107	0
Total,	20,159		20,159	0

GWINN MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 4 (9 mos.)	1 9 1 3	INCREASE	DECREASE
<u>PRODUCT</u>	48,389			
General Expense	.298			
Maintenance	.569			
Mining Expense	2.323			
<u>Cost of Production</u>	3.190			
Exploratory	.052			
<u>DEPRECIATION</u>				
Plant	.051			
Equipment	.001			
New Construction	.250			
Total depreciation	.302			
Taxes	.064			
Central Office	.147			
Sundry Expense	.056			
Supply Inventory	.011			
<u>COST ON STOCKPILE</u>	3.822			
Loading & Shipping	.006			
Total cost on cars	3.828			
No. days operating	224			
No. shifts and hours	2-8hr			
Avg. daily product	216			
<u>COST OF PRODUCTION</u>				
Labor	1.816			
Supplies	1.374			
Total	3.190			

Mine started on operating basis April 1st, 1914.

GWINN MINE.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '14 48,389 Tons	SURFACE		UNDERGROUND		TOTAL	
	1914	1913	1914	1913	1914	1913
PRODUCT '13 - "						
Avg. no. men working	43	-	95	-	138	
Avg. wages per day	2.39	-	2.71	-	2.61	
Avg. wages per mo.25 days	59.75	-	67.75	-	65.25	
Avg. product per man per day	4.90	-	2.27	-	1.55	
Labor cost per ton	.488	-	1.197	-	1.685	
Avg. $\frac{1}{2}$ product breakg.& trmg.			4.15			
Avg. wages for miners contract			2.92			
Total avg.wages for contract			2.92			

  

	1914	1913	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	9,867			
Average rate	2.39			
<u>Amount</u>	23,607.22			
<u>UNDERGROUND</u>				
Total number of days	21,343			
Average rate	271			
<u>Amount</u>	57,919.52			
Total days	31,210			
Average rate	2.61			
<u>Total amount</u>	81,526.74			
Labor cost per ton	1.685			
No. shifts and hours	2-8hr.			

Proportion Surface to Underground Men; 1914 - 1 to 2.16

GWINN MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1914.

KIND.	LINEAL FEET.	AVG. PRICE PER FOOT.	AMOUNT	
			1 9 1 4	1 9 1 3
6" to 8 " Timber	3,372	.02	67.44	
8" to 10" "	2,980	.04	119.20	
10" to 12" "	13,823	.06	829.38	
12" to 14" "	21,943	.08 $\frac{1}{4}$	1,810.30	
Total 1914	42,118	.0671	2,826.32	
	LINEAL FEET	PER 100'	1 9 1 4	1 9 1 3
5" Lagging	135,020	.465	628.00	
8" "	189,244	.55	1,040.84	
Total lagging	324,264	.515	1,668.84	
Poles	14,118	.95	134.12	
Total 1914	338,382	.53	1,802.96	
			1 9 1 4	1 9 1 3
Feet of timber per ton of ore			.870	
Feet of lagging per ton of ore			6.70	
Feet of lagging per ft. of timber			7.70	
Cost per ton for timber, lagging and poles			.0956	
Equivalent of stull timber to board measure			158,718	
Feet board measure per ton of ore			3.28	
Total product			48,389	
Total cost of timber and lagging - 1914				4,629.28

GWINN MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY	AVERAGE PRICES.	AMOUNT	
			1 9 1 4	1 9 1 3
60% Powder	13,500	.12	1,620.00	
50% "	150	.105	15.75	
80% "	16,500	.14	2,310.00	
Total powder	30,150	.1308	3,945.75	
Fuse	99,600	3.826	380.07	
Caps	18,500	6.212	115.05	
Cap Crimpers	6	.25	1.50	
Total fuse, etc.			496.62	
Grand total			4,442.37	
Product			48,389	
Pounds powder per ton ore			.0623	
Cost per ton for powder			.0816	
Cost per ton for fuse, caps,			.0103	
Cost per ton for explosives			.0919	
Avg. price per lb. for powder			.1308	

JOPLING MINE

There was no work done at the Jopling Mine during the year.

Some of the timber purchased for this shaft was sold to other mines of the Company during the year.

FRANCIS MINE

There was no work done at the Francis Mine during the year.

Some of the timber purchased for this shaft was sold to other mines of the Company during the year.

The hoist purchased for this mine from the Webster, Camp and Lane Company was removed to the Mackinaw Mine.

The water tank was also taken there.

#### MACKINAW MINE

There was no work done at the Mackinaw Mine during the month of December.

#### WORK FOR YEAR

The work of installing brackets and steel sets in the concrete shaft was started in January and completed late in February. Guides were then placed in cage compartment, solars laid in ladder compartment and lath placed between compartments.

Sinking the rock shaft was started on March 23rd and continued on two eight hour shifts up to September 30th, on which date work was stopped for an indefinite period.

The sea elevation of the bottom of the shaft on September 30th was 709.88 or 401.59 feet below the collar of the shaft.

Total depth sunk below concrete 285.50 feet.

#### UNDERGROUND IN GENERAL

A temporary pumping station, 9 x 14 feet and 19 feet high, was cut out on the South side of the shaft at an elevation of 300 feet below the surface of the ground. Concrete walls were constructed in the sump of this pump station and electric sinking pump installed.

A 10 inch discharge pipe was also installed from the collar of the shaft to pump station.

Lean ore was encountered in the shaft at a depth of 390 feet below the collar, the bottom of the shaft being still in lean ore.

Practically no water was encountered in sinking the rock shaft. The greater part of the water that is being made is coming through a weep hole near the bottom of the concrete.

#### MACKINAW SURFACE

Land was cleared on site for stockpile ground East of the shaft, also East of Mine buildings. This land was seeded down for fire protection.

A boiler for temporary heating plant was installed just Southwest of machine shop and boiler enclosed in temporary building.

The water tank that was at the Francis Mine was brought over to the Mackinaw Mine and placed just West of temporary heating plant.

A Nordberg Electric driven compressor and an electric Webster, Camp and Lane hoist were installed in Mackinaw Engine House.

A drill press and pipe cutter were installed in machine shop and drill sharpener and forge in blacksmith shop.

Captains' office was erected just North of warehouse. Shower bath, toilet and wash basin, also steel lockers, were installed in change room of Captains' office.

The old cement shed that was erected by The New York Foundation Company was dismantled and moved to a point just West of shop building, pipe rack installed and building fitted up for warehouse.

A temporary landing floor for bucket, bucket and two sets of doors for safety device were constructed at Mackinaw Shaft.

A temporary hoisting plant was rigged up just East of the shaft and used to hoist bucket early in the year until turn sheaves could be installed.

Railings for safety device were placed in engine house and on stairway and langing floor of head frame.

Plank was laid on landing floor and a four inch plank floor laid on bottom of pockets of head frame.

A new wagon road was cleared and graded from mine buildings at Mackinaw Mine to the Gardner engine house.

A bridge was also constructed at the point where road crosses the drainage ditch dug last year.

Concrete foundation for turn sheave was constructed just North of Mackinaw Shaft and two sheaves installed. Two pulley stands were also erected between the head frame and engine house.

A board fence was erected on either side of pulley stands between engine house and shaft.

A four inch well point was sunk just South of Mackinaw engine house,

A Prescott pump was installed and pipe line laid to Gardner Engine House and South towards old drill camp, also North towards the Mackinaw-Gardner Location. The above being done for temporary fire protection.

A 6" sewer line was laid from Captain's office to outlet just East of the bridge across the drainage ditch. Y. connections were placed on this line along side of permanent dry and brick manhole constructed at the angle in sewer line.

A 10" discharge pipe was laid on surface from collar of shaft to a point on drainage ditch just East of bridge.

A small temporary trestle was constructed from rock dump just East of shaft 150 feet Northeast to tram rock for fill along North side of stocking ground.