LABOR.
(CONT'D)

The efficiency of our labor has dropped materially during the past few months, and the results from our miners engaged in stoping are away down due to the unskilled character of the men now engaged in this work.

The following statement shows the men of different nationalities now employed at this mine, viz:

Americans,	57
English,	13
Swede,	10
French,	11
Finnish,	83
Italian,	51
Greeks,	1
	226

PRODUCTION.

During the year our production totaled 284,000 tons, made up of the following grades, viz:

MINE.	BESSEMER	MORRIS	SILICA	NORTH LAKE	NORTH LAKE HIGH PHOS.	TOTAL
Morris	45,939	9,530	9,471			64,940
Lloyd	9,833		43,377	138,235	27,615	219,060
TOTAL	55,772	9,530	52,848	138,235	27,615	284,000

Of the total tonnage, 16,213 tons were mined by steam shovel from the open pit on Section 6, the balance came direct from underground operations.

Ore was hoisted on 302 days during the year, at the rate of 886 tons per day. The total average tons per day including the ore from the open pit, was 940 tons per day.

PRODUCTION. (CONT'D)

Our tons per man per day as shown by our Labor Statement for the current year and the three years previous, are as follows, viz:

TONS PER MAN PER DAY.

	SURFACE				UNDERGROUND				TOTAL			
	1914	1915	1916	1917	1914	1915	1916	1917	1914	1915	1916	1917
JAN.	14.87	10.98	10.86	17.75	3.43	2.58	2.87	3.71	2.78	2.09	2.27	3.07
FEB.	15.31	10.54	12.29	18.04	3.41	2.60	2.94	3.96	2.79	2.09	2.37	3.25
MAR.	15.49	12.74	15.38	18.37	3.08	3.15	3.75	4.14	2.57	2.53	3.02	3.38
APR.	13.97	12.26	14.50	17.88	3.00	3.08	3.64	4.02	2.47	2.46	2.91	3.28
MAY.	14.47	13.91	16.50	21.43	3.35	3.20	4.17	4.33	2.72	2.60	3.33	3.60
JUN.	15.68	13.54	17.86	19.28	3.42	3.63	4.56	4.06	2.81	2.86	3.63	3.36
JUL.	10.58	14.51	15.64	20.25	2.44	4.00	4.39	4.39	1.98	3.13	3.43	3.61
AUG.	13.21	12.49	17.64	20.09	3.00	3.97	4.74	4.75	2.44	3.01	3.73	3.84
SEP.	12.25	15.15	16.04	17.36	2.84	4.06	4.53	4.79	2.30	3.20	3.53	3.75
OCT.	13.16	14.48	17.00	16.76	2.95	4.10	4.33	4.63	2.41	3.20	3.45	3.63
NOV.	13.82	15.12	15.56	16.92	3.06	3.97	4.04	4.47	2.50	3.15	3.21	3.54
DEC.	13.30	14.13	17.57	15.28	3.09	3.48	4.01	4.04	2.51	2.79	3.26	3.20
AVG.	13.86	13.38	15.57	18.51	3.09	3.48	4.00	4.23	2.53	2.76	3.18	3.48

SHIPMENTS.

Shipments for the year totaled 303,255 tons, made up of the following grades, viz:

	TONS.	TONS.
Morris Bessemer,	59,620	
North Lake Bessemer,	26,809	
TOTAL BESSEMER,		86,429
Morris Ore,	14,050	
North Lake Ore,	126,753	
High Phosphorous Ore,	19,280	
TOTAL NON-BESSEMER,		160,083
Morris Silica,	10,930	
North Lake Silica,	45,813	
TOTAL SILICA,		56,743
GRAND TOTAL,		303,255

Of this total 156,716 tons were shipped from pocket, 130,326 tons from stockpile, and 16,213 tons from the open pit.

Car service was poor all the year, and shipments did not go forward with regularity.

MORRIS-LLOYD MINE.

ORE IN STOCK.

Our balances in stockpile are not as heavy as last year, due to the fact that we cleaned up all of our Bessemer during the summer.

BALANCES IN STOCKPILES DECEMBER 31st, 1917.

MINE.	BESSEMER	MORRIS	SILICA	NORTH LAKE	HIGH PHOS.	TOTAL.
Morris,	6,345	3,769	17,610			27,724
Lloyd,	916		15,293	31,006	23,960	71,175
TOTAL,	7,261	3,769	32,903	31,006	23,960	98,899

COSTS OF PRODUCTION.

The following table shows-

PRODUCT MONTHLY, PER MAN AND COSTS, WITH COMPARISON FOR PREVIOUS YEARS, TAKEN FROM COST SHEETS.

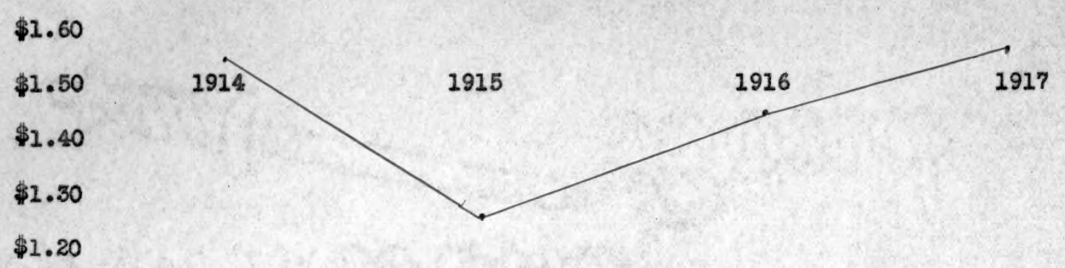
	PRODUCT	TONS PER MAN	TOTAL COST OF PRODUCTION			COST PER TON.		
	TONS.	PER DAY.	LABOR	SUPPLIES	TOTAL	LABOR.	SUPP.	TOTAL
JAN.	23,168	3.07	26417.62	9924.28	36341.90	1.140	.429	1.569
FEB.	21,234	3.25	23010.26	9467.83	32478.09	1.083	.446	1.529
MAR.	25,611	3.38	26561.64	10655.03	37216.67	1.037	.416	1.453
APR.	21,419	3.28	23034.89	9690.44	32725.33	1.075	.453	1.528
MAY.	24,979	3.60	26988.70	10100.40	37089.10	1.080	.405	1.485
JUN.	22,296	3.36	25748.48	10670.50	36418.98	1.155	.478	1.633
JUL.	22,879	3.61	25003.41	10813.28	35816.69	1.093	.472	1.565
AUG.	24,132	3.84	25263.58	10865.61	36129.19	1.047	.450	1.497
SEP.	20,475	3.75	22472.20	9524.22	31996.42	1.098	.465	1.563
OCT.	22,320	3.63	26447.55	10470.57	36918.12	1.185	.469	1.654
NOV.	19,335	3.54	23524.23	10698.98	34223.21	1.217	.553	1.770
DEC.	17,444	3.20	23398.21	12160.48	35558.69	1.342	.697	2.038
OVERRUN	2,495							
OPEN PIT	16,213							
TOTAL-17	284,000	3.48	297870.77	125041.62	422912.39	1.113	.467	1.580
" 1916	307,685	3.18	257025.03	139995.37	397020.40	.911	.501	1.412
" 1915	221,585	2.76	178145.41	97464.12	275609.53	.804	.440	1.244
" 1914	192,145	2.53	193822.98	103064.08	296887.06	1.010	.535	1.545

The costs of production and tons per man in above statement do not include the 16,213 tons ore mined from the open pit, but are based entirely on the shaft product.

The heavy cost per ton shown in December month, is due largely to a heavy charge for electrical control equipment on our skip hoist at the Lloyd Mine, which was installed during the year, and the total charge for same was made during December month.

MORRIS-LLOYD MINE.

COSTS OF PRODUCTION.



ESTIMATE OF PRODUCTION.

Our estimated production for the coming year is:-

300 days at 1,000 tons per day, 300,000 tons.

The following table shows the results of development work during the past and previous years, viz:

	1912	1913	1914	1915	1916	1917
In place Jan.1st,	3060000	2861000	3218750	3089200	2081600	2575577
Product,	142339	176080	192145	221585	307685	284000
Balance,	2917661	2684920	3026625	2867615	1773915	2291577
In place Dec.31st,	*2861000	**3218750	3089200	2081600	2575577	2267116
Dev. Fiscal Year,	** 56661	533830	62575	** 786015	801662	**24461

* No estimate made for Morris Mine in 1912.
**Shows a loss.
**700,750 tons estimated for Morris Mine
**Section 6 ore body reduced 603,200 tons.

The figures for the first few years are approximate, as the information at hand was from drill holes only. The ground has now been opened to such an extent that more accurate estimates can be made.

OPEN PIT.

Work in this place was discontinued in the fall of 1916 after the approach had been deepened to permit the removal of more ore with the steam shovel.

The commencement of work this year was put off from time to time by the contractor until Aug. 22nd, 1917, when work was resumed,

OPEN PIT.

(CONT'D)

and a total of 16,213 tons ore was removed. This was all that could be taken on the grade of the present approach, and the cost of lowering same was considered too high to warrant further work at this point. The contractor removed his equipment, and ore will be milled from this pit during the coming summer.

MINE BUILDINGS.

All of our mine buildings are in good condition, and very few repairs have been necessary for their maintenance during the past year.

DWELLINGS.

Very few repairs have been necessary on our dwelling houses, and only the regular supplies of paint and kalsomine have been furnished for interior cleaning.

House No. 101, occupied by our Mine Clerk, was papered downstairs, and kalsomined upstairs.

A great many of our dwellings will have to be re-painted soon.

The alleys of the location were cleaned in the spring, and an effort is being made to keep them in a sanitary condition.

The cess pools at these dwellings are a source of annoyance and expense, due to filling up rapidly and having to be pumped out. There seems to be no way of getting away from this except to install a sewer system.

All of our dwellings are now rented, and it will be advisable to erect additional houses this coming summer.

STORE BUILDING.

A store building 24' x 70' was authorized and erected during the summer, and will be opened on January 1st, 1918 by Mr. J. B. Casper, to whom it has been rented at a rate of fifty dollars per month.

MORRIS-LLOYD MINE.

STORE BUILDING.
(CONT'D)

This will be a general store, carrying meats, groceries, drygoods, etc., and will be greatly appreciated by our people.

WELFARE WORK.

We continued the practice of giving prizes for vegetable and flower gardens, etc., and most of our tenants take great interest in keeping their premises in a neat condition.

During the spring of 1917 we plowed and fenced a large area in Section 6 field, which was used by our men for planting potatoes and other vegetables. Each man was offered 15,000 square feet; most of our men accepted, and cultivated this ground, and a good crop of potatoes would have been secured had not a heavy freeze caught them before they were harvested. As it was, some of the potatoes had to be left in the ground.

Seed potatoes were purchased and furnished the men at cost.

The Club House which was authorized last year, was commenced in April this year, and is now approaching completion.

This building will contain-

2 Standard Bowling Alleys,
1 Billiard Table,
1 Pool Table,
Moving Picture Room,
Assembly Room,
Reading Room,
Ladies Room,
Kitchen.

The building is well planned, and we feel will be greatly appreciated by our men and their families, as it will provide a place for recreation which will be easy of access at all times.

Some work was done in clearing an area near the school house to be used as a ball ground. This will be completed in the spring.

MINE POLICE.

On February 1st, 1917, a Mine Police System was installed, and one man each on day and night shift were employed.

DOCKS, TRESTLES AND POCKETS.

We have been to small expense in maintaining our trestles during the year. Most of our shipments from stockpile were made without dismantling the trestles.

The stocking trestle at the Morris Mine Bessemer pile fell down after all the ore had been removed, and was caused by not properly securing same after the work of removing the ore was completed.

The changes made last year in the method of handling the rock at both mines, has worked out very satisfactorily during the past year, and no expenditures at all were necessary in carrying on the work here. The results are reflected in our Cost Sheets covering this item.

The old rock trestle at the Morris Mine has been taken down and the material will be used to build a rock trestle at the new shaft on Barnes-Hecker Lease No. 31. This will save the expense for new material at that point.

TOP TRAM ENGINES & CARS.

A new 40 HP motor was installed in January month, replacing the 25 HP in work on the north side engine at the Lloyd Mine, and no further trouble has been experienced at this point on account of lack of power.

We have considerable trouble on the top tram at the Morris Mine during the winter months due to the lack of power. These trams are operated by 25 HP motors, which are too small, and should be replaced by 40 HP motors or new improved plants entirely.

In December month we broke one of the large gears on the North Tram engine at the Lloyd Mine, which had to be replaced. Outside of this, only the regular maintenance charges were necessary during the year.

MORRIS-LLOYD MINE.

TRACKS & YARDS

The railway tracks in our yards are maintained by the Railroad Company, and we have therefore been to no expense on this account during the past year.

The usual amount of surface work, cleaning and maintaining ditches, etc., is all that has been done.

HOISTING MACHINERY.

Our hoisting machinery is in good condition, and in addition to the regular maintenance charges, we installed a new control outfit and new gears on the Lloyd skip hoist at a cost of $2523.00, also new rheostats costing $118.30.

Two new hoisting cables were put in use during the year at a cost of $484.41.

COMPRESSORS.

Our Nordberg compressor has been operated all of the year, and the Ingersol-Rand was used for a while to furnish air to the Barnes-Hecker shaft.

On Nov. 21st, one of the main bearings on the Nordberg compressor burned out, and the mine lost one shift while same was being changed.

Six new BBR auger drills were purchased and put in use during the year at a cost of $750.00.

PUMPS.

We have been to considerable expense in connection with our pumping during the year. New gears were purchased and installed on our main pump, and a new 50 HP motor for the winze pump, together with new gears for the Gould pump.

A new sump and pump house is also being cut on the 6th level,

MORRIS-LLOYD MINE.

PUMPS.
(CONTD)

(bottom of winze,) The present pump is in the line of shaft and as we are now bringing this opening to this level, the water storage place must be changed. This sump and pump house will be completed in January 1918.

The cleaning of our main sump on the 4th level has always been a source of annoyance and expense, and we are planning on rectifying this by holing a raise from the skip road to the bottom of the sump, in which to take away the accumulation of mud. The raise has been completed, but will not be holed and connected until our shaft has been sunk to the sixth level and skip roads installed.

The amount of water being handled is the same as for last year, and averages 607 gallons per minute.

ELECTRIC TRAM PLANT.

One new 6-ton electric locomotive was purchased during the year and placed in work on the bottom of the winze, (6th level, Morris Mine). We also purchased three new 4-ton saddle back tram cars at a cost of $1422.00.

On account of our long trams and large territory being worked, we have to maintain an excessive amount of this equipment, operating at the present time four locomotives and 43 cars to produce a tonnage of less than 1000 tons per day.

Our motor generating set burned out on February 14th, and some time was lost while we were installing a new set from the Holmes Mine, which was used while our own was being repaired.

MINE VENTILATION.

Very little expense has been necessary for ventilation purposes during the year, as the mine is now well opened up, and natural ventilation is sufficient. The only territory in which mechanical ventilation will be necessary is on the 6th level of the Morris Mine, which has but one outlet.

MORRIS-LLOYD MINE.

CRUSHING MACHINERY.

Our crusher was operated all during the year on ore shipped direct to furnaces.

During the freezing winter weather we have difficulty in keeping the pockets and chutes cleared, and to assist in this work we have built a large heater underneath the ore pocket, which has proven of great assistance. No trouble is now experienced, and only the regular force is necessary to keep things going.

UNDERGROUND TRACKS & CARS.

Only the regular repairs and extensions have been necessary in maintaining our tracks and cars during the year. We are saving every pound of rail and buying none but what is absolutely necessary.

MINE TIMBER AND LAGGING.

No timber on this winters contracts has started to come in as yet. We have a good stock of all sizes, and anticipate no trouble from this source, as the contractor advises they can get all the timber necessary, but just at present no cars are available for moving same, and it is quite possible that this material will be coming along all through the year in place of just during the winter months as has been the practice heretofore.

WATER SUPPLY.

The small spring from which we have secured a portion of our water supply for the location, has been exhausted, and all of our requirements now comes from the Carp River. It will be necessary to drive standpipes in order to secure a pure supply of water should the Carp River water become contaminated.

MORRIS-LLOYD MINE.

PERSONAL INJURIES.

We are pleased to be able to report no fatal accidents for the past year.

We had two serious accidents; one occurred on June 7th, wherein Ole Nelson sustained a smashed ankle due to being buried by loose ground from the stockpile falling on him while he was drilling in the frozen ore. He is still laid up. Another accident, wherein Frank Makela sustained a broken arm, occurred on Oct. 25th, in Contract No. 13, between the 2nd and 3rd levels in the Lloyd Mine, and was caused by a large chunk sliding down from the dirt pile, which knocked him down and caught his arm. He is still laid up.

ACCIDENTS TO EQUIPMENT.

On Feb. 14th, our motor generator set burned out, and 14 Hours were lost while repairs were being made.

On Oct. 10th, the brakeman at the Morris Mine pulled the skip up into the head sheave, breaking the skip rope and top sheave, and eight hours were lost while repairs were being made.

On Nov. 21st, the main bearing on our Nordberg compressor burned out, and eight hours were lost while repairs were being made.

Outside of the above, we have been subjected to no serious delays, and only minor troubles have been experienced.

STEAM SHOVEL LOADING.

Our loading by steam shovel was intermittant during the whole summer, and frequent moving of the shovel was necessary to get the proper mixtures. Very few full days loading were in progress, and costs are therefore high.

The piles were badly frozen, and during the early part of the season much expense was incurred in blasting the frozen ore before the shovel could dig same.

During the season we loaded a total of 130,326 tons, at a cost of .055 per ton.

MORRIS-LLOYD MINE.

TAXES.

The valuation on the Lloyd Mine and Section 6 remain the same as last year, but the Morris Mine was subjected to a material increase. The total taxes paid are higher, as will be noted by the following statement.

	1914		1915		1916		1917	
	VALUATION	AMOUNT	VALUATION	AMOUNT	VALUATION	AMOUNT	VALUATION	AMOUNT.
LLOYD MINE.								
Realty	56000.00	1101.46	93460.00	1983.61	93460.00	2301.21	328613.00	9697.01
Personal	100867.00	1983.99	108113.00	2291.98	93171.00	2295.78	289291.00	8379.87
Section 6	315000.00	6195.74	390780.00	8293.86	429858.00	10584.18		
TOTAL LLOYD & SECTION 6	471867.00	9281.19	592353.00	12569.55	616489.00	15181.17	617904.00	18076.88
MORRIS MINE								
Realty	54624.00	737.43	100000.00	1791.60	75000.00	1180.94	190810.00	3108.54
Personal	50146.00	676.97	63958.00	1145.87	60704.00	955.83	229021.00	3731.05
TOTAL MORRIS	104770.00	1414.40	163958.00	2937.47	135704.00	2137.77	419831.00	6839.59
GRAND TOTAL,	576637.00	10695.59	756311.00	15507.02	752193.00	17317.94	1037735.00	24916.47
PRODUCT-TONS		192,145		221,585		307,685		284,000
TAXES PER TON PRODUCED		.056		.069		.056		.0877
SHPMTS--TONS		152,173		276,521		339,597		303,253
TAXES PER TON SHIPPED.		.070		.056		.051		.0822

ROCK DRIFTING.

We show a large decrease in our rock drifting for the year as compared with 1916. Last year, (1916) was unusually large, as rock work was under way developing on the bottom of the Morris Mine, and also in the Section 6 territory.

During the past year we drifted 1023 feet in rock, at a cost of $7.01 per foot.

MORRIS-LLOYD MINE.
UNDERGROUND.
MORRIS MINE.

THIRD LEVEL.

The ground above this elevation has now been worked down below the level, and six gangs continue slicing and caving, all of the product being dropped to the fourth level and trammed to skips there.

The ore here occurs in two lenses, separated by a belt of jasper. The timber for the east ore body is taken in on the 3rd level and dropped down to the places, but all supplies for the inner or west lens must be taken in on the 4th level and hoisted to the places.

FOURTH LEVEL.

No breaking of ground was done on this level during the year, and the only work under way here has been the handling of the product coming down from above.

SIXTH LEVEL.

During the year the main level was extended west in an attempt to locate ore bodies, as some ore was shown in drill holes No. 4 and 96. One contract raised up above the level near the 2900 west meridian, a distance of 50 feet, and then crosscutted south to the ore. This ore body was developed by raises and drifts, and was found not to be extensive, containing only about 8,000 tons. The main drift encountered bunches of ore and dike, but is now being carried west in jasper. Hole No. 4 shows forty feet of ore below this level to the west, and may come up to this elevation to the south.

The ore found in horizontal drill hole No. 31 is being developed by two contracts, and the limits of same have now been determined on this level. Two raises are now going up, and No. 28 has proven the ore body to extend over 80 feet above the level. We hope this ore body extends through to the 4th level, a distance of 400 ft.

One contract has raised up 200 feet to the elevation of the fifth level in the first ore lens as located by drill holes No.

SIXTH LEVEL (CONT'D)

22 and 23. This raise was in lean material all the way, but we appear to be on the contact of the ore and jasper on the hanging side. This raise is laid out to hole into the ore on the fourth level. This ore body will now be proved on the 5th level elevation by drifting and crosscutting; the raise will then be extended, and should a considerable tonnage be proven, it will be necessary to drive a new level from the shaft on this elevation, in which to provide a gangway for men, timber and supplies, as 400 feet is too great a distance to climb and lug timber and other supplies.

SINKING MORRIS SHAFT.

The work of sinking this shaft from the fourth to the sixth level, a distance of 400 feet, was started in May month. A raise was put through on line of shaft, and then the work of stripping down was commenced. At the close of the year the shaft had been stripped and timbered to just above the sixth level. We are now using the miners to cut a new pump house and sump, which must be provided to care for the water before the shaft can be sunk below the level for skip pit and pocket.

DIAMOND DRILLING.

Horizontal hole No. 35, which was being drilled at the close of last year from the breast of the crosscut on the 6th level of the Morris Mine, was bottomed at 1447 feet in quartzite after encountering the hard ore jasper without finding any ore.

After hole No. 35 was completed, the machine was moved back on hole No. 29, and this was bottomed in the slate footwall at 1143 ft. A few runs of lean ore were encountered at 409 ft. to 455 ft., but nothing of importance was discovered. This hole shows 275 feet of good Bessemer ore from 50 ft. to 330 ft. below the sixth level.

MORRIS-LLOYD MINE.
UNDERGROUND.
DIAMOND DRILLING.
(CONT'D)

After bottoming hole No. 29, it was decided to drill another hole to test the trough at a greater distance from the footwall, and the crosscut was extended a distance of 275 ft. south from the location of hole No. 29, and at the close of the year Hole No. 41 had reached a depth of 651 feet without encountering any ore.

Holes No. 38 and 39 were drilled horizontally on the west end of the sixth level to ascertain if the ore found above the level at this point extended down to this elevation, but no ore was encountered.

Hole No. 40 was drilled north from the main drift to test the ground between this drift and the footwall. The hole entered the footwall at 93 feet without finding any ore.

MORRIS-LLOYD MINE.
UNDERGROUND.
LLOYD MINE.

SECOND LEVEL.

The ground above this level has, with the exception of a few thousand tons of Silica ore, all been taken, and no work is now being done on this elevation.

Timber and supplies are taken in on this level and dropped down to the contracts at work below.

THIRD LEVEL.

Eleven contracts are at work slicing and caving in the central ore body between the second and third levels, and this territory is gradually being worked down. Most of the product is of North Lake grade, but a considerable tonnage of Silica ore must be taken at times in order to win the higher grade ore.

The formation stands on end here, and the ground becomes quite heavy, permitting great masses to fall. We provide ample covering for protection, and of course, the mat gets thicker as we progress downward.

A rock drift was driven on this level to hole to a raise coming up in the ore from the fourth level to permit the tramming of the product without transferring.

FOURTH LEVEL.

The development of the ore body above this level reported as being under way at the close of last year, has proceeded during the past twelve months, and an unusual situation has developed, inasmuch as we have followed the ore body upwards to a point 600 feet above the fourth level, or opposite the second sub in Section 6 shaft. This ore lens has been connected with the openings on the main third level and on the third or 1155 ft. sub in Section 6 shaft.

This body of ore will necessarily have to be worked down from above as soon as its limits have been determined.

Four gangs of miners have been at work in the ore above this level all the year. The product is high in phosphorous, and is all of

MORRIS-LLOYD MINE.
UNDERGROUND.
LLOYD MINE.

FOURTH LEVEL, (CONT'D)

North Lake and High Phosphorous grade.

The ore body now being followed up from the 4th level is a separate one from the main body coming down to the east from the open pit.

SECTION 6.

FIRST SUB, 1456 FT. ELEVATION.

Nos. 18 and 19 contracts are slicing and caving in the ore body above this sub, and work will be continued in this territory from now on, after being tied up awaiting the completion of the work in the open pit by the contractors. No. 18 ore body was directly underneath the contractor's track entering the pit, and we were compelled to discontinue operations while same were in use.

During the coming summer milling will be in progress in the open pit and the ore trammed through this sub.

SECOND SUB, 1305 FT. ELEVATION.

The balance of the ore shown by drill hole No. 57 was mined out above this elevation during the year.

A rock drift is now being driven west just below this level to connect with the raise in the ore body which has been followed up from the fourth level. The ore from here down will be sliced in the regular way.

THIRD SUB, 1155 FT. ELEVATION

Work has been under way throughout the year in the territory penetrated by diamond drill holes 58, 62 and 63, and the small lenses of ore have been followed up a distance of 93 feet above this elevation. The ore bodies are very irregular, and the cost of mining is high. A raise was brought up from the main third level to care for the product from this area and do away with transferring.

MORRIS-LLOYD MINE.
UNDERGROUND.
SECTION SIX.

THIRD SUB, 1155FT. ELEVATION-(CONT'D)

A rock drift was also driven west from No. 12 raise on this elevation to connect with the raise which had followed the ore lens up from the fourth level.

FOURTH SUB.

No. 42 and No. 17 are all that are working in the narrow ore body below this sub. The ore lies between dikes, is very narrow, but of high iron content. This ore is in the hanging, and is not connected with the main Section 6 ore body.

The main Section 6 ore body has been divided into, and is being worked in three sections, in order to make room for a sufficient number of men to gain a proper product. The ground is badly cut up by small dikes, and the mining must be closely watched to insure a clean output.

MORRIS-LLOYD MINE.

ORE IN SIGHT DECEMBER 31st,1917.

Following is an estimate of ore in the mine as of December 31st, 1917, calculating a deduction of 20% for rock and loss in mining, viz:

MORRIS MINE.

LOCATION.	BESSEMER	MORRIS ORE	TOTAL.
Above 4th Lev.(Chase Lease #9)	53,409	17,803	71,212
" " " (E.I.Co. Land)	85,392	28,430	113,822
" 6th " (" ")		253,340	253,340
" " " (Chase Lease #9)		45,527	45,527
" " " (" " #24)		7,800	7,800
PROSPECTIVE ORE.			
Shown by Drill Hole No. 36 below 6th Level,		93,840	93,840
Shown by Drill Holes No. 29, 32 and 34, below 6th Level,		28,528	28,528
Ore above 4th level,	1,560	520	2,080
PROSPECTIVE,(CHASE LEASE #9)			
Above 6th Lev.(Floor of 4th Lev.)	2,396	800	3,196
Below " " (Chase Lease #9)		6,538	6,538
NET TOTAL ORE, MORRIS MINE.	142,757	483,126	625,883

PROBABLE ANALYSES.

Bessemer,	Iron	60.00	Phos.	.050	Moist.	15.00
Non-Bessemer,	"	58.50	"	.125	"	15.00

LLOYD MINE.

LOCATION.	NORTH LAKE	HIGH PHOS.	TOTAL ORE.
Above 3rd Level,	162,905	126,675	289,580
PROSPECTIVE ORE.			
Below 3rd Level,		5,000	5,000
TOTAL LLOYD MINE,	162,905	131,675	294,580

PROBABLE ANALYSES.

North Lake,	Iron	58.50	Phos.	.080	Moist.	12.00
High Phos.,	"	58.50	"	.180	"	12.00

MORRIS-LLOYD MINE.

ORE IN SIGHT DECEMBER 31st, 1917.
(CONTINUED)

SECTION 6

LOCATION.	NORTH LAKE	HIGH PHOS.	TOTAL.
Above 1455 Ft. Sub		143,559	143,559
" 1305 " "		243,048	243,048
" 1155 " "	33,138	153,115	186,253
" 1055 " "	3,175	73,509	76,684
" 3rd Level	26,207	105,418	131,625
" 4th "	115,697	341,987	457,684
PROSPECTIVE ORE.			
Above 1055 Ft. Sub,	1,500	3,500	5,000
Below 4th Level,		102,800	102,800
TOTAL SECTION SIX,	179,717	1,166,936	1,346,653

PROBABLE ANALYSES.

North Lake,	Iron	58.50	Phos.	.080	Moist,	13.50
High Phos.,	"	58.50	"	.180	"	13.50

SUMMARY OF TOTAL ORE.

MINE.	BESSEMER	NORTH LAKE	NORTH LAKE HIGH PHOS.	TOTAL.
Morris,	142,757	483,126		625,883
Lloyd,		162,905	131,675	294,580
Section 6,		179,717	1,166,936	1,346,653
GRAND TOTAL,	142,757	825,748	1,298,611	2,267,116

Total ore on Chase Lease No. 9,	126,473
" " " " " " 24,	7,800
" " " Company Lands,	2,132,843
GRAND TOTAL,	2,267,116

BARNES-HECKER, LEASE NO. 31.

DIAMOND DRILLING.

A Keystone Drill outfit was delivered to this lease in March 1917, and standpiping for a shaft location was commenced. Holes No. 90 and 91 were put down to the north of the ore body; No. 90 went to a depth of 215 ft., striking ledge at 186 ft., No. 91 was put down only 80 ft., and was discontinued when ledge was not encountered.

The drill was then moved to near the west end of the property, where the ledge outcropped, and holes Nos. 92, 93,94 and 95 were put down to ledge and a site selected. The drill was then removed.

SHAFT SITE.

The opening of this lease was authorized and the shaft site staked out on July 30th.

The matter of a spur to serve this property was immediately taken up with the Lake Superior & Ishpeming Railway Co. The shaft site was cleared of timber the first part of August, but other work was delayed awaiting railway track on which to bring in material.

On account of the topography of the ground at the shaft location; the Railway Company found they would have to grade down about 10 feet to get the proper elevation for their tracks at our shaft collar, and we were unable to commence sinking until this work was completed. After they had moved part of this material, we were compelled to put in our own shovel and remove material sufficient to clear our shaft and make room for the back stays on our steel head frame.

MINE BUILDINGS.

Contracts were let for our mine buildings; dry, office and shops. The contractor was delayed getting material and men, and work was not commenced until October month, and has not been completed at the end of December. All have been enclosed, and all should be completed within a few weeks.

BARNES-HECKER, LEASE NO.31.

BOILER PLANT.

We installed a 125 HP Tubular Boiler, taken from old No. 4 Plant at Ishpeming, which will be used to furnish power for hoisting until an electrical hoist can be installed. The boiler will also be used for the permanent heating plant.

TEMPORARY ENGINE HOUSE.

We have erected a temporary engine house, (frame) and installed a small hoist to be used in sinking the shaft.

SINKING SHAFT.

The type of shaft selected is our standard shaft, being 10 ft. 10 in. by 14 ft. 10 in., inside of timbers.

This mine is to have but one opening, therefore in order to make it as near fireproof as possible, it is proposed to put down the shaft with 6" x 12" sets, place the lath on the inside of the sets, and then concrete solidly back to the rock walls. It being a well known fact that the greatest danger in shaft fires is where the fire gets in the blocking back of the lath where it cannot be fought.

In order to get a good wall of concrete around the overburden to the ledge, we put down a larger opening than the regular shaft, and then timbered our regular sets inside after ledge was encountered; this will give us an 18 inch space between to fill with concrete.

It was planned not to erect a temporary head frame but to put up the steel shaft house taken from the Chase Mine, which is stored in the Morris Mine yard, and before doing this, it was necessary to sink the shaft to and anchor it in the ledge, as the ground would be more or less disturbed around the collar.

Bearers were laid, and sinking commenced on October 15th, 1917. Water and quicksand were encountered at 15 ft., and the ledge on the north side of the shaft at 20 ft. Ledge over the whole area

BARNES-HECKER, LEASE NO.31.

SINKING SHAFT.
(CONT'D)

of the shaft was secured at 27 feet.

Trouble was had as soon as quicksand was encountered, and runs from the sides were frequent. Regular shaft sets were used in sinking until water was reached, when solid timbering was started and jacked down. This worked very satisfactorily, and no trouble was experienced, and ledge over the whole area of the shaft was secured in November month. The work was slow and expensive, as the sand was heavy on the timber, and we were compelled to proceed with extreme caution.

It was expected that as soon as we encountered the ledge we could set the bearers, but we found the rock badly shattered and standing on end. A heavy flow of water amounting to about 500 gallons per minute was also struck, and we were compelled to sink into the ledge to a depth of 60 feet before solid ground was found. This was not accomplished until the latter part of December. The bottom bearers have now been set, and the shaft is being prepared for concreting in the hope of being able to shut off the heavy flow of water.

This work has been slow and expensive, as only one shift was worked, and blasting had to be very carefully done on account of the heavy ground which was crowding our shaft timber. The cost for air for pumping was also very heavy.

The shaft was sunk to its present depth without accident of any kind.

As soon as the work of concreting the present section of the shaft has been completed, the steel head frame will be erected and sinking resumed.

SHOP EQUIPMENT.

Our equipment for the blacksmith shop is on hand, and will be installed immediately.

BARNES-HECKER, LEASE NO.31.

SHAFT TIMBER.

Most of the material for this work has been received, and we anticipate no delay from this source.

PIPE LINE FROM MORRIS MINE.

We have provided a 6 in. air line from the Morris Mine to the shaft collar, and air will be furnished from the main plant at that mine. This pipe was on the line running from the Morris Mine to the Cliffs Shaft Mine, and was taken up and placed here.

We were delayed getting this in, waiting for special rubber gaskets for the Dresser Couplings with which this pipe is joined.

DWELLINGS.

The contract has been let and the work is now under way building ten double dwellings for this mine. These are located on land owned by our Company on Section 35, T-48, R-28, just north of this property.

LABOR.

We find it difficult to procure men for this mine, and have had but one shift at work in the shaft.

We expect we may be able to secure a full crew as soon as some of the houses are available for use.

GENERAL.

The work thus far has proven slow and expensive, but we expect to make up for it as soon as our head frame is erected and we get properly organized.

MORRIS-LLOYD MINE.

ANALYSIS OF COST SHEETS, EXPLAINING INCREASE OR DECREASE IN VARIOUS ACCOUNTS BETWEEN YEARS 1917 - 1916.

GENERAL EXPENSE.

Engineering, Acct. 27,	Year 1917,	$2589.63	Cost Per Ton	.010
	Year 1916,	1868.08	"	.006
	Increase 1917,	721.55	"	.004

The only extraordinary work done during the year of 1917 was the laying out of garden plots, Section 6 Open Pit, and plumbing of Morris shaft. Increase in wages account for most of the added cost.

Analysis, Acct. 28,	Year 1917,	$6421.18	Cost per ton	.024
	Year 1916,	6173.82	"	.022
	Increase 1917,	247.36	"	.002

The slight increase here is due principally to wage increases during the year of 1917.

Personal Injury, Acct. 30,	Year 1917,	$2261.69	Cost Per Ton,	.008
	Year 1916,	6944.57	"	.025
	Decrease 1917,	4682.88	"	.017

The heavy decrease in this account is due to there having been two fatal accidents at the Morris-Lloyd in 1916, while the 1917 charge is for compensation to injured employees and doctors only.

Mine Office, Acct. (a)	Year 1917,	$3447.37	Cost Per Ton,	.013
	Year 1916,	1143.29	"	.004
	Increase 1917,	2304.08	"	.009

The increase in this account is due to putting on two policemen in Feb. 1917, their time being charged to this account, and to the increases in salaries during the past year.

District Office, Acct. (b)	Year 1917,	$10,826.36,	Cost Per Ton,	.041
	Year 1916,	9,829.16	"	.035
	Increase 1917,	997.20	"	.006

The increase in this account is due to salary increases during the past year.

SUMMARY-GENERAL EXPENSE.

Year 1917,	$25,620.78	Cost per ton	.096
Year 1916,	26,005.31	"	.092
Decrease 1917,	384.53	"	.004

MORRIS-LLOYD MINE.

MAINTENANCE.

Tracks & Yards, Acct. 125,	Year 1917,	$1,498.61	Cost Per Ton,	.006
	Year 1916,	1,464.16	"	.005
	Increase 1917,	34.45	"	.001

There was no extraordinary work done under this account during 1917. This account in spite of labor increases during 1917, is practically the same as that of 1916, due to teamsters working without the aid of swampers.

Docks, Trestles and Pockets, Acct. 126,	Year 1917,	$298.18	Cost Per Ton,	.001
	Year 1916,	2,008.68	"	.007

The large decrease in this account in 1917 is due to the erection of a rock trestle at the Morris Mine in 1916. The 1917 charge represents the maintenance cost on shaft house pockets and permanent trestles only.

Buildings, Acct. 127,	Year 1917,	$370.83	Cost Per Ton,	.001
	Year 1916,	678.95	"	.002
	Decrease 1917,	308.12	"	.001

The 1917 charge for this account represent the ordinary upkeep of mine buildings, while in 1916, the engine house interiors were painted, as well as considerable work done in changing pipe lines in Morris-Lloyd dry building.

Shop Mach'y, Acct. 128,	Year 1917,	$162.32	Cost Per Ton,	.001
	Year 1916,	103.32	"	---
	Increase 1917,	59.00	"	.001

The only renewals in shop machinery was the purchase of a set of knives for the level-splitting shears, dollies for the drill sharpener, and one new hand pipe threading machine.

Boiler Plant, Acct. 129,	Year 1917,	$271.75	Cost Per Ton,	.001
	Year 1916,	75.61	"	---
	Increase 1917,	196.14	"	.001

The increase in 1917 is mainly in the supply charge, and is due to considerable repair work done by W. T. Cole on Section 6 boiler at different times during the year. New grates and flues were also installed in this boiler.

Hoisting Mach'y Acct. 130,	Year 1917,	$4656.75	Cost Per Ton,	.017
	Year 1916,	1297.56	"	.005
	Increase 1917,	3359.19	"	.012

The large increase here is due mainly to putting into use two new cables, (2675 ft.), three new rheostats, and entire new electrical control equipment costing $2600.00, also re-babbitting bearings on Lloyd hoists. More repair work was done throughout the past year in maintaining this equipment as compared with previous year.

MAINTENANCE.
(CONTINUED)

Compressors & Power Drills, Acct. 131,	Year 1917,	$918.08	Cost Per Ton,	.003
	Year 1916,	1025.73	"	.004
	Decrease 1917,	107.65	"	.001

In 1917 six new BBR machines were put into use, the balance of charge representing repairs to Nordberg compressor. In 1916 seven new BBR machines were put into use.

Pump Machinery, Acct. 132,	Year 1917,	$3539.12	Cost Per Ton,	.013
	Year 1916,	2462.79	"	.009
	Increase 1917,	1076.33	"	.004

The increase in this account is due to the fact that during 1917 a raise was put up to be used in connection with sump cleaning, and in December month the work of cutting out for a pump house on the bottom of Morris Mine was started.

Top Tram Mach'y Acct. 133,	Year 1917,	$1496.68	Cost Per Ton,	.006
	Year 1916,	3046.75	"	.011
	Decrease 1917,	1550.07	"	.005

The 1917 charge for this account shows no extraordinary charges for maintaining this equipment, while in 1916 practically all of the tram equipment was overhauled, viz., roller bearing trucks, Hard Ore labor on motors and drums, six new 24 in. sheaves, plate, 6500 feet of 5/8 in. wire rope, etc., as well as labor on cars and other equipment.

Skips & Roads, Acct. 134,	Year 1917,	$987.49	Cost Per Ton,	.004
	Year 1916,	1622.08	"	.006
	Decrease 1917,	634.59	"	.002

The decrease in this account is due to an accident at the Morris Mine in 1916, when the skip was pulled into the cage road. The 1917 cost is for repairs only.

Undg.Tracks & Cars, Acct. 135,	Year 1917,	$3123.30	Cost Per Ton,	.012
	Year 1916,	3435.39	"	.012
	Decrease 1917,	312.09	"	---

Although there is a slight decrease in the amount charged to this account, the cost per ton is the same for both years, the charges representing the ordinary upkeep of cars and extensions to sub level tracks.

MAINTENANCE.
(CONTINUED)

Elect.Tram Plant, Acct.136,	Year 1917,	$8057.18	Cost Per Ton,	.030
	Year 1916,	9817.16	"	.035
	Decrease 1917,	1759.98	"	.005

The large decrease in this account is due to the following extraordinary expenditures in 1916, viz., 25 tons 40 lb. rail and splices for same, 10 sets roller bearing trucks and eight new motor cars. The only extraordinary expenditures during the past year was for three motor cars costing $1496.00.

Tel. & Safety Devices, Acct. 137,	Year 1917,	$468.17	Cost Per Ton,	.002
	Year 1916,	889.04	"	.003
	Decrease 1917,	420.87	"	.001

In 1916 considerable material was used under Acct.(137 A), "Lighting for Shafts & Levels." The only extra charges for 1917 was for new equipment in hospital rooms, viz., tables, chairs, basins, cabinets, etc., also labor and material used in painting the hospital rooms.

SUMMARY OF MAINTENANCE EXPENSE.

Year 1917,	$25,848.46	Cost Per Ton	.097
Year 1916,	27,927.22	"	.099
Decrease 1917,	2,078.76	"	.002

MINING EXPENSE.

Air Pipes, Acct. 150,	Year 1917,	$1995.81	Cost Per Ton	.007
	Year 1916,	2900.58	"	.010
	Decrease 1917,	904.77	"	.003

The decrease in this account is due principally to the fact that fewer extensions were necessary on underground air pipes during the past year, and cutting off of surplus labor.

Compressors, Acct. 151,	Year 1917,	$15,458.69	Cost Per Ton,	.058
	Year 1916,	14,548.18	"	.052
	Increase 1917,	910.51	"	.006

The increase in this account is due mainly to extra machines in use when the work of stripping down the Morris shaft to full size was started, and increases in wages.

Hoisting, Acct. 152,	Year 1917,	$16,829.69	Cost Per Ton,	.063
	Year 1916,	14,952.50	"	.053
	Increase 1917,	1,877.19	"	.010

This increase is due mainly to the wage increases of 1917.

MINING EXPENSE. (CONTINUED.)

Pumping,				
Acct. 153,	Year 1917,	$16,000.42	Cost Per Ton,	.060
	Year 1916,	14,790.01	"	.053
	Increase 1917,	1,210.41	"	.007

The increase in this account in 1917 is entirely due to the wage increases and putting on one additional pumpman, making eight hours shift in place of twelve hours. The actual cost for current during 1917 was 58,798 K.W's less than that of 1916.

Sinking,				
Acct. 154,	Year 1917,	$15,878.85	Cost Per Ton,	.059
	Year 1916,	370.61	"	.001
	Increase 1917,	15,508.24	"	.058

This increase is all due to the work of raising and stripping down the Morris shaft from the 800 ft. level to the 1200 ft. level to standard shaft size. The cost for 1916 is for minor shaft repairs.

Drifting,				
Acct. 155,	Year 1917,	$7,170.68	Cost Per Ton,	.027
	Year 1916,	31,023.72	"	.110
	Decrease 1917,	23,853.04	"	.083

There was very little rock work at the Morris-Lloyd Mine during the past year, viz.,1023 ft., as compared with 4260 ft. during the previous year. In 1916 considerable rock work was done in the Section 6 territory and bottom of the Morris Mine.

Breaking Ore,				
Acct. 156,	Year 1917,	$161,849.95	Cost Per Ton,	.604
	Year 1916,	137,286.71	"	.487
	Increase 1917,	24,563.24	"	.117

The increase here is caused by the wage increases of 1917, also to the increased cost of powder and other miners supplies, coupled with a falling off in efficiency of our miners. We have a poor class of miners in the District.

Tramming,				
Acct. 157,	Year 1917,	$41,494.40	Cost Per Ton,	.155
	Year 1916,	38,506.57	"	.137
	Increase 1917,	2,987.83	"	.018

The slight increase here is caused by wage increases of 1917. During 1917 there were actually fewer trammers employed than for 1916.

Timbering,				
Acct. 159,	Year 1917,	$67,580.91	Cost Per Ton,	.252
	Year 1916,	65,825.63	"	.234
	Increase 1917,	1,755.28	"	.018

The increase here is principally in labor, due to wage increases of 1917. During the latter part of 1917 fewer timbermen were employed, as the miners were putting in their own timber. In the cost for mine timber used during 1917, there was a decrease of $1,982.84.

MORRIS-LLOYD MINE.

MINING EXPENSE.
(CONTINUED.)

Capt. & Bosses, Acct. 160,	Year 1917,	$13,550.06	Cost Per Ton,	.051
	Year 1916,	10,809.08	"	.038
	Increase 1917,	2,740.98	"	.013

The increase here is caused by wage increases of 1917.

Dry House, Acct. 161,	Year 1917,	$6,019.89	Cost Per Ton,	.023
	Year 1916,	4,155.85	"	.015
	Increase 1917,	1,864.04	"	.008

The increase here is due partly to the increases in wages of 1917, also to the fact that the Section 6 dry was in use all of 1917, and for only six months in 1916.

Top Landing, Acct.162,	Year 1917,	$5,954.74	Cost Per Ton	.022
	Year 1916,	6,255.56	"	.022
	Decrease 1917	300.82		.---

This account shows a slight decrease in spite of 1917 wage increases, due to the fact that the change made late in 1916 in the methods of handling this work were in effect all of 1917, and the results are reflected in the costs.

Stocking Ore, Acct. 163,	Year 1917,	$1,494.05	Cost Per Ton	.005
	Year 1916,	949.34	"	.003
	Increase 1917,	544.71	"	.002

The maintenance charge in this account increased on account of more repair work in 1917 account of the north Morris stocking trestle breaking down while ore was being loaded from stockpile.

Sorting Ore,	Year 1917,	.74	Cost Per Ton,	---
	Year 1916,	264.98	"	.001
	Decrease 1917,	264.24	"	.001

During 1917 there was no rock picking done around stockpiles, while in 1916, at different times, one man was employed in this work.

Ventilation, Acct. 171,	Year 1917,	136.45	Cost Per Ton,	.001
	Year 1916,	1035.00	"	.004
	Decrease 1917,	898.55	"	.003

The 1917 charge represents current for operating fan only, while in 1916 ventilation pipes were installed at the bottom of the Morris shaft.

SUMMARY-MINING EXPENSE.

Year 1917,	$371,443.15	Cost Per Ton	1.387
Year 1916,	343,987.87	"	1.221
Increase 1917,	27,455.28	"	0.166

MORRIS MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA
Morris Bessemer,	59.19	.050	7.59
Morris,	58.41	.092	
Morris Silica,	52.23	.061	17.64

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1917.

GRADE	IRON	Mine PHOS.	SILICA
Morris Silica,	52.26	.058	17.72

ORE STATEMENT - DECEMBER 31ST, 1917.

	MORRIS BESSEMER	MORRIS	MORRIS SILICA	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	28,344	333	28,815	57,492	43,018
Output for Year,	35,126	17,486	9,833	62,445	71,292
Stockpile Overrun,	2,495			2,495	1,275
Total,	65,965	17,819	38,648	122,432	115,591
Shipments,	59,620	14,050	21,038	94,708	58,099
Balance on Hand,	6,345	3,769	17,610	27,724	57,492
Increase in Production-6%				6,841	
Decrease in Ore on Hand,				29,768	

2-8 Hr. Shifts during 1916 & 1917.

SHIPMENTS FOR YEAR--1917.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Morris Bessemer,	15,988	43,632	59,620	52,275
Morris,	9,822	4,228	14,050	5,435
Morris Silica,	362	20,676	21,038	389
Total,	26,172	68,536	94,708	58,099
Total last Year,	16,056	42,043	58,099	
Increase - 63%			36,609	

MORRIS MINE.

LLOYD MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA
North Lake Bessemer,	59.08	.051	7.07
North Lake ,	58.67	.083	7.06
North Lake Silica,	52.31	.068	16.15
North Lake High Phos.,	58.36	.167	7.00

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA
North Lake Ore,	58.50	.087	
North Lake Silica,	50.88	.060	18.15

ORE STATEMENT - DECEMBER 31ST, 1917.

	NO. LAKE BESSEMER	NO.LAKE	NO.LAKE SILICA	N.LAKE H.PHOS.	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	32,907	3,866	8,262	15,625	60,660	107,047
Output for Year,	9,132	129,757	43,116	20,842	202,847	205,326
Stockpile Overrun,						3,934
Transferred,	15,015	15,015				
Total,	27,024	148,638	51,378	36,467	263,507	316,307
Shipments,	26,108	117,632	36,085	12,507	192,332	255,647
Balance on Hand,	916	31,006	15,293	23,960	71,175	60,660
Decrease in Production-17%					52,800	
Increase in Ore on Hand,					10,515	

2 - 8 Hr. Shifts during 1916 & 1917.

LLOYD MINE.

LLOYD MINE

SHIPMENTS FOR THE YEAR-1917.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR	
North Lake Bessemer,	5,685	20,423	26,108	3,777	
North Lake,	92,577	25,055	117,632	114,584	
North Lake Silica,	24,693	11,392	36,085	107,978	
North Lake High Phos.,	8,192	4,315	12,507	29,308	
Total,	131,147	61,185	192,332	255,647	
Total last Year,	148,661	106,986	255,647		
Decrease - 33%			63,315		

LLOYD MINE.

NORTH LAKE SECTION 6 MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR THE YEAR-1917.

GRADE	IRON	PHOS.	SILICA
Section 6 North Lake Bessemer,	60.37	.051	5.43
Section 6 North Lake	59.49	.084	
Section 6 North Lake H.Phos.,	59.92	.119	
Section 6 North Lake Silica,	49.24	.065	20.45

Above grades went into mixed cargoes.

NORTH LAKE SECTION 6 MINE

ORE STATEMENT AND SHIPMENTS FOR 1917.

	SECTION 6 N.L. BESS.	SECTION 6 NO. LAKE	SECTION 6 N.LAKE H.PHOS.	SECTION 6 N.L.SILICA	TOTAL	TOTAL LAST YEAR
Output for Year,	701	8,436	6,773	303	16,213	25,852
Shipments,	701	8,436	6,773	303	16,213	
Decrease					9,639	

Loaded from Open Pit by Hoose & Pearson

August 27th to October 6th.

NORTH LAKE SECTION 6 MINE.

MORRIS-LLOYD MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	284,000	307,685		23,685
General Expense	.096	.092	.004	
Maintenance	.097	.099		.002
Mining Expense	1.387	1.221	.166	
Cost of Production	1.580	1.412	.168	
Exploratory	.033	.048		.015
Extraordinary Drifting		.076		.076
DEPRECIATION.				
Original Purchase	.053	.131		.078
Plant Account	.239	.229		.010
Equipment	.003	.002	.001	
Uncompleted Construction		.001		.001
Total Depreciation	.295	.363		.068
Taxes	.088	.057	.031	
Central Office	.064	.058	.006	
Miscellaneous		.001	.001	
Sundry Expense	.013	.014	.001	
Cost on Stockpile	2.073	2.027	.046	
Loading & Shipping	.106	.126		.020
Total Cost on Cars	2.086	2.024	.062	
No. Days Operating	302	299	3	
No. Shifts and Hours	2-8hr	2-8hr		
Avg. Daily Product	940	942		2
COST OF PRODUCTION.				
Labor	1.113	.912	.201	
Supplies	.467	.500		.033
Total	1.580	1.412	.168	

MORRIS-LLOYD MINE.

COMPARATIVE WAGES AND PRODUCT.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	267,787	281,833		24,046
No. Shifts and Hours	2-8hr	2-8hs		
AVERAGE NO. MEN WORKING				
Surface	45	59		14
Underground	206	232		26
Total	251	291		40
AVERAGE WAGES PER DAY				
Surface	3.44	2.82	.62-22%	
Underground	3.90	3.16	.74-23%	
Total	3.81	3.09	.72-23%	
WAGES PER MO. OF 25 DAYS				
Surface	86.00	70.50	15.50	
Underground	97.50	79.00	18.50	
Total	95.25	77.25	18.00	
PRODUCT PER MAN PER DAY				
Surface	18.47	15.83	2.64	
Underground	4.29	4.05	.24	
Total	3.48	3.23	.25	
LABOR COST PER TON				
Surface	.186	.178	.008	
Underground	.909	.780	.129	
Total	1.095	.958	.137	
AVG. PRODUCT BRK'G & TRM'G	7.62	6.68	.94	
" WAGES CONTRACT MINERS	4.14	3.32	.82	
" " " TRAMMERS	0	3.03		
" " " LABOR	4.14	3.28	.86	
TOTAL NUMBER OF DAYS				
Surface	14,497¼	17,809		3,311¾
Underground	62,400	69,507¾		7,107¾
Total	76,897¼	87,316¾		10,419½
AMOUNT FOR LABOR				
Surface	49,857.92	50,278.93		421.01
Underground	243,244.93	219,642.50	23,602.43	
Total	293,102.85	269,921.43	23,181.42	

Proportion Surface to Underground Men:

1917 - 1 to 4.57
1916 - 1 to 3.93
1915 - 1 to 3.85
1914 - 1 to 4.48
1913 - 1 to 4.05
1912 - 1 to 4.37
1911 - 1 to 4.06

MORRIS-LLOYD MINE.

MORRIS-LLOYD MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31, 1917.

KIND.	LINEAL FEET.	AVG.PRICE PER FOOT.	AMOUNT 1 9 1 7.	AMOUNT 1 9 1 6.
6" to 8" Timber	169,450	.02¼	3835.09	6352.35
8" to 10"	102,288	.04¼	4347.23	3468.76
10" to 12"	20,406	.06¼	1275.27	1762.24
12" to 14"	6,893	.08½	580.90	626.29
Total 1917	299,037	.033	10038.49	
Total 1916	410,440	.03	12209.64	12209.64
	LINEAL FEET.	PER 100'.		
5' Lagging	662,575	.514	3407.53	4684.34
7' "	12,985	.55	71.42	
8' "	838,896	.55	4650.82	2294.34
Total Lagging (1)	1,514,456	.504	8129.77	6978.68
Poles	152,106	.95	1455.04	1494.42
Total 1917	1,666,562		9584.81	8473.10
Total 1916	1,474,507	.575	8473.10	8473.10
Product			267,787	281,833
Feet Timber per ton of ore			1.12	1.70
Feet Lagging "			5.66	4.70
Feet Lagging per ft. of Timber			5.07	3.19
Cost per ton for Timber			.038	.043
" Lagging			.03	.025
" Poles			.005	.005
" Timber, Lagging & Poles			.073	.075
Equivalent of stull timber to Bd. Measure			450,728	583,741
Feet Board Measure per ton of ore			1.69	2.07
Total Cost for Timber,Lagging & Poles		1917		19623.30
"		1916		20682.74
"		1915		14219.21
"		1914		12335.11
"		1913		8394.16
"		1912		6634.06
"		1911		6001.30

MORRIS-LLOYD MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY.	AVERAGE PRICES.	AMOUNT 1 9 1 7.	AMOUNT 1 9 1 6.
40% Powder, Red Cross,	175,411	.154	26934.35	20523.52
40% " Gelatin,				15.00
50% " Red Cross,	200	.136	27.20	3822.98
60% " " "	1,850	.227	419.04	2122.55
60% " Gelatin,	6,300	.246	1552.07	178.50
Total Powder	183,761	.157	28932.66	26662.55
Fuse	511,580	5.84	2989.31	2534.87
Caps	93,975	12.72	1194.55	1102.76
Cap Crimpers	33	.375	12.39	17.90
Tamping Bags	27,000	2.04M	55.10	24.49
Connecting Wire	6	.46	2.77	6.30
Total Fuse, Etc.			4254.12	3686.32
Total All Explosives			33186.78	30348.87
Product			267,787	281,833
Pounds Powder per ton Ore			.686	.714
Cost per ton for Powder			.108	.0945
" " Fuse, Caps, Etc.			.0159	.0131
" " All Explosives			.1239	.1076
Avg. Price per lb. for Powder			.157	.13

MORRIS-LLOYD-SECTION 6 MINES

CONSOLIDATED ORE STATEMENT - DECEMBER 31ST - 1917.

	MORRIS BESS.	MORRIS	MORRIS SILICA	NO.LAKE BESS.	N.LAKE	NO.LAKE H.PHOS.	NO.LAKE SILICA	SEC. 6 N.LAKE BESS.	SEC. 6 N.LAKE	SEC. 6 N.LAKE SILICA	SEC. 6 N.LAKE H.PHOS.	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	28,344	333	28,815	32,907	3,866	15,625	8,262	0	0	0	0	118,152	150,065
Output for Year,	35,126	17,486	9,833	9,132	129,757	20,842	43,116	701	8,436	303	6,773	281,505	307,685
Stockpile Overrun,	2,495											2,495	
Transferred,				15,015	15,015								
Total,	65,965	17,819	38,648	27,024	148,638	36,467	51,378	701	8,436	303	6,773	402,152	457,750
Shipments,	59,620	14,050	21,038	26,108	117,632	12,507	36,085	701	8,436	303	6,773	303,253	339,598
Balance on Hand,	6,345	3,769	17,610	916	31,006	23,960	15,293	0	0	0	0	98,899	118,152
Decrease Production-12%												55,598	
Decrease in Ore on Hand,												19,253	

MORRIS-LLOYD SEC. 6 MINES.

MORRIS-LLOYD SECTION 6 MINES.

GENERAL REMARKS:

The product of the several producing mines for the year was as follows:

Stephenson Mine,	253,266 tons	
Gwinn Mine,	161,963 "	
Austin Mine,	51,659 "	
Francis Mine,	1,778 "	
Princeton Mine,	492 "	
Total Product for the Year,		469,158 tons
" " " 1916,		469,104 "
Increase, 1917,		54 "

During 1917 the Stephenson and Gwinn Mines have been the main producers. The Austin was operated from April 23rd to December 21st, and produced more than twice as much ore as in 1916. A small amount of ore was obtained from development work at the Francis. Sinking and drifting has been continued at the Mackinaw, and in September sinking was started at the Gardner. After the flooding of the Stephenson Mine in December the work of re-opening the Princeton was started. At the close of the year work was being carried on at the Gwinn, Princeton, Francis, Jopling, Mackinaw and Gardner Mines, while the Austin and Stephenson were idle on account of water.

There has been a shortage of labor throughout the year which has greatly curtailed surface work and other improvements which it had been planned to make. The production of the Stephenson Mine is much lower than it would have been if more miners had been available. At the close of the year, however, there was quite an increase in the number of men employed in the district, as compared with 1916, there being 714 men employed as against 573 in the previous year. This was due, in a large measure, to the re-opening of the Gardner and Mackinaw Mines.

During the past year there has been considerable building activity in the District. Five double houses and two single cottages have been erected at Gwinn, and five double houses at the Mackinaw-Gardner Location. At the end of the year all the houses at the Mackinaw-Gardner Location were occupied and there are now sufficient applications to fill at least five more double houses. At the close of the year there were four vacant houses in Gwinn. This condition is only temporary, and it is expected that all available houses will soon be

occupied. One lot was sold and a cottage erected on Pine Street; another lot was sold and a building started on Maple Street. Both sides of Pine Street have been macadamized, and this is now the main thoroughfare thru the town. The addition to the High School, which was started in the Fall of 1917, was completed this year, and the ground graded around it.

The shipment of 879,577 tons in 1917 from the Gwinn District were the largest ever made in one year. The Cambridge pile at Princeton No. 2, which contained over 156,000 tons, has been shipped, with the exception of about 3,800 tons. The large pile of Stephenson No. 2 ore south of the shaft has been shipped. There is, however, 71,118 tons of Stephenson #2 ore remaining in stock on the low ground North of the rock pile. What promised to be a most successful year for the District was destroyed by the breaking of the hanging at the Stephenson Mine on December 4th, which resulted in the flooding of the Stephenson Mine. All underground work had to be abandoned at once, and in spite of all efforts the mine rapidly filled with water. The Austin Mine was operated on double shift a short time in order to give the men employment, but the Austin had to be abandoned on the 21st of December as the water penetrated the mine through the caved ground.

The work of preparing the Princeton for re-opening was started with as large a crew as it was possible to work, and a double shift was also put on at the Gwinn Mine.

Up to the close of the year there had been two volunteers to the Army, seven to the Navy, two to the Aviation Corps, three to the Medical Corps, five to the Engineers and twenty-two men drafted, making a total of 41 men which have left this District on account of the war. There were 363 men registered on June 5th, of which there are probably seventy-five in Class 1, some of whom have already gone; the balance will probably leave by June, 1918. There was a severe shortage of surface labor during 1917; this will be much more pronounced in 1918, as the draft did not start until in the Fall.

AUSTIN MINE.

The work of re-opening the Austin Mine for the season of 1917 was started on April 16th, and continued throughout the month; mining was started about May 1st and continued until December 21st. It had been planned to keep the Austin Mine open all Winter in order to increase the production of Bessemer ore from the District, but work had to be stopped in December, at which time the mine was flooded with water from the Stephenson Mine.

The product for 1917 was as follows:

	TONS.	PERCENT.
Austin Bessemer,	28,584	56
" or Off-Grade Bess.,	3,347	6
" No. 2,	19,728	38
TOTAL ORE,	51,659	100
TOTAL ROCK,	3,459	
TOTAL HOIST ORE AND ROCK,	55,118	

Shipments from Pockets for 1917 were as follows:

AUSTIN BESSEMER	AUSTIN	AUSTIN NO.2	TOTAL
25,216	3,347	15,857	44,420

The ore in stock, December 31st, is as follows:

AUSTIN BESSEMER	AUSTIN NO.2	TOTAL
3,368	4,096	7,464

The following is an estimate of the ore in sight at the Austin Mine:

	AUSTIN BESSEMER	AUSTIN	AUSTIN NO.2	TOTAL.
Above 1st Level,	14,700	2,000	8,300	25,000
" 2nd "	36,800	5,200	20,900	62,900
" 3rd "	30,000	4,200	17,100	51,300
" 4th "	10,520	1,490	5,990	18,000
" 5th "	4,890	680	2,770	8,340
TOTAL TONS,	96,910	13,570	55,060	165,540

The total ore in sight in the mine on January 1st, 1917, was 182,690 tons. During 1917 there was 51,659 tons mined, so that the estimate of ore in sight on December 31st, of 165,540 tons shows an increase of 34,509 tons over the amount which would have been in sight if the product

of 1917 was deducted from the ore in sight on January 1st, 1917. Considerable ore was found in caved areas outside of the shaft pillar, which ore was not included in the estimate. It had been expected that the pillars on the levels below the 3rd level would be exhausted during 1917, but there is still considerable ore remaining here. There was no more ore found in the pillars than had been anticipated, but it was necessary to scatter the contracts in order to obtain the hoist of the past Summer, so that it was not possible to concentrate work on these pillars. The estimate shows that there is still 26,340 tons of ore in sight below the 3rd level, showing that during the past year there was approximately only 11,000 tons mined from this territory. In the areas outside the shaft pillar on these levels a large tonnage of ore was obtained by drifting in caved ground. Preparations are under way for the use of the new No. 2 shaft some time in 1918.

The work for the year was confined to mining on the 1st, 3rd, 4th and 5th levels, and to the subs above the 4th and 5th. The main rock work for the year consisted in the raising of No. 2 shaft from 3rd to 2nd levels. The work in detail for the year was as follows:

FIRST LEVEL:

Early in the year the work of re-opening the drifts along the foot wall was started in order to see if any ore had been left in the old stopes south-east and north-west of the shaft. Mining has been carried on in the old stopes to the south-east throughout the greater part of the year, and a large amount of good grade ore obtained. Two drifts were also driven from the cross-cut from the shaft. One was started on the north-west side of the contact and was driven along the hanging to the north-west. The ore in this drift was of rather low grade, but as it was very low in phosphorus it was used in the mixture with the other Bessemer ores during the shipping season. The other drift was started on the south-east side of the cross-cut about 25 feet North of the contact, and was extended 80 feet. During the year a raise was put up from the footwall drift to the hanging and a sub opened on which 120 feet of drifting had been done by the end of the year.

AUSTIN MINE:

The estimate of ore in sight above the 1st shows a total of 25,000 tons, all of which is in the shaft pillar.

SECOND LEVEL:

The principal work for the year consisted in drifting along the foot to the south-east of the shaft, considerable ore being obtained in re-opening this drift. This drift had not reached the extreme limit of the old workings when the mine closed down. During the year two raises were put up from the 2nd level to the elevation of the old second sub. The old hanging wall drift on the sub was then repaired, after which three cross-cuts were driven across to the old foot wall drift. This work was done in preparation for the mining of this shaft pillar. There was no actual mining on the sub levels between the 1st and 2nd levels during the past year.

No. 2 shaft was holed to the 2nd level, and the old rock drift here was widened so as to permit of handling ore. It was necessary to stope up the bottom of this drift for some distance over towards No. 1 shaft in order to prepare this drift for tramming, as the grades heretofore had all been in favor of No. 1 shaft. The work on this rock drift was not completed at the close of the year, but it advanced far enough so that there will be no difficulty in completing it before the time when it will be necessary to use No. 2 shaft for hoisting ore.

It is estimated that there is 62,900 tons in sight between the 2nd and 1st levels, about 58% of which is of Bessemer grade.

THIRD LEVEL:

The principal work on the 3rd level during 1917 consisted in drifting along the foot on the south-east side beyond the shaft pillar and cross-cutting from this drift into the old mined areas. In addition to this, drifting was also done on the hanging side of the shaft pillar.

Some work had been done during the past year on the old 1st and 2nd subs above the 3rd level. On the second sub a new foot-wall drift was driven thru the shaft pillar on the south-east side, and some mining was done here. On the north-west side of these subs some ore was obtained

from drifting thru the shaft pillar, and from stoping of the shaft pillar near the limit of mining. On the 1st sub above the 3rd the work of developing this sub preparatory to mining had just been started when the mine closed down.

It is estimated that there are 51,300 tons of ore left in the shaft pillar between the 2nd and 3rd levels, of which about 58% is Bessemer grade.

FOURTH LEVEL:

The work for the year on the 4th level was principally confined to drifts along the hanging on the West side of the level. Some pillars were mined in one of the old subs between the 4th and 3rd levels. The estimated tonnage between the 4th and 3rd level is 18,000, practically all of which is Bessemer ore.

FIFTH LEVEL:

The work on this level was confined to mining the ore left in the pillars along the foot. Some work was also done on the subs above the 5th where the few remaining shaft pillars are being rapidly removed. It is estimated that there are 4,140 tons left on the sub levels above the 5th, and 4,200 tons in the pillars on the 5th. All the ore has now been mined from the territory below the 5th level.

No. 2 shaft: Work was continued on No. 2 shaft the greater part of the year. After the shaft holed to the bottom of the old timber raise on the 2nd level, the old raise was enlarged to size of the new shaft and timbered, and at the time the mine was abandoned it had been completed to a point seven feet below the 1st level. After the mine was abandoned in December it was decided to sink and re-timber #2 shaft from surface to connect with that part of the shaft which had already been finished below the 1st level. This is being done, with two objects in view: 1st - it will provide another place in which to put pumps when the work of unwatering the Austin and Stephenson Mines is started. 2nd - if it develops that the Austin cannot be completely unwatered during the shipping season it will be possible to do some mining in the shaft pillars above the 3rd level

AUSTIN MINE:

thru this shaft, provided the water can be lowered to this point in time. This would make it necessary to abandon the present shaft for all future mining operations, which would make it necessary to transfer the ore below the 3rd level.

AUSTIN MINE SURFACE:

Practically the only surface work done at the Austin of any importance during 1917 consisted in re-timbering the upper part of No. 2 shaft and other work connected with the construction of the head-frame here. The surface, which was about fifteen feet deep at the collar, caved in the Spring of 1917, owing to the rotting of the cribbing in the old timber raise. The old timbers were cleaned out and a set of bearers placed on the ledge; three sets of shaft timber were hung below the bearers and three sets placed above the bearers, bringing the collar up to the required elevation. Concrete piers for the head frame were constructed on surface and the ground levelled off around the collar of the shaft. The timber for the head frame and trestles is on the ground and it is planned to erect them during the Winter.

After the mine was drowned out it was decided to complete the re-timbering and enlarging of the old timber raise, working down from surface. Preparations for this work were being made at the close of the year by the erection of a tripod over the shaft and the construction of a small engine house.

When it was decided to operate the Austin Mine during the Winter of 1917 it became necessary to erect stocking trestles. There was considerable expense involved in this work, as the old permanent trestle was in poor condition. A total of eight bents were erected and stocking was continued from the close of the shipping season until the mine closed down, there being 7464 tons in stock at the time the mine closed down.

AUSTIN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA	MANG.
Austin Bessemer,	60.17	.038	8.69	
Austin	60.00	.089	9.05	.463
Austin #2,	58.38	.371	8.75	.441

Above grades went into mixed cargoes.

ORE STATEMENT - DECEMBER 31ST, 1917.

	AUSTIN BESSEMER	AUSTIN	AUSTIN No.2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	0	0	225	225	48,553
Output for Year,	28,584	3,347	19,741	51,672	21,331
Stockpile Shortage,			13	13	5,138
Total,	28,584	3,347	19,953	51,884	64,746
Shipments,	25,216	3,347	15,857	44,420	64,521
Balance on Hand,	3,368	0	4,096	7,464	225
Increase in Output-219%				35,466	
Increase in Ore on Hand,				7,239	

1917 - Mine idle Jan. 1st to April 23rd
1-8 Hr. Shift April 23rd to Dec. 31st

1916 - Mine idle Jan. 1st to April 24th
1-8 Hr. Shift April 24th to Oct. 21st
Mine idle Oct. 22nd to Dec. 31st.

AUSTIN MINE

SHIPMENTS FOR YEAR -- 1917.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Austin Bessemer,	25,216		25,216	14,308
Austin,	3,347		3,347	2,785
Austin No. 2,	15,645	212	15,857	47,428
Total,	44,208	212	44,420	64,521
Total last Year,	21,287	43,234	64,521	
Decrease - 31%			20,101	

AUSTIN MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	51,659	16,193	35,466	
General Expense	.145	.189		.044
Maintenance	.148	.247		.099
Mining Expense	1.228	1.548		.320
Cost of Production	1.521	1.984		.463
DEPRECIATION.				
Plant Account		.060		.060
Total Depreciation		.060		.060
Taxes	.045	.181		.136
Central Office	.061	.081		.020
Miscellaneous	.008	.007	.015	
Idle Expense	.031	.131		
Sundry Expense	.014	.009	.005	
Cost on Stockpile	1.680	2.439		.759
Loading & Shipping	.039	.216		.177
Total Cost on Cars	1.719	2.655		.936
COST OF PRODUCTION				
Labor	1.119	1.314		.195
Supplies	.402	.670		.268
Total	1.521	1.984		.463
No. Days Operating	112	148		36
No. Shifts and Hours	1-8hr	1-8hr		
Avg. Daily Product	257	144		113

Operating year 1916 from April 24th to October 19th.

AUSTIN MINE.

AUSTIN MINE.

COMPARATIVE WAGES AND PRODUCT.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	51,659	161,193	35,446	
No. Shifts and Hours	1-8hr	1-8hr		
AVERAGE NUMBER MEN WORKING				
Surface	11	6	5	
Underground	35	17	18	
Total	46	23	23	
AVERAGE WAGES PER DAY				
Surface	3.50	2.76	.74-26.8%	
Underground	4.36	3.21	1.15-36%	
Total	4.15	3.10	1.05-34%	
WAGES PER MONTH OF 25 DAYS				
Surface	87.50	69.00	18.50	
Underground	102.00	80.25	21.75	
Total	103.75	77.50	26.25	
PRODUCT PER MAN PER DAY				
Surface	14.86	9.42	5.24	
Underground	4.99	3.17	1.82	
Total	3.74	2.37	1.37	
LABOR COST PER TON				
Surface	.235	.292		.057
Underground	.873	1.014		.141
Total	1.108	1.306		.198
AVG. PRODUCT BRK'G & TRM'G	7.54	6.51	1.03	
" WAGES CONTRACT MINERS	4.41	3.26	1.15	
" " " TRAMMERS	4.61	0		
" " " LABOR	4.45	3.26	1.19	
TOTAL NUMBER OF DAYS				
Surface	3,466¼	1,718½	1,747¾	
Underground	10,344	5,106½	5,237½	
Total	13,810¼	6,825	6,985¼	
AMOUNT FOR LABOR				
Surface	12,160.53	4,722.93	7,427.60	
Underground	45,089.69	16,416.01	38,673.68	
Total	57,250.22	21,148.94	46,101.28	

Proportion Surface to Underground Men:
1917 - 1 tp 3.2

AUSTIN MINE.

AUSTIN MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31, 1917.

KIND.	LINEAL FEET.	AVG. PRICE PER FOOT.	AMOUNT 1917.	AMOUNT 1916.
6" Cribbing Timber	15,682	.0162	254.21	
6" to 8" Stull Timber	3,120	.0024	69.95	70.88
8" to 10" "	21,376	.0425	908.48	326.50
10" to 12" "	13,060	.0624	815.25	167.53
12" to 14" "	846	.085	71.88	
Total 1917	54,084	.0392	2119.77	
Total 1916	15,360	.0373	572.11	572.11
	LINEAL FEET.	PER 100'.		
5' Lagging	146,200	.00512	749.62	181.01
6' "	6,101	.5505	33.59	
8' "	46,800	.541	253.53	111.72
Total Lagging (1)	199,101	.520	1036.74	292.73
Poles	12,425	1.02	127.52	30.81
Total 1917	211,526	.5504	1164.26	
Total 1916	70,018	.565	395.45	395.45

Product	51,659	21,331
Feet Timber per ton of Ore	1.05	.720
Feet Lagging " "	3.85	2.92
Feet Lagging per foot of timber	3.682	4.056
Cost per ton for Timber	.041	.0268
" Lagging	.020	.0137
" Poles	.003	.0048
" Timber, Lagging & Poles	.064	.0453
Equivalent of Stull Timber to Board Measure	96,171	25,530
Feet Board Measure per ton of Ore	1.862	1.197

Total cost for Timber, Lagging & Poles	1917	3284.03
"	1916	967.56
"	1915	2174.79
"	1914	7351.40
"	1911	6214.48
"	1910	3378.03
"	1909	6356.25

Mine ceased operations Dec.21,1917, account being flooded.

AUSTIN MINE.

AUSTIN MINE.

STATEMENT OF EXPDOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY.	AVERAGE PRICES.	AMOUNT 1 9 1 7.	AMOUNT 1 9 1 6.
40% Powder	13,325	.1706	2272.71	549.36
50% "	4,475	.2054	919.18	232.19
60% "	100	.2327	23.27	
80% Gelatin	100	.3015	30.15	
Total Powder	18,000	.1803	3245.31	781.55
Fuse	47,800	.633	302.48	129.76
Caps	12,600	12.83	161.65	98.76
Cap Crimpers	17	.43	7.32	2.76
Total Fuse, Etc.			471.45	231.28
Grand Total			3716.76	1012.28
Product			51,659	21,334
Pounds Powder per ton Ore			.348	.286
Cost per ton for Powder			.0628	.0366
" " " " Fuse, Caps, Etc.			.0091	.0109
" " " " All Explosives			.0719	.0475
Avg. Price per Lb. for Powder			.1803	.1281

Mine idle since Dec. 20,1917, account flooded with water.

AUSTIN MINE.

STEPHENSON MINE.

The Stephenson Mine was operated on one 8-hour shift during 1917, and ore was hoisted on two 8-hour shifts. Mining and development work were carried on throughout the year up to December 4th, on which date the mine was flooded, and all work stopped.

The product for the year was as follows:

	TONS.	PERCENT.
Stephenson Bessemer,	32,920	15
Stephenson,	115,891	54
Stephenson #1,	17,006	8
Stephenson #2,	49,409	23
Total Ore Stephenson,	215,226	100
Total ore from C&NW Lease, Section 29, hoisted thru Stephenson shaft,	38,040	
Rock,	22,481	
Total Hoist Ore & Rock,	275,747	

The product from the Stephenson Mine in 1916 was 261,832 tons; the decrease in production in 1917 being 46,606 tons. This decrease was due to the shortage of labor throughout the year, together with the fact that all work at the mine stopped on December 4th. The working force at the mine was decreased when the Austin Mine re-opened in April; other men quit and left the district, so that there has been a constant shortage of miners all thru the year. The shortage of labor has been very unfortunate in view of the fact that the mine is now opened up to take care of twice as many men as were employed underground. For a short time before the mine closed down there was no Stephenson #2 grade made. This was due partly to mining conditions, there being no contracts working directly on the foot-wall, but mainly to all the product being lower in phosphorus. This change is apparently coming as mining is being done at greater depth and will materially increase the value of the product obtained from the Stephenson Mine. It will prevent the accumulation of large stockpiles of this grade which have occurred in the past.

The 1917 shipments and balances on hand December 31st, 1917, were as follows:

	SHIPMENTS. TONS.	BALANCE ON HAND. TONS.
Stephenson Bessemer,	39,656	4,000
" or .300 Phos. Ore,	122,066	13,000
" #1 or Off-Grade Bess.,	17,006	
Stephenson No. 2,	283,413	71,118
TOTAL,	462,141	88,118

The balance on hand shows a gratifying decrease as compared with the balance of the previous year, which was 335,033 tons.

The ore in sight on December 31st, 1917, was as follows:

	STEPHENSON BESSEMER	STEPH. ORE .300 PHOS.	STEPHENSON NO. 1	STEPHENSON NO. 2	TOTAL.
Above 1st Level,				4,890	4,890
" 3rd "				1,530	1,530
" 4th "	15,000	47,000	5,000	40,900	107,900
" 5th "	85,660	385,980	43,000	128,660	643,300
Total Ore in Sight,	100,660	432,980	48,000	175,980	757,620
Prospective Ore below 5th Level	100,000	187,500	50,000	62,500	400,000
Grand Total developed and prospective Ore,	200,660	620,480	98,000	238,480	1,157,620

The estimate of ore in sight on December 31st. 1917, was 757,620 tons as compared with 853,320 tons on December 31st. 1916. This shows an increase of 119,526 tons, if the hoist of 1917 is deducted from the estimate of December 31st, 1916. The actual decrease in developed ore was only 95,700 tons in 1917. The prospective ore estimated below the 5th is the same as shown in 1916, which is the amount used by the State Tax Commission. The development work of 1917 did not yield any additional information in regard to the prospective ore. The work in detail for the year is as follows:

THIRD LEVEL:

There was no work done on or above the 3rd level during the past year.

On the sub levels below the 3rd the work for the year was confined to the 2nd and 3rd subs at the extreme south-east end of the deposit. The 2nd sub was being developed here at the close of 1916. In 1917 a drift was driven

from the East side of the raise in ore a distance of 50 feet to the south-east, at which point the ore pinched out, after which it was all mined out up to the hanging, which completed the work on this sub level. The contract was then moved down 14 feet in the raise and the 3rd sub opened in this territory. The ore proved to extend only about 50 feet on each side of the raise and at the end of the year the greater part of the ore on this sub had been mined.

FOURTH LEVEL:

The work on the 4th level was also confined to the south-east end of the deposit. The main haulage drift here was extended to the East 80 feet, at which point it struck the ore. It was continued 20 feet in first-class ore and stopped in lean ore. A foot-wall drift was then started to the north-east along the contact, but the ground proved to be so heavy that the drift had to be abandoned. Considerable time was spent here in attempting to continue this drift, but it was impossible to hold the ground. There was a great deal of water in the ore, which was very soft, and it proved to be impossible to prevent it from running. On abandoning the haulage drift it was decided to mine this ore body from the top of the last raise put up to this elevation from the 5th level. When the mine was closed on December 4th this drift had been extended 200 feet to the East in ore at the elevation of the 4th level, and cross-cuts driven at various points. One cross-cut had been driven near the East end of this drift, 50 feet to the West, at which point it holed to the main 4th level haulage drift. This permitted timber to be brought in and also provided a second outlet for the men. It is planned to continue work here and completely mine this deposit on and above the 4th level. It is estimated that there was 107,900 tons of ore in sight between the 4th and 3rd level on December 31st. 1917, the greater part of which is in the pillars left near the shaft.

On the 1st sub below the 4th level the work for 1917 was confined to mining some of the pillars left on this sub level. The ore now remaining

on this sub level consists of two pillars - one of which has been left in the extreme south-west end of the deposit near the Section 29 boundary line containing about 20,000 tons, which pillar could not be mined as it is beneath the stockpile grounds; the other pillar has been left to protect the haulage road at the end of the main cross-cut from the shaft. This latter pillar contains about 36,000 tons.

2ND SUB BELOW THE 4TH:

The greater part of the product from the Stephenson Mine has been obtained from the 2nd sub below the 4th level during the past year. In the early part of the year there were 21 contracts breaking ore on the south-east side of the deposit, and 11 on the south-west side, a total of 32 contracts. During the year the greater part of the ore was removed from this sub level, and at the last of the year only a few contracts were working here. The estimated ore left on this sub level on December 31st, 1917, amounted to 77,900 tons. The greater part of this ore is in two large pillars - one at the extreme south-west end of the deposit containing about 10,000 tons, which is not available for mining, as it is beneath the stockpile ground; the other pillar is located just south-east from the cross-cut in the shaft, and has been left to support the haulage drift - this pillar contains about 42,500 tons.

3RD SUB BELOW THE 4TH:

During the past year this sub level was developed, and on the south-east side of the deposit the greater part of the ore has been mined between No. 5 and No. 7 cross-cuts on the 5th level. There were seven contracts breaking ore on this part of the sub level at the time the mine was forced to close down. On the south-west side the hanging wall drift on the sub level was extended 180 feet to the North. The work on this side of the sub level was principally confined to mining operations on the foot side of the sub between Nos. 3 and 5 cross-cuts on 5th level. There still remains a large amount of ore to be mined on this sub level.

4TH SUB BELOW THE 4TH:

The work on this sub level was confined to the south-east side of the

deposit where a sub level was opened from raises put up from the 5th level hanging wall drift; also from raises located on the side of the main haulage drift. In this particular part of the deposit the greater part of the ore has now been mined out between the foot and hanging, the area actually mined is relatively small. Mining was done here principally in order to open more ground under the hanging in an effort to draw the water away from the ore on the 3rd sub; this being the plan now generally followed at the Stephenson Mine.

FIFTH LEVEL:

The work on the 5th level was confined to driving two cross-cuts to the North from the hanging wall drift and extending the main haulage drift on the south-east side of the level. This level had been previously developed, so that there was relatively little work necessary here during 1917. The estimated ore in sight between the 5th and 4th level on December 31st, 1917, was 643,300 tons.

SIXTH LEVEL:

During the past year development work has been continued steadily on the 6th level, both on the Stephenson and Section 29 properties. On the south-east side of the 6th level the main haulage drift was extended 70 feet to the south-east, at which point it crossed the boundary line on to the C. & N. W. Lease, Section 29. One cross-cut was started in 1917 at a point about 100 feet North-west of the boundary and extended 115 feet to the north-east. The extension of the main haulage drift on the north-east side of the level was started late in the year. It is planned to develop the 6th level by two main haulage roads - one on the south-west side of the ore body and one on the south-east side. These two haulage drifts will be connected by cross-cuts about 175 feet apart. In this way two main haulage drifts will be available, one on each side of the Stephenson ore body; they are located in the foot-wall below the ore body. A number of raises have been started from the side of the main haulage drift, as well as from cross-cuts. These are being put up in rock above the 6th and none as yet have been extended through to the 5th level. This work is

being done, however, preliminary to the development of the ore body below the 5th level.

The excavation for the 6th level pump house was completed in 1917, concrete foundations were then installed and the pump erected. This pump went into commission in September. The sump on the south-east side of the pump house was enlarged and a sump drift driven from a point opposite the pump house 100 feet to the north-west, at which point an incline was put up and holed to the main 6th level cross-cut. It has been necessary to operate this pump only a few hours each day to handle the water.

STEPHENSON SURFACE.

A number of improvements were made during the past year in the Stephenson Dry. The hospital room has been closed in and the walls plastered, after which they were given three coats of enamel paint. The floors have been painted and up-to-date equipment installed. It is now possible to keep the hospital room clean at all times. The shift bosses' rooms has also been improved by the installation of lockers and shower baths. The latter part of the year an addition was built to the rear of the dry to provide space for toilets. The building has been completed, but there still remains some work to be done on the plumbing.

A brick oil house has been built, but the equipment has not been installed owing to the closing down of the mine.

A tunnel has been driven through the approach to the coal dock under the railroad tracks to facilitate the handling of mine timber and lagging. Heretofore all timber and lagging unloaded on the North side of the dock had to be teamed around the dock to the timber tunnel. It is now trammed and dumped directly down in the tunnel - one man doing the work of a team and helper.

In order to prepare for handling the product during the winter of 1918, six bents were erected on the C. & N. W. No. 2 stocking trestle; two double bents and 22 single bents were erected for stocking the Stephenson and Section 29 Bessemer ore and 33 double bents were put up for stocking Stephenson and Stephenson No. 2 grades. Only a small amount of ore has been stocked, as the mine did not operate more than a month after the closing of the shipping season.

FLOODING OF STEPHENSON MINE.

On the morning of the 4th of December, it was noticed that the pillars on the 2nd sub level at the south-west side of the Stephenson Mine near the C. & N. W. Lease, were taking weight. When the men went back to work after the dinner hour it was noticed that considerable water was coming in on the sub level from the territory that had shown signs of taking weight in the morning. The situation was considered dangerous and all the men were withdrawn from this territory. Preparations were made for increasing the pumping capacity by starting up a steam pump on the 4th level. The main pumping plant on the 5th level, which handled about 3000 gallons of water per minute, was not quite able to hold the water during the afternoon of the 4th. There was no general change in conditions until about 2:00 A.M., on the 5th, at which time there was a sudden increase in the amount of water coming in. Temporary dams were thrown up in the 5th level drifts in an effort to keep the water away from the shaft, but they merely succeeded in damming the water back for a short time on the 5th level, the water overflowing and running down the drift to the shaft, causing the 6th level to start to fill. Before this occurred one of the steam pumps on the 4th level was in operation - the total pumping capacity of the two plants being approximately 3700 gallons per minute. Throughout the day of December 5th the inrush remained constant, there being no further change until about 2:30 A. M. December 6th, when there was another sudden increase. The pumping plants were working steadily and bailers had been installed, so that there was approximately 4,800 gallons per minute being pumped. This seemed to make absolutely no impression on the incoming water, which continued to rise steadily at the rate of from 6 in. to 1 ft. per hour. The mine continued to fill until the water reached a point 20 feet below the 4th level, when it became absolutely necessary to abandon the 5th level pumping plant. The water was leaking into this plant

through the concrete seals, and even through the pillar left between the pump house and the haulage drift. Investigation showed that the pump house was filled by the water leaking in within thirty minutes after the pumps were stopped. After the loss of the 5th level pumping plant there was approximately 1500 gallons per minute being handled by the steam pump on the 4th and the bailers. Preparations were made for starting the other two steam pumps on the 4th, as soon as the water reached the 4th level; in the meantime the work of putting in a new 8" discharge line had been pushed and this work was soon completed. A small electric pump of 500-gallons capacity had been installed on the 4th, but it was considered impossible to stop the water after the loss of the 5th level pump house, and the small electric pump was removed.

Two thick concrete dams were put in between the Austin and Stephenson in an effort to keep the water out of the Austin, but they were not successful, as the water entered the Austin through the caved ground, connecting the two properties. On December 9th the water reached the elevation of the 4th level, and the two steam pumps, which had been idle due to lack of water at the suctions were started up which, together with the other steam pump and the bailers gave a combined capacity of approximately 4,000 gallons of water per minute. These pumps continued operating for approximately 5-1/2 hours, by which time the water had risen to a point seven feet above the 4th level and drowned out the pumps. During this period of 5-1/2 hours the water rose at the rate of 17 in. per hour, in spite of the fact that there was an additional pumping capacity of 2,500 gallons per minute during this period. It is evident that the amount of water pumped represented only such a small portion of the total amount coming in, that it had no appreciable effect on the inflow. Up to the 15th the water rose approximately 12 in. per hour. From the 15th on there was a gradual decrease in the rate of inflow. Two Prescott sinkers of approximately 700 gallons capacity were installed on the 1st level, and suctions extended down the shaft. A blower was also installed in the new 8 in. discharge column in the shaft, which went into commission on December 17th.

The water reached the elevation of the 1st level at 11:30 P. M. December 17th. The two Prescott pumps were operated for 6-1/2 hours, but as they made no impression on the inflow, it was decided to remove them, as they would be useful when the work of unwatering actually started. The water continued to rise more slowly all the time; on December 31st, it had reached a point 139 feet below the collar of the shaft - the rise in the last 48 hours being at the rate of 1.4 in. per hour.

It has been attempted to keep the water out of the Austin by pumping from the 5th level, but it was impossible to hold it and these pumps were taken out of the mine. Another attempt was made on the 3rd level, but it was also unsuccessful, and the pumps were removed. For a short time the water was 20 feet or more higher in the Stephenson shaft than in the Austin, but later on the elevation of the water became the same, and has continued the same since.

The sudden inflow of water in the Stephenson Mine was probably due to the settlement of large masses of hanging, which settlement broke into a crack or crevise which connected with the sand. There has been absolutely no disturbances on surface and the water entering the mine has been perfectly clear. From this fact it is safe to assume that the cave did not extend entirely through to surface. The ledge at the point where the water now comes in, is considerable deeper than at the point where the capping had previously broken. Diamond drilling in this territory indicates that there is a basin here; in other words, there is a depression in the ledge which forms a natural basin here. The most reasonable supposition in regard to the source of the water seems to be that it is coming from this basin. The drill holes show sand-stone at the ledge, which probably carries 25 or 30% water. The sandstone may also have acted as a filter for the water coming from surface, which would account for the clearness of all the water coming into the mine.

In order to recover the mine it will be necessary to have a large pumping equipment. The water can be pumped through the Stephenson shaft and through the Austin No. 1 and 2 shafts. This will give opportunity for the installation of a numbere of pumps, which will be needed for this work. It is

probable that it will be possible to lower the water a certain distance after which it will be lowered very slowly, during the time that is required to drain the basin. As soon as the basin has been drained, the big inflow will decrease, but it is probable that the incoming water will be considerably greater than it has been heretofore. Calculations, based on an inflow of 2,000 gallons per minute, in relation to the average rain fall in this section indicate that it has required a drainage area of three square miles to produce the normal water pumped during the past year at the Stephenson. If the point of the new break of the capping is 50 feet lower than the old break, it can readily be seen that the gradient line might include five square miles of territory from which it might be inferred that it will be necessary to pump anywhere from 3000 to 5000 gallons per minute to hold the incoming water, after the basin is emptied. It must be borne in mind that there is a possibility of some underground connection with the river, or some underground water course, in which case the recovery of the mine would be impossible.

Every conceivable effort to save the mine was made with the equipment available, but it was impossible, owing to the tremendous volume of water coming in. It is probable that from 10,000 to 20,000 gallons per minute is a conservative estimate of the rate of inflow. It is important to keep the water down as far below the collar of the shaft as possible, owing to the possibility of sand coming into the mine from the old sand caves, when the water is lowered again.

FATAL ACCIDENT - STEPHENSON MINE.

I regret to report that a fatal accident occurred at the Stephenson Mine on December 8th, 1917, in which James Dally, a pipeman, was instantly killed. Dally was a married man, aged 28.

In order to provide additional facilities for pumping. it had been decided to put in an 8" discharge column in the Stephenson shaft from the 4th level to surface. Dally was one of a crew of pipemen engaged on this work on the night of December 7th. The pipe had been installed from the 4th level to a point above the 1st. The men rode from the 1st level to surface and then followed the pipe down by climbing the ladder road. There was no signal system on the 1st level, but there was an electric signal system on the 2nd level which was used by the cage rider. The men on the 1st called down to him when they were ready to use the cage.

At the time of the accident the cage had come to the 1st level and the head pipeman got on. Dally was in the act of stepping on the cage when it was hoisted, causing him to fall back into the shaft. The accident was due to the carelessness of the cage rider in not allowing sufficient time for the pipemen to get on the cage, and in not being certain that his signal was understood. He should also have lowered the cage back to the 2nd level instead of giving the signal to hoist.

STEPHENSON MINE.

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA	MANG.
Stephenson Bessemer,	61.29	.051	6.26	
Stephenson,	61.66	.279	4.00	1.002
Stephenson No. 1,	61.22	.068	5.70	1.038
Stephenson No. 2,	60.07	.768	3.94	1.019

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR-1917.

	Mine				Lake Erie	
GRADE	IRON	PHOS.	SILICA	MANG.	IRON	MOIST.
Stephenson No. 2,	60.94	.730	3.63	1.009	60.75	15.25

ORE STATEMENT - DECEMBER 31ST,1917.

	STEPHENSON BESSEMER	STEPHEN-SON.	STEPHEN-SON No.1	STEPHEN-SON No.2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	10,736	19,175	0	305,122	335,033	425,447
Output for Year,	31,958	103,418	17,006	49,409	201,791	261,832
Stockpile Overrun,	962	12,473			13,435	2,918
Total,	43,656	135,066	17,006	354,531	550,259	690,197
Shipments,	39,656	122,066	17,006	283,413	462,141	355,164
Balance on Hand,	4,000	13,000	0	71,118	88,118	335,033
Decrease in Output-19%					49,524	
Decrease in Ore on Hand,					246,915	

1917 - 1-8 Hr. Shift Jan. 1st to Dec. 5th - Mine filled with water

1916 - 1-8 Hr. Shift.

STEPHENSON MINE

STEPHENSON MINE

SHIPMENTS FOR YEAR - 1917.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR	
Stephenson Bessemer,	27,620	12,036	39,656	43,226	
Stephenson,	33,777	88,289	122,066	109,777	
Stephenson No. 1,	5,997	11,009	17,006	17,246	
Stephenson No. 2,	31,683	251,730	283,413	184,915	
Total,	99,077	363,064	462,141	355,164	
Total last Year,	111,883	243,281	355,164		
Increase - 30%			106,977		

462141 ou 29
34571
496712

355164
13575
368739

STEPHENSON MINE.

STEPHENSON MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	253,266	303,562		50,296
General Expense	.154	.125	.029	
Maintenance	.134	.125	.009	
Mining Expense	1.148	.964	.184	
Cost of Production	1.436	1.214	.222	
DEPRECIATION.				
Original Purchase	.001	.002		.001
Plant Account	.008	.055		.047
Equipment	.005	.004	.001	
Uncompleted Construction	.008	.013		.005
Total Depreciation	.022	.074		.052
Taxes	.098	.052	.046	
Central Office	.060	.048	.012	
Supply Inventory		.002		.002
Miscellaneous	.052	.034	.018	
Sundry Expense	.008	.014		.006
Cost on Stockpile	1.676	1.438	.238	
Loading & Shipping	.129	.053	.076	
Total Cost on Cars	1.805	1.491	.314	
No. Days Operating	282	298		16
No. Shifts and Hours	1-8hr	1-8hr		
Avg. Daily Product	898	1019		121
COST OF PRODUCTION.				
Labor	.919	.755	.164	
Supplies	.517	.459	.058	
Total	1.436	1.214	.222	

STEPHENSON MINE.

COMPARATIVE WAGES AND PRODUCT.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	253,266	303,562		50,296
No. Shifts and Hours	1-8hr	1-8hr		
AVERAGE NUMBER MEN WORKING				
Surface	50	58		8
Underground	144	178		34
Total	194	236		42
AVERAGE WAGES PER DAY				
Surface	3.31	2.75	.56-20.4%	
Underground	3.95	3.21	.74-23 %	
Total	3.78	3.10	.68-22 %	
WAGES PER MO. OF 25 DAYS				
Surface	82.75	68.75	14.00	
Underground	98.75	80.25	18.50	
Total	94.50	77.50	17.00	
PRODUCT PER MAN PER DAY				
Surface	15.96	17.04		1.08
Underground	5.73	5.67	.06	
Total	4.22	4.25		.03
LABOR COST PER TON				
Surface	.207	.162	.045	
Underground	.688	.566	.122	
Total	.895	.728	.167	
AVG. PRODUCT BRK'G & TRM'G	10.84	9.72	1.12	
" WAGES CONTRACT MINERS	4.19	3.35	.84	
" " " TRAMMERS	0	0		
" " "" LABOR	4.19	3.35	.84	
TOTAL NUMBER OF DAYS				
Surface	15,860	17,811¼		1,951¼
Underground	44,144	53,528¾		9,384¾
Total	60,004	71,340		11,336
AMOUNT FOR LABOR				
Surface	52,428.11	49,044.44	3,383.67	
Underground	174,324.65	171,727.39	2,597.26	
Total	226,752.76	220,771.83	5,980.93	

Proportion Surface to Underground Men;
1917 - 1 to 2.9
1916 - 1 to 3.07
1915 - 1 to 2.73
1914 - 1 to 2.88
1913 - 1 to 3.13
1912 - 1 to 4.69

STEPHENSON MINE.

STEPHENSON MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31, 1917.

KIND.	LINEAL FEET.	AVG.PRICE PER FOOT.	AMOUNT 1917.	AMOUNT 1916.
6" Cribbing Timber	22,933	.0163	374.76	
6" to 8" Stull Timber	3,644	.0208	75.74	99.36
8" to 10" "	60,656	.0412	2502.04	3643.24
10" to 12" "	62,356	.0615	3836.29	3551.59
12" to 14" "	15,352	.0839	1287.64	1027.38
Total 1917	164,941	.0490	8076.47	
Total 1916	179,706	.0463		8321.57
	LINEAL FEET.	PER 100'		
5' Lagging	474,300	.496	2354.23	2995.45
7' "	1,015	.249	2.53	14.70
8' "	479,184	.531	2544.67	3344.00
Total Lagging(1)	954,499	.515	4901.43	6354.15
Poles	120,404	.923	1111.73	1510.95
Total 1917	1,074,903	.559	6013.16	
Total 1916	1,493,663	.550		8218.63
Product for Year			253,266	303,562
Feet Timber per ton of Ore			.651	.592
Feet Lagging " " (1)			3.77	4.23
Feet Lagging per ft. of Timber			5.79	7.14
Cost per ton for Timber			.0319	.0274
" Lagging			.0193	.0209
" Poles			.0044	.0062
" Timber, Lagging, Poles			.0556	.0545
Equivalent of stull timber to Board Measure			381,548	.397,385
Feet Board Measure per ton of ore			1,506	1,309
Total cost for Timber, Lagging & Poles		1917		14089.63
"		1916		16540.20
"		1915		9643.88
"		1914		12362.13
"		1913		15053.54
"		1912		11897.82
"		1911		9696.65
"		1910		7855.24
"		1909		5428.62

STEPHENSON MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANRITY.	AVERAGE PRICES.	AMOUNT 1 9 1 7.	AMOUNT 1 9 1 6.
30% Powder	23,531	.1508	3548.14	34.50
40% "	35,275	.1795	6331.06	5311.04
50% "	1,275	.2436	310.53	660.65
80% Red Cross				28.85
80% Gelatin	250	.3015	75.38	266.66
Total Powder	60,331	.1701	10265.11	11939.55
Fuse	195,600	.632	1236.26	1353.22
Caps	49,000	1.284	629.16	882.74
Cap Crimpers	53	.437	23.15	13.38
Total Fuse,Etc.			1888.57	2251.79
Total All Explosives			12153.68	14191.34
Product			253,266	303,562
Pounds Powder per ton Ore			.238	.288
Cost per ton for Powder			.0405	.0393
" " " Fuse, Caps, Etc.,			.0075	.0074
" " " All Explosives			.0480	.0467
Avg. Price per lb. for Powder			.1701	.1367

Mine idle since Dec. 4, 1917, account flooded with water.

STEPHENSON MINE.

C. & N. W. LEASE, SECTION 29.

The product for the year was as follows:

		PERCENT
Bessemer,	10,694 tons	28
Off-Grade Bessemer,	2,864 "	8
Section 29 No. 2,	24,500 "	64
TOTAL,	38,058 "	100

The 1917 shipments and balance on hand December 31st, 1917, were as follows:

	SHIPMENTS. TONS.	BALANCE ON HAND. TONS.
Bessemer,	20,343	1,394
Off-Grade Bessemer,	2,896	
Section 29 No. 2,	11,286	27,312
TOTAL,	34,525	28,706

The estimated ore in sight December 31st, 1917, was as follows:

	BESSEMER	OFF-GRADE BESSEMER	SECTION 29 NO. 2	TOTAL.
Ore above 5th Level,	5,700	1,900	15,200	22,800
" below 5th "	6,990	2,320	18,630	27,940
Prospective ore below 5th Level,	103,500	34,500	276,000	414,000
TOTAL,	116,190	38,720	309,830	464,740

The estimate of 1917 shows an increase of approximately 15,000 tons in the amount of ore in sight, due almost entirely to a small amount of ore which has been developed below the 5th level. No change has been made in the estimate of prospective ore below the 5th, as the development work of 1917 did not advance far enough to permit of a more accurate estimate. Some changes have been made in the grade of the ore in the estimate as compared with the previous year, which changes have been the result of additional information gained during 1917.

The work for the year was confined to the development work on the 5th level, and to mining operations on the 5th and the sub levels above. At

the close of 1916 the greater part of the ore had been mined down to the sill floor of the second sub below the 4th. The work for the year in detail is as follows:

SUB LEVELS ABOVE THE 5TH:

2nd Sub above the 5th:

The balance of the ore left on this sub level on January 1st, 1917, amounting to about 2500 tons, was mined out in the early part of the year.

1st Sub above the 5th:

This sub level was developed during 1917 and the greater part of the ore mined out; there is about 4200 tons left in the pillars remaining here.

FIFTH LEVEL:

The 5th level ore body on Section 29 was developed from three raises which were put up from the 6th level. These raises were connected at the elevation of the 5th and a connection also made to the 5th level haulage drifts. Drifts were then driven from these raises across the ore body to the hanging and mining started. The development work had all been completed and mining was in progress here at the time the mine was flooded. It is estimated that there are 18,500 tons of ore remaining in the pillars here.

SIXTH LEVEL:

The main 6th level haulage drift crossed the Stephenson boundary line the last of January, 1917, and the work of extending this drift on C. & N. W. property was continued throughout the year. The drift was extended 530 feet to the south-east in arkose to the contact of the ore formation. At this point a curve was started to the north-east which, up to December 4th, had been extended 100 feet in jasper and lean ore. The last day that work was done here ore was encountered in the bottom of the drift dipping to the south-west, so that apparently the drift had just reached the main ore body on the 6th level.

During the year four raises have been put up from the side of the main haulage drift near the Stephenson boundary. These raises have all been

extended through to the 5th level and the ore mined on the sill floor of the 5th was handled through three of these raises. The ore in these raises was encountered near the elevation of the 5th level. The result of the work here indicates that the foot-wall on the South side of the ore body runs more nearly parallel to the boundary line than had been expected. This may result in a decrease in the tonnage expected in this territory, but the work has not advanced far enough to permit of any information on this question, except at the point where the raises were put up.

During the year three cross-cuts were turned off from the main haulage drift on Section 29 property; cross-cut No. 1 is located 70 feet from the boundary and was extended 30 feet to the north-east. Cross-cut No. 2 is located 230 feet from the boundary and was extended 35 feet to the north-east and cross-cut No. 3, located 390 feet from the boundary, was extended 8 feet.

The work of opening the 6th level has advanced to such a point that the ore body can now be quickly developed. The information which will be obtained from this work will be very vaulable, for both the Stephenson and Section 29 properties. It had been planned to make a rapid development of the ore body at the elevation of the 6th level on Section 29 property and start mining here. From the records of the drill holes it seemed probable that the greater part of the ore was of Bessemer grade, and it was hoped to develop the ore so that a considerable tonnage would be available here during the shipping season of 1918. It is now impossible to predict when work can be resumed here, as no idea can be formed of how long it will require to unwater the mine.

C. & N.W. SECTION 29 MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA	MANG.
Section 29 Bessemer,	59.72	.050	8.32	.630
Section 29,	58.21	.073	10.36	.680
Section 29 #2,	59.75	.170	7.07	.685

Above grades went into mixed cargoes.

ORE STATEMENT - DECEMBER 31ST, 1917.

	SEC. 29 BESSEMER	SEC. 29	SEC. 29 NO. 2	TOTAL	TOTAL LAST YEAR
On hand Jany. 1st, 1917,	11,043	0	14,194	25,237	0
Output for Year,	8,286	2,846	24,500	35,632	38,812
Overrun,	2,408			2,408	
Total,	21,737	2,846	38,694	63,277	38,812
Shipments,	20,343	2,846	11,382	34,571	13,575
Balance on Hand,	1,394	0	27,312	28,706	24,237
Decrease in Output-2%				772	
Increase in Ore on Hand,				4,469	

1917 - 1-8 Hr. Shift to Dec. 5th - Mine flooded

1916 - 1-8 Hr. Shift - Began hoisting January 20th, 1916.

C. & N. W. SECTION 29 MINE.

C. & N. W. SECTION 29 MINE

SHIPMENTS FOR YEAR-1917

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Section 29 Bessemer,	5,876	14,467	20,343	1,511
Section 29,	2,397	449	2,846	1,764
Section 29 No. 2,	3,806	7,576	11,382	10,300
Total,	12,079	22,492	34,571	13,575
Total last Year,	13,575		13,575	
Increase - 155%			20,996	

PRINCETON MINE.

In the early months of 1917 there were three men employed underground at the Princeton Mine doing repair work on the 5th and 6th levels. In April, when the Austin Mine started up again, this crew was reduced to two men, who continued to work here for the balance of the year. There was a daily inspection made of the important drifts, props being put in whereever necessary. The water has been kept out of the mine - one pumpman being employed for this work. Some ore was obtained from repair work - the total for the year being 443 tons.

The work of preparing for re-opening the mine was started early in December, after the Stephenson Mine was flooded. Up to December 15th there were regular charges for "Idle Expense" but after December 15th this account was dropped and all charges were made against "Re-opening".

The work of repairing the surface equipment was started about the middle of December with a large crew of men from the Stephenson Mine. The first important work consisted of installing a motor for the hoist, so that material could be taken into the mine. Temporary repairs were made to the 150 H.P. motor which had burned out on the Austin hoist last spring, this motor being temporarily installed at the Princeton. This motor was used until the last of the month, by which time the Austin Mine had been drowned out, after which the 200 H.P. motor which belonged to the Princeton hoist was moved from the Austin and installed at the Princeton in place of the 150 H.P. motor. While this work was being done the pulley stands were repaired and the sheaves at the top of the shaft house raised 18 inches.

The work of repairing the shaft between the 4th and 5th level, where several of the steel sets had buckled, was completed before the end of the month. The greater part of these sets were removed and replaced by timber sets spaced one foot apart. This increased the strength very materially, so that no further

trouble at this point is anticipated. Eleven stocking bents were erected on the Cambridge stockpile ground, which will be sufficient for a short time. Timber is now being framed for the stocking trestle North of the shaft for the Princeport grade. The top tram equipment was not yet in operation at the end of the year, and the rock and ore coming from the mine was handled by hand tramming.

As soon as the shaft had been repaired so that the cage could be operated, a crew of men started to work installing motor haulage tracks on 6th level. There was a section of the 6th level drift, about 400 feet in length, which had not been equipped for motor haulage at the time the mine closed down in 1913.

A crew of men was started on the 5th level where it was decided to drive a new drift in the ore near the foot-wall, instead of repairing one of the old drifts, which had caved. It would be possible to make faster head-way by driving a new drift than by re-timbering the old drift. At this is the point from which the first product would be obtained, this work is being done on three 8-hour shifts in order to speed it up.

No attempt will be made in this report to outline the work which will have to be done before the Princeton Mine is in condition for producing a good product. The work thus far is only the preparatory work, however, and it will require nearly all of 1918 to complete it. The programme of new work when completed will make it possible to mine the ore left in No. 1 shaft pillar, also to open the ore body on C. & N. W. Lease, Section 19, as well as to open the main Princeton ore body on 6th and 7th levels. This will result in the development of a large territory, and it is hoped, will permit of the production of an ore of better physical character than has been possible in the past.

The re-opening work in December was handicapped by the fact that more men were employed than could be worked to the best advantage, but it was very important to keep all the men from the Stephenson and Austin Mines employed so that they would not leave the district. Some ore was obtained from the re-

opening work on the last day of the year, the product amounting to forty-nine tons.

During the year, 150,375 tons of Cambridge ore was shipped from the old pile at the Princeton Mine. A careful estimate was made of the ore remaining in stock from which it developed that there was a shortage of 1,598 tons. This old Cambridge pile was made prior to 1913, so that it had been standing at least five years. The shortage was undoubtedly due to the ore carried away from the pile by melting snow and heavy rains. There is over a 1/2 inch of ore over a considerable area in a field two hundred or more feet from the pile.

PRINCETON MINE

AVERAGE MINE ANALYSIS OF OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA	MANG.
Cambridge #2,	57.47	.397	10.33	.895

Above grade went into mixed cargoes.

ORE STATEMENT - DECEMBER 31ST,1917.

	CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On Hand January 1st, 1917,	154,938	154,938	154,793
Output for Year,	492	492	145
Stockpile Shortage,	1,598	1,598	
Total,	153,832	153,832	154,938
Shipments,	150,375	150,375	0
Balance on Hand,	3,457	3,457	154,938
Decrease in Ore on Hand,		151,481	

Mine idle during 1916 ' 1917.

PRINCETON MINE.

PRINCETON MINE.

COMPARATIVE WAGES AND PRODUCT.

	1917.	1916.	INCREASE.	DECREASE.
PRODUCT	-	145		
No. Shifts and Hours	1-8hr	1-8hr		
AVERAGE NUMBER MEN WORKING				
Surface	4	3½	½	
Underground	4	4½		½
Total	8	8		
AVERAGE WAGES PER DAY				
Surface	3.31	2.83	.48-16.96%	
Underground	4.04	3.49	.55-15.76%	
Total	3.70	3.20	.50-15.63%	
WAGES PER MONTH OF 25 DAYS				
Surface	82.75	70.75	12.00	
Underground	101.00	87.25	13.75	
Total	92.50	80.00	12.50	
TOTAL NUMBER OF DAYS				
Surface	1,146¼	1,158		11¾
Underground	1,302¾	1,455½		152¾
Total	2,449	2,613½		163½
AMOUNT FOR LABOR				
Surface	3,799.99	3,277.12	522.87	
Underground	5,261.13	5,078.18	182.95	
Total	9,061.12	8,355.30	705.82	

Proportion Surface to Underground Men:

1917 - 1 to 1
1916 - 1 to 1.29
1915 - 1 to 1.25
1914 - 1 to 1.31
1913 - 1 to 3.13
1912 - 1 to 4.69
1911 - 1 to 4.18

Mine not producing since 1913.

GWINN MINE.

The Gwinn Mine was operated on two 8-hour shifts from January 1st to July 15th, and on one 8-hour shift from January 15th to December 9th, after which it was again operated on two 8-hour shifts for the balance of the year.

The product for the year was as follows:

	TONS.	PERCENT.
Gwinn Bessemer,	50,042	31
Gwinn No. 2,	111,921	69
TOTAL ORE,	161,963	100
Rock,	29,315	
TOTAL HOIST ORE AND ROCK,	191,278	

The increase in production of 17,897 tons in 1917 is due principally to more gangs mining ore and less rock work. The territory from which the ore was obtained in 1917 was considerably larger than in 1916; in other words, the ore was obtained from more levels than in the previous year. In the early part of the year there was a very large amount of development work under-way, later in the year this work had largely decreased, and a larger product was obtained. The cost of the product from the Gwinn Mine continued to be higher than in the other soft ore mines operated by the company. The reasons for this may be briefly stated as follows: First, the thin deposit, second, the small areas that can be mined due to the fact that only every other level is available for mining, third, the semi-hard character of the ore, placing it in a class between the soft and hard ores, fourth, practically twice as much development work for each ton of ore produced due to mining on alternate levels.

The monthly output of Bessemer ore showed a wide variation. The steeper pitching parts of the ore body, i. e., the upper part of the area which has been mined above the 5th level, the area now being mined between the 6th and 7th levels and the ore developed on the 10th level, contain a large percentage of Bessemer ore, while the flatter deposits, of which the main 8th level deposit is the best example, contain practically no Bessemer. The amount of

Bessemer is, therefore, dependent on the territory where mining is being carried on.

The shipments for 1917 and balance of ore in stock are as follows:

	SHIPMENTS. TONS.	BALANCE ORE IN STOCK. TONS.
Gwinn Bessemer,	52,615	17,095
Gwinn,	31,563	
Gwinn No. 2,	103,890	58,083
TOTAL,	188,068	72,178

The ore in sight at the Gwinn Mine on December 31st, 1917, was 801,390 tons. This shows that during the past year there has been approximately 280,000 tons of ore developed. The estimate of ore in sight is as follows:

	BESSEMER	GWINN	GWINN #2	TOTAL
Ore above 5th Level,	7,460	7,465	14,925	29,850
" " 6th "	42,675	42,675	85,350	170,700
" " 7th "	7,500	7,500	30,600	45,600
" " 8th "	35,500	35,500	142,040	213,040
" " 9th "	16,490	16,490	98,940	131,920
" " 10th "	36,000	17,360	106,720	160,080
TOTAL ORE,	145,625	126,990	478,575	751,190
Prospective Ore below 10th Level,	8,370	8,370	33,460	50,200
GRAND TOTAL,	153,995	135,360	512,035	801,390

Of the ore remaining in the mine, it is estimated that approximately 20% is Bessemer ore; 20% Gwinn Ore and 60% Gwinn No. 2. As in previous years no estimate has been made of the ore above the 4th level, as this ore has not yet been developed by drifts or raises, also because it is not considered probable that this ore can ever be mined, even if it was developed.

In 1916 it was estimated that there was 84,000 tons of prospective ore below the 9th level. Development work of the past year has permitted of a fairly accurate estimate being made of this territory, which shows 160,000 tons here. In the territory below the 10th, it is estimated that the ore will have a depth of 50 feet and an area equal to the present area on 10th level, which gives a tonnage of 50,200 tons of prospective ore in this territory. No ore is estimated in the territory West of the developed ore body on the 9th

level, where two diamond drill holes from the 8th show merchantable ore. This territory has been developed by a drift on the 9th level, which indicates that the deposit is extremely flat, and that the drill holes may have merely followed followed a narrow seam in the formation. On the whole, the work of the past year at the Gwinn Mine has been favorable from the stand-point of the development of additional ore. The area of the ore on the 10th level, while not absolutely determined, seems fairly accurate, but there are still possibilities here yet which have not been finally determined. It is possible that a larger tonnage will eventually be proven up, which would in turn, indicate a larger tonnage at greater depth. The work in detail for the year is as follows:

FOURTH LEVEL:

No further work has been done on the 4th level during 1917. The tracks which had been laid in the drift which was driven the length of the ore body in 1916 have been removed, and used on lower levels. This drift is being kept open in order that examinations can be made of the stopes above the area which was being mined on the 5th level. It was very important that these stopes be examined periodically in order to determine the manner in which they were being filled by caved material; also to give accurate information of the height to which the cave is extending. As long as the regular sub-level mining was in progress on the 5th level, the back was continually caving and the stope being filled. When preparations for mining the 5th level sill floor was started by drifting from raises put up from the 6th level, the caving stopped, and up to the close of the year there had been no changes in these stopes. The highest stope now probably extends up to the elevation of the 3rd level, and as far as can be determined, has filled itself within 10 feet of the back. The stopes further to the West, in the territory beneath the channel of the river, have only caved a short distance above the 4th. The ground here has broken in very large masses, leaving numerous openings between, with the result that the stopes are practically filled to the back. The breaking of the hanging at the Stephenson Mine, followed by the flooding of the mine, has emphasized very forcibly the danger connected with mining operat-

ions in this district. The contracts have been taken from the 5th level to the lower levels, and it is now planned to stop all mining at this elevation. The fourth level drift will be kept in repair, in order that examinations can be made of the stopes.

SUBS ABOVE THE 5TH LEVEL:

At the close of the year 1916 all of the ore had been mined to the sill floor of the 3rd sub above the 5th, and in one part of the deposit to the sill floor of the 2nd sub, except in the extreme West end of the deposit. During the year 1917 the remaining ore has been removed on the second sub, over the entire deposit, and all of the ore mined on the first sub above the 5th, over about half the deposit. It will not be possible to mine the ore on the other half on the first sub until the ore on the sill floor of the 5th has been mined at the extreme West end of the deposit. As the ore areas decreased above the 5th, it was necessary to take the gangs and move them to the 8th level, so that throughout the year there has been a gradual decrease in the output of ore from the 5th level.

FIFTH LEVEL:

During the year, three raises have been put up from the 6th level to the elevation of the 5th, and cross-cuts driven from the tops of these raises to the North until they holed to the main 5th level haulage drift. These raises were put up in order to mine the ore on the sill floor of the 5th and in preparation for later mining the pillar between the 5th and 6th. By the end of the year drifts had been driven along the hanging to outline the West half of the 5th level ore body, and some mining had been done at the extreme West end of the level. As stated before, in this report, the work on the sill floor of the 5th level has been stopped and the gangs moved to the lower levels. This change being made since the flooding of the Stephenson Mine on December 4th. The estimated ore above the 5th level on December 31st, 1917, was 29,850 tons, about 25% of which is Bessemer grade.

SIXTH LEVEL:

The work for the year on the 6th level was confined to putting up

three raises to the elevation of the 5th level; also on the main level, trolley wire was installed for electric haulage, as it was necessary to handle the ore coming from the 5th level through raises put up from this level. Although work has been temporarily stopped on the 5th, the equipment will be left on the 6th in anticipation of later returning here and doing some mining after all the ore has been exhausted in the bottom of the deposit. The estimated ore in sight between the 5th and 6th levels on December 31st. 1917, was 170,000 tons, 25% of which is Bessemer grade.

SUB LEVELS BELOW THE 6TH.

1st Sub Below the 6th:

The work for the year on this sub was confined to mining the remaining pillars West of old square set room No. 1. This work was completed early in the year.

2nd Sub Below the 6th:

On this sub the pillars were all mined between old square set rooms Nos. 1 to 4, during the past year.

Third Sub Below the 6th:

On this sub the ore was mined between old square set rooms Nos. 3 and 4, and at the present time subs are being developed between rooms Nos. 1 and 2, and 2 and 3.

On the 4th sub below the 6th the ore has been mined between old square set rooms No. 3 to 5.

On the 5th and 6th subs below the 6th level work has been confined to mining ore between the old square set rooms Nos. 4 and 5 only, which work, at the end of the year, had been completed on the 5th sub, but not entirely finished on the 6th. It will be noted from the number of sub levels referred to in the preceeding paragraphs that these subs are being opened approximately 11 feet apart, each succeeding sub being opened immediately below the sub above. This has given a much cleaner product, and is also absolutely necessary from the standpoint of safety. The open rooms on each side render mining here rather dangerous, and it is necessary to keep close under the covering to

avoid accidents.

SEVENTH LEVEL:

There was no work done on the 7th level proper during the past year. The estimated ore in sight between the 7th and 6th amounts to 45,600 tons, about 16% of which is estimated to be of Bessemer grade.

Sub Levels Above the 8th.

The work for the year was confined to the 1st and 3rd subs above the 8th level. The 3rd sub had been opened several years ago in developing the 8th level, and a small deposit found between the 8th and 7th levels, which did not connect with either level. In mining out the ore in the flat deposit on the 8th level it was decided that it would be advisable to mine this small isolated body of ore. Accordingly, one of the raises from the 9th level was extended up to the elevation of this old sub, and a cross-cut driven from the top of this raise, 88 feet to the North to the foot-wall, showing that the main deposit at this point was very flat. A drift was then started at a point 25 feet North of the raise and driven due West 155 feet, where it holed to this old sub level. Mining was started the last of the year at the extreme end of this sub level, all the ore being taken out from the foot to the hanging, where it is about 30 feet wide. The grade of the ore here is considerably below the general average of the mine, as it only runs about 54% Iron. Mining will be conducted slowly here in order to mix this leaner ore with the high grade ore.

The first sub above the 8th level was opened from three raises from the 9th level which were extended up to the hanging. The flat deposit on the 8th level rises about 20 feet above the 8th level on the North side, and also on the South side of the deposit. In the center there is a roll which carries the hanging down to a point about ten feet above the floor of the 8th, so that in this part of the deposit it was not possible to open a sub level.

During the year the greater part of available ore outside the shaft pillar had been mined on this sub level.

GWINN MINE:

EIGHT LEVEL:

The work for the year on the 8th level was confined to mining the ore above the sill floor at the East end of the level, and to driving drifts in the ore preparatory to mining the deposit South and West of the shaft pillar. The latter part of the year mining was started along the hanging at the extreme south-west end of the deposit. The cost of mining the ore on the 8th level has been higher than on the other levels. This is due, in a large measure, to the thin, flat deposit, and to the roll in the foot. The height of the ore above the floor of the 8th level is very variable, and in order to get all the ore it has been necessary to handle it twice in a great many cases; the hanging is also soft, and it has been necessary to timber closely to prevent the drifts from breaking down. At the present rate of mining, the ore on the 8th level will not last more than through the year 1918. It is estimated that there is 213,040 tons of ore in sight between the 8th and 7th levels. This figure is large in comparison with the tonnage in the pillar left between the 6th and 5th levels, but this is due to the flattening of the deposit at the 8th. The actual ore in the pillar between the 8th and 7th, which ore cannot be mined at this time, does not amount to 170,000 tons; the balance represents the ore which is now in process of being mined in the flat deposit on the 8th level.

SUBS BELOW THE 8TH:

The 2nd sub below the 8th is now being developed on the East side of the deposit, in a small territory. The first sub here was mined out during the latter part of the year. On the 5th sub below the 8th level, which is about 20 feet above the 9th level, some work has been done from two raises, the ore being developed by drifts along the hanging. At the end of the year there had been 300 feet of drifting on this sub level. No mining can be done here for some time, but it was considered advisable to outline the ore more definitely between the levels in order to give more accurate information for estimating.

NINTH LEVEL:

A large amount of development work has been done during the past year on the 9th level. This work consisted principally in the extension of the main haulage drifts and cross-cuts beneath the flat deposit on the 8th level, so that raises could be put up for mining this ore body. At the close of 1916 the main haulage drift West of the shaft had been advanced a short distance beyond No. 1 cross-cut; in 1917 this drift was extended 200 feet further West and No. 2 cross-cut driven South a distance of 220 feet. From No. 2 cross-cut three raises were put up to the 8th level. In 1917 No. 1 cross-cut was extended South 200 feet and then turned South-East for 100 feet, where it holed to the haulage drift from the East along the hanging. Four raises were later put up to the 8th level from No. 1 cross-cut, three of them being extended to the first sub above the 8th. A number of other raises were also put up from the main haulage drifts on the East side of the shaft in order to provide for mining the ore on the 8th level and also on its downward extension towards the 9th. The West foot-wall drift, south-east of the shaft has been extended about 300 feet during the past year. This drift was driven in order to explore the territory West of the main ore body on the 9th level. From drilling done on the 8th level, it is known that there is a basin or trough in this territory, and in several of the drill holes some ore was developed. The results of drifting have not been favorable, as it has proven that the formation here is almost horizontal. This would render it possible for the drill holes to have followed a seam of ore which might only have been 6 inches thick, indicating an ore deposit, where in reality there was only a narrow seam. In December this haulage drift had crossed the basin and struck the arkose, or foot-wall on the South side. It was turned due West here, and is now being driven in arkose towards two drill holes which showed ore about 35 feet above the elevation of the drift. It is planned to put up several raises to cross-cut the flat formation above the drift in an effort to determine whether the ore on the 9th level continues to

the West in this flat basin and also to prove the size of the ore shown by the diamond drill holes on the 8th level.

The East foot-wall drift on the 9th level was extended north-east 50 feet in ore, and then due North 175 feet in ore to the point where the foot swings around and cuts off the ore. This East foot wall drift was driven to develop the ore deposit on the 9th level. The main haulage drift South-East of the shaft was then extended 50 feet on a curve and holed to this East foot wall drift, making two roads through which the ore could be taken to the shaft. When it was decided to sink No. 2 winze below the 9th level a side slice was taken along the side of the foot-wall drift for a distance of 150 feet and a station cut out here for the hoist. This permitted the rope line to be carried in this side drift and eliminated all danger.

The 9th level pump house had been partly cut out at the time No. 1 winze was sunk from the 7th level to the 9th. It was necessary to take out more ground to make room for the pump room here. This work was done during the past year and two steel sets installed to support the back. In order to support the loose ground here it was necessary to concrete the entire pump house. A sump was made 12 feet below the floor of the 9th level, with a capacity of 170,000 gallons. A drift was driven on an incline below the 9th until the level of the sump was reached, and regular motor cars were used for handling the material from the sump drift.

Preparations for sinking #2 winze were started in June. The head frame and pocket, also the concrete foundations for the hoist were constructed, and actual sinking started in July. The winze was sunk to a depth of 112 feet below the 9th level. It was in ore for 43 feet below the 9th, at which point it encountered the foot wall on the West side. The foot was dipping very steeply here and for the next 21 feet the winze was half in the ore and half in the foot wall. The winze passed out of the foot wall slate near the bottom of the shaft and was stopped in arkose. At a depth of 55 feet below the 9th an opening was made to the East for a distance of 10 feet in ore.

This opening was made with the expectation that later on it might be advisable to open a sub level here.

TENTH LEVEL:

The 10th level was opened at a point 100 feet below the 9th. A drift was driven from the East side of the winze, the ore body being reached at a distance of 40 feet from the winze. At this point the drift branched; one deift being driven to the East across the deposit and the other due South along the strike of the formation. In the East drift 115 feet of high grade ore was developed and at the close of the year the South drift had advanced 155 feet in high grade ore. A number of cross-cuts have been driven from these two drifts outlining the ore body. Up to the close of the year there had been a total of 350 feet of ore drifting on the 10th level. The development work done here, while only showing up one-half as large an ore body as on the 9th level, is favorable, due to the unusual amount of Bessemer ore proven up. The 9th level ore body dips on a steep angle down to the 10th, and apparently it is in the steep pitching part of the deposit that the greater part of the Bessemer ore is found. The indications are that a large part of the ore between the 9th and 10th levels may be high grade Bessemer. The general average of the Iron content of the 10th level ore body is at least 3% higher in Iron than any of the other bodies thus far developed in the mine, and will run 60% and better. The limits of the ore on the 10th level are not determined at all points, and an extension to the South and East is possible. Drifts are now being driven which will soon prove up the ore body on this side.

It is estimated that there is 160,080 tons of ore in sight between the 9th and 10th levels.

GWINN MINE SURFACE:

The hospital room at the Gwinn dry has been plastered, the walls and floor painted, and the standard hospital equipment installed.

The floors of the engine house have been painted with several coats of concrete floor dressing, and rubber matting installed, bringing this engine house up to the standard.

Neither the Bessemer or No. 2 stockpiles were all shipped in 1917. This made it difficult to put up the stocking trestles, and on both grounds the new trestles had to be erected parallel with the old ones. There were twenty single bents erected for stocking Gwinn No. 2, and ten single bents for Gwinn Bessemer.

GWINN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR-1917.

GRADE	IRON	PHOS.	SILICA	MANG.
Gwinn Bessemer,	58.13	.052	8.42	
Gwinn,	57.78	.072	9.49	.415
Gwinn #2,	57.21	.250	8.60	.334

Above grades went into mixed cargoes.

ORE STATEMENT - DECEMBER 31ST, 1917.

	GWINN BESSEMER	GWINN	GWINN No. 2	TOTAL	TOTAL LAST YEAR
On Hand Jany. 1st, 1917,	51,233	0	47,052	98,285	97,927
Output for Year,	18,477	31,565	111,921	161,963	144,066
Total,	69,710	31,565	158,973	260,248	241,993
Shipments,	52,615	31,565	103,890	188,070	143,708
Balance on Hand,	17,095	0	55,083	72,178	98,285
Increase in Output-12%				17,897	
Decrease in Ore on Hand,				26,107	

1917-2-8 Hr. Shifts Jan. 1st to July 16th
1-8 Hr. Shift July 16th to Dec. 10th
2-8 Hr. Shifts Dec. 10th to Dec. 31st
1916-2-8 Hr. Shifts for year.

GWINN MINE.

GWINN MINE

SHIPMENTS FOR YEAR - 1917.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR	
Gwinn Bessemer,	18,141	34,474	52,615	47,584	
Gwinn,	10,380	21,185	31,565	18,424	
Gwinn No. 2,	47,483	56,407	103,890	77,700	
Total,	76,004	112,066	188,070	143,708	
Total last Year,	62,597	81,111	143,708		
Increase - 31%			44,362		

GWINN MINE.

GWINN MINE.

COMPARATIVE MINING COST FOR YEAR.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	161,963	144,066	17,879	
General Expense	.161	.174		.013
Maintenance	.133	.136		.003
Mining Expense	1.547	1.462	.085	
Cost of Production	1.841	1.772	.069	
Exploratory	0	.094		.094
DEPRECIATION.				
Plant Account	.300	.349		.049
Equipment	.001	.001		
Original Purchase	.003	.006		.003
Uncompleted Construction		0		
Total Depreciation	.304	.356		.052
Taxes	.044	.042	.002	
Central Office	.069	.078		.009
Miscellaneous		.004	.004	
Sundry Expense	.018	.013	.005	
Fire Loss		.001		.001
Cost on Stockpile	2.276	2.352		.076
Loading & Shipping	.145	.071	.074	
Total Cost on Cars	2.421	2.423		.002
No. Days Operating	300	301		1
No. Shifts and Hours 1-8hr	123			
2-8hr	177	2-8hr		
Avg. Daily Product	540	479	61	
Cost of Production.				
Labor	1.160	1.144	.016	
Supplies	.681	.628	.053	
Total	1.841	1.772	.069	

GWINN MINE.

COMPARATIVE WAGES AND PRODUCT.

	1 9 1 7.	1 9 1 6.	INCREASE.	DECREASE.
PRODUCT	161,963	1440,066	17,879	
No. Shifts and Hours	123-1-8 177-2-8	2-8hr		
AVERAGE NUMBER MEN WORKING				
Surface	33	40		7
Underground	120	141		21
Total	153	181		28
AVERAGE WAGES PER DAY				
SURFACE	3.38	2.74	.64-23.3%	
Underground	4.03	3.16	.87-27.5%	
Total	3.89	3.09	.80-26 %	
WAGES PER MONTH OF 25 DAYS				
Surface	84.50	68.50	16.00	
Underground	100.75	79.00	21.75	
Total	97.25	77.25	20.00	
PRODUCT PER MAN PER DAY				
Surface	16.33	12.13	4.20	
Underground	4.44	3.40	1.04	
Total	3.49	2.66	.83	
LABOR COST PER TON				
Surface	.207	.226		.019
Underground	.909	.940		.031
Total	1.116	1.116		
AVG. PRODUCT BRK'G & TRM'G	8.49	7.78	.71	
" WAGES CONTRACT MINERS	4.23	3.38	.85	
" " " TRAMMERS	0	0		
" " " LABOR	4.23	3.38	.85	
TOTAL NUMBER OF DAYS				
Surface	9,917¾	11,379		1,461¼
Underground	36,510¼	42,385¼		5,874¼
Total	46,428¼	54,764¼		8,336
AMOUNT FOR LABOR				
Surface	33,489.67	32,516.68	972.99	
Underground	147,238.99	135,403.26	11,835.73	
Total	180,728.66	167,919.94	12,808.72	

Proportion Surface to Underground Men;
1917 - 1 to 3.63
1916 - 1 to 3.50
1915 - 1 to 3.22
1914 - 1 to 2.16

GWINN MINE.

GWINN MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31, 1917.

KIND.	LINEAL FEET.	AVG.PRICE PER FOOT.	AMOUNT 1917.	AMOUNT 1916.
6" Cribbing	104,963	.0195	2046.90	
6" to 8" Stull Timber	5,808	.0225	130.68	67.28
8" to 10" "	57,864	.0425	2459.32	952.52
10" to 12" "	18,850	.0625	1177.12	805.28
12" to 14" "	10,600	.0850	901.00	1052.28
Total 1917	198,085	.0338	6715.02	
Total 1916	55,239	.0521		2877.36
5' Lagging	398,650	.482	1921.75	1066.88
8' "	464,137	.547	2509.71	1062.90
Total Lagging (1)	862,787	.514	4431.46	2129.78
Poles	66,227	.950	629.15	707.59
Cribbing				583.15
Total 1917	929,064	.545	5060.61	
Total 1916	573,271	.597		3420.52
Product			161,963	144,066
Feet Timber per ton of ore			1.223	.383
Feet Lagging " "(1)			5.328	3.13
Feet Lagging per foot, of Timber			4.34	8.15
Cost per ton for Timber			.042	.020
" Lagging			.027	.0148
" Poles			.004	.0089
" Timber, Lagging & Poles			.073	.0437
Equivalent of still timber to Bd.Measure			324,272	146,904
Feet Bd.Measure per ton of ore			2.00	1.02
Total cost for Timber, Lagging & Poles 1917				11775.63
" 1916				6297.88
" 1915				6946.16
" 1914				4629.28

Increase in stull timber and feet board measure due to using 6" timber for cribbing instead of poles, as in previous years, and extraordinary amount of raising in 1917 account of opening 8th level for mining.