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11. ACCIDENTS AND PERSONAL INJURY

Date of Accident	Name of Injured Man	Lost Wk.	Lost Da.	Compensation Paid to 12-31-39	Description of Accident
10/30/39	Edwin Laak	6	1	$111.00	Laak slipped while descending a ladder and fell about 30 feet, striking his back, which fortunately only caused minor bruises and soreness.
12/20/39	Herbert Blomquist	Still Home Estimated 10 Weeks			Blomquist was repairing a sling for a block in a small close timbered drift when he was unexplainably struck by a piece of ore which presumably fell from a raise some 25 feet away and bounded in such a manner as to strike his leg, breaking both bones.
12/29/39	Henry Paull	Still Home Estimated 2 Weeks			Paull was tying a knot in a scraper rope and although wearing gloves, punctured his fingerwith a broken strand. He had it treated at once but the wound became infected.

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

E & A No. 689

Total Estimate		$ 81,262.50
Total Expended to 12-31-38	$ 101,711.43	
Total Expended in 1939	497.49	
Total Expended to 12-31-39		102,208.92
Balance Dec. 31st, 1939		20,946.42

The purpose for which this E & A was authorized was the moving of 30 houses to the Cleveland-Cliffs Iron Company's second addition on account of future mining causing the surface to cave at their present location. As this E & A was practically completed last year and the detail of the completed accounts was listed in the last annual report, the only ones mentioned this year are as follows:

Outside Painting

Total Estimate	$ 3,900.00
Total Expenditure to 12-31-38	6,318.38
Total Expenditure in 1939	0
Balance Dec. 31st, 1939	$ 2,418.38

There are several houses covered by this account which have not yet received their second coat of paint and this will be done during 1940. The small crew of painters were kept busy in the Ishpeming district until too late to do this work satisfactorily.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

E & A No. 689 (Cont.)

Fencing

Total Estimate		$ 4,500.00
Total Expenditure to 12-31-38	2,721.50	
Total Expenditure in 1939	497.49	
Total Expenditure to 12-31-39		3,218.99
Balance Dec. 31st, 1939		$ 1,281.01

This account was completed in 1939.

E & A No. 727

Total Estimate	$132,660.00
Total Expenditure to 12-31-38	161,927.28
Balance Dec. 31st, 1939	$ 29,267.28

The purpose of this E & A was the moving of 28 houses to the Cleveland Cliffs Iron Company's second addition and although there was no work done on this account in 1939, there are several houses that have not yet received their second coat of paint and therefore the total estimate and this one account are shown again this year as there will be an expenditure in 1940. All the other accounts were completed last year and their detail was shown in the previous report.

Outside Painting

Total Estimate	$ 4,400.00
Total Expenditure to 12-31-38	7,011.23
Balance Dec. 31st, 1939	$ 2,611.23

E & A No. 783

Total Estimate		$ 18,150.00
Total Expenditure to 12-31-38	13,707.39	
Total Expenditure in 1939	4,554.37	
Total Expenditure to 12-31-39		18,261.76
Balance Dec. 31st, 1939		$ 111.76

The purpose of this E & A was the purchase of three larry cars and the installation of motors, controls, brakes and conductors for use on the stockingtrestle in place of the endless rope haulage system. This account will be completed in 1940 as although the installation is completed, there are a few charges yet to come in.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

E & A Nos. 808 & 808A

Total Estimate		$ 20,445.00
Total Expenditures to 12-31-38	2,260.35	
Total Expenditure in 1939	16,713.24	
Total Expenditure to 12-31-39		18,973.59
Balance Dec. 31st, 1939		$ 1,471.41

The purpose of E & A No. 808 was the sinking of test hole No. 13 and a large bore well, called No. 2 Well, approximately 1000' West of the shaft to remove the surface water before it enters the mine. This part of the account was completed in 1939 but an addition was made this year to cover the expense of more work on No. 1 Well, authorized under E & A No. 716, to increase the capacity of the same and there will be charges to this latter account in 1940.

E & A No. 826

Total Estimate	$ 3,088.00
Total Expenditure in 1939	3,088.00
Balance Dec. 31st, 1939	0

The purpose of this E & A was the purchase of two 20 H. P. Ingersoll Rand scraper hoists to be used in transfer systems underground. This account was completed in 1939.

E & A No. 831

Total Estimate	$ 4,000.00
Total Expenditure in 1939	3,725.00
Balance Dec. 31st, 1939	$ 275.00

The purpose of this E & A was the purchase of a rotor and coupling to be used as a replacement on the motor of the skip hoist, which had been in use nineteen years and was showing defective insulation. This account was completed in 1939.

E & A No. 844

Total Estimate	$ 1,151.00
No Expenditure in 1939	

The purpose of this E & A was for a new roof on the mine dry but it was decided to do the work next spring on account of the stormy fall weather.

E & A No. 852

Total Estimate	$ 7,800.00
Total Expenditure in 1939	7,390.17
Balance Dec. 31st, 1939	$ 409.83

The purpose of this E & A was the purchase of new equipment to increase production and there will be some charges to this account early in 1940.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

E & A No. 855

Total Estimate	$ 3,916.00
Total Expenditure in 1939	174.09
Balance Dec. 31st, 1939	$ 3,741.91

The purpose of this E & A was the sinking of five test holes by the Layne Northwest Company to explore the formation to the West of the caved area on surface.

PROPOSED NEW CONSTRUCTION

The E & A's which will carry over into 1940 are Nos. 689, 727, 783, 808, 844, 852 and 855.

There have been no new E & A's authorized for next year.

13. EQUIPMENT AND PROPOSED EQUIPMENT

a. Steam Shovels

There were two regular steam shovels used for loading ore in 1939 besides the No. 21, a small caterpillar steam shovel used for loading rock to make new stockpile grounds. Both No. 44, which is a railroad type, and No. 45, a large caterpillar, were repaired at the mine in the spring of 1939 and therefore had very little repairs during the season. However, the No. 44, which is a very large shovel and has to be moved around a lot on account of the various grades, was taken to the Ishpeming shops for repairs this winter and will be replaced in the spring with a smaller one. The No. 45 will be repaired at the mine.

b. Stocking Trestles

Additions were made from time to time on the ends of both the Southeast and Southwest single track wooden trestles to enable the wet ore of Maas grade to be stocked during the summer, before enough ore had been cleaned up to erect new trestles. The Southwest trestle was just about filled to capacity as before it was abandoned the wet ore was running out onto the main highway and chunks were flying against some of the houses. The Southeast trestle can be extended further if necessary as the gulley to the East has been filled and the grounds are in readiness but that would make a very long tram. It is desired that this present pile of Maas ore to the East of the Special grades be cleaned up next year and this Southeast trestle be kept entirely for the Special grade ores as with a loss of 60,000 tons, due to three gaps between the four grades and royalties, it takes twelve more bents, or 300' more of trestle, than to stock an

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13. EQUIPMENT AND PROPOSED EQUIPMENT

b. Stocking Trestles (Cont.)

equivalent amount of ore of one grade, aside from the fact that there will probably be a considerable increase in the amount of Special grade produced in the future. There were nine bents of this Special grade trestle that had to be dismantled and re-erected twice during the season as there was not enough of this grade to fill the orders without disturbing the trestle, and after the current order was filled there was no other place to stock ore of this grade. With the exception of the steel trestle, this difficulty exists on all the trestles as 30% of the ore has to be stocked during the summer or shipping months as it is too wet to load into cars. Therefore, the wooden trestles have to be maintained at all times unless there could be two separate trestles for each grade, which is impossible with the limited space available.

The small pile of Special grade lying under the extreme East end of the steel trestle was removed, making this space available for Bessemer ore, and as part of the regular Bessemer space where a considerable tonnage was removed during the year is also available, there should be ample room for the two Bessemer grades.

Two new single track trestles were erected West of the shaft, one of 43 bents for Maas and Race Course ores and one of 23 bents lying parallel to and 100' South of the first one, this latter to be for Maas grade only. It will soon be necessary to extend the new rock trestle to the Northeast and this trestle as well as both sides of the steel trestle and the new West trestle have been electrified for the use of the new larry car system. This new system has been improved during the year with larger brakes on the cars and a change of track gauge from 30" to 36" which should prove very satisfactory, thus doing away with the long haulage ropes together with the accompanying sheaves and rollers.

c. Scraper Hoists

There was an addition of seven scraper hoist units during the year; one 25 H. P. Sullivan hoist rented from the Athens Mine, together with two 20 H. P. Ingersoll Rand hoists purchased for use in the transfer systems, and four 15 H. P. Ingersoll Rands purchased to enable the forming of new contracts to speed up production, these latter having arrived in December and will be put into use early in the year.

The list of equipment is as follows:

Ingersoll-Rand	10	H.P.	Electrics	3
"	" 15	"	"	16
"	" 20	"	"	2

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13. EQUIPMENT AND PROPOSED EQUIPMENT

c. Scraper Hoists (Cont.)

Sullivan	25 H.P. Electrics	3
"	20 " "	1
"	15 " "	24
"	7½ " "	1
"	6½ " "	4
Total Electric Hoists		54
Ingersoll-Rand Air Hoists, rebuilt to handle timber (single drum)		16

The five small Sullivan hoists and the three 10 H. P. Ingersolls are only used for exploration work and for emergencies while the larger ones are being repaired, therefore there are 46 hoists available for contract mining, five of which are used in transfer systems.

d. Skips and Cages

There were no changes made in the skips and cages during 1939; however, the estimated skip capacity was lowered from 5.65 to 5.5 in December 1938, and this lower figure was used throughout 1939.

14. MAINTENANCE AND REPAIRS

Early in the year there was a very extensive overhauling program carried out on the Third Level or main pumps. The Aldrich pump broke one of the main supports and crankshaft, so while waiting for new parts the rest of the pump was gone over very thoroughly and everything placed in the best shape possible. As soon as the work on the Aldrich was completed, the Prescott was checked over and the necessary adjustments made. At the same time it was found that the discharge column had considerable vibration due to loose hangers, therefore a new type of hanger was constructed, the column checked very carefully for alignment and then all small leaks as well as one section that had split were welded, all of which reduced the amount of water that was being repumped and made it possible to re-divert the water that had formerly been diverted to the Negaunee Mine since the surface cave in 1937.

The Third and Fifth Level sumps were cleaned out and valves installed in the Fifth Level dam so that a better control of the water is possible. Some further repairs have to be made to the Third Level sump dam and then everything should be in very fine shape to handle the water with the least possible amount of mud entering the suction pits. A series of settling basins have been installed on the various levels to catch as much of the mud as possible before it enters the main sump and a surprisingly large number of cars of mud are removed from these each month.

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14. MAINTENANCE AND REPAIRS

Last October and again in July of this year considerable delay was caused by the shorting of the coils in the rotor of the 700 H. P. skip hoist motor. This motor has been in service 19 years and had worked 24 hours per day during 1937, causing excessive heat and the consequent baking of the insulation. A new rotor and coupling was purchased from the Westinghouse Company and installed in November and it was in connection with the work on this unit that Mr. Edward Merrila, one of the Cliffs Power & Light Company employees, was killed when he fell from an overhead traveling crane to the concrete floor. A complete account of this accident will appear in the Cliffs Power & Light report and therefore no further mention will be made here.

The Maas Mine tractor was also given a thorough overhaul and several new parts purchased during the year.

A new hoisting rope was installed during 1939 on both the cage and South skip, while two 1 3/8" ropes partly used at the Athens Mine were put on the North skip, one only lasting less than a month before showing signs of wear. It has been the custom to use these 1 3/8" ropes from the Athens Mine after they have been worn down to 1¼", which is the standard for the Maas, and generally they prove very satisfactory, thus effecting a saving at both the Athens and the Maas.

15. POWER

The following is the rate charged per K.W. hour by months during 1939:

January	$ .0140
February	.0140
March	.0136
April	.0136
May	.0138
June	.0136
July	.0146
August	.0144
September	.0136
October	.0136
November	.0132
December	.0134
Average	$ .0138

The average rate for 1939 shows a decided decrease as compared with that for 1938 and is due to two causes; the first being the increased efficiency of the pumps with consequently less delays and therefore less fifteen minute high peaks to pump the excess water with three pumps operating at the same time, while the second cause was the increased production using more current, which together with a lower demand, gave a higher percentage factor and thus a smaller rate.

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17. CONDITION OF PREMISES

There was no work done about the grounds other than the routine work of keeping the lawns and shrubbery in good condition.

18. NATIONALITY OF EMPLOYEES

As to Parentage	1939	%	1938	%
Finnish	175	41.3	162	40.4
English	96	22.5	96	23.9
American	42	9.8	33	8.3
Italian	39	9.1	37	9.3
Swedish	30	7.0	30	7.5
French (Canadian)	20	4.5	19	4.7
German	9	2.1	8	2.0
Norwegian	7	1.6	8	2.0
Danes	4	.9	4	1.0
Irish	2	.5	2	.5
Austrians	1	.2	1	.2
Polish	2	.5	1	.2
Total	427	100.0	401	100.0

	Total		American Born		Foreign Born	
As to Birth	1939	1938	1939	1938	1939	1938
Finnish	175	162	98	85	77	77
English	96	96	53	50	43	46
American	42	33	42	33	0	0
Italian	39	37	13	9	26	28
Swedish	30	30	22	21	8	9
French (Canadian)	20	19	19	18	1	1
German	9	8	7	6	2	2
Norwegian	7	8	6	6	1	2
Danes	4	4	3	3	1	1
Irish	2	2	2	2	0	0
Austrian	1	1	0	0	1	1
Polish	2	1	2	1	0	0
Total	427	401	267	234	160	167
Percentage			62.0%	58.4%	38.0%	41.6%

19. MAAS CRUSHER

The following table shows the years operations:-

Mine	1939	1938	Incr.
Cliff Shaft	12,380	3,580	8,800
Lloyd	37,128	12,004	25,124
Morris (Inland)	9,423	1,578	7,845
Maas		1,257	1,257
Total	58,931	18,419	40,512

The Maas crusher operated considerably more in 1939 than in 1938

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19. MAAS CRUSHER

but only approximately one half as much as in 1937 which was due mostly to the large amount of Lloyd Silica crushed in 1937 when the crusher at the Lloyd shaft was out of commission. Quite extensive repairs were made to the crushing plant this year as there was practically no work done last year on account of the attempt to keep down expenses and also due to the fact that several large parts of the crusher itself wore out. Early in the spring the loading pocket will have to be repaired as both the wood work and the lining plates are in very bad shape, nothing having been done to them since the crushing plant was installed.

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1. GENERAL:

The Negaunee Mine operated on a three day per week schedule from January 1st to January 9th when the working time was increased to four days per week. The four day schedule continued from January 9th to June 12th, when it was reduced to three days per week. The three day schedule continued from June 12th to September 11th when the mine started operating five days per week and continued on this schedule for the balance of the year. Two shifts of men were employed during the year. A few men were hired in September and in the following months in order to increase production. A small hoisting crew started working on the third shift the last of September when the product exceeded the capacity of the hoist on two shifts.

Comparatively little work was done in 1939 in developing the new 14th level. The concrete loading pocket on the 14th level was constructed in the early months of the year, and timbering in the shaft completed in the summer. The new skip ropes were installed in October and in the latter part of the month drifting was started on the 14th level with a crew of two men on a single shift. At the end of the year the haulage drift from the shaft pocket had advanced beyond the plat and in January stripping of this drift to form the shaft plat will be started. Extension of the haulage drift toward the Maas boundary will be under way in about four months.

Production in 1939 was 551,362 tons, an increase of 139,362 tons over 1938. The average working schedule during the year was equivalent to four days per week on two shifts and the average monthly production was approximately 46,000 tons. The five day per week or present operation is the best working schedule possible for the mine as one week day is available for extraordinary repairs and replacements. The product is sufficient to give a reasonable cost of production and the employees earn wages that insure them a good living.

There were no fatal accidents in 1939 but several severe injuries. In nearly every case the injury was caused by carelessness on the part of the injured man. The hardest thing to combat in safety work is the human failure to safeguard ones self from possible injury. A moments lapse and an accident occurs which obviously could have been avoided. There were undoubtedly many narrow escapes from injuries during the year but the unfailing law of averages claims an occassional victim. There must be eternal vigilance exercised by all employees before a perfect safety record can be attained in the soft ore mines and constant efforts are being made to educate the men to make them safety conscious. During the past year a number of conferences were held with the mining Captains and all the foremen to review the accidents, go over the rules and standards with a general discussion open to all on methods of improving the safety record. It is believed that these local meetings keep the foremen better informed and more alert to safety work.

Surface churn drilling to ledge on Section 32, Northeast of No. 2 shaft to locate a site for a deep well was resumed last summer and very favorable conditions found in the last hold sunk. A contract was then awarded to the Layne Northwest Company to install a deep well pump. Work was started in the fall and nearly completed late in December. It is believed, from a preliminary test run, that 400 to 500 gallons will be pumped from this well and that the mine will be benefited to the extent of an appreciable part of the water being diverted by the well. Accurate data will not be available until 1940.

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2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

	1939	1938	Increase	Decrease
Negaunee Ore	551,362	412,000	139,362	
Rock	26,148	27,588		1,440
Total Hoist	577,510	439,588	137,920	

b. Shipments:

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons
Negaunee Ore	279,687	399,993	679,680
Total 1938	123,464	207,712	331,176
Increase	156,223	192,281	348,504

Shipments increased 105% in 1939 and were 128,318 tons more than the product for the year.

c. Stockpile Inventories:

	Dec. 31, 1939	Dec. 31, 1938	Decrease
Negaunee Ore	90,074	218,392	128,318

Including estimated overrun there were approximately 150,000 tons in stock at the end of the year.

d. Division of Product by Levels:

	1939	%	1938	%
9th Level	102,321	18.5	40,161	9.8
11th Level	134,464	24.4	112,681	27.3
12th Level	223,441	40.5	222,260	53.9
13th Level	91,136	16.6	36,898	9.0
Total	551,362	100.0	412,000	100.0

There was a large increase in production from the 9th level. In the three years that have elapsed since reopening this level 175,720 tons have been produced.

e. Production by Months:

Month	Negaunee Ore	Rock
January	41,545	2,752
February	38,748	2,404
March	49,071	1,880
April	40,545	1,272
May	46,796	2,648
June	36,025	2,080
July	30,955	2,264
August	32,820	1,200
September	50,223	2,112
October	60,984	2,344
November	66,066	2,764
December	57,584	2,428
Total	551,362	26,148
Total 1938	412,000	27,588
Increase	139,362	
Decrease		1,440

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Cont'd)

e. Production by Months: (Cont'd)

The product by leases was distributed as follows:

	1939	1938	Increase
Negaunee Mine Co.	506,134	375,408	130,726
American Mining Co.	45,228	36,592	8,636
Total	551,362	412,000	139,362

f. Ore Statement:

	Negaunee Ore	
	1939	1938
On Hand January 1, 1939	218,392	137,568
Product for year	551,362	412,000
Overrun		
Total	769,754	549,568
Shipments	679,680	331,176
Balance on Hand	90,074	218,392
Increase in Output	139,362	
Decrease in Ore on Hand	128,318	

1939 - 2-8-hr. shifts 3 days & 3 nights per week 11/1/38 to 1/9/39.
2-8-hr. shifts 4 days & 4 nights per week 1/9/39 to 6/12/39.
(1) 1 & 2-8-hr. shifts 5 days & 1 night per week 6/12/39 to 9/11/39.
2-8-hr. shifts 5 days & 5 nights per week 9/11/39 to 12/31/39.

(1) To give each man three days per week.

1938 - (2) 2-8-hr. shifts 6 days & 6 nights per week 12/6/37 to 3/28/38.
(3) 3-8-hr. shifts 4 days & 4 nights per week 3/28/38 to 4/18/38.
3-8-hr. shifts 3 days & 3 nights per week 4/18/38 to 6/1/38.
2-8-hr. shifts 2 days & 2 nights per week 6/1/38 to 11/1/38.
2-8-hr. shifts 3 days & 3 nights per week 11/1/38 to 12/31/38.

(2) Equivalent to 4 shifts per week for each crew on the 3-8-hr. shift schedule.
(3) Shaft sinking started April 1st on 3-2-8 hr. shift schedule and continued to completion.

g. Delays:

There was a one hour delay on February 23, 1939 due to the burning of the induction motor of the new motor generator set which furnishes power for the hoisting equipment. The old set was immediately put into use while repairs were being made, during which time the capacity of the skip was reduced to three-quarter capacity by the installation of a false bottom and hoisting was done on 3-8-hr. shifts until repairs were completed.

On March 8, 1939 there was a five hour delay due to the rotor connection to the slip ring on the prime mover of the Ilgner motor generator set coming loose and having to be welded on. The resultant loss of product was 715 tons.

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2. PRODUCTION, SHIPMENTS & INVENTORIES: (Cont'd)

h. Delays from Lack of Current:

On April 17, 1939 there was a one hour delay on the day shift due to a severe sleet storm. The loss of product was 165 tons. The mine was also idle on the afternoon shift on April 17 and on the day and afternoon shifts on April 18. There was no loss of product due to the mine working on the 21st and 28th to make up the time lost on the 17th and 18th.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	1939				1938			
Grade	Tons	Iron	Phos.	Silica	Tons	Iron	Phos.	Silica
Negaunee Ore	551,362	60.54	.110	7.06	412,000	59.50	.114	7.60

b. Average Mine Analysis on Straight Cargoes:

				Lake Erie	
Grade	Iron	Phos.	Silica	Iron	Moisture
Negaunee Ore	60.13	.114	7.56	-	-
Negaunee Crushed Ore	61.74	.090	5.95	62.65	11.52

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption: 12 cu. ft. equals one ton
10% deducted for rock
10% deducted for loss in mining
% of Bessemer - none

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4. ESTIMATE OF ORE RESERVES: (Cont'd)

a. Developed Ore: (Cont'd)

9th Level and above	1,030,876
11th Level and above	125,658
Between 11th and 12th Levels	518,736
Between 12th and 13th Levels	1,259,652
Below 13th Level	360,006
Total	3,294,928
Less 10% for Loss in Mining	329,493
	2,965,435
Less 10% for Rock	296,543
	2,668,892
Less December 1939 Production	52,044
Total Developed Ore 1939	2,616,848
Total Developed Ore 1938	3,034,062
Decrease 1939	417,214

This year the gross ore is shown for each level and the 10% deduction for loss in mining and 10% for rock is deducted from the gross total ore, whereas in previous years the deductions were made for each level and only the net tons shown. The product from the Negaunee Mine lease in 1939 was 506,134 tons. Deducting the decrease shown in the estimate of 417,214 tons from the product shows that 88,920 tons were developed during the year on the Negaunee Mine lease. It must be borne in mind that the ore on the American Mining Company lease, otherwise known as the Adams Strip, is mined by the Negaunee Mine Company, and hoisted and stocked with the Negaunee Mine lease ore. It, therefore, should be included in considering the life of the mine and the ore reserves that will be available for mining. The net estimated tonnage on the American Mining Company property at the end of 1939 was 327,613 tons. Adding this tonnage to the net tons on Negaunee Mine lease gives a total of 2,944,461 tons of ore. If an allowance be made for probable ore it is reasonable to assume a probable total of 3,500,000 tons to be mined. This represents the probable total possibilities from which the life of the mine can be figured on the basis of various yearly productions.

In 1939 the tonnage above the 12th level decreased due to the separation of the main ore body into two parts on the 325' sub level. This eliminated a 100 ft. area formerly considered as ore. There was an increase in tonnage between the 12th and 13th levels and also below the 13th level, due to extension of the ore body beyond limits heretofore assumed. This extension was due to flattening of the hanging wall. Mining on the Maas property adjacent to the boundary, together with the ore which was found in diamond drill holes drilled in the early part of 1939, accounted for the increase in ore reserves below the 13th level.

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5. LABOR AND WAGES:

a. Comments:

There were 354 men on the payroll on January 1st, 1939 and 391 on December 31st, 1939. The increase was made in September and succeeding months in order to increase production on the five day per week schedule. Most of the men hired were chosen from the group laid off on June 1st, 1938. During the year one man died, eight men were transferred to other mines, four were laid off, four left for various reasons and seven were retired on small monthly payments. During the year sixty-six men were hired.

Average wages earned by contract labor increased and also average wages per month. The employees are contented since the five day schedule has been in effect and for many months not a single complaint has been made to the representatives of the Marquette Range Industrial Union. The few complaints made earlier in the year were given immediate consideration and settled satisfactorily.

b. Comparative Statement of Wages and Product:

	1939	1938	Increase	Decrease
PRODUCT	551,362	412,000	139,362	
No. Shifts and Hours	1-8 41	1-8 34	1-8 7	
	2-8 187	2-8 118	2-8 69	
	3-8 -	3-8 35		3-8 35
AVERAGE NO. MEN WORKING:				
Surface	67	62	5	
Underground	318	284	34	
Total	385	346	39	
AVERAGE WAGES PER DAY:				
Surface	5.55	5.54	.01	
Underground	6.52	6.45	.07	
Total	6.35	6.26	.09	
AVERAGE WAGES PER MONTH:				
Surface	92.05	82.50	9.55	
Underground	105.97	84.91	21.06	
Total	103.60	84.45	19.15	
PRODUCT PER MAN PER DAY:				
Surface	41.37	32.78	8.59	
Underground	8.90	8.62	0.28	
Total	7.32	6.83	0.49	
LABOR COST PER TON:				
Surface	.134	.169		.035
Underground	.733	.748		.015
Total	.867	.917		.050
AVERAGE PRODUCT MINING:				
Stoping	22.03	22.24		0.21
Development in Ore	8.73	8.28	0.45	
Total	21.34	21.17	0.17	

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5. LABOR AND WAGES: (Cont'd)

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

	1939	1938	Increase	Decrease
AVERAGES WAGES CONT. LABOR	7.27	7.22	.05	
TOTAL NUMBER OF DAYS:				
Surface	13,329¾	12,568	761¾	
Underground	61,993¼	47,774	14,219¼	
Total	75,323	60,342	14,981	
AMOUNT FOR LABOR:				
Surface	74,002.64	69,548.69	4,453.95	
Underground	404,383.83	308,149.40	96,234.43	
Total	478,386.47	377,698.09	100,688.38	
AVERAGE WAGES PER MONTH AS PER LABOR STATEMENT, LESS CAPTAIN AND CLERKS:				
Surface	89.68	79.20	10.48	
Underground	105.29	84.15	21.14	
Total	102.50	83.25	19.25	

Proportion of Surface to Underground Men:

1939: 1 to 4.74

2-8-hr. shifts 3 days & 3 nights per week 11/1/38 to 1/9/39.
2-8-hr. shifts 4 days & 4 nights per week 1/9/39 to 6/12/39.
(1) 1 & 2-8-hr. shifts 5 days & 1 night per week 6/12/39 to 9/11/39.
2-8-hr. shifts 5 days & 5 nights per week 9/11/39 to 12/31/39.

(1) To give each man three days per week.

1938: 1 to 4.58

(2) 2-8-hr. shifts 6 days & 6 nights per week 12/6/37 to 3/28/38.
(3) 3-8-hr. shifts 4 days & 4 nights per week 3/28/38 to 4/18/38.
3-8-hr. shifts 3 days & 3 nights per week 4/18/38 to 6/1/38.
2-8-hr. shifts 2 days & 2 nights per week 6/1/38 to 11/1/38.
2-8-hr. shifts 3 days & 3 nights per week 11/1/38 to 12/31/38.

(2) Equivalent to 4 shifts per week for each crew on the 3-8-hr. shift schedule.
(3) Shaft sinking started April 1st on 3-2-8 hr. shift schedule and continued to completion.

6. SURFACE:

a. Buildings, Repairs:

A new shed for storing a few tons of Blossberg coal, used in the blacksmith shop forges, was erected in November and early December and the old shed dismantled.

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6. SURFACE: (Cont'd)

a. Buildings, Repairs: (Cont'd)

Some leaks developed in the base of the fan house at No. 2 shaft house that permitted air from the main ventilating fan to escape. A concrete footing 4" wide by 18" deep was put in outside the old foundations and the leaks sealed.

The minor repairs necessary to put the coal dock in condition were completed in May.

Storm sheds that can be removed in sections and stored in the Summer were erected at the two main entrance doors to the change rooms in the dry house. The storm sheds will prevent the winter wind from blowing directly on the men that change their clothing near the doorway.

A removable storm shed was installed on the outside door to the Captain's change room in the mine office building, also a similiar storm shed on the entrance door to the supply room corridor in the warehouse. The miners come to the warehouse for certain supplies and with the supply window open, the supply clerk has been exposed to the cold North wind. If many miners came at one time it was necessary for some to stand outside and await their turn. They are now sheltered from the wind in the storm shed.

The floors of the office building shrunk due to drying out of the joist, leaving openings all around the walls. The floors were jacked up, leveled and all rotted flooring replaced. The plaster was loose in several rooms and it was also repaired. This entailed replastering of certain walls and in one room an entire new ceiling was installed. The large open cracks around the window and door casings from 1/4" to 3/4" in size, were filled with plastic cement in order to make the rooms warmer and eliminate drafts. The shrinkage of ceiling lumber, 1" X 8" shiplap, in the ceiling of the warehouse left cracks from 1/2" to 1" open to the attic with the result that the attic was heated and the warehouse very cold in the winter. The ceiling was covered with plaster board and in the recent zero weather the warehouse was quite warm. After these general repairs were completed the interior walls were redecorated, the floors stained and oiled and the woodwork varnished. This was the first general overhauling in over fifteen years.

In order to unload heavy equipment such as underground tram cars, motors, etc., the West doors of the shop building were enlarged so that the five ton General Storehouse truck could back into the shop and use the chain blocks on the overhead trolley to lift the equipment.

Two heavy steel plates were installed in the skip roads above the collar of the shaft on the bent columns to prevent further buckling of these steel members. These members buckled due to the heavy weight and the intense heat generated by the fire in the shaft house several years ago. They were reinforced when repairs were made to the shaft house but there was evidence of further bending indicating the necessity of additional supports.

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6. SURFACE: (Cont'd)

a. Buildings, Repairs: (Cont'd)

Two new plates were installed in the skip dump in the Spring and new runners installed in the shaft house opposite the skip dump.

To increase the safety for the top landers cleaning the skips and skip dump, additional landings and stairways were built in the shaft house to replace the ladders formerly in use.

A portion of the stairway to the shaft house landing floor was replaced in November.

b. Stockpiles:

At the close of the shipping season about November 20th, the ore under both the East and West steel trestles had been loaded and also a portion of the ore under the wood trestle that parallels the East steel trestle. There is ample stocking capacity available from the steel trestles for the anticipated product of 66,000 tons per month.

b-1. Rock Trestle:

In the late summer work was started in constructing a new rock trestle between the two rock piles. A total of twenty bents were assembled and erected and with the filling of the old rock trestle in November, the ropes were changed and stocking from the new trestle started in early December. The opening of the 14th level made it necessary to provide stocking room for a large amount of rock that will be hoisted during the next two years.

b-2. Ore Trestles - Steel:

New ties were installed on the North side of the West steel trestle. There were 410 ties installed, all of which were treated with Chromated Zinc Chloride at the Athens treating plant to prolong their life. This work was not quite completed at the end of the year.

Painting of the piers and braces of the steel stocking trestle was resumed in June. This work was started in 1938 and completed during the past Summer.

b-3. Ore Trestles - Wood:

In September the greater part of the wood ore stocking trestle was dismantled. A portion of the square timbers, stringers, caps and corbals were used on the new rock trestle.

c. Tracks, Roads:

The private road to the mine from the end of Lincoln Street was improved by surfacing with gravel. With over one hundred automobiles in use by the employees, in addition to trucking of mine timber and supplies, it is quite difficult to keep the gravel road in good condition, particularly during prolonged wet periods.

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6. SURFACE: (Cont'd)

d. Water Supply:

The cost of water purchased from the City of Negaunee and used at the mine for the last seven years is as follows:

	1939	1938	1937	1936	1935	1934	1933
1st Quarter	113.48	80.08	55.86	67.61	44.31	47.39	54.25
2nd Quarter	116.83	75.04	61.20	59.77	62.98	76.80	36.00
3rd Quarter	136.78	115.15	56.70	83.64	61.51	75.85	52.14
4th Quarter	150.92	115.22	67.76	81.75	62.55	35.98	36.29
Total	518.01	385.49	241.52	292.77	231.35	235.02	178.68
Product - tons	551,362	412,000	820,915	512,612	291,318	235,664	61,761
Cost Per Ton	.000939	.000935	.000294	.000571	.000794	.001001	.002893

The cost for water was higher in 1939 due to more water used in the mine to eliminate dust. It is used with compressed air to clean cars at the shaft pockets, for wetting down and washing walls in rock drifts and raises, for sprays in rock drifts and for washing air in the clean air blowers.

e. Grounds:

The grounds around the mine buildings were well cared for during the year. The shrubbery was severly pruned as it had grown so tall that it shut off light from the buildings. The lawn was maintained in good condition, being given an application of fertilizer in the early Spring. The fences around the mine grounds were repaired, new posts and 2" X 4"'s being installed to replace rotted ones. The flag pole was badly bent in the heavy wind storm in the Summer and had to be taken down, straightened and reinforced near the base. The pine plantation on the sand slope South of the engine house was cleaned, all dead trees and broken limbs removed. The unusual storms of the past two years severely damaged the plantation and it will never be as attractive as in the years prior to 1938.

f. Deep Well - Sec. 32:

A small ditch, 1,770 ft. in length was dug from No. 1 deep well on Section 32 to the mine discharge ditch. This ditch will carry the water away when pumping is started at the deep well. It may develop later that a permanent launder will have to be installed in the open ditch to prevent absorption of the water into the ground and hence back to the mine.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1939 but some work was done in connection with sinking, namely, excavation of shaft pocket on the 14th level, installation of runners in the skip roads from 13th to 14th levels, etc.

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7. UNDERGROUND: (Cont'd)

a. Shaft Sinking: (Cont'd)

Excavation of the shaft pocket on the 14th level was started on December 28th, 1939 and the excavation of the main pockets was completed in March. The forms for the concrete walls of the pocket were constructed and concrete poured in April. The measuring pocket was then excavated, forms installed and concrete poured. Steel lining plates were installed in both the shaft pocket and measuring pocket, working platforms built, finger chutes, air cylinders, etc., installed and all other work completed in the Summer.

Runners were installed in the skip roads in June and the shaft compartments cased below the 13th level. No further work was done until in October when the 13th level skip pit pocket was removed, the skip ropes lengthened and hoisting from the 14th level started to handle rock coming from the development of the level. The cost of the work was charged to E. & A. No. 795, account No. 2.

b. Development:

The total development in ore and rock in 1939 was nearly the same as in 1938 with, however, a slight difference in the footages for the several classifications of the work. The totals for the two years are as follows:

	Drifting		Raising		Grand
Year	Ore	Rock	Ore	Rock	Total
1939	275'	1463'	1313'	827'	3878'
1938	585'	1306'	943'	1158'	3992'
Increase		157'	370'		
Decrease	310'			331'	114'

Included in the above total rock drifting in 1939 is 154 ft. of drifting on the 14th level and in 1938 147 ft. which was charged directly to E. & A. No. 795.

Approximately one-four of the development work in 1939 was done on the 9th level and subs above in connection with the development of the small ore pillars on each side of No. 1 shaft pillar.

The approach of mining operations to the 11th level elevation in the ore area between No. 1 and No. 2 dikes made it necessary to put up a total of four raises from the 12th level during the year into this area with two additional raises going up at the end of the year. A new cross-cut in the footwall started in November 1938 was completed early in 1939. Two of the raises completed this year were put up from this cross-cut.

Due to continual crushing of the Western section of the haulage drift parallel to the Maas boundary on the 13th level it was decided to drive a drift in rock near the South footwall and turn off cross-cuts to the North to the Maas boundary. This program was under way the latter half of the year with one cross-cut completed and the second one turned off from the haulage drift. Raises put up from this new drift and cross-cuts will develop the ore South of the main dike as also the main ore body North of the dikes. Several raises were put up from the 13th level during the year to mine the main ore body.

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7. UNDERGROUND: (Cont'd)

b. Development: (Cont'd)

Development of the 14th level was started in October with the driving of the main haulage drift North from the loading pocket at the shaft. By the end of the year the drift had advanced nearly to the limit of the shaft plat area and stripping of the drift to form the plat will start the first week of 1940.

b-1. Rock Development:

On the 9th level and subs above in No. 1 and No. 2 shaft pillar areas there was a total of 171 ft. of rock drifting and 312 ft. of rock raising, a grand total of 483 ft. of drifting and raising in rock.

On the 11th level there was no development in rock in 1939.

On the 12th level and two sub levels above the 12th, there was a total of 385 ft. of rock drifting and 347 ft. of rock raising, a grand total of 771 ft. of drifting and raising in rock.

On the 13th level and two sub levels above there was 719 ft. of rock drifting and 270 ft. of rock raising, of which a grand total of 912 ft. was on the 13th level and 72 ft. on two sub levels.

On the 14th level there was 154 ft. of rock drifting which was charged to E. & A. No. 795 - "Development of 14th Level".

A summary of the development in rock follows:

	Drifting	Raising	Total 1939	Total 1938
9th Level	171'	310'	481'	1091'
11th Level	-	-	-	32'
12th Level	424'	347'	771'	203'
13th Level	719'	265'	984'	991'
14th Level	154'	-	154'	22'
Skip Pit Drift, Pump House & Sump	-	-	-	125'
Total	1468'	922'	2390'	2464'
Decrease			74'	

b-2. Ore Development:

There was a small increase in ore development in 1939 with more raising in ore and less drifting.

On the 9th level in No. 1 shaft and adjacent pillars including also No. 2 shaft pillars, there was 61 ft. of ore drifting and 581 ft. of ore raising, a grand total of 642 ft.

On the 11th level there was 60 ft. of ore drifting from the top of the 12th level raises to connect to 11th level drifts to improve ventilation and provide traveling roads.

On the 12th level there was 236 ft. of ore raising in five raises from the 12th to 11th level. Four of the raises were located in the ore body between No. 1 and No. 2 dikes and one in the ore body South of No. 1 dike.

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7. UNDERGROUND: (Cont'd)

b-2. Ore Development: (Cont'd)

On the 13th level there was 87 ft. of ore drifting and 496 ft. of ore raising. The ore drifting was confined to development of the small East-West ore body that lies between the South footwall and the main dike. The raises with one exception, were all located in the main ore body North of the dikes adjacent to the Maas boundary line. On two sub levels above the 13th level there was 67 ft. of ore drifting to make connections to the 12th level in order to provide ventilation and traveling roads.

A summary of the development in ore follows:

	Drifting	Raising	Total 1939	Total 1938
9th Level	61'	581'	642'	918'
11th Level	60'	-	60'	73'
12th Level	-	236'	236'	84'
13th Level	154'	496'	650'	453'
Total	275'	1313'	1588'	1528'
Increase			60'	

c. Stoping:

Mining in 1939 was confined to the same areas as in the previous year but the product by levels was materially changed from previous years. The most striking change was the large increase in product from the 9th and 13th levels. In percentage of the total product the 12th showed a large decrease, and there was also a small decrease on the 11th level. The decrease in size of the main ore body adjacent to and on the 12th level elevation made it necessary to transfer a number of mining contracts to the 9th level area.

The cost of stoping above the 9th level has been much above the average cost for the balance of the mine. This is due to the opening of sub levels under the hanging, many of which were under caved and broken jasper. The old timber encountered in the stopes has also increased costs by reducing the amount of ore recovered from a blast. The covering of many floors by close poling and wiring increased labor and supply cost. The worst phase has now been passed and output and cost from this area should show an improvement in the coming year.

In 1939 ore was mined in No. 1 shaft and adjacent pillars above the 9th level on the 855' sub level, the 3rd level, 825', 810', 795' subs, the 4th level, 773', 764', 747', 733', 720', 673', 663', 653' and 640' sub levels and in No. 2 shaft pillar on the 825' and 810' sub levels, the 4th level and the 773' sub level.

On the 11th level and subs above ore was mined on the 440', 425' and 415' sub levels and the 11th level in the area between No. 1 and No. 2 dikes and on the 415' sub level and the 11th level in the ore pillar on the Maas boundary.

On the 12th level and subs above ore was mined in the main ore body on the 350', 335', 325' and 315' sub levels and on the 12th level.

Above the 13th level ore was mined on the 295', 285', 270', 260' and 250' sub levels in the main ore body and on the 220' sub in the small ore body near the Southwest corner of the Negaunee Mine.

7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

In 1939 ore was mined on thirty-six sub levels as compared with twenty-six in 1938 and twenty-seven in 1937. The large increase was due to starting mining at various elevations in No. 1 shaft and adjacent pillars. Due to the system of mining followed by the former operators, i.e., square set stopes with 20 ft. pillars between, it has proven impossible in many cases to start mining at the hanging contact due to caving of the tops of the pillars. One pillar will extend to the jasper hanging while an adjacent pillar will be caved 20 ft. or more below the hanging and the opening filled with broken jasper. This condition accounts for the numerous sub levels opened for mining above the 9th level.

Detail of Stoping:

Subs Above the 9th Level

855' Sub - No. 1 Shaft Pillar

Mining of No. 1 shaft pillar was started in January 1939 on this sub level but the jasper hanging was encountered within 10 ft. on all sides and in the back and further work at this elevation abandoned.

3rd Level - No. 1 Shaft Pillar

Mining of No. 1 shaft pillar at the elevation of the old 3rd level was started in January by two contracts, one West of the shaft, the other East. To the East only two short slices were driven to the jasper footwall one of which holed into No. 1 shaft. The old shaft was filled with caved timber and jasper. The gang mining West of the shaft crossed the old 3rd level drift from No. 1 shaft to the incline shaft and mined the pillar between the footwall and the hanging. The ore area here was approximately 60' X 25' in size. The ore from the two contracts working at this elevation was moved by scraper hoists to the incline transfer drift from No. 901 raise and then transferred by scraper to No. 901 raise. Mining was completed here in April.

825' Sub - No. 1 Shaft Pillar

Mining was started here in January by one contract and was not completed until in November. The ore pillar was found to extend some distance beyond No. 1 shaft pillar on both the South and North sides. The maximum width including the incline transfer drift was 160 ft., 40 ft. North and 60 ft. South beyond the limits of No. 1 shaft pillar. The total area mined here was 5,750 sq. ft. divided as follows: 4,500 sq. ft. South of the transfer drift and 1,250 sq. ft. North.

825' Sub - No. 2 Shaft Pillar

Mining was started at this elevation in No. 2 shaft pillar by one contract from a transfer raise put up from a transfer drift driven from No. 915 raise. The ore area extended from an old mined area on the North side South to the footwall and followed the jasper hanging on the West side. A limit of mining was set on the East side to prevent establishing a connection to the old workings above this area which were quite wet. Before mining was completed another transfer drift was driven from No. 915 raise and another transfer raise put up. The first transfer drift and raise was then used for handling water from the area being mined. Mining in this new area progressed slowly as it was hindered by water. Close poling and wiring of the sub level floors were necessary on this new sub level. The first sub level under new hanging also requires holes to be drilled and blasted in the jasper hanging to insure breaking gob to fill the opening after the timber sets are blasted. The area mined here was about 4,000 sq. ft. in size. Work on this sub level was completed in December.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

810' Sub - No. 1 Shaft & Adjacent Pillars

Mining started from the incline transfer drift above No. 901 raise at this elevation late in January and has been carried on intermittently during the year. The first drifts to the Southeast were in the jasper hanging for over 50 ft. Work was then abandoned for a time as the rock interferred with the transfer of ore from the 825' sub level, which was also using this transfer drift. Later in the summer drifting to the North of the transfer was started and a small ore pillar found here which was mined. No further work was done until in November when the contract mining the 825' sub level completed work and moved down to the 810' sub level and resumed work in the ore pillar South of the transfer drift. After a few feet of advance in jasper, ore was encountered in which mining has been underway since. The ore extends 50 ft. beyond the limit of No. 1 shaft pillar across a stope filled with caved ore and a 20 ft. pillar beyond to a stope filled with caved jasper. It will require several months to mine the ore here.

810' Sub - Pillars South of No. 1 Shaft Pillar

Mining of an area at the top of No. 910 raise was started in the Summer and completed in November. The area mined is 100 ft. South of No. 1 shaft pillar and is approximately 115 ft. in length by 30 ft. in width. It comprised only one pillar and one slice in caved ore in an adjoining stope.

Another pillar was found in November from a transfer raise in a transfer drift driven from No. 908 raise 50 ft. South of No. 910 raise and mining started in December. This pillar is the last one on the South side of the ore body and is separated from the area being mined from No. 910 raise, described in the previous paragraph, by a stope filled with caved jasper.

810' Sub - Pillars North of No. 1 Shaft Pillar

No. 903 raise from the 9th level was completed late in 1938 to the 810' sub level elevation. It was cut out in December 1938 and mining started, which was completed in October 1939. Much of the work done here during the year was exploratory in character, as a number of dikes were found and it was necessary to drift through them to explore the ground beyond. The area mined was cut up by drifts driven by the former operators, also by stopes. At one point the ore extended to the edge of an open stope on the North side of No. 1 shaft ore body. To make mining safe it was necessary to drill and blast in this area to provide filling. Caving of the back over the open stope then started and the stope soon filled with caved material and a short time later the ground on surface started to settle directly above this stope. In mining the caved ore in the stopes forepoling was required to prevent runs of ore and rock from the back. Careful covering down of the floor of the sub level was necessary to hold back the rock and make mining safe and more reasonable in cost on succeeding sub levels. The old stopes are filled with caved ore and square set timber. The above description is intended to convey some idea of the amount of dead work required in reopening an area that had been partially mined fifty years ago. The area mined was approximately 100' X 80' in size but was irregular in outline due to the dikes and caved jasper in the old stopes.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

810' Sub - No. 2 Shaft Pillar

On completion of mining on the top sub at the 825' sub level elevation in this area the transfer raise was cut out on the 810' sub level and drifting started in December 1939. Most of the mining on this sub level will be under the floor covering of the sub above and conditions will, therefore, be much more favorable and the ore produced at a considerably lower cost.

795' Sub - No. 1 Shaft & Adjacent Pillars

No. 903 raise was cut out at this elevation in November 1939 and mining started. This raise is located near the North limit of No. 1 shaft ore body in an area crossed by several small dikes which have to be removed to mine the ore that was developed by the work done on the sub above, the 810' sub level. Most of the mining will be under the floor covering of the upper sub level and forepoling will be unnecessary except under new hanging. Mining will progress more rapidly with increased output and lower cost per ton.

795' Sub - Narrow Pillars South of No. 1 Shaft Pillar

Mining from No. 910 raise at this elevation was started in December 1939 on completion of mining the pillar on the sub above. The ore area here is comparatively small as the only available ore is in the narrow pillar with caved sand and jasper in the old stopes. Mining on this new sub level should progress more rapidly as it will be under the covering of the sub level above where mining was completed in November 1939.

4th Level - Pillars North of No. 1 Shaft Pillar

This ore area located at the Northwest end of No. 1 shaft ore body was discovered by a transfer raise put up from the 733' sub level. A raise, No. 918, was then put up from the 9th level which holed to the transfer raise and mining was started in June 1939 at the elevation of the old 4th level approximately 788'. Mining was continued for the balance of the year and is not yet completed. The area mined thus far is approximately 95' X 50' in size. Part of the area had been mined by the former operators at a higher elevation but most of the area at the elevation of the sub level was in solid ore. An 8 ft. dike was crossed and a solid pillar of ore 20 ft. wide by 50 ft. in length found and mined beyond the dike directly under solid jasper hanging. This ore had evidently been overlooked by the former operators. Another dike crosses the area adjacent to No. 918 raise and all the ore West of the dike will be mined from No. 918 raise. Southeast of this area and East of this dike mining is underway on the 795' sub level from No. 903 raise.

4th Level - No. 2 Shaft Pillar

Mining of No. 2 shaft pillar in this area was started in 1938 in the area North of the dike which divides the ore body. It was directly under a sub level mined in 1921 and on which the floor covering had rotted. Mining was therefore carried on under a handicap due to driving spiling for every foot of advance. Mining Northwest of the raise was finished in 1938 and in 1939 the pillar North and Northeast of the raise was mined. The first drift near the footwall was very wet and considerable trouble was experienced before it reached the end of the ore pillar a distance of 103 ft. from the

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

raise. As most of the water came from the end of the drift a dam was made 20 ft. back from the breast and the water carried in a 2" pipe to the raise and down to the level. The four side slices were all comparatively dry. The area mined here in 1939 was approximately 120' X 60' in size and extended from the footwall to the area mined about twenty years ago. The floors were carefully poled down and wire fencing laid on top to insure a good covering to hold back the broken jasper. Mining from No. 917 raise was completed early in August and the contract moved down to open the 773' sub 12 ft. below. The ore pillar found on the 4th level elevation was larger than had been anticipated from the available records.

Some drifting was done from No. 915 raise, located 100 ft. South of No. 917 raise, in 1938 and an ore body developed by one drift at this elevation. An incline raise followed the ore 35 ft. above the level on an angle of 30°. In 1939 the raise was continued to the old 3rd level which was found open but partially filled with caved ore and jasper. It was decided to drive the drift ahead on the 4th level elevation and put up a cribbed raise to use in mining the ore. The raise was put up early in 1939 and mining started at the 825' sub level elevation a short distance below the 3rd level and the ore transferred on the 4th level elevation.

Later in the year a new transfer drift was driven in about the center of the area mined on the 825' sub level and a new transfer raise put up to this sub level. The first transfer drift on the 4th level was abandoned for transfer of ore and used to handle water encountered on the foot side of the area mined on the 825' sub level, 37 ft. above. There are two more sub levels to mine before reaching the 4th level elevation. The ore body here lies on a flat dike dipping to the West and North, which will cut off the ore a short distance below the 4th level when it intersects the main East-West dike which dips to the South.

773' Sub - No. 2 Shaft Pillar:

On completion of mining at the old 4th level elevation, No. 917 raise was cut out and mining started in August on the 773' sub level in the pillar North of the dike. By the end of the year an area 100' X 60' had been mined North of the raise. The first drift near the East side was quite wet but after installing a pipe to carry the water, subsequent slicing was done after favorable conditions. The progress made was almost double that on the sub level above as it was not necessary to drive spiling to hold back the loose rock above. The area here has proven larger than was indicated by the old records. At the end of 1939 about two-thirds of the ore area had been mined.

773' Sub - Pillars South of No. 1 Shaft Pillar

No. 908 raise was put up from the 9th level in 1939, reversed at the 720' sub level and extended to the jasper hanging at a height of 173 ft. A sub level was opening under the jasper at the 773' sub level elevation in August and a drift driven Southeast to the footwall in the ore pillar a distance of 140 ft. Two transfer raises were put up from this drift and late in the year mining started from the higher one at the elevation of the 810' sub level. Late in the year a drift was driven from No. 908 raise at right angles to the pillar to determine if there were any parallel pillars of ore beyond the old stopes on each side. The drift to the Southwest found no ore at this elevation while the one driven Northeast crossed

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c. Stoping: (Cont'd)

a stope filled with caved ore into another pillar which was later mined on the hanging or Northwest side. On account of the transfer drift and mining at a higher elevation above the transfer raise, it will be impossible to mine under the hanging near the raise until mining near the footwall has been completed.

764' Sub - Pillars South of No. 1 Shaft Pillar

This sub level was opened late in 1937 and early in 1938 from No. 900 raise and a drift driven from the hanging Southeast to the footwall. A cross-cut was also driven at a point 60 ft. back of the footwall Southwest across two stopes filled with caved ore and one solid pillar of ore. Sufficient ore was found to warrant a raise from the 9th level and No. 910 raise was put up in 1939. It was extended to the 810' sub level where mining was started. At the 764' sub level elevation a drift was driven 20 ft. West from the raise to the cross-cut to make a traveling road connection.

747' Sub - Pillars South of No. 1 Shaft Pillar

This sub level was opened from No. 900 raise in 1938. The only work done here in 1939 was a small drift from No. 908 raise driven 25 ft. to the Northwest to hole to a cross-cut from No. 900 raise. The cross-cut from No. 900 raise which was 125 ft. distant, was cleaned and timbered with small tamarack timber in 1939 to make it safe for a traveling road. The connection to No. 908 raise is in daily use by the officials on inspection trips and also by the miners.

733' Sub - No. 1 Shaft Pillar & Narrow Pillars North

This sub level was opened from No. 920 raise in 1938 and mining started. It was temporarily abandoned after a connection had been made by way of the next higher sub level to No. 902 raise. Mining was resumed here in the early Summer and after driving several slices to the hanging a slice was extended beyond a seam of jasper to the Northeast to the jasper footwall a distance of 140 ft. A transfer raise near the footwall was extended to the elevation of the old 4th level and after No. 918 raise was completed from the 9th level to connect with the transfer raise, mining was started on the old 4th level. No further work was done on the 733' sub level until in the fall when mining of the balance of No. 1 shaft pillar was started. A mining limit was set and all the ore in the pillar mined to the established limits. Work was completed in December and the contract moved down to open the next lower sub level. The area being mined in No. 1 shaft pillar lies Northwest of the dike which runs through the pillar in a general East-West direction. It extends from the jasper hanging Southeast about 60 ft. to the mining limit. Due to the Westward pitch of the hanging the ore area should be larger on lower sub levels.

720' Sub - Narrow Pillar South of No. 1 Shaft Pillar

This sub level was opened on the completion of a transfer raise put up from a drift driven from No. 924 raise late in 1938 on the 673' sub level. The transfer raise was started in 1938 and completed early in 1939 at the elevation of the 720' sub level. A drift was then driven on the 720' sub level from the transfer raise in an ore pillar 155 ft. Southeast to the footwall. No. 908 raise from the 9th level holed into this drift, where it was reversed and continued up to the hanging jasper. Late in

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c. Stoping: (Cont'd)

December 1939 mining under the hanging at the elevation of the 720' sub level was started. The jasper hanging was encountered Southwest of the raise and to the Northwest the drift was in caved ore with the jasper hanging on the West side. It is expected that the ore can be mined on this, the first sub level in this area, in two slices. The area to be mined should increase in size on succeeding lower sub levels. The ore is dumped in the transfer raise and scraped to No. 924 raise on the 673' sub level. The area to be mined here is in the Southwest corner of No. 1 shaft ore body South of the dike that cuts through the ore and divides it into two parts.

673' Sub - Pillars South of No. 1 Shaft Pillar

Mining from No. 922 raise was underway at the end of 1938 and was completed in this area North of the dike in May 1939. The area of this sub level which extends from No. 1 shaft pillar under the hanging along the dike was approximately 9,000 sq. ft. It crossed three stopes filled with caved ore and timber and two solid pillars. Its maximum length along the dike was 185 ft. and maximum width North of the dike 100 ft., the average width being, however, only 50 ft.

673' Sub - Pillars South of the Dike & No. 1 Shaft Pillar

This sub level was opened in November 1938 and drifting started to outline the ore in the Southwest corner of No. 1 shaft ore body immediately South of the dike. A drift was driven through caved ore to the caved jasper. A cross-cut was started to the Northeast from the end of this drift in December 1938 and completed early in January 1939 after advancing 70 ft. in ore across two pillars with stopes filled with caved ore between. The cross-cut was stopped in the second ore pillar and a raise put up 40 ft. to the jasper hanging at the elevation of the 720' sub level. It was then decided to drive another cross-cut directly from No. 924 raise to the transfer raise to make a better road for transferring the ore. This drift was in caved and solid ore and was 85 ft. in length. Mining from the transfer raise was started in December 1939 on the 720' sub level. The area to be mined here may produce considerable ore as the former operators seldom extended the square-set stopes directly to the dike but left small pillars between.

663' Sub - Pillars South of No. 1 Shaft Pillar - North of the Dike

This sub level was opened in May 1939 from No. 922 raise on completion of mining on the 673' sub level. The ore on this sub level was also mined from No. 923 raise which was put up into this area in 1939 due to the ore extending along the dike beyond economical tramming distance from No. 922 raise. Mining from No. 922 raise was finished in November. Mining from No. 923 raise was started in September and completed by the end of the month.

653' Sub - Pillars South of No. 1 Shaft Pillar - North of the Dike

Same area as described in preceding paragraph.

This sub level was opened from No. 923 raise in October 1939 and mining was completed adjacent to this raise early in December.

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c. Stoping: (Cont'd)

Mining from No. 922 raise was started in November 1939 and will not be completed for several months. The areas mined from Nos. 923 and 922 raises join each other and comprise the entire area of old stopes and pillars South of No. 1 shaft pillar North of the dike. The combined length along the dike is approximately 220 ft. and the width from the dike to the hanging varies from 120 ft. near No. 1 shaft pillar to 50 ft. at the Southwest end of the present limits of the ore body which was mined beyond this point years ago.

640' Sub - Pillars South of No. 1 Shaft Pillar - North of the Dike

Same area as described in preceding paragraphs.

This sub level which is only 30 ft. above the 9th level was opened from No. 923 raise early in December. Due to the small size of the ore body adjacent to this raise mining will be completed here within sixty days.

9th Level

There was no drifting on the 9th level during 1939. Four raises were put up in No. 1 shaft and adjacent narrow pillars.

No. 918 raise on the Northwest side of No. 1 shaft ore body was started in May and completed in June to a height of 134 ft. It holed to a transfer raise put up from the 733' sub level a distance of 55 ft. in ore, making the total height of No. 918 raise 184 ft. above the 9th level. The log of the raise is as follows: 0 - 100' slate and jasper; 100' - 184' ore; jasper at 185'.

No. 910 raise put up in narrow pillar 80 ft. South of No. 1 shaft pillar was started in January 1939 and finished at a height of 219 ft. in April. It was extended to the 810' sub level in a Southeasterly direction from the 9th level. The log of the raise is as follows: 0 - 125' slate, jasper and lean ore; 125' - 219' ore; 219' jasper.

No. 908 raise located in narrow pillar 45 ft. Southwest of No. 910 raise was started in April and completed in July at a height of 186 ft. to the jasper hanging. It was located in the West side of the 9th level haulage drift and was extended in a Northwesterly direction. The log of the raise is as follows: 0 - 20' slate; 20' - 70' jasper and lean ore; 70' - 186' ore. It was extended to the 773' sub level elevation.

No. 923 raise in the main level ore drift near the hanging was started in May and completed at the end of the month at a height of 65 ft. to caved jasper. This raise is located North of the main dike in the last narrow pillar Southwest of No. 1 shaft pillar. The log of the raise is as follows: 0 - 20' dike; 20' - 65' ore.

Subs Above the 11th Level

440' Sub - Ore Body Between No. 1 & No. 2 Dikes

This sub level was opened in July 1937 and at the end of 1938 was 75% mined with four contracts working. In 1939, one contract finished in January, one in May, one in July and mining was finished by the last contract at the end of August. This sub level was 500 ft. in length with an average width of 140 ft. It required almost exactly two years to mine the ore.

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c. Stoping: (Cont'd)

425' Sub - Ore Body Between No. 1 & No. 2 Dikes

This sub level was opened in April 1938 at the East end by one contract which worked for the balance of the year and mined about 12½% of the ore on the sub level. In 1939, as mining was finished on the subs above, four contracts moved down and started to mine. During the year three raises were put up from the 12th level in this area, two of which were extended to the 425' sub level and one opened at the elevation of the 415' sub level near the East end of the ore body. At the end of the year only one 11th level raise was still in use and three raises from the 12th level, one of which had been put up in 1937. With the completion of the 12th level raises, mining conditions improved as there was no storage capacity in the 11th level raises. The ore body on this sub level is smaller than on the 440' sub level, being 490' in length by 120' in average width. The footwall is advancing faster than the hanging recedes and also the area between the two dikes is decreasing as the dikes are approaching each other and come together at the West end on the 12th level elevation. This ore body cuts out entirely between the 13th and 12th levels.

415' Sub - Ore Body Between No. 1 & No. 2 Dikes

This sub level was opened late in September by one contract after a raise from the 12th level was completed to this elevation. Mining is underway near the East end of the deposit where 8% of the ore on the sub level had been mined at the end of the year. Another raise from the 12th level, located at the West end of the deposit, was opened at this elevation in the Summer and a drift driven in jasper to the ore. Due to the large number of old 11th level drifts in this area, several of which had crushed, the floor covering of the 425' sub level was down within 3 ft. of the floor of the 415' sub level. Mining from this raise was then started about 2 ft. above the 11th level elevation.

11th Level - Ore Body Between No. 1 & No. 2 Dikes

Mining of an area adjacent to No. 1 dike under the hanging at the West end of the deposit was started in July and continued for the balance of the year by one contract. Nearly every slice had to cross an old crushed 11th level drift which interferred with production. The ore area has extended West more rapidly than on the subs above due to flattening of the hanging. One dropper in the hanging still persists near the raise but is less than 20 ft. in diameter. It is being mined as slicing extends in all directions from the raise.

The most Easterly raise from the 12th level was connected by a drift 40 ft. in length to the 11th level haulage drift to improve ventilation and provide a traveling road.

One raise from the 12th level in the ore body South of No. 1 dike near the footwall was connected to the 11th level drift by a small drift 30 ft. in length driven in lean ore and hanging material. The ore did not extend to the 11th level elevation at the location of this raise.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

415' Sub - Ore South of No. 1 Dike Near the South Footwall

An enriched area along No. 1 dike was mined here in 1938 but owing to the ore being only 15 ft. in width it did not cave after blasting down the timber on the 425' sub level 12 ft. above. Work was resumed here in 1939 and the hanging blasted until the open space was filled after which the balance of ore on the 415' sub was mined. After blasting the timber on the 415' sub more filling was broken to make a mat. This small ore body is 15 ft. wide by 60 ft. in length and it is hoped is merely the top of a much larger ore body that will be developed at lower elevations.

415' Sub - North Footwall Pillar Near Maas Boundary

Mining on this sub level started in April 1938 and was completed in September 1939. The pillar was mined by two contracts from two 12th level raises. The pillar on this sub level was approximately 200 ft. by 90 ft. in size.

11th Level - North Footwall Pillar Near Maas Boundary

Same ore area as described in preceding paragraph.

This sub level was opened in September 1939 and at the end of the year one-third of the ore had been mined. The ore is being mined rapidly on the five day schedule and the pillar is also gradually decreasing in size. The jasper hanging between the pillar and the mined area to the South and East is disappearing and will probably be entirely eliminated on the next sub level after which the size of the pillar will decrease rapidly on each sub level and will be cut out entirely by the footwall about 30 ft. above the 12th level.

Subs Above the 12th Level

350' Sub - Main Ore Body

Mining on this sub level was started in 1936 and at the end of 1938 was completed except for several pillars adjacent to No. 1298-A raise. Mining of these small pillars was completed in March 1939 which finished work on this sub level.

335' Sub - Main Ore Body

This sub level was opened in 1936 and by the end of 1938 the ore above the 1230, 1240 and 1250 series of raises was all mined and mining nearly completed above the 1260 series. One contract was mining above the 1270 series and four above the 1290 series in December 1938. Mining on this sub level was completed in November 1939. All of the ore mined in 1939 was handled on the 13th level except from one small area above No. 7 cross-cut on the 12th level. The sub level in the area above No. 6 and No. 7 cross-cuts on the 12th level decreased very rapidly in size due to the flat footwall and the steepness of the hanging. The hanging was almost vertical from the 360' sub down to the 335' sub while the footwall flattened and advanced more than normally, resulting in a severe reduction in the ore area.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

325' Sub - Main Ore Body

This sub level was opened in January 1937 under the hanging from a 13th level raise. By the end of 1938 mining was underway from eight raises from the 13th level and about 30% of the main ore body had been mined. In 1939 mining was completed except from three 13th level raises on the Maas boundary above No. 9 cross-cut on the 12th level. For the first time an area of lean ore and jasper cut the main ore body into two separate bodies. The one being mined at the end of the year is approximately 300 ft. in length on the Maas boundary by 150 ft. in width. This area was 25% mined at the end of the year. The lean ore and jasper area between this ore and the mined portion of the main ore body is approximately 100 ft. in width. Thus 100 ft. of the main ore body was eliminated on this sub level.

Mining progressed very rapidly on this sub level in 1939 due to the large number of contracts working here. The average number was seven contracts, the maximum nine. The 13th level raises are laid out to give each contract long slices which increased output and as a result areas are mined more rapidly. Thirty tons stoping per miner per eight hour shift was often attained in this area. Some contracts made two cycles per eight hour shift which is unusual. The excellant results obtained in this area offset to a large extent the low output obtained from the exploratory work in No. 1 and No. 2 shaft pillars above the 9th level.

315' Sub - Main Ore Body

This sub level was opened in June 1937 under the hanging from a 13th level raise. By the end of 1938 an area 250 ft. in length had been mined under the hanging except for a few small pillars which were mined early in 1939. This completed all mining in the main ore body at the elevation of this sub level. To correct differences in elevation, mining of the balance of the main ore body is reported under the 12th level elevation approximately 304 ft. while the actual elevation of the area mined on the 315' sub was 309 ft.

12th Level - Main Ore Body

Mining under the hanging at the 12th level elevation was started from one 13th level raise in October 1937. The area mined under the hanging reported under the heading "315' Sub Level" in the previous paragraph was near the 12th level elevation and was therefore also put on the 12th level map. This transfer brought the area mined on the 12th level to a length of 250 ft. along No. 2 dike and under the jasper hanging and a width of 75 ft. at the West or narrow end and 200 ft. at the East end.

Mining on the 12th level was resumed early in 1939 as contracts finished mining on the 325' sub level which was actually only one sub above the 12th level.

By the end of the year seven contracts were mining in the central portion of the main ore body and 70% of the ore here had been mined. The ore has extended to the West under the hanging and on the 325' sub reached the old Maas Mine workings on the boundary. The extension however, did not offset the advance of the footwall on the North and Northeast sides and the ore body showed a further decrease in area on the 12th level.

7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

In December 1938 a cross-cut was being driven in the footwall from which two raises were later put up to the 415' sub above the 11th level to mine the ore between No. 1 and No. 2 dikes. The advance in 1938 was 30 ft. The cross-cut was extended 183 ft. to the East in 1939 and two raises put up to the first sub above the 11th level. The drift was in jasper and slate.

No. 1222 raise was started in July and completed in August at a height of 117 ft. The log of the raise is as follows: 0 - 84' jasper and dike; 84' - 117' ore.

No. 1220 raise was started in September and completed in October at a height of 134 ft. The log of the raise is as follows: 0 - 80' jasper and dike; 80' - 134' ore.

In the main footwall drift on the 12th level, one raise, No. 1218, was put up to mine the ore body between No. 1 and No. 2 dikes. The log of the raise follows: 0 - 76' jasper and lean ore; 76' - 141' ore.

In the old footwall drift to the winze, No. 1210 raise was put up to mine the ore South of No. 1 dike near the footwall. This raise was started in February and completed to a height of 117 ft. in April. It struck the jasper hanging at the elevation of the floor of the 11th level. The log of the raise follows: 0 - 35' jasper; 35' - 117' ore; 117' jasper.

No. 1212 raise in the same cross-cut as No. 1210 was started in December 1939 and at the end of the month was up 38 ft. in hard jasper. This raise will reverse direction at a height of 40 ft. and will reach the 11th level elevation at a height of 113 ft. It will be used to mine the ore near the East end of the deposit between No. 1 dike and the South footwall. This section of the ore body is pinching out rapidly due to jasper on all sides and probably does not extend more than one sub level below the 11th level.

No. 1240 raise in old No. 1240 cross-cut was started in December 1939 and at the end of the month was up 67 ft. in ore. It will be extended to the 11th level elevation to mine the ore between No. 1 and No. 2 dikes.

No. 1364 raise near the Maas boundary at the North end of the 12th level was connected at the 12th level elevation to the footwall drift by a rock drift 90 ft. in length to provide ventilation for the 1360 series of raises from the 13th level. This is the area formerly served by the 1290 series of raises on the 12th level. It is the warmest place in the mine and has required booster fans for ventilation for many years.

Subs Above the 13th Level

295' Sub - Main Ore Body

This sub level was opened under the hanging in September 1938 from No. 1323 raise and one contract mined here for the balance of the year. In 1939 three other contracts finished mining on other sub levels and moved to this sub level. One additional raise was put up from the 12th level to mine the Westward extension of the ore body under the hanging as the slices were too long from the other raises. Mining of this area was completed in December 1939. The area mined here was 230 ft. by 175 ft. in size. A small horse of jasper on the dike found on two subs above was much larger on this sub level and materially decreased the ore area.

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285' Sub - Main Ore Body

Mining of two small areas under the hanging at this elevation Southwest of the area described in the previous paragraph was completed in 1937 and 1938. The area furthest to the Southwest extended to this elevation due to a roll in the hanging wall and was roughly circular with a diameter of 70 ft. The other area was mined directly under the regular hanging and was only two slices wide by 130 ft. in length. Mining on this sub level was resumed in November 1939 when mining on the 295' sub was nearly completed. Drifting to connect the four raises was completed and slicing was under way at the end of the year. The area to be mined extends to a mining limit on the Northeast and North side, to the jasper hanging on the Northwest side, to a mined area on the Southwest side and to the dike and horse of jasper on the Southeast side. Due to extension of the hanging to the West to an area already mined, this sub level will have an area of approximately 245 ft. by 200 ft.

Another small area was mined at the elevation of this sub level in 1938 from No. 1352 raise directly under the jasper hanging, not far from the Maas boundary. It was only 25 ft. in width by 60 ft. in length. Mining was started here to undercut the hanging and relieve pressure on the 13th level haulage drift that parallels the Maas boundary.

270' Sub - Main Ore Body

This sub level was opened in May 1937 and one small area under the hanging mined from No. 1310 raise. In February 1938 mining further Southwest under the hanging from No. 1311 raise was started by one contract and continued for the balance of the year. Mining of this area was completed in February 1939.

A raise, No. 1338, was completed to this elevation in February 1939 and mining started. The raise was located near the main dike and the first drift was driven along the dike a distance of 175 ft. from the raise. A test raise proved that the ore diredtly on the dike extended to the 295' sub level elevation and preparations were made to mine the narrow seam of ore along the dike at this higher elevation. The 13th level drift below however, was crushing badly and it was necessary to stop work on the sub level and retimber the haulage drift. The new timber in the drift lasted only a few weeks and it was then decided to mine this area from raises put up from a new cross-cut that was planned to reach this area about March 1940. Crushing on the 13th level in this area is due mainly to the pull or drag from the mined area on the Maas property which is less than a hundred feet to the Northwest.

Mining from No. 1352 raise at the 270' sub level elevation was started in November 1938 and completed in June 1939. The area mined was about twice the size on the 285' sub where mining was started directly under the hanging. The increase in area was due to the Westward pitch of the hanging jasper. The ore extended to a mined area on the Maas property. The area mined was approximately 110 ft. by 40 ft. in size.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

260' Sub - Main Ore Body

The small area under the hanging mined on the 285' and 270' sub levels from No. 1352 raise was opened for mining on the 260' sub level late in June 1939 and mining was underway for the balance of the year. Three slices extended to the old workings on the Maas property and three slices struck the jasper hanging before reaching the boundary. The area mined thus far on this sub level lies Northwest of the raise and is approximately 100 ft. by 60 ft. in size. It is thought that Southwest of the raise, the ore will extend to the mining limit set Northeast of No. 1311 raise. The mining of this area will partially relieve the pressure on the 13th level haulage drift for it is directly above the area where crushing has been very severe all the year.

Another area at the elevation of this sub level was opened from No. 1311 raise late in January 1939 and mining continued throughout the year except for various short periods when the contract was moved down to the 13th level to repair the haulage drift. The ore area mined was 140 ft. by 60 ft. in size. It extended from the dike to the jasper hanging.

In November another raise, No. 1308, was put up to this elevation and mining started directly East of the area mined from No. 1311 raise. The area to be mined from No. 1308 raise is bounded on the Northeast by a mining limit, on the South by the dike, on the Northwest by the jasper hanging and on the Southwest by a mined area. No. 1308 raise has replaced No. 1310 raise which crushed beyond repair this year.

250' Sub - Main Ore Body

In November a new raise, No. 1307 was completed to this elevation from No. 1310 cross-cut. The development contract that put up this raise then cut out and installed timber over the raise under the floor covering of the 260' sub, 60 ft. Southeast of No. 1311 raise. This new raise will be used to mine ore on the 250' sub and No. 1311 raise will be abandoned on account of heavy pressure on the 13th level haulage drift in the vicinity of this raise.

220' Sub - Small Ore Body Near Southwest End of 13th Level

This sub level was opened in June 1938 from No. 1341 raise and mining completed here in February 1939. The ore area was smaller than on the sub above due to the jasper footwall pitching to the North. The ore on this sub level however, extended North to the dike that crosses to the Maas property, directly Northwest of No. 1341 raise. No more mining can be done in this area until the 14th level is developed as the 220' sub level is only 24 ft. above the 13th level.

At the end of 1938 a drift was being driven South from No. 1344 raise on the 220' sub level elevation to prove up ore found on the 13th level in the haulage drift and also in diamond drill hole No. 28 drilled on the 13th level to the South. The small exploratory drift was continued a distance of 90 ft. Southeast of No. 1344 raise 35 ft. beyond the point reached in December 1938. It continued in hanging jasper and along a dike on the West side for the last 20 ft. A drift was then driven through the dike which was about 8 ft. thick and hanging jasper encountered. It was decided to develop this area from the 14th level as it was evident the ore encountered by the 13th level drift and by No. 28 diamond drill hole South of the drift was the top of the ore body.

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c. Stoping: (Cont'd)

13th Level

On account of discovery of ore by diamond drilling South of the dike together with the heavy pressure on the haulage drift parallel with the Maas boundary it was decided to drive a drift near the South footwall and turn off cross-cuts to the Northwest from which raises would be put up to mine the ore on the Southwest end of the main ore body and also any ore that might be developed above the 13th level South of the main large dike in what is commonly termed the South footwall area. This drift was started in April on a curve to the Southwest from the main haulage drift to the shaft in the transition slate and jasper area near the slate footwall. In July the point of curve for No. 1 cross-cut was reached and after advancing 84 ft. around the curve, ore was encountered which proved to be 45 ft. in width. After drifting 15 ft. in jasper beyond the ore, the cross-cut holed to the end of old No. 1 cross-cut which had been driven Southeast two years ago from the drift in ore parallel with the Maas boundary. The main drift was then continued to the Southwest and at the end of November the point of curve for the second cross-cut was reached. This cross-cut advanced around the curve in December, a distance of 80 ft., the last 15 ft. of which was in ore. This ore was discovered in diamond drill hole No. 29 which was drilled early in 1939 on a sub level 24 ft. above the 13th level. It is probably the Southwest continuation of the ore encountered in No. 1 cross-cut. The cross-cut will be advanced as rapidly as possible to completion at the Maas boundary 305 ft. distant. It is expected that a new dike branching off from the main dike will be encountered within 90 ft. beyond which there is reason to believe ore will be found that will extend to the main dike. North of the main dike the main ore body will extend 100 ft. to the Maas boundary. There was a total 605 ft. of drifting here in 1939, 545 ft. in rock and 60 ft. in ore. All other development work on the level was confined to raising.

No. 1358 raise was cut out in December 1938 and raising started in January 1939. This raise was completed at a height of 126 ft. in March at the elevation of the 325' sub level. It was in jasper to a height of 44 ft., in ore from 44 ft. to 111 ft. and in hanging jasper 111 ft. to 126 ft. This raise is located in the drift parallel with the Maas boundary midway between No. 3 and No. 4 cross-cuts.

No. 1338 raise was cut out in December 1938 and completed at a height of 95 ft. in January. It encountered jasper at 95 ft. and a sub level was opened at the elevation of the 270' sub level. The raise was in ore. It is located in the ore haulage drift parallel with the Maas boundary and is the last raise to the Southwest in the main ore body. The crushing of the haulage drift made it necessary to abandon this raise early in the fall.

No. 1325-A raise was started in April and completed in June to the 295' sub level. The raise was in ore. It was put up to facilitate mining of ore under the hanging that had extended beyond economical scraping distance from the 1320 series of raises on the opposite side of No. 2 cross-cut.

In October an exploratory raise was put up near the footwall or South side of the ore found in the connection driven from the new haulage drift near the South footwall to old No. 1 cross-cut. The jasper hanging was struck 26 ft. above the floor of the cross-cut or 16 ft. above the back. This did not provide enough storage room to warrant drifting under the hanging to outline this ore body. It indicated a very flat Westward pitch of the ore which must be mined from the 14th level.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

No. 1307 raise located on the West side of old No. 1 cross-cut was started in October and completed in November at a height of 61 ft. at the floor covering of the 260' sub level. It was cut out on the 250' sub level and will replace No. 1311 raise located in the haulage drift parallel with the Maas boundary. No. 1311 raise is now in use in mining the main ore body adjacent to the main dike. Owing to the difficulty and expense of maintaining the haulage drift near No. 1311 raise, the raise and the drift will be abandoned on completion of mining on the 260' sub level from No. 1311 raise.

No. 1308 raise located on the East side of old No. 1 cross-cut was started in November and completed at the end of the month, at a height of 96 ft. It was extended in ore to the 270' sub level elevation. Mining was started from this raise in December. No. 1308 raise replaced No. 1310 raise which had crushed beyond repair during the period it was impossible to maintain the curve from old No. 1 cross-cut to the haulage drift that parallels the Maas boundary.

No. 1353 raise was started in November 1939 and at the end of the year was completed at a height of 138 ft. in ore. This raise is midway between No. 1352 and No. 1354 raise and will facilitate the mining of the ore pillar adjacent to the Maas boundary which has extended beyond economical scraping distance from No. 1354 raise. The hanging jasper prevented the extension of No. 1352 raise to the 12th level elevation. No. 1353 raise at the end of December had been cut out and mining started on the 12th level.

A powder house was excavated in 1939 on the side of the North footwall drift on the 13th level. The area excavated was equivalent to 17 ft. of full size rock drift.

14th Level

The work done on this level is reported under "Development in Rock" elsewhere in this report. It was started in October 1939 and at the end of the year the haulage drift from the shaft pocket had advanced 154 ft. in hard slate containing seams of chert. They will continue the drift 16 ft. further, then move back and strip it to make room for the shaft plat.

d. Timbering:

Under this heading is included a paragraph on retimbering work during 1939. In a large measure, retimbering was confined to the 13th level haulage drift that parallels the Maas boundary and to the curves on the cross-cuts to the haulage drift. The area under heavy pressure extended from the lean ore area at the intersection of No. 3 cross-cut to the point where the haulage drift intersects the main dike near the Southwest end of the 13th level. The area under pressure was 700 ft. in length along the haulage drift and also involved about 60 ft. around the curve in Nos. 1, 2, and 3 cross-cuts or a grand total of 860 ft. of drift and cross-cuts. Certain sections of the drift were under more severe pressure than other sections, the worst areas being in sections under the hanging jasper which had not yet been undercut by mining operations. It appears that the relief of pressure on the mined areas adjacent to the hanging materially increases pressures on the hanging. There is also the added side pressure due to the tendency of the ground to ride towards the mined areas on the Maas property.

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7. UNDERGROUND: (Cont'd)

d. Timbering: (Cont'd)

Three raises had to be abandoned near the West end of the drift due to crushing. An average of four repair gangs worked steadily throughout the year repairing on the 13th level and in addition several mining contracts were transferred to the level to repair work to open the drift so that ore could be trammed from their raises. In addition to actual replacement of crushed timber, constant trouble has been experienced in keeping the tracks down to grade due to swelling of the ground. In some cases 2 ft. to 3 ft. of ground had to be removed to get down to grade. Production was seriously hampered while this work was underway. A decided improvement was noticeable in the latter part of the year due to mining above a portion of the area. The rate of crushing has decreased and longer time between repair periods has occurred. The replacement of the worst portion of the drift by cross-cuts, one of which has been completed, will permit the abandonment of haulage on a 400 ft. section of the drift and materially reduce repair expense.

Some timber repair work has been necessary on the other operating levels, mainly replacement of rotted timber. The expense for this work has been normal except on the 13th level.

The product increased 33.8% in 1939 and the total cost for timber, lagging, and poles increased 31%. The price of timber decreased 5½% as compared with a decrease of 8% in 1938. The cribbing timber used in 1939 increased 31.5% while the total feet of stulls increased 29.5%. The feet of timber per ton of ore decreased approximately 3% in 1939 and would have been considerably larger if less cribbing timber had been used. More poles were used account of more ore mined and more close poling of sub level floors in new areas opened for mining above the 9th level. The actual increase in feet of poles used was 55%. The total cost per ton for timber, lagging, poles, and wire fencing was 1.5% less in 1939.

Statement of Timber Used:

	Lineal Feet	Avg. Price Per Foot	Amount 1939	Amount 1938
6" to 8" Cribbing	161,572	.0352	5,682.99	4,432.60
8" Stulls	77,178	.0664	5,128.51	3,528.24
10" Stulls	11,093	.0925	10,279.77	8,857.22
12" Stulls	56,989	.1306	7,443.47	6,670.49
Treated Timber	978	.0359	351.04	* 14.20
Total 1939	407,810	.0708	28,885.78	
Total 1938				23,502.75
Lagging - 7 ft.	1,589,117	.0076	12,132.09	9,616.76
Poles - 9½ ft.	1,207,457	.0132	15,949.86	10,272.94
Total 1939	2,796,574	.0104	28,081.95	
Total 1938				19,889.70
Wire Fencing - Feet	11,220		640.93	396.07
Grand Total 1939			57,608.66	
Grand Total 1938				43,788.52

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YEAR 1939

7. UNDERGROUND: (Cont'd)

d. Timbering: (Cont'd)

Statement of Timber Used: (Cont'd)

	1939	1938
Product	551,362	412,000
Feet of Timber per ton of ore	.740	.761
Feet of Lagging per ton of ore	2.882	2.950
Feet of Lagging per ft. of timber	3.897	3.875
Feet of Wire Fencing per ton of ore	.0203	.0167
Cost per ton for timber	.0524	.0570
Cost per ton for lagging	.0220	.0233
Cost per ton for poles	.0289	.0249
Cost per ton for wire fencing	.0012	.0009
Total Cost Per Ton	.1045	.1061
Equivalent of stull timber to board measure	826,888	506,318
Feet of board measure per ton of ore	1.499	1.22

Total Cost for Timber, Lagging, Poles, etc.

Year	Product	Amount	Cost Per Ton
1939	551,362	57,608.66	.1045
1938	412,000	43,788.52	.1061
1937	820,915	76,759.61	.0935
1936	512,612	44,983.10	.0877
1935	291,318	26,935.69	.0924
1934	235,664	23,441.91	.0985
1933	61,941	9,147.82	.1477

e. Drifting and Raising:

Ore drifting decreased and rock drifting increased in 1939, the net decrease was 7%. The major portion of the work was on the 13th level, as was also true in the two previous years. However, the 13th level development is well advanced and for the coming two years work will be concentrated on the 14th level. Ore and rock raising increased slightly in 1939. Raising was done on the 9th, 12th and 13th levels and will be continued on a reduced scale during the coming year on these same levels. The decrease in size of the ore body on the 12th and 13th levels has made it necessary to keep development work advancing at more than customary speed during the past several years. This condition will continue during the next several years while the 14th level is being developed, as also the ore body between No. 1 and No. 2 dikes and between No. 1 dike and the footwall from the 12th and 13th levels. As a mine approaches exhaustion the amount of development work required to develop a given tonnage of ore increases due to decrease in size of the ore bodies. The Negaunee Mine is now entering this period as the probable life, at a production rate of 600,000 tons per year, will not exceed six years.

NEGAUNEE MINE
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YEAR 1939

7. UNDERGROUND: (Cont'd)

e. Drifting and Raising: (Cont'd)

The following table gives a comparison of the total drifting and raising in ore and rock in 1939 and 1938:

	Drifting		Raising		Grand
Year	Ore	Rock	Ore	Rock	Total
1939	275'	1463'	1313'	827'	3878'
1938	585'	1306'	943'	1158'	3992'
Increase		157'	370'		
Decrease	310'			331'	114'

f. Explosives, Drilling and Blasting:

The cost per ton for powder increased 1.7% or $ .0009 in 1939 while the cost per pound for powder decreased 4%. The total cost of all explosives increased 3%. The cost for fuse, caps, etc., increased 10.8%. The pounds of powder per ton of ore increased 6%. More powder was used due to mining of more "tight" ore in flat pitching ore areas under jasper hanging. Another cause was the mining of caved ore in the old stopes above the 9th level where powder was used for blasting the old timber mixed with the ore. The product was reduced due to the old timber, hence more powder was used in this territory to break a ton of ore.

Gelamite No. 1 is almost exclusively used in the mine for breaking ore. This powder has twenty-five more sticks per hundred pounds and in blasting strength rates pound per pound with 60% gelatin powder. The powder is distributed to the miners daily from underground powder houses.

The following statement gives a comparison of costs, etc., for the past nine years:

Year	Cost Per Lb. For Powder	Lbs. Powder Per Ton of Ore	Cost Per Ton Powder	Cost Per Ton Fuse & Caps	Total Cost
1939	.1176	.4584	.0539	.0113	.0652
1938	.1225	.4320	.0530	.0102	.0632
1937	.1195	.4270	.0510	.0110	.0620
1936	.1104	.4320	.0475	.0105	.0580
1935	.1168	.4270	.0498	.0102	.0600
1934	.1140	.4350	.0507	.0106	.0613
1933	.1196	.5110	.0610	.0130	.0740
1932	.1235	.4191	.0518	.0099	.0617
1931	.1268	.4025	.0510	.0091	.0602

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7. UNDERGROUND: (Cont'd)

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

Statement of Explosives Used: (Ore Development and Stoping)

	Quantity	Average Price	Amount 1939	Amount 1938
Gelamite #1	244,600	11.76	28,786.47	19,161.07
50% Gelatin	6,600	11.63	767.54	2,601.22
60% Gelatin	1,550	12.06	187.00	65.00
Total Powder - 1939	252,750	11.76	29,741.01	
Total Powder - 1938				21,827.29
Fuse - feet	879,588	5.65	4,441.60	3,010.02
Caps - No. 6	123,823	12.10	1,498.76	1,030.08
Tamping Bags	34,000	3.25	110.51	86.15
Fuse Lighters	21,500	6.63	142.55	94.54
Electric Detonators	60	120.00	7.20	-
Master Fuse Lighters	2,500	.20.34	50.86	-
Total Fuse, etc. - 1939			6,251.48	
Total Fuse, etc. - 1938				4,220.79
Total All Explosives - 1939			35,992.49	
Total All Explosives - 1938				26,048.08
Product			551,362	412,000
Pounds of powder per ton of ore			.458	.432
Cost per ton for powder			.0539	.0530
Cost per ton for fuse, caps, etc.			.0113	.0102
Cost per ton for all explosives			.0652	.0632

Sinking, Rock Development, Etc.

Gelamite #1	8,700	12.56	1,092.33	899.41
50% Gelatin	4,200	11.68	490.53	834.89
60% Gelatin	8,650	12.04	1,042.00	78.00
Total Powder - 1939	21,550	12.18	2,624.86	1,812.30
Total Powder - 1938				1,812.30
Fuse - feet	65,383	5.68	371.99	289.25
Caps - No. 6	8,752	12.20	106.76	94.25
Electric Detonators	40	170.00	6.80	20.78
Total Fuse, etc. - 1939			485.55	
Total Fuse, etc. - 1938				404.61
Total All Explosives Rock Development - 1939			3,110.41	
Total All Explosives Rock Development - 1938				2,216.91
Total All Explosives Used in Mine - 1939			39,102.90	
Total All Explosives Used in Mine - 1938				28,264.99
Average Price Per Pound for Powder - 1939			.118	
Average Price Per Pound for Powder - 1938				.1224
Explosives Used for Stoping & Development			39,102.90	
Explosives Used for Blasting Stockpile			54.80	
Total Explosives Used as Per Cost Sheet			39,157.70	

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7. UNDERGROUND: (Cont'd)

g. Mining and Loading:

There were no changes in mining practice during 1939. The spacing of raises is determined from several factors, i.e., economical length of scraper haulage, maintenance of connecting drifts to adjoining raises, and connections to main level for ventilation airways. It is true that, taking an average over the whole mine, scraping distances are increasing each year. This is brought about by purchasing larger scraper units with 20 H.P. and 25 H.P. continuous rated motors and the spacing of raises in recent development at longer intervals. Radial slicing is in general use with more and more of the contracts mining in all directions from the raise. Unusually large outputs were obtained this year by several contracts in long slices in areas with good ventilation and where the ore was soft and dry. In regular slicing two complete cycles have been made in eight hours for periods of two weeks with a product per miner per day stoping of from 33 to 38 tons. The general average in the mine was 22 tons stoping. Time is lost by the miners when starting new slices, laying poles for floor covering and in repair work, building timber bulkheads, etc. Tons stoping would have been higher in 1939 except for the low product from mining above the 9th level where much of the work is exploratory in character, also there were many areas where the driving of spiling was necessary to hold back the broken hanging jasper and more time was required to cover the floors with poles laid close together and covered with wire fencing. Several of the above handicaps occur only on the opening of a new sub level under the jasper hanging in caved areas and will not persist on lower sub levels.

h. Ventilation:

A study was made of ventilation in the Negaunee and Maas Mines by the Engineering Department in 1939 and recommendations submitted for certain changes. It was found that the airways between certain levels in the Negaunee Mine were not of sufficient cross section to permit unrestricted flow of the air. Plans have been made for enlargement of these airways and the work will be undertaken early in 1940. Ventilation in the mine was good during 1939 due in part to the major portion of mining operations being on or very close to the 11th and 12th levels. Each area being mined has an outlet to the next lower level through a raise and a connection to the level nearby which insures an abundant supply of air. In dead ends air was forced in by booster fans. Due to heavy pressure on the 13th level and the crushing of a portion of the haulage drift which was propped and haulage abandoned it was not possible to maintain full size openings to the raises from the 5th level Maas Mine. This condition will be corrected in a few months when the new cross-cut on the 13th is extended to the Maas boundary.

The most severe handicap to ventilation occurs in the winter and is due to the restriction of area in No. 2 shaft due to formation of ice in severe cold weather. The fan is reversed on week-ends during the winter and warm air drawn from the mine to thaw the ice but in below zero weather it forms again so rapidly that the area in the shaft is materially reduced within twenty-four hours. It is impossible to cut off the water at No. 2 shaft and the only way to eliminate this problem is to provide another airway that is free from water. The life of the Negaunee Mine is limited and the expense of a new airway is not warranted.

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7. UNDERGROUND: (Cont'd)

i. Pumping:

The number of gallons pumped per minute in each month of the year for the past six years are shown in the following statement:

Month	1939	1938	1937	1936	1935	1934
January	947	1038	893	886	931	815
February	938	906	866	898	953	788
March	944	951	1025*	867	898	779
April	963	988	1075	866	878	796
May	995	1029	1062	992	887	807
June	1085	1052	1089	798	895	826
July	1177	1055	1107	931	911	837
August	1112**	1085	1148	952	917	854
September	1067	1070	1161	959	936	857
October	1033	1044	1162	951	944	859
November	979	994	1131	954	940	875
December	947	973	1105	916	927	876
Total Average	1015	1015	1069	914	918	831

(*) Increase due to water diverted from Maas Mine and pumped by Negaunee Mine.
(**) Diversion of water from Maas Mine was stopped on July 31st.

The following statement shows the average number of gallons pumped per minute for the past ten years:

Year	Gallons Per Minute
1939	1015
1938	1015
1937	1069
1936	914
1935	918
1934	831
1933	857
1932	905
1931	914
1930	1060

The average gallons of water pumped per minute in 1939 was exactly the same as in 1938. Diversion of water from the 3rd level Maas to the 12th level Negaunee ceased at the end of July. Due to the heavy rainfall in the early Summer this decrease was not fully apparent until in September. The unusually dry fall and early winter resulted in a decrease each month for the balance of the year. The bulk of the water comes into the mine on the 9th level from the surface caves. Weirs were installed on the levels in 1939 to measure the water which showed as follows in percentage of the total: 9th level - 63%; 10th level - 22%; 11th level - 9%; 12th level 4%; 13th level - 2%. These figures show the importance of a deep well to pump from ledge adjacent to the cave to surface Northeast of the 9th level workings where most of the water enters the mine. Churn drilling to test the formation in this area was started in 1938 and a favorable site for a well was found in the summer of 1939. A contract with the Layne-Northwest Company for a deep well was made in the Fall and the well was nearly ready for pumping at the end of the year. A preliminary test run indicated that 400 or 500 gallons would be the probable output. It is hoped that when pumping is started there will be an immediate decrease in the water on the 9th level.

NEGAUNEE MINE
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YEAR 1939

7. UNDERGROUND: (Cont'd)

i. Pumping: (Cont'd)

The 13th level pump was overhauled in the General Shops in 1939 and is now in good condition. The small sump near the shaft was enlarged as there has been a small increase in the water on this level coming from the development work in the area between the South footwall and the main East-West dike.

The skip pit pump was moved late in the year from the 13th level skip pit to the 14th level skip pit and the discharge line lengthened 120 ft.

j. Underground in General:

Pressure continued on the 13th level haulage drift during the year but it was much less than in 1938. Mining has been under way on several sub levels directly above the haulage drift and in these areas the pressure has materially decreased. It was found impossible to maintain the Southwest end of the haulage drift that parallels the Maas boundary and about two hundred feet of the drift was propped and abandoned for haulage.

The second cross-cut from the new footwall haulage drift is now advancing toward this area and on its completion within a few months, raises will be put up in this area and mining resumed. The cross-cuts will not be subject to heavy pressure like the drift along the strike of the formation.

There has been more ore developed above the 9th level in No. 1 shaft pillar than was anticipated when this area was reopened three years ago. Thus far the ore mined has cost considerably more than in the rest of the mine but with the completion of the top sub levels over nearly the entire area of the ore body, better results are anticipated.

The heavy production schedule now in effect, viz., 800,000 tons in 1940, makes it necessary to plan on an increased development program. With only about three and one-half million tons of ore remaining in the mine it is evident that the 14th level must be developed rapidly as also the ore body between No. 1 and No. 2 dikes and the ore body South of No. 1 dike near the South footwall. Mining of the two ore bodies has not quite reached the 11th level elevation and to speed the rate of mining it is planned to open sub levels under the hanging above both the 12th and 13th levels.

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8. COST OF OPERATING:

a. Comparative Mining Costs:

	1939	1938	Increase	Decrease
PRODUCT	551,362	412,000	139,362	
Underground Costs	1.174	1.228		.054
Surface Costs	.114	.156		.042
General Mine Expenses	.231	.270		.039
Cost of Production	1.519	1.654		.135
Taxes	.219	.288		.069
Depletion & Depreciation	.375	.369	.006	
Loading & Shipping	.039	.020	.019	
Adm. & General Expense	.021	.024		.003
Miscellaneous Income	.007	.008		.001
TOTAL COST	2.166	2.347		.181
No. of Days Operated	228	187	41	
No. of Shifts & Hours	1 & 2 8-hr.	1,2,& 3 8-hr.		
Average Daily Product	2,418	2,203	215	

COST OF PRODUCTION:

	1939	%	1938	%	Decrease
Labor	.889	58.5	.950	57.4	.061
Supplies	.630	41.5	.704	42.6	.074
Total	1.519	100.0	1.654	100.0	.135

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Mine Worked	Shifts & Hours	Men Employed	Total Shifts
1939	228	1 & 2 8-hr.	385	75,323
1938	187	1,2, & 3 8-hr.	346	60,342
Increase	41		39	14,981

(2) Wages:

A reduction in salaries was made April 16th, 1938 and restored December 16th, 1938.

(3) Comparison of Production:

Production - 1939	551,362 Tons
Production - 1938	412,000 "
Increase	139,362 "

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(4) Comparison of Number of Men and Wages:

	No. Men	No. Days	Amount	Rate Per Day
1939	385	75,323	478,386.47	6.35
1938	346	60,342	377,698.09	6.26
Increase	39	14,981	100,688.38	.09

(5) Tons Per Man Per Day:

	1939	1938	Increase
Surface	41.37	32.78	8.59
Underground	8.90	8.62	.28
Total	7.32	6.83	.49

(6) Cost of Production:

1939	837,797.65	Cost Per Ton	1.519
1938	681,432.91	Cost Per Ton	1.654
Increase	156,364.74		
Decrease			.135

	Labor	%	Supplies	%
1939	490,416.83	58.5	347,380.82	41.5
1938	391,246.14	57.4	290,186.77	42.6
Increase	99,170.69	1.1	57,194.05	
Decrease				1.1

8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)
(7) Detail of Accounts:

	1939		1938		Inc. or dec.	
Days Per Week	3, 4, & 5		2, 3, & 4			
Shifts & Hours	1 & 2 8-hr.		1, 2 & 3 8-hr.			
Production - Tons	551,362		412,000		139,362	
Avg. Daily Product - Tons	2,418		2,203		215	
Number of Days Worked	228		187		41	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
UNDERGROUND COSTS:						
1. Exploring in Mine	814.50	.002	900.65	.002	86.15	
2. Sinking in Shaft						
3. Development in Rock	18236.29	.033	19988.41	.049	1752.12	.016
4. Development in Ore	11328.90	.022	10540.83	.026	788.07	.004
5. Stoping	236768.81	.429	171902.67	.417	64866.14	.012
6. Timbering	190229.95	.345	137792.75	.334	52437.20	.011
7. Tramming	56329.33	.102	48815.84	.118	7513.49	.016
8. Ventilation	8421.19	.015	7963.84	.019	457.35	.004
9. Pumping	36103.13	.065	37004.97	.090	901.84	.025
10. Compressors & Air Pipes	40471.53	.073	31312.84	.076	9158.69	.003
11. Back Filling	90.91		127.04		36.13	
12. Underground Superintendence	18229.07	.033	14520.16	.035	3708.91	.002
13. Cave-ine						
14. Maint: Comp. & Power Drills	697.31	.001	759.49	.002	62.18	.001
15. Scraper Equipment	12247.96	.022	10966.30	.027	1281.66	.005
16. Electric Tram Equipt.	14143.62	.026	11460.90	.028	2682.72	.002
17. Pumping Machinery	3453.68	.006	1876.09	.005	1577.59	.001
Total Underground Costs	647566.18	1.174	505932.78	1.228	141633.40	.054
SURFACE COSTS:						
18. Hoisting	28045.14	.051	24567.51	.060	3477.63	.009
19. Stocking Ore	7906.23	.014	12384.03	.030	4477.80	.016
20. Shop Machinery			1328.00	.003	1328.00	.003
21. Dry House	6957.67	.013	6457.79	.016	499.88	.003
22. General Surface Expense	7771.04	.014	7537.10	.018	233.94	.004
23. Maint: Hoisting Equipment	5625.33	.010	6421.06	.016	795.73	.006
24. Shaft	1841.92	.003	2038.25	.005	196.33	.002
25. Top Tram Equipment	2821.01	.005	2102.62	.005	718.39	
26. Docks, Trestles & Pockets	456.34	.001	969.87	.002	513.53	.001
27. Mine Buildings	1667.04	.003	506.11	.001	1160.93	.002
Total Surface Costs	63091.72	.114	64312.34	.156	1220.62	.042
GENERAL MINE EXPENSES:						
Prop. Gen. Sthse. Vacation Pay	127.11		111.82		15.29	
27A. Employees Vacation Pay	5920.74	.011	3922.44	.010	1998.30	.001
28. Insurance	3775.87	.007	826.49	.002	2949.38	.005
29. Mining Engineering	3061.15	.006	2921.93	.007	139.22	.001
30. Mech. & Elec. Engineering	2617.94	.005	2199.72	.005	418.22	
31. Analysis and Grading	12693.75	.023	9495.31	.023	3198.44	
32. Personal Injury	13404.54	.024	16618.07	.040	3213.53	.016
33. Safety Department	2081.99	.004	1894.95	.005	187.04	.001
34. Telephones & Safety Devices	3090.86	.006	2553.21	.006	537.65	
35. Local & General Welfare	6898.47	.012	6047.06	.015	851.41	.003
36. Spec. Exp., Pensions & Allow.	12818.93	.023	13481.99	.033	663.06	.010
37. Ishpeming Office	19889.83	.036	15985.52	.039	3904.31	.003
38. Social Security Taxes	21370.50	.039	18645.74	.045	2724.76	.006
39. Mine Office	16538.86	.030	16483.54	.040	55.32	.010
Total General Mine Expenses	124285.61	.226	111187.79	.270	13097.82	.044
COST OF PRODUCTION	834943.51	1.514	681432.91	1.654	153510.60	.140
40. Taxes	120746.75	.219	118560.68	.288	2186.07	.069
TOTAL COST	955690.26	1.733	799993.59	1.942	155696.67	.209

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8. COST OF OPERATING:

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

UNDERGROUND COSTS:

1. Exploring in Mine:

Decrease due to less time spent by Geological Department on Negaunee Mine geological work account of less diamond drilling in 1939. Expenditures decreased $ 86.15.

3. Development in Rock:

Decrease due to less development in rock. In 1939 the Cost Sheet showed 2,056 ft. compared with 2,113 ft. in 1938. The cost per foot in 1939 was $ 8.87 compared with $ 9.46 per foot in 1938. Expenditures decreased $ 1,752.12.

4. Development in Ore:

Increase of $ 788.07 due to more raising in ore. Cost per ton decreased $ .004 account of larger product.

5. Stoping:

Expenditures increased $ 64,866.14. In 1939 there were 24,496 shifts worked compared with 18,035 shifts in 1938. Labor cost increased $ 51,688.06 and supply cost increased $ 13,178.08. The cost per ton increased $ .012 andtons per man per day increased to 7.32 tons from 6.83 tons in 1938. Average tons stoping for 1939 increased to 21.34 tons from 21.17 tons in 1938. There was an increase of $ .002 in cost per ton for explosives.

6. Timbering:

Expenditures increased $ 52,437.20. More stull timber, lagging and poles used account of more ore mined and more cribbing used in raises. Labor cost increased $ 38,617.06. There were more shifts worked in repairing drifts and raises than in 1938.

7. Tramming:

Expenditures increased $ 7,513.49. Cost per ton decreased $ .016. Electric current increased $ 1,155.46, also electric haulage expense increased account larger tonnage trammed.

8. Ventilation:

Increase of $ 457.35 due to replacing 2300 volt line from the engine house to ventilation shaft. Cost per ton decreased $ .004.

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

9. Expenditures decreased $ 901.84. Electric current decreased $ 1,240.77, labor and supplies increased $ 339.00. Cost per ton decreased $ .025.

No. gallons pumped - 1938	534,118,975
No. gallons pumped - 1939	532,641,788
Decrease	1,477,187

10. Compressors & Air Pipes:

Expenditures increased $ 9,158.69. Cost per ton decreased $ .003. Electric current increased $ 8,557.77, and cost of labor and supplies for air piping increased $ 601.00.

Cu. ft. air compressed - 1939	1,026,945,000
Cu. ft. air compressed - 1938	771,210,000
Increase	255,735,000

11. Back Filling:

Decrease in expenditures of $ 36.13.

12. Underground Superintendence:

Expenditures increased $ 3,708.91 account of increase in working schedule and also adding an underground foreman. Cost per ton decreased $ .002.

14. Compressors & Power Drills:

Two RB-12 jackhammers, $ 400.00, charged out in 1939 compared with one SAR-85 stoper, $ 365.88, in 1938. Repairs to compressors $ 97.00 higher in 1938 than in 1939. Cost per ton decreased $ .001.

15. Scrapers & Mechanical Loaders:

Expenditures increased $ 1,281.66. Cost per ton decreased $ .005. In 1939, 65,808 ft. of wire rope, costing $ 6,306.41, charged out compared with 52,308 ft. of wire rope, costing $ 5,191.51, charged out in 1938. The cost of repairs was practically the same in 1939 and 1938.

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

16. Electric Tram Equipment:

Expenditures increased $ 2,682.72. Decrease in cost per ton of $ .002.

	1939	1938	Increase	Decrease
Locomotives	4484.13	5282.25		798.12
Wiring	1817.49	1524.64	292.85	
Tracks	4094.88	2765.90	1328.98	
Cars	3680.16	887.76	2792.40	
Generator	66.96	1000.35		933.39
Total	14143.62	11460.90	2682.72	

Increase in expense for "Tracks" due to more track repairs and more 40 lbs rail charged out. The large increase in expense for "Cars" due to overhauling twelve cars at the General Shops.

17. Pumping Machinery:

Expenditures increased $ 1,577.59 and cost per ton increased $ .001. Cliffs Power & Light Company labor and supplies rewiring pumps $ 427.06. General Shop labor and supplies repairing pumps $ 733.00, also one pinion $ 275.00, one belt $ 70.00, 89 ft. 4" pipe $ 41.00 and valves and valve seats $ 32.00 charged out in 1939. Increase in expense repairing pumps due to overhauling of 13th level electric pump at General Shops.

18. Hoisting:

Expenditures increased $ 3,477.63. Cost per ton decreased $ .009. Electric current increased $ 3,273.02, oil and miscellaneous supplies increased $ 204.00 account of increased tonnage hoisted.

19. Stocking Ore:

Decrease in expenditures of $ 4,477.80. Labor and supplies erecting and repairing temporary wooden trestles $ 3,823.90 less than in 1938. Cost of stocking ore decreased $ 1,091.00 account of less ore stocked due to increased shipments. Picking out wood and rock increased $ 437.00.

20. Shop Machinery:

One Ideal Flash Boiler used for heating shop buildings $ 952.00 and one Pittsburgh lathe for machine shop $ 468.00 charged out in 1938. No expenditures in 1939.

21. Dry House:

Expenditures increased $ 499.88. Cost per ton decreased $ .003. Increase of $ 203.00 in cost for heating dry house and $ 297.00 in labor attending dry account of mine operating more days in 1939.

NEGAUNEE MINE
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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

22. General Surface Expense:

Increase in expenditures of $ 233.94. Cost per ton decreased $ .004. 1000 ft. of snow fence $ 58.50, repairs to policemen's clock $ 19.00 and labor and supplies repairing fences around caves.

23. Hoisting Equipment:

Expenditures decreased $ 795.73. In 1939 repairs to new fly wheel generating set account of fire cost $ 3,302.84 less credit for fire loss of $ 1,642.18 makes a total expense of $ 1,660.66, 1750 ft. of 1-1/4" hoisting rope $ 645.75, also increase in repairs to skips of $ 246.00. In 1938 there were five 1-1/4" hoisting ropes, $ 2,888.07, and repairs to generating set and hoisting machinery $ 460.00 charged out.

24. Shaft:

Expenditures decreased $ 196.33 due to less repairs to shaft and shaft pockets.

25. Top Tram Equipment:

Expenditures increased $ 718.39. Cost per ton same as 1938. 4965 ft. of 5/8" wire rope $ 505.81, repairs to cars $ 34.00 and one set of stator coils $ 178.21, charged out in 1939.

26. Docks, Trestles & Pockets:

Decrease in expenditures of $ 513.53 due to less repairs made to shaft house pockets and less new decking and repairs for steel stocking trestles.

27. Mine Buildings:

Expenditures increased $ 1,160.93 and cost per ton increased $ .002. Increases in repairs over 1938 were as follows:

Office & Warehouses	$ 623.00	General repairs and storm sheds
Shops	164.00	New doors, new frame for power saw
Shaft House	181.00	New stairways, reinforcing in skip road
Engine House	35.00	Repairs to brick work
Dry House	158.00	Storm sheds and repairs to interior brick walls.

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

GENERAL MINE EXPENSES:

27a. Employees Vacation Pay:

Expenditures increased $ 1,998.30. Cost per ton increased $ .001. In 1939 employees were given a vacation of four days compared with three days in 1938. In 1939, 233 employees were given vacations compared with 207 in 1938.

28. Insurance:

Expenditures increased $ 2,949.38 and cost per ton $ .005.

	1939	1938	Increase	Decrease
Property	1134.54	923.31	211.23	
Group	2309.49	333.05	2642.54	
Catastrophe	331.84	236.23	95.61	
Total	3775.87	826.49	2949.38	

29. Mining Engineering:

Expenditures increased $ 139.22. Cost per ton decreased $ .001.

30. Mechanical & Electrical Engineering:

Expenditures increased $ 418.22. Cost per ton same as 1938.

31. Analysis & Grading:

Expenditures increased $ 3,198.44. Cost per ton same as 1938.

	1939	1938	Increase
Ishpeming Laboratory charges	8026.29	5766.11	2260.18
Shipping Department expenses	27 88.17	2386.63	401.54
Mine sampling	1879.29	1342.57	536.72
Total	12693.75	9495.31	3198.44

32. Personal Injury:

Expenditures decreased $ 364.32 and cost per ton $ .011.

	1939	1938	Increase	Decrease
Compensation & Doctors	17585.08	11274.62	[illegible]	3689.54
Compensation Dept.	840.45	895.88		55.43
Hospital Loss	4979.01	4447.57	531.44	[illegible]
Total	13404.54	16618.07		3213.53

Increase due to larger payrolls in 1939.

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

33. Safety Department Expense:

Charge to Negaunee Mine increased $ 187.04. Cost per ton decreased $ .001. More expense for operating Safety Department in 1939.

34. Telephones & Safety Devices:

Expenditures increased $ 537.65. Cost per ton same asin 1938. Charge for electric current in 1939 was $ 893.00 compared with $ 692.20 in 1938, an increase of $ 200.80. In 1939 there were 255 pairs of safety goggles, $ 456.74, charged out compared with 90 pairs of goggles $ 120.26, in 1938, an increase of $ 336.58.

35. Local & General Welfare:

Expenditures increased $ 851.41. Cost per ton decreased $ .003. Proportion of cost of visiting nurse at Negaunee and other welfare expenses charged at Ishpeming Office.

36. Special Expense, Pensions & Allowances:

Expenditures decreased $ 663.06 and cost per ton $ .010.

	1939	1938	Increase	Decrease
Pensions	3887.83	3998.43		110.60
Legal	483.50	453.37	30.13	
Saranac Invest.	1772.24	2022.21		249.97
Central Employment Office & other	4656.15	2869.22	1786.93	
Curtailment Expense	2019.21	4138.76		2119.55
Total	12818.93	13481.99		663.06

37. Ishpeming Office:

Expenditures increased $ 3,904.31. Cost per ton decreased $ .003. Expense is based on total labor cost at mine.

38. Social Security Taxes:

Expenditures increased $ 2,724.76. Cost per ton Decreased $ .006.

	1939	1938	Increase
Unemployment Insurance Tax	16402.81	14721.48	1681.33
Old Age Benefit Tax	4967.69	3924.26	1043.43
Total	21370.50	18645.74	2724.76

The tax rate for unemployment insurance for 1939 was $ .033 compared with $ .03 for 1938. The tax rate for old age benefit is $ .01.

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8. COST OF OPERATING: (Cont'd)

b. Detailed Cost Comparison: (Cont'd)

(7) Detail of Accounts: (Cont'd)

39. Mine Office:

Expenditures increased $ 55.32. Cost per ton decreased $ .010.

	1939	1938	Increase	Decrease
Clerks - salaries	5898.00	5638.75	259.25	
Mine Supt. - "	4164.28	4233.60		69.32
Central Warehouse	3827.08	4262.09		435.01
Total	13889.36	14134.44		245.08

There was an increase in Donations, Telephone Tolls, and labor and supplies redecorating office, etc.

40. Taxes:

Expenditures increased $ 2,186.07. Cost per ton decreased $ .069. Valuation of mine property by State Tax Commission increased $ 160,000.00 divided $ 15,000.00 in realty and $ 145,000.00 in personal. The tax rate decreased from $ 3.7566 in 1938 to $ 3.66 in 1939.

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

The drilling program undertaken at the Negaunee Mine in 1938 with several objects in view was not completed at the end of the year. Information as to location of probable ore South of the main dike on or adjacent to the 13th level elevation was not fully determined and additional drilling was done in 1939.

Standpiping to find a location for a deep well Northeast of No. 2 shaft was postponed in December 1938 until the Spring of 1939.

Following is the record of holes drilled in 1939 and comments thereon:

E. & A. No. 795 - Development 14th Level

Hole No. 29, Negaunee Mine - 220' sub level, 24 ft. above the 13th level, horizontal, course 69° East, near Southwest end of 13th level. Started December 19th, 1938, completed January 12th, 1939. Drilled to depth of 164 ft. in 1938. Log of hole follows:

Footage	Material
0 - 76'	Ore - Iron 64.15, Phos. .109, Sul. .010
76' - 80'	Lean ore
80' - 83'	Jasper
83' - 116'	Dike
116' - 235'	Jasper
235' - 240'	Lean ore
240' - 255'	Ore - Iron 58.65, Phos. .041, Sul. .015
255' - 296'	Lean ore
296' - 317'	Jasper

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (Cont'd)

This hole showed 76 ft. of high grade ore from the main dike South to another large dike and a small run of ore near the South footwall. It determined the location of the second cross-cut now being driven Northwest from the new rock drift located near the South footwall. The existance of a dike 33 ft. in width that parallels the main dike may have an important bearing on the possibilities for ore below the 13th level.

Hole No. 30, Negaunee Mine. Same station as No. 29, started January 16th, completed February 4th, horizontal course S 9° 25' E. The log of hole follows:

Footage	Material
0 - 21'	Jasper
21' - 40'	Dike
40' - 55'	Lean ore
55' - 91'	Jasper
91' - 106'	Dike
106' - 142'	Jasper
142' - 144'	Dike
144' - 150'	Lean ore
150' - 195'	Ore - Iron 62.77, Phos. .021, Sul. .011
195' - 205'	Lean ore
205' - 239'	Jasper

This hole showed 45 ft. of high grade Bessemer ore and a number of dikes that may have a bearing on the ore concentration in this area. It is doubtful if the ore found in this hole extends far enough above the drill hole to warrant development on the 13th level.

Hole No. 31, Negaunee Mine, 13th level near Southwest end of haulage drift. Dip 43° 30', course S 2° 44' W. Started February 8th, 1939, completed February 15th, 1939. The log of hole follows:

Footage	Material
0 - 20'	Dike
20' - 40'	Lean ore
40' - 70'	Ore - Iron 63.91, Phos. .094, Sul. .013
70' - 145'	Jasper
145' - 163'	Transition jasper and slate

This hole was drilled to determine depth of ore South of the dike that parallels the main dike and location of the footwall. This information was necessary to locate the 14th level drift and cross-cuts.

Hole No. 32, Negaunee Mine, Southeast end of old No. 1 cross-cut. Horizontal, course S 2° 11' E. Started February 21st, 1939, completed February 24th, 1939. The log of hole follows:

Footage	Material
0 - 15'	Lean ore
15' - 60'	Ore - Iron 62.43, Phos. .060, Sul. .010
60' - 112'	Jasper

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (Cont'd)

This hole found the ore body that runs Southwest-Northeast South of the dike and near the South footwall. After connecting to the end of old No. 1 cross-cut from the new drift along the footwall, an exploratory raise in this ore showed that it did not extend far enough above the level to warrant exploration and that adjacent to No. 1 cross-cut no ore would be available here for mining on the 13th level.

E. & A. No. 735-A & 735-B - Diamond & Churn Drilling & Deep Well

Churn drilling to ledge to locate a site for a deep well on Sec. 32, Northeast of No. 2 shaft. Continuation of work started in 1938 and temporarily stopped in December 1938 on completion of churn drill hole No. 7.

Hole No. 8, churn drill, located approximately 200 ft. North of No. 7 and about 1,700 ft. Northeast of No. 2 shaft. Started May 8th, 1939, completed May 24th, 1939. The log of hole No. 8 follows:

Footage	Material
0 - 12'	Fine sand and clay
12' - 38'	Fine gravel, sand and 2' clay
38' - 67'	Fine sand
67' - 68'	Clay and sand
68' - 71'	Hardpan
71' - 80'	Gravel and clay
80' - 94'	Fine gravel and clay
94' - 108'	Fine sand
108' - 115'	Gravel and sand - Water level at 108 ft.
115' - 126'	Fine gravel and sand
126' - 131'	Muddy gravel and sand
131' - 141'	Slate - Ledge

At the suggestion of the Layne-Northwest Company, hole No. 9, located 170 ft. Southwesterly from hole No. 7 and about the same distance Northwesterly from No. 6-A, was then sunk to ledge.

Hole No. 9, churn drill, started June 3rd, 1939, completed June 30th, 1939.

Footage	Material
0 - 15'	Sand and gravel
15' - 39'	Fine sand, gravel and clay
39' - 57'	Fine sand
57' - 76'	Sand, gravel and clay
76' - 79'	Fine sand
79' - 92'	Clay
92' - 96'	Coarse sand
96' - 98'	Coarse gravel
98' - 101'	Gravel, sand and clay
101' - 113'	Muddy sand
113' - 133'	Medium Coarse sand
133' - 141'	Sand and gravel
141' - 147'	Muddy sand and gravel
147' - 155'	Sand and gravel
155' - 166'	Coarse sand and gravel
166' - 171'	Broken ledge

Water level at 96 ft.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (Cont'd)

The material in this hole was considered more favorable for a deep well than any hole drilled on Section 32 or adjacent to the Maas Mine. It was accordingly decided to give the Layne-Northwest Company a contract to sink a well and install a deep well pump. The last of July they started work and by the end of the year had made a short test run that indicated a possible flow of 400 to 500 gallons per minute. Some additional work is contemplated involving the installation of another shutter screen pipe and actual pumping is expected to start some time in January 1940. A more detailed description of the deep well follows:

Shaft 6' x 6' in size sunk 77' 8" to water.
60" steel pipe sunk by hand to depth of 90'.
48" steel pipe sunk by bailing to depth of 115' 4".
38" steel pipe sunk by bailing to depth of 147' 8" with shutter screen pipe 25' 5" on bottom.
26" steel pipe from 147' 8" to 163' with 20' shutter screen pipe on bottom.
16" shutter screen steel pipe from 163' to 181' - 18' in broken ledge.

Test run made in December - pumped 400 gallons per minute. Pump clogged with sand and mud. An agitator was inserted and sand and mud washed out of gravel and bailed out of bottom of hole. A 12" shutter screen pipe is to be inserted in the 16" pipe to hold back material washing out of the broken ledge. Work delayed until arrival of the 12" pipe. Test run to be made after installation of the 12" pipe, probably in the latter part of January 1940.

10. TAXES:

A comparison of taxes paid by the Negaunee Mine Company in 1939 and 1938 follows:

	1939		1938	
	Valuation	Taxes	Valuation	Taxes
Realty - 213.19 Acres	2,185,000	79,989.35	2,170,000	81,519.09
Personal-Stockpile,Equip. & Supp.	975,000	35,693.20	830,000	31,180.11
Total by Tax Commission	3,160,000	115,682.55	3,000,000	112,699.20
Collection Fees		1,156.83		1,126.99
Total Optg. Negaunee Mine	3,160,000	116,839.38	3,000,000	113,826.19
Rented Buildings	17,300	633.33	19,100	717.54
Collection Fees		6.33		7.18
Total Negaunee Mine Co.	3,177,300	117,479.04	3,019,100	114,550.91
Tax Rate per $100 Valuation		3.66		3.7566
Total Tax City of Negaunee		560,092.01		556,066.25
Negaunee Mine Co. % of City Tax		20.47%		20.60%

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11. ACCIDENTS AND PERSONAL INJURY:

The following table gives the number and class of accidents causing loss of time during the past five years:

	1939	1938	1937	1936	1935
Fatal	0	0	1	0	0
Time Lost - Over four months	3	4	2	0	1
- One to four months	2	6	5	3	1
- Less than one month	4	0	4	1	0
Total Compensable Accidents	9	10	12	4	2
Number of cases paid compensation for accidents prior to Jan. 1st, 1939	10	11	7	7	8
Number of cases being paid difference in wages (Included in above total)	3	4	2	2	4

There were nine compensable accidents in 1939, a decrease of one as compared with the previous year. There were less severe accidents and more slight accidents causing loss of time of less than one month. One severe accident occurred in June, two in September and one in December. The men injured in the last three accidents have not yet returned to work.

The nature of the accidents was as follows: Five fractures of legs, one fracture of great toe, two contusions, and one infection.

During the year there were 62 slight accidents that did not cause a loss of time of more than one day and two accidents that caused a loss of three and four days respectively.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

E. & A. No. 735, 735-A, & 735-B - Mining Nos. 1 & 2 Shaft Pillars, Diamond & Churn Drilling, & Deep Well

	Estimated Expenditures	Expended 1939	Expended 1938	Total Expenditures	Unexpended Balance
Test Hole No. 8	500.00	1177.72		1177.72	677.72
Base Cost of Well	12704.00	8609.43		8609.43	4094.57
Trolley Lines, etc.	1200.00		27.00	1267.84	67.84
Telephones, Lights,etc.	300.00		17.66	355.16	55.16
Air & Water Pipes	800.00		250.07	755.01	44.99
Plat	250.00			278.46	28.46
Air Doors	300.00			389.32	89.32
Retimbering	2000.00			2716.54	716.54
Rail	2500.00			1808.67	691.33
General Shop Work	-			430.34	430.34
Drifting & Raising	15000.00		3633.10	15606.32	606.32
Scraper Hoists	6500.00			6789.50	289.50
Drill Machines, etc.	800.00			800.00	
Water Cut-off-No. 2	10000.00	201.97	1249.99	1451.96	8548.04
Rocker Dump Cars	1080.00			1080.00	
Rebuilding 9th Pockets	1500.00			2632.06	1132.06
Approximately 1650 ft. Diamond Drilling	7000.00	9.84	5892.74	5902.58	1097.42
Total	62434.00	9998.96	11070.56	52089.76	10344.24
Contingencies	4110.00				4110.00
Grand Total	66544.00	9998.96	11070.56	52089.76	14454.24

This E. & A. was completed in 1938 except for two items, viz., "Water Cut-off - No. 2 Shaft", and "Churn Drilling". An addition to the E. & A. was made in 1939 to cover the cost of "Churn Drilling Hole No. 8", and "Base Cost of Deep Well". In 1939 test hole No. 8 was completed and expenditures also made in connection with the "Base Cost of Well". There were also some charges in the account "Water Cut-off - No. 2 Shaft", and in the account "Approximately 1650 ft. Diamond Drilling".

With the installation of the deep well pump and same in regular operation, the E. & A. will be completed.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION: (Cont'd)

E. & A. No. 795 - Development of 14th Level

	Estimated Expenditures	Expended 1939	Expended 1938	Total Expenditures	Unexpended Balance
Sinking Shaft 140'	14700.00		14752.53		52.53
Excavating Shaft Pocket Skip Pit Pocket and Plat	10000.00	6080.67	5711.33	11792.00	1792.00
Rock Drift - 2660'	31920.00	1592.26		1592.26	30327.74
Tail Drift at Shaft - 100'	1200.00				1200.00
Raising in Rock-1000'	10000.00				10000.00
Drum for Skip Hoist	1500.00	25.65	733.75	759.40	740.60
Trolley Wires, Hangers and Lights	2500.00	659.10	489.30	1148.40	1351.60
Rails, Ties, Frogs	3600.00	128.23	155.17	283.40	3316.60
Air & Water Lines	1000.00	97.12	23.18	120.30	879.70
Air Lock Doors	500.00				500.00
Small Sump & Pump House	2000.00	206.34	176.41	382.75	1617.25
Powder House	100.00				100.00
Equipment	3525.00		2289.03	2289.03	1235.97
Diamond Drilling	5037.50	2066.11	3085.06	5151.17	113.67
Counter Balance		38.00	482.13	520.13	520.13
Total	87582.50	10893.48	27897.89	38791.37	48791.13
Contingencies	8758.25				8758.25
Grand Total	96340.75	10893.48	27897.89	38791.37	57549.38

There were expenditures in nearly every account of this E. & A. in 1939. At the end of the year 40% of the total estimated expenditures had been made. The main uncompleted item is "Rock Drifting" which was under way at the end of the year. The E. & A. will be active for at least eighteen months.

E. & A. No. 812 - 20 H.P. Scraper Hoists

	Estimated Expenditures	Expended 1939	Expended 1938	Total Expenditures	Unexpended Balance
2 - 20 H.P. Ingersoll-Rand Double Drum Scraper Hoists	2947.00	3088.00		3088.00	141.00
Total	2947.00	3088.00		3088.00	141.00

E. & A. completed in April 1939.

This E. & A. covered the cost of new equipment needed to transfer ore on the 9th level in mining No. 1 shaft and adjacent narrow pillars.

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12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION: (Cont'd)

E. & A. No. 848 - Equipment to Increase Production

	Estimated Expenditures	Expended 1939	Expended 1938	Total Expenditures	Unexpended Balance
3 - 65 cu. ft. Rocker Dump Cars	1380.00	1380.00		1380.00	
6 - I-R Auger Drills	1212.00	1202.50		1202.50	9.50
1 - 20 H.P. Sullivan Scraper Hoist	1536.00	1536.00		1536.00	
1 - 20 H.P. Ing-Rand Scraper Hoist	1536.00	1536.00		1536.00	
3 - Ing-Rand Utility Hoists	1425.00	1425.00		1425.00	
Total	7089.00	7079.50		7079.50	9.50

E. & A. Completed in December 1939.

This E. & A. was made to permit of an increase in production on the five day two shift operating schedule.

At this time the only new construction contemplated in 1940 is the remodeling of the dry house to eliminate the major portion of the dust.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Steam Shovels:

No. 7 shovel, owned by The Negaunee Mine Company, required only minor repairs before going into operation at the opening of the shipping season. It operated quite steadily in the last three months of the season and has been taken to the General Shops for general overhauling this Winter.

b. Stockpiles Trestles:

Wood Trestles:

The wood trestle erected in 1938 for stocking ore North of and parallel with the East steel trestle was dismantled in the Fall and was not re-erected as there was ample stocking room under the steel trestles.

A new rock stocking trestle twenty bents in length was erected in the Fall and went into commission in December. It should last more than a year.

Steel Trestles:

New ties were installed on the South track of the West steel trestle in 1939. This work was not quite completed at the end of the year.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (Cont'd)

c. Scraper Hoists:

Following is a list of scraper hoists at the mine:

Company	On Hand 1-1-1939	Purchased 1939	Total	Cost for Repairs Per Machine 1939	1938
Ing-Rand 10 H.P. Elec.	6		6	62.66	54.41
" 15 H.P. "	12		12	75.03	60.01
" 20 H.P. "	6	3	9	10.48	12.58
" 25 H.P. "	2		2	33.56	-
Sullivan 15 H.P. "	14		14	43.01	53.61
" 20 H.P. "	1	1	2	9.10	-
" 25 H.P. "	2		2	-	-
Gard-Den 15 H.P. "	2		2	-	26.49
Total	45	4	49		
Lake Shore Engine Works 25 H.P. Electric Scraper Slide	2	-	2	167.74	10.45
Scrapped, sold or transferred			None		

The total amount expended in 1939 for repairs, including new wire scraper ropes which cost $ 6,306.41, was $ 12,247.96; $ 3,419.17 was expended for repairs to scraper hoists, scraper blocks, chains, etc.

In 1939 four 20 H.P. electric scraper hoists were purchased while in 1938 none were purchased.

The repair cost per machine was higher in 1939 due to the mine operating more days. The bulk of repairs were made to the oldest hoists a number of which have been in service from seven to ten years. The cost of repairs for the 10 H.P. units is high due to burning of armatures in motors. This unit is under powered for everything except very short scraping distances of 50 ft. or less. They are used mainly to replace a machine that is out of commission for repairs.

d. Underground Tram Cars:

There were three 65 cu. ft. rocker dump cars purchased in 1939 at a price of $ 460.00 each. These cars were charged to E. & A. No. 848 - Equipment to Increase Production. No cars were purchased in 1938.

e. Drill Equipment:

There were eight RB-12 jackhammers purchased in 1939 at a cost of $ 200.42 each. Two were charged to operating mine and six were charged to E. & A. No. 848 - Equipment to Increase Production. There were five RB-12 machines purchased in 1938.

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13. EQUIPMENT AND PROPOSED EQUIPMENT: (Cont'd)

f. Haulage Tracks:

Expense for material for track extension and replacements increased due to 13th level new drift and to more replacement on other levels. The expenditures for tracks in 1939 and 1938 were as follows:

	1939	1938
40-lb. Rail	417.26	282.98
Steel Ties & Tie Plates	155.82	42.27
Manganese Frogs	94.25	-
Total	667.33	325.25

14. MAINTENANCE AND REPAIRS:

Expenditures for maintenance and repairs in the accounts listed under "Underground Costs" increased $ 5,479.79. The amount expended in 1939 was $ 30,542.57 compared with $ 25,062.78 in 1938. The cost per ton decreased $ .007 in 1939.

Following is a list of purchases and repair costs:

2 RB-12 Jackhammers	$ 400.84	
8 Circuit Breakers	252.54	
1000 ft. 4/0 Grooved Trolley Wire	118.80	
Total Cost New Undg. Equipment		$ 772.18
Repairs to Scraper Hoists, Scrapers, etc.	5689.01	
Cost of 3/8" & 1/2" Wire Rope for Scrapers	6306.41	
Repairs to Compressors	296.47	
Repairs to Generator & Wiring	1765.65	
Repairs to Locomotives	4484.13	
Haulage Tracks	4094.88	
Repairs to Haulage Cars	3680.16	
Repairs to Pumping Machinery	3453.68	
Total Repair Costs		29770.39
Grand Total Purchases and Repairs		30542.57

Expenditures in the accounts listed under "Surface Costs" increased $ 373.78. The cost per ton decreased $ .007 in 1939. The amount expended in 1939 was $ 12,411.64 compared with $ 12,037.91 in 1938.

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14. MAINTENANCE AND REPAIRS: (Cont'd)

Following is a list of the items making up the charges in each account:

Repairs to hoists	$ 1067.04
Repairs to Generator a/c Fire	1660.66
New Hoisting Rope	645.75
Repairs to Skips & Cages	2251.88
Repairs to Top Tram Engines	387.81
Repairs to Tracks & Cars	1171.19
Wire Rope, Sheaves & Rollers	1262.01
Repairs to Permanent Trestles	261.49
Shaft House Pockets.	194.85
Repairs to Mine Buildings	1667.04
Repairs to Shaft & Pockets	1841.92
Total	$ 12411.64

15. POWER:

The following is a detail of electric current purchased, distribution of charges to various accounts, and other data:

	1939 - 12 Months Optg.		1938 - 12 Months Optg.	
	Cost	Cost Per Ton	Cost	Cost Per Ton
Stoping	1923.00	.0035	1645.00	.0040
Timbering	85.12	.0002	65.43	.0002
Compressors	32488.24	.0589	23930.47	.0581
Ventilation	6351.45	.0115	5700.85	.0138
Pumping	25597.58	.0465	26838.35	.0651
Hoisting	19582.46	.0355	16309.44	.0395
Stocking Ore	206.50	.0004	320.34	.0008
Dry House Expense	235.40	.0004	228.39	.0005
Tel. & Safety Devices	893.00	.0016	692.20	.0016
Mine Office	58.47	.0001	52.26	.0001
Electric Haulage	4954.42	.0090	3798.96	.0093
Shops	182.98	.0003	148.13	.0004
District Carpenter Shop	10.27		10.17	
Total	92568.89	.1679	79739.99	.1935
Main Line Meter - K.W. (*)		6,658,912		5,613,604
Separate Meter Reading - K.W.		6,541,717		5,483,435
Line Loss - K.W.		117,195		130,169
Product - tons		551,362		412,000
K.W. Per Ton (Inc. Line Loss)		12.06		13.62
Cost Per K.W. (Avg. for Year)		.0139		.01421
15 Min. Demand - K.W. (Avg. for Year)		1547		1421
Load Factor (Avg. for Year)		52%		48%

(*) Less Maas charges

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15. POWER: (Cont'd)

The total cost for current purchased in 1939 was $ 12,828.90 more than in 1938. The cost per ton was, however, $ .0258 lower in 1939 or expressed in percentage, 13% less. The decrease in cost per ton was due to a better average load factor during the year which lowered the cost per kilowatt 2%. Due to a larger product the kilowatts per ton decreased 11%. A good load factor is possible on a five day per week operation, while on a two or three day per week operation a poor factor results.

17. CONDITION OF PREMISES:

a. Mine Grounds:

The grounds around the mine were kept in good condition during the year. The shade trees show the severe damage inflicted by ice and the heavy snow storms in 1938 as also does the pine plantation on the hill South of the engine house.

b. Negaunee Mine Houses:

Eleven houses are owned by The Negaunee Mine Company as none were sold in 1939. There are twenty-two families living in the eleven houses. The cost of repairs in 1939 was $ 3,037.08 as compared with $ 1,040.46 in 1938. The revenue from rented buildings in 1939 was $ 2,362.80. The cost for repairs was high due to building new chimneys in several houses, from cellar to roof, to replace old chimneys that were too small and dangerous due to damage by repeated chimney fires. Four houses were repaired and painted, one of which required new siding. Expense for the next several years should be low as the houses are now in a good state of repair.

18. NATIONALITY OF EMPLOYEES:

The nationality record of employees is submitted in two forms, one as to parentage, the other as to country of birth.

As to Parentage	1939	%	1938	%
Finnish	182	46.6	162	45.6
English	57	14.6	58	16.1
Italian	57	14.6	51	14.4
Swedish	36	9.3	31	8.8
French (Canadian)	31	7.9	29	8.3
French (France)	1	.2		
Austrian	10	2.6	10	2.8
Norwegian	3	.8	5	1.4
German	7	1.8	5	1.4
Danish	3	.7	2	.6
Belgian	1	.2	1	.3
Irish	2	.5	1	.3
Polish	1	.2		
Total	391	100.0	355	100.0

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18. NATIONALITY OF EMPLOYEES: (Cont'd)

As to Birth	American Born		Foreign Born	
	1939	1938	1939	1938
Finnish	105	88	77	74
English	39	39	18	19
Italian	29	21	28	29
Swedish	25	19	11	12
French (Canadian)	30	27	1	2
French (France)			1	
Austrian	8	8	2	2
Norwegian	2	4	1	1
German	7	4		1
Danish	3	2		
Belgian	1	1		
Irish	2	1		
Polish	1			
Total	252	214	139	141

NORTH JACKSON MINE
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1. GENERAL:

This property has been idle for thirty-one years.

6. SURFACE:

The old fence around the West half of the North Jackson pit was torn down and a complete new fence erected. A new fence was also erected around some of the pits South of the old Jackson offide and minor repairs were also made to the other fences enclosing the property.

The interior of the four apartment building which was formerly the mine office, was redecorated during the year.

10. TAXES:

	1939		1938	
	Valuation	Taxes	Valuation	Taxes
47% of Jackson Realty Sec. 1-47-27	220,000	$ 8,086.81	220,900	$ 8,298.42
Collection Fees		80.87		82.98
Total	220,000	$ 8,167.68	220,900	$ 8,381.40
Rented Buildings				
Old Jackson Office	700	$ 25.90	700	$ 26.56
Grand Total	220,700	$ 8,193.58	221,600	$ 8,407.96
City of Negaunee Tax Rate Per $100.00 Valuation		3.661		3.7566

Taxes decreased due to lower City tax rate and to lower assessed valuation by the State Tax Commission.

SOUTH JACKSON MINE
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1. GENERAL:

There was no change in conditions at this idle property during 1939.

4. ESTIMATE OF ORE RESERVES:

a. Available Ore:

Above present pit available by present system of mining:

On Southwest Side	35,000 tons
North of Lucy Pit	5,000 "
South and Southwest of Lucy Pit	3,000 "
Total	43,000 "

Below present pit and above drainage tunnel available by milling:

West of Crusher	186,000 tons
Area below bottom of present pit shown by churn drilling	105,226 "
Total	291,226 "
Grand Total	334,226 "

c. Estimated Analysis:

	Iron	Phos.	Silica	Alum.	Mang.	Lime	Mag.	Sul.	Igni.	Moist.
Natural	34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

6. SURFACE:

The fences and shaft covering were inspected regularly during the Summer and necessary repairs made. The only building remaining at this idle property is the lower section of the shaft house. The sills under the shaft house are in a bad state of decay and the shaft house should be dismantled in 1940.

10. TAXES:

	1939 Valuation	1939 Taxes	1938 Valuation	1938 Taxes
53% of Realty as described Sec. 1-47-27	249,100	$ 9,119.14	249,100	$ 9,357.79
Collection Fees		91.19		93.58
Total	249,100	$ 9,210.33	249,100	$ 9,451.37
City of Negaunee Tax Rate Per $100.00 Valuation		3.661		3.7566

The taxes decreased due to a decrease in the City of Negaunee tax rate.

FRANCIS MINE
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1. GENERAL

This mine was abandoned in 1924. The steel headframe is the only structure remaining on the property. All of the ore on this property was moved during the year. The ore which was left on the stockpile sollar was shoveled into trucks and placed on stockpile and loaded out by steam shovel. This amounted to 3,518 tons.

2. PRODUCTION SHIPMENTS & INVENTORIES

b. Shipments

	1939	1938
Franport	13,469	0

c. Stockpile Inventories

Franport	(Shortage)	2,536	16,005

3. ANALYSIS

b. Complete Analysis of Ore Shipped (Dried at 212°)

Franport Grade	Tons	Iron.	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss	Moist
Mine Analysis	13,469	55.62	.301	7.82	.61	5.28	1.00	1.92	.050	2.70	13.69

8. COST OF OPERATING

	1939	1938	Incr.
General Mine Accounts	427.57	7.39	420.18
Taxes	384.17	382.17	2.00
Loading and Shipping	4,417.92	0	4,417.92
Total Cost at Mine	5,229.66	389.56	4,840.10

The large increase is due to the fact that in 1939, 13,469 tons of ore were shipped, while in 1938 there were no ore shipments. Included is the cost of loading the ore from the stockpile sollar into trucks and transporting it to a place where it could be loaded by steamshovel.

10. TAXES

	1939		1938	
	Valuation	Taxes	Valuation	Taxes
SW¼ of NW¼ Sec.27,45-25		3.80		3.74
Personal property	20,000	376.60	2,000	374.68
Total		380.40		378.42
Collection Fee		3.77		3.75
Total Taxes		384.17		382.17

GARDNER MACKINAW MINE
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1. GENERAL

The Gardner Mackinaw Mine was closed to production for the entire year of 1939 with the result that no ore was produced.

The only work which was performed during the year, with the exception of the usual pumping operations, which will be described under that heading, was to maintain the 4th and 5th level drift. Im the following pages of this report, only those headings will be used which have resulted in any change during the year. Any other information necessary, can be found in its complete form in the last year's annual report.

2. PRODUCTION SHIPMENTS & INVENTORIES

a. Production by grades

Grade	1939	1938	Decrease
Gardner Ore	0	0	
Mackinaw Ore	0	48,824	48,824
Total	0	48,824	48,824

b. Shipments

Grade of Ore	Pocket Tons	Stockpile & Tons	Total Tons	Total Last Year
Gardner	0	2,775	2,775	818
Mackinaw	0	46,366	46,366	13,670
Total	0	49,141	49,141	14,488

Increase 1939 34,653

c. Stockpile Inventories

	Dec.31,1939	Dec.31,1938	Decrease
Gardner	4,286	7,061	2,775
Mackinaw	71,601	117,967	46,366
Total	75,887	125,028	49,141

f. Ore Statement

	Gardner	Mackinaw	Total
On hand 1-1-39	7,061	117,967	125,028
Product for year	0	0	0
Total	7,061	117,967	125,028
Shipments	2,775	46,366	49,141
Balance on hand	4,286	71,601	75,887

Decrease in output 48,874

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3. ANALYSIS

b. Average Analysis on Straight Cargos

There were no straight cargos forwarded from the mine, all shipments being graded with other ores, however, the analysis of ore shipped is as follows:

Grade	Tons	Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Ign.	Moist.
Mackinaw	49,141	59.10	.498	.330	.28	2.29	2.78	.93	9.50	1.95	10.91

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Assumption: 12 cu. ft. equals one ton
10% deduction for rock
10% deduction for loss in mining
Estimate is of available ore (merchantable) as well as high phosphorus ore (unmerchantable)

Non-Bessemer	Tons-Merchantable	Tons-NonMerchantable
5th to 6th Level	21,675	30,834
6th to 7th Level	20,382	88,475
7th to 8th Level	34,560	81,044
8th to 9th Level	22,223	91,713
9th to 10th Level	2,728	308,388
Below 10th Level	13,416	224,817
Total Developed ore 12-31-39	114,984	825,271

c. Estimated Analysis

Ore Reserves : Approximate Expected Natural Analysis
Developed Ore.

	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Ign.	Moist.
Mackinaw	52.64	.445	3.08	.22	1.92	2.38	.89	.898	1.78	11.00

Ore in Stock: Average Natural Analysis

Mackinaw	53.571	.365	2.67	.24	1.70	2.21	.88	.867	2.88	10.70

The slight change in the expected analysis is the result of a reduction in moisture and to a somewhat better grade of ore developed on the 6th Level.

GARDNER MACKINAW MINE
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7. UNDERGROUND

d. Timbering

4th Level

Late in 1938, preparations were in progress for making a portion of the 4th Level into a sump. In January 1939, this work was completed which included the replacing of several timber sets in the main level drift in the vicinity of the Mackinaw ore body. Other clean-up work was done from time to time whenever necessary.

The floor and main timbers of the small pumphouse were also replaced in January.

5th Level

Probably the most important job during the year on this Level included the retimbering of the upper portion of the incline shaft. Sets were replaced on the hanging and sides of the shaft from the 5th Level up. This work also necessitated the removing of a large amount of loose material on the hanging wall and sides of the shaft. The work was concluded in October after all sets had been braced and double cased to prevent any loose material from falling.

Considerable retimbering was done on the 5th Level between the shaft crosscut and the incline shaft pocket, in the vicinity of the ore body. For the most part, all sets were of treated timber and whenever a wide span was necessary, "H" beam sets were put in. In November this work was completed and no further work should be necessary for some time to come. The traveling raise, which connects the 5th with the 4th Level, was repaired early in the year and will be maintained for traveling as well as for pipe lines, indefinitely.

Statement of Timber Used

	Linear Feet	Amount 1939
8" to 9" Timber		
10" to 12" Timber		
12" to 14" Timber	694	141.19
Total Timber	694	141.19
7' Lagging	5,330	53.30
7' Poles	280	3.78
9'6" Poles	2,375	45.66
Total Lagging & Poles		102.74
Total Cost for timber, lagging & poles		$ 243.93

GARDNER MACKINAW MINE
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7. UNDERGROUND (Cont.)

k. Pumping

4th Level

During January, repairs were completed in the 4th Level Pump Station which included the rewiring of the panels of both pumps. During the entire pumping schedule, for the remainder of the year, both of these pumps were used at various intervals in an effort to keep them in condition for any emergency which might arise. The 200 gallon Aldrich pump, which was dismantled in 1938 for use on the 10th Level, was reassembled in January and can be used if necessary.

5th Level

Early in January, a pumping station was completed in No. 4 stope below the 5th Level. A platform was built at a point approximately 15' below the 5th Level elevation. On this platform, two centrifugal pumps of 300 and 500 gallon capacity were connected so that either or both could be in operation at the same time. A second 4" pipe line was then installed from the pumps through the above mentioned traveling raise to the 4th Level, where the water is carried by ditch into the new sump on the 4th Level. During February, the lower workings of the mine had filled to a point where pumping was necessary. Thus, as shown in the table below, the gallons per minute pumped rose from 187 to 252 per minute. A leeway was allowed between the maximum and minimum water levels of approximately 8', thus in the event of an electrical failure, approximately 8 days could be allowed before this temporary pumping station would be flooded.

Throughout the rest of the year, pumping was in progress every day on a single eight hour shift, with one regular pumpman and helper. The pumps just below the 5th Level operate automatically, with the result that very little watching is necessary other than regular inspections. On the 4th Level, a regular pumpman is necessary for the entire shift and the actual amount of pumping amounts to approximately 6 hours by using either the 1,000 gallon Aldrich vertical pump or the 1,000 gallon Prescott centrifugal.

Month	1939	1938	1937	1936	1935
January	122	119	123	137	143
February	187	126	121	126	142
March	252	146	119	130	138
April	258	152	119	130	138
May	246	173	117.9	133	140
June	256	152	118	125	140
July	259	82	115	130	137
August	255	0	98	123	134
September	260	0	106	124	135
October	258	0	114	124	135
November	255	70	112	119	134
December	261	57	117	123	133
Average	239	90*	115	127	138

* During August, September & October, no water was pumped from the mine. The total inflow was allowed to fill the lower workings, with the result that the average for 1938 is considerably lower.

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8. COST OF OPERATING

Idle Expense	Amount	Per Ton
Underground Costs		
Timbering	$ 3,449.75	
Pumping	17,512.03	
Compressors and Air Pipes	6.81	
Underground Suptnce	889.22	
Maint: Pumping Machinery	1,673.24	
Total Underground Costs	$ 23,531.05	
Surface Costs		
Hoisting	$ 1,353.15	
Dry House	52.11	
General Surface Expense	1,345.27	
Maint: Hoisting Equipment	339.07	
Shaft	78.99	
Mine Buildings	66.18	
Total Surface Costs	$ 3,234.77	
Total General Mine Expense	$ 6,513.03	
Loading & Shipping		
Steam Shovel	$ 3,658.12	.074
District Crusher	2,531.30	.052
Total Loading and Shipping	$ 6,189.42	
Taxes	$ 4,015.10	
TOTAL COST	$ 43,483.37	
Supply Inventory Adjustment	39.39	
TOTAL	$ 43,443.78	

10. TAXES

GARDNER MINE - C&NW LEASE	1939 Valuation	1939 Taxes	1938 Valuation	1938 Taxes
SE¼ of SE¼, Sec. 35, 45-25	2,000	37.66	2,000	37.47
NE¼ of SW¼, Sec. 35, 45-25	1,000	18.83	1,000	18.73
NW¼ of NE¼, Sec. 2, 44-25	1,000	18.83	1,000	18.73
Personal property	125,000	2,353.66	130,000	2,435.42
TOTAL	129,000	2,428.98	134,000	2,510.35
Collection Fees		24.29		25.10
TOTAL TAXES		2,453.27		2,535.45

GARDNER MACKINAW MINE
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10. TAXES (Cont.)

MACKINAW MINE - D&N LEASE	1939 Valuation	1939 Taxes	1938 Valuation	1938 Taxes
N½ of SE¼ of SW¼ of SE¼ of Sec.35,45-25	81,000	1,525.18	76,000	1,423.78
S½ of SW¼ of SE¼ of Sec.35,45-25	1,125	21.19	1,125	21.07
TOTAL	82,125	1,546.37	77,125	1,444.85
Collection Fees		15.46		14.45
TOTAL TAXES		1,561.83		1,459.30
TOTAL GARDNER MACKINAW MINE	211,125	4,015.10	211,125	3,994.75

15. POWER

	K. W. H. USED 1939
Gardner Hoist	0
Mackinaw hoist & lighting	12,289
Compressors	7,030
Electric Haulage	4,500
Shops	1,153
Top Tram	0
U. G. Hoist	11,921
Pumping & Lighting	704,392 *
Heating Plant	0
Dry House	0
Office	0
Timbering	0
Total	741,285
In cash	$ 13,302.12
Cost per KWH	.0180

* The increase in power consumption for this item was largely due to the increase in gallons per minute pumped during the year, which necessitated the addition of two electric pumps, etc.

No comparison is made with 1938 for in that year the mine was on an operating schedule for six months and six months idle, whereas in 1939 it has been idle for the entire year.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

1. GENERAL

Conditions in the District were less favorable than in 1938. No mine operated in 1939, whereas the Mackinaw operated until June 1st, 1938. A large number of men from the District were fortunate in obtaining work at North Lake, Ishpeming and Negaunee. They commute by bus, morning and night.

There were a few logging operations in the District.

Schools

There was a decrease in the school enrollment of 32. This was due to several families moving out of the district.

Enrollment:	1939	1938
Elementary Grades	294	309
7th to 12th Grades	261	278
Total	555	587

In the above enrollment are 42 children from Wells Township who are transported 20 miles morning and afternoon through a wooded unsettled country. Turin Township also transports 8 pupils about 15 miles to Gwinn.

A band consisting of boys and girls of the Gwinn School made their first appearance Memorial Day.

Houses and Lots

Practically all of the Company houses in the District were rented during the year. The rental charged is based on days worked. The rentals from January 1st to June 1st were 3/4 normal, from June 1st to September 1st they were 1/2 normal and from September 1st to January 1,1940, they were full or normal.

Princeton House #5 was sold during the year. This building was old and in very poor condition.

Conservation Department Station

Improvements were continued on the grounds surrounding the new Equipment Station, located on the County Road, just west of Gwinn. Also a flag pole was set up in front of the building. The Station with grounds presents a very neat appearance.

Civilian Conservation Corps

Escanaba River Camp #1620, located about 18 miles west of Gwinn, continued throughout the year. This is the only C.C.C. camp remaining in Marquette County.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

1. GENERAL (Cont.)

Municipal Skating Rink
A skating rink made by the WPA was used very extensively again during the winter months. It is located on Lots 11, 12, 13 of Block 14. It is well lighted and well attended by the people of Gwinn and vicinity.

Sinclair Gas Station
A new gas station was built by the Sinclair Oil Company. This started operating on July 31, 1939. It is located on Lot 35 of Block 27 at the extreme northwest end of Maple Street.

Cash Way Store
In August, 1939, a new"Cash Way Store" was started by the Frank C. Schilling Company in one of the store rooms in the hotel building.

Gwinn Oil Company Gas Station
An addition was built to the Gwinn Oil Company Gas Station. The covered drive way in front of the gas station was removed. This open drive way, with the new addition has added to the appearance of the gas station.

Michigan Bell Telephone Company
On December 5th the Michigan Bell Telephone Company cut the old system over to a new dial system.

a. Statement Showing Total Ore Produced in District by C.C.I.Co., 1903 to 1939 inclusive

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1939	1,589,018	1,584,333	3,835,157	988,665	504,667	1,289,118	9,790,958
1939	0	0	0	0	0	0	0
	1,589,018	1,584,333	3,835,157	988 665	504,667	1,289,118	9,790,958

b. Statement Showing Ore Shipments by C.C.I.Co. from 1905 to 1939

YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	GARDNER MACKINAW	TOTAL
Total to 1939	1,589,018	1,463,434	3,773,361	988,325	488,662	1,167,486	9,470,286
1939	0	202	5,431	0	13,469	49,141	68,243
	1,589,018	1,463,636	3,778,792	988,325	502,131	1,216,627	9,538,529

c. Ore in Stock at Mines, December 31, 1939

Princeton	Stephenson	Francis	Gardner Mackinaw	Total
120,697	50,375	0	75,887	246,959

GWINN DISTRICT GENERAL
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YEAR 1939

10. TAXES

The following statement gives the taxes in detail for 1939 and 1938 for all Company properties in the district. The mine taxes in the summary shows totals only, as the detail for each mine is included in the mine report.

The summary also includes the taxes paid by the Cliffs Power & Light Company in order to show the total taxes paid in Forsyth Township by the Company, exclusive of those paid by the Land Department.

		1939		1938	
Forsyth Township		Valuation	Taxes	Valuation	Taxes
Mineral Lands, Gwinn					
SW¼ of SW¼ of Sec.26,45-25	45 A.	100	1.89	100	1.88
NE¼ of SE¼ of Sec.28,45-25	40 A.	100	1.89	100	1.88
N½ of NE¼ of Sec.34,45-25	80 A.	200	3.76	200	3.75
SE¼ of NE¼ of Sec.34,45-25	40 A.	100	1.89	100	1.88
NE¼ of NW¼ of Sec.34,45-25	40 A.	100	1.89	100	1.88
NE¼ of SE¼ of Sec.34,45-25	40 A.	100	1.89	100	1.88
NW¼ of Sec.35,45-25	160 A.	400	7.53	400	7.49
Lots 1, 2 and 3,Sec.36,45-25	52 A.	125	2.36	125	2.35
Lots 7, 8 and 9,Sec.36,45-25	98.42 A.	260	4.91	260	4.89
Lot 11, Sec.36,45-25	13.3 A.	25	.48	25	.47
Und.½ of S½ of N½ of Sec.22,45-25	160 A.			500	9.38
Und.½ of S½ of NE¼ Sec.28,45-25	80 A.			142	2.67
Und.½ of N½ of NW¼ Sec.2,45-26	87.08 A.			100	1.88
Und.½ of NE¼ of Sec.2,45-26	165.61A.			200	3.75
TOTAL		1,510	28.49	2,452	46.03
Collection Fee			.29		.46
TOTAL TAXES			28.78		46.49
Gwinn Townsite - Surface Only					
NE¼ of SW¼,Sec.21,45-25,not included in Plat, 6 acres.....		100	1.89	100	1.88
NE¼ of NW¼. Sec.21,45-25, 17.54 acres		150	2.82	150	2.82
That part of S½ of NW¼,Sec.21,45-25 not included in Plat of Gwinn, 25.01 A.		200	3.76	200	3.75
E½ of SE¼ of Sec.21,45-25, 65.84 A....		150	2.82	150	2.82
That part of W½ of SE¼,Sec.21,45-25 not included in Plat of Gwinn, 38.80 A.		300	5.66	300	5.63
Gwinn Townsite Plat.....		86,300	1,625.17	86,405	1,618.37
Supt.Res. 1.2.A. Part W½ of SE¼,Sec.21		1,500	28.25	3,000	56.20
NW¼ of NE¼,Sec.21,45-25, except 5 A.		100	1.89	100	1.88
Part of S½ of NE¼,Sec.21,45-25, 50.88 A		300	5.66	300	5.63
Total		89,100	1,677.92	90,705	1,698.98
Collection Fee.....			16.78		16.99
TOTAL TAXES.....			1,694.70		1,715.97

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

10. TAXES (Cont.)

	1939 Valuation	1939 Taxes	1938 Valuation	1938 Taxes
Gardner Mackinaw Dwellings				
N½ of NE¼ of Sec.35,45-25, 87.35 A...	500	9.42	500	9.38
Collection Fee		.09		.09
Total		9.51		9.47
Central Water Plant, NW¼ of NE¼ of Sec. 28,45-25	100	1.91	100	1.90
Personal District Office.....	500	9.50	500	9.48
District Crusher, N½ of NW¼, Sec.27, 45-25.....1.....	1,000	19.02	1,000	18.91
	1,600	30.43	1,600	30.29
Austin Location				
Part of Lot 5, SW¼ of NE¼,Sec.20,45-25	3,500	65.91	3,500	65.57
NW¼ of SE¼, Sec.20,45-25.....	3,500	65.91	3,500	65.57
NE¼ of SW¼ of Sec.20,45-25, BH.....	260	4.90	260	4.88
Total.....	7,260	126.72	7,260	136.02
Collection Fee.....		1.37		1.36
Total Taxes.....		138.09		137.38
Summary				
Stephenson Mine.....	67,100	1,276.08	92,100	1,742.64
Princeton Mine.....	241,260	4,588.19	241,260	4,564.98
Francis Mine.....	20,000	384.17	20,000	382.17
Gardner Mackinaw Mine.....	211,125	4,015.10	211,125	3,994.75
Austin Location.....	7,260	138.09	7,260	137.38
Mineral Lands.....	1,510	28.78	2,452	46.49
Gwinn Townsite.....	89,100	1,694.70	90,705	1,718.30
Gardner Mackinaw Location.....	500	9.51	500	9.47
Central Water Plant.....	100	1.91	100	1.90
Personal Distridt Office.....	500	9.50	500	9.48
District Crusher.....	1,000	19.02	1,000	18.91
Total C.C.I.Co. Including 1% fee	639,455	12,165.05	667,002	12,626.47
Less Francis, Paid by Cleveland				3.74
Less 1933 Taxes on NE¼ of SW¼ Sec.21				2.33
Total to Pay.....				12,620.40
The Cliffs Power & Light Co....	152,535	2,900.94	98,665	1,848.55
TOTAL TAXES.....	791,990	15,065.99	765,667	14,468.95
Rate.....1.....		1.883		1.874

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

10. TAXES (Cont.)

Taxes Levied - Forsyth Township

	1939	1938	1937	1936
Forsyth Township Valuation	1,339,590	1,322,780	1,446,395	1,429,110
Rate per $100.00	1.883	1.873	1.839	1.851
Amount of Tax Roll				
County Tax.....	7,974.55	8,329.33	9,437.28	10,003.77
County Debt Service.....		138.71	405.87	494.36
County Road.....	2,742.10	2,520.19	2,375.04	928.92
Township Tax.....	4,018.30	2,671.36	3,635.11	4,215.87
Township Debt Service.....	1,427.39	1,102.96	805.86	800.00
School.....	5,357.62	6,461.27	6,344.02	6,288.08
School Debt. Service.....	3,705.10	3,746.01	3,712.87	3,704.48
Rejected Tax.....				187.92
Total.....	25,225.06	24,969.83	26,716.05	26,623.40
Amount paid by C.C.I.Co....	15,065.99	14,468.95	15,920.19	16,347.81
Percent paid by C.C.I.Co.	59.7	58.00	59.59	60.08

16. WATER SUPPLY
GWINN DISTRICT

The pumping plant at the Jopling Shaft (Kidder) operated throughout the year.

The water supply has been excellent but early in the year serious trouble started due to leaks all over the system, particularly in the Austin and Princeton Locations and to a certain extent in Gwinn. Last spring the Princeton Location was without water one-third of the time. The matter was referred to our Mechanical Department and it was decided it was necessary to construct a new 8" line from the pump station to Gwinn and replace an abandoned 6" wood line, by a 4" iron, across the park south of the hotel to reduce the pressure on the system. It was further decided to move the booster pump station from the Austin Location to the East bank of the Escanaba River below Austin, and replace all wood pipes with iron pipes from this station up to the Central office. E&A #846 to cover this work was approved and the work was practically completed by the end of the year.

The line supplying the L. S. & I. tank at the Austin Location was replaced by the Railroad Company.

While the water system has been helped considerably by the work done in 1937 and last year, there is bound to be trouble in Gwinn as long

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

16. WATER SUPPLY
GWINN DISTRICT

as the wood pipes are used. They are practically gone and can stand but little strain. Whenever the pressure is raised, it is evident that much of the water is lost through leaks that do not show at surface.

During the year water samples were taken on the 15th and 30th of each month, and sent to the Michigan Department of Health laboratory located at Houghton, Michigan. No chlorination has been necessary.

The operating costs at the present pump station have fluctuated considerably the three years it has been in service. The large item has been maintenance. It is expected there will be less expense from this source in the future, except possibly at Gwinn Townsite.

The total cost of operating the Kidder Pump Station for the year 1939 was.....$ 8,543.87

Total cost of operating Kidder Pump Station for the year 1938 was..... 6,415.14

Total cost of operating Kidder Pump Station for the year 1937 was..... 10,505.97

Total cost of operating the old Escanaba River Plant for the year 1936 was..... 8,724.86

The following gives the cost of operating the Pump Station for the years 1939 and 1938:

	1939	1938	Incr.	Decr.
General Expense	41.81	39.60	2.21	
Maintenance Labor	1,238.67	691.27	547.40	
" Material	1,333.89	883.13	450.76	
Operating Labor	612.68	757.19		144.51
" Supplies	5,316.82	4,043.95	1,272.87	
Total	8,543.87	6,415.14	2,128.73	

During the year 1939 there was an item of $552.33 charged to pump station which should have been charged to E&A #846. This charge was made before the E&A was prepared. The power cost increased $1,239.08 over 1938. In December, in addition to the $43.31

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

16. WATER SUPPLY
GWINN DISTRICT (Cont.)

charged to E&A #699, an additional depreciation charge of $319.01 for E&A #846 was made. These items practically account for the increase shown above.

Maintenance Labor and Material
Increase account charges for E&A's in 1939 as noted above.

Operating Labor and Supplies
Net increase due to increased power cost.

Operating costs were charged off as follows:

	1939	1938
1. C.C.I.Co. Mines.....	7.50	35.00
2. Water Charges Receivable....	2,087.24	2,124.38
3. Gwinn Townsite Expense General	6,449.13	4,255.76
	8,543.87	6,415.14

17. CONDITION OF PREMISES

The rents accrued, collected and repair expense for the Company houses in Gwinn and in the Austin, Princeton and Gardner Mackinaw Locations follows. The rents accrued in 1939 were larger than in 1938 on account of increased working schedules - thus the increase in rentals shown.

Gwinn Townsite	1939	1938	1937	1936
Number of Houses - 121				
Rents Accrued.....	9,454.31	8,756.35	11,590.99	10,391.71
Repair Expense.....	5,562.68	2,007.88	14,887.99	5,945.19
ACCRUED RENT over repair cost	3,891.63	6,748.47	3,297.00	4,446.52
Actual Rent Collected.....	8,215.61	7,144.59	11,123.67	9,095.45
Amount credited by men owing back rent.....	0	0	276.54	632.29
Total Collection.....	8,215.61	7,144.59	11,400.21	9,727.74

There were no house and lot sales during the year.

The increase in 1939 for repairs to rented buildings amounted to $3,554.80.

GWINN DISTRICT GENERAL
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YEAR 1939

17. CONDITION OF PREMISES (Cont.)

Austin Location	1939	1938	1937	1936
Number of Houses - 41				
Number occupied.....	38	38	37	32
Rents Accrued.....	1,651.73	1,559.75	1,684.08	1,463.97
Repair Expense.....	1,065.51	300.26	1,441.05	436.30
ACCRUED RENT over repair cost..	486.22	1,259.49	243.03	1,027.67
Actual rent collection.....	1,567.38	1,513.00	1,710.07	1,596.49
Amount credited by men owing back rent.....	110.00	16.00	0	7.04
Total Collection.....	1,677.38	1,529.00	1,710.07	1,603.53

The increase of $765.25 in repairs is due to the fact that there were more general repairs in 1939.

Princeton Location	1939	1938	1937	1936
Number of Houses - 10				
Number occupied.....	8	10	9	9
Rents accrued.....	472.25	419.15	596.90	437.50
Repair Expense.....	588.77	144.12	468.40	165.99
ACCRUED RENT over repair cost	116.52	275.03	127.60	415.91
Actual rent collection.....	453.50	412.86	635.00	471.59
Amount credited by men owing back rent.....	0	0	0	7.04
TOTAL COLLECTION.....	453.50	412.86	635.00	478.63

During the year Princeton House No. 5 was sold to Wilfred J. Kari.

Cost of repairs to Princeton Houses increased $444.65 in 1939.

Gardner Mackinaw Location	1939	1938	1937	1936
Number of Houses - 2				
Number occupied.....	1	1	0	2
Rents Accrued.....	0	0	104.00	279.90
Repair Expense.....	0	9.29	15.27	91.00
ACCRUED RENT OVER repair cost	0	9.29	88.73	188.90
Actual rent collections.....	19.02	42.00	80.98	237.90

There is only one house remaining in this location. It is vacant.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

17. CONDITION OF PREMISES (Cont.)

Statistical Statement of Rented Buildings 1939

Location	Vacant	Occupied	Total	Cost of Repairs	Repair Cost Per House	Rent Accrued	Rent Collected
Princeton	2	8	10	588.77	58.87	472.25	453.50
Austin	3	38	41	1,065.51	26.00	1,651.73	1,567.38
Gardner Mackinaw	1	1	2	0			19.02
Gwinn Townsite	3	118	121	5,562.68	46.00	9,454.31	8,215.61
	9	165	174	7,216.96 (1)	41.48	11,578,29	10,255.51 (2)

(1) Actual cash expenditure for repairs $7,216.96
(2) Actual cash received 10,255.51
Amount credited by journal voucher for labor performed 110.00

Included in the above total rent collection is an amount of $159.02 which was credited to rent accounts which had previously been charged off.

19. GWINN ASSOCIATION
GWINN HOTEL

1. Gwinn Association

The following is a brief synopsis of the annual report furnished to the Welfare Department of the Company, of the activities carried on at the Gwinn Association Clubhouse.

The Association Clubhouse completed its 30th year of offering the residents of the district a modern place to enjoy their social and recreational activities.

The Club receives financial assistance from the local Board of Education, the Cliffs Power & Light Company and The Cleveland-Cliffs Iron Company. In addition to the financial assistance given by the Cleveland-Cliffs Iron Company, it also furnished material to resurface the roof over the entire building, paint for the interior redecorating and material for replacing pipes in the water system in the building.

The membership roll showed an average monthly membership of 241 of which 165 were Cleveland-Cliffs Iron Company employees and the remainder residents of Gwinn and vicinity.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

19. GWINN ASSOCIATION
GWINN HOTEL (Cont.)

1. Gwinn Association (Cont.)

Indoor activities included a bowling leage for men and women, cribbage and bridge leagues for men and women, a library, a reading room, (which receives 3 daily and 2 weekly newspapers and 23 weekly and monthly magazines), a recreational room with pool, billiard and table tennis tables and other miscellaneous games; meeting rooms for social activities used by churches, scout troops and other organizations; a gymnasium used for class work and as a dance floor.

The number of meetings of a business, social or recreational nature held at the building during the year totaled 409. Of this number, 11 were considered as annual events of community interest; church organizations used the building on 73 occasions; 3 scout troops held 128 meetings; 27 dances were held; 14 committee meetings; 18 educational classes by Red Cross or State Extension Workers; card playing leagues, women's study club, Federal unemployment adjusters, sportsmen's association, musical organizations and other groups used the building on 143 occasions. Equipment in club kitchen was used 169 times, and equipment was loaned for family parties 57 times.

The gymnasium is used by the local school for all of their physical education activities and is equipped with necessary mats, bars and other gym apparatus. Senior men and women members enjoy: badminton, volleyball, basketball and handball. The club sponsors a basketball team in the County league and a 10 team junior league. The gymnasium was used for 486 supervised periods with a total of 10,172 participants. There were 16 major basketball games and 69 junior league games, which drew 5,000 spectators.

A total of 25,150 spectators and participants enjoyed outdoor activities sponsored by the Club. This included a 6 team adult softball league, a junior league, the club entry in the County hardball league, tennis court and small playground with horsehoe court and supervision of Bass Lake Camp and grounds.

The local school conducted 170 all day sessions of their kindergarten in special rooms provided for that purpose and served 57 noon lunches for buss pupils in club kitchen.

The general condition of the building is fair considering the use it has received over the period since it opened in 1910. All floors were re-varnished and waxed, locker rooms and toilet floors repainted. Fencing in rear of the club was renewed.

The club made extensive repairs to the bowling alleys and they are now in first class condition. One pool table was recovered with new bed cloth and new games were added to the recreational room.

The coming summer it is the intention of those in charge to make an effort to give the lawn and shrubbery some much needed attention.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

19. GWINN ASSOCIATION
GWINN HOTEL (Cont.)

Bass Lake Camp

The Club cottage opened June 15th and closed with the Annual Rabbit Supper by the Sportsmen's Association, November 5th. The same arrangement covering the use of boats and cottage was in effect as last year. That is, club members were permitted the use of boats and cottage, no charge.

Some needed repairs were made on the cottage, a new floor placed on one side of the porch and a new screen added. The roof over the entire cottage was given a coat of tar. The Cleveland-Cliffs Iron Company paid the caretaker.

Summary

48 - basket picnics - different groups
950 - bathers.

Cottage	Number in party
5 - different families used camp 3 to 7 days	60
1 - group of older boys - 5 days	6
Troup #1 - Girl Scouts - 3 days	11
Troop #2 - Girl Scouts - 3 days	16
Troup #14 - Boy Scouts - 4 days	14
11 - families used cottage for all day Sunday picnic	250
Annual Rabbit Supper (Sportsmen's Assn.)	43
Annual Picnic - Negaunee City Band	50
1 - Church picnic	75
1 - School picnic	40

Total attendance at grounds and cottage; including bathers, basket picnics, fishermen, those using cottage and visitors ... 2200.

2. Gwinn Hotel
The Gwinn Hotel was operated throughout the year under the same management as last year, until December 20th, at which time Eugene LaRochelle took over the hotel. The west store building in the hotel block was rented August 15th to the Frank C. Schilling Company of Green Bay, for a "Cash Way Store". This is a chain store on the order of the A. & P. Apparently it is being well patronized.

GWINN DISTRICT GENERAL
ANNUAL REPORT
YEAR 1939

20. GWINN DISTRICT
CRUSHER

The crusher operated 30 days during 1939. The ore crushed was as follows:

	1939	1938
Gardner Mackinaw	49,141	14,488

The cost for the years 1939 and 1938 was as follows:

	1939		1938	
	Amount	Per Ton	Amount	Per Ton
General Expense	37.82	.001	22.48	.002
Maintenance	178.99	.004	40.00	.003
Operating	1,809.59	.037	861.78	.060
Total Operating Cost	2,026.40	.042	924.26	.065
Switching	504.90	.010	156.47	.010
GRAND TOTAL	2,531.30	.052	1,080.73	.075
Tons crushed	49,141		14,488	
Increase	34,653			

PRINCETON MINE
ANNUAL REPORT
YEAR 1939

1. GENERAL

This mine has been idle since 1921. During the year, 202 tons of ore were loaded by hand and shipped. This ore was used in the manufacture of paint.

In November a section of railroad track at No. 2 shaft, belonging to the Company was salvaged. In December the surface around No. 2 shaft was cleaned.

2. PRODUCTION SHIPMENTS & INVENTORIES

b. Shipments

	1939	1938	Increase
Cambridge	202	57	145
Princeport	0	0	0

c. Stockpile Inventories

Cambridge	105,019	105,221
Princeport	1,750	1,750
Sec. 19 Cambridge	13,673	13,673
Sec. 19 Princeport	255	255
	120,697	120,899

3. ANALYSIS

a. Stockpile Analysis

Grade	Tons	Iron	Phos.	Sil.	Mang.	Al.	Lime	Mag.	Sul.	Loss	Moist.
Princeport	2,005	61.24	.273	5.76	.46	1.49	1.42	.72	.052	1.20	11.95
Cambridge	118,692	59.80	.822	3.60	1.20	1.21	3.42	.89	.016	1.43	12.95

b. Average Analysis of Shipments

Cambridge	202	59.85	.895	4.28	1.13	1.21	3.42	.89	.118	1.43	12.95

4. ESTIMATE OF ORE RESERVES

a. Developed Ore

Assumption:
12 cu. ft. equals one ton
10% deduction for rock
10% deduction for loss in mining
Percentage of Bessemer equals 0