10. TAXES:

	1945 Valuation	1945 Taxes	1944 Valuation	1944 Taxes
Cambria Realty: S½ of SE¼ of Sec. 35, 48-27) Lots 7 & 8 of Sec. 35, 48-27) Lots 5, 6 & 7 of Sec. 36, 48-27) - 222.09 Acres)	125,000	5,273.49	150,000	6,265.38
Jackson Strip: N 660' of N½ of NW¼ of Sec. 1, 47-27 - 40 Acres)	775,000	32,695.62	645,000	26,941.13
Personal Property:				
Stockpile, Supplies & Equipment	280,000	11,812.61	390,000	16,289.99
Total by Mich. State Tax Com.	1,180,000	49,781.72	1,185,000	49,496.50
Lillie Mine Location, 1 house	100	4.22	100	4.18
Total	1,180,100	49,785.94	1,185,100	49,500.68
Collection Fees		497.86		495.01
Total Taxes, Negaunee		50,283.80		49,995.69
Division of Payments:				
Cambria-Jackson Taxes, City of Ishpeming*	20,000	718.74	1,000	35.99
Cambria-Jackson Taxes, City of Negaunee	1,180,100	50,283.80	1,185,100	49,995.69
Total	1,200,100	51,002.54	1,186,100	50,031.68

*Cambria-Jackson Mine-Ishpeming: N 660' of NE¼ of NE¼ of Sec. 2, 47-27 - 20 Acres)

Tax Rate per $100 of Valuation:	1945	1944
City of Negaunee	4.26098	4.17692
City of Ishpeming	3.59370	3.59893
Total Taxes, City of Negaunee:	542,465.77	582,020.52
Cambria-Jackson Percent of Taxes:		
City of Negaunee	9.27	7.94

11. ACCIDENTS AND PERSONAL INJURY:

Following is a list of the number of accidents classified as to time lost:

	1945	1944
Fatal	0	0
Time Lost - Over Four Months	1	0
Time Lost - One to Four Months	3	5
Time Lost - Less than One Month	5	7
Total Compensable Accidents	9	12

On December 31, 1945 payments were being made on two accidents which occurred prior to January 1, 1945; one being paid for total and the other partial disability.

Accident No.	Date of Accident	Nature of Injury	Days Lost
25	3-19-45	Fracture right thumb	48
26	4-27-45	Bruised back right side	222
27	6-8-45	Scalp and chest wound	19
28	6-19-45	Wrenched knee	28
29	6-27-45	Foreign body left eye	9
30	6-28-45	Foreign body left eye	8
31	9-7-45	Cut instep right foot	8
32	10-3-45	Fracture right leg	76
33	11-27-45	Bruise right shoulder, cut on head	53
	Total Days Lost		471

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION:

The following statement shows expenditures in the various accounts, E. & A. No. CC-152, Addition to Engine House and Installation of Air Compressor. This E. & A. will probably be closed in a couple of weeks with very little additional expenditures.

STATEMENT SHOWING EXPENDITURES ACCOUNT E.&A. NO. CC-152
ADDITION TO ENGINE HOUSE AND INSTALLATION OF AIR COMPRESSOR

Detail	Amount Authorized	Expenditures Month of December, 1945 Labor	Supplies & Expenses	Total	Total To Date	Unexpended Balance
Concrete Foundation for Building and Compressor	2,800.00	-	11.23	11.23	4,000.75	1,200.75
Structural Steel & Camesco Panels for Walls and Roof-Metalled	3,400.00	85.33	355.56	440.89	2,904.34	495.66
5 Ply Roofing - Complete	600.00	-	-	-	-	600.00
2300 CFM Worthington Air Compressor, Complete with 340 H.P. Motor, Exciter and Receiver	3,400.00	-	-	-	3,400.00	-
Remove Compressor from Holmes Mine and Erect at Cambria	1,500.00	1,296.08	501.71	1,797.79	3,518.51	2,018.51
Remove & Install Electrical Equipment for Compressor	1,000.00	190.59	193.82	384.41	1,031.24	31.24
Social Security Taxes	-	-	84.42	84.42	144.33	144.33
Total	12,700.00	1,572.00	1,146.74	2,718.74	14,999.17	2,299.17
10% for Contingencies	1,270.00	-	-	-	-	1,270.00
GRAND TOTAL	13,970.00	1,572.00	1,146.74	2,718.74	14,999.17	1,029.17

The large over-expenditure for construction of foundations for building and compressor was due to the fact that when excavation got underway it was found that the rock ledge was just a little lower than specifications for foundations called for, and rather than leave a layer of earth between the foundations and ledge, this earth was removed and foundations extended. Also included in this expenditure was a concrete stairway to the basement entrance which was not included in the E. & A.

The other large over-expenditure was for the removal of compressor from the Holmes Mine and erecting it in the new addition. This was partially due to an underestimate of this item and also to the fact that the air receiver which was purchased with this compressor was brought over and installed at the Cambria-Jackson.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Shaft Cable:

In February, E. & A. No. CC-141 was authorized for the purchase and installation of a 2300-volt shaft cable. This project was completed with an under-expenditure of $63.04. This shaft is now equipped with two shaft cables, as are all the other mines of The Cleveland-Cliffs Iron Company.

b. Pumps:

In August 1944, E. & A. No. CC-137 was authorized for the purchase and installation of a Vertical Triplex pump with motor and starting equipment. Excavation for the enlargement of the 7th Level pumproom for this installation was completed early in the year. The pump has been erected, but has not as yet been connected to the new discharge line, which is being put in from the 7th to the 4th Levels. When completed, the cost of this installation will run under the expenditure authorized.

In October, E. & A. No. CC-161 was authorized for the purchase and installation of a 5" x 18" used Prescott Plunger pump, complete with motor and control and replacement of the discharge line. This pump is on the grounds but cannot be installed until the other pump is put into operation, as the old pump is located where the Prescott is to be installed. Work has been started on changing the discharge line and will be completed shortly after the first of the year.

13. EQUIPMENT AND PROPOSED EQUIPMENT:(CONT.)

c. Shaft Hoist:

In April, E. & A. No. CC-149 was authorized for the purchase and installation of an Auxiliary Brake for the shaft hoist. The brake has been delivered and the coupling is now being made at the General Shops.

d. Steam Shovels:

No. 16 shovel, which was brought to the mine from the General Shops in November 1944, was used during the 1945 shipping season, after which it was sent back to the shops at Ishpeming.

e. Water Line:

A four-inch iron pipe water line was installed from the Negaunee City water main just North of the Dry to a point in the center of the West Timber Yard, a distance of about 500 feet. This is a dry line, with the shut-off valve near the City main and a double connection for the standard 2½-inch fire hose in the timber yard.

f. Scraper Hoists:

Following is a list of scraper hoists at the mine and costs of repairs:

				1945		1944	
Company		Total Machines	Total Machines Repaired	Avg. Cost of Ea. Mach. Repaired	Total Machines Repaired	Avg. Cost of Ea. Mach. Repaired
Ing.-Rand	15 H.P. Elec.	12	3	180.75	2	56.33
"	20 " "	2	1	34.50	1	21.86
Sullivan	10 " "				1	224.08
"	15 " "	6	5	231.04	4	211.28
"	20 " "				1	84.57
"	25 " "	6	2	27.42	2	53.09
Total		26	11	1,786.76	11	1,394.44

No scraper hoists were purchased in 1945. One 7½-horsepower Gardner-Denver hoist was scrapped, showing a decrease of one hoist at the mine on December 31st, 1945.

g. Underground Tram Cars:

In May, E. & A. No. CC-151 was authorized for the purchase of 16 - 65 cubic foot rocker dump cars from the Lake Shore Engineering Company to replace the 23 - 40 cubic foot cars, which are practically worn out. To date this order has not been received, but it is expected that delivery will be made the latter part of January.

h. Timber Hoists:

During 1945 one H. U. Utility Hoist was purchased at a cost of $470.00. This increases to 21 the number of these air hoists in use at the present time.

i. Haulage Tracks:

The following is a detailed comparison of haulage track costs for 1945 and 1944:

	1945	1944
40-Lb. Rail	774.58	891.48
Ties and Tie Plates	51.02	260.66
Total	825.60	1,152.14

The haulage tracks at the present time are in very good condition. Most of the rail on the 6th Level was replaced during 1945.

13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

j. Mine Trucks:

The Cambria-Jackson Mine operates two trucks, one a two-ton 1940 Dodge and the other a one and one-half ton 1937 Chevrolet. The Chevrolet is practically worn out and an order has been placed for a new one to be delivered when General Motors gets into production.

14. MAINTENANCE AND REPAIRS:

The Maintenance and Repair Costs listed under "Underground Costs" were as follows:

	1945		1944	
	Amount	Cost per Ton	Amount	Cost per Ton
Compressors & Power Drills	2,318.02	.007	669.01	.002
Scraper Equipment	6,861.65	.022	9,110.44	.032
Electric Tram Equipment	25,617.92	.081	26,422.88	.094
Pumping Machinery	7,389.46	.024	1,604.10	.006
Total	42,187.05	.134	37,806.43	.134

The following is a list of purchases and repair costs for 1945 as compared with 1944:

	1945	1944
4 - Slide Cone Power Feeds	1,040.00	
1 - Electric Blower	432.16	
1 - H. U. Utility Hoist	475.00	
1 - Pickhamer	111.09	
3 - RB-12 Drill Machines	601.31	
50,400 ft. Wire Rope for Scrapers	5,063.53	
Total Purchases	7,723.09	10,915.62
Repairs to Compressors and Power Drills	676.71	
Repairs to Scraper Hoists	6,861.65	
Repairs to Locomotives	7,140.30	
Repairs to Wiring - E.&A. No. CC-119	6,624.86	
Repairs to Trolley Wire	969.01	
Repairs to Track	5,148.36	
Repairs to Cars	4,888.11	
Repairs to Pumping Machinery	2,502.50	
Total Repairs	34,811.50	36,101.08
One New Hoisting Rope	1,372.41	
Repairs to Electric Hoists	6,756.79	
Repairs to Skips, Cages, Etc.	5,824.73	
Repairs to Sheaves and Pulley Stands	1,651.98	
E. & A. No. CC-149 - Auxiliary Brakes	2,403.99	
Repairs to Shaft	2,005.20	
Repairs to Larry Cars and Tracks	3,511.48	
Trestle Trolley Line	402.66	
Repairs to Permanent Trestles	1,628.56	
Repairs to Pockets, Chutes, Etc.	13.79	
Repairs to Mine Buildings	1,212.79	
Total	26,784.38	45,002.25

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15. POWER:

Following is a detail of electric current purchased in 1945 and 1944, distribution of charges to various accounts and other data:

	1945		1944	
	Cost	Cost per Ton	Cost	Cost per Ton
Stoping	1,418.36	.005	1,515.81	.005
Tramming	176.30	.001	365.42	.001
Ventilation	1,140.22	.004	791.79	.003
Pumping	14,720.59	.047	13,511.94	.048
Compressors	13,701.06	.043	14,534.52	.052
Hoisting	10,965.76	.035	11,486.97	.041
Stocking Ore	772.63	.002	787.02	.003
Dry House	265.61	.001	430.86	.001
General Surface	420.45	.001	241.01	.001
Telephones and Safety Devices	1,867.06	.006	1,843.85	.006
Mine Office	77.16	.000	79.77	.000
Electric Haulage	5,761.99	.018	3,673.83	.013
Shops	461.12	.001	462.01	.002
Heating	152.23	.001	370.97	.001
Tractor and Truck	15.94	.000	000.00	.000
Total	51,916.48	.165	50,095.77	.177
Main Line Meter - K. W.	3,553,600		3,440,000	
Separate Meter Readings	3,540,030		3,421,454	
Line Loss - K. W.	13,570		18,546	
Product - Tons	315,514		282,184	
K. W. per Ton (Inc. Line Loss)	11.26		12.19	
Cost per K. W. (Average)	.0146		.0146	
15 Min. Demand - K. W. (Average)	913		887	
Average Load Factor	44%		44%	

17. CONDITION OF GROUNDS:

The general appearance of the plant from the main highway was greatly improved by the removal of the foundations of the old smokestack, coal dock and engine house and rough grading of the entire area. Due to the shortage of labor most of the proposed improvements such as planting of lawns and shrubbery, building concrete walks, relocating roads and painting buildings was postponed. This work will probably be done during the coming year if the labor situation improves.

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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	1945	Percent	1944	Percent
Finnish	68	36.8	69	38.5
Italian	34	18.4	32	17.9
English	28	15.1	26	14.5
Swedish	24	13.0	24	13.4
Danish	6	3.2	6	3.4
French (France)	6	3.2	5	2.8
French (Canadian)	5	2.7	5	2.8
German	4	2.2	4	2.2
Norwegian	4	2.2	3	1.7
Austrian	3	1.6	3	1.7
Irish	3	1.6	2	1.1
Total	185	100.0	179	100.0

	American Born		Foreign Born	
As to Birth	1945	1944	1945	1944
Finnish	39	41	29	28
Italian	14	10	20	22
English	19	18	9	8
Swedish	21	21	3	3
Danish	6	6	0	0
French (France)	6	5	0	0
French (Canadian)	5	4	0	1
German	4	4	0	0
Norwegian	2	2	2	1
Austrian	1	1	2	2
Irish	3	2	0	0
Total	120	114	65	65
	64.9%	63.7%	35.1%	36.3%

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1. GENERAL:

There were no changed at this idle property during 1945.

6. SURFACE:

The fences around the open pits and old abandoned shafts were inspected early in the summer and necessary repairs made.

10. TAXES:

	1945		1944	
	Valuation	Taxes	Valuation	Taxes
Various Parcels	28,120.00	1,186.33	28,120.00	1,174.55
Collection Fees		11.87		11.74
Total	28,120.00	1,198.20	28,120.00	1,186.29

Taxes increased due to the higher tax rate in the City of Negaunee.

WRA/jl - 3
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MAAS MINE
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1. GENERAL

The Maas Mine operated on two 8-hour shifts, five days per week from January 1st to January 27th and from January 27th to December 31st on two 8-hour shifts, six days per week. Although a full shift was worked on Saturday afternoon, all the contracts were not always filled, as part of the work consisted of repairing and cleaning up. There was a net loss of 19 men during the year, 35 men leaving, and among the replacements there were only 10 returned service men who started to work near the end of the year.

The total product for the year was 558,633 tons, a decrease of 19,674 tons from 1944, due mostly to the decrease in working force and to allowing the men to take a week's vacation in August. There were only 626 operating shifts with an average of 352 men in 1945, as compared with 667 shifts and an average of 417 men in 1944. There was very little rock development during 1945, most of the rock hoisted coming from rock intrusions in the ore bodies, or from raising in rock. 50,000 Tons of standard grade and 30,000 tons of special grade were in stock at the end of the shipping season, which closed earlier than usual. The special grade ore had been cleaned up previously, and 4,655 tons of previous year's overrun, together with 3,526 tons of current year overrun were developed.

Mining progress was less delayed on account of water during 1945 than it has been for several years, as there was less water in the contracts, and where this occurred considerable expense had been entailed to open rock transfers between several of the raises so that the ore could be handled without so much delay to the miners. On the other hand, the mining of the East Footwall pillar on and above the 3rd Level was greatly handicapped by having to cut through old drifts and cross-cuts. There was an increased amount of jasper intrusions in the working areas and a much larger percentage of the ore was very hard, requiring one complete shift or more to drill, even though the mine was changed over to nearly 100% wet drilling during the year. A sub level stope was in the process of development since the middle of the year, and stoping was started late in December. This stope will increase production, and the ore will be of standard grade, although it is entirely in the sulphur horizon that starts about 80' above the 5th Level and continues to below the 6th Level. The division of the product was about 60% standard and 40% special grade, and this should continue for approximately six years, after which, at the present rate of production, the standard grade ore will be nearly exhausted.

The only development outside of raising was the 6700 Cross-Cut on the 6th Level, which was being driven, in ore, to enable more than one raise to be put up to the 75' transfer where a sub level stope is being started. The 5200 Cross-Cut will have to be driven in rock on the 5th Level during 1946, as the workings above are very close to the 4th Level, but aside from this and the necessary raises, there should be no more development required next year.

There were no changes of note on surface during 1945.

The only major delay to production occurred on January 24 when the coils in the skip hoist motor burned out, and although another motor was on hand, it was decided to change to a new flexible coupling, and this was not completed until the day shift on the 25th, causing a loss of 1,700 tons.

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1. GENERAL (Cont.)

Unfortunately there was a fatal accident underground on March 26th, when Richard Oates, a miner, was instantly killed by a fall of ground. Oates and his son were erecting a set in the breast of the slice in #27 Contract, two subs above the 4th Level. A piece of ground came off the left side, breaking the bridle and causing the stage planks to fall on Richard who was underneath them in the act of moving the bottom of the leg. The ground had been very firm and in their judgment did not require side spiling, the use of which would have probably prevented this accident. Both father and son and their opposite partners were considered very careful miners and neither crew thought the place was dangerous, but there was a slip in the ground that could not be observed, and this caused the chunk to let go. Mr. Oates was 54 years of age and left a wife and two daughters besides two married sons, who are employed at the Maas.

2. PRODUCTION, SHIPMENTS & INVENTORIES

a. Production by Grades

	1945	1944
Maas	265,217	299,398
Maas Special	131,282	113,450
Race Course	74,073	77,398
Race Course Special	88,061	88,061
Total	558,633	578,307
Rock	17,545	42,540
Total Hoist	576,178	620,847

There was a decrease of 19,674 tons of ore as compared with 1944, due to a smaller force and less operating shifts. The standard ore continued to show a decrease, while the special grade ore increased, due to more mining below the 4th Level.

b. Shipments

Grade of Ore	Pocket Tons	Stockpile Tons	Total Tons	Total Last Year
Maas	151,380	73,230	224,610	324,918
Maas Special	47,539	89,501	137,040	101,893
Race Course	37,404	28,375	65,779	76,226
Race Course Special	31,320	63,595	94,915	77,998
Total	267,643	254,701	522,344	581,035
Total Last Year	233,975	347,060	581,035	
Increase		92,359	58,691	
Decrease				

c. Stockpile Inventories

Grade of Ore	12-31-45	12-31-44
Maas	61,488	20,881
Maas Special	23,889	27,319
Race Course	17,158	8,864
Race Course Special	16,584	21,111
Total	119,119	78,175

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2. PRODUCTION, SHIPMENTS & INVENTORIES (Cont.)

d. Division of Product by Levels

	1945	%	1944	%
Third Level	63,153	11.3	109,636	19.0
Fourth Level	96,209	17.2	150,525	26.0
Fifth Level	389,751	69.8	294,089	50.8
Sixth Level	9,520	1.7	24,059	4.2
Total	558,633	100.0	578,307	100.0

Ore mined on 3rd and 4th Levels was all standard grade.
Ore mined on 5th Level was 46% standard, an increase of 6% over last year.
Ore mined on 6th Level was all special grade.

e. Production by Months

Month	Maas	Maas Spcl.	Race Course	R. C. Spcl.	Total	Rock
January	24,265	7,768	9,350	8,121	49,504	710
February	20,758	9,370	10,251	7,893	48,272	1,160
March	26,050	12,301	7,604	8,298	54,253	2,710
April	19,842	12,384	4,889	7,098	44,213	1,725
May	26,786	12,550	6,594	6,254	52,184	1,740
June	20,127	13,235	5,359	6,828	45,549	1,620
July	20,718	12,460	2,919	7,596	43,693	1,305
August	21,849	8,656	3,577	5,137	39,219	735
September	20,351	10,832	6,113	8,263	45,559	2,195
October	18,429	11,124	8,339	9,809	47,701	1,185
November	23,358	8,998	5,274	7,151	44,781	1,305
December	23,281	7,873	4,381	4,644	40,179	1,155
Total	265,814	127,551	74,650	87,092	555,107	17,545
1945 Stock-pile O'run		3,134		392	3,526	
Prev. Yrs. Overrun		2,328		2,327	4,655	
Gr. Total	265,814	133,013	74,650	89,811	563,288	
Transferred To & From	597	597	577	577		
	265,217	133,610	74,073	90,388	563,288	

The product was distributed by leases as follows:

	1945	1944
George Maas Lease	375,824	398,535
Catholic Cemetery Lease	5,094	11*
Adams Strip or N 1/6 of Rt. ofWay	2*	36*
C.C.I. CO. or N 1/3 of Rt. of Way	480	47*
Race Course Lease	164,461	165,577
Baldwin Kiln Road Lease	17,427	15,916
Total	563,288	580,122

*No mining in these leases; tonnage shown is proportion of previous year's overrun

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2. PRODUCTION, SHIPMENTS & INVENTORIES (Cont.)

f. Ore Statement

	Maas	Race Course	Maas Spcl.	R. C. Spcl.	Total	Total Last Year
On Hand 1-1-45	20,881	8,864	27,319	21,111	78,175	79,088
Product for Year	265,814	74,650	127,551	87,092	555,107	570,146
Transfers	597	577	597	577		
Cur. Yrs. Overrun			3,134	392	3,526	8,161
Prev. Yrs. Overrun			2,328	2,327	4,655	1,815
Total	286,098	82,937	160,929	111,499	641,463	659,210
Shipments	224,610	65,779	137,040	94,915	522,344	581,035
Balance on Hand	61,488	17,158	23,889	16,584	119,119	78,175

g. Schedule of Operations

1945 2 8-hour shifts, 5 days per week from January 1st to January 27th, 6 days per week from January 27th to December 31st, except the afternoon shift on Saturdays was not necessarily a complete mining shift, being used partly for repairing and cleaning up. One shift only was operated from August 12th to August 25th to afford the men one week's vacation.

1944 3 8-hour shifts, 5 days per week and one 8-hour shift on Saturday from January 1st to July 1st, 2 8-hour shifts, 5 days per week from July 1st to December 31st, with only repair work on Saturday and Sunday.

1943 3 8-hour shifts, 5 days per week and 2 8-hour shifts on Saturday from January 1st to February 1st; same schedule with only 1 8-hour shift on Saturday from February 1st to December 31st.

h. Delays

On account of the mine only working two shifts and it being possible to make up the lost tonnage by hoisting a few hours overtime, only the major delays are reported.

Date	Shift	Duration	Loss In Product	Cause
January 24	Day & Aft.	13 hrs.	1,700 tons	Coils in Skip Hoist Motor burned out.
August 4	Day	7 hrs.	350 tons	Skip caught in 6th Level pocket.

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3. ANALYSIS

a. Average Mine Analysis on Output

Grade	1945 Iron	Phos.	Sil.	Sul.	1944 Iron	Phos.	Sil.	Sul.
Maas	59.95	.109	8.30	.040	59.76	.110	8.38	.030
Maas Special	60.37	.100	6.98	.196	60.30	.099	7.10	.158
Race Course	60.26	.105	7.78	.042	59.87	.103	8.26	.033
Race Course Special	60.54	.102	7.10	.200	60.33	.102	7.14	.148

b. Average Mine Analysis on Ore Shipped

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Maas & R.C. Non-Bess.	60.00	.105	8.24	.22	2.58	.67	.27	.036	1.86	12.80
Maas & R.C. Special	60.40	.100	7.05	.19	2.66	.80	.18	.192	2.33	13.00

d. Average Analysis of Ore in Stock - December 31, 1945

Average Natural Analysis

Grade	Tons	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Maas	61,488	52.22	.101	7.44	.19	2.26	.59	.24	.040	1.63	12.53
Maas Special	23,889	52.69	.092	6.34	.17	2.32	.70	.16	.165	2.03	12.70
Race Course	17,158	52.42	.096	7.05	.20	2.39	.50	.20	.046	1.33	12.63
Race Course Spcl.	16,584	52.42	.093	6.35	.18	2.47	.41	.24	.162	1.74	12.89

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.

Location Standard	Race Course Lease	Maas Lease	R.C.Cem. Lease	B.K.Road City/Neg Lease	N 1/3 Rt./Way C.C.I.Co.	Total Tons
Above 3rd Level		19,825		460		20,285
3rd to 4th Levels	119,254	1,672,088	4,583	4,948		1,800,873
4th to 5th Levels	150,300	498,818				649,118
Gross Total 11-30-45	269,554	2,190,731	4,583	5,408		2,470,276
Less Dec. 1945 Product	4,381	23,281				27,662
Total as of Dec. 31, 1945	265,173	2,167,450	4,583	5,408		2,442,614
Net Total Standard Grade	238,218	1,948,377	4,125	4,867		2,195,587

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4. ESTIMATE OF ORE RESERVES

a. Developed Ore (Cont.)

Location Special	Race Course Lease	Maas Lease	R.C.Cem. Lease	B.K.Road City/Neg Lease	N 1/3 Rt./Way C.C.I.Co.	Total Tons
4th to 5th Levels	445,275	853,045		29,238		1,327,558
5th to 6th Levels	876,765	1,811,710				2,688,475
Below 6th Level	18,542	805,208				823,750
Gross Total 11-30-45	1,340,582	3,469,963		29,238		4,839,783
Less Dec. 1945 Product	4,644	6,795		1,078		12,517
Total as of Dec. 31, 1945	1,335,938	3,463,168		28,160		4,827,266
Net Total Special Grade	1,201,880	3,116,172		25,236		4,343,288
Total All Grades	1,440,098	5,064,549	4,125	30,103		6,538,875

In the Maas area leased to Negaunee Mine, including N 1/3 and N 1/6 of right of way, there were 674,194 tons as of December 31st, 1945, of which 53,100 tons were of special grade.

There was a decided change in the method of reporting the reserve tonnage to the State Tax Commission, in that there was a reduction of 10% for rock and 10% for loss in mining used in 1944, while there was only 10% for rock and loss in mining used in 1945. Taking this into consideration, there was a total decrease of 41,000 tons over the estimate of a year ago. The distribution of this difference by grades and royalties was as follows:

	Maas	Race Course	Total
Standard Grade	55,000 Tons	55,000 Tons	110,000 Tons
Special Grade	168,000 Tons	17,000 Tons	151,000 Tons
	113,000 Tons	72,000 Tons	41,000 Tons

The increase of 55,000 tons in the Maas Standard was mostly due to proving up more ore in the vicinity of the sub level stope at the West end of the 5th Level, while the increase of practically the same amount in the Race Course Standard was due to increase in the ore area on the North footwall from 4th to 5th Levels and also due to recovering a considerable amount of standard ore from the so-called special grade area.

The large decrease of 168,000 tons in the Maas Special grade between 5th and 6th Levels was due partly to a roll of jasper formed on the South footwall and also to change in outline of the Western boundary of the ore as shown in Diamond Drill Hole No. 61. Both of these changes made a decided decrease in the size of the 5th Level ore area.

c. Estimated Natural Reserve Analysis

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist
Maas & Race Course Non-Bessemer	53.00	.092	7.30	.19	2.20	.57	.22	.025	1.70	12.00
Maas & Race Course Special	53.40	.088	6.60	.18	2.00	.52	.16	.180	1.40	12.50

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4. ESTIMATE OF ORE RESERVES (Cont.)

d. Estimated Production
December 1st, 1945 to December 1st, 1946

Grade	Estimated Production 12 Shifts Per Week
Maas & Race Course Non-Bessemer	359,500
Maas & Race Course Special	217,000
Total	576,500
Plus 4% overrun on ore stocked	6,000
Grand Total	582,500

Grade	Iron	Phos.	Sil.	Mang.	Alum.	Lime	Mag.	Sul.	Loss	Moist	Iron Nat'l
Maas & RaceCourse Non-Bessemer	60.20	.105	8.30	.22	2.50	.65	.25	.025	1.90	12.00	53.00
Maas & Race Course Special	60.50	.100	7.50	.22	2.28	.60	.18	.200	1.60	12.50	53.40

5. LABOR & WAGES

a. Comments

The labor situation was very acute all year until November when some of the service men started to return and it was also possible to obtain other service men, who, although never having worked in the mines before, were discharged. It was necessary to work about 20 men two hours overtime each day on the afternoon shift and also have 20 to 30 men out on Sunday to keep up the necessary repairs and cleaning of main levels. At the end of the year there were still practically no extra company account men forhoisting timber, sub level repairing, or track cleaning, and the mine was short 50 men to complete two full shifts. A comparison of the detail in labor turnover is shown below.

	1945	1944	1943
Died	3	0	2
Fatal Accident	1	0	0
Retired on account of age or total disability	9	3	1
Unable to work on account of ill health	2	10	5
Transferred to other C.C.I.Co. Properties	2	17	28
Left for Armed Services of U.S.	0	37	44
Quit for other occupations	18	69	65
Discharges	0	3	3
Total	35	139	148
Hired or Transferred to Maas	16	20	116
Net Loss	19	119	32
Experienced Miners Included in Total Loss	7	57	20

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5. LABOR & WAGES

a. Comments (Cont.)

The total men from the Maas Mine in service was 135, and at the end of the year about 40% had been discharged, of whom 10 men, or 20%, had returned to work at the Maas.

The average age of the employees in 1945 was 43, as compared with 42 in 1944. There were 34 men 60 years of age or over, 11 who had served the Company for at least 40 years and 78 for 25 years or over.

The men who were eligible for vacation were idle one week only regardless of whether they were eligible for one or two weeks. The vacation payroll was originally calculated on the basis of one week's vacation for 3 to 10 years' service and two weeks' vacation for 10 years or more, but later this was changed by a war labor board directive so that men with one year's service were eligible for one week and those with five years' service received two weeks' pay. This adjusted amount was paid together with a shift differential of five cents per hour to the men on the afternoon and midnight shifts at the end of the year and it was all retroactive to January 4th, 1944. There was no other raise in wages during 1945.

270 men, or 76%, received pay for 96 hours.
83 men, or 24%, received pay for 48 hours.

The percentage of absenteeism was somewhat lessened this year on account of allowing vacation time, but it increased in November, due to two-thirds of the men taking time off during deer season.

On November 28th a strike vote was called by the C.I.O. under the direction of the labor board at all of the Company properties and as only about 70% of the men voted, there were approximately 70% who voted in the affirmative. The majority of the men seemed to think they were voting for a $2.00 a day increase in wages anddid not appear to take the possibility of a strike seriously.

Proportion of surface to underground men:

1945	1944	1943	1942	1941
1 - 4.5	1-- 5.1	1 - 5.1	1 - 5.7	1 - 5.4

b. Comparative Statement of Wages & Product

	1945	1944	Increase	Decrease
Product	558,633	578,307		19,674
Number of Shifts & Hours	301	283	18	
1 8-hour	12	27		15
2 8-hour	289	128	161	
3 8-hour		128		128

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5. LABOR & WAGES

b. Comparative Statement of Wages & Product (Cont.)

	1945	1944	Increase	Decrease
AVERAGE NO. MEN WORKING				
Surface	67	76		9
Underground	285	341		56
Total	352	417		65
AVERAGE WAGES PER DAY				
Surface	7.65	6.88	.77	
Underground	8.76	7.93	.83	
Total	8.55	7.73	.82	
AVERAGE WAGES PER MONTH				
10 Shifts per Week 1944				
12 Shifts per Week 1945				
Surface	191.25	151.36	39.89	
Underground	219.00	174.46	44.54	
Total	213.75	170.06	43.69	
PRODUCT PER MAN PER DAY				
Surface	28.07	26.88	1.19	
Underground	6.52	6.30	.22	
Total	5.29	5.10	.19	
LABOR COST PER TON				
Surface	.273	.256	.017	
Underground	1.342	1.259	.083	
Total	1.615	1.515	.100	
AVERAGE PRODUCT MINING				
Stoping	18.01	18.29		.28
Ore Development	9.51	10.47		.96
Total	17.43	17.81		.38
AVERAGE WAGES CONTRACT LABOR	8.85	8.46	.39	
TOTAL NUMBER OF DAYS				
Surface	19,900 3/4	21,510 3/4		1,610
Underground	85,654 1/2	91,843 1/4		6,188 3/4
Total	105,555 1/4	113,354		7,798 3/4
AMOUNT FOR LABOR				
Surface	152,248.85	148,098.28	4,150.57	
Underground	749,907.67	728,122.37	21,785.30	
Total	902,156.52	876,220.65	25,935.87	
AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL				
Surface	176.10	162.25	13.85	
Underground	217.94	187.00	30.94	
Total	210.00	182.30	27.70	

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5. LABOR & WAGES

c. Nationality of Employees

As to Parentage	1945	%	1944	%
Finnish	147	39.7	154	39.5
English	75	20.2	82	21.0
American	55	14.8	55	14.1
Italian	35	9.5	37	9.5
Swedish	24	6.5	22	5.7
French (Candian)	19	5.1	22	5.7
German	5	1.4	6	1.5
Norwegian	5	1.4	5	1.3
Danish	3	.8	3	.8
Austrian	1	.3	1	.2
Irish	1	.3	1	.2
Polish	0		1	.2
Swiss	0		1	.2
Total	370	100.0	390	100.0

As to Birth	Total		American Born		Foreign Born	
	1945	1944	1945	1944	1945	1944
Finnish	147	154	95	97	52	57
English	75	82	45	47	30	35
American	55	55	55	55		
Italian	35	37	12	12	23	25
Swedish	24	22	20	18	4	4
French (Canadian)	19	22	19	22	0	0
German	5	6	5	5	0	1
Norwegian	5	5	4	4	1	1
Danish	3	3	3	3	0	0
Austrian	1	1	0	0	1	1
Irish	1	1	1	1	0	0
Polish	0	1	0	1	0	0
Swiss	0	1	0	1	0	0
	370	390	259	266	111	124

6. SURFACE

a. Buildings & Repairs

There were no buildings erected and only very minor repairs made on the existing ones during 1945.

b. Location Buildings and Repairs

There were only five regular men employed on the location crew in 1945, but these were supplemented from time to time by laborers from the general surface roll. The work, which was divided between Maas, Athens, and Negaunee Mine houses, was of a very minor character in the Maas location, as there was no outside painting or extensive changes. Both labor and material were hard to obtain, and only the necessary repairs were performed.

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6. SURFACE

b. Location Buildings and Repairs (Cont.)

There was one house sold and one small house torn down, but none purchased during 1945.

House No.	Address	Lot	Block	Addition	Sold To	Date
		4 & S		C.C.I. Co.'s		
33	957 Pine St.	20' - 3	4	2nd Addition	Guido Menapace	8/1/45
187	321 Peck St.	Rear-5	33	Pioneer Plat	Thomas Anderson	10/1/45

c. Stockpiles

Shipments from stockpiles this year ceased on November 23rd and from the pocket on November 21st, leaving approximately 50,000 tons of standard grade and 30,000 tons of special grade in stock. There were no trestles dismantled during 1945, the ore that could not be reached by steam shovel being pushed out with the bull-dozer. Very few legs were broken, and these were replaced immediately. The Southwest timber stocking trestle was changed from rope haulage to Third rail system, as the rope sometimes interfered with the larry car at the shafthouse pocket. The rock continued to be stocked from the trestle to the Northeast of the shafthouse, and it was spread with the bull-dozer to enable the material to be dumped as close to the shaft as possible and thus cut out a long tram with consequent delay.

The special grade ore was cleaned up from time to time as the wet ore, that could not be shipped from pocket, dried out sufficiently, and a previous year's overrun of 2,328 tons on Maas Special and 2,327 tons on Race Course Special was developed. As the ore of standard grade was never cleaned up, no overrun was shipped, but the engineers estimated a slight overrun in the combined Maas and Race Course grades.

The current year overrun developed and the engineers estimate is shown below:

	Maas	Race Course	Maas Spcl.	R. C. Spcl.	Total
Current Year Overrun			3,134	392	3,526
Engineer's Estimate	3,408	1,935			1,473
Total	3,408	1,935	3,134	392	4,999

d. Tracks, Roads, etc.

There was no change in either track or road layout during 1945, but there was considerable maintenance of the roads with the bull-dozer.

e. Timber Yard

There was an ample supply of cribbing, lagging, and poles on hand at all times, but it remained difficult to obtain sufficient stulls to lay up any reserve. The material was delivered both by railroad and trucks, and as the former were delivered intermittently, there was very little delay in unloading.

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6. SURFACE (Cont.)

e. Timber Yard (Cont.)

Some 9,000' of stulls were selected from the regular stock, transferred to the treating plant, peeled, and these, together with approximately 1,000' peeled and delivered by the Athens Mine, were treated during the year. It has been impossible to obtain sufficient timber for treating during the labor shortage to supply the necessary demand for underground use and it is hoped that this situation can be remedied next year, as a large proportion of the timber in the new development of the past years needs replacement, and all succeeding development should have treated timber. The additional cost of peeling and treating is more than offset by the saving in cost of maintenance, treated timber lasting about five times as long.

A detail of the operations of the treating plant is shown below:

Maas Mine Timber Treating Plant

Lineal feet of mine timber treated	10,228	
Amount chromated zinc chloride used	1,525	lbs.
Price per pound	.0747	
Cost of preservative	$ 113.92	
Miscellaneous supplies purchased	56.09	
Plant depreciation	250.00	
Labor, peeling & treating timber	1,142.87	
Total Cost, excluding cost of timber	$1,562.88	
Cost per Foot for peeling & treating	.152	

f. Drainage

Nos. 1 and 2 Wells operated continuously throughout the year, not only removing water that might otherwise have to be handled by the underground pumps, but also furnishing all the water used on surface at the mine. At some future date it may be advisable to do further testing of the formation to see if more water can be recovered, as the water in the working places underground continues to be a very great problem.

7. UNDERGROUND

a. Shaft-Sinking

There was no shaft-sinking in 1945.

b. Development

There was very little main level developing during the year on account of the very extensive program during 1943 and 1944. Next year it will be necessary to drive one cross-cut on the 5th Level and possibly one more on the 6th Level, both in rock. Several raises were put up from the 4th, 5th and 6th Levels, and there was also development of sub level stopes, but this latter properly belongs under mining and not development.

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7. UNDERGROUND

b. Development (Cont.)

Table of Main Level Ore & Rock Development

Location	Raising		Drifting	
	Ore	Rock	Ore	Rock
4th Level	67'	67'		52'
5th Level	45'	25'		
6th Level	331'	90'	203'	
Total	443'	182'	203'	52'

c. Stoping
General

There was an average of 32 contracts employed in mining during 1945, and these had to spend 20% of their time on repair work, as there were not sufficient timbermen available. Due to the shortage of labor, almost all of the contracts had to hoist their own timber, although there was someone available to lash and send it up from the main level.

There was room for only four contracts in the East footwall pillar on and above the 3rd Level and these were all very much handicapped by having to drift through and remove old timber from the main level drifts and cross-cuts in order to remove the ore from the small pillars. By the end of the year one contract was on the sub below the 3rd and the three others should complete mining on the 3rd Level in the spring of 1946. It has also been very difficult to ventilate this area, as the connection with the Negaunee Mine is almost entirely filled with props to hold it up, thus reducing the area of the opening, and the long drifts from the workings to the footwall drift are also badly crushed. A new connection has been started on the 4th Level, which will hole to the 13th Level Negaunee and should provide sufficient ventilation for the territory above. When this is completed and the Eastern end of the 300' Sub is mined, the Roman Catholic Cemetery Lease can be cancelled, as all of the ore on that property will be exhausted.

Toward the last of the year raising was started in the 4200 Cross-Cut on the 4th Level preparatory to opening up that area some 150' above for mining. A raise was also started in the footwall from the 4th Level in the center of the very wet area in which various attempts to open it up for mining had been tried during 1943. When the raise is completed, drifts will be driven East and West along the footwall and small raises put up to tap the water, after which it should be possible to use the former raises in the hanging for mining. It is necessary to reopen this area in order to provide sufficient working places in ore of standard grade.

Mining continued throughout the year in all of the other areas being mined last year and conditions were generally fair with the following exceptions. In the territory above the 4100 Cross-Cut on the 4th Level droppers from the jasper hanging not only cut off a considerable amount of the ore but made it necessary to drift through rock to recover ore to the West. In the mining block controlled by the 5300 system of raises from the 5th Level almost the entire pillar consisted of very hard material requiring at least one shift to drill, even with the use of wet drilling with jackbits and jacklegs. The areas in the Race Course Lease all continued to be very wet and several small transfers were put in close to the 6th Level, on which the wet ore could be

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7. UNDERGROUND

c. Stoping
General (Cont.)

collected for scraping into the cars without delaying the miners. The new territory on the North footwall above the 5th Level to the West of the Race Course Lease was cut off on the footwall side faster than it increased on the hanging side, and there continued to be increachments of jasper from both sides.

In the new area under the hanging opened up last year from the 6th Level, mining was very slow as a good matt had to be established before it would be safe to cut out below, but by the end of the year one contract was mining with very good results on the lower sub level and the other contract had almost completed mining. One more contract was introduced to this territory late in the year, and by next fall the pillar should be large enough to warrant the use of several more.

The development of the sub level stope lying to the extreme West on the North footwall above the 5th Level was practically completed by December and a very good production is expected here during 1946, although this new territory, which was expected to be entirely dry, has developed a large amount of water which may or may not drain off.

A second sub level stope was in the process of development above the 6th Level, but had to be stopped temporarily until a new main level cross-cut could be driven, from which one or more raises could be put up to shorten the scraping distance on the transfer. This cross-cut was started late in the fall.

Detail

335' Sub Level - Northeast Footwall

Mining was in progress on this elevation from January to April, when all of the ore was exhausted, and the contracts moved elsewhere.

3rd Level - Northeast Footwall

Actual mining of this pillar on the 3rd Level elevation was started late in 1944 and was continued throughout 1945. On account of the very flat footwall it was only economical to put up four raises in this area, they being in rock almost the entire distance of 200' from the 4th to 3rd Level, and therefore considerable drifting through old main level drifts was necessary to recover the small pillars remaining. The footwall has almost entirely eliminated the ore on the Roman Catholic Cemetery Lease, and it is very doubtful if any will be found on the sub below.

3rd Level - West Footwall

In June an attempt was made to recover the small pillars lying East and West of the South end of the main shaft cross-cut. There was no raise from 4th Level available for this work, and therefore it was decided to use a scraper slide in the level. The ground was so badly crushed that a drift could not be started on the East side, and as nothing but lean ore was encountered on the West side, it was decided to leave any ore that might exist along the dike to the South until a transfer raise could be put up from the 200' sub.

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7. UNDERGROUND

c. Stoping
Detail (Cont.)

300' Sub Level - Northeast Footwall

Near the first of October #6 Contract cut out in #433 and started to open up this sub level for mining. In December this was still the only contract at this elevation, and they had completed a traveling and ventilation road to the North and were starting to mine on the hanging side between the raise and the former mining limit.

185' Sub Level

This area is being mined through raises from the 4100 Cross-Cut on the 4th Level, and this particular sub level was completed in February of this year.

170' Sub Level

The workings at this elevation are in the same area mentioned above and mining was continuous from February to the end of the year. A large amount of rock had to be excavated as a jasper dropper from the hanging occurred between the raises and the ore to the West. Another intrusion of jasper occurs to the East, but the ore lying beyond this can be mined from the 4200 Cross-Cut. The ore itself is quite hard and required considerable time to drill. There was also some difficulty experienced in holding back jasper runs adjacent to the droppers from the hanging. In December one contract was mining from #4107 Raise.

160' Sub Level

One contract, upon completion of mining in #4109 Raise, cut out on this sub in October and in drifting to the West encountered even more jasper than on the sub above. In December they were slicing beyond the jasper contact.

150' Sub Level

This sub level was opened at #4113 Raise in January and mining has been almost continuous throughout the year. In December their raise became so badly crushed due to the close proximity of the mining to the 4th Level below that the contract had to stop and repair

All of the ore removed by the above-mentioned contracts was of standard grade and, with the exception of one contract in the Roman Catholic Cemetery Lease on the 3rd Level, came from the Maas Lease.

130' Sub Level

This is a small area in the Race Course Lease lying between the North footwall and the dike, and was worked by one contract from January to April, when mining was completed, and the contract moved to a new raise put up into this territory from the 5th Level.

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7. UNDERGROUND

c. Stoping
Detail (Cont.)

4th Level

In the area mentioned above, #27 Contract cut out in #5015 Raise in May, and as the size of the ore body is decreasing very rapidly, they had completed mining and started to cut a new sub by the end of December.

Mining was continuous from January to October in the mining block controlled by the #5300 Series of raises. The material in this area is very hard, requiring a full shift or more to drill and the South end is very difficult to mine on account of mud runs.

A ventilation raise was put up near the East end of the 4th Level footwall drift to the 170' Sub and in November and December a connection was being driven to hole to the Negaunee 13th Level to provide a permanent rock passage for the air to ventilate the Eastern end of the 4th Level and subs above. This will take the place of the connection between the 3rd Level and Negaunee 12th Level, which has almost closed due to crushing.

Near the end of the year raising was started in the 4200 Cross-Cut so that working places will be available when the contracts in the Northeast footwall have finished mining, and also to open up more of the standard ore areas, as it will be necessary before long to stop working in the 5400 and 5300 mining blocks until mining to the East catches up in elevation.

Late in December it was also decided to make another attempt to open the very wet area above the 4th Level on the North footwall just East of the Shaft Cross-Cut, and a raise was started in about the center of this area to be put up to within 20' of the old workings. From the top of this raise drifts will be driven East and West along the footwall contact and small raises put up to drain the water. If successful, then mining can be resumed from the former raises put up near the hanging side of the ore body.

Subs Between the 4th and 5th Levels

100' Sub Level

This sub level was opened in the fall of 1944 in the second mining block East of the Race Course Lease and mining continued throughout the entire year with the Northern end slightly in advance of the Southern end. The same conditions existed as were mentioned under the 4th Level caption, and the ore was all of standard grade from the Maas Lease. In December four contracts were mining here.

90' Sub Level

Upon the completion of mining in the vicinity of #5318 Raise on the Sub above, #25 Contract cut out at this elevation in September and drove a traveling and ventilation drift to the North to hole to the 4th Level. In December they were mining to the Southwest.

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7. UNDERGROUND

c. Stoping Detail (Cont.)

75' Sub Level

This sub level was opened in 1944 in the small territory lying just West of the Race Course Lease on the North footwall above 5th Level. Three contracts were employed here until the end of this year and were able to develop one small stope in a riser in the hanging South of #54 Raise. Generally the foot is flattening faster than the hanging, and thus the size of the ore body is decreasing, rather than increasing.

65' Sub Level

Work was started here in the territory just mentioned above in March and has been continuous throughout the year. The area on the hanging side increased somewhat in width, although the jasper was encountered at the same distance South of the raise as above. In December #18 Contract was slicing toward the footwall between #52 and #54 Raises.

50' Sub Level

#19 Contract cut out in #52 Raise at this elevation in September and #14 cut #5022 Raise in October, and both contracts were slicing from their respective raises in December. All of the ore produced in this territory was of standard grade and came from the Maas Lease.

Four contracts were mining in the first mining block East of the Race Course Lease from January to March when #32 moved to the sub below. This area is too small for efficient mining, as it is cut off by a dike on the East, thus making it necessary to slice parallel with the traveling road, which introduces more weight and consequent retimbering. The ore in this block was exhausted by October of this year.

40' Sub Level

As was mentioned above, this sub level was opened in March and mining was continuous to the end of the year. In the North at #5410 Raise it was found possible to mine over into the area formerly mined from the 5500 raises and this avoided cutting through jasper to reach the ore. In December Contracts #32, #21, #37 and #16 were slicing respectively from #5410, #5422, #5426 and #5432 Raises. The ore came from the Maas, City of Negaunee, and Race Course Leases, and was mostly of special grade.

In the area on the North footwall in the Race Course Lease two contracts completed mining at this elevation in September and both were moved to other territories. Conditions here were quite unfavorable on account of water and very heavy ground.

Near the West boundary of the Race Course Lease and South of the main North dike one contract was slicing under the hanging from a new raise (#6305) put up from the 6th Level. They completed mining at this elevation in May and moved to the sub below.

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7. UNDERGROUND

c. Stoping Detail (Cont.)

40' Sub Level (Cont.)

During the early part of the year there was also one contract slicing at this elevation under new hanging in the territory controlled by the 6400 Cross-Cut on the 6th Level. The hanging here is very uneven and contracts were working at various elevations in order to mine out the small chimneys of ore and have the mining all on the same elevation, as soon as possible.

25' Sub Level

Another of the small areas under the hanging mentioned just above was opened late in 1944 and worked continuously until October of this year at #6409 Raise, when the ore was exhausted and they moved to the sub below. A connection was made with #6410 Raise, but here the ore was very narrow, as jasper was encountered on both sides of the connecting drift. It is expected that on the next lower elevation there will be one continuous ore body. #30 at #6410 Raise mined on this elevation since April and some of the slices extended into the Race Course Lease before encountering the hanging. In December they were slicing in the last pillar remaining. The ore here is dry and very good results were obtained, the only delay being that of blasting filling to form a matt. The ore was all of special grade.

#23 opened the area in the Race Course Lease between the North footwall and the dike at #5021 Raise and completed one drift North to the footwall. In December they had started to slice. The ore in this territory is of standard grade. Four other contracts were mining at various times during the year in the Race Course Lease South of the North dike. A small area near the hanging at #6305 Raise was opened up and completed while mining to the East consisted of slicing and connecting raises. This entire area is very wet and the ore is mostly of special grade.

One contract was mining the ore adjacent to #6305 from January to September, when the weight became so excessive that two small pillars had to be abandoned. This territory was also very wet. In December #11 and #51 were slicing from #6204 and #6304 Raises.

It was decided to open a sub level stope along the North footwall in the extreme West end of the ore body and therefore a transfer drift was driven to the Southwest from #56 Raise approximately 35' above the 5th Level parallel to the footwall. This drift encountered a 20' seam of jasper about 60' from the rasie and was stopped, approximately 260' from the raise, when reaching the dike, as drilling on the level had shown jasper beyond the dike. Another single-compartment raise was put up from the level 120' West of #56 so as to shorten the scraping distance and to take care of the water which was very abundant. Fourteen Raises at 20' intervals were put up to the hanging which varied in height from 40' to 60', and stoping at the West end was started in December. The ore was of standard grade, although the ore encountered in the main level was very high in sulphur.

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7. UNDERGROUND

c. Stoping
Detail (Cont.)

10' Sub Level

A small amount of mining was performed near #5520 Raise in the Race Course Lease in the early part of the year to complete the mining to the North limit of mining. #49 was moved from the 3rd to 5th Level territory in April and was mining between #6312 and #6308 in the RaceCourse Lease for the balance of the year. In December they were taking up the bottom at #6308 Raise in order to gain more height at the Northern end of this pillar. There is considerable weight here and this contract has also been handicapped by water.

#1 Contract cut out on this elevation in October at #6409 Raise and in December were slicing toward the western mining limit. They were in the Maas Lease and the ore was of special grade.

00' Sub Level

During the first half of the year two contracts were slicing between the South footwall and the dike just West of the Southwest corner of the Race Course Lease. #38 Contract moved to the 5th Level below in July while #8 spent the balance of the year slicing from #632 Raise. In December they were stoping in a small stope along the South limit of mining, set to protect the surface along Main Street. The ore was mostly of special grade, although some standard ore was produced.

In the small area under the hanging around #6406 Raise one contract was slicing during the first half of the year. They exhausted all the ore and then were moved to another place as work should not be started below until mining to the South has reached this elevation.

Three contracts were slicing near the Southeast corner of the Race Course Lease, the ore being handled through 6th Level raises. As mining was completed by the various contracts they were moved to the 5th Level below at their respective raises. The slices, which crossed the South boundary of the Race Course Lease, encountered lean ore lying in the footwall, while the Eastern limit of mining for this block controlled the work in that direction.

This is probably the wettest area inthe mine and yet, after the transfer was put in between #6212 and #6214 Raises, the results here were very favorable. The ore produced was all of special grade. In December #44 Contract was still slicing from #6208 Raise.

5th Level

Actual mining was in progress in two separate areas on the 5th Level during 1945. In the territory just mentioned above, #22 mined from March to November from #6214 Raise and #46, who moved to this elevation about the middle of the year, were slicing from #6212 in December. Contract #38 cut out at #630 Raise to the West of the Race Course Lease in July and after removing the ore North to the dike were slicing toward the South footwall in December. Although the sub above had been fairly dry, they encountered quite a large stream of water near the raise.

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7. UNDERGROUND

c. Stoping
Detail (Cont.)

5th Level (Cont.)

Late in the summer it was decided to put up another raise from the 6400 Cross-Cut on the 6th Level and open up an area to the West of #8's workings at #632 Raise. Raise #6411 was completed to this elevation and #22 moved here from the 6200 Block in November. In drifting to the South jasper was encountered much sooner than had been expected, but upon cross-hauling to the East the ore was found to rise in a small chimney, and this was being stoped in December after putting up a small raise from which to work.

The only development work in the 5th Level during 1945 was that of putting up Raises #5015 and #5057, but the maintenance of the main level drifts and cross-cuts required the steady work of three gangs of timbermen besides considerable overtime on the afternoon shift and on Sundays by other timbermen or miners.

Subs Between 5th & 6th Levels

-75' Sub Level

A decision was made to open up another area to be mined by the sub level stoping and therefore in October a transfer drift was started from the Western end of the North footwall drift. This drift encountered jasper at 175' South of the Raise and continued in jasper for several cuts. It is thought that this is the same jasper seam which has been encountered to the East on the subs above the 5th Level and that more ore will be found to the South. However, the scraping distance was becoming escessive and therefore a new cross-cut was turned off on the 6th Level and work on the transfer was stopped temporarily until a new raise could be put up.

6th Level

As was mentioned above, the 6700 Cross-Cut on this level was started in October and in December #17 was advancing it to the South. At the end of the month they were 160' South of the footwall drift and within 30' of the jasper encountered on the transfer drift above. The ore in this drift and above was all of special grade.

Raises #6411, #6204, #6304, #6310 and #6062 were put up during the year. The only other work on the level was that of replacing the timber sets with treated timber. When the drifts were put in it was almost impossible to obtain treated timber on account of the shortage of men to do this additional work. A large number of steel sets will also be put in where the ground in the rock drifts tends to slab, but where weight is not expected.

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7. UNDERGROUND

d. Timbering

TIMBER STATEMENT FOR THE YEAR 1945

Kind	Lineal Ft.	Avg. Price Per Ft.	Amount 1945	Amount 1944
6" x 8" Cribbing Timber	52,576	.0535	2,812.54	10,972.64
8" x 10" Stulls	69,615	.0915	6,371.36	6,339.69
10" x 12" Stulls	108,573	.1265	13,731.67	15,842.99
12" x 14" Stulls	47,694	.1731	8,253.54	12,252.20
Treated Timber	4,977	.3077	1,531.78	87.50
Total 1945	283,435	.1154	32,700.89	
Total 1944	456,335	.0997		45,495.02
	Per 100 Ft.			
7' Lagging	1,503,881	1.405	21,133.62	26,772.19
9½' Poles	1,547,285	2.064	31,935.19	28,042.05
Total 1945	3,051,166	1.739	53,068.81	
Total 1944	3,202,315	1.712		54,814.24
Wire Fencing - Sq. Ft.				313.20
Grand Total 1945			85,769.70	
Grand Total 1944				100,622.46
Product, Tons			558,633	578,307
Feet of Timber per Ton of Ore - Stulls & Cribbing			.5073	.7891
Feet of Stull Timber Only per Ton of Ore			.4132	.4616
Feet of Lagging per Ton of Ore			2.69	3.21
Feet of Poles per Ton of Ore			2.769	2.327
Feet of Wire Fencing per Ton of Ore				.0357
Feet of Lagging per Foot of Timber			5.3059	4.0681
Feet of Poles per Foot of Timber			5.459	2.949
Cost per Ton for Timber			.0585	.0787
Cost per Ton for Lagging			.0378	.0463
Cost per Ton for Wire Fencing				.0005
Cost per Ton for Poles			.0572	.0485
Cost per Ton for All Timber			.1535	.1740

Total Cost for Timber, Lagging, Poles, Etc. and Cost per Ton

Year	Amount	Cost per Ton
1945	85,769.70	.1535
1944	100,622.46	.1740
1943	111,613.33	.1565
1942	93,785.17	.1063
1941	75,111.73	.0908

Although the price per foot for timber continued to increase, the cost per ton was less, due to there being less men available for repairing, although the necessity still remains.

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7. UNDERGROUND

f. Explosives, Drilling and Blasting

EXPLOSIVES STATEMENT FOR THE YEAR 1945

Stoping and Ore Development

Kind		Quantity	Average Price	Amount 1945	Amount 1944
1¼" 60% Amonia Gel. Powder	lbs.	6,550	.1150	753.25	161.00
1½" Gelamite #1	"	235,459	.1150	27,085.01	25,147.41
Total Powder 1945		242,009	.1150	27,838.26	
Total Powder 1944		220,073	.1150		25,308.41
Fuse	M Ft.	892,440	5.143	4,589.93	4,618.38
#6 Blasting Caps	M	126,756	12.20	1,546.44	1,576.98
Electric Blasting Caps	Cwt.	1,361	12.00	163.38	450.22
Powder Bags	ea.	112	3.45	386.40	186.30
Tamping Bags	M	15,000	5.00	75.00	49.90
Fuse Lighters	"	30,000	6.75	202.56	168.80
#18 - 2 Cond. Blasting Wire	M Ft.	2,000	17.46	34.92	65.00
Master Fuse Lighters		500	2.00	10.04	10.04
Miscellaneous				9.90	19.25
Total Fuse, Caps, Etc.				7,018.57	7,144.87
Total All Explosives				34,856.83	32,453.28
Product, Tons				558,633	578,307
Pounds Powder per Ton of Ore				.4332	.3805
Cost per Ton for Powder				.0498	.0438
Cost per Ton for Fuse, Caps, etc.				.0126	.0124
Cost per Ton for All Explosives				.0624	.0562

Rock Development

1¼" Gelamite #1	lbs.	3,228		371.21	445.05
Total Powder 1945		3,228		371.21	
Total Powder 1944		3,870			445.05
Fuse	M Ft.	5,880		30.22	26.34
#6 Blasting Caps	M	680		8.29	7.32
Electric Blasting Caps					19.80
Total Fuse, Caps, Etc.				38.51	53.46
Total All Explosives				409.72	498.51
Total Explosives Used at Mine				35,266.55	32,951.79
Average Price per Pound for Powder				.1150	.1150

The cost per ton for explosives showed an increase in 1945 due to a larger proportion of stiffer ground and also to more blasting of filling under new hanging.

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7. UNDERGROUND

f. Explosives, Drilling and Blasting (Cont.)

Statement showing cost per ton for explosives, exclusive of rock development, for the period 1941 to 1945:

Year	Cost per Ton	Production
1945	.0624	558,633
1944	.0562	578,307
1943	.0528	713,069
1942	.0555	882,399
1941	.0581	827,369

h. Mining & Loading

The ore produced in 1945 was mined by the top slicing method with the exception of two very small sub level stopes. Two more, large sub level stopes, were being developed during the year and will be producing in 1946. The ore was all handled by scrapers, either directly or through transfers to the underground cars.

The water continued to be the worst handicap, as it not only persisted in the former areas but also started to come into ore bodies opened in virgin ground. There was also a much larger proportion of ore encountered which was very stiff and hard to drill, and therefore for this and other reasons practically the entire mine was changed over from dry to wet drilling. New water front heads were purchased for the drill machines and the auger steel, which had been showing a very high loss due to breakage, was abandoned and hollow steel with jackbits substituted. Jacklegs were also purchased to aid in supporting the drills and thus increase the speed of drilling. A saving of approximately 50%, or $2,000, was effected by the change, besides the faster drilling speed and also the safety and health factors of having water in all of the contracts in case of fire and cutting down the dust when drilling.

With a 12-shift-per-week operating schedule, it was only possible to keep the levels clean and do the necessary repairs on them by working a small crew two to three hours overtime on the afternoon shift and also on Sundays. Practically all the miners had to hoist their own timber and do all of the repairing in their places, as well as cutting out or repairing their raises, as there were no extra company account men available for this work.

i. Ventilation

The ventilation was fairly good except in the 3rd Level workings and in the subs above the 5300 Cross-Cut on the 5th Level and work has been nearly completed on the 4th Level, with a new connection in rock to the Negaunee 13th Level, which will improve conditions in the former area, while a large 25 horsepower fan has been installed on the 5th Level to increase the volume in 5300 Cross-Cut. Control doors on the main level drifts force this air up to the sub levels and further impetus is added by the use of the small auxiliary fans.

As mining descends and the Negaunee Mine is abandoned, a rather expensive layout of rock drifts and raises will be necessary to bring the air directly to the 6th Level.

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7. UNDERGROUND

j. Pumping

The total amount of water being pumped both underground and on surface has not varied very much in the last four years. Only two well pumps were in operation on surface and these operated almost continuously. There were no major break-downs in the underground system and work was almost completed on the 3rd Level with the installation of a new plunger type pump to take the place of the centrifugal pump for emergencies, and this will greatly improve conditions. There will be three plunger type pumps, only two of which will be able to handle the entire discharge from the 3rd Level to surface, and thus a break-down of one of the pumps will not present the danger of flooding the lower levels that it has in the past.

The number of gallons per minute pumped both on surface and underground is shown in the following tables:

Underground Pumping

Month	1945	1944	1938*
January	1,054	1,196	1,240
February	1,049	1,045	1,442
March	1,041	1,141	1,367
April	1,051	1,151	1,379
May	1,051	1,115	1,545
June	1,076	1,083	1,372
July	1,068	1,074	1,438
August	1,053	1,108	1,391
September	1,050	1,082	1,434
October	1,062	1,054	1,644
November	1,055	1,064	1,408
December	1,096	1,052	1,496
Total Average	1,058	1,097	1,496

*Before surface wells were put in operation.

The following table shows the amount of water passing over the weirs on the various levels. The readings taken in 1938, before the surface wells were in operation, are shown for comparison.

Year	1st Level	2nd Level	3rd Level	4th Level	5th Level	Total Undg.	Surface
1938	73	52	500	400	230	1,255	
1944	67	57	285	344	270	1,023	925
1945	67	57	250	335	270	979	925

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8. COST OF OPERATING

a. Comparative Mining Cost

	1945	1944
Product	558,633	578,307
Underground Cost	1.955	1.967
Surface Cost	.191	.182
General Mine Expense	.377	.319
Cost of Production	2.523	2.468
Depletion - Original Cost	.114	.115
Increment	.000	.000
Depreciation - Plant & Equipment	.050	.050
Development	.071	.070
Taxes	.225	.241
Loading & Shipping	.051	.059
Total Cost at Mine	3.034	3.003
Budget, Estimated Cost Per Ton	3.046	2.970
Number of Days Operated	301	283
Number of Shifts & Hours:		
1-8-hr.	12	27
2-8-hr.	289	128
3-8-hr.		128
Average Daily Product	1,856	2,043

Cost of Production

	1945	%	1944	%
Labor	1.673	66.3	1.613	65.4
Supplies	.850	33.7	.855	34.6
Total	2.523	100.0	2.468	100.0

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8. COST OF OPERATING

b. Detailed Cost Comparison

	1945		1944	
Underground Costs	Amount	Per Ton	Amount	Per Ton
1. Exploring in Mine	2,800.97	.005	11,839.25	.021
2. Development in Rock	2,218.39	.004	1,397.44	.002
4. Development in Ore	22,789.44	.041	27,394.69	.047
5. Stoping	345,757.90	.619	331,933.75	.574
6. Timbering	372,503.66	.667	413,705.84	.715
7. Tramming	109,171.92	.195	102,423.77	.177
8. Ventilation	16,505.31	.030	17,902.22	.031
9. Pumping	63,729.73	.114	62,216.30	.108
10. Compressors & Air Pipes	52,657.89	.094	61,690.26	.108
11. Back Filling	335.69	.001		
12. Underground Superintendence	34,248.92	.061	34,150.65	.059
13. Cave-In			3.45	
14. Maintenance, Compr. & Drills	3,421.84	.006	2,690.34	.005
15. Scrapers & Mechanical Loaders	36,215.47	.065	38,049.87	.066
16. Electric Tram Equipment	25,170.32	.045	27,606.18	.047
17. Pumping Machinery	4,728.66	.008	4,461.87	.008
Total Underground Costs	1,092,256.11	1.955	1,137,465.88	1.967
Surface Costs				
18. Hoisting	42,085.26	.076	41,082.97	.071
19. Stocking Ore	14,393.61	.026	16,246.22	.028
21. Dry House	14,739.72	.026	14,220.89	.025
22. General Surface	9,700.83	.017	11,052.78	.019
23. Maintenance Hoisting Equipment	16,670.77	.030	12,637.28	.022
24. Shaft	4,106.40	.007	4,583.38	.008
25. Top Tram Equipment	2,767.71	.005	2,086.35	.004
26. Docks, Trestles, & Pockets	1,109.07	.002	1,030.04	.002
27. Mine Buildings	1,021.51	.002	2,260.15	.004
Total Surface Costs	106,594.88	.191	105,200.06	.182
General Mine Expense				
28. Insurance	4,691.74	.008	5,440.32	.009
29. Mining Engineering	4,057.55	.007	5,237.98	.009
30. Mechanical & Electrical Engineering	2,391.81	.004	2,374.29	.004
31. Analysis & Grading	39,647.70	.072	35,497.66	.061
32. Personal Injury	37,013.64	.066	16,217.78	.028
33. Safety Department	2,425.32	.004	2,550.60	.004
34. Telephones & Safety Devices	3,235.63	.006	2,631.74	.006
35. Local & General Welfare	4,642.17	.008	4,542.64	.008
36. Sp. Exp., Pens. & Allowances	10,046.09	.018	10,285.10	.018
37. Ishpeming Office	25,476.10	.046	23,920.75	.041
39. Mine Office	23,625.64	.042	27,214.72	.047
Social Security Taxes	20,239.40	.036	20,411.81	.035
Employees Vacation Pay	31,982.39	.058	25,173.65	.044
Group Annuity Premiums	1,042.43	.002	2,190.03	.004
Total General Mine Expenses	210,517.61	.377	184,689.07	.319
Cost of Production	1,409,368.60	2.523	1,427,355.01	2.468
40. Taxes	125,662.19	.225	139,085.11	.241
Total Cost	1,535,030.79	2.748	1,566,440.12	2.709

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8. COST OF OPERATING

b. Detailed Cost Comparison (Cont.)

(1) Days and Shifts

Year	Days Worked	Shifts & Hours	Men Employed	Total Days Worked
1945	301	1 & 2-8	352	105,555¼
1944	283	1, 2 & 3-8	417	113,354
Increase	18			
Decrease			65	7,798 3/4

Total Men Employed in December of Each Year

	1945	1944	1943
Surface	63	66	77
Underground	286	305	430
Total	349	371	507

(2) Wages

There was an increase in wages during 1945, a shift differential of five cents per hour to men working on afternoon and midnight shifts, retroactive to January 4, 1944.

(3) Comparison of Production

Year	Production	Average Daily Product
1945	558,633	1,856
1944	578,307	2,043
Decrease	19,674	187

(4) Comparison of Number of Men & Wages

Year	No. Men	No. Days	Amount	Rate Per Day
1945	352	105,555 ¼	902,156.52	8.55
1944	417	113,354	876,220.65	7.73
Increase			25,935.87	.82
Decrease		7,798 3/4		

(5) Tons Per Man Per Day

	1945	1944	Increase
Surface	28.07	26.88	1.19
Underground	6.52	6.30	.22
Total	5.29	5.10	.19

(6) Cost of Production

Year	Total Cost	Per Ton
1945	1,409,368.60	2.523
1944	1,427,355.01	2.468
Increase		.055
Decrease	17,986.41	

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8. COST OF OPERATING

b. Detailed Cost Comparison (Cont.)

(6) Cost of Production (Cont.)

	Total Cost				Cost Per Ton		
Year	Labor	%	Supplies	%	Labor	Supplies	Total
1945	934,620.12	66.3	474,748.48	33.7	1.673	.850	2.523
1944	933,053.41	65.4	494,301.60	34.6	1.613	.855	2.468
Incr.	1,566.71	.9			.060		.055
Decr.			19,553.12	.9		.005	

(7) Detail of Accounts

GENERAL

While the cost of production for the year showed an increase of .055, this was due entirely to the retroactive pay adjustment for shift differential, increased vacation pay, etc. The comparison for the year at the end of November, before these figures were added, showed a decrease of .018, even though there were approximately 18,000 tons less product in 1945. This decrease was due to slightly better tons per man on account of eliminating the third shift in July, 1944 and working practically 12 shifts per week during most of 1945. As the retroactive pay adjustment accounted for most of the increase, only a few of the various accounts are detailed to show some other reason, or for a division in labor and supplies.

UNDERGROUND COSTS

3. Development in Rock

	Drifting	Raising	Total Feet	Cost Per Foot
1945	73'	140'	213'	10.49
1944	165'	47'	212'	6.59
Increase		93'	1'	3.90
Decrease	92'			

There was very little rock development in either 1945 or 1944, but the cost was higher in 1945, due partly to the pay adjustment and also to the material being harder and the conditions more adverse than in 1944.

4. Development in Ore

	Drifting	Raising	Total Feet	Cost Per Foot
1945	933'	1,267'	2,200'	10.36
1944	717'	1,626'	2,343'	11.68
Increase	216'			
Decrease		359'	143'	1.32

The ore development was practically the same for both years and showed a 10% decrease in cost per foot despite the raise in wages, and this was on account of less high raises being put up in 1945 and to better results in main level drifting this year.

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8. COST OF OPERATING

b. Detailed Cost Comparison

(7) Detail of Accounts (Cont.)

5. Stoping

	Labor	Cost Per Ton	Supplies	Cost Per Ton	Total
1945	297,696.80	.533	48,061.10	.086	.619
1944	284,661.37	.492	47,272.38	.082	.574
Increase	13,035.43	.041	788.72	.004	.045

The increase in cost per ton for stoping during 1945 was also partly due to the pay adjustment and also to less tons per man per day stoping. There were more inclusions of jasper encountered in the various ore bodies and these delayed the miners, both in having to remove the rock in order to reach ore beyond and in causing rock runs after the jasper horses were broken up.

6. Timbering

	Labor	%	Cost Per Ton	Supplies	%	Cost Per Ton	Total Cost Per Ton
1945	269,117.04	72.2	.482	103,386.62	27.8	.185	.667
1944	293,042.30	70.8	.507	120,663.54	29.2	.208	.715
Increase		1.4					
Decrease	23,925.26		.025	17,276.92	1.4	.023	.048

Timbering showed a decrease in cost per ton for both labor and supplies in spite of the fact that there was an increase in wages and in the cost per foot for timber. This was due to having to stop some of the repair work on account of there not being enough men available for this work. It will be necessary to do considerable more repairing in 1946 to catch up some of the main level drifts that had only minor emergency repairs.

9. Pumping

	Surface Gallons Pumped	Gals. Per Min.	Underground Gallons Pumped	Gals. Per Min.	Total Cost for Power
1945	473,040,000	900	555,380,166	1,058	45,471.06
1944	486,180,000	925	578,254,701	1,090	44,495.20
Increase					975.86
Decrease	13,140,000	25	22,874,535	32	

Both surface and underground pumping showed a decrease in gallons per minute as there were only Nos. 1 and 2 Wells operating on surface in 1945, and while a large percentage of the contracts remained very wet, and two formerly dry areas developed considerable water, the flow along the footwall above the present workings decreased.

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8. COST OF OPERATING

b. Detailed Cost Comparison

(7) Detail of Accounts (Cont.)

Total Underground Costs

	Labor	Supplies	Total	Cost Per Ton
1945	789,449.50	302,806.61	1,092,256.11	1.955
1944	793,448.25	344,017.63	1,137,465.88	1.967
Decrease	3,998.75	41,211.02	45,209.77	.012

The decrease in this account was almost entirely due to less supplies, as there were very few single items of large cost purchased in 1945 and the distribution of supply accounts from the Ishpeming Office showed a decrease of .03 per ton.

SURFACE COSTS

21. Dry House Expense

	1945	1944	Incr.	Decr.
Coal Used in Heating Plant, Tons	1,070	1,145		75
Cost per Ton for Coal	6.72	6.45	.27	
Cost of Coal	7,178.64	7,388.78		210.14

23. Hoisting Equipment

	Cost	Cost Per Ton
1945	16,670.77	.030
1944	12,637.28	.022
Increase	4,033.49	.008

The skip hoist motor burned out during 1945 and had to be sent to Milwaukee for major repairs.

Total Surface Costs

	Labor	Supplies	Total	Cost Per Ton
1945	57,362.70	49,232.18	106,594.88	.191
1944	57,837.82	47,362.24	105,200.06	.182
Increase		1,869.94	1,394.82	.009
Decrease	475.12			

31. Analysis & Grading

	No. Determinations	Lab. Expense Cost Per Determination	Analysis & Grading
1945	267,992	.123519	.147944
1944	94,970	.373777	.571840

The charge from the laboratory showed a decided increase for 1945 over 1944 principally because theyset up a new system of charging by the various units, rather than by the number of individual determinations. This resulted in a decided increase in the reported number of determinations and a higher cost for the Maas Mine as compared with the other mines on account of so many sulphur determinations, to which they give a value of 5, as compared with 1 for an iron determination.

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8. COST OF OPERATING

b. Detailed Cost Comparison (Cont.)

Analysis of Supplies Used

	1945		1944	
	Amount	Per Ton	Amount	Per Ton
41. General Supplies	25,782.42	.044	28,958.08	.050
42. Iron & Steel	7,688.49	.014	12,945.96	.022
43. Oil & Grease	3,244.86	.006	3,501.63	.006
44. Machinery Supplies	9,231.95	.017	8,507.53	.015
45. Explosives	35,338.42	.063	33,851.49	.059
46. Lumber & Timber	94,750.54	.170	111,358.42	.193
47. Fuel	7,178.64	.013	7,388.78	.013
48. Electric Power	132,473.77	.237	140,607.00	.243
49. Sundries	39,113.59	.070	39,468.20	.068
50. Other Mines & Accounts	291.35	.001	585.75	.001
Total	354,549.29	.635	385,551.34	.667

9. EXPLORATIONS AND FUTURE EXPLORATIONS

There were two diamond drill holes drilled during 1945. Hole No. 60 was drilled on the 75' Sub to determine if there was a riser in the hanging to the South of the jasper encountered on that elevation. The only ore found in the entire length of 165' was a small 5' seam from 150' to 155', the rest of the material being hanging jasper.

Hole No. 61 was drilled on the 5th Level to intersect the ore found in Hole No. 50 and thus determine the shape of the ore area, where sub level stoping had been planned. The total depth of the hole was 260' with jasper from 0' to 126' and again from 230' to 260'. The ore showed a width of 104' which is slightly large for stoping, but as this narrows rapidly to the South, it was decided to go ahead with the stope development. The ore was entirely of special grade.

There is no further exploration contemplated for 1946, as all of the areas are pretty well outlined and the ore below the 6th has been thoroughly tested.

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10. TAXES

	1945 VALUATION	1945 TAXES	1944 VALUATION	1944 TAXES
Maas Mine	$ 1,785,000	75,305.40	$ 1,785,000	74,558.02
Race Course	615,000	25,945.56	750,000	31,326.90
*Adams Strip (N 1/6 Rt./Way)			175,000	7,309.61
Stockpile & Equipment	540,000	22,781.47	595,000	24,852.67
Miscellaneous Parcels	9,140	358.58	10,805	451.35
Total Oprtg. Maas Mine	2,949,140	124,413.01	3,315.805	138,498.55
Collection Fees		1,244.18		1,384.98
Total		125,662.19		139,883.53
Tax Rate		4.21879		4.17692
Total City of Negaunee Tax		542,472.42		582,020.52
Maas Mine % of City Tax		23%		22.8%
Maas Mine Rented Houses	103,265	4,356.62	107,225	4,426.20
Mineral Lands, Etc.	15,510	654.35	17,860	746.01
Total Houses & Lands	118,775	5,010.97	125,085	5,172.21
Collection Fees		50.11		51.72
Total		5,061.08		5,223.93

*This is included with Negaunee Mine valuation in 1946 and charged to Negaunee Mine in 1945.

11. ACCIDENTS AND PERSONAL INJURY

	1945	1944
Fatal	1	0
Time Lost, over 4 months	3	2
Time Lost, 1 to 4 months	9	7
Time Lost, less than 1 month	7	5
Total Compensable Accidents	20	14

On December 31, 1945 payments were being made on four accidents which occurred prior to January 1, 1945. One is a death claim and three are receiving full compensation.

The total amount paid in compensation for injuries received during the year was $3,036.50, as compared with $1,897.00 in 1944.

The following is a description of the more serious accidents, except the fatal injury which was described earlier in the report.

Date of Accident	Name of Injured Man	Description of Accident
5-14-45	Roy Gustafson	Roy Gustafson was unloading a car of lagging on surface and fell off the car to the ground 8' below. He fractured his wrist and was home about two months.

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11. ACCIDENTS AND PERSONAL INJURY (Cont.)

Date of Accident	Name of Injured Man	Description of Accident
6-14-45	James Tasson	James Tasson, a miner, was cleaning up at the breast, preparatory to drilling, when some dirt slid off the breast onto his leg, causing contusion of knee and ankle. He was home nearly three months.
5-5-45	Gerald LeBresh	Gerald LeBresh, a timber framer on surface, was moving a log when the point of the cant hook broke and he fell backwards. He fractured his ankle and is still home. There was a flaw in the steel which caused it to snap off.
12-12-45	Jafet Servio	Servio had just returned to the mine after a reported back strain and was ordered to help clean up a jackpot. He left his work, and when walking toward the shaft was struck by a motor car, breaking his leg. He is still home. This accident could not have occurred if he had obeyed orders.
12-17-45	John Hill	John Hill, a miner, was attempting to bar down a bad piece of loose ground when another piece fell on his bar, causing it to strike him and fracturing the collar bone. He will probably be home for several months

12. NEW CONSTRUCTION AND PROPOSED NEW CONSTRUCTION

E & A CC-128

The purpose of this E & A was the installation of an Aldrich Plunger Pump on the 3rd Level to replace an Alberga Centrifugal Pump which is worn out. This E & A was completed in 1945.

Total Estimate		$12,734.00
Total Expended to 12-31-44	$8,416.27	
Total Expended in 1945	4,012.83	
Total Expended to 12-31-45		12,429.10
Balance 12-31-45		$ 304.90

There is no new construction anticipated for 1946.

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13. EQUIPMENT AND PROPOSED EQUIPMENT

a. Steam Shovels

Nos. 27 and 45 Shovels were used at the Maas Mine during 1945, and at the end of the season No. 27 was moved to the Ishpeming Shops for repairs, while No. 45, being a caterpillar shovel, will be repaired at the mine. It is the intention to have another caterpillar shovel, purchased from the Oliver Mining Company at the Holmes Mine, stationed at the Maas next year, thus cutting down the number of men. A caterpillar shovel only needs four men, as compared with nine for a railroad-type shovel. It is also a safer shovel to operate, as there are no men needed between the shovel and the stockpile.

b. Tractor

The International bull-dozer tractor, purchased last year, was in operation the entire year and has proved very satisfactory

c. Stocking Trestles

The tramming on theSouthwest timber stocking trestle was changed from endless rope system to electric larry car system during the year. There was very little work on trestle maintenance, as they were not dismantled and only a few legs were broken when removing the ore.

d. Scraper Hoists

There was no new equipment of this nature purchased during 1945, nor is any anticipated in 1946. If any additional hoists are necessary, it should be possible to obtain these from the Negaunee Mine, where the number of contracts is being gradually reduced.

e. Skips & Cages

There was no change in design or operation of these units during the year and the estimated skip capacity remained at 5.5.

15. POWER

The following is the rate charged per K.W. hour by months in 1945.

January	$ .0140
February	.0136
March	.0136
April	.0138
May	.0138
June	.0138
July	.0138
August	.0140
September	.0138
October	.0136
November	.0136
December	.0136
Average 1945	.0137
Average 1944	.0135

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17. CONDITION OF PREMISES

The premises adjacent to the mine buildings were kept in good condition and presented a very favorable appearance during the year. There were no particular changes made during the year.

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1. **GENERAL:** On January 1st, 1945, the Negaunee Mine was operating on a 10-shift per week schedule of 2-8 hour shifts. On February 5th this operating schedule was increased to 12 shifts, allowing an overtime shift per week. This schedule is somewhat more efficient from a cost and production standpoint, however, timbering and other non-productive work must be carried on during the regular working period, resulting in some delays or extra overtime.

The production in 1945 was 654,447 tons as compared with 757,677 tons in 1944. At the close of shipping season near the end of November the total ore in stock amounted to 32,203 tons. This balance in stock reduced the accumulated overrun to 4,772 tons of Maas Lease Ore as compared with an overrun of 28,665 tons in 1944. When all ore was shipped late in the season 3,489 tons of Negaunee Lump Ore were loaded out which completed shipments as well as production of this grade.

The production in the area under lease from the Maas Mine increased approximately 12% during the year to a total of 46% in 1945. The production resulting from the Negaunee Lease was 43% and that from the South Shore Right of Way 11%. As mining continues it is very evident that there will be an ever-increasing percentage from the Maas Lease with a proportional decrease in the Negaunee Lease Ore.

During 1945 there was very little exploration work carried on and this was confined largely to exploring small, segregated ore bodies. Two drill holes were drilled into the high sulphur area southwest of the main Negaunee shaft on the 14th Level. This work showed only a limited tonnage of extremely high sulphur ore and it is questionable whether this deposit can be mined without considerable expense in development.

With the gradual decline in production due to depletion, the manpower shortage did not seriously affect the general production schedule, and during the year a number of employees, particularly miners, were transferred to the Mather Mine.

2. **PRODUCTION: SHIPMENTS & INVENTORIES**

a. Production by Grades:

	1945	1944	Increase	Decrease
Negaunee Ore	282,654	481,070		198,416
South Shore R. of Way Ore	70,782	18,320	52,462	
Negaunee-Maas Ore	301,011	258,287	42,724	
Total Ore	654,447	757,677		103,230
Rock	21,545	23,260		1,715
Total Hoist	675,992	780,937		104,945

Skip capacity reduced from 5.5 tons to 5.3 tons on 11/10/43.

b. Shipments:

	Pocket Tons	Stockpile Tons	Total Tons	Total Tons Last Year
Negaunee Ore	179,105	103,097	282,202	562,687
South Shore R. of Way Ore	39,534	29,436	68,970	10,695
Negaunee-Maas Ore	202,171	75,132	277,303	284,639
Total 1945	420,810	207,665	628,475	858,021
Total 1944	428,982	429,039	858,021	
Decrease	8,172	221,374	229,546	

Shipments decreased 36.5% in 1945 and were 25,972 tons less than the product for the year.

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2. PRODUCTION: SHIPMENTS & INVENTORIES: (CONT.)

c. Stockpile Inventories:

	Dec. 31st, 1945	Dec. 31st, 1944	Increase
Negaunee Ore	32,226	31,774	452
South Shore R. of Way Ore	9,437	7,625	1,812
Negaunee-Maas Ore	37,525	13,817	23,708
Total	79,188	53,216	25,972

Including estimated overrun there were approximately 32,203 tons in stock at the end of the shipping season.

d. Division of Product by Levels:

	1945	Percentage	1944	Percentage
9th Level	86,020	13.14	142,445	18.8
10th Level			10,154	1.3
13th Level			284,884	37.6
14th Level	568,427	86.86	320,194	42.3
Total	654,447	100.00	757,677	100.0

Production from t he 9th Level decreased approximately 56,000 tons in 1945 or 13% of the total product. The remaining 87% was mined above the 14th Level and this figure will also increase during 1946. As noted from the table above there was no production from the 10th, 11th, 12th and 13th Levels as all ore has been mined at these elevations.

e. Production by Months:

Month	Negaunee	S.S.R/W.	Maas	Total Ore	Rock
January	24,382	7,218	16,421	48,021	1,710
February	23,165	7,512	23,734	54,411	790
March	27,058	9,349	27,367	63,774	2,205
April	28,907	5,667	25,312	59,886	1,820
May	23,636	4,158	28,480	56,274	2,850
June	19,867	5,504	29,663	55,034	1,265
July	22,399	6,603	26,502	55,504	1,200
August	19,492	4,648	18,963	43,103	1,300
September	24,802	3,877	24,411	53,090	2,335
October	25,984	5,283	27,909	59,176	3,010
November	22,711	6,538	24,903	54,152	1,230
December	20,251	4,425	22,574	47,250	1,830
Total	282,654	70,782	296,239	649,675	21,545
Stockpile Overrun			4,772	4,772	
Total 1945	282,654	70,782	301,011	654,447	21,545
Total 1944	437,815	61,575	258,287	757,677	23,260
Increase		9,207	42,724		
Decrease	155,161			103,230	1,715

The product by leases was distributed as follows:

	1945	1944	Increase	Decrease
Negaunee Mine Company	282,654	438,957		156,303
S 1/2 R. of Way	70,782	61,575	9,207	
Maas Lease	262,195	229,465	32,730	
N 1/3 R. of Way	24,987	21,387	3,600	
N 1/6 R. of Way	13,829	8,471	5,358	
Total	654,447	759,855*		105,408

* 2,178 tons prior year's stockpile overrun included.

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2. PRODUCTION SHIPMENTS & INVENTORIES: (CONT.)

f. Ore Statement:

	Negaunee	S.S.R/W.	Maas	Total 1945	Total 1944
On Hand Jan. 1, 1945	31,774	7,625	13,817	53,216	151,382
Product for Year	282,654	70,782	296,239	649,675	731,190
Stockpile Overrun			4,772	4,772	28,665*
Total	314,428	78,407	314,828	707,663	911,237
Shipments	282,202	68,970	277,303	628,475	858,021
Balance on Hand	32,226	9,437	37,525	79,188	53,216
Decrease in Output	144,685	9,222	53,948	81,515	223,800
Increase in Ore on Hand	452	1,812	23,708	25,972	98,165

*2,178 tons prior year's stockpile overrun included.

g. Delays:

April 3rd - 2-1/2 hours delay - Loss of Product - 350 tons
Broken main airline - 14th Level.

April 4th - 3-1/4 hours delay - Loss of Product - 424 tons

Two hours a/c no current - 1/1/4 hours putting wheel on skip.

May 18th - 4 hours delay - Loss of Product - 318 tons
Hoisting with one skip a/c broken rod measuring pocket door.

June 5th - 2 Hours delay - Loss of Product - 220 tons
14th Level pocket door out of commission.

June 28th - 1 hour delay - Loss of Product - 110 tons
Broken brake rod on skip hoist.

The total loss of product for the year on account of delays amounted to 1,422 tons as compared with 3,015 tons in 1944.

3. ANALYSIS:

a. Average Mine Analysis on Output:

	1945				1944			
Grade	Tons	Iron	Phos.	Sil.	Tons	Iron	Phos.	Sil.
Negaunee	282,654	59.71	.087	8.12	427,339	59.66	.092	8.43
Maas	296,239	59.99	.090	8.20	242,291	59.31	.093	8.15
S.S.R/W.	70782	60.21	.086	7.74	61,560	58.43	.079	11.34

b. Average Mine Analysis on Straight Cargoes:

	Mine			Lake Erie	
Grade	Iron	Phos.	Silica	Iron	Moisture
Negaunee Ore (lump)	63.46	.031	6.60	62.20	2.46
Negaunee - Crushed	59.61	.085	8.29	58.65	10.88

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption:
12 Cubic feet equals one ton
10% deducted for rock & loss in mining

Area	Negaunee Lease	S½ R of W or ⅔ of Adams Strip	Leased from Maas Mine: N 1/6 R of W or ⅓ Adams Strip	N 1/3 R.of W or C.C.I.Co. Strip	Maas Area	Special Grade	Total Tons
9th Level	81,598						81,598
13th to 14th Levels	245,783	53,431	20,238	44,321	614,978		978,751
Below 14th Level	16,667			375	35,375	59,000	111,317
Total Gross Tons 11/30/45	344,048	53,431	20,238	44,696	650,253	59,000	1,171,666
Less December 1945 Production	20,251	4,425	1,483	2,246	18,845		47,250
Total Gross Tons 12/31/45	323,797	49,006	18,755	42,450	631,408	59,000	1,124,416
Less 10% for Rock and Loss in Mining	34,405	5,343	2,024	4,470	65,025	5,900	117,167
Net Total 12/31/45	289,392	43,663	16,731	37,980	566,383	53,100	1,007,249

Maas Lease Ore	674,194 tons
Negaunee Lease Ore	289,392 "
South Shore R. of Way Ore	43,663 "
Total	1,007,249 tons

It should be noted t hat the estimate as given above shows a total of 10% reduction for both rock and loss in mining whereas in previous years the reduction included 10% for rock and 10% for loss in mining. For this reason a direct comparison cannot be made with the 1944 estimate.

The actual developed ore amounted to approximately 79,000 tons and was derived from several areas which proved to be slightly larger than the previous estimate had shown as well as additional ore drawn from several small pillars between dikes where it was not economically possible to mine by the top slicing method.

b. Prospective Ore:

All ore in the mine is developed.

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4. ESTIMATE OF ORE RESERVES: (CONT.)

c. Estimated Analysis:

Grade	Ore Reserves: Tons	Approximate Expected Natural Analysis: Iron	Phos	Sil	Mang	Alum	Lime	Mag	Sul	Loss	Moist.
Negaunee	333,055	52.80	.090	7.00	.194	2.48	.700	.290	.014	1.80	12.00
Neg-Maas	621,094	52.80	.088	7.50	.194	2.08	.503	.160	.016	1.33	12.00
Maas Spec.	53,100	52.80	.070	7.50	.180	2.00	.520	.160	.200	1.10	12.50
Total	1,007,249										

The Negaunee ore includes all ore from the Negaunee Lease and the South Shore Right of Way; the Negaunee-Maas ore includes Parcels No. 1, 2 and 3, otherwise known as the Maas Strip, the North 1/3 and North 1/6 Right of Way.

Grade	Ore in Stock - Average Natural Analysis: Tons	Iron	Phos	Sil	Mang	Alum	Lime	Mag	Sul	Loss	Moist.
Negaunee	32,226	52.714	.078	7.70	.16	2.75	.48	.20	.014	1.55	11.82
Neg-Maas	37,525	52.469	.076	7.76	.13	2.71	.46	.23	.012	1.48	11.92
S.S.R/W.	9,437										
Total	79,188										

5. LABOR AND WAGES:

a. Comments:

There were 314 employees on December 31st, 1945 as compared with 331 on December 31st, 1944, a decrease of 17 men. The reduction in the working force was somewhat greater during the last half of the year due to the depletion of mining places and a general reduction in the number of mining contracts. During the year 20 men quit to work elsewhere, 11 men were transferred to the Mather Mine, 8 surface employees were laid off due to insufficient work or to make room for returning servicemen, 3 were drafted, 3 died and two were retired on account of age or disability. The decrease amounted to 47 men. During the same period 30 men were hired of which 8 were returned servicemen, which resulted in the net decrease as mentioned above.

Throughout the year relations between the United Steel Workers or CIO Union and the supervisory force continued to be very satisfactory. There have been no grievances between the Union and management as far as the Negaunee Mine is concerned since the original union election in 1943. This record continues to show that employees find that any complaints or requests can be given much more immediate attention than going through the union grievance procedure.

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5. LABOR AND WAGES: (CONT.)

b. Comparative Statement of Wages and Product:

	1945	1944	Increase	Decrease
Product	654,447	757,677		103,230
No. of Shifts & Hours	1-8 13	1-8 26		1-8 13
	2-8 288	2-8 162	2-8 126	
	3-8 0	3-8 95		3-8 95
Average No. Men Working:				
Surface	63	76		13
Underground	250	335		85
Total	313	411		98
Average Wages Per Day: (Including retroactive wages)				
Surface	7.56	7.09	.47	
Underground	9.13	8.45	.68	
Total	8.79	8.18	.61	
Average Wages Per Month: (Including retroactive wages)				
Surface	184.63	156.37	28.26	
Underground	205.06	171.11	33.95	
Total	200.95	168.38	32.57	
Product Per Man Per Day:				
Surface	35.42	37.65		2.23
Underground	9.71	9.31	.40	
Total	7.62	7.46	.16	
Labor Cost Per Ton: (Including Retroactive Wages)				
Surface	.213	.188	.025	
Underground	.940	.908	.032	
Total	1.153	1.096	.057	
Average Product Mining:				
Stoping	26.73	23.98	2.75	
Developing in Ore	7.59	7.68		.09
Total	25.69	22.80	2.89	
Average Wages Contract Labor	9.54	8.76	.78	
Total Number of Days:				
Surface	18,475¼	20,123¾		1,648½
Underground	67,367¾	81,415		14,047¼
Total	85,843	101,538¾		15,695¾
Amount for Labor: (Including Retroactive Wages)				
Surface	139,583.84	142,617.74		3,033.90
Underground	615,181.89	687,849.77		72,667.88
Total	754,765.73	830,467.51		75,701.78
Average Wages Per Month as Per Labor Statement - Less Captain & Clerks				
Surface	170.64	145,78	24.86	
Underground	203.65	169.98	33.67	
Total	197.00	165.51	31.49	

Proportion of Surface to Underground Men:

1945 1 to 3.97

1944 1 to 4.41

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6. SURFACE:

a. Buildings and Repairs:

Throughout 1945 regular repairs and maintenance were made to all mine buildings when necessary. There were no major improvements or additions to surface buildings or property.

b. Fences:

Minor repairs were made to all fences on the mine property and those which enclose the caved area northwest of the Negaunee Mine.

c. Tracks and Roads:

All tracks and roads in the vicinity of the mine were maintained during 1945. The mine bulldozer has great ly facilitated the clearing of snow from all roads and parking areas during and after heavy snowstorms.

d. Stockpiles:

The loading of ore from the stockpiles started on the 13th of April or just two weeks ahead of 1944. All stockpile shipments were completed on November 10th, 1945 as compared with November 26th, 1944.

d-1. Ore and Rock Trestles:

During the latter part of the summer months the permanent steel trestles were scraped and painted. A number of new ties and decking were also put in to replace worn-out pieces.

During October and November a new rock trestle was built along the northwest crest of the present rockpile which has been levelled by the bulldozer. This trestle included 14 timber bents and should allow sufficient storage of rock for the remaining life of the mine.

e. Shaft House:

Repairs to the shaft house were made intermittently during the year, replacing plates in the pockets and dumps when necessary. Minor changes were made in the skip dumps in steepening the side plates to prevent the ore from building up along the sides. Two permanent air blower pipes were also installed under the plates and near the edge, making it possible to blow the pockets from the top tram control house.

f. Water Supply:

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

	1945	1944	1943	1942
1st Quarter	212.44	318.00	496.85	203.17
2nd Quarter	306.94	352.65	389.82	341.84
3rd Quarter	398.85	483.90	678.64	602.21
4th Quarter	145.24	357.90	407.74	425.32
Total	1,063.47	1,512.45	1,973.05	1,572.54
Product - Tons	654,447	757,677	954,990	1,106,694
Cost Per Ton	.001409	.001996	.002066	.001421

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6. SURFACE: (CONT.)

g. Grounds:

The grounds around the mine were kept clean and in good condition throughout the year. The shrubbery in the immediate vicinity of the office, dry house and engine house were pruned and thinned out to improve the general appearance. In November snow fences and storm sheds were erected in preparation for the winter season.

h. Truck:

No repairs outside the usual maintenance were necessary to the 1-1/2 ton Chevrolet truck during 1945.

i. District Sawmill Plant:

The sawmill located in the west end of the timber yard was in intermittent operation during the entire year. In addition to cutting the usual mine timber and supply lumber, approximately 82,000 feet of white pine purchased locally was cut into lumber. This work was carried on during June and July in addition to special orders. During September and October a large number of ties, ladder sides, roller stock, uprights and sills were sawed for use in the district mines during the winter months. Due to the general shortage of manpower in outside sawmills it was necessary to cut approximately 45,000 b.f.m. of hemlock for use underground.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1945.

b. Development:

There was a considerable decrease in the total amount of developing comprising drifting and raising in 1945 as compared wit h 1944. The following table g ives this comparison of development in ore and rock:

	Drifting		Raising		Grand
Year	Ore	Rock	Ore	Rock	Total
1945	1,449'	1,497'	987'	330'	4,263'
1944	2,357'	1,276'	1,701'	151'	5,485'

The total development footage resulted from three items. First, the driving of numerous drifts and raises into the footwall to extend the ventilation openings as mining continues downward and away from the 13th Level ventilation drifts. Second, the numerous small drifts and raises contributory to the development and mining in the southwest stoping areas. Third, the extension of three main level drifts to develop the southwest portion of the Maas Area Lease.

b-1. Rock Development:

The following table gives a summary of the rock drifting and raising in 1945 and 1944.

7. UNDERGROUND: (CONT.)

b. Development: (Cont.)

b-1. Rock Development: (Cont;)

Location	Drifting	Raising	Total 1945	Total 1944
700' Sub-level	10		10	
690' Sub-level	89	14	103	
13th Level	85		85	295
270' Sub-level				100
260' Sub-level	30		30	185
185' Sub-level	81	42	123	120
170' Sub-level	393		393	173
160' Sub-level	46	16	62	
150' Sub-level	329		329	
140' Sub-level	59	37	96	105
115' Sub-level	264	221	485	
14th Level	111		111	449
Total 1945	1497'	330'	1827'	1427'
Total 1944	1267	160'	1427'	

There was a slight increase in rock drifting and raising during the yea r. Approximately 80% of this rock work was carried on between the 150' Sub-level and the 195' elevation (13th Level). The north and east footwall of the present large mining sub-level at the 150' elevation is now approximately 150 feet away from the four 13th Level ventilation drifts. In an effort to maintain a constant flow of fresh air, drifts and raises must be extended into the lean ore and slate footwall to the 13th Level elevation, the vertical distance amounting to approximately 45 feet. In most cases these drifts can be driven away from the pressure areas as they enter the footwall, resulting in a minimum of repairs.

As mining operations continue downward it is evident that the ventilation system must be altered to allow the air to enter the 14th Level by using the various mining raises as airways. This however will only be necessary when it is impossible to maintain connections above.

Rock drifting and raising was also carried on in the southwest portion of the 14th Level area where considerable development was necessary to explore small ore chutes and chimneys which were known to exist from drill holes during the original 14th Level development.

b-2. Ore Development:

The following is a summary of the ore development in 1945 and 1944:

Location	Drifting	Raising	Total 1945	Total 1944
690' Sub-level	14		14	
13th Level	60		60	422
220' Sub-level	84	40	124	
185' Sub-level	59		59	369
170' Sub-level	43		43	
160' Sub-level	754	503	1257	903
150' Sub-level	19	58	77	
140' Sub-level	129	75	204	1421
115' Sub-level	159	68	227	95
14th Level	128	243	371	848
Total 1945	1449'	987'	2436'	4058'
Total 1944	2357'	1701'	4058'	

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7. UNDERGROUND: (CONT.)

b. Development: (Cont.)

b-2. Ore Development: (Cont.)

There was a marked decrease in ore development as indicated by the table above during the year. As previously mentioned about 80% of this work was carried on in the stoping area in the southwest portion of the ore body. The large hard and later soft ore stopes southwest of Raises 1474 and 1473 have been actively worked for over three years. During 1945 the ore outline had been fairly well established and only local development in the form of raises and drifts was necessary to continue stoping operations.

Near the middle of the year the extension of the 1450 Crosscut under the southwest end of the Maas Area was abandoned due to the need of constant repairs to the drift and raises. In July the 1480 Crosscut was started to the west from the main 1430 drift on the 14th Level. This drift will open for mining the south portion of the remaining pillar in the Maas Area. Drifting operations were carried on throughout the remainder of the year in intermittent stages to allow mining on the sub-level (85' above) to get underway before advancing the crosscut. In this way a minimum of pressure was developed as drifting operations were carried on below.

c. Stoping:

The production for 1945 was mined from the same areas as in the previous years. 13% came from above the 9th Level while 87% was mined between the 13th and 14th Levels. No ore was trammed or mined on any intermediate levels. As previously mentioned the percentage of production from the Maas Area Lease was slightly larger than that from the Negaunee Lease, which in itself shows the rapid depletion of the original Negaunee Mine ore bodies. The proportion of ore mined from Parcels 1, 2 and 3 in the Maas Lease amounted to 46%, from the South Shore Right of Way 11% and the production from the Negaunee Mine proper amounted to 43%. It is quite evident that during the coming year that the total product from the Maas Lease may well exceed 60%. This figure will continue to rise in succeeding years until all ore has been mined.

The sub-levels on which mining was carried on during the year above the 9th Level include the 733', 720', 710' (6-1/2 Level), 700' and 690' Sub-levels. This mining is located in the No. 1 Shaft pillar and at the present writing there are no other ore areas above the 9th Level.

Between the 13th and 14th Levels mining was carried on on all sub-level intervals listed as follows: 195', 185', 170', 160', 150', 140', 125' and 115' sub-levels.

In summarizing the above data, ore was mined at 13 different elevations in 1945 as compared with 19 different elevations in 1944. This decrease reflects the general trend of the concentration of mining operations during recent years as the size of the main ore bodies are reduced.

The locations of mining contracts for the years 1945 and 1944 are listed below.

	1945	1944
	4 above 9th Level	5 above 9th Level
	1 above 13th Level	4 above 13th Level
	25 above 14th Level	25 above 14th Level
Total	30	34

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

It will be noted from the preceding table that there were four less contracts working at the end of the year as compared with 1944. On the average 23 contra cts were carrying on regular mining operations while four contracts were developing and three c ontracts were carrying on repairs to either main level drifts or raises. The following table shows the changes in contracts due to the reduction of mining places requiring less miners.

	1945	No. Miners	1944	No. Miners
Two shift contracts	28	112	31	124
One shift contracts	2	4	3	6
Total Contracts and Miners	30	116	34	130

In December, 1945 the number of Company Account miners was 28 as compared with 27 in 1944. This figure has remained fairly constant in the past few years and these men are used to fill vacancies which occur through absenteeism of men in the regular mining contracts. Despite the fact that the number of contracts and the product are continually decreasing, the number of Company Account miners and repairmen has only been slightly reduced. This condition results from a large number of ventilation drifts which must be maintained near the active contracts as well as constant repairs to the main level drifts as mining descends to them.

(2) Detail of Stoping:

Subs Above the Ninth Level

Negaunee Mine - No. 2 Shaft Pillar

Mining operations were continued in the small area adjacent to the main dike in the No. 2 Shaft pillar until July, 1945. During this interval the 733' and 720' Sub-levels were completed. This small ore body has been mined downward for six sub-levels and is more or less segregated from other mining operations above the 9th Level. After completing the 733' Sub-level mining was started in March on the 720' Sub-level. During the progress of operations it was noted that the ore which heretofore had dipped toward the dike at approximately 25° had greatly flattened on the 720' Sub-level despite the fact that the actual width of ore against the dike was in excess of 60 feet.

No. 1 Shaft Pillar - Adjacent Pillars and Stopes

This mining area lies along the southwest footwall northwest of the old No. 1 Shaft adjacent to and south of the main dividing dike which has served as a boundary or mining limit for a number of sub-levels. Early in the year mining operations were being completed in the southwest portion of this area on the 720' Sub-level. The north end of the ore body was opened on the 700' Sub-level in January with the remaining three contracts moving to this elevation in February. The size of the ore area is reduced by approximately 10 to 15 feet on each sub-level increasing to 50 feet at the extreme south end. On the north side the general size is increased in about the same proportion approaching the dike at the south end. In October the 690' Sub-level was opened at the north end and after a ventilation connection had been completed to the 6-1/2 Level, drifting was started to the southwest where the five remaining raises were opened for mining.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

For the most part the connecting drifts between raises 901, 901-A, 903 and 909 are located along and parallel to the lean ore footwall. These raises originate from the south side of the 9th Level crosscut. As mining continues downward three additional raises on the north side of the drift will be used with mining being conducted in a general reverse direction or to the footwall.

In 1945, 86,020 tons were mined above the 9th Level and the present known ore reserves as of December 31st, 1945 amount to 81,598 gross tons. It would appear under these circumstances that the remaining ore above the 9th Lev el will largely be mined during 1946.

In December No. 1 Contract completed one drift and slice northwest of No. 901 Raise to the caved dike. No. 24 Contract advanced two slices northwest of No. 901-A Raise to the dike. The remaining ore to the west will be mined under the jasper capping which lies adjacent to the dike and is narrowing on succeeding sub-levels. No. 12 Contract completed two slices west of the raise and along the lean ore footwall. No. 43 Contract mined one drift west of the raise to old workings.

10th, 11th and 12th Levels

There were no mining operations carried on above these levels during 1945. All ventilation drifts and raises which conduct the air to the 13th Level were maintained and kept in repair during the year.

Maas Lease

13th Level - North Footwall Area

Early in the year mining operations were completed adjacent to the north footwall on the 195' Sub-level (13th Level). These workings partially overlapped Parcels No. 2 and 3.

Negaunee Lease

Area North of Main Dike

Mining operations were started at this elevation in January. The area is located between the main dividing dike and the southwest portion of the Maas Lease. Three mining contracts were engaged in the mining of this territory from Raises 1430, 1432 and 1443. In August this area was completed and the 185' Sub-level was opened up. During the early months of the year mining operations were also in progress near the northeast footwall from No. 1409 Raise. Two small pillars were mined with the work being completed in February. The product from the above two areas was divided between the Negaunee Lease and the South Shore Right of Way.

In September it was found necessary to drive a ventilation drift to the north from the 1380 Crosscut (13th Level) to which a sub-level drift could be driven which would greatly aid in the cooling off and ventilation of this upper mining area. The drift was driven to the north approximately 140 feet through ore, jasper and to the main dividing dike. This work was concluded in October.

7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

Maas Lease

185' Sub-level - Subs Above the Fourteenth Level

In January mining operations were well underway at this elevation which comprises an area 250 feet in width and 520 feet in length. Fifteen mining contracts continued operations until the mining was completed in June, 1945. With the heavy concentration of mining contracts some difficulty was experienced in the maintenance of traveling and ventilation drifts, however, mining operations were carried on satisfactorily.

Negaunee Mine and South 1/2 Leases

Mining operations were also in progress in this area which lies along the east footwall and paralleling the original Negaunee property line. For the most part the footwall was fairly regular despite several local pockets which extended into the footwall. In the vicinity of Raises 1420 and 1404 mining operations indicated in intrusive jasper horse approximately 30 feet in width and entering the ore body about 100 feet from the normal footwall position. Mining on lower sub-levels has shown that this jasper intrusion was considerably enlarged with a corresponding reduction of the mining area.

In the territory bounded on the south by the main Negaunee dike and on the north by old Maas workings of the Maas Lease, mining was being concluded near the end of 1945. In July in an effort to speed up this work as well as bring it more nearly to the elevation of the present active sub-level, Raise No. 1480 was put up from the 14th Level, increasing the total number of mining contracts to four. With the completion of the previously mentioned 13th Level ventilation drift, general mining conditions were very satisfactory and in December No. 14 Contract, mining from No. 1480 Raise completed operations and then commenced timbering over their raise on the 170' Sub-level elevation. No. 21 Contract advanced two slices southwest of No. 1432 Raise and also were completing mining operations. No. 7 Contract advanced two slices to the bounding dike southwest of No. 1430 Raise. Only two small pillars remain at this elevation before the sub-level will be completed. No. 8 Contract advanced four slices northeast of No. 1443 Raise and here again two small pillars remain to be mined.

Area South of the Main Dike

Two mining contracts were located above No. 1453 Raise and No. 1441 Raise during the early months of 1945. Operations included the mining of several remaining pillars adjacent to the dike and in March this work was completed.

Maas Lease

150' Sub-level

During the year this entire sub-level was opened and mined to completion. The actual size of the ore body was reduced by approximately 30 feet on th e dip of the north and east footwalls. As a result of this reduction in size it was necessary to abandon the raises of two contracts

7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

whose mining area had been cut off by the lean ore footwall. In the west central portion of the Maas Area the jasper capping still persists and no appreciable reduction in size was noted on the 170' Sub-level as compared with the 185' Sub-level.

Negaunee Mine and South 1/2 Leases

The remaining territory which lies parallel to the original Negaunee Boundary line averages approximately 80 feet in width. The jasper horse near Raises 1420 and 1404 extended into the mining area approximately 160 feet in a westerly and then northerly direction. During the course of operations four main ventilation connections were maintained to the 13th Level airways. Generally speaking conditions were very good and an adequate supply of air was available for the ventilation of the 22 active mining contracts at all times.

Area South of the Main Dike

In September, 1945 the mining area between the fork of the main dikes was opened for mining. No. 1441 Raise was timbered and two ventilation drifts were driven to allow the air to pass through this area in an effort to ventilate the active sub-level to the north. In November a drift and slice were driven along the dike and through a narrow cross dike which has heretofore served as the boundary of this area. In December four mills were extended to a height of 40 feet from the drift and by the end of the month stoping operations were in progress to mine this ore pillar.

Immediately west of the above area mining operations were underway from No. 1453 Raise. Near the middle of 1945, two drifts were extended to the north and east through the dividing dike where a small triangular pillar was mined adjacent to the Maas Lease. Further mining was then continued throughout the remainder of the year to the east and south of the main dike. In December No. 34 Contract completed one slice north of the raise where a small ore pillar was drawn and thereafter commenced an exploratory drift to the west to determine the extend of the ore adjacent to the main dike.

Maas Lease

150' Sub-level

During July, August and September the 150' Sub-level was opened for mining throughout its entire extent. The actual size of this mining area is 250 feet in width and 480 feet in length, having been reduced in size by approximately 60 feet due to the flattening north and east footwalls. The number of mining contracts located in this main ore body was reduced from 16 to 11 and it is evident that three or four additional contracts will be abandoned on the subsequent sub-levels. With the exception of a small area in the vicinity of No. 1433 Raise the present mineable ore pillar is included entirely within the limits of the Maas Lease. The jasper capping which was still in evidence on the 170' Sub-level has now reduced in size t o such an extent that mining can now be

7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

carried on to the boundary of the Maas Lease in the central west portion of the area. General conditions were again very satisfactory and it was possible to continue to maintain all ventilation and traveling connections with the 13th Level.

A brief resume' is given below covering the work of the active contracts during December, 1945:

No. 1414 Raise - No. 25 Contract advanced three slices to the Maas limit west of the raise. Mining is being continued south.

No. 1412 Raise - No. 6 Contract completed two slices and started a t hird southwest of the raise to old workings.

No. 1410 Raise - No. 31 Contract advanced two slices south of the raise and parallel to the lean ore footwall. Late in December this mining location was abandoned due to depletion of ore and No. 31 Contract was moved to No. 1482 Raise on the 125' Sub-level.

No. 1425 Raise - No. 28 Contract advanced two slices to the workings of No. 25 Contract north of the raise. The mining area in the vicinity of this raise will be c ompleted early in January.

No. 1423 Raise - No. 45 Contract completed a new traveling and ventilation drift to No. 1425 Raise to the northwest. Mining was then continued in the remaining pillar east of the raise where two slices were advanced.

No. 1424 Raise - No. 23 Contract completed five slices to old workings east and north of the raise to mine the last pillar in this direction.

No. 1422 Raise - No. 22 Contract advanced two slices along the lean ore footwall northeast of the raise. Near the end of December due to the rotted condition of the cribbing, it was necessary to make major repairs, starting on the sub-level and repairing downward.

No. 1434 Raise - No. 15 Contract advanced four slices to complete the mining of a small pillar east and south of the raise to old workings. A new traveling drift was then driven to the north, making a connection with No. 1436 Raise.

No. 1435 Raise - No. 30 Contract advanced a slice which will serve as a traveling and ventilation drift 110 feet east of the raise. This slice will eventually hole to a ventilation drift near No. 1420 Raise and will admit air to the inner mining area where openings are small due to the continually crushing timber.

No. 1436 Raise - No. 37 Contract advanced one slice northwest of the raise 87 feet. Some difficulty was experienced in this mining due to the fact that the jasper capping on the sub-level above had flattened and allowed the mining to be carried on under it on this 150' Sub-level elevation. The actual mining area has now been enlarged by approximately 60 feet toward the property line.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

No. 1438 Raise - No. 36 Contract advanced one slice west of the raise, also under the jasper capping.

Negaunee Lease

No. 1404 Raise - No. 32 Contract advanced a ventilation drift southeast of the raise into the lean ore footwall, from which a connection will be made with the ventilation drift which connects with the 13th Level.

No. 1433 Raise - No. 33 Contract completed six slices northwest and southwest of the raise to old workings and a mine limit. Operations will be continued to the south where a large pillar remains. A considerable portion of the product from this contract came from the South Shore Right of Way with the remainder from the Negaunee Lease.

140', 160', 185' & 195' Sub-levels - Southwest Ore Body

The stoping area which lies in the vicinity of Raises 1473, 1474 and 1475 was mined by two mining gangs throughout 1945. It might be added that this now large stope has been worked for slightly over three years. In January there was a considerable tonnage of hard lump ore in evidence above the transfer southeast of No. 1475 Raise. This ore was mined on the various sub-levels until May at which time the stope was completed. The hard ore from this operation was hoisted and stocked separately and amounted to approximately 9,000 tons. Above the adjacent transfer southeast of No. 1474 Raise mining operations were continued throughout the entire year. This stope is divided from the hard ore stope by several dikes which were allowed to cave into the abandoned stope. For the most part this ore was of a softer nature and mining operations were extended back to a vertical pillar line 15 feet southeast of the raise. Near the end of 1945 development was continued in the transfer northwest of the raise and the stoping face will be carried over No. 1474 Raise on the upper sub-levels and under the jasper capping which has now cut the ore off to the 185' Sub-level elevation.

In May after the completion of the hard ore stope the mining contract was moved to No. 1473 Raise on the 140' Sub-level. A transfer was driven to the south immediately under the ore. Six mills were then extended to the mill sub and the development was connected with the open stope to the south which is again divided by a dike. During the remainder of the year stoping operations were carried on on the 160', 185' and 13th Level elevations. As the working face was being retreated to the north it was found that the jasper capping, which strikes east and west and dips at about 20°, was reducing the actual mining height to 25 feet. Near the end of the year the stope had been enlarged to approximately 250 feet by 240 feet, having been mined from the three main transfers on the 140' Sub-level.

In December No. 44 Contract completed stoping operations above No. 1473 Raise where the jasper footwall and capping had been exposed on the north and east sides of the open stope. This contract will be moved in January to a new location above No. 1477 Raise where a small ore pillar will be stoped.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

No. 1474 Raise - No. 20 Contract continued further development of the remaining ore pillar northwest of the large stope where drifts and raises wer e being extended to the 185' Sub-level elevation at which point a connection will be made with the present open stope. It might be added that several narrow stringersdikes have complicated the development and mining of this remaining ore pillar. From past experience it has been found that the dikes can be blasted into abandoned stopes which have been mined adjacent to them, thus reducing the dilution of ore to a minimum.

Maas Lease

125' Sub-level

In October the 1480 Crosscut on the 14th Level had been advanced approximately 200 feet, from which two raises were extended to the 125' Sub-level under the original Maas Mine workings. This area, which is approximately 300 feet in length and 250 feet in width was opened to allow additional mining contracts to continue operations. The ore pillar has a vertical height above the 14th Level of approximately 45 feet and it will be possible to mine it at least two or possibly three sub-levels. Mining operations were started in November from No. 1481 Raise. Several slices were extended to the northwest under low covering and it was later found necessary to cut the raise at a slightly lower elevation in order to continue mining. In December three slices were extended to the north and east also t o low covering and it was then necessary to make further repairs to the raise to give additional mining height. In December No. 1482 Raise was completed to the 125' Sub-level elevation and No. 31 Contract completed two short slices, the second of which served as a traveling and ventilation drift northeast of the raise. The maintenance and repair work on the crosscut immediately below was greatly reduced after mining operations had been carried on just above. At the present time it is evident that no serious delay will result from the maintenance of the crosscut below.

In the southwest portion of the Maas Lease territory a crosscut was driven east and north of the 5300 drift to also open the remaining Maas Pillar. Early in 1945 two raises were put up to the 125' Sub-level and mining was carried on adjacent to the jasper footwall. Work was continued for several months at which time five slices were advanced to old workings approximately 80 feet northeast of the raise. During the course of mining a large amount of water was encountered and constant repairs were necessary to the crosscut below as well as Raises 1452 and 1454. In August this area was abandoned and all efforts were made t o continue the development from the 1480 Crosscut.

Mining operations were continued throughout the year just north of the main dividing dike in the vicinity of Raises 1463 and 1464, lying along and parallel to the Maas and Negaunee Mine Boundary. This area is approximately 60 feet in width and 110 feet in length and its mining has been retarded by a generally wet condition as well as rock runs from the jasper capping. Despite these unfavorable conditions operations were continued and it is very evident that a decided improvement should be made while mining subsequent sub-levels. In December No. 26 Contract completed two slices west of No. 1463 Raise in the Maas Lease. Mining will continue to the north where a small pillar remains adjacent to the boundary dike.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

Negaunee Lease

115' Sub-level

Early in 1945 an exploratory transfer was extended northeast of No. 1477 Raise from which raises were extended to develop a small ore body adjacent to an old stope above the 160' Sub-level elevation. During a two month period development was continued on the 125' and 140' Sub-levels. The results were very disappointing as only a small ore pillar was found above the end of the transfer. This area was mined in April at which time the stope was abandoned. It might be added that the small ore pillar has been developed to the southeast of No. 1477 Raise between the 115' Sub-level and the 150' Sub-level. This area will be stoped in 1946.

Exploratory work was also carried on in the extreme southwest portion of the Negaunee Mine above Raises 1478 and 1479. During the original development the raises showed small bunches of ore mixed with bands of jasper and lean ore.

No. 1478 Raise was cut out on the 115' Sub-level elevation and the ore was outlined in four directions which gave evidence of an ore body approximately 70 feet by 90 feet. From the development below as well as the extended raise it is questionable whether this area continues down to the 14th Level elevation. However, further exploration work will be done in 1946 to determine the actual extent of the ore.

In No. 1479 Raise a cut out was also made at the 115' Sub-level elevation. A connection was then driven to No. 1478 Raise. Two small mill raises were then extended to a height of 16 and 32 feet respectively, indicating again that the ore was very spotty. The general dip of the jasper capping is to the northwest and indications through the development show that it is very uniform. In April a drift was started to the south of No. 1479 Raise to explore a small 16-foot run of ore which had shown up by drill hole No. 27 which was driven a number of years ago from a cut out on the 13th Level elevation. The exploratory drift was driven to a point approximately 135 feet from the raise. A small raise was extended 50 feet to approximately the 170' Sub-level elevation. A cut out was then made and plands were formulated to drift to the southeast immediately under the ore which had been shown up in the above-mentioned drill hole. Late in May it was necessary to abandon this work and use the men elsewhere. It might be mentioned that development work in this area will be continued sometime in 1946 to locate and determine the extent of the ore.

14th Level

In June the new 1480 Crosscut was driven west of the main 1430 drift. This crosscut will open for mining the southwest ore pillar between the 125' Sub-level and the 14th Level approximately 45 feet. The drift was extended to the west approximately 210 feet where the next three raises, namely 1480, 1481 and 1482 were extended. After some difficulty due to the extreme pressure, mining from the raises was started and near the end of 1945 mining operations were being carried on very satisfactorily.

There was no additional development on the 14th Level during 1945, although a considerable amount of maintenance and repair work was carried on, particularly in the 1410, 1420 and 1430 Crosscuts.

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7. UNDERGROUND: (CONT.)

d. Timbering:

The total cost of timbering decreased slightly in 1945 as compared with 1944 as indicated in the cost statement. The total expense of timbering was approximately $27,000.00 less in 1945. With the reduced tonnage as well as the retroactive shift differential and vacation adjustment, the cost per ton as per cost sheet was .488 in 1945 as compared with .457 in 1944. Omitting these additional charges the actual increase would probably be .015 per ton.

During 1945 there was an average of 25 mining contracts between the 13th and 14th Levels. A considerable amount of timbering was necessary to maintain the extended traveling and ventilation roads from the active sub-levels to the 13th Level drifts. Because of this concentration, traveling roads between the various mining contracts were frequently used as mining limits and in some instances it was necessary to mine to or along these connecting drifts immediately after the drifts were driven or the sub-level was opened to mining.

During the past year the practice has been to install a 16-foot sill on the hanging side of a newly cut-out raise. This sill distributes the timber pressure which heretofore had damaged the hanging portion of the various mining raises immediately below the sub-level. Where extensive weight is in evidence the raise sets are propped from the sill and experience during the past year has shown a marked reduction in the frequently costly repairs in the vicinity of raises.

Approximately 50% of the timbering on the main level drifts and in raises results from the constant deterioration of the timber. During the coming year it is planned to re-open the district timber treating plant and it will then be possible to use treated timber wherever permanent main level timbering is necessary.

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7. UNDERGROUND: (CONT.)

d. Timbering: (Cont.)

Statement of Timber Used:

	Lineal Feet	Avg. Price Per Foot	Amount 1945	Amount 1944
6" to 8" Cribbing	76,289	.0510	3,892.07	3,332.35
8" Stulls	28,674	.1161	3,329.21	9,221.59
10" Stulls	66,416	.1365	9,064.01	17,034.24
12" Stulls & Over	86,942	.1987	17,280.34	19,452.60
Total	258,321	.1299	33,565.63	49,040.78
Lagging - 7 ft.	1,884,791	.0138	25,966.34	27,907.25
Poles - 9½ ft.	1,541,344	.0217	32,630.13	31,248.32
Total 1945	3,426,135	.0171	58,596.47	59,155.57
Wire Fencing - Feet	1,650	.0633	104.40	292.86
Grand Total - 1945			92,266.50	108,489.21

	1945	1944
Product - Tons	654,447	757,677
Feet Timber Per Ton of Ore	.395	.525
Feet of Lagging Per Ton of Ore	2,880	2.698
Feet of Poles Per Ton of Ore	2.355	2.233
Feet of Lagging Per Foot of Timber	7.296	5.143
Feet of Wire Fencing Per Ton of Ore	.0025	.0061
Cost Per Ton for Timber	.0513	.0647
Cost Per Ton for Lagging	.0397	.0368
Cost Per Ton for Poles	.0498	.0412
Cost Per Ton for Wire Fencing	.0001	.0004
Total Cost Per Ton	.1409	.1431

Total Cost for Timber, Lagging, Poles, Etc.

Year	Product	Amount	Cost Per Ton
1945	654,447	92,266.50	.1409
1944	757,677	108,489.21	.1431
1943	954,990	129,718.86	.1358
1942	1,106,694	123,588.82	.1117
1941	1,033,220	96,802.32	.0937
1940	865,689	79,331.40	.0916
1939	551,362	57,608.66	.1045

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7. UNDERGROUND: (CONT.)

e. Drifting and Raising:

The following list gives a comparison of the total footage of drifting and raising for the years 1945 and 1944:

	Drifting		Raising		Grand Total
	Ore	Rock	Ore	Rock	
1945	1449	1497	987	330	4263
1944	2357	1276	1701	151	5485
Increase		221		179	
Decrease	908		714		1222

As indicated in the table above there was an increase in drifting an d raising in rock in 1945 as compared with 1944 an d a decrease in drifting and raising in ore.

f. Explosives, Drilling and Blasting:

The total cost of all explosives decreased 20% in 1945 while the product decreased 14%. The cost per ton of all explosives used during the year was .060 as compared with .065 in 1944. This reduction was the result of a newer type of tamping shell which has proved considerably more satisfactory than the conventional oiled paper envelope type. These tamping shells, which are made of heavy waxed paper, appear very similar to an actual stick of powder, being 1-1/4" in diameter and 8" long. These shells are issued from the underground powder magazines and a limited number are given out to each contract. In order to prevent the crushing of these shells regular sticks of powder are inserted in them and at the time t hey are used the cartridge is removed and the shell is filled with fine ore.

During 1945 - 347 inspections were made on 32 mining contracts of four men each, or 64 individual crews. Each crew or shift was inspected at least once every two months as to proper procedure and instructions were given to newer or less experienced miners.

With the gradual reduction of mining contracts there has been an accumulation of idle drilling equipment. At the present time this surplus amounts to approximately 19 jackhammers. There were no new RB-12 jackhammers purchased during the year.

Thefe was very little improvement in the quality of the auger drill steel resulting from the tests which were made in 1944 and early in 1945. Several special batches of steel were tested and to date little or no improvement has been shown. The use of pneumatic jacklegs has been responsible for increased breakage due to the bending action of the steel when the proper alignment is not made during the drilling operation.

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7. UNDERGROUND: (CONT.)

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

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

Year	Cost per lb. For Powder	Lbs.Powder Per Tonsof Ore	Cost Per Tom For Powder	Cost Per Ton Fuse & Caps	Total Cost
1945	.1150	.4346	.0500	.0100	.0600
1944	.1150	.4723	.0543	.0107	.0650
1943	.1150	.4918	.0566	.0115	.0681
1942	.1150	.4788	.0551	.0117	.0668
1941	.1150	.4792	.0551	.0118	.0669
1940	.1151	.4485	.0516	.0111	.0627
1939	.1176	.4584	.0539	.0113	.0652
1938	.1225	.4320	.0530	.0102	.0632
1937	.1194	.4270	.0510	.0110	.0620
1936	.1104	.4320	.0475	.0105	.0580

Statement of Explosives Used: (Ore Development & Stoping)

	Quantity	Average Price	Amount 1945	Amount 1944
Gelamite #1	273,350	11.50	31,435.24	35,983.51
60% Gelatine	11,100	11.50	1,276.50	5,169.25
Total Powder 1945	284,450	11.50	32,711.74	41,152.76
Fuse - Feet	902,109	5.18	4,677.69	5,863.71
#6 Blasting Caps	130,248	12.19	1,587.25	1,887.75
Tamping Bags	25,250	5.60	141.45	149.75
Fuse Lighters	25,000	6.75	168.80	187.70
Blasting Wire - Lbs.	8	.67	5.37	----
Total Fuse, Etc. 1945			6,580.56	8,088.91
Total Cost All Explosives			39,292.30	49,241.67
Product - Tons			654,447	757,677
Pounds Powder Per Ton of Ore			.4346	.4723
Cost Per Ton for Powder			.0500	.0543
Cost Per Ton for Fuse, Caps, Etc.			.0100	.0107
Cost Per Ton for All Explosives			.0600	.0650

Sinking, Rock Development, Etc:

Gelamite #1	8,700	11.50	1,000.50	603.75
60% Gelating				414.00
Total Powder 1945	8,700	11.50	1,000.50	1,017.75
Fuse - Feet	23,280	5.18	120.28	140.47
#6 Blasting Caps	3,240	12.20	39.50	49.43
Total Fuse, Etc. 1945			159.78	189.90
Total Cost All Explosives 1945 Rock Development			1,160.28	1,207.65
Grand Total All Explosives Used 1945			40,452.58	50,449.32
Average Price Per Pound for Powder 1945			.115	.115
Explosives Used for Stoping & Development			40,452.58	50,449.32
Explosives Used for Other Work			766.43	782.81
Total as Per Cost Sheet			41,219.01	51,232.13

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7. UNDERGROUND: (CONT.)

g. Mining and Loading:

There were no changes in 1945 in the top slicing mining method which has been practiced at the Negaunee Mine during the past 25 or 30 years. During the past three years seven stopes have been developed and mined in the segregated southwest portion of the ore body. This area lies south of the main dividing dike and away from the pressure area and the slicing operations. The product in 1945 resulted 85% from slicing and 15% from stoping. Despite the numerous dikes which have divided the stoping area, mining operations in general have been very favorable. The jasper capping is exceptionally sound and seems to hold up very well. Mining by the stoping method has brought about some dilution of lean ore where small jasper intrusions from the footwall and capping have been mined to make available the adjacent ore areas.

At the present time there are six additional small ore pillars largely in the southwest territory which can be mined by the sub-level stoping system. Only a small amount of development will be necessary to put these areas into production.

There were no changes in the scraping practices during the year. The 42-inch, box type scrapers continue to prove very satisfactory.

h. Ventilation:

The Aerodyne Fan located at the No. 2 Shaft was in continuous operation throughout 1945. A number of improvements were made in the steam heating plant which is located in the same building as the fan, particularly with respect to the unit heater pipes. During the operation of the heating plant in the previous year it was found that the return condensate was not being carried away from the heaters fast enough. In July this condition was corrected by increasing the return grade of the pipes as well as insulating and covering the main 100 H.P. boiler.

The general underground ventilation system has for the most part remained unchanged. Semi-annual inspections by the safety and engineering departments have continued to show very good results in the ventilation of the Maas and Negaunee Mines. On December third the second inspection was made in Company with a ventilation engineer from the Saranac Laboratories. At that time approximately 90,000 cubic feet per minute were entering the mine and being distributed between the 9th, 13th and 14th Levels, The air enters the 9th Level from the No. 2 Shaft. A small split ventilates four mining contracts above t he 9th Level and this air later joins the main air current which is then directed to the 13th Level through various rock drifts and raises. On the 13th Level there are five splits which distribute the air to active mining areas below the main level; each split ventilates five or six contracts and the air is then allowed to exhaust through three main openings to the Maas Mine. Each exhaust is equipped with a water curtain which cleans and cools the air. Two auxiliary 18,000 cubic foot fans are also in use on the 14th Level with one being used to ventilate the inner mining area where four mining contracts are located. The second fan serves as a booster for the ventilation entering the Maas Mine from the 1420 Crosscut. In general and despite the large number of mining contracts, the ventilation has been exceptionally good, with an average of 2,000 c.f.m. of air per mining contract.

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7. UNDERGROUND: (CONT.)

i. Pumping:

The average number of gallons of water pumped per minute during 1945 were 681, a decrease of 32 gallons per minute from the previous year's average. There is no particular explanation for this decrease inasmuch as there has not been a steady decline during the past five years.

The greatest inflow of water continues to be loacted on the 9th Level where over half the total volume enters the mine from the old abandoned northeast mining a reas. There has been a slight decrease on the 13th Level with a corresponding increase on the 14th Level resulting from the continuation of mining.

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	1945	1944	1943	1942	1941	1940
January	629	740	668	671	612	892
February	631	712	660	636	591	857
March	634	690	713	635	583	768
April	570	673	671	627	582	700
May	775	679	726	641	824*	747
June	712	787	794	659	838	678
July	720	804	843	666	602	679
August	722	805	858	662	613	685
September	717	732	849	662	612	657
October	696	654	833	667	605	644
November	685	642	860	671	629	640
December	684	634	761	675	646	618
Total Average	681	713	770	656	645	714

(*)Athens Mine water diverted to Negaunee Mine for May & June.

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

Year	Gallons Per Minute
1945	681
1944	713
1943	770
1942	656
1941	645
1940	714
1939	1015
1938	1015
1937	1069
1936	914

j. Underground in General:

The product in 1945 was 654,447 tons of ore produced by an average of 32 contracts working 12 shifts per week. The production showed a decrease of 103,230 tons as compared with 1944. It is anticipated that the product for the coming year will be considerably more reduced than the above comparison. The estimated available ore above the 9th Level amounts to 81,000 tons and the production during the past year amounted to 87,000 tons. While this comparison might indicate less than one year's life above the 9th Level, it will be likely be extended due to the reduction mining rate due to the decrease in area at the lower elevations.

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7. UNDERGROUND: (CONT.)

j. Underground in General: (Cont.)

Near the end of 1945 th e 140' Sub-level was opened to mining. This sub-level is approximately 65 feet above the 14th Level; however, it is questionable whether slicing operations can be carried on below a point 25 feet above the level. Thus three sub-levels remain to be mined, namely the 125', 140' and 115' Sub-levels. During the latter stages of this mining a considerable amount of maintenance work will be necessary as additional weight is thrown on the main level drifts where mining will be carried on 25 feet above. While the actual estimate would indicate a life of approximatelyntwo years' remaining, this will be considerably lengthened as the number of mining places are reduced with a corresponding decrease in production.

8. COST OF OPERATING:

a. Comparative Mining Costs:

	1945	1944	Increase	Decrease
Product - Tons	654,447	757,677		103,230
Underground Costs	1.414	1.361	.053	
Surface Cos ts	.143	..133	.010	
General Mine Expenses	.273	.202	.071	
Cost of Production	1.830	1.696	.134	
Taxes	.147	.151		.004
Depl. & Depreciation	.021	.150		.129
Loading & Shipping	.035	.044		.009
Adm. & Gen. Expense	.045	.051		.006
Miscellaneous Income	.008	.001	.009	
Total Cost	2.086	2.091		.005
Budget Estimate	2.169	2.192		
No. of Days Operated	301	283	18	
Total No. of Shifts	589	635		46
No. of Shifts & Hours	1 & 2-8 hr.	1, 2 & 3-8 hr.		
Average Daily Product	2,174	2,677		503

Cost of Production:

	1945	Percent	1944	Percent	Increase	Decrease
Labor	1.230	59.0	1.127	53.9	.103	
Supplies	.856	41.0	.964	46.1		.108
Total	2.086	100.0	2.091	100.0		.005

NEGAUNEE MINE
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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison:

(1) Days and Shifts:

Year	Days Mine Worked	Shifts & Hours	Men Employed	Total Shifts Worked
1945	301	1 & 2-8 hrs.	313	85,843
1944	283	1, 2 & 3-8 hrs.	411	101,539
Increase	18			
Decrease			98	15,696

(2) Wages:

There was no increase in wages in 1945. However, retroactive payment to January 1st, 1944 was made to adjust shift differential of five cent s per hour as well as to adjust the vacation pay.

(3) Comparison of Production:

Production - 1945	654,447 tons
Production - 1944	757,677 tons
Decrease	103,230 tons

(4) Comparison of Number of Men and Wages:

Year	No. of Men	No. of Days	Amount	Rate Per Day
1945	313	85,843	754,765.73	8.79
1944	411	101,539	830,467.51	8.18
Increase				.61
Decrease	98	15,696	75,701.78	

(5) Tons Per Man Per Day:

	1945	1944	Increase	Decrease
Surface	35.42	37.65		2.23
Underground	9.71	9.31	.40	
Total	7.62	7.46	.16	

(6) Cost of Production:

1945	1,197,682.96	Cost Per Ton	1.830
1944	1,284,789.87	Cost Per Ton	1.696
Increase			.134
Decrease	87,106.91		

	Labor	Percent	Supplies	Percent
1945	790,572.13*	66.0	407,110.83	34.0
1944	834,083.76	65.0	450,706.11	35.0
Increase		1.0		
Decrease	43,511.63		43,595.28	1.0

(*)Retroactive Payroll - 53,541.62 included in 1945 Costs.

8. COST OF OPERATING: (CONT.)
b. Detailed Cost Comparison: (Cont.)
(7) Detail of Accounts:

	1945	1944
Days Per Week	6	5 & 6
Shifts & Hours	1-8 13 2-8 288	1-8 26 2-8 162 3-8 95
Production - Tons	654,447	757,677
Average Daily Production-Tons	2,174	2,677
Number of Days Worked	301	283

	UNDERGROUND COSTS:	Amount	Per Ton	Amount	Per Ton
1.	Exploring in Mine	4352.79	.006	2731.79	.004
3.	Development in Rock	12042.85	.018	9486.49	.013
4.	Development in Ore	17076.78	.026	26766.73	.035
5.	Stoping	328342.95	.502	358545.59	.473
6.	Timbering	319328.78	.488	346330.13	.457
7.	Tramming	80118.40	.122	91803.99	.121
8.	Ventilation	17809.97	.027	22887.34	.030
9.	Pumping	36507.71	.056	36627.13	.048
10.	Compressors & Air Pipes	39674.65	.061	48382.87	.064
12.	Underground Superintendence	29893.26	.046	34952.52	.047
13.	Cave-in	102.15			
14.	Maint: Comp. & Power Drills	496.33	.001	1946.99	.003
15.	Scraper Equipment	17489.64	.027	22929.57	.030
16.	Electric Tram Equipment	20835.18	.032	24564.69	.032
17.	Pumping Machinery	1306.01	.002	3044.51	.004
	Total Underground Costs	925377.45	1.414	1031000.34	1.361
	SURFACE COSTS:				
18.	Hoisting	39785.63	.061	40362.50	.053
19.	Stocking Ore	11605.87	.018	11849.20	.016
21.	Dry House	13415.10	.020	13418.33	.018
22.	General Surface Expense	13106.19	.020	14496.20	.019
23.	Maint: Hoisting Equipment	6257.93	.010	7700.08	.010
24.	Shaft	3862.00	.006	4277.73	.006
25.	Top Tram Equipment	2242.20	.003	2385.43	.003
26.	Docks, Trestles & Pockets	2195.77	.003	5435.39	.007
27.	Mine Buildings	946.55	.002	1196.16	.001
	Total Surface Costs	93417.24	.143	101121.02	.133
	GENERAL MINE EXPENSES:				
	Employees Vacation Pay	35219.30	.054	21751.30	.029
28.	Insurance	4429.93	.007	5266.63	.007
29.	Mining Engineering	2935.84	.004	2643.05	.003
30.	Mech. & Elec. Engineering	2359.91	.004	2496.80	.003
31.	Analysis and Grading	16288.71	.025	20746.49	.027
32.	Personal Injury	39448.96	.060	15071.85	.020
33.	Safety Department	2000.73	.003	2217.66	.003
34.	Tel. & Safety Devices	5030.54	.008	3785.67	.005
35.	Local & General Welfare	3883.94	.006	4156.67	.005
36.	Special Exp., Pension, All.	8889.76	.014	9928.11	.013
37.	Ishpeming Office	19487.72	.030	21888.28	.029
38.	Social Security Taxes	18609.51	.028	20882.80	.028
39.	Mine Office	20303.42	.030	21833.20	.029
	Total General Mine Expenses	178888.27	.273	152668.51	.202
	COST OF PRODUCTION:	1197682.96	1.830	1284789.87	1.696
40.	Taxes	96445.01	.147	114695.60	.151

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

UNDERGROUND COSTS:

1. Exploring in Mine:

Increase due to exploratory work by Gopher Hi-Speed Drill; depth of hole No. 50 - 380 feet; depth of hole No. 51 - 591 feet.

3. Development in Rock:

Increase due to more development work in rock. Retroactive pay for 1944 and 1945 amounting to 553.96 included in labor cost.

4. Development in Ore:

Decrease due to less development work in ore. Retroactive pay for 1944 and 1945 amounting to 787.73 included in labor cost.

5. Stoping:

Expenditures decreased 30,202.64. In 1945 there were 24,079-1/4 shifts compared with 30,835 shifts in 1944. Labor cost for year 1945 amounted to 277,169.90 compared with 294,549.91 for 1944, a decrease of 17,380.01, but included in 1945 labor cost is retroactive pay for 1944 and 1945 amounting to 14,673.33. The average tons stoping in 1945 was 26.73 as compared with 23.98 in 1944.

6. Timbering:

Expenditures decreased 27,001.35. Labor cost for year 1945 amounted to 213,172.86 compared with 222,372.33 for year 1944, a decrease of 9,199.47, but included in 1945 labor cost is retroactive pay for 1944 and 1945 amounting to 11,285.35. Two HU Utility Hoists, 950.00 were charged out in 1945.

7. Tramming:

Expenditures decreased 11,685.59 due to less tonnage trammed and less shifts worked. Included in the labor cost is retroactive pay for 1944 and 1945 amounting to 3,791.18.

8. Ventilation:

Expenditures decreased 5,077.37. Included in the labor cost is 324.77 for retroactive pay for 1944 and 1945. Electric current decreased 167.21, also less drifting for ventilation.

9. Pumping:

Expenditures decreased 119.42. Included in labor cost is 654.52 for retroactive pay for 1944 and 1945. Electric current decreased 315.99.

Number of gallons pumped - 1945		357,175,529
Number of gallons pumped - 1944		375,416,897
	Decrease	18,241,368

Average number of gallons per minute - 1945	681
Average number of gallons per minute - 1944	713
Decrease	32

NEGAUNEE MINE
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YEAR 1945

8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

10. Compressors and Air Pipes:

Expenditures decreased 8,708.22. Included in labor cost is 444.23 for retroactive pay for 1944 and 1945. Electric current decreased 8,975.82.

Cubic feet air compressed - 1945	873,270,000
Cubic feet air compressed - 1944	1,165,140,000
Decrease	291,870,000

11. Back Filling:

No cost for backfilling during 1945.

12. Underground Superintendence:

Expenditures decreased 5,059.26. Included in labor cost is 1,320.11 for retroactive pay for 1944 and 1945. Two less shift bosses during 1945.

14. Compressors and Power Drills:

Expenditures decreased 1,450.66. One JB-4 Jackhammer, 205.00, charged out in 1945 compared with one CC-60 Paving Breaker, 195.75 and two Model DA-30 Drifters 1,075.11, also repairs to intercooler 305.67 charged out in 1944.

15. Scrapers and Mechanical Loaders:

Expenditures decreased 5,439.93. Wire rope used decreased 2,613.97, also less repairs to hoists and drags.

16. Electric Tram Equipment:

Expenditures decreased 3,729.51.

	1945	1944	Increase	Decrease
Locomotives	6870.24	9411.89		2541.65
Wiring	1247.39	1519.33		271.94
Tracks	8309.35	8946.50		637.15
Cars	3490.15	4290.79		800.64
Generators	918.05	396.18	521.87	
Total	20835.18	24564.69		3729.51

17. Pumping Machinery:

Expenditures decreased 1,738.50. One #7 sludge pump, 180.00, charged out in 1945. In 1944 gear and pinion for 12th Level Aldrich Pump and repairs to #2 Well pump charged out.

18.

NEGAUNEE MINE
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8. COST OF OPERATING: (CONT.)

b. Det ailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

SURFACE COSTS:

18. Hoisting:

Expenditures decreased 576.87. Included in the labor cost is 816.63 for retroactive pay for 1944 and 1945. Electric current decreased 1,446.39 a/c less tonnage hoisted.

19. Stocking Ore:

Expenditures decreased 243.33. Included in the labor cost is 474.80 for retroactive pay for 1944 and 1945. Cost of operating tram system decreased. Cost of portable trestles increased a/c of dismantling old rock trestle and building a new one.

21. Dry House Expense:

Expenditures decreased 3.23. Included in labor cost is 385.59 for retroactive pay for 1944 and 1945.

22. General Surface Expense:

Expenditures decreased 1,390.01 a/c less labor cleaning up, caring for lawn and repairing raods. Included in labor cost is 580.90 for retroactive pay for 1944 and 1945.

23. Hoisting Equipment:

Expenditures decreased 1,442.15. Included in labor cost is 175.13 for retroactive pay for 1944 and 1945. In 1945 two 1-1/4" hoisting ropes were charged out, the same as in 1944. In 1944 two 8' steel-lined head sheaves were charged out. Repairing skips increased 385.02 for 1945.

24. Shaft:

Expenditures decreased 415.73 a/c less repairs to shaft pockets. Included in labor cost is 176.42 for retroactive pay for 1944 and 1945.

25. Top Tram Equipment:

Expenditures decreased 143.23. Repairs to motors increased 207.89 and replacing sheaves and rollers increased 206.14, but less repairs to cars and tracks and less wire rope used.

26. Docks, Trestles and Pockets:

Expenditures decreased 3239.62. The steel stocking trestle was repaired in 1944 and painted in 1945.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

27. Mine Buildings:

	1945	1944	Increase	Decrease
Office	68.97	124.93		55.96
Warehouse	20.43		20.43	
Shops	91.10	231.13		140.03
Shaft House	118.38	116.88	1.50	
Eng ine House	33.88	53.32		19.44
Boiler House	140.17	36.70	103.47	
Dry House	51.88	107.55		55.67
Coal Dock & Trestle	58.76	179.75		120.99
Timber Tunnel	113.05	207.34		94.29
Miscellaneous	249.93	138.56	111.37	
Total	946.55	1196.16		249.61

GENERAL MINE EXPENSE:

Employees Vacation Pay:

Expenditures increased 13,504.00. Included in vacation pay is the retroactive vacation pay amounting to 14,831.77. Employees with a record of 5 years or more of continuous service were eligible for two weeks' vacation pay; employees with 1 year or more of continuous service were eligible for one week's vacation pay. In 1945 employees were paid for 48 hours per week compared with 43 hours for 1944.

28. Insurance:

	1945	1944	Increase	Decrease
Property	1922.77	2770.92		848.15
Group	1975.20	1940.93	34.27	
Catastrophe	531.96	554.78		22.82
Total	4429.93	5266.63		836.70

29. Mining Engineering:

Expenditures increased 292.79.

30. Mechanical and Electrical Engineering:

Expenditures decreased 136.89.

31. Analysis and Grading:

	1945	1944	Increase	Decrease
Ishpeming Laboratory Charges	10809.23	14205.01		3395.78
Shipping Dept. Expense	2820.77	3134.69		313.92
Mine Sampling	2658.71	3406.79		748.08
Total	16288.71	20746.49		4457.78

Included in labor cost for mine sampling is 112.86 for retroactive pay for 1944 and 1945.

NEGAUNEE MINE
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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

32. Personal Injury:

	1945	1944	Increase	Decrease
Compensation and Doctors	32923.95	11544.38	21379.57	
Compensation Department	651.02	721.24		70.22
Hospital Loss	5870.19	2795.13	3075.06	
Mine Charges	3.80	11.10		7.30
Total	39448.96	15071.85	24377.11	

Increase in compensation and doctors due to claims paid.

33. Safety Department:

Expenditures decreased 216.93.

34. Telephone and Safety Devices:

Expenditures increased 1,244.87 due to repairing and installing safety gates. Included in labor cost is 134.49 for retroactive pay for 1944 and 1945.

35. Local and General Welfare:

	1945	1944	Decrease
General Welfare	3191.51	3417.19	225.68
Local Welfare	692.43	739.48	47.05
Total	3883.94	4156.67	272.73

36. Special Expense, Pensions and Allowances:

	1945	1944	Increase	Decrease
Pensions	953.62	1184.95		231.33
Legal	396.28	945.87		549.59
Saranac Investigations	1799.60	2009.60		210.00
Central Employment Office	876.26	1020.20		143.94
Retirement Expense	3053.13	2978.59	74.54	
Other	1810.87	1788.90	21.97	
Total	8889.76	9928.11		1038.35

37. Ishpeming Office:

Expenditures decreased 2,400.56.

38. Social Security Taxes:

	1945	1944	Decrease
Unemployment Insurance Tax	9990.38	10671.88	681.50
Old Age Benefit Tax	7684.86	8209.79	524.93
Group Annuity	934.27	2001.13	1066.86
Total	18609.51	20882.80	2273.29

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

39. Mine Office:

	1945	1944	Increase	Decrease
Mine Office Expense	12386.99	12274.22	112.77	
Superintendence	4773.62	4631.84	141.78	
Central Warehouse	3142.81	4927.14		1784.33
Total	20303.42	21833.20		1529.78

40. Taxes:

Expenditures decreased 18,250.59

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

The ore reserves of the Negaunee Mine are for the most part definitely known, and areas other than the main ore deposits have been explored to some degree bby drifts and raises. At the present time there are seven small segregated deposits lying largely south and west of the main ore body and in a territory away from the pressure area. Several of these ore bodies must remain intact until such a time as the 13th Level ventilation and traveling drifts can be re-routed. In other words mining operations would cave that portion of the main level development in ore and therefore operations must be delayed until the final stages of mining in the Negaunee Mine. In April, 1945 exploration work was carried on west of the main No. 3 Shaft at an elevation of -70 on the 14th Level. This ore was first encountered between the 12th and 13th Level elevation during the sinking of the No. 3 Shaft. It was found to be high in sulphur, averaging over 1%, or perhaps 50 times higher as compared with the sulphur of normal Marquette Range ore. This original development was carried on in 1940 but was discontinued due to the excessive war demands for standard ore and the inability to handle non-merchantable ore along with the regular mine product.

Exploration work was continued through June, 1945 to explore the downward extent of this high sulphur deposit by drilling two horizontal holes southwesterly from the 14th Level elevation. Hole No. 50 was drilled S41-38W to a depth of 380 feet. This hole showed some lean ore and iron formation in two sections from 260 feet to 345 feet. Hole No. 51 was drilled from the same location at an angle of S60-50W to a depth of 591 feet. High sulphur ore was encountered from 380 to 545 feet with local bands of lean ore and iron formation as indicated on the following log. The weighted average sulphur for the entire exploration and development work amounted to 1.058%. The following conclusions were drawn after a careful study of the possibility of mining this high sulphur deposit: 1, the ore material is too high in sulphur to be merchantable even by mixing it wit h any normal amount of standard ore available from other areas in the property. 2, inasmuch as the major portion of the tonnage lies on and below the 14th Level it would be necessary to either sink the present No. 3 Shaft or a winze near the shaft in an effort to carry on further development and mining operations. 3, inasmuch as this ore body lies immediately under and west of the main pocket tracks on surface, a considerable portion of the estimated reserve must be left as supporting pillars.

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9. EXPLORATIONS AND FUTURE EXPLORATIONS: (CONT.)

The following table gives a detailed account of the material found in the drill holes previously mentioned:

Hole No.	Location	Dip	Direction	Material	Date Started	Date Stopped
50	14th Level	/3°	S41-38W	0 - 185 Graywacke	2/3D/45	4/25/45
				185 - 260 Soft Ore Jasper		
				260 - 300 Lean Ore		
				300 - 320 Soft Ore Jasper		
				320 - 345 Lean Ore		
				345 - 380 Soft Ore Jasper		
51	14th Level	/3°	S60-50W	0 - 373 Graywacke	4/27/45	6/11/45
				373 - 452 High Sulphur Ore		
				452 - 495 Lean Ore		
				495 - 540 High Sulphur Ore		
				540 - 591 Soft Ore Jasper		

Near the end of 1945 exploration work was being considered on the 9th Level elevation where two diamond drill holes will be extended to the northwest in an effort to explore the south limb of the syncline. During the original development of the 9th Level some ore seams and lean ore were encountered as the drift approached the ore body. It is in this area and west of the drift that exploration work will be carried on.

THE NEGAUNEE MINE COMPANY

COMPARATIVE STATEMENT OF TAXES FOR YEARS 1945 & 1944

DESCRIPTION	1945 VALUATION	1945 TAXES	1944 VALUATION	1944 TAXES
NEGAUNEE MINE:				
Including stockpile, supplies and equipment as placed by Tax Commission:				
Real Estate	$1,765,000	$74,461.64	$1,698,750(1)	$ 70,955.43
Personal Property	498,440	21,028.47	1,020,000	42,604.58
Collection Fee 1%	-	954.90	-	1,135.59
Total Operating Negaunee Mine	2,263,440	96,445.01	2,718,750	114,695.60
Rented Building	3,710	156.50	2,660	111.11
Collection Fee 1%	-	1.57	-	1.11
Total Operating Rented Buildings(2)	3,710	158.07	2,660	112.22
TOTAL NEGAUNEE MINE	2,267,150	96,603.08	2,721,410	114,807.82
MATHER MINE:				
Including stockpiles, supplies and equipt. as placed by Tax Commission				
Real Estate	1,770,000	63,608.84	1,695,000	61,001.86
Personal Property	230,000	8,265.56	105,000	3,778.88
Pipe Line "Cloverdale Tract"	350	12.57	600	21.59
TOTAL MATHER MINE (3)	2,000,350	71,886.97	1,800,600	64,802.33
JACKSON SECTION 1-47-27:				
Real Estate	500,000	21,093.95	500,000	20,884.60
Collection Fee	-	210.94	-	208.85
TOTAL JACKSON SECTION 1-47-27	500,000	21,304.89	500,000	21,093.45
TOTAL OPERATING MATHER MINE	2,500,350	93,191.86	2,300,600	85,895.78
TOTAL NEGAUNEE MINE COMPANY (4)	4,767,500	189,794.94	5,022,010	200,703.68

(1) Includes fee N-1/6 of DSS&A Right of Way (Paid by C.C.I. Co.) — Included in Negaunee Mine Valuations-Year 1945 | 43,750 | 1,845.67

(2) Detail of Rented Buildings (Includes Fee)

Lot 7B-2 (CCICo.- 1st Addition)	1,140	48.57	1,140	48.10
W½ Lot 13 (Penhale) 1944	855	36.43	855	36.06
Jackson Mine Office	665	28.33	665	28.06
Lot 3, Block 7 - Uren 1945	100	4.26	-	-
Lot 12, Block 6 - Abbot 1945	950	40.48	-	-
	3,710	158.07	2,660	112.22

(3) No. collection fee assessed by City of Ishpeming for years 1945 and 1944.

(4) Total Taxes:

City of Negaunee	2,767,150	117,907.97	3,221,410	135,901.27
City of Ishpeming	2,000,350	71,886.97	1,800,600	64,802.33
Total Taxes as above	4,767,500	189,794.94	5,022,010	200,703.60
Total Taxes Paid to Cities of Ishpeming and Negaunee	-	191,565.47	-	198,857.93
Plus: Taxes Paid by C.C.I.Co.-Charged to Negaunee Mine Company	-	-	-	1,845.67
Less: Taxes Paid by Negaunee Mine Co. charged toC.C.I. Co.	-	1,770.53	-	-
TOTAL TAXES CHARGED TO OPERATIONS		189,794.94		200,703.60

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11. ACCIDENTS AND PERSONAL INJURY:

The accident record in 1945 showed a slight improvement as compared with the previous year. The severity rate, which is the recognized basis on which accidents are comparable, was 3.557 in 1945 as compared with 1.32 in 1944. The frequency rate in 1945 was 24.58 as compared with 23.11 in 1944. These figures would appear to be less favorable than in 1944, however, the percentage was substantially increased due to an accident early in the year in which an employee lost the sight of one eye. Possibly two factors are responsible for both the increased severity and frequency rates. First, the heavy mining schedule (six days per week) which was carried on throughout the year. The second factor is the result of the concentrated mining being carried on in the main ore body where the movement of the timber mat exerts an increasing pressure on the surrounding unmined pillars and is not allowed to come to rest before mining operations are started on the next sub-level.

The slight accident record showed a considerable improvement and was reduced by approximately 12% over that of the previous year.

The following statement lists the accidents for the past five years and indicates a gradual improvement since 1943.

	1945	1944	1943	1942	1941
Fatal	0	0	1	1	1
Time Lost - Over four months	4	3	3	5	3
" " - One to four months	6	5	15	5	4
" " - Less than one month	7	11	17	16	8
Total Compensable Accidents	17	19	36	27	16
Number of cases paid compensation for accidents prior to Jan 1, 1945	10	8	8	6	4
Number of Cases being paid difference in wages (Included in above total)	2	2	1	1	0

12. NEW CONSTRUCTION: AND PROPOSED NEW CONSTRUCTION:

There was no new construction and no proposed new construction work in 1945 with no proposed new construction contemplated in the coming year.

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. General:

In September, 1945 a new Whitcomb battery locomotive was delivered at the mine for use on the various idle levels which must be maintained for ventilation openings. This locomotive can be tran sferred from one level to another by merely running it on t he cage. It is also used as a stand-by in case of breakdowns to other locomotives.

With the gradual reduction of mining contracts there is a considerable amount of surplus equ ipment, including scraper hoists and drill machines. A large number of these scraper hoists are the old, original internal clutch hoists which are for the most part obsolete. The drill machines have been kept in repair and will be used as those now in use become worn and beyond repair.

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13. EQUIPMENT AND PROPOSED EQUIPMENT:

b. Steam Shovels:

The 120-B Bucyrus-Erie electric shovel was used in the shipment of all stockpile ore during the 1945 season. The actual cost of loading shows a slight increase in 1945 due to a constant shortage of cars which resulted from the unfavorable weather conditions causing a delay at the ore docks. The shovle will be moved to the Mather Mine early in 1946 for the shipment of that ore, where the stockpiles are considerable higher and require a larger shovel for safe operation.

c. Stocking Trestles:

There were no major repairs on the permanent steel stocking trestles during the year. As previously mentioned in this report, the box girders and supporting members were painted.

The only wood trestle now in use at the Negaunee Mine extends northeast of the shaft to the rock dump. This trestle was moved to the north late in the year to allow g reater stocking capacity.

c. Scraper Hoists:

Following is a list of scraper hoists at the mine:

			1945		1944	
Company		Total Machines	Total Machines Repaired	Cost of each Mach. Repaired	Total Machines Repaired	Cost of each Mach. Repaired
Ing.-Rand	10 H.P. Elec.	2	2	279.44	1	419.94
" "	15 H.P. "	16	1	347.79	3	348.65
" "	20 H.P. "	12	2	535.80	1	299.68
" "	25 H.P. "	2	-	------	-	------
Sullivan	15 H.P. "	16	4	267.25	10	282.47
"	20 H.P. "	1	-	------	-	------
"	25 H.P. "	2	-	------	-	------
	Total	51	9		15	
Total cost repairs all scraper hoists				3,047.27		5,535.73

Two scraper ~~hoi~~ slides and one 1-H SD Ing.-Rand air hoist were scrapped a/c being obsolete.

d. Underground Tram Cars:

Repairs on all underground tram cars were carried on at the mine during 1945. Three 65 cubic foot, rocker dump cars were sold to the Princeton Mine.

e. Drill Equipment:

One JB-4 drill machine was purchased in 1945 and one RB-12 dry jackhammer was sold to the Cambria-Jackson Mine. All drill machines were kept in good repair throughout the year.

f. Haulage Tracks:

Following is a detailed cost of haulage tracks for 1945 and 1944:

	1945	1944
40-lb. Rail	135.60	326.16
Ties & Tie Plates	198.01	623.36
Total	333.61	949.52

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13. EQUIPMENT AND PROPOSED EQUIPMENT:

g. Timber Hoists:

There were two HU Utility Hoists purchased during 1945.

h. Mine Truck:

The Chevrolet hydraulic dump truck purchased in 1943 operated satisfactorily throughout 1945.

14. MAINTENANCE AND REPAIRS:

Expenditures for maintenance and repairs in the accounts listed under "Underground Costs" were $40,127.16 in 1945 as compared with $52,485.76 in 1944, a decrease of $12,358.60. The cost per ton was .062 for 1945 as compared with .069 for 1944.

The following is a list of purchases and repair costs for 1945 and 1944:

Purchases	1945	1944	Increase	Decrease
1 JB-4 Drill Machine	205.00	1270.86		1065.86
1 #7 Air Sludge Pump	180.00		180.00	
67,062' Wire Rope for Scrapers	6420.77	9034.74		2613.97
1 Cameron Pump		40.00		40.00
Total Purchases	6805.77	10345.60		3539.83
Repairs to:				
Compressors & Air Lines	291.33	676.13		384.80
Scraper Hoists and Scrapers	11068.87	13894.83		2825.96
Generators	918.05	396.18	521.87	
Locomotives	6870.24	9411.11		2540.87
Wiring	1247.39	1519.33		271.94
Tracks	8309.35	8947.28		637.93
Cars	3490.15	4290.79		800.64
Pumping Machinery	1126.01	3004.51		1878.50
Total Repairs	33321.39	42140.16		8818.77
Grand Total	40127.16	52485.76		12358.60

Decrease due to less drill machines purchased, less wire rope used for scrapers, less repairs to scrapers and drags, locomotives and cars and pumping machinery.

Expenditures for maintenance and repairs in accounts listed under "Surface Costs" amounted to $15,504.45 in 1945 as compared with $20,994.79 in 1944, a decrease of $5,490.34. The cost per ton was .024 in 1945 as compared with .027 in 1944, a decrease of .003 per ton.

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14. MAINTENANCE AND REPAIRS: (CONT.)

The following is a list of repair costs for 1945 and 1944;

	1945	1944	Increase	Decrease
2 New Hoisting Ropes	1296.11	1249.00	47.11	
Sheaves	312.67	1757.00		1444.33
Repairs to Hoists	749.35	1333.03		583.68
Repairs to Skips, Cages	3561.48	3176.46	385.02	
Repairs to Shaft	3862.00	4277.73		415.73
Repairs to Top Tram Motors	246.73	38.84	207.89	
Repairs to Tracks & Cars	297.76	555.26		257.50
Wire Rope, Sheaves, Rollers	2036.03	1975.92	60.11	
Rep. to Permanent Trestles	1649.53	4559.39		2909.86
Repairs to Pockets	546.24	876.00		329.76
Repairs to Mine Buildings	946.55	1196.16		249.61
Total	15504.45	20994.79		5490.34

Decrease due to two 8-foot steel lined head sheaves and repairs to steel stocking trestles charged out in 1944.

15. POWER:

Following is a detail of electric current purchased in 1945 and 1944 and the distribution of charges to various accounts and other data:

	1945 - 12 Months Optg.		1944 - 12 Months Optg.	
	Cost	Per Ton	Cost	Per Ton
Stoping	2880.00	.0044	2880.00	.0038
Timbering	120.00	.0002	120.00	.0002
Compressors	28134.75	.0430	37110.57	.0490
Ventilation	6054.78	.0093	6221.99	.0082
Pumping	23270.89	.0355	23586.88	.0311
Hoisting	23484.86	.0358	24931.25	.0329
Stocking Ore	248.25	.0004	271.52	.0004
Dry House Expense	1160.88	.0018	1025.91	.0014
Tel. & Safety Devices	1380.00	.0021	1367.00	.0018
Mine Office	98.87	.0002	101.63	.0001
Electric Haulage	8909.03	.0136	9738.10	.0128
Shops	761.40	.0012	678.37	.0009
District Carpenter Shop	12.90	----	9.19	----
Surface Lighting	257.40	.0004	318.36	.0004
Total	96774.01	.1479	108360.77	.1430

Main Line Meter - K.W.	7,347,200	8,355,706
Separate Meter Readings - K.W.	7,243,449	8,070,766
Line Loss - K.W.	103,751	284,940
Product - Tons	654,447	757,677
K.W. Per Ton (Inc. Line Loss)	11.23	11.03
Cost Per K.W. (Avg. for Year)	.01443	.01402
15 Min. Demand - K.W. (Avg. for Year)	1619	1,705
Load Factor - K.W. " " "	50%	55%

NEGAUNEE MINE
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17. CONDITION OF PREMISES:

a. Mine Grounds:

The grounds around the mine were kept in good condition throughout the year. During the winter months all roads and parking lots were kept free of snow.

b. Negaunee Mine Houses:

At present there are six houses owned by the Negaunee Mine Company. The cost of repairs to all houses amounted to $1,606.08, and the revenue from rents was $1,116.00.

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	1945	Per Cent	1944	Per Cent
Finnish	147	49.5	158	49.6
English	56	18.9	55	17.3
Italian	34	11.4	38	11.9
Swedish	20	6.7	23	7.2
French (Canadian)	19	6.4	24	7.5
Austrian	10	3.4	10	3.2
Norwegian	3	1.0	3	.9
German	2	.7	1	.3
Danish	1	.3	2	.6
Belg ian	2	.7	2	.6
Irish	1	.3	1	.3
Polish	2	.7	2	.6
Total	297	100.0%	319	100.0%

	American Born		Foreign Born	
As to Birth	1945	1944	1945	1944
Finnish	89	95	58	63
English	45	44	11	11
Italian	17	19	17	19
Swedish	15	18	5	5
French (Canadian)	18	23	1	1
Austrian	8	8	2	2
Norwegian	3	3		
German	2	1		
Danish	1	2		
Belgian	2	2		
Irish	1	1		
Polish	2	2		
Total	203	218	94	101
	68.4%	68.3%	31.6%	31.7%

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3/14/46

NORTH JACKSON MINE
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1. GENERAL:

There was no work carried on at this idle property in 1945. These open pits have been inactive for the past 37 years.

6. SURFACE:

The fences around the open pits were inspected early in the summer and necessary repairs were made.

a. Buildings:

(1) Jackson House #1 - (Old Jackson Mine Office Building)

The four apartments in this building were occupied throughout the year. The rear apartment on the ground floor was repaired and made ready for a new tenant during March, 1944. The front downstairs apartment was also redecorated and painted during the summer. In the two other remaining apartments minor improvements were made and the tenants were supplied with necessary paint for redecorating. The total expenditure amounted to $387.00.

(2) Jackson House #2 - (Penhale Property)

The repairs and improvements to this property included work which was originally planned for 1944 but was carried over into the past year. These repairs amounted to $384.00.

(3) Jackson House #3 - (Uren Property)

This property was purchased in 1945 for $3,800.00 and during the late summer some redecorating and outside work was done and the house was occupied in November.

(4) Jackson House #4 - (Abbott Property)

This property was purchased by the Company in 1945 for $4,500.00 and a considerable amount of repair work was necessary before the house could be occupied. The total cost of improvements amounted to $455.00, being made to the exterior as well as redecorating the interior. The property was occupied in October, 1945.

(5) Jackson House #5 - (Toms Property)

This property was purchased in December of 1945 for $3,500.00. By the end of the year the owner was still occupying the building and it is quite evident that some improvements must be made before the house can be occupied after being vacated.

10. TAXES:

	1945		1944	
	Valuation	Taxes	Valuation	Taxes
47% of realty as described in Sec. 1-47-27	235,000.00	9,914.16	235,000.00	9,815.76
Collection Fees		99.14		98.16
Total	235,000.00	10,013.30	235,000.00	9,913.92

NORTH JACKSON MINE
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10. TAXES: (CONT.)

Rented Buildings:

	1945		1944	
	Valuation	Taxes	Valuation	Taxes
Old Jackson Office - #1	665.00	28.05	665.00	28.05
Penhale Property - #2	855.00	36.07	855.00	36.07
Uren Property - #3	100.00	4.22		
Abbott Property - #4	950.00	40.08		
Total	2,570.00	108.42	1,520.00	64.12
Collection Fee		1.08		
Grand Total	2,570.00	109.50	1,520.00	64.12

Total Negaunee Mine Company 1945:

237,570.00 10,122.80

Taxes increased due to the higher tax rate in the City of Negaunee.

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3/20/46

SOUTH JACKSON MINE
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1. GENERAL:

There was no change in conditions at this idle property in 1945.

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-& Southwest of Lucy Pit	3,000 "
Total	43,000 "

Below present pit and above drainage tunnell 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	354,226 "

c. Estimated Analysis:

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

6. SURFACE:

The fences around the open pits and shafts were inspected and in some instances it was possible to fill up several old shafts and holes which were a hazard. It was also necessary to re-locate some of the fencing on the north side of the property.

10. TAXES:

	1945		1944	
	Valuation	Taxes	Valuation	Taxes
53% of realty as described in Sec. 1-47-27	265,000.00	11,179.79	265,000.00	11,068.84
Collection Fees		111.80		110.69
Grand Total	265,000.00	11,291.59	265,000.00	11,179.53

Taxes increased due to the higher tax rate in the City of Negaunee. The increase per hundred dollars of valuation in 1945 as compared with 1944 was .04, the rate being 4.18 in 1944 and 4.22 in 1945.

WRA/jl - 3
3/20/45

SECTION ONE
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EXPLORATORY DRILLING

Operations in Section 1,47-27 during 1945 were confined to surface diamond drilling in the north half of the section. 7804 feet were drilled, of which 338 feet were in first class ore.

A summary of the footage drilled, ore encountered and the cost of drilling in Section 1 since drilling operations were resumed in April, 1943 is as follows:

Year	Feet Drilled	First Class Ore Feet	Second Class Ore Feet	Lean Ore Feet	Total Cost	Average Cost Per Foot
1943	1788	220	2	9	$18,133.66	$ 10.14
1944	5348	190	10	108	47,191.97	8.82
1945	7804	338	58	140	54,927.16	7.04

The high cost in 1943 was influenced largely by the difficulty in Hole #136. The ground near the bottom of the hole was badly broken and considerable caving interfered with progress. This finally resulted in stopping the hole in ore before the footwall slate had been reached. The footage of ore encountered, however, was satisfactory and approximately the amount anticipated. Further difficulty developed in recovering the casing from the hole, thus adding to the cost.

During 1944 and 1945 considerable experimental work was carried on to determine the most efficient and economical mechanically-set Bortz bits. This work resulted in progressively decreasing the bit costs over the period. Two other factors in the lower cost in 1945 as compared to 1944 were (1) better drilling conditions generally, and (2) more direct supervision. An Assistant Drill Foreman was added to the staff in 1945.

Of the 7804 feet drilled in 1945, 2560 were drilled in the area chosen as a possible location for a deep shaft, mine buildings, stockpile ground, etc. Hole #141 was drilled to a depth of 1775 feet and hole #143 was at a depth of 785 feet from surface at the end of the year.

The balance of the drilling, 5244 feet, in 1945 was concentrated on a North-South meridian approximately 130 feet East of the West boundary of the section. Holes #140 and #142 were drilling in this area as the first of several holes planned to explore the ground on the west side of a major cross-fault striking northwest-southeast. The ground east of this fracture has been faulted down. Higher up the dip this block contained ore mined in the Cambria and Jackson properties to the north. The ground on the west, or upside, of the fault is barren in the Cambria and Jackson properties, and as far south as Hole #140. Hole #142, however, encountered 206 feet of high grade ore in six separate runs. These ore occurrences varied from a minimum thickness of 9 feet to a maximum of 101 feet. This is a most encouraging discovery, and the ore may have a direct connection with the ore encountered in surface drilling at the Mather Mine 1200 to 1900 feet to the west.

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EXPLORATORY DRILLING (Cont.)

A more detailed description of the holes drilled during the year follows:

Drilling from the surface on the N½ of Section 1 was continuous throughout the year with two drill rigs being employed. Two holes, Nos. 139 and 140, which were started the latter part of 1944, were completed. Hole No. 141 was completely drilled and Nos. 142 and 143 were partially drilled. The total footage of this exploration during the year was 7,804'. All holes were drilled vertically and 338' of high grade ore was developed.

Hole #139 was located on the 7800 W. meridian, which is approximately 150' West of the North-South center line of the Section. Its position is about 470'South of Hole #137 and 730' North of Hole #136. The purpose was to define the geologic structure between these holes and, if possible, to determine the relationship of the ore in each of them. No. 139 was drilling in typical soft ore jasper at a depth of 1268' on the first of the year. It encountered two runs of high grade ore and was finally bottomed in footwall Siamo slate at a depth of 2479' on April 21st. The ore was as follows:

From	To	Amount	Iron	Phos.	Sulphur
2002	2049	47'	60.75	.071	.019
2210	2275	65'	57.67	.082	.016

Hole No. 140 was located on the 10200 W. meridian, approximately 130' East of the West boundary of the Section and 1250' South of the Northwest corner. It was the first of several holes planned to be drilled on this meridian to explore the West side of the Section for favorable geologic structures and possible high grade ore bodies. Such ore may be either extensions of known occurrences some distance to the East and West, or entirely independent ore bodies. There is a major fault striking Northwest and Southeast that passes to the East and relatively close to this hole, which may have influenced mineralizing solutions, resulting in the concentration of ore not far above the footwall slate. This fault, we believe, is an extension of the main fracture which has played an important part in the allocation of the Cambria ore bodies. The hole was drilling in typical soft ore jasper at a depth of 1112' on the first of the year and was bottomed in footwall Siamo slate at 2375' on April 30th. Several seams of enrichment were encountered between 1961' and 2238', ranging in iron content from 45% to 54%. Although no high grade ore was encountered, the geological data obtained is of important value to us in getting a clear idea of the structure along this meridian.

Hole #141 was located on the 7200 W. meridian approximately 550' South of the North line of the Section. The purpose of the hole was to continue the study of a feasible location for a deep shaft through which to mine the large bodies of ore indicated on this section by the drilling to date. Drilling commenced on June 21st and the hole was bottomed in Siamo footwall slate at a depth of 1775' on October 4th. High grade ore was encountered from 1571' to 1593'. The top 11', from 1571' to 1582', averaged 61.47% Iron, .090% Phos., and .504% Sulphur.

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EXPLORATORY DRILLING (Cont.)

The lower 11' averaged 59.89% Iron, .245% Phos., and .020% Sulphur. This run of ore, while not of commercial importance in itself, may be the upper and thinning extension of ore in merchantable quantity to the South. The high sulphur content of the upper 11' very likely is a local condition at this particular horizon.

After the completion of Hole No. 140, the drill was moved to No. 142 on the same meridian, and approximately 1000' due South of the former hole. It is being drilled to continue our studies of the geologic structureson this meridian and in search for high grade ore on the West side of the Northwest-Southeast fault mentioned in discussing Hole No. 140 above. Drilling commenced on May 15 and the hole had reached a depth of 2770' on the last of the year. It was drilling in high grade ore at that time. Several runs of good ore were encountered in this hole as follows:

From	To	Amount	Iron	Phos.	Sulphur
2232	2243	11'	64.00	.022	.013
2252	2261	9'	58.62	.014	.010
2517	2530	13'	61.67	.175	.016
2559	2660	101'	61.44	.091	.010
2670	2730	60'	57.34	.119	.020
2758	2770	12'	60.49	.204	.019

Undoubtedly the above ore extends westward onto Mather Mine property in Section 2, and may have an important connection or relationship with the deep ore in surface holes 27A and 40 on the Mather.

Hole #143 is located on the 7200 W. meridian, 400' due North of Hole No.141 and approximately 150' South of the North line of the Section. The purpose of this hole is to find out whether the ore encountered in Hole No. 141 extends up the dip, and, if so, whether it has a mineable thickness. Both holes 141 and 143 are in the area being considered as a location for a deep shaft, surface equipment and stockpile grounds to serve the deep ore on Section 1. Hole No. 143 is the sixth hole to be drilled within the area. Drilling commenced on October 26th and the hole was drilling in typical soft ore jasper at a depth of 785' on the last of the year. No high grade ore had been encountered.

ORE RESERVES:

No tonnage estimate of the ore encountered in surface diamond drilling has been made except by the Michigan State Tax Commission for valuation purposes. A total of 1135feet of first class ore has been encountered in all the drilling in Section 1, exclusive of the Jackson Strip, and the reserves are thought to be very large.

There is some silicious ore remaining in the old South Jackson open pit. These reserves are estimated as follows:

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ORE RESERVES (Cont.)

Above present pit and available by open pit mining:

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

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 tons
GRAND TOTAL	354,226

The estimated natural analysis of these reserves is:

Iron	Phos.	Silica	Alum.	Mang.	Lime	Mag.	Sulphur	Loss	Moist.
34.55	.066	36.00	1.42	2.00	.435	.175	.010	2.00	7.00

There is no estimated ore reserve remaining in the old North Jackson Pit. These pits have been inactive for the past 37 years.

Fences around the open pits were inspected and repaired during the year and some old shafts and holes were filled. Some fencing on the north side of the South Jackson pit was relocated.

TAXES

A comparison of Real Estate Taxes assessed against the Section 1 property for the years 1945 and 1944 is as follows:

	1945		1944	
	Valuation	Taxes	Valuation	Taxes
Section 1	$500,000	$21,304.89	$ 500,000	$21,093.45
Rented Buildings	2,570	109.50	1,520	64.12
Total	$502,570	$21,414.39	$ 501,520	$21,157.57

All of Section One is in the City of Negaunee, and the tax rates have been increasing annually. The approximate rates for the past five years have been:

1941	$3.32
11942	3.27
1943	3.81
1944	4.18
1945	4.22

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TAXES (Cont.)

The increase in the valuation and taxes of Rented Buildings was due to the purchase of two houses during 1945. The purchase of a third house was authorized during the year, but the actual purchase was not consummated until early in 1946.

FUTURE PLANS:

Article V, Section A of the Sections One and Two Operating Agreement of January 2, 1940, states in part as follows: "Negaunee will also conduct drilling and other exploratory operations on the Section One Property until it shall have located a site for a mine shaft and upon and subject to the location of such site will commence sinking a shaft on said property not later than 1948 and have the same complete and ready for operation by December 31, 1952".

Present plans contemplate continuance of the surface diamond drilling program with at least one drill during the greater part of 1946. Hole No. 142 will be wedged and drilled to the North and to the South in an effort to get an idea as to the extension of the ore found in that hole. A hole will also be drilled to an estimated depth of 2500' approximately mid-way between Holes #137 and #140. This proposed Hole (No.144) is to test for possible ore tributary to the Mather Mine Sixth Level extended.

With regard to the development of a shaft on Section 1, it is our present feeling that this project be started in 1947. The present plan contemplates extending the 6th Level drift at the Mather Mine over to the proposed shaft site on Section One. The initial opening for the shaft is planned to be put down by a bore-hole method to the depth of the extended 6th Level, approximately 2200' from surface, and possibly raise a portion of this distance if it is found that the bore hole cannot be practically put down the full 2200'. It is then planned that the bore hole be stripped to full shaft size and the shaft sunk 750' further to the 2950' below surface with standard sinking equipment.

The whole project of the development of a shaft on Section 1 is being studied and plans formulated. It is expected that during 1946 recommendations for the initial work to be undertaken in the development program will be submitted for approval.