

GAMBRIA-JACKSON MINE
ANNUAL REPORT
YEAR 1943

8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

UNDERGROUND COSTS:

1. Exploring in Mine: \$3,168.21 Cost per ton .022
Covers the cost of 628 feet of diamond drilling in the mine, balance is proportion of Geological Department Expense.
3. Development in Rock: \$1,664.28 Cost per ton .007
This charge covers cost of drifting and raising in rock not charged to E. & A. CC-119. It was incurred in the process of mining.
4. Development in Ore: \$5,750.55 Cost per ton .039
The expenditures in this account for raising and drifting were charged directly to operating cost and not taken up on E. & A. CC-119. They were incurred in the mining areas, to provide ventilation, travelling roads in the short raises and drifts required in mining by the sub-level caving system.
5. Stopping: \$108,920.54 Cost per ton .738
The expenditures in this account and the cost per ton was high due to many factors among which were the change in the system of mining, delays due to accidents to equipment, and the small product.
6. Timbering: \$79,816.68 Cost per ton .541
The cost per ton in this account is above normal for this mine and was due largely to the small product and the change in the system of mining. It was also high on account of the increase in cost of timber, lagging and poles and to charging out the cost and sawing of the undersized timber in the timber yard into slabs.
7. Tramming: \$36,095.47 Cost per ton .244
The expense in this account is above normal due mainly to the small product.
8. Ventilation: \$3,460.26 Cost per ton .023
This account covers cost of operating the fan of 20,000 cubic feet per minute capacity on the Sixth Level and auxiliary fans, also ventubes.
9. Pumping: \$16,717.32 Cost per ton .113
7 Months 1943 134,676,000 gallons pumped 439 gallons per minute
The cost per ton is high due to the small product.
10. Compressors & Air Pipes: \$16,889.55 Cost per ton .114
The cost per ton is high due to the small product.
11. Back Filling: \$86.40 Cost per ton .001
Expense in this account incurred in breaking jasper capping for filling.
12. Underground Superintendence: \$5,978.55 Cost per ton .040
The cost in this account was higher due to retaining the former mine Captain for three weeks and the underground foreman for a month after the change in management took place. The cost per ton is high due to the small product.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

UNDERGROUND COSTS: (CONT.)

14. Maintenance--Comp. & Power Drills: \$906.76 Cost per ton .006

Charges to this account are relatively low due to purchase of new drill machines that were charged to E. & A. CC-119. The main expense in the seven months of 1943 was for repair of drill machines.

15. Maintenance--Scraper Equipment: \$7,177.94 Cost per ton .049

The new scraper hoists purchased were charged to E. & A. CC-119. Nearly one-half of the above charge was for 3/8 and 1/2 inch rope, \$3,200.01, the balance was mainly for repair of scraper hoists, head and snatch blocks and the cost of making fifteen scrapers.

16. Maintenance--Elec. Tram Equipt. \$8,740.83 Cost per ton .059

Expense in this account was heavy due to repair of locomotives, tram cars and tracks. Detail of charges as follows:

	<u>1943</u>
Locomotives	\$1,525.23
Wiring	443.88
Tracks	3,651.05
Cars	2,304.69
Generators	815.98
Total	<u>\$8,740.83</u>

17. Maintenance--Pumping Machinery: \$1,829.65 Cost per ton .012

The cost for maintenance of this equipment was quite reasonable as more attention had been given it by the former management.

SURFACE COSTS:

18. Hoisting: \$14,029.37 Cost per ton .095

Cost for current was \$6,898.40, the balance or \$7,130.97 was for labor, oil, lights and heat. The cost per ton is high account of the small product.

19. Stocking Ore: \$10,025.35 Cost per ton .068

The expense in this account is high due to use of wood stocking trestles. Material for the two trestles was purchased and had to be framed and one of the trestles erected in 1943. There was also expense for dismantling the old trestle used by the Republic Steel Corporation prior to the transfer. Expense will decrease next year as much of the new material purchased this year for the stocking trestles can be used for several years. The cost per ton is high due to the small product.

21. Dry House: \$8,984.01 Cost per ton .061

Expense is quite ^{high} in this account due to repair of the automatic stoker, (Iron Fireman), to an extra fireman to fire the temporary heating boiler set up outside the dry while the regular heating boiler was being repaired. Labor expense decreased in November and December when the Iron Fireman was in commission as one dry man was taken off the job (on the mid-night shift). Actual expense per month averaged over the next year will be less.

22. General Surface Expense: \$6,975.74 Cost per ton .047

Expense in this account is high due to charges that will not be repeated in the future. They were due to the excessive amount of clean-up work necessary on all parts of the property.

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8. COST OF OPERATING: (CONT.)

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

SURFACE COSTS: (CONT.)

23. Maintenance: Hoisting Equipment: \$3,958.61 Cost per ton .027
There were no hoisting ropes charged out in the seven months' operation. The above expense was incurred in repairs to electric hoists, skips and skip roads, for new steel liners for head sheave in shaft house and for eight roller bearing rubber-lined pully stand sheaves.
24. Maintenance--Shaft: \$758.88 Cost per ton .005
There was relatively little expense in this account as more important work was given attention first. Expense in 1944 will be much greater as some repairs must be made in the shaft. Repair of casing plank, etc.
25. Maintenance--Top Frame Equipment: \$2,042.26 Cost per ton .014
The expense in 1943 was almost entirely for repairs to the two larry cars. Due to delay in obtaining repair parts the overhaul job is not yet completed.
26. Docks, Trestles and Pockets: \$1,782.12 Cost per ton .012
This charge covers the cost of building five bents of permanent trestle across the pocket tracks. In order to cross this track it was necessary to build a steel trestle as the span was too long to be bridged by wood stringers. Four concrete piers were built as bases for four steel legs which carried the steel members across the track. Wood stringers were bolted to the steel members to carry the top tram track. The expense of rebuilding the loading pockets at the shaft is included in E. & A. CC-119.
27. Mine Buildings: \$44.61 Cost per ton .000
Charges to this account were nominal as the alteration and repair of buildings as also the cost of new buildings was charged to E. & A. CC-119.

GENERAL MINE EXPENSE:

- Employees Vacation Pay: \$1,532.57 Cost per ton .010
On account of the change in management vacation pay was pro-rated between the two companies and as most of the expense was paid by the Republic Steel Corporation, the men were paid according to Republic Steel Corporation Vacation plan. Their plan is somewhat different from the Cleveland-Cliffs Iron Company plan. In future years the men entitled to vacation pay will be paid on the Cleveland-Cliffs Iron Company plan.
28. Insurance: \$1,356.91 Cost per ton .009
The buildings were inspected and values for insurance purposes set by the appraisers for the companies that carry the insurance at all of the Cleveland-Cliffs Iron Company mines. Detail of charges as follows:
- | | |
|-------------|-----------------|
| | 1943 |
| Property | \$215.60 |
| Group | 942.98 |
| Catastrophe | 198.33 |
| Total | <u>1,356.91</u> |
29. Mining Engineering: \$2,564.12 Cost per ton .017
This charge covers the cost of surveys in the mine, plumbing the shaft, and engineering work on surface during the seven months' period the property has been operated by The Cleveland-Cliffs Iron Company.

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8. COST OF OPERATING: (CONT.)

b. Detailed Cost Comparison: (Cont.)

(7) Detail of Accounts: (Cont.)

GENERAL MINE EXPENSE: (CONT.)

30. Mechanical and Electric Engineering: \$1,091.04 Cost per ton .007
The expense in this account was incurred by men in these two departments who inspected equipment on surface and underground and supervised the many repairs undertaken since June.
31. Analysis and Grading: \$6,421.06 Cost per ton .043
- | | |
|------------------------------|----------|
| Ishpeming Laboratory Charges | 4,735.38 |
| Shipping Department Expense | 960.82 |
| Mine Sampling | 724.86 |
- There were 12,407 determinations made of mine samples and 860 determinations of diamond drill sludge and cores. The cost per determination was \$0.35693.
32. Personal Injury: \$4,551.35 Cost per ton .031
The detail of charges to this account were as follows:
- | | |
|--------------------------|----------|
| Compensation and Doctors | 4,346.60 |
| Compensation Department | 204.75 |
| Total | 4,551.35 |
33. Safety Department: \$607.26 Cost per ton .004
The charges to this account were normal.
34. Telephones and Safety Devices: \$1,201.60 Cost per ton .008
The charges to this account were incurred in the following sub accounts: Lights at shaft and levels, mine telephones, safety gates, sign boards and signals, and fire equipment.
35. Local and General Welfare: \$1,428.94 Cost per ton .010
The detail of charges to this account were as follows:
- | | |
|------------------|----------|
| General Welfare | 1,178.07 |
| District Welfare | 250.87 |
36. Special Expense, Pensions & Allowances: \$2,448.12 Cost per ton .017
The detail of charges are as follows:
- | | |
|------------------------|--------|
| Pensions | 465.49 |
| Legal | 128.43 |
| Retirement Expense | 825.63 |
| Saranac Investigations | 713.80 |
| Central Emp. Office | 314.77 |
37. Ishpeming Office: \$6,279.25 Cost per ton .043
38. Social Security Taxes: \$5,820.24 Cost per ton .039
The detailed charges in this account were as follows:
- | | |
|---------------------|----------|
| Unemployment Tax | 3,289.86 |
| Old Age Benefit Tax | 2,530.38 |
39. Mine Office: \$12,091.96 Cost per ton .082
40. Supply Inventory Adj.: \$84.80 Cost per ton .001

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

41. <u>Taxes:</u>	\$25,889.43	Cost per ton .175
The taxes on the realty and personal property was divided between the two companies as follows:		
	Republic Steel Corporation	\$20,356.91
	Cleveland-Cliffs Iron Company	25,889.43
	Total Taxes	<u>46,246.34</u>

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

Since taking over the mine on June 1st a number of holes have been drilled with a diamond core drill in the mine in an effort to locate extensions of the known ore bodys. The equipment turned over to the Company by the Republic Steel Corporation included a Sullivan #6 Air Driven Diamond Core Drill and accessories. This is a very valuable acquisition as it provides the mine the equipment for testing the formations to depths of several hundred feet. It will eliminate the chance of overlooking ore in areas adjacent to the proven ore bodies and also in unexplored areas within limits of the capacity of this drill.

A record of the cost of drilling is given in the following tables, also the log of each hole:

<u>Drilling Cost:</u>	
Labor	\$890.10
Supplies	228.75
Bortz	<u>1,086.24</u>
Total	2,205.09

<u>Overhead Expense:</u>	
Analysis	291.35
Geological	<u>100.83</u>
Total	392.18

Grand Total \$2,597.27

<u>D. D. Hole No.</u>	<u>Depth</u>	<u>Cost</u>	<u>Cost Per Foot</u>
154	100	\$268.78	2.69
155	147	410.19	2.79
156	87	348.48	4.01
140	34	346.78	10.20
157	248	1,065.48	4.30
158	12	<u>157.56</u>	<u>13.13</u>
Total	628	2,597.27	4.14

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9. EXPLORATIONS AND
FUTURE EXPLORATIONS:

<u>D. D. Hole No.</u>	<u>Location</u>	<u>Dip</u>	<u>Direction</u>	<u>MATERIAL</u>	<u>Date Started</u>	<u>Date Stopped</u>
154	/300 Sub-Level	0°	S85E	0- 16 - Ore 16- 20 - Ore 20- 30 - Lean Ore 30- 44 - Ferruginous Dike 44- 65 - Soft Ore Jasper 65- 74 - Lean Ore 74- 88 - Ore 88- 95 - Lean Ore 95-100 - Soft Ore Jasper	7/3/43	7/15/43
155	/300 Sub-Level	0°	N74E	0- 11 - Ore 11- 15 - Lean Ore 15- 20 - Hard Blue Jasper 20- 25 - Ore 25- 55 - Ore 55- 79 - Ferruginous Dike 79- 96 - Ore 96-147 - Ore	7/16/43	8/6/43
156	/300 Sub-Level		S300	0- 80 - Ore 80- 87 - Dike	8/18/43	8/24/43
140	/300 Sub-Level	0°	S297	82- 86 - Ore 86- 97 - Hard Blue Jasper 97-110 - Ore 110-116 - Hard Blue Jasper	8/26/43	9/11/43
157	/200 Sub-Level	0°	S10E	0- 9 - Ore 9-29 - Dike 27-30- Soft Ore Jasper 30-35 - Lean Ore 35-63 - Ore 63-65 - Lean Ore 65-80 - Hard Blue Jasper 80-84 - Ferruginous Dike 84-119 - Hard Blue Jasper 119-125 - Dike 125-248 - Hard Blue Jasper	9/17/43	10/21/43
158	/200 Sub-Level	0°	S54W	0- 5 - Ore 5-12 - Hard Blue Jasper	10/25/43	10/30/43

THE CLEVELAND-CLIFFS IRON COMPANY

STATEMENT SHOWING EXPENDITURES ACCOUNT E & A NO. CC-119

DEVELOPMENT AND PLANT AND EQUIPMENT - CAMBRIA-JACKSON MINE

	<u>AMOUNT</u> <u>AUTHORIZED</u>	<u>DECEMBER - 1943</u>			<u>TOTAL</u> <u>TO DATE</u>	<u>UNEXPENDED</u>
		<u>LABOR</u>	<u>SUPPLIES</u>	<u>TOTAL</u>		
DEVELOPMENT:						
Ore and Rock Drifting 2000' @ 20.00	\$40,000.00	\$1,226.32	\$417.73	\$1644.05	\$9,874.58	\$30,125.42
Ore and Rock Raising 2500' @ 15.00	37,500.00	1,455.04	2,485.31	3940.35	11,565.10	25,934.90
Inc. Stockpile Cap.	8,000.00				1,048.46	6,951.54
Grading Pocket Tracks, Surface	500.00					500.00
Drainage	500.00	117.19	12.47	129.46	1,381.07	881.07
Line U.G. Pockets	1,000.00				174.75	825.25
Gen. Improvements	2,000.00				189.23	1,810.77
TOTAL	89,500.00	2,798.55	2,915.51	5,714.06	24,233.19	65,266.81
10% for Contingencies	8,950.00					8,950.00
TOTAL DEVELOPMENT	98,450.00	2,798.55	2,915.51	5,714.06	24,233.19	74,216.81
PLANT & EQUIPMENT:						
6-20 H.P. Double Drum Hoists	\$8800.00		\$1458.00	\$1458.00	\$1458.00	\$7342.00
2-25 H.P. " " "	3650.00		1840.00	1840.00	3680.00	30.00
14 Holcomb Scrapers	3000.00		261.81	261.81	294.02	2705.98
12 Utility Hoists	5750.00				5700.00	50.00
2 Stoper Drills, Wet	450.00				734.89	284.89
12 Auger Drills	2500.00				2406.72	93.28
1 Vent. Fan, Installed	2850.00					2850.00
2 Vent. Air Lock Doors Installed	1000.00					1000.00
Modernizing Elec. Wiring	4500.00	65.14	226.00	291.14	4157.92	342.08
Repair Steel Headframe & Enclose From Shaft Collar	3000.00	797.38	1264.10	2061.48	3202.67	202.67
Repair Cages & Skips	2500.00	186.11	37.12	223.23	2825.86	325.86
Alterations to Surface Buildings	2500.00	1849.06	2124.64	3973.70	18279.78	15779.78
Repair Underground Loco- motives	2000.00	355.53	193.53	549.06	4141.94	2141.94
TOTAL	42500.00	3253.22	7405.20	10658.42	46881.80	4381.80
10% for Contingencies	4250.00					4250.00
TOTAL PLANT & EQUIPMENT	46750.00	3253.22	7405.20	10658.42	46881.80	131.80
SOCIAL SECURITY TAXES			258.18	258.18	735.86	735.86
GRAND TOTAL	145200.00	6051.77	10578.89	16630.66	71850.85	73349.15

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10. TAXES:

	<u>1943</u> <u>Valuation</u>	<u>1943</u> <u>Taxes</u>
<u>Cambria Realty: (State Tax Commission)</u>		
Sl/2 of SE1/4 of Sec. 35-48-27 (
Lots 7 & 8 of Sec. 35-48-27) 222 Acres)	\$150,000.00	\$5,717.88
Lots 5, 6, 7 & 8 of Sec. 36-48-27 s)		
<u>Jackson Strip: (State Tax Commission)</u>		
N660' of N1/2 of NW1/4, Sec. 1-47-27)		
40 Acres)	835,000.00	31,829.53
N660' of N1/2 of NE1/4 of NE1/4		
Sec. 2-47-27 20 Acres)		
<u>Personal Property: (State Tax Commission)</u>		
Ore in Stock, Equipment and Supplies	215,000.00	8,195.63
Total as per State Tax Commission	1,200,000.00	45,743.04
<u>Rented Buildings:</u>		
Lillie Location, one house	100.00	3.81
Hartford Location, one house	200.00	7.62
Total	1,200,300.00	45,754.47
Collection Fees		457.54
Total Taxes		46,212.01
<u>Division of Payments:</u>		
Cambria-Jackson Taxes, City of Ishpeming		34.23
Cambria-Jackson Taxes, City of Negaunee		46,212.01
Total		46,246.34
Republic Steel Corporation, 4/12 of 1943 taxes, Cambria-Jackson Realty and Tax on Ore in Stockpile 4/1/43		20,356.91
Cleveland-Cliffs Iron Company proportion		25,889.43
Total		46,246.34
<u>Tax Rate per \$100 of Valuation:</u>		
City of Negaunee	3.81192	
City of Ishpeming	3.39926	
<u>Total Taxes, City of Negaunee:</u>		539,671.30
<u>Cambria-Jackson Percent of Taxes:</u>		
City of Negaunee	8.57	

The record of taxes paid in 1943 and the division between the two companies is included as part of the annual report. The house in the Hartford Location valued at \$200.00 was sold in the summer of 1943 and dismantled. It will not appear on future tax rolls.

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11. ACCIDENTS AND
PERSONAL INJURY:

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

	<u>7 months - 1943</u>
Fatal	0
Time lost - Over Four Months	3
Time lost - One to Four Months	4
Time lost - Less than One Month	<u>5</u>
Total Compensable Accidents	12

There were three severe accidents causing fractures, the
others were comparatively slight. Following is a list of the accidents:

<u>Accident No.</u>	<u>Date of Accident</u>	<u>Nature of Injury</u>	<u>Days Lost</u>
1	6/18/43	Laceration Right Cheek	8
2	7/14/43	Contusion right knee	18
3	7/30/43	Compression fracture of vertebra	154 home
4	8/5/43	Gen. Contusion infected left elbow	124
5	10/11/43	Fracture right leg. Comminuted fracture left heel	81 home
6	10/27/43	Fracture 2 bones, right foot	59
7	10/22/43	Contusion right foot	13
8	10/22/43	Colles Fracture right wrist	59 home
9	11/26/43	Foreign body right eye	17
10	11/2/43	Infection right index finger	42
11	11/21/43	Fracture bone right foot	50
12	12/13/43	Laceration of nose	<u>12</u>
Total days lost in 1943 account of accidents			<u>637</u>

with three men still at home.

12. NEW CONSTRUCTION AND
PROPOSED NEW CONSTRUCTION:

The following statement shows expenditures in the various accounts,
E. & A.-CC-119, Development Plant and Equipment, Cambria-Jackson Mine:

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12. NEW CONSTRUCTION AND
PROPOSED NEW CONSTRUCTION:

Brief comment is made of the items that show expenditures in excess of the estimates:

Drainage:

It was estimated that expense for this work would not exceed \$500.00. The ditches necessary to effectually cut off access of surface water to the caves to surface were much longer than was originally thought necessary and entailed more expense.

Plant and Equipment:

Under Plant and Equipment several items show an expenditure in excess of the estimates. Comment is made regarding those that show the greatest over-expenditures.

Alterations to Surface Buildings show an over-expenditure of \$15,779.78. This was due largely to expense incurred in the addition to the dry house and rearrangement of rooms and facilities in the old dry house. Three new buildings were erected that were not included in the original estimate, namely, a garage to house the Diesel tractor and one of the mine trucks, a storage building for iron, steel, pipe, scraper hoists, etc., and a small concreted building for the heating plant at the engine house. Expenditures in this account are not yet completed, and it is estimated that at least \$6,000.00 additional expense will be incurred.

Repair Cages and Skips:

This item shows an over-expenditure of \$325.86. The repair work was not completed at the end of the year and additional expenditures will be incurred in 1944.

Repair Underground Locomotives:

The estimate of the cost of this work was too low for the reason that it was impossible to make an accurate estimate in advance of the actual overhaul of the locomotives. They were in much worse condition than was anticipated.

Repair Steel Headframe and Enclose from Shaft Collar:

This item showed a small over-expenditure at the end of the year. The work is not half completed and the actual cost will exceed the estimate several thousands of dollars. It was impossible to determine the condition of the steel members in the shaft house until the shaft house pocket was removed, when it was found that all the steel members would have to be replaced.

One Ventilating Fan Installed:

The setup for ventilation of the mine has been entirely revamped. It is now planned to connect with the Mather Mine on the 1600 foot Level and to install a large fan in the Mather Drift near the boundary of the two properties. The Cambria-Jackson Shaft will be the upcast outlet for the air. No decision has yet been reached as to the division of cost between the two mines.

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13. EQUIPMENT AND
PROPOSED EQUIPMENT:

E. & A. CC-119 lists the new equipment that it was considered would be needed at the mine but unfortunately the list had to be made before the transfer and many items were overlooked. As a matter of fact so many items were missing from the equipment at the mine that it is questionable whether they were able to operate and show a profit. Brief comments will be made concerning the important items of equipment on hand and purchased in 1943.

a. Steam Shovels:

One steam shovel was transferred to the Cleveland-Cliffs Iron Company by the Republic Steel Corporation. It was in need of a thorough overhauling and accordingly was transferred in November to the General Shops at Ishpeming. It will be returned to the mine in March, 1944.

b. Motor--Skip Hoist:

The motor on the skip hoist was overloaded when hoisting from the 7th or bottom level and there was serious danger of the coils breaking down. The capacity of the skips were reduced when they were rebuilt, and since putting them back in service this danger has been eliminated.

c. Scraper Hoists:

In the past ten years a considerable number of scraper hoists had been accumulated at the mine, mainly from mines abandoned by the Republic Steel Corporation. They were manufactured by four different companies and ranged in horsepower from 6 1/2 to 20. Many were manufactured 10 to 15 years ago and several of the models had been discarded for some years at toher mines of the Cleveland-Cliffs Iron Company. E. & A. CC-119 provided for 8 new units--6 of which were to be equipped with 15 horsepower continuous rated motors and two with 25 horsepower motors. All are high speed hoists both on the pull and return ropes and are adequately powered for long scraper hauls. The usable scraper hoists are listed in the following statement:

<u>Company</u>	<u>H. P.</u>	<u>On Hand</u>		<u>No. Machines</u>		<u>Cost</u>
		<u>June 1, 1943</u>	<u>Purchased 1943</u>	<u>On Hand</u>	<u>Repaired</u>	
Ingersoll-Rand	10 (c)	3	0	3	1	\$23.14
	15	6	1	7	1	38.05
	20	4	1	5		
	25	0	2 (a)	2		
Sullivan	10 (c)	7 (b)		6		
	15	4		4	1	123.93
	20	4		4	2	84.48
	25	0		0	0	
Total		28	4	31	5	269.60
Average Cost Per Machine---\$53.92						

- (a) Purchased from Athens Iron Mining Company.
(b) One sold to Princeton Mine.
(c) Will be scrapped in 1944.

It is obvious that with the completion of individual raises to each contract and abandonment of the many transfer sub-level the 10 Horsepower hoist will no longer be of value in operation of the mine, as they are under-powered, have no rope capacity on the small drums and are only useful for

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13. EQUIPMENT AND
PROPOSED EQUIPMENT: (CONT.)

c. Scraper Hoists: (Cont.)

short hauls on transfer sub-levels. Development work is planned for scraper hauls of from 100 to 150 feet in length entirely beyond the capacity of the 10 horsepower hoists. As the mine is opened for a larger production more 15, 20 and 25 horsepower hoists will be required, part of which will be supplied by the six ordered on E. & A. CC-119 but not yet delivered. The four 15 horsepower Sullivans will soon be improved by replacement of the 15 horsepower, 15 minute, 55° motors with 25 horsepower continuous rated motors, as these four hoists are on large frames, have large drum capacity, and are therefore adapted to use of 25 horsepower motors.

d. Drill Machines:

There were a large number of old type drill machines at the mine, with a few modern machines. Many of the old machines have been scrapped. The machines purchased since June are listed below:

12 - Ingersoll Rand - R. B. 12 Auger Drill Machines E. & A. CC-119
2 - R - 48 Stoper Drills (wet type) E. & A. CC-119

There are four automatic feed drifter drills at the mine that will soon be converted back to hand feed type. The ground in the Cambria-Jackson is not of uniform hardness account of soft seams and the automatic feed does not work well in this type of ground.

Timber Hoists:

There were no timber hoists at the mine. Timber was hoisted by the electric scraper hoists which are not adapted for this work and this service also interfered with scraping of ore. Following is a list of timber hoists purchased since June:

12 - 6 H. U. Ingersoll Rand Utility Hoists E. & A. CC-119
Additional 6 H. U. Hoists must soon be ordered as each contract should have its own timber hoist.

e. Scrapers:

Shortly after the transfer a comparison of efficiency in operation of the scrapers in use was made against a Holcomb-Westaco scraper and the Negaunee Mine design of box type scraper. The Negaunee type proved much superior to the two others. Accordingly 15 Negaunee box type scrapers were made in the mine shop and put in service.

f. Diesel Tractor:

Included in the transfer of equipment was an old model Caterpillar Diesel Tractor which is no longer manufactured. Repair parts could not be obtained and it was decided to purchase a new D-6 Caterpillar Diesel Tractor equipped with a R-63 LaPlant-Choate trail builder and a D6N, Hyster Model, Towing Winch. The cost of this equipment was as follows:

One D-6 Caterpillar Diesel Tractor	\$5,123.00
One R-63 LaPlant Trail Builder	1,774.60
One D-6-N Hyster Model Towing Winch	<u>1,114.60</u>
Total Cost	8,012.20
Less Allowance on Old Tractor	<u>2,000.00</u>
Net Cost	6,012.20

CAMBERIA-JACKSON MINE
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13. EQUIPMENT AND PROPOSED EQUIPMENT: (CONT.)

f. Diesel Tractor: (Cont.)

The new tractor has been constantly in use since it was received, grading for timber and lagging tracks, grading the timber yard, leveling ground for roads, moving rock, shifting stockpile tracks, moving railroad cars, erecting trestles, skidding trestle timber and legs, hauling logs on a large stone boat to the sawmill and many other other uses. It has been of great value during the revamping of the surface layout at the mine.

g. The following Statement lists the miscellaneous equipment purchased since June 1st, most of which was charged to cost of operating the mine.

	<u>Charged to</u>	<u>Cost</u>
Sump Pumps - Automatic	E. & A. CC-119	\$546.49
Heating Boiler - Dry House	E. & A. CC-119	831.76
Hot Water Tank - Dry House	E. & A. CC-119	<u>123.32</u>
Total Charged to	E. & A. CC-119	<u>1,501.57</u>
Second Hand Dodge Truck 2 1/2 ton Charged to Account A-5-B		808.00
		<u>Operating Cost</u>
Portable Arc Welding Maching		\$395.00
Reversible Drill (Machine Shop Equipment)		176.58
#500 Drill Steel Cutter & Shank Grinder (Blacksmith Shop)		268.62
Hydraulic Dump Platform for Dodge Truck		518.04
Rivet Buster		110.58
Linde Combination Welding & Cutting Outfit		173.81
Metal Band Saw (Machine Shop Equipment)		385.63
Hydraulic Dump Platform for Chevrolet Truck		476.48
Coffing Chain Hoist		53.55
Three Ton Chain Block		155.69
Five Track Jacks		93.50
1 - 4 - 2nd Hand Timber Hoist		50.00
8 - Rubber Lined Roller Bearing Sheaves for Pulley Stands		<u>365.28</u>
Total New Equipment Charged to Operating Cost		<u>3,222.76</u>
One new head frame Sheave with steel liners, not yet charged out		855.56
Grand Total Miscellaneous Equipment		<u>\$6,387.89</u>

Cost per ton (Product 147,700 tons) of the equipment charged to Operating Cost (Including Head Sheave).....\$0.028.

14. MAINTENANCE AND REPAIRS:

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

7 months, 1943 \$18,655.18 Cost per ton .126

The above costs listed under the (4) accounts in the Cost Sheet were as follows:

Compressors and Power Drills	\$906.76	Cost per Ton
Scraper Equipment	7,177.94	" " "
Electric Tram Equipment	8,740.83	" " "
Pumping Machinery	<u>1,829.65</u>	" " "
	<u>18,655.18</u>	<u>.126</u>

CAMBERIA-JACKSON MINE
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14. MAINTENANCE AND REPAIRS: (CONT.)

The principal items making up the above costs were:

1 - new Ingersoll Rand Scraper Hoist	\$1,501.81
28,070 feet of Scraper Rope	3,200.01
Repair Scraper Hoists-General Shops	269.60
Repair Drill Machines	369.77
Repair Parts - Prescott Pump	312.00
Bushings - Prescott Pump	133.00
General Shop Charges - Repair Pumps	134.33
Valve Seats and Valves "	132.99
Coils for Pump Motors	55.15
(2) RB 12 Auger Drills	430.00
Repair Parts - Compressor	107.33
Labor oiling, rollers, rods, & other repairs, Scraper Hoists	5,516.39
Labor repairing Pumps and Miscellaneous Supplies	891.18
Labor and Miscellaneous Supplies - Compressors	356.91
Supplies U. G. Tracks	466.75
Track Jacks	35.88
Supplies Repairing U. G. Locomotives	368.20

Maintenance and Repair Costs as listed under "Surface Costs" were as follows:

7 months, 1943 \$8,586.38 Cost per ton .058
The above costs listed under "Surface Costs" in the (5) accounts on the Cost Sheet were as follows:

Hoisting Equipment	\$3,958.61	Cost per ton
Shaft	758.88	" " "
Top Tram Equipment	2,042.26	" " "
Docks, Trestles & Pockets	1,782.12	" " "
Mine Buildings	44.51	" " "
	8,586.38	.058

The principal items making up the above costs are as follows:

8 Rubber lined pulley stand sheaves	\$365.28	Hoisting Equipment
2 Sets steel liners for head sheave	220.00	" "
Labor on hoist, pulley stand and head sheaves	2,074.00	" "
Shop Supplies, hoist, pulley stand & head sheaves	243.82	" "
Repairs to larry car	1,850.69	Top Tram Equipment
3 ton chain block hoist	155.69	" " "
Track jacks	35.88	" " "
(5) Bents Permanent Trestle	1,782.12	Docks, Trestles & Pockets

CAMBRIA-JACKSON MINE
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15. POWER:

The detail of Electric current purchased during the seven months' operation in 1943 is as follows:

	<u>Cost</u>	<u>Per Ton</u>
Stopping	\$2,247.05	.015
Timbering	188.82	.001
Tramming	393.18	.003
Ventilation	131.00	.001
Pumping	9,873.47	.067
Compressors	8,362.68	.057
Hoisting	6,898.40	.046
Stocking Ore	424.80	.003
Dry House	280.70	.002
General Surface Lighting	92.01	.000
Telephone & Safety Devices	227.66	.002
Mine Office	54.42	.000
Electric Haulage	2,444.32	.017
Shops	320.05	.002
Total	<u>31,938.56</u>	<u>.216</u>

Main Meter K.W.	2,267,200
Separate Meter Readings K.W.	<u>2,205,478</u>
Line Loss K.W.	61,722

Product tons	147,700
K.W. Per ton	15.35
Cost per K.W.H.	.01409
15 Minute Demand K.W.	882
Average Load Factor - 7 months	50%

The low load factor, due to the two shift operation, resulted in a higher cost per K.W. than at the other Negaunee District Mines. The cost per ton is also higher than at the other mines. There were very few meters at the mine at the time of the transfer and for most of the seven months, estimates were made of the consumption. Meters are now being installed and within a few months more accurate records of consumption will be available.

16. CONDITION OF PREMISES:

Comment has been made elsewhere of the many improvements made on surface. Many of these are not yet completed and cannot be finished until next summer. There has been a great improvement in the general appearance of the surface plant, but there is still much work to be done to bring this mine up to the company standards. Some planting of lawns and shrubbery is essential, also improvement and relocation of roads, removal of unsightly buildings not required for operation of the mine, relocation and extension of the rock trestle, grading around mine buildings, etc. The present shortage of labor which promises to become more acute will probably force postponement of this work until after the war, however it will be given attention as soon as possible.

CAMBERIA-JACKSON MINE
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YEAR 1943

18. NATIONALITY OF
EMPLOYEES:

<u>As to Parentage</u>	<u>1943</u>	<u>Percent</u>
Finnish	85	38.6
English	36	16.4
Italian	32	14.5
Swedish	28	12.7
Danish	7	3.2
French (France)	7	3.2
Irish	7	3.2
French (Canadian)	5	2.3
German	5	2.3
Norwegian	4	1.8
Austrian	3	1.4
Croatian	1	.4
Total	220	100.0

<u>As to Birth</u>	<u>American Born</u>	<u>Foreign Born</u>
Finnish	54	31
English	26	10
Italian	10	22
Swedish	24	4
Danish	7	
French (France)	7	
Irish	7	
French (Canadian)	4	1
German	5	
Norwegian	3	1
Austrian	1	2
Croatian		1
Total	148	72
	67.3%	32.7%

LUCY MINE
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1. GENERAL:

There were no changes at this idle property during 1943.

6. SURFACE:

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

10. TAXES:

	<u>1943</u>		<u>1942</u>	
	<u>Valuation</u>	<u>Taxes</u>	<u>Valuation</u>	<u>Taxes</u>
Various Parcels	\$29,600.00	\$1,128.35	\$29,600.00	\$967.24
Collection Fees		11.28		9.67
Total	<u>29,600.00</u>	<u>1,139.63</u>	<u>29,600.00</u>	<u>976.91</u>

City of Negaunee Tax Rate		
Per \$100.00 Valuation	3.81192	3.267

Taxes increased due to higher rate in City of Negaunee.

WWG/jl
3/20/44

MAAS MINE
ANNUAL REPORT
YEAR 1943

1. GENERAL

The Maas Mine operated throughout 1943 on a 16 shift per week schedule except during the month of January when regular operations were carried on for 17 shifts per week. The curtailment from 17 to 16 shift per week was made so that more time would be available for the necessary repairs and cleaning up of the ore accumulated on the main levels from loading operations. There was one major delay during the year, when the axle on the skip sheave broke, snapping the rope and dropping the skip to the bottom of the shaft, wrecking the skip pit pocket and skip, which caused the mine to be idle 2 days.

The total hoist for the year was 713,069 tons, a decrease of 200,119 tons from 1942, due partly to there being 25 less shifts operated during 1943, partly on account of the loss of 30 experienced miners, and also because of the large number of men employed on rock development. There was an average of 35 men on this type of work and this resulted in a total hoist of 69,130 tons of rock, as compared with 39,245 tons in 1942. The ore in stock was almost entirely removed except for the very wet ore stocked during the last of shipping season, but there was very little overrun accumulated as it was found that the estimated skip capacity was too high and this was lowered from 5.65 to 5.5 on August 16th. There were three wooden trestles besides the steel trestle available for stocking at the end of the year and these were so arranged that both grades of ore could be stocked by either the larry cars or the endless rope type of tram cars, thus avoiding the possibility of delays on surface due to a break-down of either tramping system. 12 more bents had to be added to the rock trestle, as it was impossible to obtain the use of the district bulldozer for sufficient time to remove the large amount of rock being hoisted. The East end of this trestle is now approximately 1/4 mile from the shaft and therefore rock can be hoisted only on each 3rd or 4th skip without causing delay while waiting for the tram car to return.

The labor situation has been very acute during the entire year, as there were 148 men lost to the organization, as compared with only 116 new men being hired. Quite a large proportion of the new men were from Marquette, changing jobs to avoid the draft, and in most cases were entirely ignorant of mining and after a few weeks would quit, claiming the work was too hard. In most cases they were the type which it is not desirable to have in any group and therefore it is probably just as well that they quit.

The constant job of breaking in new men causes considerable delay which is necessarily reflected in a decreased product, and there is also a hazard from the safety angle with so many inexperienced men around. While there have been less men drafted during the year, quite a number voluntarily enlisted in the Sea-Bees, or construction unit of the Navy, and there were a large number who left for higher paid work elsewhere, even though they were not granted a release and would have to wait 30 days before starting on a new job. Absenteeism has been a very disturbing factor, as the average was approximately 5.7% with an increase to 7% in November on account of hunting season. This results in a larger decrease in product than might be supposed, as there is first the delay in rearranging the men and then those who are put in a contract to fill in do not have the same interest in getting out a large number of cars to increase their rate as do the regular miners.

Mining was continued in the same general areas which were worked in 1942, namely the East footwall pillar above the 3rd Level, which by the last of the year had reached to within one sub level above the 3rd. The second and third blocks East of the Race Course lease, with mining having just been started on

MAAS MINE
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YEAR 1943

1. GENERAL (Cont.)

the 4th Level elevation in the second block. The first block East of the Race Course lease in which at the end of the year the 65' Sub, 90' above the 5th was being opened, the Northwest footwall area above the 5th Level which has been mostly development, and the main area above the 5th Level where by the last of the year mining was being done on the last sub level that can be mined from the 5th Level.

The development program for the year was exceedingly heavy and mostly in rock, with an average of 43 miners employed throughout the entire year. The North footwall drift in slate on the 4th Level was completed, 9 raises put up and two cross-cuts driven to the Maas area boundary. One the 5th Level a North footwall drift was extended in ore to the West 530 feet and the 5700 cross-cut driven South 120 feet mostly in rock with 3 raises being put up to the hanging in the same area.

The majority of the development was on the 6th Level, where the North footwall drift has been completed as far as the 6400 cross-cut, the 6200, 6300, and 6400 Cross-Cuts completed and the South footwall drift had reached approximately half way between 6300 and 6400 Cross-Cuts by the end of the year. All of this drifting with the exception of a small amount of ore encountered near the 6400 turnout switch was in rock, but had to be timbered on account of the slabby nature of the ground. The shaft Cross-Cut being driven North from the winze was driven 275 feet during the later part of the year and there remains 960 feet to be driven to connect with the main shaft. The work at the Main Shaft was completed with the exception of concreting and installing the mechanical equipment in the new pockets and as soon as this is finished, drifting South from the shaft will be started. 12 raises have been started in the three Cross-Cuts and at the end of the year two in the South end of the 6200 Cross-Cut had reached the 5th Level.

The ventilation in the mine was very much improved during the year by the addition of three separate connections with the Negaunee Mine where the new fan with a capacity of 150,000 cubic feet per minute is located. These connections required 275 feet of drifting and raising and as they are all in rock should remain open indefinitely. The total exhaust to the Maas shaft on the 5th Level was raised from 34,000 cubic feet to 57,650 cubic feet.

There were no new projects of any kind on surface during 1943, either as regards the general surface layout or in connection with the drainage wells put down to intercept the water before it enters the mine. These were of course the necessary repairs, together with dismantling and re-erecting the SouthEast and SouthWest trestles for the winter stocking season.

MAAS MINE
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2. PRODUCTION,
SHIPMENTS &
INVENTORIES

<u>a. Production by Grades</u>	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Maas Bessemer	0	7,756*		7,756
Race Course Bessemer	0	752*		752
Maas	473,257	623,737*		150,480
Race Course	74,811**	114,019*		39,208
Maas Special	72,948	38,868*	34,080	
Race Course Special	92,053	128,056*		36,003
Total	713,069	913,188*		200,119
Rock	69,130	39,245		
Total Hoist	782,199	952,433		

*Includes current and previous year's stockpile overrun of 58,388 tons.
** " " " " " " " " " of 115 " .

<u>b. Shipments</u>	<u>Pocket</u>	<u>Stockpile</u>	<u>Total</u>	<u>Total</u>
<u>Grade of Ore</u>	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Last Year</u>
Maas Bessemer	0	0	0	12,580
Race Course Bessemer	0	0	0	770
Maas	212,758	266,016	478,774	606,650
Race Course	38,294	42,923	81,217	111,976
Maas Special	28,204	32,529	65,333	41,125
Race Course Special	46,055	52,290	98,345	128,597
Total	329,911	393,758	723,669	901,698
Total Last Year	487,331	414,367	901,698	
Decrease	157,420	20,609	178,029	

There were 98,900 tons of Special grade ore shipped all rail to Koppers Manufacturing Company at Granite City, Illinois.

c. Stockpile Inventories

<u>Grade of Ore</u>	<u>12-31-43</u>	<u>12-31-42</u>	<u>Increase</u>	<u>Decrease</u>
Maas	44,704	50,221		5,517
Race Course	7,681	14,087		6,406
Maas Special	15,762	8,147	7,615	
Race Course Special	10,941	17,233		6,292
Total	79,088	89,688		10,600

d. Division of Product by Levels

	<u>1943</u>	<u>%</u>	<u>1942</u>	<u>%</u>
Third Level	185,224	26.0	271,647	30.8
Fourth Level	212,494	29.9	184,052	20.8
Fifth Level	301,355	42.1	426,700	48.4
Sixth Level	13,996	2.0	0	0
Total	713,069	100.0	882,399	100.0

MAAS MINE
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YEAR 1943

2. PRODUCTION,
SHIPMENTS &
INVENTORIES

e. Production by Months

<u>Month</u>	<u>Maas</u>	<u>Maas Spcl.</u>	<u>Race Course</u>	<u>R. C. Spcl.</u>	<u>Total</u>	<u>Rock</u>
January	45,689	4,566	7,046	7,064	64,365	4,530
February	47,094	1,936	5,283	5,698	60,011	4,590
March	45,349	6,664	6,997	6,390	65,400	5,770
April	41,043	7,533	5,201	7,430	61,207	7,160
May	46,317	5,505	4,428	9,840	66,090	6,550
June	41,002	5,082	6,213	11,098	63,395	6,425
July	33,558	5,424	4,443	9,761	53,186	5,895
August	39,210	6,275	6,283	10,154	61,922	6,240
September	33,899	5,935	7,346	9,258	56,438	4,780
October	35,360	8,827	8,143	4,334	56,664	5,890
November	31,622	7,934	8,964	3,255	51,775	6,170
December	33,114	7,267	4,349	7,771	52,501	5,130
Total	473,257	72,948	74,696	92,053	712,954	69,130
1943 Stockpile O'run	0	0	115	0	115	
Gr. Total	473,257	72,948	74,811	92,053	713,069	69,130

The Product was distributed as follows:

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
George Maas Lease	481,370	584,259		102,889
Catholic Cemetery	26,877	53,062		26,185
American Mining Co.	5,081	5,388		307
C.-C. I. Co. (Rt. of Way)	8,874	12,134		3,260
Race Course	167,864	242,827		74,963
City of Negaunee	23,003	15,518	7,485	
Total	713,069**	913,188*		200,119

*Includes current and previous year's stockpile overrun of 58,388 tons.

**Includes current and previous year's stockpile overrun of 115 tons.

f. Ore Statement

	<u>Maas</u>	<u>Race Course</u>	<u>Maas Spcl.</u>	<u>R. C. Spcl.</u>	<u>Total</u>	<u>Total Last Year</u>
On Hand 1-1-43	50,221	14,087	8,147	17,233	89,688	78,198
Product for Year	473,257	74,696	72,948	92,053	712,954	854,800
Trans. to & from						
Cur. Yrs. O'run	0	115	0	0	115	27,599
Prev. Yrs. O'run	0	0	0	0	0	30,789
Total	523,478	88,898	81,095	109,286	802,757	991,386
Shipments	478,774	81,217	65,333	98,345	723,669	901,698
Balance on Hand	44,704	7,681	15,762	10,941	79,088	89,688

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2. PRODUCTION,
SHIPMENTS &
INVENTORIES

f. Ore Statement (Cont.)

Estimated stockpile overrun still in stock at end of 1943 shipping season.

Maas	3,000
Race Course	300
Maas Special	350
Race Course Special	550
	4,200

- 1943 3 8-hour shifts, 5 days per week and 2 8-hour shifts on Saturday from January 1st to February 1st, 3 8-hour shifts, 5 days per week and 1 8-hour shift on Saturday from February to December 31st. There were only 6 holidays during the year and the men worked during the vacation period receiving extra pay in lieu of time off.
- 1942 3 8-hour shifts, 5 days per week and 2 8-hour shifts on Saturday from January 1st to March 24th. Mine idle from March 24th to April 8th. 3 8-hour shifts 5 days per week, 2 8-hour shifts on Saturday April 8th to May 9th; one extra shift on Sunday night was added from May 9th to June 6th. From June 6th to December 31st, 3 8-hour shifts 5 days per week, 2 8-hour shifts on Saturday. A smaller crew on 3rd shift all year on account of not working wet places on that shift.
- 1941 3 8-hour shifts, 5 days per week from January 1st to January 25th; two-thirds of the regular mining crews were on the third shift. From January 25th to September 1st there was one additional 8-hour shift worked on Saturday, and from September 1st to December 31st there were two 8-hour shifts on Saturday, or 17 shifts per week.
- 1940 2 8-hour shifts, 5 days per week with a small hoisting crew on the third 8-hour shift from January 1st to September 1st, and after that an increasing number of miners on the third shift until, at the end of the year, there were 16 contracts on three shifts. The men on each crew alternated as to day, afternoon and midnight shifts.
- 1939 1 8-hour shift, 4 days per week, and 2 8-hour shifts, 1 day per week, with a small hoisting shift 3 8-hour shifts per week with crews alternating to receive 3 days per week, January 1st to January 9th.
- 2 8-hour shifts, 4 days per week, and a small hoisting third shift with crews alternating to receive 4 days per week, January 9th to June 12th.

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YEAR 1943

2. PRODUCTION,
SHIPMENTS &
INVENTORIES

f. Ore Statement (Cont.)

1939 1 8-hour shift, 4 days per week, and 2 8-hour shifts one day per week, with a small hoisting shift 3 8-hour shifts per week with crews alternating to receive 3 days per week, June 12th to September 11th.

2 8-hour shifts, 5 days per week, and a small hoisting third shift with crews alternating to receive 5 days per week, September 11th to December 31st.

g. Delays

Electrical

<u>Date</u>	<u>Shift</u>	<u>Duration</u>	<u>Loss in Product</u>	<u>Cause</u>
February 9th	Night	1 Hour	125 Tons	No Power

Non-Electrical

January 19th	All		1,300 Tons	Landing slow on account of very cold weather.
February 15th	Day	2 Hours	400 Tons	Main Air Line in shaft broken.
March 5th	Aft.	1½ Hours	200 Tons	Repairing 5th Level Measuring pocket
July 22nd, 23, 24th		49 Hours	3,800 Tons	Broken axle on North skip sheave, causing rope to break and drop skip in shaft.

3. ANALYSIS

a. Average Mine Analysis on Output

<u>Grade</u>	<u>1943</u>				<u>1942</u>			
	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Sul.</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Sul.</u>
Maas Bessemer					61.70	.053	6.48	.018
Maas	59.76	.099	8.48	.023	60.12	.088	8.30	.019
Race Course Bess.					61.77	.049	7.54	.018
Race Course	60.00	.097	8.10	.021	60.09	.086	8.39	.020
Maas Special	60.00	.098	7.33	.147	60.90	.088	7.61	.116
Race Course Special	60.57	.089	7.33	.136	61.06	.077	7.07	.129

b. Average Mine Analysis on Ore Shipped

<u>Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist</u>
Maas & R.C. Non-Bess.	59.70	.099	8.77	2.80	.22	.60	.25	.024	1.50	12.00
Maas & R.C. Special	60.45	.089	7.58	2.89	.27	.63	.15	.150	1.40	12.00

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3. ANALYSIS

d. Average Analysis of Ore in Stock - December 31, 1943

Average Natural Analysis

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
Maas	44,704	51.41	.092	8.62	.19	2.08	.50	.16	.020	1.31	12.00
Maas Special	15,762	51.70	.094	6.93	.18	2.01	.52	.16	.136	1.40	12.50
Race Course	7,681	51.60	.090	8.26	.18	2.14	.41	.15	.018	1.34	12.00
Race Course Spl.	10,941	52.10	.094	6.65	.18	2.30	.40	.23	.127	1.75	12.50

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.

<u>Location</u>	<u>Race Course</u>	<u>Maas Lease</u>	<u>R.C. Cem.</u>	<u>B.K.Road</u>	<u>C.C.I.Co.</u>	<u>Total</u>
<u>Standard</u>	<u>Lease</u>	<u>Lease</u>	<u>Lease</u>	<u>City/Neg</u>	<u>Strip</u>	<u>Tons</u>
Above 3rd Level	0	199,102	14,660	596	4,333	218,691
3rd to 4th Levels	162,708	1,790,505	5,833	8,594	7,010	1,974,650
4th to 5th Levels	190,881	637,081	0	9,986	1,125	839,073
Gross Total 11-30-43	353,589	2,626,688	20,493	19,176	12,468	3,032,414
Less 10% Mining Loss	35,359	262,669	2,049	1,918	1,247	303,242
Balance	318,230	2,364,019	18,444	17,258	11,221	2,729,172
Less 10% for Rock	31,823	236,402	1,844	1,726	1,122	272,917
Balance	286,407	2,127,617	16,600	15,532	10,099	2,456,255
Less Dec. 1943 Prod.	4,349	28,846	0	2,927	335	36,457
Total Standard Grade	282,058	2,098,771	16,600	12,605	9,764	2,419,798
<u>Special</u>						
4th to 5th Levels	592,907	927,635	0	40,895	0	1,561,437
5th to 6th Levels	842,572	1,360,829	0	0	0	2,203,401
Below 6th Level	22,083	407,292	0	0	0	429,375
Gross Total 11-30-43	1,457,562	2,695,756		40,895		4,194,213
Net Total 11-30-43	1,180,625	2,183,562		33,125		3,397,312
Less Dec. 1943 Prod.	7,771	7,267		0		15,038
Total Special Grade	1,172,854	2,176,295		33,125		3,382,274
Total All Grades	1,454,912	4,275,066	16,600	45,730	9,764	5,802,072
N1/6 D.S.S.&A. Right of Way (Adams Strip)						3,562
Total Maas Group to be mined through Shaft						5,805,634

1,013,105 tons in the Maas area as of December 31, 1943 is leased to the Negaunee Mine, of which 47,790 tons is special grade.

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4. ESTIMATE OF
ORE RESERVES

a. Developed Ore (Cont.)

INCREASE IN ORE RESERVES

	<u>Maas etc.</u>	<u>Race Course</u>	<u>Total</u>
Above 3rd Level	80,000	0	80,000
3rd to 4th Levels	116,000	12,300	128,300
4th to 5th Levels	266,000	10,900	276,900
5th to 6th Levels	1,102,300	682,500	1,784,800
Below 6th Level	330,000	18,000	348,000
	<u>1,894,300</u>	<u>723,700</u>	<u>2,618,000</u>

Divided as to grades:

<u>Maas</u>		<u>Race Course</u>	
<u>Standard</u>	<u>Special</u>	<u>Standard</u>	<u>Special</u>
186,000	1,708,300	37,300	686,400

In comparison with 1942, this year's estimate of ore reserves as reported to the tax commission shows an increase of 223,300 tons of Standard grade and 261,900 tons of Special grade above the 5th Level plus 2,132,800 tons of Special grade below the 5th Level not in the 1942 estimate.

The increase of 80,000 above the 3rd Level is due to the steepening of the footwall above the 3rd Level. The increase of 116,000 tons between the 3rd and 4th Levels in the Maas Lease, is due to larger ore areas on the 195' and 160' sub levels on account of the flattening of the jasper hanging in this area. The increase of 12,300 tons between the 3rd and 4th Levels and 10,900 tons between the 4th and 5th Levels in the Race Course Lease is also due to the jasper hanging not being as steep as anticipated in the areas near the North footwall. The large increase of 266,000 tons in the Maas Lease between the 4th and 5th Levels, which is practically all special grade ore, is due to the large area developed this year to the West along the North footwall on and above the 5th Level.

c. Estimated Natural Reserve Analysis

<u>Grade</u>	<u>Iron</u>	<u>Phos</u>	<u>Sil</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
Maas & Race Course Non-Bessemer	53.00	.086	7.30	.19	2.20	.57	.22	.020	1.70	12.00
Maas & Race Course Special	53.40	.079	6.60	.18	2.00	.52	.16	.180	1.40	12.50

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4. ESTIMATE OF
ORE RESERVES

d. Estimated Production
December 1st, 1943 to December 1st, 1944

<u>Grade</u>	<u>Estimated Production</u> <u>16 Shifts per Week</u>
Maas & Race Course Non-Bessemer	506,000
Maas & Race Course Special	<u>271,500</u>
Total	<u>777,500</u>
Plus 4% overrun on ore stocked	<u>12,500</u>
Grand Total	<u>790,000</u>

<u>Grade</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>	<u>Iron</u> <u>Nat'l.</u>
Maas & Race Course Non Bessemer	60.20	.098	8.30	.22	2.50	.65	.25	.020	1.93	12.00	53.00
Maas & Race Course Special	60.50	.090	7.50	.22	2.28	.60	.18	.200	1.60	12.50	53.40

5. LABOR & WAGES

a. Comments

1. Labor

The turnover in employees at the Maas Mine for 1943 was the largest yet experienced, both in the number lost to the armed forces and those seeking higher wages in other employment. There are practically no men available for employment, which is evidenced by the fact that only 116 men have been hired during the year as compared with 147 who have left. There is also the problem with most of the new men hired that they do not intend to continue mining and are only taking this work in order to escape the draft and still remain in their homes in this vicinity. Several have only worked a short time and then quit, claiming the work was too hard, and thus all the effort placed in their training has been wasted. The detail of the turnover in comparison with other years is shown below.

	<u>1943</u>	<u>1942</u>	<u>1941</u>	<u>1940</u>
Died	2	1	7	4
Fatal Accident at Mine	0	0	1	0
Retired at age 65 or over	1	6	1	6
Unable to work on account of ill health	5	1	0	5
Transferred to other C.C.I. Co. Properties	28	22	14	4
In armed services of U. S.	44	35	17	4
Quit for other occupations	68	42	8	5
Total	<u>148*</u>	<u>107</u>	<u>48</u>	<u>26</u>
Hired or Transferred to Maas	116	123	79	80

* Includes 30 experienced miners

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5. LABOR & WAGES (Cont.)

a. Comments

1. Labor

The average age of the employees in 1943 was 40, as compared with 38 in 1942, and 40 of them were over 60 or over. Four of the men had served 40 years or over in the company's employ and 81 for over 25 years.

Captain William Nault, former Captain at the Maas Mine from April 1937 to January 1941, at which time he was retired on account of ill health, died in December 1943. He had also been Captain of the Morris, Lloyd, Holmes, and Cliffs Shaft Mines, being experienced in all types of mining, and it was a considerable loss to the Company when he had to retire as he was only 56 years of age.

The men received their vacation pay and continued to work as in 1942 on account of the shortage of ore. Those who had worked 10 years or longer received pay for 86 hours, while those with from 3 to 10 years service received pay for 43 hours.

209 men, or 42% of the payroll, received pay for 86 hours.
152 men, or 30% of the payroll, received pay for 43 hours.

The safety bonus for the bosses was given out the same as in preceding years, with a penalty for accidents and infringements of rules or standards by the men under them. There was no bonus for the men.

A raise in pay of $5\frac{1}{2}$ cents per hour, or 44 cents per day went into effect on April 1st and was also retroactive to July 13, 1942. It was not possible at that time to obtain a raise for the bosses, but later they received an increase of approximately 5% and this was also retroactive to July 1942.

2. New Construction

There were expenditures on the following E & A's during 1943.

E & A No. CC 78 - Development of 6th Level
E & A No. CC124 - Drilling on Pioneer & Arctic Lands.
E & A No. CC128 - Aldrich Pump to be installed in 3rd Level pumphouse.

b. Comparative Statement of Wages & Product

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Product	713,069	882,399		149,330
Number of Shifts & Hours	306	296	10	
1 8-hour	47	7	40	
2 8-hour	5	47		42
3 8-hour	254	242	12	

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5. LABOR & WAGES (Cont.)b. Comparative Statement of Wages & Product

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
<u>AVERAGE NO. MEN WORKING</u>				
Surface	79	75	4	
Underground	396	423		27
Total	475	498		23
<u>AVERAGE WAGES PER DAY</u>				
Surface	7.09	6.74	.35	
Underground	8.16	7.72	.44	
Total	7.97	7.56	.41	
<u>AVERAGE WAGES PER MONTH</u>				
<u>17 Shifts per week 1942</u>				
<u>16 Shifts per week 1943</u>				
Surface	155.98	155.02	.96	
Underground	179.52	177.56	1.96	
Total	175.34	173.88	1.46	
<u>PRODUCT PER MAN PER DAY</u>				
Surface	31.36	39.32		7.96
Underground	6.48	7.43		.95
Total	5.37	6.25		.88
<u>LABOR COST PER TON</u>				
Surface	.226	.172	.054	
Underground	1.259	1.039	.220	
Total	1.485	1.211	.274	
<u>AVERAGE PRODUCT MINING</u>				
Stopping	17.17	18.68		1.51
Ore Development	10.21	7.55	2.66	
Total	16.79	18.45		1.66
<u>AVERAGES WAGES CONTRACT LABOR</u>	8.340	7.369	.971	
<u>TOTAL NUMBER OF DAYS</u>				
Surface	22,741 $\frac{1}{2}$	22,444 $\frac{1}{4}$	297 $\frac{1}{4}$	
Underground	110,085	118,801 $\frac{1}{4}$		8,716 $\frac{1}{4}$
Total	132,826 $\frac{1}{2}$	141,245 $\frac{1}{2}$		8,419
<u>AMOUNT FOR LABOR</u>				
Surface	161,169.89	151,382.48	9,787.41	
Underground	897,863.34	916,777.78		18,914.44
Total	1,059,033.23	1,068,160.26		9,127.03
<u>AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL</u>				
Surface	170.01	168.17	1.84	
Underground	188.94	180.58	8.36	
Total	185.80	178.75	7.05	

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5. LABOR & WAGES (Cont.)

b. Comparative Statement of Wages & Product

Proportion of Surface to Underground Men

- 1943 - 1 to 5.1 3 8-hour shifts, 5 days per week and 2 8-hour shifts on Saturday from January 1st to February 1st, and 3 8-hour shifts 5 days per week and 1 8-hour shift on Saturday from February 1st to December 31st.
- 1942 - 1 to 5.7 3 regular 8-hour shifts 5 days per week and 2 regular 8-hour shifts on Saturday from January 1st to December 31st, except from March 24th to April 8th when the mine was idle, and from May 9th to June 6th, when there was one extra shift on Sunday nite.
- 1941 - 1 to 5.4 3 regular 8-hour shifts, 5 days per week and one extra 8-hour shift on Saturday from January 25th to September 1st; two extra 8-hour shifts on Saturday from September 1st to December 31st. The night shift is somewhat smaller than the other two, due to having no miners in the wet contracts.
- 1940 - 1 to 5.0 2 regular 8-hour shifts and a small third 8-hour shift with an increasing number of men employed as miners on this shift as the year progressed, all alternating to receive 5 days per week from January 1st to December 31st.
- 1939 - 1 to 5.1 1 8-hour shift, 4 days per week, and 2 8-hour shifts 1 day per week, with a small hoisting shift 3 8-hour shifts per week with crews alternating to receive 3 days per week, January 1st to January 9th. 2 8-hour shifts, 4 days per week, and a small hoisting third shift with crews alternating to receive 4 days per week, January 9th to June 12th. 1 8-hour shift 4 days per week, and 2 8-hour shifts one day per week, with a small hoisting shift 3 8-hour shifts per week, with crews alternating to receive 3 days per week, June 12th to September 11th. 2 8-hour shifts 5 days per week, and a small hoisting third shift with crews alternating to receive 5 days per week, September 11th to December 31st.

6. SURFACE

a. Buildings & Repairs

There were only minor repairs on the Maas Mine buildings during 1943. The largest expense was in connection with the heating system for the water used in the showers. Considerable trouble was experienced in heating enough water for the 240 men on the day shift and a 4th tank of 600 gallons capacity was installed. These tanks each have a unit heater, but the water leaves a hard deposit on the inside of the copper coils which cuts down the circulation and is almost impossible to remove, therefore spare coils were purchased and a change made so that the steam passes through the coil and the water circulates outside and therefore any deposit left can be readily removed.

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6. SURFACE (Cont.)

b. Location Building and Repairs

The majority of the repairs to the Maas rented houses consisted of renewing the siding and painting the 10 houses located on the North end of the Race Course Lease and 4 houses near the West side of the vacated area, 4 in the 2nd addition and the Negaunee Dispensary. The crew doing this work was depleted by transferring men to the Cambria Mine and to the Ishpeming District where repairs and new construction were more urgent.

There were no houses sold during 1943, but there were the following purchases:

<u>House</u>	<u>Address</u>	<u>Lot</u>	<u>Block</u>	<u>Addition</u>	<u>Purchased From</u>	<u>Date</u>
191 Single	302 E. Main	14 & W 20' 13	30	Pioneer Iron Co.'s Plat	Amanda E. & Hazel Haupt	10/1/43
192 Store	109 Brown Ave	13	30	"	"	10/1/43
193 Double	212 Clark St.	11	24	"	McDonald Estate	11/20/43
194 Single	214 Clark St.	11	24	"	"	11/20/43

On December 31st , 1943, the Maas Mine owned 63 houses, stores, etc, as listed below:

Single Family Houses	53
Two " "	5
Four " "	1
Legion Club	1
Stores	2
Church	1
Total	63

c. Stockpiles

At the end of the shipping season which occurred on December 2nd of this year there was approximately 31,000 tons in stock, as compared with 29,000 tons at the same time in 1942, and consisted mostly of the ore hoisted in October and November which was too wet to ship directly from the pocket and therefore had to be stocked. The Southwest and Southeast trestles were both entirely dismantled and after the ore had been cleaned up were re-erected. The ore was removed from the West pile without disturbing the trestle, thus saving considerable expense. There will be ample room for stocking ore during the winter season and as there are two independent tram systems, one 3rd rail and one endless rope, so arranged as to be available for either grade or royalty, there should not be much delay due to stocking except in extremely cold weather. The rock, of which there is

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6. SURFACE (Cont.)

c. Stockpiles

approximately 5,000 tons per month, has to be stocked about $\frac{1}{4}$ mile from the shaft and therefore consecutive skips of rock cannot be hoisted, but with the skiptenders alternating rock and ore, there should be no delay.

There was very little stockpile overrun developed in 1943, as it was found from the pocket shipments early in the year that the estimated skip weight was too high. On August 16th this weight was lowered from 5.65 to 5.5.

The following stockpile overruns were developed during the year:

	<u>Maas</u>	<u>Race Course</u>	<u>Maas Spcl.</u>	<u>R. C. Spcl.</u>	<u>Total</u>
Current Year					
Overrun	0	115	0	0	115
Estimated Overrun in Stock					
December 31, 1943	3,000	300	350	550	4,200
Total	3,000	415	350	550	4,315

d. Tracks, Roads, etc.

There were no changes made in either the tracks or roads on the Maas property during 1943, but there was, however, the regular maintenance, and in the late fall a snow fence was erected about 75' West of the road entering the mine from Prince Street to attempt to stop some of the snow that formerly has drifted very badly onto this particular stretch of road.

e. Timber Yard

The large problem during 1943 has been that of obtaining sufficient timber to carry on mining operations. The labor in the woods has been very much curtailed and there have been several occasions when the timber yard was practically empty of stull timber. During the fall, however, more started coming in, and at the last of the year approximately four months' supply had been accumulated. It was necessary at one time to divert odd length timber cut for the mills and as a result there was a considerable extra expense on account of delay in cutting and handling besides the waste of from two to six feet that had to be cut off to obtain the required lengths needed underground. These odd lengths were sold to a local merchant for firewood. There has been very little lagging received since the spring break-up, and it has been necessary to use small poles, waste from the Company saw mill, etc., in place of regular lagging. Cribbing also was getting low before the new supply started coming in, as soon as the swamps became frozen. The timber treating plant was not used at all during 1943, as no peeled timber could be obtained, nor was there a sufficient supply of stulls that could be peeled and treated at the mine.

There was an average of 52 mine trucks of timber framed, loaded and sent underground daily and these were divided approximately as follows; 130 pieces of 5' 4" Cribbing, 120 pieces of Stull Timber, 400 pieces of poles and lagging.

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6. SURFACE (Cont.)

e. Timber Yard

A regular crew of 10 timber framers and handlers is required to perform this this work and in addition there is the extra force necessary to unload the timber that comes in by railroad cars, of which there were 379 unloaded during the year. The timber yard is well laid out and the work systemized so that there is very little delay except during the winter months and especially after a heavy snow fall, as most of the snow removal has to be done by hand, there not being sufficient room to operate a plow without having the timber piled too far from the tunnel.

f. Drainage

The surface deep well pumps Nos. 1, 2, and 4 put down by the Layne-Northwest Company have operated intermittently during 1943. No. 1 has been shut down twice during the year on account of the sand wearing down the impellers and No. 2 was idle for two months on account of motor trouble, while No. 4 operated continuously the entire year. The average discharge from these pumps was 710 gallons per minute, as compared with 950 during 1942, while the amount of water pumped from the mine as calculated from the Weir readings, increased from 922 gallons per minute in 1942 to 1020 gallons per minute in 1943. Part of this increase was due, however, to holing into and draining some former workings on the North footwall above the 4th Level. At the end of the year, the amount being pumped was approximately the same as for the same time last year. No further work was done in connection with testing the surface for future well sites, as the latest results were so discouraging on account of encountering nothing but very fine sand with little or no gravel. If a location could be found in formation capable of producing approximately 1,000 gallons per minute, there would be a very material benefit to, and a reduction in, the cost of underground operations, as the present well pumps although of small capacity have effected a decrease of approximately 200 gallons per minute.

7. UNDERGROUND

a. Shaft-Sinking

There was no shaft-sinking in 1943, as both the auxiliary winze and main shaft were completed last year, but a crew has been employed almost the entire year on opening the skip pit level 80' below the 6th Level, building a new skip pit pocket and excavating for the main storage and measuring pockets on the 6th Level. This work had to be stopped for considerable time, however, after the skip fell in the shaft in July, demolishing the skip pit pocket on the 6th Level and filling the bottom of the shaft with broken material that could only be removed on the week-ends when the mine was not operating.

b. Development

The development work for 1943, on which an average of 43 men were employed, consisted most of rock, as is evidenced by the fact that 69,130 tons were hoisted, being way in excess of any previous year since the time when the mine was first being developed. This was occasioned by the fact that every effort was being made to develop the 6th Level as rapidly as possible in in order to open up special grade ore areas. In the natural sequence of mining this level should have been opened at least two years earlier, but

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7. UNDERGROUND (Cont.)

b. Development

when it was found that apparently all the ore below the 5th Level contained high sulphur, making it a penalty ore and hard to dispose of, it was decided not to develop any below the 5th but to concentrate on the upper levels. Therefore development was concentrated in the Maas area and almost immediately after very extensive rock drifts and raises had been completed and the slow process of establishing a matt under the hanging had been finished, this area, consisting of approximately 2,000,000 tons was turned over to the Negaunee Mine, leaving the Maas very much behind in development. At the same time as the authorization came through to open the 6th Level work had to be started on the 4th Level to open up a new area for standard ore, thus causing the development of 2 areas at the same time when there was also a shortage of man power.

Fourth Level

The North footwall drift started last year was completed late in April and then the 4200 Cross-Cut was driven to the North side of the Maas area a distance of approximately 300' and a connection made near the boundary with the Negaunee 14th Level to improve ventilation. Two raises started last year were completed to the 260' elevation and 5 others, all put up from the North footwall drift, were completed to the subs above 3rd Level. These last five reached an average height of 150' before encountering the ore.

Fifth Level

The North footwall drift on the 5th Level started in January to develop the Northwest ore body, extending from the 5th Level to a short distance above the 4th Level and partly outlined during 1942 by exploration drifts and diamond drilling, was extended 530' to the West during 1943 and three raises were put up to the jasper hanging from 115 to 145' above the level. The drift was all in ore containing from .100 to 1.000 in sulphur, but the raises however, encountered standard ore very close to the level. At the West end of this drift several dikes were encountered, and it was decided to stop drifting temporarily until some exploratory drilling could be done to determine the lay of the ore and the best direction to continue the drift. In February it was decided to continue to the South in the 5700 Cross-Cut turned off several years ago and it was advanced 120 feet through the main North dike and jasper and then again stopped, as there was too much rock to be handled at this time without lowering production. It had been expected that this cross-cut would encounter ore South of the dike but evidently there is a dropper in the hanging at this point and the ore lies below the level.

Sixth Level

By the end of 1943 the drifts and cross-cuts required at this time for mining had been almost completed and the main shaft cross-cut had been advanced 393' from the winze North toward the shaft.

Nos. 6200 and 6300 were all in the footwall while the most of the 6400 Cross-Cut was in lean ore and jasper lying immediately under the ore body. A small amount of ore was encountered near the point where the 6400 Cross-Cut was turned off from the 6000 Footwall Drift and the short extension of this drift

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7. UNDERGROUND (Cont.)

b. Development (Cont.)

Sixth Level

to the West was also in ore. The 6000 Drift will be extended to the West 650 feet during 1944, but no more Cross-Cuts will be started at this time, as the purpose of the drift is solely for ventilation. Two raises will be put up at the extreme West end and the air coming down from the 5th Level near the South boundary of the Race Course will be forced up these raises to ventilate the area above on the 5th Level and thence exhausted on the 5th Level to the shaft.

The analysis of the ore and lean ore found so far on the 6th Level has been very encouraging, as the sulphur content has been very much less than had been anticipated. In several small runs the ore has been of standard grade which tends to bear out the theory that below the 6th Level the sulphur horizon will possibly be cut out and the ore body again become standard.

Drilling should be started next year to determine the grade below the 6th Level as the amount of standard ore remaining in the Maas Mine is becoming rapidly depleted, and if the ore below the 6th Level to the West is of standard grade, development should be started as soon as possible in order to maintain maximum production during times when it is not possible to dispose of the special grade. Detail of the development is as follows:

Table of Ore and Rock

<u>Location</u>	<u>Raising</u>		<u>Drifting</u>	
	<u>Ore</u>	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>
4th Level	454	867	0	760
90' & 130' Subs.	46	35	0	126
10' Ventilation Sub.	0	70	0	80
5th Level	382	91	550	85
6th Level	90	0	569*	0
6th Level E & A CC 78	0	115	0	2,329
Total	972	1,178	1,119	3,380

c. Stoping
General

There was an average of 33 contracts employed mostly in mining during 1943, a decrease of 6 from 1942, with approximately two-thirds on three shifts with the remaining one-third on two shifts mostly in the wet areas. It is a more efficient operation to have one shift free from the delay of loading wet ore at the chutes so that the motor crews have time to clean out all the ore in the dry areas.

Ten of the contracts were employed in the area lying on the North footwall above the East end of the 3rd Level until near the last of the year when mining approached so close to the level that some of the 3rd Level raises

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7. UNDERGROUND (Cont.)

c. Stoping

General (Cont.)

had to be abandoned and the new raises from the 4th Level put into use. There are not as many of these latter on account of their having to be put up 150' or more in rock and naturally this cuts down the number of available places for contracts. The footwall is very flat in this vicinity and the area to be mined is decreasing very rapidly, as there is a vertical mining limit to the South. This has been one of the best production areas for its size in the mine as it has been possible to drive a draining drift along the footwall one sub level in advance of the remainder, and thus keep 90% of the ore comparatively dry.

One contract has been employed continuously in the small area in the North-western part of the ore body between the 3rd and 4th Levels, and at the end of the year mining had descended to 40' above the 4th Level.

Four contracts were mining in the block of ore controlled by the 4100 Cross-Cut on the 4th Level. In the first part of the year there were only three raises available for the 4 contracts but later #4113 Raise was put up and results have been very much better. This area is comparatively dry with easy drilling, the only handicap being that of the ore extending further on each succeeding sub level, necessitating the preparing of a new matt and blasting filling.

Four other contracts spent practically the entire year in mining out the 130' Sub, which is in the 2nd block East of the Race Course Lease and although above the 4th Level, the ore is removed through the 5th Level raises in the 5300 Cross-Cut. The ore here is very hard, requiring the use of jackbits and jacklegs with wet drilling and the Southeastern end is also very wet with considerable trouble from runs of broken Jasper washed down from the sub above.

It was decided early this year to re-open the area lying on the North footwall above the 4th Level between the old winze and the East footwall pillar so as to make places for some of the 3rd Level contracts and to maintain the required amount of standard grade ore. Several attempts which will be listed under the detail have been made and up to the present time they have all resulted in failure on account of the large amount of water encountered. The old workings have apparently acted as a huge reservoir and each time the back breaks through enough water has come out to stop transportation on the level and in one case almost drowned out the pumps. As so much expense has been incurred and so as not to lose the raises already put up in this area, one contract is to be continued here until the source of the water can be found and plans made to dry up the surrounding area. Although more stress is to be laid during 1944 on mining special grade ore, this area should be opened and preparation made so as to be able to move 4 to 6 gangs from special to standard whenever the market for special declines.

Four contracts were mining continuously during 1943 in the first block East of the Race Course Lease and at the end of the year were just starting to open the 65' Sub approximately 90' above the 5th Level. Heretofore the ore

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7. UNDERGROUND (Cont.)

c. Stoping
General (Cont.)

in this area has been almost entirely of standard grade, but the 65' elevation is at approximately the top of the sulphur horizon, and it is expected that on this next sub level at least 50% of the ore will be of special grade.

One contract continued to mine along the North footwall above the 5th Level in what was supposed to be the Western limit of the ore body. However, last year it was found by drilling and exploratory drifting and raising that there was a riser in the hanging much further to the West. A new footwall drift therefore was extended to the West on the 5th Level for 530' until two small dikes were encountered running almost parallel with the drift. It was then decided to stop the drift temporarily and put in several drill holes to determine the best direction to continue the drift and keep it in ore if possible. Drill hole No. 48 proved there was no ore North of the drift, but Hole No. 49 drilled to the Southwest cut 200 feet of ore before encountering the jasper. Another hole No. 50 was drilled due South to determine the width of the ore at approximately the center of this ore body and was finally stopped in ore at 275 feet, it being supposed that this hole was following just under the hanging and that there would not be sufficient height to warrant any 5th Level development to the South. Two of the three raises put up from the footwall drift also encountered jasper a short distance above the level and for a time it looked as though all of the ore in this area would have to be removed through 6th Level raises, the hanging being so close to the 5th Level. However, Raise #54 broke through the jasper and again found ore and Raise #56 went up over 100' in ore. It was then decided that it would be better to explore and develop further from these raises before deciding to advance the drift. At the end of the year one sub at the 125 foot elevation or 15' above the 4th Level had been mined out and a small stope was started in a chimney or ore that rises some 40' above the sub. Raises #54 and #56 were cut out just under the jasper hanging 40' below the 125' elevation, but in drifting South from #54 a short run of ore was found and a raise has been put up 40' and is still in ore. Either this is another small chimney similar to that near #52 or it may develop into something larger, as there is no true hanging or solid jasper in this area, the formation consisting of alternate seams of ore and jasper. Considerable exploration, both by raises and drilling, will have to be done before actual mining can be started. The ore in the 5th Level drift was all of special grade, but it changes to standard at about 30' above the level.

The remainder of the contracts were all working in various parts of the main ore area South of the dike and just above the 5th Level, mostly in the Race Course Lease. The small area between the South dike and the Negaunee Mine boundary has been entirely cut off by the South footwall, and during January of next year the last remaining pillar in this area will be mined. The South footwall has also cut across the dike and is rapidly cutting out ore areas South and Southwest of the Race Course Lease. There is apparently another fold in the hanging to the West of the Race Course Lease and it is expected that the new raises from the 6th Level will go 2 or 3 subs above the 5th Level before encountering the hanging, and as this will be in virgin ground it should be dry until sufficient ore is mined for the subsequent caving to

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7. UNDERGROUND (Cont.)

c. Stoping
General (Cont.)

join with the cave above the main area. The main area to the East has been very wet and it is hoped that the two caves will not join until most of the ore above the 6th Level and to the West has been mined.

The following is a detailed report on the underground operations during 1943, showing the locations and developments of the various contracts. The work done in December will be included in the paragraph for the contracts that were active at that time.

Subs Above the Third Level

East Footwall Pillar

375' Sub Level

Mining on this sub level was completed early in April. Contracts #3, #49, #2 and #9 recovered the remaining pillars and then moved down to develop the next sub level.

Contract #3 advanced 6 slices Southeast to the old workings completing the mining from #104 Raise at this elevation in April.

Contract #49 working from #103 Raise completed recovery of the pillars Northwest and Southeast of the raise. The contract moved down to the next lower sub level in April.

Contract #9 completed mining on this sub level in January and then moved down to develop the 355' Sub Level.

Contract # 2 completed mining on this sub level in February recovering the small pillars Northwest and Northeast of the raise.

The above mining operations were all located in the Maas Lease between the coordinates 200 West to 400 West and 600 South to 200 South.

355' Sub Level

Mining on this sub level was confined largely to the same area as described above namely, that above the #100 Cross-Cut, which comprises an area about 200' square. There was a small amount of mining, however, in the are above the #200 Cross-Cut. All of the mining on this sub level was confined to the Maas Lease.

Contract #3 was temporarily moved to the 170' Sub Level above 4th Level in April but in May, mining was resumed on the 355' Sub Level at #104 Raise. Slices were mined to the East extending to the old transfer South of #111 Raise. The contract completed mining on this sub level in November recovering the last remaining pillar West of the raise.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #49 started developing a connection from #105 to #103 Raise. Mining was carried on mainly to the North with slices that extended to the drainage drift which runs along the footwall in this area. They completed mining in November and then moved down to develop the next lower sub level.

Contract #9 cut out #106 Raise late in January and started mining to the Southeast. The territory in this area is quite small due to the jasper pillars Northeast and Southeast of the raise, limiting the area in this direction. Mining was completed in September and the contract was transferred to #107 Raise on the 345' Sub Level.

Contract #2 working from #105 Raise completed a connecting drift from #106 Raise in March. The are to the West was then mined with slices that extended to the old caved area. By October mining from this raise was completed and the contract moved down to develop the next lower sub level.

Contract #51 completed recovery of the last remaining pillar in the area above the 200 Cross-Cut in February and then down to the 345' Sub.

345' Sub Level

Mining in the extreme East end of that part of the ore body located in the Roman Catholic Cemetery Lease was completed by April. The territory above the 200 Cross-Cut was also completed late in the year and development of the sub level below was started. Towards the end of the year the preliminary connections were completed between the raises in the area above the 100 Cross Cut and mining had started.

Contract #6 completed mining from #121 Raise in February and then moved down to develop the next lower sub level.

Contract #12 working from #119 Raise completed mining during the month of March. The contract was then transferred to the 4th Level and the continued as a development contract putting up raises.

Contract #29 recovered the pillars Southeast and Southwest of Raise #115 completing the mining on this sublevel. About 50% of the mining for the year was in the Roman Catholic Cemetery Lease and the remainder in the Maas Lease. By June the work on this sub level was completed and the contract was transferred to the 245' Sub on the North footwall above the 4th Level.

In January contract #35 started development of the area above the #200 Cross-Cut by driving a connection from #113 Raise to #203 Raise. Mining was then continued mainly to the West with slices that extended to the jasper pillar which occurs between the 100 and the 200 Cross-Cuts. Towards the end of the year mining from this raise was completed with the last few slices extending East to the old workings of #29 contract.

In February contract #51 moved to this sub level and completed a connection from #203 to #204 Raise. Operations from #204 Raise were confined to a small

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

area East of the raise and this work was completed in August and the contract was then transferred to #5530 Raise in the 5th Level area to increase the production of Special grade ore.

Contract #15 working in that area above the main level footwall drift drove a connection from #111A Raise to #113 Raise. Mining was then continued to the Southwest of #113 Raise with slices that extended to the jasper pillar. All of the ore was recovered from this area by June and the contract moved down to the sub level below.

Late in the year development of the area above the #100 Cross-Cut was started on this sub level.

Contract #9 was transferred to #107 Raise at this elevation and started mining the narrow pillar West of the old transfer. In December the contract completed the first slice to a point about 130' South of #107 Raise. At the end of the month another slice was advancing in the same direction. This area is very wet as the footwall drainage drift had to be sloped just East of #107 Raise.

Contract #2 cut out #105 Raise in October and drove a drift Southeast into the jasper pillar looking for ore to the South but found it had been cut off at this elevation. In December this drift was completed and mining was then continued due South of the raise with slices that extended to the old workings.

Contract #49 started work on this sub level by driving a connection from #105 Raise to #103 Raise. After re-timbering of the latter raise in December the contract started mining to the Southwest completing the first drift to the old transfer. At the end of the month the first slice was also near completion.

In November Contract #3 cut out #104 Raise and advanced a connection Southeast to #431 Raise from the 4th Level. In December a traveling and ventilation connection was made to the drift South of #103 Raise. When this work was completed, mining was started to the Northeast with the first drift and ore slice being completed to the old workings.

335' Sub Level

Contract #6 started mining on this sub level in March with slices that extended Southwest of #121 Raise to the mining limit and old workings. In December, 3 slices were completed Southwest to the Negaunee Mine boundary which finished the work on this sub level and the contract was transferred to another territory. The North footwall is very flat and decreasing this area very rapidly.

In June and July Contract #5 drove connections from #111A Raise to #113 Raise and thence to #114 Raise. Mining was then started Southeast of #114 Raise along the footwall with slices that butted against the first drift mined by #6 Contract. In December the contract advanced a slice which

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

started near the raise, 140' to the Southeast. This drift will hole to #439 Raise from the 4th Level but will be used to mine the pillar to the South.

Contract #51 started work on this sub level in September by driving a drift to the West of #111A Raise along the footwall. This drift is driven in advance of mining operations on each succeeding sub level to drain off the large amounts of water which occurs near the footwall in this territory.

Contract #35 moved to #113 Raise on this sub level in October and started a drift Southwest toward #433 Raise put up from the 4th Level. This connection was completed in November and in December mining was started South of #433 Raise.

3rd Level

The only work for the year on the 3rd Level was done by #12 Contract and consisted of a connection between #429 Raise and the 100 Cross-Cut. This now serves as a new ventilation and traveling connection between 3rd and 4th Levels.

Subs Between 3rd and 4th Levels.

260' Sub Level

Operations on this sub level were carried on by #36 Contract for 2 months during the year, namely May and June. Raise #420 which is located in the East Footwall pillar between 4100 and 4200 Cross-Cuts, was cut out and a drift started West towards #418 Raise. However, after advancing about 35' a large quantity of water broke through the old covering preventing any further advance. A drift was then started to the East toward #422 Raise and after a short advance another large break through of water occurred making it necessary to abandon operations from this raise.

245' Sub Level

Development of the area mentioned in the preceding paragraph was continued by #29 Contract on this sub level. Due to previous experiences with the large amounts of water which occur in this area it was felt that it was necessary to provide a second outlet for safety. Accordingly, in September a connection between #422 Raise and #4104 Raise was completed. A drift was then started to the Northwest of #422 Raise in an attempt to reach the footwall to the North and drain the water through a large pipe which was installed in the raise. This drift advanced about 30' and a break through of water occurred. By drifting around this break through it was finally possible to extend the drift as far North as the old trench stope where another break through of water occurred making it necessary to abandon any further attempts in this direction. The contract then transferred their operations to #4104 Raise where they started to drift Northwest towards #418 Raise. By the last of December this drift had holed to the end of #418 Raise and after this Raise has been taken up another attempt will be made to drift to the North

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

toward the footwall. It is hoped that by passing to the West of the old trench slope, that the footwall can be reached without a break down as there is about 7' of back left to hold back the water.

215' Sub Level

Contract #7 completed mining operations on this sub level early in January and then moved to the 200' Sub Level.

200' Sub Level

Contracts #20 and #7 continued operations from #4107 and #4109 respectively. The ore extended somewhat further to the Southeast at this elevation due to the flattening of the jasper dropper in this area. Contract #20 completed mining on this sub level in June and moved down to develop the next lower sub level. Contract #7 continued mining on this sub level until July at which time all available ore had been removed.

Contract #42 cut out and timbered over Raise #420 on the North footwall at this elevation in March. The raise was then reversed and continued to the North being complete to the 260' Sub Level.

195' Sub Level

Contract #20 opened up this sub level in June and by the end of the year only a small pillar of ore remained to be mined West of the raise. The major portion of the mining was done Northeast of the raise with slices that extended to the mining limit. In December the contract completed one short slice and was advancing a second Northwest to the jasper. Here again they are able to advance under the jasper for considerable distance.

Contract #7 moved to this elevation in July and completed the connection between #4107 Raise and #4109 Raise. Mining was then started to the Northwest with slices that extended to the old workings. The slices to the East were considerably shorter on this sub level being cut off by jasper which appeared unexpectedly at this elevation. In December the contract completed recovery of all the ore Northeast of the raise and then started a slice in the last remaining pillar to the Northwest.

185' Sub Level

By March Contract #48 had completed mining on this sub level in the area above #4100 Cross-Cut adjacent to the Maas Area. The contract then moved down to Develop the next lower sub level.

170' Sub Level

Contract #48 opened up this sub level by cutting out and starting a drift to the South. After advancing about 30' in lean ore, another drift to the South-West was started and the first drift was continued South by #3 Contract which

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7. UNDERGROUND (Cont.)

c. Stoping, (Cont.)

was transferred here in April. Later Contract #14 replaced Contract #3 and mining on this sub level was continued by #14 and #48 Contracts. In September Contract #14 moved down to the 4th Level and started to put up #4113 Raise which, when completed provided another raise from which to mine this block of ore. Contract #48 completed mining on this sub in October and then moved down to the 160' Sub Level.

160' Sub Level

During the month of October Contract #14 cut out and timbered over #4113 Raise which they had recently completed to this elevation. A drift was then advanced to #4111 Raise and when #48 Contract completed the sub level above they moved down and continued mining from #4113 Raise chute and #14 Contract moved to #4111 Raise to be under their own cover. In December Contract #14 completed the first drift and started a slice to the Northwest. Contract #48 completed 3 slices Southeast to the Maas Area boundary. There was some ore apparently left along the Northeast side of the old mining limit but each attempt to reach this has resulted in so much rock work that it had to be stopped.

Contract #18 working in the territory above #52 Raise in the North foot-wall West of the Race Course Lease put up a small raise in jasper to this elevation. A drift was advanced Northeast in jasper holing to an old exploration raise. From this drift the contract did a small amount of stoping above the slices which were mined on the 130' Sub Level. Most of the work was completed in December.

150' Sub Level

Contract #27 continued mining from #305 and #306 Raises with slices that extended to the dikes and jasper. In October this sub was completed and the contract moved down to develop the next lower sub level.

140' Sub Level

Contract #27 opened this sub level in October and they advanced a connection Northwest to #306 Raise. Mining was then continued to the East with slices that extended to the dike. In December the contract completed 2 slices and started a third East towards the dike.

Contract #11 working in the 5300 block, East of the Race Course Lease, completed mining from #5324 Raise in February and then moved down to the 130' Sub Level.

Contract #44 mined 3 slices Southwest of #5326 Raise and then transferred to #5324 Raise and completed recovery of the last remaining pillar in this block. In April the contract started to develop the next lower sub level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

130' Sub Level

Development of this sub level in the 5300 Block was started late in 1942. By January Contract #25 had completed the traveling and ventilation connection to #625 Raise and a connection was then made to #5320 Raise. When this was completed the contract started mining from #5318 Raise and Contract #31 drove a connection from #5320 Raise to #532 Raise. Contract #11 continued from here and drove a connection to #5324 Raise, while Contract #31 started to mine to the South. In April Contract #44 moved to this elevation and they completed the ventilation and traveling connection to #5324 Raise to #5326 Raise. #15 Contract was transferred to this territory in July and the 5 contracts mentioned above, continued mining this block of ore. By the end of the year a pillar 100' long and 50' wide remained to be mined Southeast of #5326 Raise. Contract #25 completed mining from #5318 Raise in September and moved down to the 4th Level elevation.

Contract #18 was moved to this elevation during October and they started mining to the East of #52 Raise located above the 5th Level in the area West of the Race Course Lease along the North Footwall. This new area was just opened up in 1943 by 3 raises, and as the hanging was found to be very irregular the process has been very slow. After slicing in a small area between the dike and the jasper hanging, it was found that a small chimney of ore extended to about the 170' elevation and two raises were put up, one in ore and one in jasper to slope out the ore. Mining was then stopped temporarily to do some diamond drilling to the Southwest as here again a test raise from the 90' sub had found another chimney of ore. It was decided to explore this country by drill so as not to cut it up too badly if ore was found at a higher elevation.

Mining operations carried on in December are described as follows.

Contract #31 completed mining in the pillar Northeast of #5320 Raise and then moved down to the 4th Level elevation.

Contract #11 working from #5322 Raise completed one slice which extended Northeast of #5320 Raise.

Contract #15 continued mining in the pillar West of #5324 Raise.

Contract #44 advanced one slice to the Southwest, a distance of about 80'.

All of the area on the footwall side of these raises is very hard, requiring the use of wet machines and jack bits, while the mining of #15 and #44 to the South is badly handicapped by low cover and considerable water causing breakdowns and mud runs.

#18 Contract completed all of the mining at #52 Raise and moved to #56 Raise on the 90' Sub Level.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

4th Level

Main Level drifting operations were carried on by #15 Contract. The 400 drift was advanced 500' farther to the East to a point 53' East of the 00 coordinate near the Negaunee Mine Boundary. This work which was all in footwall material was completed in April and the contract then started driving the 4200 Cross-Cut to the Southeast. This drift was advanced in transition material to the Maas Area Boundary line and upon completion in July the contract was transferred to the 130' Sub Level. Later in the year a Negaunee Mine Contract put up a ventilation raise which holed to the end of the 4200 Cross-Cut. Although the drift and Cross-Cut were in rock, it was of such slabby nature that it had to be timbered.

Six new raises were put up in the 400 Drift during the year and 4 of them were to replace 3rd Level Raises where mining is rapidly approaching the level, while the other two were to mine the block to the West. By the end of the year mining was being carried on above the 3rd Level in one of the new raises. One of the raises, namely #422 was put up to develop the ore body below the old trench stopes. A new raise was also put up in the 4100 Cross-Cut to provide another working place in the ore body above.

The operations on the raising contracts which worked on this level during the year are briefly described as follows.

Contract #42 completed #420 Raise in ore to the 260' Sub Level where it was cut out. The contract then started #427 Raise and advanced it to the 245' Sub Level where it encountered the old tramming drift East of the trench stope. One drill hole broke through to the drift and it revealed water under considerable pressure so the hole was plugged and the raise was temporarily abandoned. The contract then was transferred to the 5th Level.

Contract #39 worked in #422 Raise and #4104 Raise early in the year. Later they started putting up #433 Raise which was completed to the 335' Sub Level in October. This raise was in rock for 165' before reaching the ore and the contract was then transferred to the 6th Level.

Contract #12 started #431 Raise and in June moved to #429 Raise. This was put up to the 3rd Level elevation in rock for the entire distance as it encountered a dropper in the jasper hanging after cutting 160' of footwall material.. It was then cut out and a connection driven to the 100 Cross-Cut on 3rd Level for traveling and ventilation. In November the contract was transferred to the 6th Level.

Contract #30 started raising in #431 in May and completed it to the 345' Sub Level in September. The contract was then disbanded. There was 165' of footwall material before the ore was reached.

Contract #8 was organized in June and the advanced the #439 Raise to the 335' Sub Level completing it in November. This raise was in footwall material for its entire 220' but it had to be put up to reach the ore pillar to the West.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #14 stopped mining temporarily and put up #4113 Raise to the 160' Sub Level. By the end of the year the contract had resumed mining in the territory above the South end of the 4100 Cross-Cut.

Contract #25 started development in the North end of the 5300 Block in September. In December the contract completed one slice and started a second Northeast of #5318 Raise. Also, a connecting drift was driven Southeast to #5320 Raise.

Subs Between 4th and 5th Levels

90' Sub Level

The first block East of the Race Course Lease.

Contract #37 working from #5426 Raise completed mining on this sub level in January.

Contract #21 working from #5432 Raise in the same block as the above contract completed operations in February and then moved down to develop the next lower sub level.

Contract #42 working the area being developed West of the Race Course Lease along the North footwall cut out #54 Raise at this elevation. In December they advanced a small exploration drift approximately 75' to the South most of which was in lean ore and jasper. A small showing of ore was found about 30' South of the raise and a single compartment exploration raise was started to the East. By the end of the month it had advanced 42' in ore. However, the hanging wall of the raise revealed lean ore and jasper.

In December Contract #26 cut out and timbered over #56 Raise which is located about 60' West of #54 Raise. Exploration will also be carried on from this Raise. Raises #52 and #56 were in ore for their entire distance but Raise #54 encountered considerable jasper showing that there is a jasper dropper in this vicinity.

75' Sub Level

All of the mining on this sub level for 1943 was carried on in the 5400 Block which comprises part of the Race Course Lease, the City of Negaunee Lease, and part of the Maas Lease, the largest part of the block being in the Maas Lease. The sub level was opened late in 1942 by #14 Contract which mined from #5420 Raise until May of this year, at which time they were transferred to another territory.

Contract #32 replaced Contract #14 and continued the mining.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Early in the year contracts #37 and #21 moved to the elevation from the sub level above and started mining in Raises #5424 and #5432 respectively.

Contract #16 was transferred to this area in March and mined from \$5410 Raise.

By November mining was completed and all the contracts were on the sub level below in December.

65' Sub Level

The 5400 Block on this sub level was opened by Contracts #16, #21, #37, and #32 in November and December 1943. By December mining had started from Raise #5424 and #5420.

The work in December is described briefly as follows.

Contract #21 completed the first drift and 2 slices East to the Dike.

Contract #16 drove a drift Southeast passing thru #5428 Raise and extending beyond toward #5432 Raise. This drift had to partly take up an old traveling road driven several years ago.

Contract #37 completed the connection from #5422 Raise to #5420 Raise and started to the East. The first drift was advanced to the 1000 Coordinate passing through the dike at a distance of about 50' from the raise.

Contract #32 started driving a drift Northwest toward \$5410 Raise which when completed will provide a traveling and ventilation connection between the raises. A very hard ore seam has appeared for the first time in this area and slowed up production in which had formerly been the best area in the mine. Special grade ore is also encountered at this elevation.

During January and February Contract #16 mined in the ore body located North of the main dike in the Race Course Lease. The contract recovered the pillar of ore Southwest of #5019 Raise and was then transferred to the 5400 Block on the 75' Sub Level.

Contract #28 continued working from #5020 Raise until July at which time this sub level was completed and the contract then moved down and cut out.

50' Sub Level

The only mining on this sub level during the year was carried on in the ore body North of the Main dike in the Race Course Lease. Contract #28 cut out #5020 Raise late in July and a drift was then driven Southeast to #5019 Raise. A connection was also made Northeast to #5018 Raise for ventilation. Mining was then started to the West and Northwest of #5020 Raise with slices that extended to the jasper footwall. In December the contract completed 5 slices and started on 6th. These slices being comparatively short.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #6 was transferred to #5019 Raise in December and started drifting Southwest toward #5021 Raise.

40' Sub Level

All of the mining on this sub level during the year was in the Race Course Lease. Contract #18 working from #5411 Raise, mined to the Northwest with slices that extended to the dike and jasper. A similar area was mined to the South of the mine with slices that extended to the old workings and jasper in an area that was very wet.

Contract #46 working from #5622 Raise completed recovery of a pillar North-East of the raise in February and then moved to #5524 Raise on the sub level below.

Contract #32 completed mining from #5618 Raise in May and then moved to the 75' Sub Level.

Contract #41 completed mining around #5614 Raise and then moved to #5510 Raise where a connection was made Southeast to #5512 Raise and #5516 Raise. Another drift was then driven West to #5515 Raise where the contract started mining to the Southwest and West. In December one slice was completed and a second started Northwest to the jasper. #5515 raise was put up in order to mine this pillar dry, allowing the water to be drained off in the raises to the Northeast.

Contract #24 was transferred to #5516 Raise at this elevation in July and started mining in the pillar South of the raise. In December one slice was completed and a second started South to the old workings. By the end of the year only a small amount of ore remained to be mined. Production has been retarded considerably in this area due to the large amounts of water which makes it necessary to scrape the broken ore directly into the ore cars, and also causes numerous breakdowns by washing the broken jasper from above into the working place.

25' Sub Level

This sub level was worked during the entire year although activity slacked off during the second half and by the end of the year there was no mining being done at this elevation.

Contract #23 completed the connection from #5522 Raise to #5520 Raise and started mining to the Northeast with slices that extended to the mining limit. Four short slices were also mined Southwest of the Raise and the contract moved down to the next lower sub level in October.

Contract #46 was transferred to this sub level in February and started mining from #5524 Raise. Mining was continued to the limits West and East of the raise and in December the contract recovered the last pillar or ore in this area.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #43 working from #5526 Raise mined slices to the Southwest and North-East completing the work at this elevation in September. The Contract was then disbanded.

Contract #24 completed the mining Northwest of #5645 Raise and then moved to #5626A Raise. Mining was then continued Southeast of the latter Raise until July at which time it was necessary to abandon mining from raises in the 5600 Cross-Cut due to the high maintenance costs of the drift which was rapidly crushing. By the end of the year this Cross-Cut was crushed to the point where air would no longer pass through. The contract was then transferred to the 40' Sub Level.

Contract #22 completed mining West of #5640 Raise in February and then moved down to the sub level below.

Contract #47 completed mining East of #5638 Raise in January and then moved to #510 Raise. A connection was then advanced to #509 Raise and mining was started to the South. By July the contract had completed the mining from this raise and they moved to the sub level below.

Contract #1 completed a connection from #511 Raise to #510 Raise in January and started mining from the latter Raise. Operations were completed in August and the contract moved to the 10' Sub Level.

Contract #26 completed mining East and South of #511 Raise in March and then moved to the 5th Level.

Contract #33 mined 7 slices early in the year Northeast of #5742 Raise encountering the dike. In March they cut out on the next sub level.

Contract #38 finished 3 slices Southwest of Raise #5737. Mining in this area was then stopped and the contract moved down to the next lower sub level.

10' Sub Level

Mining on this sub level was first started in the Southwest limb in the vicinity of the dikes. Later the area along the footwall near the South boundary of the Race Course Lease was opened up. By the end of the year the development and mining was progressing to the North in the Race Course Lease above the 5500 Drift as mining was completed on the sub level above.

Contract #38 cut out #5745 Raise and drifted to #5742 Raise in February. Mining was then continued from #5745 Raise until September at which time they transferred their operations to #5742 Raise and continued mining to the West. In December one slice was completed and a second slice started West to the mining limit. The ore area here was considerably decreased by the flatening of the South footwall.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Contract #33 moved to this elevation in March and a connection was made from #5742 Raise to #5737 Raise. Mining was then carried on Northwest and West of the latter raise, and in December 2 slices were completed and a 3rd started Southwest to the limit. At the end of the year only a small pillar of ore remained to be mined in this direction.

Contract #22 cut out and timbered over one compartment of #5640 Raise in March. A connection was then driven Northwest to #5638 Raise, #5636 Raise and #5634 Raise. Mining was then carried on Northeast of #5638 Raise with slices that extended to the mining limit. In July a connection was completed Northeast to #5536 Raise, from which operations were continued the remainder of the year. A drift was then driven Northwest taking up #5536 Raise, #5532 Raise and #5530 Raise. In September mining was started in the area Southeast of #5536 Raise with slices that extended to the lean ore footwall. In December 2 slices were completed and a 3rd started Southeast toward the footwall.

Contract #23 started mining East of #5532 Raise in October with slices that extended to the mining limit. In December 3 slices were completed and a fourth started Northeast towards the limit.

Contract #51 was transferred to this territory in December and the first drift and one slice were completed Southwest of #5530 Raise. At the end of the year a second slice was advancing in this same direction.

Contract #46 moved to this elevation in December and started driving a connection Northwest toward #5528 Raise.

Contract #47 cut out and timbered over #511 Raise in July. A drift was then started Southwest towards #510 Raise. After advancing about 50 feet in lean ore and jasper it was stopped and the contract was disbanded.

Contract #1 started operations at this elevation in August. The contract continued from #511 Raise where #47 contract left off the month before. The connection to #510 Raise were completed and drifting continued Southwest to #509 Raise. Operations were then transferred to the latter raise and one drift and one slice was mined to the South. All of the development in this area was in lean ore and jasper due to the very flat pitch of the footwall which has now practically pinched the ore body out against the dike to the North. In December the contract did a small amount of mining Southwest of #510 Raise.

A Company Account crew cut out #516 Raise and started a drift in rock to the Southeast in May. In June Contract #34 continued the drift to a point 135' Southeast of the raise. During July Contract #10 started putting up a raise from the end of the above mentioned drift and by October the raise was completed to the Negaunee 1450 Cross-Cut providing a new ventilation connection between Negaunee Mine 14th Level and Maas Mine 5th Level, which should stand for a long time as it is all in rock and water sprayers have been installed to purify the air and also preserve the timber.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

Practically all of the contracts mentioned in preceding paragraphs under the 10' Sub Level, in and adjacent to the Race Course Lease except those on the extreme North and South footwalls have mined 100% in Special grade ore. It has been decided to concentrate on this grade of ore as much as possible as there is a larger market for this grade during the present time.

5th Level

The regular repair work was carried on ore or less constantly through out the year in 5300, 5400, and 5500 Cross-Cuts and in addition to this a considerable amount of development work was done.

Contract #17 started development of the ore body on the North footwall to the West of the Race Course Lease found by the previous drifting and drilling on the sub levels above. The 50 Cross-Cut which was started Southwest of #5022 Raise was advanced Northwest and thence West to a point about 30' East of the 2200 Coordinate. Practically all of the drifting was in ore of high sulphur grade.

Three raises namely #52, #54, and #56 were put up to the North to continue the exploration and development. Contract #26 advanced #52 Raise to the 130' Sub Level where it was cut out and the contract then started raising #56 Raise which was located about 125' to the West. In December this contract was cutting out the raise on the 90' Sub Level. Contract #42 started #54 Raise in July and by October were cutting out the raise on the 90' Sub Level. The upper half of this raise was in jasper but it was necessary to continue it to the 90' elevation as some 40' of ore had been found to the South by drilling on the 100' Sub.

The 5700 Cross-Cut was also advanced about 125' farther to the South in ore, dike, and jasper by #26 Contract. This work was done during the month of April and the contract then moved to #52 Raise in May, when it was found that apparently there was a large amount of jasper South of the dike and the 6th Level raises would not reach this elevation. Diamond drilling was carried on during the year on this level, the detailed reports of which are found under "Explorations".

6th Level

Most of the work on the 6th Level consisted of the development South of the Winze. Contract #19 started the development and Contract #17 joined in the work the last half of the year. In October Contract #45 was organized and the drift towards the main shaft was started.

Contract #19 advanced the 6000 or North footwall drift, which connects the Corss-Cuts on the North, to a point Southwest of the 6300 Cut. The contract then started advancing 6200 and 6300 Cross-Cuts and by the end of October they were connected by the 600 or South footwall drift on the South boundary of the Race Course Lease. The 600 drift was then continued and by the end of the year was advanced to a point about 60' East of the 1400W Coordinate. The footage for December was about 73' in slate and jasper.

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7. UNDERGROUND (Cont.)

c. Stoping (Cont.)

The most part of all the drifting on the 6th Level was in footwall material but several fairly rich seams of jasper were encountered in the 6300 and 6400 Cross-Cuts South of the dike showing that the ore lies very close to the level. The 6000 Drift encountered ore at the turn out for the 6300 Cross-Cut and has continued in ore to the West. The ore has for the most part been of Special grade, but the sulphur content has been much lower than anticipated, at times even below .050 and therefore there is an indication that the bottom of the sulphur horizon is in sight and standard ore may apparently be found below the 6th Level further to the West.

Contract #17 was transferred to this level in July and they continued the 6000 drift to a point 55' East of the 1600W Coordinate. The 6400 Cross-Cut was then started and in December it was stopped when it reached the switch of the proposed 600 Drift. The advance for December was approximately 115' in ferruginous slate and lean ore.

Contract #45 advanced the main drift to shaft to a point 80' South of the 600 South Coordinate. The footage for December was approximately 95' in slate and graywacke.

In addition to the drifting operations, the sump near the Winze was enlarged and some raising was also done in the completed Cross-Cuts.

Contract #12 was transferred to 6th Level in November and they started to put up #6214 Raise which is located on the curve in the extreme South end of the 6200 Cross-Cut. In addition to replacing 5th Level Raises this raise will provide a ventilation connection between 5th and 6th Levels. The advance for December was 62' to a total inclined height of 138' above the level. This raise is now complete to the 10' Sub Level, only the last 20' of this raise was in ore, the lower part being in the footwall.

Contract #39 was also transferred to 6th Level late in the year and they started raising #6212 Raise. The footage for December was 92' to a total inclined height of 120' above the level. This raise encountered the ore 50' above the level.

Main Shaft.

Sinking operations were completed by #4 Contract in January. The skip pit drift was then cut out at the bottom of the shaft and extended approximately 50' to the South. A new skip pit pocket and slide for removing the dirt was installed and then a small raise was put up to the 6th Level from the bottom of the regular pocket to form a second outlet while excavating the pocket. In April work was started on the pockets and also part of the pentice was removed under the cage compartment. During May work was done on week ends only and in June the excavation for the pockets was continued. This operation was interrupted in July when the skip broke loose and went down to the bottom of the shaft causing considerable damage near the 6th Level. After repairs were completed work was resumed and by the end of the year all excavation for the storage pockets was complete and construction of the measuring pockets had started.

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TIMBER STATEMENT FOR THE YEAR 1943

7. UNDERGROUND (Cont.)

d. Timbering

<u>KIND</u>	<u>LINEAL FT.</u>	<u>AVG. PRICE PER FT.</u>	<u>AMOUNT 1943</u>	<u>AMOUNT 1942</u>
6" x 8" Cribbing Timber	307,324	.0306	9,418.68	3,319.12
8" x 10" Stulls	93,346	.0930	8,680.65	10,100.49
10" x 12" Stulls	142,237	.1302	18,518.66	17,294.26
12" x 14" Stulls	91,824	.1748	16,050.87	10,031.91
Treated Timber	741	.3536	262.08	357.13
Total 1943	635,472	.0833	52,930.94	
Total 1942	457,250	.0898		41,102.91

Per 100 Ft.

7' Lagging	2,377,572	1.071	25,460.98	23,529.15
9½' Poles	1,771,564	1.846	32,698.81	28,735.11
Total 1943	4,149,136	1.402	58,159.79	
Total 1942				52,264.26
Wire Fencing - Sq. Ft.	34,375	.0152	522.60	418.00
Grand Total - 1943			111,613.33	
Grand Total - 1942				93,785.17

	<u>Amount 1943</u>	<u>Amount 1942</u>
Product, Tons	713,069	882,399
Feet of Timber per ton of ore-Stulls & Cribbing	.8911	.5182
Feet of Stull Timber only per ton of ore	.4601	.4307
Feet of Lagging per ton of ore	3.3300	2.7500
Feet of Poles per ton of ore	2.4840	1.9720
Feet of Wire Fencing per ton of ore	.0482	.0401
Feet of Lagging per foot of timber	3.7414	5.3144
Feet of Poles per foot of timber	2.7877	3.8061
Cost per ton for timber	.0742	.0466
Cost per ton for Lagging	.0357	.0267
Cost per ton for Wire Fencing	.0007	.0004
Cost per ton for Poles	.0459	.0326
Cost per ton for all timber	.1565	.1063
Equivalent of Stull timber to board measure	1,287,097	990,583
Feet of board measure per ton of ore	1.8050	1.1230

Total Cost for Timber, Lagging, Poles, etc. and cost per ton

<u>Year</u>	<u>Amount</u>	<u>Cost per Ton</u>
1943	111,613.33	.1565
1942	93,785.17	.1063
1941	75,111.73	.0908
1940	62,856.72	.0898
1939	53,010.66	.1023

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7. UNDERGROUND (Cont.)

d. Timbering (Cont.)

Although the average price per foot for stull timber was lower in 1943 than in 1942 there was an increase in all other types of mine timber and the cost per ton for timber was approximately 50% higher in 1943. More men were employed on extensive repairs to main levels and the contracts also spent more of their time repairing, especially those working just above the main levels, and these two factors together with a decreased product resulted in the increased cost per ton. There was also almost twice the amount of raising in 1943 over that in 1942 causing the large cribbing requirements.

e. Drifting and Raising

The following is a comparison of the drifting and raising in the years 1943 and 1942.

<u>Year</u>	<u>Drifting</u>		<u>Raising</u>		<u>Total</u>
	<u>Ore</u>	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>	
1943	1,119	1,051	972	1,063	4,205
1942	187	542	972	219	1,920

In addition to the above there was the following rock development under E & A CC 78:

	<u>Rock Drifting</u>	<u>Rock Raising</u>
1943	2,329	115'
1942	664	

The development program for 1943 was very heavy there being over twice the amount of drifting and raising on the upper levels and four times as much on the 6th Level as in 1942. There still remains approximately 1000 feet of rock drifting on the 6th Level and a large number of raises to be put up during 1944.

f. Explosives, Drilling and Blasting

Stoping and Ore Development

<u>Kind</u>	<u>Quantity</u> <u>Pounds</u>	<u>Average</u> <u>Price</u>	<u>Amount</u> <u>1943</u>	<u>Amount</u> <u>1942</u>
1 $\frac{1}{4}$ 60% Amonia Gel. Powder	250	.1150	28.75	805.00
1 $\frac{1}{4}$ Gelamite #1	241,313	.1150	27,751.02	37,489.43
Total Powder 1943	241,563	.1150	27,779.77	
Total Powder 1942	332,995	.1150		38,294.43

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7. UNDERGROUND (Cont.)f. Explosives, Drilling and Blasting

<u>Kind</u>		<u>Quantity</u> <u>Pounds</u>	<u>Average</u> <u>Price</u>	<u>Amount</u> <u>1943</u>	<u>Amount</u> <u>1942</u>
Fuse	M Ft.	1,217,123	5.140	6,256.20	6,761.60
#6 Blasting Caps	M	166,287	12.20	2,028.72	2,366.84
Electric Blasting Caps	C	5,992	11.16	668.88	616.38
Powder Bags	ea.	144	3.45	497.05	429.08
Tamping Bags	M	25,000	4.95	123.70	86.55
Fuse Lighters	M	37,500	6.75	253.18	239.66
#18 2-Cond. Elec. Blast Wire					30.88
Miscellaneous				34.20	94.80
Master Fuse Lighters	M	5,000	2.07	10.34	20.05
Total Fuse, Caps, Etc.				9,872.27	10,645.84
Total All Explosives				37,652.04	48,940.27
Product, Tons				713,069	882,399
Pounds Powder per Ton of Ore				.3387	.3773
Cost per Ton for Powder				.0390	.0433
Cost per Ton for Fuse, Caps, Etc.				.0138	.0121
Cost per Ton for All Explosives				.0528	.0555

Rock Development and Filling

<u>Kind</u>		<u>Quantity</u> <u>Pounds</u>	<u>Average</u> <u>Price</u>	<u>Amount</u> <u>1943</u>	<u>Amount</u> <u>1942</u>
1 $\frac{1}{4}$ " 60% Amonia Gel. Pwd.		3,000	.1150	345.00	258.75
1 $\frac{1}{4}$ " Gelamite 1		47,440	.1150	5,455.60	6,319.82
Total Powder - 1943				5,800.60	
Total Powder - 1942					6,578.57
Fuse	M Ft.	42,162	5.457	230.12	188.89
#6 Blasting Caps	M	5,196	12.20	63.40	62.68
Powder Bags	ea.	7	3.45	24.15	
Electric Blasting Caps	C	1,981	11.97	237.23	336.17
Total Fuse, Caps, Etc.				554.90	587.74
Total All Explosives				6,355.50	7,166.31
Total Explosives Used at Mine				44,007.54	56,106.58
Average Price per Pound for Powder					.1150

Statement showing cost per ton for explosives, exclusive of rock development, for the period 1939 to 1943:

<u>Year</u>	<u>Cost per Ton</u>	<u>Production</u>
1943	.0528	713,069
1942	.0555	882,399
1941	.0581	827,369
1940	.0568	699,977
1939	.0555	517,899

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7. UNDERGROUND (Cont.)

h. Mining & Loading

With the exception of raise development, all of the ore and rock produced in 1943 was handled by electric scraper hoist units, of which there were 47 in service at the end of the year, 2 20 H.P. Sullivan Hoists having been purchased during 1943. A new type of loader for use in main level drifts was put into use this year and it has proven so very satisfactory that it has been copied by three other mines in the district. It was designed by the Superintendent and Captain and assistant mechanic and built by the latter, and by the end of the year there were three of these units in operation. The principle involved is that of a portable scraper slide with a standard 15 H.P. electric hoist mounted on top with the controls so arranged that the operator can stand alongside, instead of having to be on top of the loader. The loader is mounted on wheels and is held in place by means of screw jacks, attached to the loader and quickly adjusted to the back of the drift. The design is such that the whole assembly can be run on the cage when moving from one level to another, while most others have to be either dismantled or hung below the cage. The advantages over most types of mechanical loaders is that the full width of the drift can be cleaned up and the cars completely filled, the first being impossible with a loader, and the second only with a conveyor type which costs approximately \$10,000, while this unit cost approximately \$500.00 and for power uses any of the 15 H.P. units, which can be removed and used in the sub levels at any time the loader is idle.

The very important advantage over former scraper slides is its movability and the securing of the unit in position, thereby making it practical to have the loader close to the breast when in use. The total time consumed in dismantling the ropes and jacks, being moved to another heading by use of a locomotive, and installing in place, is less than one half hour, and a four-ton car can be loaded in about two minutes. Another advantage is that it operates equally well in either rock or ore and also in either wet or dry material.

The contracts continued to spend between 18% and 20% of their time repairing either in or on top of their respective raises, as the mine is continually getting heavier and also due to so many of the working places being in close proximity to the main levels. The repairing of the main levels and traveling ways also continued to be a very extensive program, there being approximately 50 men employed constantly on this work. The cost of timbering increased 15.5 cents making a total of .614 per ton, with supplies showing an increase of only .05 per ton, for a total of .180, only approximately one-half of this increase being due to the decreased product.

A large percentage of the ore was being removed from under new hanging with the consequent delay and increased cost due to time being spent in blasting filling and preparing more extensive covering. There was also considerable exploring in the new area to the Northwest above the 5th Level, where several raises and dog drifts had to be driven to ascertain the size of the ore body in order to mine it most efficiently. There have been several encroachments of large jasper pillars into other mining areas, with a consequent shortening of the slices and thereby increasing the proportion of timbering, in starting

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7. UNDERGROUND (Cont.)

h. Mining and Loading (Cont.)

new slices, to the total ore removed. Two of the areas that were formerly the best producing in the mine have been badly handicapped by seams of hard blue steel ore which increased the drilling time from one hour to a full shift, although wet machines with jacklegs and jackbits were promptly installed. The water has not been quite as much a handicap in most of the areas, but in the new area being opened up on the North footwall above the 4th Level, the flow of water was so great that after repeated efforts from four different raises, it has been decided to temporarily abandon this area and concentrate on new areas above the 6th Level which should be dry and also produce ore of special grade, for which there is a good market at present.

Special attention was given to the opening of the 6th Level with respect to the main level cross-cuts and the tracks, and as a result, everyone who has seen it has reported it the best they have ever seen. The timbered drifts were driven 17 feet wide in the bottom, allowing maximum room for ditches and storage of timber. The tracks have been well ballasted and welded together in 100 foot lengths, eliminating joints which tend to sag and cause spillage of the ore, especially if it is wet. All surplus material has been cleaned up and loose rock along the sides tamped down to form an even floor.

i. Ventilation

The ventilation of the Maas Mine has been very much improved during 1943. The new raises from the 4th Level to the 3rd Level have allowed the air to pass through the working places where formerly it had to be picked up on the 3rd Level with auxiliary fans and carried into the contracts by long lines of vent tube. Two new connections, one in rock, were made between the 14th Level, Negaunee, and the 4th Level, Maas, which have greatly increased the volume on the 4th Level. The most noticeable improvement, however, has been in the 5th Level where a rock drift 140 feet in length was driven and 60 feet of rock raise extended to the 14th Level Negaunee.

Water sprays have been installed at all of these openings, both to purify the air and also to help maintain the timber by keeping it constantly wet. A new type of auxiliary fan was also introduced in 1943 which maintains more pressure and therefore delivers more air even though the vent tube is constricted where it passes through openings which are crushing. Two raises have been holed from the 6th to the 5th Level and the air passes down these and then up again through the winze. Ventilation doors will be installed between the winze and main shaft on the 6th Level and local control doors on the 5th Level, forcing the air to all come down to the 6th Level at the South end of the mine, and back to the 5th on the North footwall and thence out to the shaft, thus ventilating the area on the 5th which at present has to depend entirely on auxiliary fans. Forced ventilation, consisting of both an exhausting and a blowing fan have been used in connection with water curtains while drifting the 6th Level drifts, the air being taken from the 5th Level through the winze and thence back to 5th Level through 10" steel tubing placed in the winze and exhausting beyond a water curtain on the shaft side.

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7. UNDERGROUND (Cont.)

j. Pumping

The amount of water pumped underground during 1943 increased from 50 to 100 gallons a minute, over the amount in 1942, as shown respectively by the pump logs and by the weir readings. This may have been caused in part by trouble with the surface wells during which times the pumps were shut down and the average pumped on surface for the year was only 710, as compared with 950 the year before. Most of the increase came, however, from tapping the old workings in an attempt to open up the North footwall area above the 4th Level. Several times there was so much water coming down these new raises that dams had to be inserted on the 4th Level to avoid drowning out the pumps. By the end of the year, however, some of this excess had evidently drained off, although there was still so much water in this one area that it was temporarily abandoned and will have to be reopened at some later date when there is not as much rock development as at present, it being considered necessary to put up more rock raises on the footwall.

The number of gallons per minute pumped during 1943, 1942, 1941, 1940, and 1939 are shown below, as calculated by the Mechanical Department from the power consumption of the pumps:

<u>Month</u>	<u>1943</u>	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>
January	1,050	997	1,347	1,370	1,565
February	1,056	1,004	1,187	1,339	1,525
March	1,072	1,017	1,126	1,382	1,339
April	1,042	1,029	1,105	1,386	1,430
May	1,082	1,035	1,105	1,411	1,327
June	1,056	1,068	1,096	1,434	1,290
July	1,117	1,095	1,106	1,380	1,224
August	1,175	1,111	1,104	1,321	1,356
September	1,141	1,069	1,157	1,245	1,397
October	1,138	1,065	1,148	1,276	1,385
November	1,129	1,046	1,150	1,280	1,434
December	<u>1,126</u>	<u>1,051</u>	<u>998</u>	<u>1,318</u>	<u>1,370</u>
Total Average	<u>1,099</u>	<u>1,049</u>	<u>1,136</u>	<u>1,345</u>	<u>1,387</u>

Following is the average number of gallons per minute as calculated from the underground weir readings and from the surface pumping for 1941, 1942, and 1943.

<u>Year</u>	<u>1st Level</u>	<u>2nd Level</u>	<u>3rd Level</u>	<u>4th Level</u>	<u>5th Level</u>	<u>Total Undg.</u>	<u>Surface</u>
1941	76	19	334	276	223	928	975
1942	66	13	269	346	228	922	950
1943	93	15	274	378	260	1,020	654

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8. COST OF OPERATINGa. Comparative Mining Cost.

	<u>1943</u>	<u>1942</u>	<u>Incr.</u>	<u>Decr.</u>
Product	713,069	882,399		169,330
Underground Cost	1.841	1.472	.369	
Surface Cost	.159	.136	.023	
General Mine Expense	.282	.246	.036	
Cost of Production	<u>2.282</u>	<u>1.854</u>	<u>.428</u>	
Depletion - Original Cost	.100	.126		.026
Increment	.000	.000		
Depreciation-Plant & Equip.	.050	.062		.012
Development	.050	.062		.012
Movable Equip.	.000	.000		
Taxes	.142	.108	.034	
Loading & Shipping	.058	.051	.007	
Total Cost at Mine	<u>2.682</u>	<u>2.263</u>	<u>.419</u>	
No. of Days Operated	306	296	10	
No. of Shifts & Hours	1, 2 & 3-8	1, 2 & 3-8		
Average Daily Product	2330	2,981		651

Cost of Production

	<u>1943</u>	<u>%</u>	<u>1942</u>	<u>%</u>
Labor	1.527	66.9	1.242	67.1
Supplies	.755	33.1	.612	32.9
Total	<u>2.282</u>	<u>100.0</u>	<u>1.854</u>	

b. Detailed Cost Comparison
(1) Days and Shifts

<u>Year</u>	<u>Days</u> <u>Worked</u>	<u>Shifts &</u> <u>Hours</u>	<u>Men</u> <u>Employed</u>	<u>Total</u> <u>Days Worked</u>
1943	306	1, 2 & 3-8	475	132,826 $\frac{1}{2}$
1942	296	1, 2 & 3-8	498	141,245 $\frac{1}{2}$
Increase	10			
Decrease			23	8,419

The mine operated 16 shifts per week during 1943 except for the month of January when there were 17 shifts per week.

Total Men Employed in December of Each Year

	<u>1943</u>	<u>1942</u>	<u>1941</u>
Surface	77*	74*	81*
Underground	430**	466	422
Total	<u>507</u>	<u>540</u>	<u>503</u>

*Includes 8 men on Company House repairs.

**Includes 39 men on E & A CC 78, 6th Level Development.

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8. COST OF OPERATING

b. Detailed Cost Comparison

(2) Wages

There was an increase in wages of $5\frac{1}{2}$ cents per hour which became effective on April 1st and was retroactive to July 13th 1942. Later the salaried employees at the mine received an equivalent raise also retroactive.

(3) Comparison of Production

<u>Year</u>	<u>Production</u>	<u>Average Daily Product</u>
1943	713,069	2,330
1942	882,399	2,981
Decrease	169,330	651

The decrease in production was mostly due to the large development program and also to the loss of skilled miners who quit to obtain higher wages in other occupations.

(4) Comparison of Number of Men & Wages

<u>Year</u>	<u>No. Men</u>	<u>No. Days</u>	<u>Amount</u>	<u>Rate Per Day</u>
1943	475	132,826 $\frac{1}{2}$	1,059,033.23	7.97
1942	498	141,245 $\frac{1}{2}$	1,068,160.26	7.56
Increase				.41
Decrease	23	8,419	9,127.03	

(5) Tons Per Man Per Day

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Surface	31.36	39.32		7,960
Underground	6.48	7.43		.095
Total	5.37	6.25		.088

(6) Cost of Production

1943	1,627,380.65	Cost per ton	2.282
1942	1,636,020.54	Cost per ton	1.354
Increase			.428
Decrease	8,639.89		

	<u>Total Cost</u>				<u>Cost Per Ton</u>		
	<u>Labor</u>	<u>%</u>	<u>Supplies</u>	<u>%</u>	<u>Labor</u>	<u>Supplies</u>	<u>Total</u>
1943	1,088,922.28	66.9	538,458.37	33.1	1.527	.755	2.282
1942	1,096,336.90	67.1	539,683.64	32.9	1.242	.612	1.854
Incr.				.2	.325	.143	.428
Decr.	7,414.62	.2	1,225.27				

(7) Detail of Accounts

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Average Days Per Week	6	6		
Shifts and Hours	1, 2 & 3-8	1, 2 & 3-8		
Production, Tons	713,069	882,399		169,330
Avg. Daily Product, Tons	2,330	2,981		651
Number of Days Worked	306	296	10	

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8. COST OF
OPERATING

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

	1943		1942		Increase		Decrease	
	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton	Amount	Per Ton
<u>Underground Costs</u>								
1. Exploring in Mine	3,139.95	.004	3,026.75	.003	113.20	.001		
2. Development in Rock	31,580.65	.043	12,001.92	.014	19,578.73	.029		
4. Development in Ore	25,123.31	.034	9,476.50	.011	15,646.81	.023		
5. Stopping	414,243.74	.566	466,621.59	.529		.037	52,377.85	
6. Timbering	437,823.22	.598	405,289.04	.459	32,534.18	.139		
7. Trammig	119,743.18	.164	141,669.51	.161		.003	21,926.33	
8. Ventilation	17,967.65	.025	15,447.84	.018	2,519.81	.007		
9. Pumping	60,539.21	.083	58,489.66	.066	2,049.55	.017		
10. Comp. & Air Pipes	73,767.87	.101	65,140.82	.074	8,627.05	.027		
11. Back Filling			1,108.38	.001			1,108.38	.001
12. Underground Supt.	35,457.69	.048	30,034.27	.034	5,423.42	.014		
13. Cave-In	52.72		119.27				66.55	
14. Main. Compr. & Drills	5,160.28	.007	1,506.26	.002	3,654.02	.005		
15. Scrapers & M. Loaders	43,853.07	.060	46,073.65	.052		.008	2,220.58	
16. Elec. Tram Equipment	36,326.16	.050	36,349.82	.041		.009	23.66	
17. Pumping Machinery	7,895.47	.011	6,528.75	.007	1,366.72	.004		
Total Undg. Costs	1,312,674.17	1.793	1,298,884.03	1.472	13,790.14	.321		
<u>Surface Costs</u>								
18. Hoisting	44,502.54	.061	47,577.46	.054		.007	3,074.92	
19. Stocking Ore	18,771.83	.026	13,964.75	.016	4,807.08	.010		
20. Screening, Crushing at Mine			88.71				88.71	
21. Dry House	16,414.25	.022	16,279.70	.018	134.55	.004		
22. General Surface	10,642.49	.015	9,989.68	.011	652.81	.004		
23. Main. Hoisting Equip.	11,599.73	.016	12,731.80	.015		.001	1,132.07	
24. Shaft	7,005.64	.010	10,073.26	.012			3,067.62	.002
25. Top Tram Equipment	2,799.38	.004	2,564.19	.003	235.19	.001		
26. Docks, Trestles, & Pkts.	432.96	.001	2,074.26	.002			1,641.30	.001
27. Mine Buildings	1,388.39	.002	4,340.31	.005			2,951.92	.003
Total Surface Costs	113,557.21	.155	119,684.12	.136		.019	6,126.91	
<u>General Mine Expense</u>								
28. Insurance	6,402.73	.009	6,119.57	.007	283.16	.002		
29. Mining Engineering	4,831.48	.007	4,347.75	.005	483.73	.002		
30. Mech. & Elec. Engrg.	2,817.82	.004	2,443.97	.003	373.85	.001		
31. Analysis & Grading	40,606.54	.055	45,089.48	.051		.004	4,482.94	
32. Personal Injury	19,562.42	.027	15,240.70	.017	4,321.72	.010		
33. Safety Department	2,933.99	.004	2,638.85	.003	295.14	.001		
34. Tel. & S. Devices	3,639.72	.005	3,069.23	.003	570.49	.002		
35. Local and Gen. Welfare	6,135.75	.008	6,893.10	.008			757.35	
36. Sp. Exp. Pens. & All.	47,289.65	.065	25,093.25	.028	22,196.40	.037		
37. Ishpeming Office	26,960.75	.037	26,149.28	.030	811.47	.007		
39. Mine Office	27,266.65	.037	26,854.00	.031	412.65	.006		
Social Security Taxes	24,887.16	.034	27,585.25	.031		.003	2,698.09	
Employees Vacation	25,003.38	.034	25,927.96	.029		.005	924.58	
Total Gen. Mine Exp.	238,338.04	.326	217,452.39	.246	20,885.65	.080		
Cost of Production	1,664,569.42	2.274	1,636,020.54	1.854	28,548.88	.420		
40. Taxes	101,712.75	.139	95,673.93	.103	6,038.82	.036		
Total Cost	1,766,282.17	2.413	1,731,694.47	1.962	34,587.70	.451		

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8. COST OF OPERATING

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

GENERAL

Almost all of the accounts show an increase due to the raise in wages and also to the large decrease in production caused by the extensive rock development.

UNDERGROUND COSTS

3. Development in Rock

	<u>Drifting</u>	<u>Raising</u>	<u>Total Feet</u>	<u>Cost Per Foot</u>
1943	1051'	1063'	2114'	14.94
1942	542'	219'	761'	12.10
Increase	509'	844'	1353'	2.84

The large increase in rock development was due to the new footwall drift, 4200 Cross-Cut and raises to put up to serve the 3rd Level area.

4. Development in Ore

	<u>Drifting</u>	<u>Raising</u>	<u>Total Feet</u>	<u>Cost Per Foot</u>
1943	1119'	972'	2091'	12.01
1942	187'	972'	1159'	8.17
Increase	932'		932'	3.84

The increase in ore development was due to drifting on the 5th Level and above in opening the area on the Northwest footwall.

5. Stoping

	<u>Labor</u>	<u>Cost Per Ton</u>	<u>Supplies</u>	<u>Cost Per Ton</u>	<u>Total</u>
1943	364,051.17	.511	50,192.57	.070	.581
1942	401,068.18	.455	65,553.41	.074	.529
Increase		.056			.052
Decrease	37,017.01		15,360.84	.004	

The increase in cost per ton for stoping was due mostly to the increase in wages and also to more gangs working under new hanging or jasper pillars.

6. Timbering

	<u>Labor</u>	<u>%</u>	<u>Cost</u>			<u>Cost Total Cost</u>	
			<u>Per Ton</u>	<u>Supplies</u>	<u>%</u>	<u>Per Ton</u>	<u>Per Ton</u>
1943	309,816.72	70.6	.434	128,006.50	29.4	.190	.614
1942	295,090.34	72.8	.334	110,198.70	27.2	.125	.459
Increase	14,726.38		.100	17,807.80	2.2	.055	.155
Decrease		2.2					

The increase both in amount and cost per ton was due mostly to more time being spent by the contracts on timbering but also to more main level timbering and the increase in wages.

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8. COST OF OPERATING

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

<u>7. Traming</u>	<u>Labor</u>	<u>Cost Per Ton</u>
1943	119,743.18	.164
1942	128,479.75	.146
Increase		.018
Decrease	8,736.57	

The increase in cost per ton was entirely due to the increase in wages.

8. Ventilation

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	17,967.65	.025
1942	15,447.84	.018
Increase	2,519.81	.007

The increase in ventilation was mostly due to new equipment and also extensive connections in rock between the Maas and the Negaunee Mines.

9. Pumping

	<u>Surface</u>	<u>Gals. Per Min.</u>	<u>Underground</u>	<u>Gals. Per Min.</u>	<u>Total Cost for Power</u>
	<u>Gallons Pumped</u>		<u>Gallons Pumped</u>		
1943	373,176,000	710	569,868,620	1,087	42,525.46
1942	499,220,000	950	553,177,899	1,059	41,125.03
Increase			16,690,721	28	1,400.43
Decrease	126,044,000	240			

There was a slight increase in the water pumped from underground due mostly to opening up the North footwall above the 4th Level. The large decrease in the amount pumped from the Surface Wells was due to break downs of the pumps and delay in getting repair parts.

10. Compressors & Air Pipes

	<u>Cu. Ft. Air Compressed</u>
1943	1,916,100,000
1942	1,703,655,000
Increase	212,445,000

The increase in the amount of air compressed was due to more drilling in rock and more hard seams of ore also requiring a longer drilling period.

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8. COST OF OPERATING

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

12. Underground Superintendence

	Cost	Cost Per Ton
1943	35,457.69	.050
1942	30,043.27	.034
Increase	<u>5,414.42</u>	<u>.016</u>

The increase in the cost of underground superintendence was due mostly to the increase in their salaries but also in part to putting on another boss for 6th Level to speed up that development.

14. Main. Comp. & Drills

	Cost	Cost Per Ton
1943	5,160.28	.007
1942	1,506.26	.002
Increase	<u>3,654.02</u>	<u>.005</u>

The large increase was due to charging out the cost of four utility hoists purchased in December 1942 and also to the purchase of 12 new drills during 1943.

15. Scrapers and Mechanical Loaders

	Cost	Cost Per Ton
1943	43,853.07	.062
1942	46,073.65	.052
Increase		<u>.010</u>
Decrease	2,220.58	

Although there were two new scraper hoists purchased in 1943 there was considerable less repairs to the other units.

16. Electric Tram Equipment

	Cost	Cost Per Ton
1943	36,326.16	.051
1942	36,349.82	.042
Increase		<u>.009</u>
Decrease	23.66	

17. Pumping Machinery

	Cost	Cost Per Ton
1943	7,895.47	.011
1942	6,528.75	.007
Increase	<u>1,366.72</u>	<u>.004</u>

The increase was almost entirely due to rewinding spare motor for pump.

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8. COST OF OPERATING

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

SURFACE COSTS

18. Hoisting

	<u>Total Ore & Rock</u>	<u>Power Cost</u>	<u>Cost Per Ton For Power</u>	<u>Cost Per Ton</u>
1943	782,199	28,339.88	.0362	.062
1942	921,644	32,380.72	.0351	.054
Increase			.0011	.007
Decrease	139,445	4,040.84		

Decrease on this account was due to hoisting less ore.

19. Stocking Ore

	<u>Tons Stocked</u>	<u>Amount</u>	<u>Cost Per Ton</u>
1943	383,043	18,771.83	.026
1942	390,306	13,964.75	.016
Increase		4,807.08	.010
Decrease	7,263		

This increase was due to increase in wages and purchasing more trestle legs in 1943.

21. Dry House Expense

	<u>1943</u>	<u>1942</u>	<u>Increase</u>
Coal Used in Heating Plant, Tons	1,301 $\frac{1}{2}$	1,217	84 $\frac{1}{2}$
Cost Per Ton for Coal	6.280	5.720	.560
Cost of Coal	7,810.86	6,974.64	836.22

January and February of 1943 were much colder than in 1942 and the price of coal was advanced.

22. General Surface

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	10,642.49	.015
1942	9,989.68	.011
Increase	652.81	.004

The increase in cost was due to increase in wages and more overtime work unloading cars of mine timber.

23. Hoisting Equipment

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	11,599.73	.016
1942	12,731.80	.015
Increase		.001
Decrease	1,132.07	

Decrease due to less repairs to hoists, skips, and cages.

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8. COST OF OPERATING

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

24. Shaft

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	7,005.64	.010
1942	10,073.26	.012
Decrease	3,067.62	.002

In both 1942 and 1943 the cost of this account was high due to accidents in the shaft when the skip ropes broke.

25. Top Tram Equipment

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	2,799.38	.004
1942	2,564.19	.003

26. Docks, Trestles, & Pockets

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	432.96	.001
1942	2,074.26	.002
Decrease	1,641.30	.001

Most of the cost in 1942 was due to painting trestle and repairing pockets.

27. Mine Buildings

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	1,388.39	.002
1942	4,340.31	.005
Decrease	2,951.92	.003

There was very little maintenance on mine buildings during 1943.

28. Insurance

	<u>1943</u>	<u>1942</u>	<u>Increase</u>
Property	3,154.82	3,061.76	93.06
Group	2,354.85	2,192.07	162.78
Catastrophe	893.06	865.74	27.32
Total	6,402.73	6,119.57	283.16

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8. COST OF OPERATING

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

29. Mining Engineering

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	4,831.48	.007
1942	4,347.75	.005
Increase	<u>483.73</u>	<u>.002</u>

Increase due to more time spent by engineers giving lines in the development drifts and raises.

30. Mechanical & Electrical Engineering

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	2,817.82	.004
1942	2,443.97	.003
Increase	<u>373.85</u>	<u>.001</u>

Increase due to larger proportions of Mechanical Department cost.

GENERAL MINE EXPENSES

31. Analysis and Grading

	<u>No. Determinations</u>	<u>Lab. Expense Cost Per Determination</u>	<u>Analysis & Grading</u>
1943	73,251	.388694	.445019
1942	83,603	.371944	.539328
Increase		<u>.016750</u>	
Decrease	10,352		.094309

Decrease due to eliminating large number of phosphorus determinations on account of discontinuing the production of Bessemer Ore.

32. Personal Injury

	<u>1943</u>	<u>1942</u>	<u>Increase</u>
Compensation Department	879.22	869.93	9.29
Hospital Loss	8,347.27	7,968.92	378.35
Reserve & Catastrophe, Compensation Set-up & Medical Service	<u>10,335.93</u>	<u>6,401.85</u>	<u>3,934.08</u>
	<u>19,562.42</u>	<u>15,240.70</u>	<u>4,321.72</u>

Less credit to this account on December of 1943 as compared with December of 1942.

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8. COST OF OPERATING

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

33. Safety Department

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	2,933.99	.004
1942	2,638.85	.003
Increase	295.14	.001

Increase due to more safety department expense.

34. Telephones & Safety Devices

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	3,639.72	.005
1942	3,069.23	.003
Increase	570.49	.002

Increase in most part due to purchase of more fire extinguishers and more fire patrol on afternoon shifts.

35. Local and General Welfare

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	6,135.75	.009
1942	6,893.10	.008
Increase		.001
Decrease	757.35	

Decrease due to less aid to employees in 1943.

36. Special Expense, Pensions & Allowances

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Saranac Invest.	3,064.97	2,749.35	315.62	
Legal	551.46	518.96	32.50	
Pension	1,998.78	2,559.39		560.61
Miscellaneous	6,792.39	19,265.55		12,473.16
	<u>12,407.60</u>	<u>25,093.25</u>		<u>12,685.65</u>

Large credit taken in 1943 on account of retroactive raise in wages which had been allocated to the various accounts.

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8. COST OF OPERATING

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

37. Ishpeming Office

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	25,548.46	.036
1942	<u>26,149.28</u>	<u>.030</u>
Increase		.006
Decrease	600.82	

Decrease due to less Ishpeming Office expense on account of less ore produced.

39. Mine Office

	<u>Cost</u>	<u>Warehouse Overhead</u>	<u>Cost Per Ton</u>
1943	27,266.65	7,431.32	.038
1942	<u>26,854.00</u>	<u>8,149.36</u>	<u>.031</u>
Increase	412.65		.007
Decrease		718.04	

Increase in cost due to increase in wages but this was partly offset by decrease in warehouse overhead due to smaller production.

Employees Vacation

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	25,003.38	.035
1942	<u>25,927.96</u>	<u>.029</u>
Increase		.006
Decrease	924.58	

Vacation pay in 1943 was based on 16 shifts per week while in 1942 the average was based on 17 shifts.

40. Taxes

	<u>Cost</u>	<u>Cost Per Ton</u>
1943	101,702.75	.142
1942	<u>95,673.93</u>	<u>.108</u>
Increase	6,038.82	.034

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8. COST OF OPERATING

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

Analysis of Supplies Used

	<u>1943</u>		<u>1942</u>		<u>Increase</u>		<u>Decrease</u>	
	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>	<u>Amount</u>	<u>Per Ton</u>
41. General Supplies	26,914.24	.037	40,877.83	.047			13,963.59	.010
42. Iron & Steel	12,653.15	.017	14,264.87	.016		.001	1,611.72	
43. Oil & Grease	3,067.29	.004	3,460.05	.004		.000	392.76	
44. Machinery Supplies	13,133.30	.018	21,443.93	.024			8,310.63	.006
45. Explosives	44,133.90	.060	52,160.76	.059		.001	8,026.86	
46. Lumber & Timber	121,176.03	.166	101,117.93	.115	20,058.10	.051		
47. Fuel	7,779.27	.011	7,295.51	.008	,483.76	.003		
48. Electric Power	150,372.49	.205	147,232.75	.167	3,139.74	.038		
49. Sundries	47,335.31	.065	25,824.68	.029	21,510.63	.036		
50. Other Mines & Accounts	<u>868.59</u>	<u>.001</u>	<u>958.46</u>	<u>.001</u>			<u>89.87</u>	
Total	<u>425,696.39</u>	<u>.581</u>	<u>412,719.85</u>	<u>.468</u>	<u>12,976.54</u>	<u>.113</u>		

While the total amount for General Supplies, Machinery Supplies and explosives was lower in 1943, this was due to less product and therefore the cost per ton remained nearly the same. Electric Power was slightly higher in 1943 as pumping was up and the compressors had to be operated the same although there was less product. There was considerable more timber used and Sundries were up on account of Clearing account taken from column 9 and put under Sundries.

9. EXPLORATIONS
AND FUTURE
EXPLORATIONS

There was considerable exploring by drilling during 1943, both with the small "Gopher" drill and also with the standard diamond drill. The former has been invaluable in drilling short holes in new areas and thus avoiding cutting up the pillars with drifts and raises which subsequently are a handicap if the ore is found to extend higher in certain parts of the area. It costs more on the start to use a drill, but this is more than made up by being able to open up the area in a better manner and also saves the cost of crossing over and cutting through drifts that would have had to be driven in advance of mining if the drill had not been used.

Holes #46 and #47

These holes were drilled on the 4th Level in the breast of #4200 Cross-Cut to tap water dammed up in the old footwall drift and drain it off gradually before continuing the cross-cut.

Hole #48

This hole was drilled to the Northwest from the West end of the North foot-wall drift on the 5th Level, which had encountered two small dikes running about parallel with the drift and it was necessary to know where the ore lay before continuing the drift. The hole, however, was entirely in alternate

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9. EXPLORATIONS
AND FUTURE
EXPLORATIONS

Hole #48 (Cont.)

seams of dike and jasper and encountered the slate footwall at 60 feet, proving that there was no ore lying North of the drift.

Hole #49

This hole was drilled Southwest from the same position as #48, and after passing through 10 feet of dike continued in ore for 200 feet with the exception of a small dike and jasper from 130 to 145 feet. The last 25 feet was in jasper and as this was apparently the hanging, the hole was stopped.

Hole #50

After finding that the ore continued to the Southwest from the end of the 5th Level drift, it was decided to ascertain the width at approximately the center of this new area, and this hole was put in due South and continued in ore for 275 feet, when it was stopped, as this is about the limit this type of drill can handle.

Hole #51

This hole was drilled to determine the amount of jasper that would have to be cut if it was found necessary to drift West on the 5th Level with another drift South of the present so-called #50 drift in order to mine the ore found in #50 Hole if it extended too high above the 5th Level to be mined efficiently from the 6th Level. This hole was entirely in jasper for the 50 feet drilled, proving that the ore found in #50 does not extend very far to the East and therefore probably does not reach very far above the 5th Level.

Hole #52

This hole was drilled to the Southwest from the West end of the South footwall drift in order to find out as to whether or not the small deposit South of the dike extends to the 5th Level and below, but the hole encountered only jasper and lean ore, proving that the South footwall cuts this ore body out entirely on the 10 foot elevation, as had been supposed.

Hole #53

This hole was covered by E & A CC-124 and together with #54 was drilled to ascertain if there was any ore on the Pioneer and Arctic lands in this area which would warrant new development and mining from the Negaunee Mine. It was drilled due South at an inclination of --30°, cut through 195 feet of high sulphur ore, and encountered the South footwall at 234 feet, or just above the 6th Level elevation and approximately 160 feet horizontally South of the end of the #58 Cross-Cut.

Hole #54

This horizontal hole was drilled due South from the same elevation as #53, and at the end of the year was 685 feet in depth, encountering nothing but formations averaging approximately 35% in iron. It is therefore evident that there is not very much ore lying in this area unless at depth and far to the South near the Bunker Hill line.

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9. EXPLORATIONS
AND FUTURE
EXPLORATIONS

Hole #54 (Cont.)

It is intended to do some further drilling in the North footwall area above the 5th Level to help in outlining the ore and it has also been decided to drill some more or less vertical holes from the 6th Level to determine the grade of the ore lying below this level. Samples taken on the 6th Level would tend to indicate there might be a possibility of finding standard ore below the high sulphur horizon.

10. TAXES

	<u>1943</u>		<u>1942</u>	
	<u>VALUATION</u>	<u>TAXES</u>	<u>VALUATION</u>	<u>TAXES</u>
Maas Mine	\$ 2,640,000	100,634.69	\$ 3,285,000	107,344.60
Race Course	640,000	24,396.29	610,000	19,933.09
Adams Strip	165,000	6,289.67	75,000	2,450.00
Stockpile & Equipment	735,000	28,017.61	580,000	18,952.78
Miscellaneous Parcels	8,860	337.84	8,860	289.56
Total Mine	<u>4,188,860</u>	<u>159,676.10</u>	<u>4,558,860</u>	<u>148,970.82</u>
Collection Fees		1,596.76		1,489.71
Total Oprtg. Maas Mine		<u>161,272.86</u>		<u>150,460.53</u>
Maas Area Leased to Negaunee Mine	1,382,000	53,207.54	1,585,000	52,311.30
Adams Strip Charged to Negaunee Mine	<u>165,000</u>	<u>6,352.57</u>	<u>75,000</u>	<u>2,475.30</u>
Total Charged to Negaunee Mine	<u>1,547,000</u>	<u>59,560.11</u>	<u>1,660,000</u>	<u>54,786.60</u>
Bal. Oprtg. Maas Mine	2,641,860	101,712.75	2,898,860	95,673.93
Total as Above	4,188,860	159,676.10	4,558,860	150,460.53
		<u>1943</u>		<u>1942</u>
	<u>VALUATION</u>	<u>TAXES</u>	<u>VALUATION</u>	<u>TAXES</u>
Tax Rate		3.81192		3.26772
Total City of Negaunee Tax		539,671.30		480,690.32
Maas Mine % of City Tax		29.5%		32.2%
Maas Mine Rented Houses	108,100	4,120.61	105,700	3,471.44
Mineral Lands, Etc.	18,800	716.66	18,600	607.79
Total Houses & Lands	<u>126,900</u>	<u>4,837.27</u>	<u>123,300</u>	<u>4,079.23</u>
Collection Fees		48.38		40.79
Total		<u>4,788.89</u>		<u>4,120.02</u>

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11. ACCIDENTS AND
PERSONAL INJURY

	<u>1943</u>	<u>1942</u>
Fatal	0	0
Time Lost, over 4 months	2	1
Time Lost, 1 to 4 months	5	7
Time, Lost, less than 1 month	<u>10</u>	<u>6</u>
Total Accidents	17	14

On December 31, 1943 payments were being made on four accidents which occurred prior to January 1, 1943. Two are death claims and two are receiving full compensation.

The total amount paid on compensation in 1943 was \$14,243.13 as compared with \$7,292.36 in 1942. Approximately \$6,000 of the 1943 figures was on account of making final settlements for two previous injuries. The following is a brief description of the lost time accidents.

<u>Date of Accident</u>	<u>Name of Injured Man</u>	<u>Days Lost</u>	<u>Compensation Paid to 12-31-43</u>	<u>Description of Accident</u>
1-9-43	Frank Gensheimer	23	\$ 51.00	Gensheimer received a severe strain in his back while attempting to lift a measuring pocket door with a bar.
2-19-43	Ensio Salo	31	75.00	Salo was pulling a piece of timber along the drift when it hit another piece near to the hoist where he was standing. This other timber hit his right leg causing a fracture.
2-27-43	Carl Lenshek	21	45.00	Lenshek was sharpening a punch on the emery wheel when the punch slipped and his hand was pulled between the rest and wheel, lacerating the 3rd finger of his right hand.
3-17-43	Oliver Krook	13	21.00	Krook was working on a stage about 6' from the bottom of the shaft and was knocked off by a piece of timber being lowered. He fell on his right side dislocating his elbow.
3-19-43	Wm. Kampinen	187	643.68	Kampinen was kneeling on the pile of broken ore, trimming the breast when a chunk fell on his right leg causing a fracture. Kampinen is now back at work.

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11. ACCIDENTS AND
PERSONAL INJURY (Cont.)

<u>Date of Accident</u>	<u>Name of Injured Man</u>	<u>Days Lost</u>	<u>Compensation Paid to 12-31-43</u>	<u>Description of Accident</u>
4-8-43	Frank Campaign	24	\$ 54.00	Campaign was breaking a chunk of ore with a moiling machine when the machine slipped against his right foot causing a laceration.
4-24-43	George Jandron	25	57.00	Jandron was working in a raise when he slipped and in saving himself by catching the divider fractured a bone in his right hand.
6-5-43	Pete Bessola Jr.	109	327.00	Bessola, a shift boss, fell when climbing down a raise and after slipping thru several of the man ways in the safety doors landed on one about 75' below fracturing his vertebra. He is now back at work on his regular job.
7-1-43	Sam Jacobsen	53	159.00	Jacobsen who was raising climbed up after a blast and then fell back about 25' to the level, fracturing his pelvic bone. He is now back at work.
7-6-43	Fred Peterson	22	48.00	Peterson was moving a plank when it fell and lacerated his right finger.
7-15-43	Albert Paull	39	117.00	Paull was stooping over in his mining contract when some loose ore fell, bruising his back.
8-30-43	Uno Ollila	8	7.00	Ollila was replanking a raise when a short piece of plank was pulled out by the tugger rope and fell on his left foot, causing a bruise.
9-14-43	Reino Lammi	16	35.00	Lammi was walking along the drift carrying an axe which hit the side of the drift and struck his left knee causing a laceration.

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11. ACCIDENTS AND
PERSONAL INJURY (Cont.)

<u>Date of Accident</u>	<u>Name of Injured Man</u>	<u>Days Lost</u>	<u>Compensation Paid to 12-31-43</u>	<u>Description of Accident</u>
10-4-43	Gordon Ellis	24	\$ 84.00	Ellis was barring down loose rock above the 6th Level pocket when a piece of rock falling struck a timber and bounded against his left foot breaking a toe.
10-11-43	John Flannery	19	45.50	Flannery was unloading stull timber from a railroad car when a piece struck him in the chest causing a slight contusion.
10-13-43	Nick Kratz	33	115.50	Kratz was attempting to open the door on the top tram car when he slipped and fell into the pocket fracturing his left clavicle.
12-2-43	Julius Wigg	Home	21.00	Wigg was unloading old timber brought out of the mine on a timber truck when a piece slipped and fractured a bone in his right foot.

12. NEW CONSTRUCTION
AND PROPOSED NEW
CONSTRUCTION

E & A No. CC-78

The purpose of this E & A was the development of the 6th Level by sinking the main shaft 80 ' for pocket and skip pit, drifting on the 5th Level for an auxiliary winze, sinking the same, and drifting and raising on the 6th Level. There is about 900 feet of rock drifting still to be done in 1944.

Total Estimate		\$ 187,660.00
Total Expended to 12-31-42	\$ 69,158.10	
Total Expended in 1943	88,689.19	
Total Expended to 12-31-43		<u>157,847.29</u>
Balance December 31st, 1943		29,812.71

The accounts are detailed as follows:

Sinking Shaft 80'

Total Estimate		18,000.00
Total Expended to 12-31-42	18,618.25	
Total Expended in 1943	4,022.57	

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12. NEW CONSTRUCTION
AND PROPOSED NEW
CONSTRUCTION (Cont.)

Sinking Shaft 80' (Cont.)

Total Expended to 12-31-43		22,640.82
Balance December 31st, 1943		<u>4,640.82</u>

Charge to this account was increased due to sinking 6' more than originally planned, and also due to increase in wages. This account was completed in 1943.

Plat Pocket & Skip Pit

Total Estimate		\$ 15,500.00
Total Expended to 12-31-42	\$ 3,210.31	
Total Expended in 1943	14,719.38	
Total Expended to 12-31-43		<u>17,929.69</u>
Balance December 31st 1943		<u>2,429.69</u>

This account was practically completed in 1943 and the increased cost was mostly due to the increase in wages.

Sump & Pump House

Total Estimate		\$5,000.00
Total Expended to 12-31-42	0	
Total Expended to 1943	\$ 1,973.57	
Total Expended to 12-31-43		<u>1,973.57</u>
Balance December 31st, 1943		<u>3,026.43</u>

The Sump has been completed but there will be more work in 1944 on the Pump House and installing the pump.

Rock Drift Shaft to Winze

Total Estimate		\$25,200.00
Total Expended to 12-31-42	642.28	
Total Expended in 1943	7,993.02	
Total Expended to 12-31-43		<u>8,635.30</u>
Balance December 31st, 1943		<u>16,564.70</u>

This account was only about one-third completed at the end of 1943

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YEAR 1943

12. NEW CONSTRUCTION
AND PROPOSED NEW
CONSTRUCTION (Cont.)

Raise 30' Above Auxiliary Winze

Total Estimate		\$ 3,000.00
Total Expended to 12-31-42	\$ 1,186.44	
Total Expended in 1943	0	
Total Expended to 12-31-43		<u>1,186.44</u>
Balance December 31st, 1943		<u>1,813.56</u>

This account was completed in 1942.

Sink 102' in Winze

Total Estimate		17,850.00
Total Expended to 12-31-42	13,081.17	
Total Expended in 1943	391.11	
Total Expended to 12-31-43		<u>13,472.28</u>
Balance December 31st, 1943		<u>4,377.72</u>

This account was completed early in 1943.

Rock Drift on 5th Level at Winze Location

Total Estimate		4,500.00
Total Expended to 12-31-43		<u>6,415.98</u>
Balance December 31, 1943		<u>1,915.98</u>

This account was completed in 1942 and the extra cost was expended at that time on account of more drifting.

Rock Drifting 2400' Winze to Ore Body

Total Estimate		45,000.00
Total Expended to 12-31-42	5,643.57	
Total Expended in 1943	47,923.82	
Total Expended to 12-31-43		<u>53,567.39</u>
Balance December 31st, 1943		<u>8,567.39</u>

This account shows an increase over the estimate due to not finding the ore where it was expected and also due to the increase in wages. This account should be completed early in 1944.

Raising 1,000'

Total Estimate		12,000.00
Total Expended in 1943	2,930.23	
Total Expended to 12-31-43		<u>2,930.23</u>
Balance December 31st, 1943		<u>9,069.77</u>

This account will be alive during 1944.

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12. NEW CONSTRUCTION
AND PROPOSED NEW
CONSTRUCTION

Excavating for and Installing Hoist at Winze

Total Estimate		\$ 1,600.00
Total Expended to 12-31-43	\$ 2,956.56	
Total Expended in 1943	71.77	
Total Expended to 12-31-43		<u>3,028.33</u>
Balance December 31st, 1943		<u>1,428.33</u>

This account was completed early in 1943 and the over charge was mostly due to slabby ground in the hoist room that required steel sets.

Rail, Frogs, and Switches

Total Estimate		4,500.00
Total Expended in 1943	2,164.43	
Total Expended to 12-31-43		<u>2,164.43</u>
Balance December 31st, 1943		<u>2,335.57</u>

Trolley Wire & Rail Bonds

Total Estimate		4,000.00
Total Expended to 12-31-42	318.24	
Total Expended to 1943	814.57	
Total Expended to 12-31-43		<u>1,132.81</u>
Balance December 31st, 1943		<u>2,867.19</u>

Cage (Rebuilt)

Total Estimate		1,000.00
Total Expended to 12-31-43		<u>864.02</u>
Balance December 31st, 1943		<u>135.98</u>

This account was completed in 1942.

Electric Cables to Carry A.C. Current

Total Estimate		1,500.00
Total Expended to 12-31-43		<u>2,790.54</u>
Balance December 31st, 1943		<u>1,290.54</u>

This account was also completed in 1942.

Air and Water Lines

Total Estimate		2,500.00
Total Expended to 12-31-42	232.79	
Total Expended in 1943	1,218.46	
Total Expended to 12-31-43		<u>1,451.25</u>
Balance December 31st, 1943		<u>1,048.75</u>

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12. NEW CONSTRUCTION
AND PROPOSED NEW
CONSTRUCTION (Cont.)

New Equipment

Total Estimate		\$ 7,150.00
Total Expended to 12-31-42	\$ 12,336.39	
Total Expended in 1943	1,156.95	
Total Expended to 12-31-43		<u>13,493.34</u>
Balance December 31st, 1943		<u>6,343.34</u>

The overcharge was due to buying more equipment than had been originally planned including a new pump. It had been originally intended to use a pump already on hand.

Rental of Equipment

Total Estimate		2,000.00
Total Expended to 12-31-43		<u>1,584.04</u>
Balance December 31st, 1943		415.96

E & A CC - 124

The purpose of this E & A was for drilling from the 5th Level to explore in the Pioneer and Arctic Parcel.

Total Estimate		3,000.00
Total Expended to 12-31-43		<u>2,417.06</u>
Balance December 31st, 1943		582.94

This Account will be completed early in 1944.

E & A CC - 128

The purpose of this E & A was the purchase of a plunger type pump to take the place of the Alberger Centrifugal pump on the 3rd Level.

Total Estimate		12,734.00
Total Expended to 12-31-43		<u>477.81</u>
Balance December 31st, 1943		12,256.19

13. EQUIPMENT
AND PROPOSED
EQUIPMENT

a. Steam Shovels

The Caterpillar Shovel #45 and the railroad type shovel #27 were used at the Maas Mine during 1943 and the ore was practically all cleaned up early in October. During the last week in November and the first week in December, #16 Shovel was brought to the mine to ship some of the wet ore that had been stocked during October and November. The #45 Shovel was repaired at the mine during the winter, while the others were sent to the Ishpeming Shop.

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13. EQUIPMENT
AND PROPOSED
EQUIPMENT (Cont.)

b. Stocking Trestles

The same procedure regarding the removing of ore from the stockpiles as was adopted in 1941 was continued, namely that of dismantling only the Southeast and Southwest wooden trestles and removing the ore from under the West trestle without disturbing the bents. This latter was accomplished with the aid of the Bull-dozer and made a considerable saving in both time and money as the West trestle is approximately one-quarter mile in length. Practically all of the ore was removed by the early part of October, but very little overrun was accumulated as it was found that the Skip estimated capacity was too high and this was not reduced from 5.65 to 5.5 until August. All of the trestles were in good shape at the start of the stocking season and with two independent top tram systems there should be no delays in stocking during the winter. Twelve more bents were added to the Rock trestle during 1943.

c. Scraper Hoist

There were two new 20 H.P. Sullivan scraper hoist units purchased during 1943, and the 25 H.P. unit rented from the Negaunee Mine, for use in transfer operations, was returned. There was also one 15 H.P. Sullivan scrapped during the year, it being the first of the size to be purchased and had been in service for 16 years. At the end of the year there were 38 15 H.P. units, 7 20 H.P., and 2 25 H.P. in use and also 3 10 H.P. which are available for exploring, cleaning the Sump, or handling the skip pit buggy.

d. Cages & Skips

There were no changes in the design of the Cage during 1943 but one of the old square box type skip has been in use since one of the new types was smashed in July. The estimated skip weight was reduced from 5.65 to 5.5 in August of this year.

On July 23rd at 6:00 A.M. the axle on the North skip sheave broke causing the rope to snap and thus allowing the loaded skip to fall into the old skip pit pocket at the 6th Level elevation. The skip evidently stayed on the guides for the entire distance and the force was so great that the entire pocket was torn out and the skip landed on the rock prentice below and finally lodged in the cage compartment a few sets below. It was so badly smashed that it had to be cut up with the torch before it could be removed. The skip pit pocket had to be rebuilt as the new pocket below the 6th Level still had to be used for rock excavated from the main ore pockets. The accident occurred on Thursday and by Monday morning overything was in readiness to resume operations. The debris at the bottom of the shaft, however, took several week-ends to clean up and thus delayed work on the pockets. The axle was found to have a bad flaw and this was the only reason that could be ascertained to have caused this unusual accident.

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13. EQUIPMENT
AND PROPOSED
EQUIPMENT

e. Various Other Equipment

A new type of portable scraper slide was designed for main level drifting and proved so satisfactory that two more were built and put in operation. Their cost is very low as they are powered with standard 15 H.P. units that can be removed at any time the slides are idle and used in the regular mining operations. This unit is described more in detail in another part of this report.

Four new auxiliary ventilating fans were purchased during 1943, two being Coppus Vent Air and two of Jeffrey manufacture, both types being far superior to the old Sirocco fans as they can build up a certain amount of pressure.

There were three Cleveland Stoppers, three Cleveland and three Ingersoll Rand Jack Hammer drills purchased in 1943.

15. POWER

The following is the rate charged per K.W. hour by months during 1943.

January	\$.0134
February		.0130
March		.0132
April		.0130
May		.0130
June		.0128
July		.0130
August		.0130
September		.0130
October		.0130
November		.0132
December		.0132
Average 1943		<u>.013067</u>
Average 1942		.013067

17. CONDITION OF
PREMISES

There was no extraordinary work done in 1943 in connection with improving the grounds. There was of course the regular routine work in keeping everything in as good shape as possible.

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18. NATIONALITY OF
EMPLOYEES

<u>As to Parentage</u>	<u>1943</u>	<u>%</u>	<u>1942</u>	<u>%</u>
Finnish	200	39.5	212	40.0
English	96	19.1	97	18.3
American	87	17.2	93	17.5
Italian	43	8.5	49	9.2
Swedish	30	5.9	31	5.9
French (Canadian)	27	5.3	21	3.9
German	8	1.6	9	1.7
Norwegian	6	1.2	7	1.3
Danish	3	.6	3	.6
Austrian	2	.4	4	.8
Irish	1	.2	1	.2
Polish	1	.2	1	.2
Jugoslavian	1	.2	1	.2
Swiss	1	.2	1	.2
Total	506	100.0	530	100.0

<u>As to Birth</u>	<u>Total</u>		<u>American Born</u>		<u>Foreign Born</u>	
	<u>1943</u>	<u>1942</u>	<u>1943</u>	<u>1942</u>	<u>1943</u>	<u>1942</u>
Finnish	200	212	140	150	60	62
English	96	97	60	61	36	36
American	87	93	87	93	0	0
Italian	43	49	15	22	28	27
Swedish	30	31	25	25	5	6
French (Canadian)	27	21	27	21	0	0
German	8	9	6	7	2	2
Norwegian	6	7	5	6	1	1
Danish	3	3	3	3	0	0
Austrian	2	4	1	3	1	1
Irish	1	1	1	1	0	0
Polish	1	1	1	1	0	0
Jugoslavian	1	1	1	1	0	0
Swiss	1	1	1	1	0	0
Total	506	530	373	395	133	135
Percentage			73.7%	74.5%	26.3%	25.5%

19. MAAS CRUSHER

The Maas Crusher operated 32 days during 1943 and crushed a total of 30,714 tons divided as follows:

<u>Mine</u>	<u>1943</u>	<u>1942</u>	<u>Incr.</u>	<u>Decr.</u>
Cliffs Shaft Lump	3,606	11,069		7,463
Morris Slicious	27,108	24,470	2,638	
Maas		3,530		3,530
Negaunee		927		927
Total	30,714	39,996		9,282

There was also approximately 4,000 tons of Cliffs Shaft crushed in stock from previous years screening operations and this was picked up by the small Marion Shovel loaded into trucks and run thru the plant to load out for shipment. There was very little repair work required during the year but it will probably be necessary to replace some of the supporting bents for the conveyor belt in 1944.

NEGAUNEE MINE
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1. GENERAL:

The Negaunee Mine operated on a 17 shift per week schedule during the month of January and starting February 1st, for the balance of the year on a 16 shift per week schedule, the first five days of the week on a three shift schedule and one shift on Saturday. This schedule allowed more time for shaft inspection and repairs and decreased the number of men that formerly had to work on Sundays. In 1942 it was difficult to get men to work on Sunday and before the end of 1943 it was becoming increasingly difficult to get men to do repair work on the Saturday afternoon and midnight shifts. The heavy operating schedule in effect the past three years and the large monthly earnings has brought about a feeling among the men that they are entitled to more time for rest and recreation. The obvious solution is the elimination of the day shift on Saturday which would put the mine on a fifteen shift per week operating schedule. This schedule would decrease the overtime pay for time worked in excess of 40 hours per week and would undoubtedly provide the men required for repairs in the shaft and in the mine as elimination of overtime pay would immediately make a number of the men anxious to obtain it.

Production in 1943 was 954,990 tons. All the ore in stock was not shipped this year and there was no overrun from stockpile shipments to add to the product. The loss of one operating shift per week for eleven months of the year reduced the product which also was reduced by less contracts working due to loss of men and to depletion of the ore reserves. Absenteeism also was a factor in reduction of output, especially on the midnight or graveyard shift. The draft and shifting of employees to other mines and to the cities reduced the number of employees working underground. The total production in 1941, 1942 and 1943 was 3,094,904 tons, a yearly average of 1,031,635 tons. Shipments in 1943 were 897,534 tons, a decrease of 194,195 tons as compared with 1942. Some cancellations and deferments of shipments occurred late in the season. Shipments however, averaged for the three year period 1,013,423 tons per year, a new record for the mine.

Production from the area under lease from the Maas Mine was slightly less than in 1942 but amounted to 25% of the product as compared with 22% in 1942. Development of the Western end of the leased area was underway late in the year and will be completed in 1944. Due to heavy pressure in this area development has been postponed until it was necessary to move contracts from the Negaunee Mine lease to the Maas Lease.

Development of the several small ore bodies above the 14th Level Southwest of the Negaunee Mine main deposit was underway at the end of the year. Two small areas here were mined in 1943 by the sub-level stoping system and the several additional areas now being developed will also be mined by this system. The ore is very hard as is also the overlying hangingwall jasper which is an unusual occurrence and no falls of ground have occurred in the areas mined in 1943. A much larger tonnage has been developed in the new stoping area than was anticipated. There are several small dikes crossing this area and the ore deposits are found between these dikes and the South slate footwall. From present indications two contracts will be able to work here during the coming year.

The estimated ore reserves at the end of 1943 indicated a probable life of three to four years for the Negaunee Mine depending on the operating schedule. In this connection it should be recalled that Negaunee Mine employees are to be transferred to the Mather Mine as this mine is developed

NEGAUNEE MINE
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1. GENERAL: (Cont'd)

for ore production. This transfer has been temporarily postponed due to unforeseen complications so that for the time being nearly a full crew will remain at the Negaunee Mine. The transfer will start later in the year and will reduce production.

There was one fatal accident in 1943 due to a blasting accident. The miner violated a safety rule when lighting fuse. There were a large number of minor accidents during the year and several severe injuries. The heavy operating schedule and unexperienced men that have been hired were responsible for most of the accidents.

A year ago there was a shortage of stull timber, this year the only shortage was seven foot lagging. At the end of 1943 there was a five months supply of stull timber and 9½ foot poles at the mine. It was impossible to purchase ties for the mine tracks and for the past several months, all the mines of the Company have obtained ties made at the saw-mill. The shortage of seven foot lagging in the latter months of the year was due to the mild weather which made it impossible to work in the swamps. Colder weather late in December indicates that it will soon be possible to relieve the shortage of seven foot lagging.

2. PRODUCTION:
SHIPMENTS &
INVENTORIES

a. Production by Grades:

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Negaunee Ore	729,040	866,029		136,989
Maas Lease	225,950	240,665		14,715
Rock	<u>23,085</u>	<u>34,550</u>		<u>11,465</u>
Total Hoist	978,075	1,141,244		<u>163,169</u>

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

b. Shipments:

	<u>Pocket</u>	<u>Stockpile</u>	<u>Total</u>	<u>Total Tons</u>
	<u>Tons</u>	<u>Tons</u>	<u>Tons</u>	<u>Last Year</u>
Negaunee Ore	437,188	252,679	689,867	861,749
Maas Lease	<u>136,361</u>	<u>71,306</u>	<u>207,667</u>	<u>229,980</u>
Total 1943	573,549	323,985	897,534	1,091,729
Total 1942	768,335	323,394	1,091,729	
Increase		591		
Decrease	194,786		194,195	

Shipments decreased 17.8% in 1943 and were 57,456 tons less than the product for the year.

c. Stockpile Inventories:

	<u>Dec. 31, 1943</u>	<u>Dec. 31, 1942</u>	<u>Increase</u>
Negaunee Ore	112,249	73,076	39,173
Maas Lease	<u>39,133</u>	<u>20,850</u>	<u>18,283</u>
Total	151,382	93,926	57,456

Including estimated overrun there were approximately 157,000 tons in stock at the end of the year.

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2. PRODUCTION
SHIPMENTS &
INVENTORIES: (CONT)

d. Division of Product by Levels:

	<u>1943</u>	<u>Percentage</u>	<u>1942</u>	<u>Percentage</u>
9th Level	250,335	26.2	280,806	25.7
10th Level	15,523	1.6	-	
12th Level	29,039	3.0	128,089	11.7
13th Level	632,154	66.2	656,939	60.1
14th Level	27,939	3.0	26,928	2.5
Total	<u>954,990</u>	<u>100.0</u>	<u>1,092,762</u>	<u>100.0</u>
Skpiple Overrun	-		13,932	
	954,990		<u>1,106,694</u>	

Production from the 9th and 13th Levels increased in percentage of product. Mining was completed on the 12th Level and there was a large decrease in production from this level as compared with prior years. Mining of No. 1 Shaft Pillar was started below the 9th Level resulting in the production of a small tonnage from the 10th Level. Most of the ore credited to the 13th Level was trammed on the 14th Level, from 14th Level raises that extended a short distance above the 13th Level. The total production from the 9th Level since mining was resumed here in 1936 now amounts to 1,131,040 tons.

e. Production by Months:

<u>Month</u>	<u>Negaunee Ore</u>	<u>Maas Ore</u>	<u>Total Ore</u>	<u>Rock</u>
January	60,481	23,386	83,867	2,865
February	52,427	22,266	74,693	1,505
March	75,906	20,328	96,234	1,100
April	73,449	20,274	93,723	1,110
May	70,515	20,583	91,098	1,400
June	70,177	17,687	87,864	2,265
July	65,815	14,753	80,568	1,475
August	54,936	17,573	72,509	1,565
September	45,426	21,482	66,908	2,575
October	51,969	15,149	67,118	3,725
November	53,657	17,554	71,211	730
December	54,282	14,915	69,197	2,770
Total	<u>729,040</u>	<u>225,950</u>	<u>954,990</u>	<u>23,085</u>
Stockpile Overrun	-	-	-	-
Total 1943	729,040	225,950	954,990	23,085
Total 1942	<u>866,029</u>	<u>240,665</u>	<u>1,106,694</u>	<u>34,550</u>
Decrease	136,989	14,715	151,704	11,465

The product by leases was distributed as follows:

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
Negaunee Mine Co.	663,165	820,500		157,335
So. 1/2 R. of Way	65,745	45,529	20,216	
Maas Lease	197,926	215,745		17,819
N 1/3 Right of Way	19,355	15,458	3,897	
N 1/6 Right of Way	8,799	9,462		663
Total	<u>954,990</u>	<u>1,106,694</u>	<u>24,113</u>	<u>175,817</u>

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2. PRODUCTION
SHIPMENTS &
INVENTORIES: (CONT)

f. Ore Statement:

	Negaunee Ore	Maas Lease	Total 1943	Total 1942
On Hand January 1, 1943	73,076	20,850	93,926	78,961
Product for Year	729,040	225,950	954,990	1,092,762
Stockpile Overrun	-	-	-	13,932
Total	802,116	246,800	1,048,916	1,185,655
Shipments	689,867	207,667	897,534	1,091,729
Balance on Hand	112,249	39,133	151,382	93,926
Decrease in Output	124,544	13,228	137,772	73,492
Increase in Ore on Hand	39,173	18,283	57,456	14,965

1943 - Five 3-8 hr. Shifts and one 2-8 hr. Shift from 8/23/41 to 2/1/43.
Five 3-8 hr. Shifts and one 1-8 hr. Shift from 2/1/43 to 12/31/43.

1942 - Five 3-8 hr. Shifts and one 2-8 hr. Shift from 8/23/41.

g. Delays:

January 19th, 1 hour delay - Loss of Product - 138 tons

This delay was due to the extremely cold weather which froze the butterfly door in the headframe, so that it could not be moved by the air cylinder until it had been thawed out by steam.

February 15th, 2 hours delay - Loss of Product - 253 tons

Severe cold weather caused this delay which occurred on Monday morning. Practically all the mechanical equipment on the top landing was frozen and had to be thawed out by steam. In addition, it was necessary to replace several broken steel liners on one of the head sheaves.

March 17th - 2 hours delay - Loss of Product - 275 tons

The casting which supports the axle was broken on one of the top tram cars. It required two hours to remove the broken casting and install a new one.

March 24th, 4 hours delay - Loss of Product - 803 Tons

This delay was caused by the top tram engineer not stopping the top tram car which hit the end sheave and fell off the trestle. It was necessary to splice the haulage cable and replace the end sheave as also put the spare top tram car into commission.

August 17th, 1½ hours delay - Loss of Product - 220 tons

The skip stuck in the skip dump due to worn guides and it required one and one-half hours to free the skip and make the necessary repairs.

September 1st, 2 hour delay - Loss of Product - 275 tons

A short circuit developed in the exciter of the skip hoist motor and it required two hours to locate it and make the necessary repairs.

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2. PRODUCTION
SHIPMENTS &
INVENTORIES: (CONT)

g. Delays: (Cont.)

Total loss of product for the year on account of delays amounted to 1964 tons as compared with 5,092 tons in 1942. This is a very good record in view of the heavy operating schedule of the past several years.

h. Delays from Lack of Current:

There were no delays from lack of current during the year.

3. ANALYSIS:

a. Average Mine Analysis on Output:

Grade	1943				1942			
	Tons	Iron	Phos.	Sil.	Tons	Iron	Phos.	Sil.
Negaunee Ore	729,040	59.67	.097	8.08	866,029	60.03	.099	7.75
Maas Lease	225,950	60.03	.100	8.88	240,665	60.25	.107	7.74

b. Average Mine Analysis on Straight Cargoes:

Grade	Mine			Lake Erie	
	Iron	Phos.	Silica	Iron	Moisture
Negaunee Ore	59.21	.089	8.51	59.00	10.84

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Assumption:

- 12 Cubic Feet equals one ton
- 10% deducted for rock
- 10% deducted for loss in mining
- Percent of Bessemer - None

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4. ESTIMATE OF ORE RESERVES:

a. Developed Ore: (Cont.)

Area	Negaunee Lease	S $\frac{1}{2}$ R. of W. or $\frac{3}{4}$ of Adams Strip	Leased from Maas Mine			Total Tons	Special Grade Ore Maas Area
			N. 1/6 R Of W or $\frac{1}{4}$ Adams Strip	N 1/3 R. of W. or C.C.I.Co. Strip	Maas Area		
Above 9th Level	243,360					243,360	
9th to 10th Level	55,526					55,526	
12th to 13th Level	164,055	47,510	2,675		97,165	311,405	
13th to 14th Level	410,451	149,502	40,204	89,321	942,040	1,631,518	
Below 14th Level	15,781	6,667		563	38,192	61,203	59,000
Total Gross							
Tons 11-30-43	889,173	203,679	42,897	89,884	1,077,397	2,303,012	59,000
Less 10% for Loss in Mining	88,917	20,368	4,288	8,988	107,740	230,301	5,900
	800,256	183,311	38,591	80,896	969,657	2,072,711	53,100
Less 10% for Rock	80,026	18,331	3,859	8,089	96,966	207,271	5,310
Net Total							
11-30-43	720,230	164,980	34,732	72,807	872,691	1,865,440	47,790
Less December 1943 Production	46,690	7,592			14,915	69,197	
Total Developed							
Ore 1943	673,540	157,388	34,732	72,807	857,776	1,796,243	47,790*
Total Developed Ore 1942						2,419,236	
Decrease 1943						622,993	

(*) Not included in total of 1,796,243 on account of grade and also unavailable from Negaunee Mine.

The product from all leases was 954,990 tons, deducting the decrease in estimate of developed ore as compared with 1942, shows that 331,997 tons were developed in 1943. This compares with 674,275 tons developed in 1942. As the ore areas grow smaller the chance of developing additional ore decreases. Additional ore was developed in 1943 above the 9th Level, 13th and 14th Levels.

Including probable ore (not in above estimates), there is approximately 2,300,000 tons of ore to be mined. The indicated life of the mine is four years depending on the operating schedule.

b. Prospective Ore

All ore in the mine is developed.

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4. ESTIMATE OF ORE RESERVES: (CONT.)

c. Estimated Analysis

Ore Reserves: Approximate Expected Natural Analysis

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
<u>Neg. Ore</u>	865,660	52.80	.090	7.00	.194	2.48	.700	.290	.014	1.80	12.00
<u>Neg.-Maas Ore</u>	930,583	52.80	.088	7.50	.194	2.08	.503	.160	.016	1.33	12.00
<u>Total</u>	1,796,243										

The Negaunee ore includes all ore from the Negaunee Lease and the South One-half of 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 of Right of Way.

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
<u>Maas Special</u>	47,790*	52.80	.070	7.50	.180	2.00	.520	.160	.200	1.10	12.50

*Not included in estimates, not available.

Ore in Stock - Average Natural Analysis

<u>Grade</u>	<u>Tons</u>	<u>Iron</u>	<u>Phos.</u>	<u>Sil.</u>	<u>Mang.</u>	<u>Alum.</u>	<u>Lime</u>	<u>Mag.</u>	<u>Sul.</u>	<u>Loss</u>	<u>Moist.</u>
<u>Negaunee Ore</u>	112,249	53.39	.084	7.30	.19	2.65	.65	.27	.015	.159	11.39
<u>Negaunee-Maas</u>	39,133	53.01	.091	7.52	.19	2.38	.65	.32	.012	.143	11.48

5. LABOR
AND
WAGES

a. Comments:

There were 496 employees on December 31st, 1942, and 461 on December 31st 1943, a decrease of 35 men. The average number of employees in 1943 was 498 men, the maximum during the year was 520 men. The decrease from the maximum was 59 men. During the year eleven men were drafted into the armed forces, 18 men enlisted in the Army, Navy and Seabees, 59 men quit to take jobs elsewhere, five men were discharged, two men were retired on account of age or disability, two men died, one was killed in the mine, and 32 men were transferred to other mines of the Company. The total loss of employees was 130 men. During the year 95 men were hired. Labor has been scarce during the entire year as the supply in Marquette county has been exhausted. A number of boys were hired on reaching 18 years of age but the recent ruling of the Selective Service Director will force all young men 18 to 21 years of age inclusive into the Armed Service as their deferments expire. The mine therefore can expect to lose within six months 22 young men that cannot be replaced. Jobs in the mine such as motormen, brakemen, chutemen, timber hoisters require active young men for efficient operation and the prospective loss of these 22 young men will lower efficiency and increase the cost of production.

Due to the decrease in the labor supply, the Marquette county draft board has deferred practically all employees regardless of age or nature of employment during the greater part of the past year. The recent directive order leaves the draft board no option for deferment of men between ages 18 to 21 inclusive.

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5. LABOR
AND
WAGES

a. Comments: (Cont.)

At an election held early in 1943, a majority of the employees voted to have the United Steel Workers or C.I.O. as their sole bargaining agent. Contrary to expectations no grievances have as yet been submitted by the grievance committee at this mine. This very satisfactory condition is due to the good feeling existing at the mine between the supervisory force and the employees and also to our good fortune in having a grievance committee that will not bring petty grievances to our attention. It is, however, impossible to anticipate a continuation for any length of time of the present satisfactory conditions.

b. Comparative Statement of Wages and Product:

	<u>1943</u>		<u>1942</u>		<u>Increase</u>	<u>Decrease</u>
Product	954,990		1,106,694			151,704
No. Shifts and Hours	1-8	48	1-8	3	1-8	45
	2-8	5	2-8	50		2-8 45
	3-8	255	3-8	255		
<u>Average No. Men Working:</u>						
Surface	81		80		1	
Underground	417		407		10	
Total	498		487		11	
<u>Average Wages Per Day:</u>						
Surface	7.16		6.79		.37	
Underground	8.25		7.84		.41	
Total	8.06		7.67		.39	
<u>Average Wages Per Month:</u>						
Surface	167.57		157.08		10.49	
Underground	178.19		183.50			
Total	176.47		179.16		2.69	
<u>Product Per Man Per Day:</u>						
Surface	41.98		49.83		7.85	
Underground	8.83		9.68		.85	
Total	7.30		8.10		.80	
<u>Labor Cost Per Ton:</u>						
Surface	.170		.136		.034	
Underground	.934		.810		.124	
Total	1.104		.946		.158	
<u>Average Product Mining:</u>						
Stoping	20.70		22.17		1.47	
Development in Ore	5.62		9.51		3.89	
Total	19.97		21.67		1.70	
<u>Average Wages Contract Labor</u>						
	8.45		8.30		.15	

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YEAR 1943

5. LABOR
AND
WAGES

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

	<u>1943</u>	<u>1942</u>	<u>Increase</u>	<u>Decrease</u>
<u>Total Number of Days:</u>				
Surface	22,746 ³ / ₄	22,207 ³ / ₄	539	
Underground	108,114 ¹ / ₄	114,359 ¹ / ₄		6,245
Total	130,861	136,567		5,706
<u>Amount for Labor:</u>				
Surface	162,881.48	150,797.53	12,083.95	
Underground	891,684.32	896,191.45		4,507.13
Total	1,054,565.80	1,046,988.98	7,576.82	
<u>Average Wages Per Month as Per Labor Statement - Less Captain and Clerks:</u>				
Surface	167.51	154.62	12.89	
Underground	177.16	183.11		5.95
Total	176.14	178.62		2.48

Proportion of Surface to Underground Men:

1943 1 to 5.14

Five 3-8 hour shifts and one 2-8 hour shift from 8/23/41 to 2/6/43.
Five 3-8 hour shifts and one 1-8 hour shift from 2/6/43 to 12/31/43.

1942 1 to 5.09

Five 3-8 hour shifts and one 2-8 hour shift from 8/23/41 to 12/31/42.

6. SURFACE:

a. Buildings, Repairs:

In the fuse room, a rack was made in April for hanging up fuse cans and windows were covered with heavy wire screen.

Minor repairs were made to the coal dock trestle in May, seven new legs, one new cap, 24 short ties, and six long ties being installed, also, two new braces and tightened shims. In September, a shed was constructed enclosing two bents of dock to provide storage and prevent the stored stoker coal from getting wet and freezing. This coal is used in the heating plant at No. 2 Shaft in the heating unit for warming the cold air as it enters the fan that forces air into the mine.

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6. SURFACE: (CONT.)

a. Buildings, Repairs: (Cont.)

In July, a new catch basin to divert water from the West end of timber tunnel was built, a ditch carries the water to the West away from the tunnel.

In August, repairs were made on the East wall of the transfer engine house which was damaged when the top tram car ran off the end of the stocking trestle which in turn threw a strain on the transfer mechanism as well as the transfer building that supports it. The building was pulled out of shape and it was necessary to practically rebuild it because of the rotted condition of the supporting members.

New doors were made and installed in September at the West end of timber tunnel, which can now be locked when the mine is idle.

In October a new excitor motor for the Ingersoll-Rand compressor was installed in the mine engine house.

The sewer from the dry house that discharges into the mine discharge water line near the shaft was flushed and all catch basins were cleaned in October.

In October a new storage building for storing timber puffers, scraper hoists, spare haulage motors, and etc. was built. It is 22 by 30 feet in size, built between two storage sheds, so roof and two walls were all that were required to construct this new building. The walls were made of 2" x 6" lumber and covered with galvanized corrugated sheet iron.

In September, the concrete floor of the warehouse was painted with concrete floor paint.

b. Fences:

In June a new fence was built parallel with the road to the mine extending to the West boundary and now completely enclosing the timber yard.

To provide for greater safety from sabotage and prevent trespassing, ¹⁵signs identifying the Mine property as a defense area were erected in conspicuous places and at various entrances during July.

c. Tracks and Roads:

In November the timber motor tracks on surface were extended about 40 feet to reach the new storage shed where timber puffers and scraper hoists, etc., are stored to facilitate the handling of this equipment in and out of the mine.

d. Stockpiles:

Due to a late spring the steam shovel started loading from the stockpile on the 25th of May, completing loading on the 26th of November.

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6. SURFACE: (CONT.)

d-1. Ore and Rock Trestles:

In February, one of the eight inch steel "I" beams of the East steel trestle broke and the brace member at pier, and another one started to break. Five piers on the steel trestle were repaired in May, the "I" beams under the box girders were broken and this part was cut out and new pieces riveted on with splice plates under both sides of the girder. A larger gusset plate was also installed under the beams.

During June, the last five bents on rock trestle were raised and repaired and two bents replaced. Forty-three ties and 21 pieces of decking were also replaced at this time.

By September the concrete pier under the West batter leg of the steel trestle had broken into two parts and the upper part moved several inches every time the skips were hoisted and dumped. The two parts of the pier were then reinforced with scrap iron and ten inches of concrete added to four sides.

During November, the wood stocking trestle was straightened and overhauled due to all ore instock not being shipped this year and a late shipping season next spring would make it necessary to use this trestle for stocking ore.

e. Shaft House:

Under this heading is grouped repairs made to the shaft house during the year.

In January, wearing strips were nailed on runners in each skip road near the dump, and the butterfly was also repaired.

In March two new plates were installed in the shaft house skip dump below the butterfly and the steel liners on the South headframe sheave were replaced.

In April two new runners were installed in the South skip road and strips were nailed on the other runners below the skip dump down to the collar of the shaft.

In May two new plates were installed in the South ore pocket replacing worn out plates.

In June, one new plate was installed in the North skip dump and two plates in the North shaft loading pocket.

In July a new stairway was built to the pocket platform. Two plates were installed above the butterfly in the shafthouse.

In August the skip dump in the shaft house was repaired, eight worn plates were replaced and a rebuilt butterfly installed.

In October two new stringers were replaced in North skip road in the shaft house near the skip dump. New angle irons were installed in the South skip dump replacing badly worn angles.

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6. SURFACE: (CONT.)

f. Water Supply:

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

	<u>1943</u>	<u>1942</u>	<u>1941</u>	<u>1940</u>	<u>1939</u>	<u>1938</u>	<u>1937</u>
1st Quarter	496.85	203.17	140.27	125.41	113.48	80.08	55.86
2nd Quarter	389.82	341.84	266.62	170.24	116.83	75.04	61.20
3rd Quarter	678.64	602.21	392.20	261.10	136.78	115.15	56.70
4th Quarter	407.74	425.32	224.55	269.08	150.92	115.22	67.76
Total	1973.05	1572.54	1023.64	825.83	518.01	385.49	241.52

Product-Tons	954,990	1,106,694	1,033,220	865,689	551,362	412,000	820,915
Cost Per Ton	.002066	.0001421	.000954	.000939	.000935	.000249	.000571

The cost for water purchased from the City of Negaunee increased again in 1943. The booster pressure pump installed in the summer of 1942 was in service a full year as compared with six months in 1942. The City also installed a new meter which immediately showed more water used than had been registered by the old meter which was often out of order.

g. Grounds:

The grounds around the mine were kept clean and in good condition throughout the year. The shrubbery in the plantations adjacent to mine buildings were pruned and tied up in November to prevent injury from ice and snow during the winter months. The parking lot was kept in good shape by occasional filling of low spots.

h. Truck:

A new one and one-half ton Chevrolet truck ordered last spring for the mine was received in November. The old truck had been in service for seven years and was worn out.

i. District Sawmill Plant:

A permanent building was erected at the Negaunee Mine in September 1942 to house the District Sawmill which was then moved from the Athens Mine. There was no space available at the Athens Mine for permanent location of the mill. The Lake Superior & Ishpeming Railway tracks were extended 400 feet to the West of the timber yard in order that logs could be unloaded at the mill. The mill operated intermittantly when logs were available until it was moved to the Cambria-Jackson Mine in September. It was returned to the Negaunee Mine on January 3rd, 1944.

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6. SURFACE: (CONT.)

I. District Sawmill Plant: (Cont.)

During the time the mill was in operation at the Negaunee Mine, 10,300 mine ties, 4'-6" in length were sawed from tamarack logs and distributed to the Company mines. During the entire year it was impossible to purchase mine ties and the Company sawmill was the only source of supply. In addition to sawing mine ties, dimension timber was sawed for mine timber trucks, hardwood strips for skip runners, trolley poles, and charging sticks. There was also nearly 50,000 board feet of lumber sawed from hemlock, pine, oak, and maple logs for distribution to the mines and General Storehouse.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1943. The work of sinking from the 13th to the 14th Level was completed in 1939.

b. Development:

There was a considerable decrease in development drifting and raising in 1943 as compared with 1942. The decrease was approximately nine percent in both drifting and raising with a total decrease of about 18% for all development.

The following table gives a comparison of total drifting and raising in ore and rock for the years 1943 and 1942:

<u>Year</u>	<u>Drifting</u>		<u>Raising</u>		<u>Grand Total</u>
	<u>Ore</u>	<u>Rock</u>	<u>Ore</u>	<u>Rock</u>	
1943	1567	903	2015	758	5243
1942	1244	1639	2152	1332	6367
Increase	323				
Decrease		736	137	574	1124

On the mining sub-levels above the 9th Level there was only a small amount of drifting in rock where it was necessary to make ventilation connections or explore for the extension of ore due to rolls in the hanging or footwall.

On the 9th Level one rock raise was extended to the 673' Sub-level to eliminate a short transfer. This raise was No. 909 and is located in the stope and pillar area South of No. 1 Shaft Pillar.

On the 10th Level early in the year two raises, no. 1005 and 1004 were extended from the 10th Level to sub-levels a short distance above the 9th Level elevation. These raises were in slate for the entire distance except the last 25 feet which was in ore. This development is located near the dike South of No. 1 Shaft Pillar.

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7. UNDERGROUND: (CONT.)

b. Development: (Cont.)

The drift being driven on the 12th Level at the end of 1942 was completed in the slate footwall to the main shaft haulage drift in January 1943. This drift was driven to by-pass two small ore bodies which were mined in 1943 on the 12th Level near the fork of the main shaft drift.

A large amount of development work in ore and rock was carried on in the stoping areas South of the main Negaunee ore body between the 13th and 14th Levels. The rock and ore drifting here as well as raising was largely development which precedes the actual stoping operations, and might be classified as dog drifts and raises for the most part un-timbered. In addition to this work two rock transfer drifts were driven to connect No. 1473 and 1475 Raises. A small amount of development by dog raises was also necessary at the Southeast end of the ore body where stoping operations were underway in November and December.

The remaining development work was largely confined to the 14th Level, where a drift and raise connection was driven from No. 1410 Cross-cut to the Maas No. 4200 Cross-cut. This drift was located in the slate footwall and will be a permanent connection for ventilation and a second outlet between the two mines. In the latter half of the year No. 1425 and 1426 Raises were put up to the 13th Level to increase the number of working places for gangs working in areas that were depleted later. The new No. 1430 Cross-cut was also started in October into the Maas Strip from which four mining raises will be put up. This drift is located in lean ore South of the main ore body a short distance from the mixed slate and jasper that overlies the true footwall. Development raises will enter the ore body at a point approximately 22 feet above the 14th Level. No. 1474 Raise in the Southwest end of the ore body was extended to the 160' Sub in June and will be used to facilitate the mining of a second small ore area by the sub-level stoping method. No. 1477 Raise also in this area was completed to the 150' Sub and was used to explore the downward trend of the small ore body which is now being stoped above the 160' Sub-level. Several small drifts were driven at this elevation to determine the extent of the ore. In October three diamond drill holes were drilled to explore and determine the extent of the several small ore bodies in this area. This diamond drill work will be further described under the main heading No. 9 "Explorations."

b-1. Rock Development:

The following table gives a summary of the rock drifting and raising in 1943 and 1942:

	<u>Drifting</u>	<u>Raising</u>	<u>Total 1943</u>	<u>Total 1942</u>
Old 4th Level	98		98	0
9th Level	18	73	91	389
10th Level		239	239	26
12th Level	278		278	405
13th Level	318	34	352	580
14th Level	191	412	603	1571
Total 1943	<u>903</u>	<u>758</u>	<u>1661</u>	<u>2971</u>
Total 1942	<u>1639</u>	<u>1332</u>	<u>2971</u>	
Decrease	736	574	1310	

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7. UNDERGROUND: (CONT.)

b-1. Rock Development: (Cont.)

There was a decrease of almost 50% in rock drifting and raising during the year. This decrease was due largely to the fact that no major development program was required in as much as the main Negaunee ore body already had been completely developed. From time to time it may be necessary to do a small amount of rock drifting and raising to maintain travel and ventilation connections between the various areas being mined above the 13th and 14th Level elevations.

b-2. Ore Development:

The following is a summary of the ore development in 1943 and 1942:

	<u>Drifting</u>	<u>Raising</u>	<u>Total 1943</u>	<u>Total 1942</u>
4th Level		58	58	0
9th Level	60		60	144
10th Level		116	116	89
12th Level	136	153	289	
13th Level	1240	872	2112	288
14th Level	<u>131</u>	<u>816</u>	<u>947</u>	<u>2875</u>
Total 1943	<u>1567</u>	<u>2015</u>	<u>3582</u>	<u>3396</u>
Total 1942	<u>1244</u>	<u>2152</u>	<u>3396</u>	
Increase	<u>323</u>		<u>186</u>	
Decrease		137		

The slight increase in ore development was due to the opening of the Southwest end of the ore body for mining by the sub-level stoping method. The ore in this area is extremely hard and more time is required for drilling, a considerable amount of development work is necessary in this method of mining before actual stoping operations get underway. Possibly another reason for the increase is due to the raises put up during the year from the 14th Level which for the most part enter the ore within 40 feet of the Level. It is likely that the ore development footage during the coming year will be approximately the same as in 1943 as several undeveloped ore areas in the Maas Strip will be opened for mining in addition to the large amount of development work in stoping the several small ore bodies between the 14th and 13th Levels.

c. Stoping:

The product from the Negaunee Lease was obtained from the same areas as in previous years with one exception, viz: The small ore body on the South footwall between the 11th and 12th Levels was mined out near the middle of the year. This is shown in the table below as there were no mining contracts working above the 12th Level at the close of 1943. It will also be noted that there was a reduction during the year of three mining contracts working above the 9th Level. This reduction was due to the decrease in size of the No. 1 Shaft Pillar as mining progressed downward. Two of these contracts were transferred to the same areas below the 9th Level where mining is now nearing completion. While

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

at present, there are eleven contracts mining above the 13th Level, nine are using 14th Level raises but are actually mining on or just above the 13th Level elevation. The increase in mining activity between the 13th and 14th Level is largely due to the increased sub-level stoping development in the hard ore deposits found between several small dikes near the South footwall.

Ore mined on the Maas Lease from Parcels No. 1, 2 and 3 was approximately in tonnage the same as in 1942 but showed a small increase in proportion of the total product. Of the total, approximately 25% was mined from the above leases while the remaining 75% came from the Negaunee Lease and the South One-half of Right of Way.

The locations of the mining contracts at the end of the year 1943 and 1942 are given below:

	<u>1943</u>		<u>1942</u>
7 above 9th Level			10 above 9th Level
2 above 10th Level			1 above 10th Level
0 above 12th Level			4 above 12th Level
11 above 13th Level			13 above 13th Level
<u>16</u> above 14th Level			<u>15</u> above 14th Level
Total	<u>36</u>	Total	<u>43</u>

It will be noted from the above table that there were several less contracts working at the end of the year as compared with 1942. During 1943, approximately 32 contracts were engaged in mining, while five contracts carried on development work.

There were only 36 contracts working in December 1943 as compared with 43 a year ago. This was one less contract working three shifts, three less working two shifts and three less working one shift per day.

The following table shows the changes in the contracts due to loss of miners in 1943. The table does not however indicate the actual loss of men as vacancies in a number of the contracts were filled by company account men. This in turn resulted in a shortage of company account miners that are normally engaged in timber repair work.

	<u>1943</u>	<u>No. Miners</u>	<u>1942</u>	<u>No. Miners</u>
Three shift contracts	<u>33</u>	198	34	204
Two shift contracts	2	8	5	20
One shift contracts	<u>1</u>	<u>4</u>	<u>4</u>	<u>8</u>
Total contracts				
and miners	36	210	43	232
Decrease in No. miners		22		

In December 1942, there were 36 company account miners while in December 1943 there were 27. This shows a reduction during the year of nine company account miners. Combining the loss of 22 miners and nine company account miners gives a loss of 31 miners during the year.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

During 1943 ore was mined in the No. 2 Shaft Pillar on the 4th Level (or 777' Sub-level), 764', 756', 747' Sub-levels.

In the No. 1 Shaft Pillar and adjoining stopes and pillars ore was mined on the 756', 747', 733', 710', 690', 673', 640', 653', 630', and 620' Sub-levels and the 9th Level. There was a total of thirteen sub-levels on which ore was mined above the 9th Level.

Mining operations were carried on below the 9th Level on the 595' and 580' Sub-levels.

Above the 12th Level, ore was mined on the 325' Sub, 12th Level (302' elevation) and 295' Sub-level.

Above the 13th Level, mining was done on the 270', 260', 250', 235', 220', 210', Sub-levels and 13th Level elevation.

Between the 13th and 14th Levels ore was mined on the 185', 170', 160', 150', and 140' Sub-levels.

In summarizing the above data ore was mined on 31 different elevations in 1943 as compared to 27 in 1942. It might be added that on several of the above sub-levels only a comparatively small amount of ore was available for mining.

(2) Detail of Stoping:

Subs Above the Ninth Level

No. 2 Shaft Pillar

Mining operations were continued in the West portion of No. 2 Shaft Pillar during the entire year. This small ore body lies Southeast of the dike which separates this territory from the main mined out area to the Northwest. During the year mining was carried on by one contract in this area which is approximately 50 feet wide and 100 feet long. For the most part this small ore body is surrounded by jasper and lean ore with caved jasper to the Northeast where the pillar was mined during the past several years. During the year this area was mined on the 4th Level at an elevation of 777' together with the 764' Sub and late in November operations were started on the 747' Sub-level. There was no apparent increase in the size of the ore body as mining progressed, however, on the 756' Sub a small test drift was driven in jasper with ore in the floor to the Southwest approximately 40 feet outside the outline of the **jasper boundary**. This drift indicated that the ore extended to the South and will likely enlarge the mining areas as mining continues on the 747' Sub-level.

In December, No. 35 Contract continued **slicing** Northeast of No. 914 Raise completing one slice and starting a second toward the old workings to the Northeast. A part of this mining was carried on under the jasper capping with the result that the ore area will be widened to somewhat over 75 feet.

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7. UNDERGROUND: (CONT.)

c. Stoping: (Cont.)

(2) Detail of Stoping: (Cont.)

No. 1 Shaft Pillar and Adjacent Pillars and Stopes

This mining area which ~~lies~~ on both sides of old No. 1 Negaunee Shaft pillar was mined on three sub-levels during 1943. Five contracts were engaged in mining here from No. 910, 908, 903A, 901, 901A Raises. The mining area on the 756' Sub was fairly uniform in outline although numerous caved jasper pillars and old wood were frequently encountered. This sub-level was completed in March with the 747' Sub-level being opened a short time previously. This ore body which is approximately 400 feet in length and 120 feet in width continues to recede due to encroachment of the footwall to the Northwest. The jasper hanging on the other hand continues to recede in the direction of the mined out area with the result that on each sub-level the average width is about the same. It might be added that the 747' Sub was continuous the entire length of the ore body with no sign of horses of jasper or caved jasper except where the new workings approached the old mined areas to the West.

In the extreme South end of this territory as mining progressed it was apparent that the jasper capping made a decided roll allowing mining operations to continue as much as 80 feet outside of the boundary above. Wet conditions somewhat hampering mining in this area where the water is encountered on the Southeast footwall side. It might be added that this area contains some ore running from .200 to .800 in sulphur which due to its small amount in proportion to the total product has not affected the average analysis.

In December No. 12 Contract completed two slices and started a third South of No. 910 Raise and parallel to the footwall. This sub-level should be completed late in January 1944. The 733' Sub was opened to mining in November 1943, a drift was driven connecting four of the regular raises from which mining was started.

In December No. 41 Contract completed four slices West of No. 903A Raise to dike and caved jasper in the mined out area to the West. No. 1 Contract commenced mining on this sub-level in December and by the end of the month had completed three slices to the lean ore footwall approximately 70 feet Southeast of No. 901 Raise. No. 24 Contract likewise started mining operations in December and completed two slices Northwest of No. 901A Raise. The jasper encountered at the end of these slices is in approximately the same location as on the sub-level above thus indicating that there is apparently no decrease in the size of the ore body in this direction. No. 39 Contract advanced a drift and two slices West of No. 908 Raise during December encountering caved jasper at a point approximately 65 feet from the raise. These workings showed an extension to the West of approximately 45 feet beyond the boundary of the sub-level above.

6 $\frac{1}{2}$ Level

The elevation of this old level is approximately 100 feet above the 9th Level or at an elevation of 710'. A comparatively small pillar was mined at the elevation of this old level and on two subs below during 1943. This area is bounded on the Northeast by lean ore and slate footwall