

ATHENS MINE
ANNUAL REPORT
YEAR 1934

6. SURFACE: (Cont'd)

e. Grounds:

The grounds were kept in condition during 1934. Several bare areas on the lawn were sodded. The shrubbery was pruned but needs transplanting in a few areas and a general treatment with fertilizer next spring.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking in 1934.

b. Development:

Very little development work was necessary in 1934. It was confined to a small amount of raising in ore and rock, and to two short drifts in ore to improve ventilation.

Several short transfer raises from the -430 ft. sub level and a branch raise from the -485 ft. sub level were put up to aid in mining the ore west of the 620 series of raises in Mitchell Lots No. 8 and No. 9 on the south footwall above the 6th level. One short mining raise from the 8th level and a ventilation raise from the 9th level to the 8th level at the west end of block No. 2 covered the raise development. The ore drifting done covered the completion of the airway drift on the -550 ft. sub level from the 620 series of raises to No. 609 raise and a similar but short connection from the top of No. 909 raise to the 8th level straight drift.

Although the cost was carried under stoping account as in 1933, part of the mining done on Mitchell Lots No. 8 and No. 9 in outlining the hanging wall in the west half of the ore area was in reality development work. The tons per man per day are necessarily low when outlining the hanging and laying a good timber mat or covering of poles and wire fencing.

c. Stoping:

(1) General Remarks:

For the past several years mining operations have been conducted in block No. 3 above the 6th level and block No. 2 above the 8th level. Work was continued here in 1934 and due to the curtailed schedule of operations comparatively little change occurred in the elevation of the areas being mined. The downward advance averaged about one sub level. Above the 6th level mining was underway on Mitchell Lots No. 8 and No. 9 along the irregular jasper hanging wall contact on sub levels from the -405 ft. (one sub below the 4th level) to the -450 ft. sub level. On the north side of the fault dike mining was confined to the -515 ft. and -530 ft. sub levels. Above the 8th level in block No. 2 mining was done on sub levels on the north side of the fault dike from the -735 ft. to the -770 ft. sub level and on the south side of the fault dike from the -720 ft. to the -745 ft. sub level.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

(1) General Remarks: (Cont'd)

One particularly troublesome factor during the year was the mining under rotted covering which had resulted from the shut-down periods in 1932 and 1933, this was particularly true on the -515 ft. and -530 ft. sub levels north of the fault dike above the 6th level.

The Mitchell territory above the 6th level developed about as expected, the ore area on successive sub levels growing quite rapidly in size. Several transfer raises were necessary to the west of the main line of raises in order to mine several upward extensions of the ore in the hanging. Mining conditions in this territory were excellent, a good covering was secured during the year; scraping distances are good and ventilation also. Mining above the 8th level disclosed larger areas of lean ore and rock on the north side of the fault dike in the neighborhood of No. 833 and No. 834 raises. Water, which has heretofore been confined in the south and west portions of this block, has been spreading so that during the last half of the year, a majority of the contracts were working under wet conditions. It is hoped that the pumping at the Breitung shaft will cut down the amount of water entering this territory and improve conditions materially.

The shut-down periods of 1932 and 1933 caused a good deal of dry rot in the timbering throughout the mine, especially in the raises above the 6th and 8th levels. Extensive repairs were necessary throughout the year in maintaining the raises. As an example, the new raises in No. 620 crosscut above the 6th level in several cases have been recribbed from top to bottom in the dirt compartment with only several sub levels having been mined at the upper part of these raises. On the 8th level, the rotted cribbing and level sets have taken weight due to the nearness of mining to the level, the lowest sub level or -770 ft. sub level, being only 25 ft. above the main level. The 8th level straight drift has been retimbered twice during the year and will need considerable attention throughout 1935.

The staggered basis of employment, whereby two crews of men work in each place, started in January with 13 working places. This was increased during the early part of the year to a total of 17 contracts, which in addition to mining ore also did considerable of the necessary repair work.

(2) Detail in Stoping:

4th Level

Mining of the small ore body on Mitchell lots No. 8 and No. 9 inside the mining limits of block 3 was completed in December 1933. No mining operations were conducted on the 4th level elevation during the year but the west crosscut leading to ventilation raises Nos. 609 and 610, was re-lined with treated timber. This drift carries the exhaust air from all the working places and must therefore be kept full size.

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7. UNDERGROUND: (Cont'd)

c. Stoping: (Cont'd)

(2) Detail in Stoping: (Cont'd)

SUBS ABOVE THE 6TH LEVEL

-405' Sub Level - South Footwall - Mitchell Lease

This sub level was being opened from the transfer raises adjacent to the mining limit in December 1933. The contract sliced to the southeast in hopes of reaching the slate footwall but were cut off by the jasper as on the 4th level elevation. The ore area increased in size, the jasper hanging wall dipping to the west and, as was later determined, this small isolated chimney of ore connected with the main ore body on the -430 ft. sub level. Mining operations were completed here in April and the contract again cut out the transfer raise on the -415 ft. sub level.

-415' Sub Level - South Footwall - Mitchell Lease

A single contract mined at this elevation from April until September. The ore area roughly doubled in size over that of the sub above. The northward dipping slate footwall was contacted along the southern extremity and on a section along the mining limit of block 3 is about the greatest width of the Athens trough from north to south, the distance between the two footwalls being about 600 ft.

Several months after mining had started, development west of No. 625 raise on the -440 ft. sub level disclosed an upward extension of the ore and a transfer raise was put up from this elevation a distance of 40 ft. to the jasper and mining was then started in this area on the -415 ft. sub level elevation. A small ore body with the raise as its center was mined here and the ore transferred to No. 625 raise on the -440 ft. sub level.

In these isolated ore areas, which later join the main ore body on the -440 ft. sub level, extra precautions were taken in covering down the floor of each sub level with poles and wire fencing. The hanging wall jasper breaks into pieces which run through a very small opening so extra care in covering down was necessary to prevent dilution of the ore on the lower sub levels.

-430' Sub Level - South Footwall - Mitchell Lease

Pillars adjacent to the main line of raises were removed early in the year and the sub level was reopened in August by way of four transfer raises. Two of these transfers were west of No. 624 and No. 625 raises respectively; one was southeast of No. 626 raise and the fourth was a branch raise put up from the -485 ft. sub level to aid in mining the ore along the south footwall. The outline of the hanging wall jasper is very irregular but at the end of the year it had proved that the ore was continuous for a distance of about 200 ft. along the mining limit and about the same distance to the southwest on a section through No. 625 raise. One contract remained at this elevation at the end of the year mining the last pillar east of No. 626 branch raise.

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7. UNDERGROUND: (Cont'd)

c. Stopings: (Cont'd)

(2) Detail in Stopings: (Cont'd)

-440' Sub Level - South Footwall - Mitchell Lease

With the exception of a transfer drift from No. 626 raise and a connection between No. 622 and No. 623 raise, all mining in the south footwall area at this elevation was done during the year. The first slice west of No. 624 and No. 625 raise disclosed the westerly extension of the ore area at this elevation and it was from these two drifts that the transfer raises were put up to mine the ore on the -415 and -430 ft. sub levels. The ore west of No. 624 raise extends a distance of 25 to 30 ft. into Athens lot 7, so that both Mitchell Lease ore and Athens ore were mined in this area during the year. Three contracts were working here in December.

-450' Sub Level - South Footwall - Mitchell Lease

One contract cut out No. 621 raise under the jasper hanging wall in March. Ore was mined east of this raise and from Nos. 622 and 623 raises successively so that at the end of the year only a few small pillars remained to be taken before cutting out on the next lower sub level. The jasper intrusion, which separates this area from the workings in block 3 on the south side of the dike, has narrowed to a width of about 100 ft. so it is expected that within one or two sub levels the ore will be continuous along the mining limit from the fault dike to the south footwall.

-485' Sub Level - South Footwall - Mitchell Lease

The transfer raise southeast of No. 626 raise is useful only as far as the -430 ft. sub level. For this reason, a branch raise was put up to the southeast of No. 626 raise from the -485 ft. sub level. The raise was inclined at an angle of slightly under 60° to reach the maximum distance to the south. It will aid in mining the ore along the south footwall on sub levels down to the -470 ft. sub level. The raise was double compartment and was extended a distance of 75 ft. in ore before striking jasper.

-515' Sub Level - North Side of Dike

Work at this elevation was started with the reopening of the mine in November 1933. In 1934 pillars in the west half and nearly the whole of the ore area in the east half were mined by a single contract. The outline of the jasper along the north side of the ore body is still very irregular and not clearly defined because of incomplete enrichment of the ore.

-530' Sub Level - North Side of Dike

This sub level was opened in July with the connection of No. 641 raise to No. 643 raise in the west half of block 3. The contract which then mined northwest of No. 643 raise along the old mining limit disclosed the junction of the jasper hanging wall with the main north dike. It was found that the dike had been caved a distance of about 10 ft. to the south by the pull of the old workings along the contact. The second contract mining north of No. 642 raise secured an advance of an additional 10 ft. to the north, indicating for the first time in four sub levels that the jasper is retreating to the north. Both of these contracts were mining here at the end of the year.

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7. UNDERGROUND: (Cont'd)

c. Stopings: (Cont'd)

(2) Detail in Stopings: (Cont'd)

-550' Sub Level - South Side of Dike

The drift which connects No. 621 raise, the most northerly in the series, with ventilation raise No. 609, was completed in February with an advance of 65 ft. in ore. A connection was made at this elevation to No. 622 raise in order to have two raises to carry away the exhaust air from the sub levels above. The drift and its connections have provided, and will provide, good ventilation on all the sub levels above in this territory.

6th Level

No mining or development work was done on the 6th level during the year. As stated above, numerous repairs were necessary on raises to the mining sub levels. The raises leading to the ore body along the south side of the fault dike which have been mined downward as far as the -515 ft. sub level, have been kept in temporary repair but in spite of by-pass ventilation, are slowly dry rotting. When operations are again started in this territory, it will be necessary to completely recrib most of the six raises. Much repair work was done in the crosscut on the north side of the dike and the airway connection from the top of No. 814 raise to the crosscut on the south side of the dike, was also completely retimbered.

SUBS ABOVE THE 8TH LEVEL

-720' Sub Level - South Side of Dike

Several small pillars adjacent to No. 835 raise were mined early in the year. In this area, near the junction of the east mining limit of block 2 and the fault dike, the ore is becoming contaminated by stringers of dike which are apparently offshoots from the fault dike. Selective mining and abandonment of several small pillars were necessary to maintain the grade of ore.

-735' Sub Level - North Side of Dike

An ore pillar near No. 851 raise, was mined early in the year. The large amount of water draining into this territory has made the mining of the last remaining pillars on each sub level a slow and difficult operation. All good grade ore was removed at this elevation but lean ore formed by the extension of stringers of paint rock and ferruginous slate into the ore area southeast of No. 851 raise, was necessarily left in place.

-735' Sub Level - South Side of Dike

Several contracts mined the ore adjacent to Nos. 835, 836 and 837 raises during the first half of the year. As on the -720 ft. sub level, some lean ore was left in place in the northeast corner of the ore body.

An airway connection from No. 835 to No. 814 raise was still being maintained at this elevation at the end of the year. This drift exhausts air from the workings above No. 831 crosscuts and has provided good ventilation in all these working places throughout the year.

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7. UNDERGROUND: (Cont'd)

c. Stopings: (Cont'd)

(2) Detail in Stopings: (Cont'd)

-745' Sub Level - North Side of Dike

The mining of pillars south of the 802 line of raises was completed in June. As on the -735 ft. sub level, a large area of lean ore was left in place east of No. 855 raise. At the end of the year one contract was mining a pillar west of this line of raises.

-745' Sub Level - South Side of Dike

This area was opened in June with the connection of Nos. 839 and 840 raises. A drift was started to the west along the fault dike to provide drainage for this area in hopes that as large a tonnage could be recovered as on the sub level above. This drift had to be discontinued just west of No. 857 raise because of the large inflow of water. Two other attempts to mine the pillar west of this point were unsuccessful and at the end of the year two contracts were working here on the pillars nearer the raises, but under extremely wet conditions. The water dammed back at times then came in with a rush of fine ore and rock that would extend sometimes 50 to 60 ft. in the drift. Often weeks would be required in cleaning up the drift and getting forepoles in to stop the run. Mining of this ore can not be done at a reasonable cost but usually one drift drains the surrounding territory and makes mining conditions better in the balance of the pillar.

-760' Sub Level - North Side of Dike

This sub level was started in December 1933 with the connection of No. 805 and No. 807 raise. The ore area adjacent to this series of raises was entirely mined during the year. Connections on all other series have been completed and mining was under way at the close of the year. In December two contracts were working in the wet territory adjacent to No. 810 and 851 raise and two other contracts were mining pillars in the east half of the block near No. 803 and No. 832 raise. The contact of the ore and paint rock stringers has passed through No. 833 raise and is decreasing the size of the ore body within this block on each successive sub level.

-770' Sub Level - North Side of Dike

This sub level was opened in August and the three raises in the 805 series connected. Two contracts were mining here at the end of the year, the one northwest of No. 806 raise toward the old mining limit under extremely wet conditions that have been growing worse on each sub level. This area is directly under the surface cave and the water is apparently following down the slope of the old mining limit and junction of the main north dike. A third contract was mining south of the new No. 812 raise which had been put up from the 8th level straight drift. Mining here is possible only with a protective pillar of ore in the back which shuts off the flow of water. It is hoped that a sizeable area can be mined here between the jasper and slate footwall before the inflow starts.

This elevation marks the last sub level that can be mined from the 8th level raises. The distance from floor to floor is approximately 25 ft. which allows only 12 to 14 ft. of ore chute storage space. The level drifts have started taking weight from mining above and operations will be kept at maximum speed to cut down the repair work necessary to keep the level drifts open.

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7. UNDERGROUND: (Cont'd)

c. Stopings: (Cont'd)

(2) Detail in Stopings: (Cont'd)

8th Level

The only drifting done at this elevation was the 20 ft. ventilation connection from the top of new No. 909 raise to the straight 8th level drift. This raise and connection has afforded a means of complete ventilation to all working places above the 8th level because of its location at the west end of block 3. The air coming into the straight drift is forced up the raises in the west half of the block to the mining sub levels and exhausts to No. 814 raise on the -735 ft. sub level.

Extensive retimbering has been done on the drifts and crosscuts within the limits of block 2, especially in the neighborhood of No. 804 and No. 810 raise. This section has been repaired at least twice during the year and all level turn-outs have also been retimbered.

9th Level

At the end of 1933, timber sets were being placed on the 9th level drift preliminary to starting No. 909 ventilation raise. The raise was started in January and in February reached the shight of the 8th level having gone successively through 25 ft. of slate, 40 ft. of ore and 45 ft. of mixed dike and ore. The raise is double compartment and will be useful as a mining raise when operations are started above the 9th level. A small amount of water has been diverted into the top of the raise to keep it wet and prevent dry rot.

7. UNDEERG d. Timbering:

The cost per ton for timber in 1934 was about the same as in 1931 and 1928 in both of which years the product was larger. The timber that had rotted in the timber yard was charged out in 1933, so there was no similiar expense in 1934. Special attention was given to covering of floors of sub levels during 1934, as the old covering had rotted due to the idle periods of 1932 and 1933. All timber used during the year has been green and sound. Retimbering of main level drifts has been above normal especially in the last three months. Practically all of the cribbing timber used in 1934 was for replacement of rotted cribbing in raises caused by the two shut-downs. The comparison of cost and quantities used with 1933 is of no value for 1933 was not a normal year. Briefly, the quantity used and cost per ton in 1934 was increased as a result of the curtailed operating schedules and two shut-downs.

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7. UNDERGROUND: (Cont'd)d. Timberings: (Cont'd)Statement of Timber Used:

| | <u>Linear Feet</u> | <u>Avg. Price Per Foot</u> | <u>Amount 1934</u> | <u>Amount 1933</u> |
|--------------------|------------------------|--------------------------------|------------------------|------------------------|
| 6" to 8" Cribbing | 46,675 | .0329 | 1,533.29 | 1,182.90 |
| 8" to 10" Stulls | 9,661 | .0556 | 536.83 | 596.15 |
| 10" to 12" " | 39,376 | .0849 | 3,344.63 | 2,365.32 |
| 12" to 14" " | 32,232 | .1122 | 3,616.93 | 3,619.82 |
| 14" to 16" " | 3,097 | .1548 | 479.56 | 412.99 |
| Treated Timber | 2,847 | .2792 | 795.10 | |
| Total 1934 | 133,888 | .0769 | 10,306.34 | |
| Total 1933 | 72,988 | | | 8,150.18 |
| | | | | |
| Lagging - 7 ft. | 523,044 | .6985 | 3,653.39 | 1,356.94 |
| Poles - 9½ ft. | 466,323 | 1.1980 | 5,586.33 | 1,865.38 |
| Total 1934 | 989,367 | .9339 | 9,239.72 | |
| Total 1933 | 339,688 | .9486 | | 3,222.32 |
| | | | | |
| Grand Total - 1934 | | | 19,546.06 | |
| Grand Total - 1933 | | | | 11,372.50 |

| | | |
|------------------------------------|---------|--------|
| Product | 162,706 | 47,368 |
| Feet of Timber Per Ton of Ore | .823 | 1.541 |
| " " Lagging " " " " | 3.208 | 4.073 |
| " " Poles " " " " | 2.866 | 3.097 |
| Feet of Lagging Per Foot of Timber | 3.991 | 2.644 |

| | | |
|-------------------------|-------|-------|
| Cost Per Ton for Timber | .0634 | .1721 |
| " " " " Lagging | .0224 | .0286 |
| " " " " Poles | .0343 | .0394 |
| " " " " Wire Fencing | - | - |
| Total Cost Per Ton | .1201 | .2401 |

| | | |
|---|---------|---------|
| Equivalent of Stull Timber to Board Measure | 344,313 | 219,203 |
| Feet of Board Measure Per Ton of Ore | 2.116 | 4.627 |

Total Cost for Timber, Lagging, Poles, etc., and Cost per Ton:

| <u>Year</u> | <u>Amount</u> | <u>Cost Per Ton</u> |
|-------------|---------------|---------------------|
| 1934 | 19,546.06 | .1201 |
| 1933 | 11,372.50 | .2401 |
| 1932 | 11,794.89 | .1541 |
| 1931 | 28,704.68 | .1141 |
| 1930 | 38,001.66 | .0985 |
| 1929 | 35,086.43 | .1015 |
| 1928 | 29,160.74 | .1207 |
| 1927 | 23,288.37 | .1001 |

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7. UNDERGROUND: (Cont'd)e. Drifting and Raising:

The following statement gives comparative figures of footage of drifting and raising in 1934 and 1933:

| <u>Year</u> | <u>Drifting</u> | | | <u>Raising</u> | | | <u>Grand Total</u> |
|-------------|-----------------|-------------|--------------|----------------|-------------|--------------|--------------------|
| | <u>Ore</u> | <u>Rock</u> | <u>Total</u> | <u>Ore</u> | <u>Rock</u> | <u>Total</u> | |
| 1934 | 135' | 0 | 135' | 215' | 75' | 290' | 425' |
| 1933 | 75' | 30' | 105' | 158' | 92' | 250' | 355' |
| Increase | 60' | | 30' | 57' | | 40' | 70' |
| Decrease | | 30' | | | 17' | | |

There was very little development work in 1934 due to the curtailed operating schedule. It has been below normal since 1931.

f. Explosives, Drilling and Blasting:

The cost per ton for explosives decreased 11.2% in 1934 and was the lowest cost in the history of the mine. Part of the decrease was due to decrease of 5.2% in cost of dynamite. There was very little tight ground in the areas mined, also close supervision of powder used and general use of tamping undoubtedly contributed to lower costs. The Athens ore on the whole, is softer than in any mine operated in recent years by the C. C. I. Co. The ore is, however, tough to break as the usual round requires from 11 to 17 holes.

A careful test of the heavy section auger drill steel manufactured by the various steel companies disclosed the fact that one type of auger steel gave the best results at the Athens. This steel has a short twist and a sharp cutting edge on the twist. This construction clears the holes of cuttings, permitting faster drilling and less breakage of drill steel.

Statement of Explosives Used: (Ore Development and Stopping)

| | <u>Quantity</u> | <u>Average Price</u> | <u>Amount 1934</u> | <u>Amount 1933</u> |
|----------------------------------|-----------------|----------------------|--------------------|--------------------|
| 50% Gelatin | 55,550 | 11.30 | 6,277.63 | 2,165.26 |
| Total Powder - 1934 | 55,550 | 11.30 | 6,277.63 | |
| Total Powder - 1933 | 18,050 | 11.92 | | 2,165.26 |
| Fuse - feet | | | 1,190.55 | 345.85 |
| Caps - No.6 | | | 367.91 | 94.11 |
| Fuse Lighters | | | 23.63 | 3.38 |
| Connecting Wire, Exploders, etc. | | | 83.76 | 3.20 |
| Total Fuse, etc. - 1934 | | | 1,665.85 | |
| Total Fuse, etc. - 1933 | | | | 446.54 |
| Total All Explosives - 1934 | | | 7,943.48 | |
| Total All Explosives - 1933 | | | | 2,611.80 |
| Product | | | 162,706 | 47,368 |
| Pounds of Powder Per Ton of Ore | | | .3414 | .3810 |
| Tons of Ore Per Pound of Powder | | | 2.929 | 2.624 |
| Cost Per Ton - Powder | | | .0386 | .0457 |
| Cost Per Ton - Fuse, Caps, etc. | | | .0102 | .0094 |
| Cost Per Ton - All Explosives | | | .0488 | .0551 |

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7. UNDERGROUND: (Cont'd)

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

Statement of Explosives Used: (Sinking, Rock Development, Etc.)

| | <u>Quantity</u> | <u>Average Price</u> | <u>Amount 1934</u> | <u>Amount 1933</u> |
|------------------------------------|-----------------|----------------------|--------------------|--------------------|
| Total Powder - 1934 | 200 | 11.50 | 23.00 | |
| Total Powder - 1933 | 1,700 | 11.87 | | 201.75 |
| Total Fuse, Caps, Etc. - 1934 | | | 8.52 | |
| Total Fuse, Caps, Etc. - 1933 | | | | 32.71 |
| Total All Explosives - 1934 | | | 31.52 | |
| Total All Explosives - 1933 | | | | 234.46 |
| | | | | |
| Total Explosives Used in Mine | | | 7,975.00 | 2,846.26 |
| Average Price per lb. for Powder | | | .1130 | .1198 |

100% of Powder used in 1934 was 50%
 100% " " " " 1933 " 50%
 100% " " " " 1932 " 50%
 58% " " " " 1931 " 60%

The following statement shows the cost per ton for explosives exclusive of rock development for the period 1929 - 1934 inclusive:

| <u>Year</u> | <u>Cost Per Ton</u> | <u>Product</u> |
|-------------|---------------------|----------------|
| 1934 | .0488 | 162,706 |
| 1933 | .0551 | 47,368 |
| 1932 | .0553 | 76,525 |
| 1931 | .0548 | 251,580 |
| 1930 | .0536 | 385,461 |
| 1929 | .0588 | 343,147 |

g. Mining and Loadings:

Nine foot timber was used exclusively on sub levels during 1934, the sub level interval averaged about 12 ft. Several areas on the 8th level were very wet which makes it difficult to handle the ore with scrapers. Not only is handling difficult on the sub levels but also in cars, the underground pockets and on surface. This condition is due to ground and surface water which enters the mine from the surface cave. Part of the 8th level workings are directly under the cave. It is hoped to cut off part of the water by lowering the water level in the Breitung Hematite Mine which is about 2,000 ft. distant on the south side of the swamp that lies between the two mines. This should be possible if the flow of water over the lip of the ledge at the Athens cave can be reversed to flow to the Breitung Mine. Permission has been granted by the owners, the Jones & Laughlin Steel Company, and this work will be undertaken early in 1935.

Electric scraper hoists were used by all contracts during 1934. One unit was purchased making a total of 17 at the mine. An increase in product will make it necessary to purchase more units as all are now in use. A change in operating schedule to four or five days per week with a full crew would require the purchase of 17 new units. The old air scraper hoists are obsolete due to small capacity and heavy maintenance expense and are being converted into single drum timber hoists.

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7. UNDERGROUND: (Cont'd)

h. Ventilation:

Since the completion of the airway raise from the 9th to 8th levels early in the year ventilation throughout the mine has been very good. The new fan on the 10th level, installed in December 1933, is slightly larger than the old fan and is forcing an increased volume of air through the mine. With ventilation doors built at necessary points to control the circulation it has been possible to have good air in nearly all working places. Where direct diversion of the air was impossible, booster fans were used to force air to the sub levels.

i. Pumping:

The average number of gallons pumped per minute decreased 28 gallons in 1934 as compared with a decrease of 26½ gallons in 1933. The maximum was in 1932 after the cave to surface in June and as stated above, there has been a decrease each year since. Rainfall has an effect on the water entering the mine since the cave occurred.

There is direct drainage through the ground from the cave on the Breitung property over to the Athens cave and pumping at the Breitung will eliminate this flow. It is impossible to judge the quantity that can be eliminated but it is hoped it will be an appreciable amount. Even a small amount will reduce the pumping cost at the Athens as the heads compare as follows: Less than 100 ft. at Breitung against 2,400 ft. at the Athens. Pumping will be underway at the Breitung within 30 days and the outcome is awaited with great interest.

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

| <u>Month</u> | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> |
|--------------|-------------|-------------|-------------|-------------|-------------|
| January | 318 | 373 | 278 | 243 | 230 |
| February | 317 | 358 | 286 | 244 | 230 |
| March | 313 | 340 | 296 | 250 | 233 |
| April | 307 | 326 | 307 | 253 | 231 |
| May | 329 | 365 | 312 | 255 | 228 |
| June | 361 | 416 | 326 | 282 | 228 |
| July | 373 | 422 | 597 | 262 | 222 |
| August | 360 | 411 | 542 | 263 | 234 |
| September | 356 | 399 | 486 | 262 | 239 |
| October | 354 | 356 | 431 | 263 | 233 |
| November | 355 | 342 | 402 | 268 | 239 |
| December | <u>355</u> | <u>326</u> | <u>391</u> | <u>274</u> | <u>242</u> |
| Average | 341½ | 369½ | 396 | 260 | 232 |

j. Shaft:

The cost of repairs to the shaft increased in 1934 and were larger than in any year since 1930. A section of the circular concrete shaft in the cage compartment about 200 ft. in depth near surface was gunited. The cage road is downcast and ice forming in this section during the winter causes the concrete to scale making repairs necessary every five or six years. Considerable of the wire netting casing off the cage road compartment rotted and was replaced in 1934. The cage guides were bolted direct to the steel dividers on a number of sets as the rivets holding the cage runner bracket were worn and loose. Maintenance of the shaft is extremely important and repairs must be made whenever inspections show they are needed.

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9. EXPLORATIONS
AND
FUTURE
EXPLORATIONS:

There was no diamond drilling on the Athens property in 1934 and none is contemplated at this time.

10. TAXES:

A comparison of assessed valuations and taxes for 1934 and 1933 follows:

| Description | 1934 | | 1933 | |
|--------------------------------------|-----------|------------|-----------|------------|
| | Valuation | Taxes | Valuation | Taxes |
| Realty (Tax Commission) | 1,675,000 | 44,893.85 | 1,500,000 | 41,616.00 |
| Ore in Stock, Equip. & Supplies | 370,000 | 9,916.85 | 500,000 | 13,872.00 |
| Total by Tax Commission | 2,045,000 | 54,810.70 | 2,000,000 | 55,488.00 |
| Sterling Addition | 4,600 | 123.30 | 4,600 | 127.62 |
| Harvey Lots | 1,300 | 34.86 | 1,300 | 36.07 |
| Total | 2,050,900 | 54,968.86 | 2,005,900 | 55,651.69 |
| Collection Fees | | 549.69 | | 556.52 |
| Total Optg. Athens Mine | 2,050,900 | 55,518.55 | 2,005,900 | 56,208.21 |
| <u>Rented Buildings :</u> | | | | |
| Harvey Plat | 4,200 | 112.59 | 7,900 | 219.20 |
| Sterling Addition | 22,700 | 608.49 | 22,700 | 629.81 |
| Total | 26,900 | 721.08 | 30,600 | 849.01 |
| Collection Fees | | 7.21 | | 8.49 |
| Total Athens Rented Bldgs. | 26,900 | 728.29 | 30,600 | 857.50 |
| Total Athens Iron Mining Co. | 2,077,800 | 56,246.84 | 2,036,500 | 57,065.71 |
| Tax Rate | | 2.6802 | | 2.774 |
| Total City of Negaunee Tax | | 339,407.51 | | 357,648.77 |
| Athens Iron Mining Co. % of City Tax | | 16.57% | | 15.95% |

11. ACCIDENTS
AND
PERSONAL
INJURY:

The following statement shows accidents for years 1930 to 1934, inclusive. There was only one lost time accident in 1934, the same number as in 1933.

| | 1934 | 1933 | 1932 | 1931 | 1930 |
|---------------------------|------|------|------|------|------|
| Fatal | 0 | 0 | 0 | 0 | 1 |
| Time Lost - Over 4 Months | 1 | 0 | 2 | 1 | 1 |
| " " - 1 to 4 " | 0 | 1 | 0 | 1 | 2 |
| " " - Less than 1 Month | 0 | 0 | 0 | 0 | 2 |
| Total Accidents | 1 | 1 | 2 | 2 | 6 |

| | | | | | |
|--|---|----|----|----|----|
| Number of cases paid compensation for accidents prior to Jan. 1st of each year | 7 | 14 | 14 | 12 | 12 |
|--|---|----|----|----|----|

| | | | | | |
|--|---|---|---|---|---|
| Number of cases paid difference in wages (included in above total) | 4 | 4 | 4 | 5 | 4 |
|--|---|---|---|---|---|

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11. ACCIDENTS
AND
PERSONAL
INJURY: (Cont'd)

The accident in 1934 resulting in a loss of time of over four (4) months was caused by fall of ground. The injury was an impacted fracture of lower end of third metatarsal bone of right foot.

The injured man will return to light work on January 2nd, 1935, but it will be several months before he will be able to resume work as a miner.

At the end of the year the Athens had operated 174 days underground and 2,069 days on surface with no lost time accidents. The surface record of nearly six years is unusual. It illustrates that elimination of accidents for long periods of time is possible. During this period there have been several no lost time accidents which, luckily, were not serious enough to cause loss of time.

12. NEW
CONSTRUCTION
AND
PROPOSED NEW
CONSTRUCTION:

E. & A. No.649 was authorized in the summer of 1934. It covered the cost of installation of individual heating plants in the office and engine house buildings, also new steam line to the shop building and to the shaft house. The office and engine house are each over 400 ft. from the main heating plant in the dry building. The old steam lines from the heating plant had rotted and would have had to be replaced. It was decided that an appreciable saving in heating cost would result from installation of an individual heating boiler in each building. Work was completed at the office building in September and at the engine house in November. The new steam line to the shop and shaft house was installed early in October. The consumption of coal at the heating plant in the dry house decreased in December as compared with the previous year indicating a saving that will retire the cost of the new plants in a few years. The actual figures were as follows: 52 tons in 1934; 95 tons in 1933. The consumption in the engine house was 8 tons in December and in the office building 4 tons, making net saving in coal consumed, 31 tons for the month.

An E. & A. will shortly be submitted to cover cost of installation of pumping equipment in the Breitung shaft. It is proposed to lower the water in the Breitung mine 30 to 40 ft. which will bring it below the level of the lip of the ledge at the Athens cave. It is hoped that this will reduce the amount of water in the Athens Mine, thereby improving operating conditions in the wet territory above the 8th level and also effect a decided saving in the pumping cost. The cost of this work will not exceed \$1000.00 and a months trial should be sufficient to determine if the cost of continued pumping is justified.

There are no other E. & A.'s contemplated at this time.

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13. EQUIPMENT
AND
PROPOSED
EQUIPMENT:

a. Steam Shovels:

The Athens Iron Mining Company does not own a steam shovel. Ore is loaded by shovels rented from the Cleveland-Cliffs Iron Company. In 1934 72,432 tons were loaded by No. 42 shovel and 4,901 tons by No.16 shovel, the total was 77,333 tons.

b. Stockpile Trestles:

Some expense was incurred in the summer for repair of the wood trestle from which Mitchell Lease ore is stocked.. No wood trestle was erected in 1934.

c. Timber Treating Plant:

The revamping of this plant involved the making of considerable new equipment. This covered rebuilding of the derrick, steel lining in concrete treatment tanks, steel cradles, quadruple blocks, etc. A full description of this work is given elsewhere in this report.

d. Scraper Hoists:

Following is a list of scraper hoist equipment:

| | <u>On Hand</u> <u>1-1-1934</u> | <u>Purchased</u> <u>1934</u> | <u>Total on Hand</u> <u>12-31-1934</u> |
|---------------------------------|-----------------------------------|---------------------------------|---|
| Sullivan 15 H.P. Electric | 14 | 1 (new) | 15 |
| Sullivan 20 H.P. Electric | 2 | 0 | 2 |
| Ingersoll-Rand 10 H.P. Electric | 2 | 0 | 2 |
| " " Air Scrapers | <u>28</u> | <u>28 Transferred</u> | <u>0</u> |
| Total | <u>46</u> | <u>27</u> | <u>19</u> |

The Ingersoll-Rand air scraper hoists are omitted from the statement this year as they are obsolete and are being converted into single drum timber hoists. The two 6½ H.P. Sullivan Electric hoists have likewise been omitted this year. One has been converted into a single drum to use with a belt drive to turn a grindstone in the mine for sharpening axes, and the other will also be soon converted to the same use. This will equip each operating level with a power driven grindstone.

If production is increased, additional electric units of 10 and 15 H. P. must be purchased as all the electric hoists at the mine are now in service.

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14. MAINTENANCE
AND REPAIRS:

Considerable expense was incurred in 1934 for maintenance and repairs. The work covered repairs to shaft house, concrete shaft, steel trestles and the office building.

The casing plank on all sides of the skip compartment in the shaft house rotted due to the warm moist upcast air, they were removed in the summer and replaced with new 2" fir plank. New nailing strips were installed and bolted to the steel channels.

A 200 ft. section of the circular concrete shaft was gunited in the cage compartment. The face of the concrete was broken by action of ice as this compartment is downcast and ice forms here in the winter.

About 400 ft. of wire fencing used as casing between the cage and ladder compartments was replaced in the summer as the old fencing had rusted away and could no longer be kept in place.

The ties or as they are commonly called, decking timbers, on the permanent trestle southwest of the shaft were replaced, also all ties on the steel stocking trestle east of the shaft. Nearly two carloads of fir ties 5" x 8" in size were required. Most of the old ties had been in service since the mine opened. This involved an expenditure of about \$2000.00.

The interior of office building was redecorated this year and new light fixtures installed in the office.

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15. POWER:

Detail of electric current purchased compared with 1933:

| | <u>1934 - 12 Mos.Optg.</u> | | <u>1933 - 5 Mos.Optg.</u> | |
|--|----------------------------|----------------|---------------------------|----------------|
| | <u>Cost</u> | <u>Per Ton</u> | <u>Cost</u> | <u>Per Ton</u> |
| Stopping | 363.60 | .002 | 140.90 | .0032 |
| Ventilation | 4,157.42 | .026 | 980.73 | .0208 |
| Pumping | 23,828.94 | .146 | 8,921.50 | .1884 |
| Hoisting | 13,549.10 | .083 | 4,072.25 | .0860 |
| Stocking Ore | 296.87 | .002 | 154.38 | .0032 |
| Dry House | 46.33 | .000 | 20.81 | .0004 |
| Lights at Levels | 1,000.49 | .006 | 246.77 | .0052 |
| Compressor | 12,290.56 | .076 | 3,789.76 | .0800 |
| Electric Haulage | 1,108.11 | .007 | 355.48 | .0076 |
| Shops | 87.46 | .001 | 36.81 | .0007 |
| Heating Plant | 12.33 | .000 | 5.00 | .0001 |
| Office | 36.74 | .000 | 7.45 | .0001 |
| Total | 56,777.95 | .349 | 18,731.84 | .3954 |
| Main Line Meter 3,528,094 K.W. | | | | |
| Separate Meter Readings 3,487,917 K.W. | | | | |
| Line Loss 40,177 K.W. (May to Dec. Inclusive) | | | | |
| Product 162,706 Tons 47,368 Tons | | | | |
| K.W. Per Ton 21.44 (Includes Line Loss) 26.115 | | | | |
| Cost Per K.W. (Avg) .01609 .01514 | | | | |
| Cost per K.W. after May 1st .01639 | | | | |

16. WATER SUPPLY:

Water supply system operated satisfactorily throughout the year.

17. CONDITION
OF
PREMISES:

The grounds around the mine were kept in good condition throughout the year. Expense was curtailed, as it has been for the past 4 years. Fertilizer is needed on lawn and planted areas, also the shrubbery needs transplanting and thinning. This work however, can be postponed until conditions become normal.

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18. NATIONALITY
OF
EMPLOYEES:

The following statements show; first, the nationality of employees as to parentage, secondly, a separation of nationalities into American and foreign born.

| <u>As to Parentage</u> | <u>1934</u> | <u>%</u> | <u>1933</u> | <u>%</u> |
|------------------------|-------------|--------------|-------------|------------|
| English | 42 | 21.8 | 30 | 26 |
| Finnish | 78 | 40.4 | 47 | 40 |
| Italian | 28 | 14.5 | 12 | 10 |
| Swedish | 18 | 9.3 | 11 | 9 |
| French (Canadian) | 16 | 8.3 | 10 | 8 |
| Scotch | 1 | .5 | 1 | 1 |
| German | 5 | 2.6 | 2 | 2 |
| Austrian | 1 | .5 | 1 | 1 |
| Norwegian | 3 | 1.6 | 2 | 2 |
| Irish | 1 | .5 | 1 | 1 |
| Total | 193 | 100.0 | 117 | 100 |

| <u>As to Birth</u> | <u>American Born</u> | | <u>Foreign Born</u> | |
|--------------------|----------------------|-------------|---------------------|-------------|
| | <u>1934</u> | <u>1933</u> | <u>1934</u> | <u>1933</u> |
| English | 26 | 21 | 16 | 9 |
| Finnish | 36 | 18 | 42 | 29 |
| Italian | 6 | 2 | 22 | 10 |
| Swedish | 14 | 9 | 4 | 2 |
| French (Canadian) | 16 | 10 | | |
| Scotch | 1 | 1 | | |
| German | 5 | 2 | | |
| Austrian | 1 | 1 | | |
| Norwegian | 3 | 2 | | |
| Irish | 1 | 1 | | |
| Total | 109 | 67 | 84 | 50 |
| Percentage | 56.5% | 57% | 43.5% | 43% |

SOUTH JACKSON MINE
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YEAR 1934

1. GENERAL:

This property has now been idle for many years and it is not expected that it will ever be operated again as an open pit mine.

4. ESTIMATE
OF ORE
RESERVES:

a. Available Ore:

| | |
|--|----------------|
| Above present pit available by present system of mining: | |
| On Southwest side | 35,000 tons |
| North of Lucy Pit | 5,000 " |
| South and Southwest of Lucy Pit | <u>3,000 "</u> |
| Total | 43,000 " |

| | |
|---|------------------|
| Below present pit and above drainage tunnel available by milling: | |
| West of Crusher | 186,000 tons |
| Area below bottom of present pit shown by churn drilling | <u>105,226 "</u> |
| Total | 291,226 " |

| | |
|-------------|-----------|
| Grand Total | 334,226 " |
|-------------|-----------|

c. Estimated Analysis:

| | <u>Iron</u> | <u>Phos.</u> | <u>Silica</u> | <u>Alum</u> | <u>Mang</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Igni.</u> | <u>Moist</u> |
|---------|-------------|--------------|---------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Natural | 34.55 | .066 | 36.00 | 1.42 | 2.00 | .435 | .175 | .010 | 2.00 | 7.00 |

6. SURFACE:

There has been no watchman at this property since 1931.

In the fall the gyratory crusher was dismantled and moved to the Cliffs Shaft Mine where it will be available to replace any parts that may break in the Cliffs Shaft crusher which is a duplicate. In the summer the upper section of the crusher building was dismantled by Negaunee Mine surface labor. Barely enough timber was salvaged to pay the labor expense as most of the timber in this exposed section was badly rotted. The work was then stopped until the gyratory crusher was removed. It can be completed by any mine in need of dimension timber as there will be enough good timber recovered to repay the labor expense.

The old carpenter and blacksmith shop building and the building housing the crusher motor were sold and dismantled in the fall as they were being wrecked by vandals.

There is a considerable amount of rail and pipe in the old open pit which should be sorted, the good material sold at low price to the active mines and the poor shipped for scrap. The only buildings now at the property are the partly dismantled crusher house, and the combined boiler and engine house. The latter building was built with pine lumber and it is recommended that it be dismantled by employees owing back rent to avoid cash outlay. The material can be used in repairing company houses and sheds in Negaunee and the labor expense of dismantling credited on rents.

The fences around the open pits were repaired in June.

SOUTH JACKSON MINE
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10. TAXES:

| | <u>1 9 3 4</u> | | <u>1 9 3 3</u> | |
|---|------------------|-----------------|------------------|-----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| 53% of realty as described, Sec. 1-47-27 | 225,250 | 6,097.59(a) | 214,650 | 5,955.25 |
| Collection Fees | | | | 59.55 |
| Total Taxes | | <u>6,097.59</u> | | <u>6,014.80</u> |

(a) Includes collection fee.

The valuation was increased \$10,600 in 1934, by the State Tax Commission. The Negaunee City tax rate decreased slightly so that the actual increase in taxes was only \$82.79 or 1.3%.

NORTH JACKSON MINE
ANNUAL REPORT
YEAR 1934

1. GENERAL:

This property has been idle for 26 years or since 1908.

6. SURFACE:

The fences around the open pits were repaired in the early summer.

10. TAXES:

| | <u>1 9 3 4</u> | | <u>1 9 3 3</u> | |
|---------------------------------------|------------------|----------------|------------------|----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| 47% of Jackson Realty Sec. 1-47-27 | 199,750 | 5407.30 | 190,350 | 5333.88 |
| <u>Rented Buildings</u> | | | | |
| Old Jackson Office | 700 | 18.96 | 700 | 19.61 |
| Total Taxes | | <u>5426.26</u> | | <u>5353.49</u> |

The valuation set by the State Tax Commission increased \$9,400.00 over the 1933 valuation. The Negaunee City tax rate decreased slightly making net increase in taxes \$72.77 or 1.8%.

LUCY MINE
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YEAR 1934

1. GENERAL:

The fences around the open pits were inspected in the spring and no repairs were necessary.

10. TAXES:

| | <u>1 9 3 4</u> | | <u>1 9 3 3</u> | |
|-----------------|------------------|-----------------|------------------|-----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| Various Parcels | 48,600 | 1,302.99 | 49,100 | 1,362.31 |
| Collection Fees | | 13.02 | | 13.62 |
| Total Taxes | | <u>1,316.01</u> | | <u>1,375.93</u> |

Valuation of property decreased \$500.00 or 1% due to lease of two lots in the Iron Plat, and tax rate was slightly lower giving a net decrease of \$59.92 in taxes.

GARDNER MACKINAW MINE
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1. GENERAL

The small product hoisted from the Mackinaw Mine in 1933 was derived entirely from shaft sinking operations below the 7th Level. During 1934 the shaft was sunk an additional 5'; the 8th and 9th Level plats cut out; the level drifts started and carried to such an extent that a total of 2100' of drifting had disclosed additional ore amounting to nearly 1,000,000 tons. Of this figure 50% was available, and nearly 400,000 tons were unmined at the end of the year. The amount of ore developed on these two lower levels somewhat exceeded expectations and it has been fairly definitely shown that the ore body is increasing in size at depth.

The quality of ore has also been undergoing a change, two factors being beneficial and one adverse. The iron content of the ore developed on the 8th and 9th Levels has been higher and the sulphur lower than on levels heretofore opened up. The phosphorus, however, in certain areas, notably northwest of the incline shaft, has shown an abrupt increase. The theory has been advanced that this element has, at least in part, replaced the sulphur and it is hoped that from the sales standpoint that the one will be no more detrimental than the other. To illustrate more completely the character of this ore, a 500' length along the vein on the 9th Level in ore 30 to 40' thick, returned the following average analysis:

| <u>Iron</u> | <u>Phos.</u> | <u>Sul.</u> |
|-------------|--------------|-------------|
| 61.10 | .780 | .346 |

The exclusion from mining of the tonnage represented by this sample, will decrease the reported ore reserves by something more than 100,000 tons, and increase the cost of producing the remaining ore, so that every effort should be made to find an outlet for it.

Development in 1934 has indicated that in the future the major portion of ore reserves are to be expected northwest of the incline shaft. From the 5th to the 7th Levels the vein length increased on both sides of the shaft but from the 7th to 9th Levels, the length of ore in the narrow portion of the vein southeast of the shaft decreased. The dip of the ore body is southwest, as is the shaft, but the pitch or trend of the formation is now in a westerly direction. The west boundary of the present Mackinaw lease has been reached by the 9th Level drift and at lower elevations an increasing portion of the ore body will pass over to the west of this line. It may be estimated roughly, from present indications, that eventually the north 1/3 of the ore body will occur on the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 35, T.45 N. S. 25 W. (a C. & N.W. forty) and the south 2/3 on the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of the same section (a D.M. & M. forty). As before noted, the west boundary of our present lease has been reached so that in order to extend our mining rights at present, it is suggested that a permit be secured from the C. & N. W. allowing us the right to explore on their above description. This permit to be so worded that the C. & N. W. ore from

GARDNER MACKINAW MINE
ANNUAL REPORT
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1. GENERAL (Cont.)

this description may be hoisted through the D.M. & M. or Mackinaw shaft and stocked with Mackinaw ore on the Mackinaw surface. If both lessors agree to this provision, tally is to be kept by tram car count. The only practical method of mining the ore on these two descriptions is by way of the Mackinaw shaft. If the C. & N. W. is unwilling to grant a permit with the above stipulations, it is suggested that the matter be dropped, because of the increased cost of handling the ore by keeping it separate.

It may be pointed out that the end of the year 1934 finds the mine in better physical shape than at any time in its history. Mining costs were low, even though the development program which placed the ore reserves at a new high figure, was carried on throughout the year. The costs were further reduced in December by the writing off of the development account charge of 51.7¢ per ton, and by May 1935, the plant depreciation charge of 34¢ per ton will have been eliminated at the present rate of production. These reductions will have a splendid effect on the profit factor which should reach a new high level. The mining plant, both surface and underground, is in shape for steady production over a number of years, without major additions or alterations.

Pumping charges have been decreasing over the past three years, the amount of water pumped dropping from an average of 327 gallons per minute in 1931 to 157 in 1934. The remarkable safety record held by this mine was extended through the full year to a total of 1681 days without a single lost time accident. Every employee is deserving of credit for this excellent showing.

2. PRODUCTION
SHIPMENTS &
INVENTORIES

a. Production by Grades

| <u>Grade</u> | <u>1934</u> | <u>1933</u> | <u>Increase</u> |
|--------------|--------------------|-------------------|--------------------|
| Gardner Ore | 0 | 0 | |
| Mackinaw Ore | <u>78,353</u> tons | <u>3,405</u> tons | <u>74,948</u> tons |
| Total | <u>78,353</u> | <u>3,405</u> | <u>74,948</u> |

GARDNER MACKINAW MINE
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2. PRODUCTION
SHIPMENTS &
INVENTORIES

b. Shipments

| <u>Grade of Ore</u> | <u>Pocket</u> <u>Tons</u> | <u>Stockpile</u> <u>Tons</u> | <u>Total</u> <u>Tons</u> | <u>Total</u> <u>Last Year</u> |
|---------------------|------------------------------|---------------------------------|-----------------------------|----------------------------------|
| Gardner | 0 | 30,502 | 30,502 | 0 |
| Mackinaw | <u>29,299</u> | <u>50,463</u> | <u>79,762</u> | <u>147,146</u> |
| Total | 29,299 | 80,965 | 110,264 | 147,146 |

Decrease 1934 36,882

c. Stockpile Inventories

| <u>Grade of Ore</u> | <u>Dec. 31, 1934</u> | <u>Dec. 31, 1933</u> | <u>Decrease</u> |
|---------------------|----------------------|----------------------|-----------------|
| Gardner | 247 | 30,749 | 30,502 |
| Mackinaw | <u>38,899</u> | <u>40,308</u> | <u>1,409</u> |
| Total | 39,146 | 71,057 | 31,911 |

d. Division of Product by Levels

| | <u>1934</u> | <u>%</u> | <u>1933</u> | <u>%</u> |
|-----------|---------------|-----------|--------------|-----------|
| 6th Level | 745 | 1 | | |
| 7th Level | 26,082 | 33 | | |
| 8th Level | 25,030 | 32 | 941 | 28 |
| 9th Level | <u>26,496</u> | <u>34</u> | <u>2,464</u> | <u>72</u> |
| Total | 78,353 | 100 | 3,405 | 100 |

The product in 1933 was all derived from shaft sinking operations.

e. Production by Months

| | <u>Mackinaw Ore</u> <u>Tons</u> | <u>Rock</u> <u>Tons</u> | <u>Total</u> <u>Tons</u> |
|-----------|------------------------------------|----------------------------|-----------------------------|
| January | 800 | 351 | 1,151 |
| February | 1,383 | 26 | 1,409 |
| March | 3,950 | 457 | 4,407 |
| April | 4,438 | | 4,438 |
| May | 9,185 | | 9,185 |
| June | 8,989 | | 8,989 |
| July | 9,037 | | 9,037 |
| August | 10,196 | | 10,196 |
| September | 7,130 | | 7,130 |
| October | 8,571 | | 8,571 |
| November | 7,410 | | 7,410 |
| December | <u>7,264</u> | | <u>7,264</u> |
| Total | 78,353 | 834 | 79,187 |

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YEAR 1934

2. PRODUCTION
SHIPMENTS &
INVENTORIES

f. Ore Statement

| | <u>Gardner</u> | <u>Mackinaw</u> | <u>Total</u> | <u>Total Last Year</u> |
|-------------------------|----------------|-----------------|----------------|----------------------------|
| On hand Jan.1,1934 | 30,749 | 40,308 | 71,057 | 214,798 |
| Product for year | 0 | 78,353 | 78,353 | 3,405 |
| Total | <u>30,749</u> | <u>118,661</u> | <u>149,410</u> | <u>218,203</u> |
| Shipments | <u>30,502</u> | <u>79,762</u> | <u>110,264</u> | <u>147,146</u> |
| Balance on hand | 247 | 38,899 | 39,146 | 71,057 |
| Increase in Output | | | 74,948 | |
| Decrease in ore on hand | | | 31,911 | |

1934 - January 1st to February 19th - 4 crews sinking shaft and cutting 8th and 9th Level Plats. Mine 6 days and nights per week, men 3 days each per week on a staggered basis. February 19th to May 1st - mine operated single shift 3 days per week. Average number of men about 60. May 1st to September 1st - mine operated single shift 6 days per week, labor staggered with 3 days per week each. Average total number of men about 110. September 1st to December 31st - mine operated single shift 4 days per week, labor receiving 2 days per week. Average total number of men about 115.

1933 - January 1st to April 8th - 6 crews sinking shaft, 2 days each per week, day and night shift. Mine idle April 8th to November 9th. November 9th to November 28th - unwatering shaft below 5th Level. November 28th to December 31st - 4 crews sinking shaft, 3 days each per week day and night shift.

g. Delays

The several delays experienced during the year were due to electrical equipment or power failures. The most serious was a one day delay caused by the burning out of several coils on the compressor motor. A half day delay was experienced from the same cause by the burning out of several coils on the 5th Level motor. The detail of delays follows:

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YEAR 1934

2. PRODUCTION
SHIPMENTS &
INVENTORIES (Cont.)

g. Delays (Cont.)

May 23rd - 8 hrs. delay - coil burned out on compressor motor,
loss in tonnage 135 tons.
June 12 - 4 " " - 3 coils burned out on compressor, loss
in tonnage 250 tons.
20 - 4 " " - coils burned out on 5th Level motor,
loss in tonnage 75 tons.
July 2 - 4½ " " - rope climbing on drum U.G.Hoist.
23 - 4 " " - Generator burned out U.G.electric haul
Nov. 8 - 8 " " - Cable burned out, loss in tonnage 150 tons.

Total 35½ hrs. delay - loss in tonnage 475 tons.

h. Delays from Lack of Current

The two non-serious delays from power failure were:

1 hour delay - June 26 - Pole hit by lightning.
1 hour delay - June 28 - Repairs to sub-station.
2 hours total delay.

3. ANALYSIS

a. Average Mine Analysis on Output

| <u>Grade</u> | <u>Tons</u> | <u>1934</u> | | | <u>1933</u> | | |
|--------------|---------------|-------------|--------------|-------------|-------------|--------------|-------------|
| | | <u>Iron</u> | <u>Phos.</u> | <u>Sul.</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sul.</u> |
| Mackinaw | (1933) 3,405 | 60.83 | .241 | .750 | 63.17 | .051 | .867 |
| " | (1934) 70,353 | | | | | | |

The grade of output from regular mining operations in 1934 is not comparable to the small tonnage hoisted from shaft sinking operations in 1933. The notable feature was the doubling of the phosphorus content in comparison to that of former years, and is explained under heading 3. d. The iron analysis was maintained at the regular high level and the sulphur held under control by the mixing of ore from various underground areas.

b. Average Mine Analysis on Straight Cargos

There were no straight cargoes, both Mackinaw & Gardner grades being mixed with other ores. The analyses of ore shipped from stockpiles and pocket, however, was as follows:

| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sul.</u> |
|-------------------|-------------|-------------|--------------|-------------|
| Gardner Stockpile | 27,830 | 58.30 | .110 | .653 |
| Mackinaw " | 43,785 | 61.43 | .124 | .759 |
| Mackinaw Pocket | 25,700 | 61.04 | .316 | .773 |

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3. ANALYSIS

c. High Sulphur Ore

Development in 1934 revealed the following facts in regard to sulphur analysis:

A comparatively high sulphur area (as on the 6th Level) in a great thickness of ore at the northwest end of the 7th Level. The drift and cross-cut in this area disclosed a sulphur content of from 1.5 to 2% in a vein thickness of 140'. Because of its low phosphorus, this ore is very suitable for mixing with the lower sulphur ores from the two lower levels.

Development of the 8th and 9th Levels during the year disclosed a lower average sulphur content than any heretofore developed in either the Gardner or Mackinaw Mines. Ore drifts of nearly 1300' on the 8th and 9th Levels northwest of the incline shaft revealed an average sulphur content of less than 0.5% in ore widths varying from 20 to 80'. Southeast of the shaft, the sulphur averaged nearly 1% but in ore only 5 to 25' thick and with short longitudinal dimension. This decrease in sulphur content has been attended by a consistently high iron analysis, but a serious feature has been an apparent increase in the phosphorus to replace the sulphur, as explained under the next heading.

d. High Phosphorus Ore

The unfortunate feature of the 1934 development program was the disclosure on the 9th Level of a length of approximately 500' of ore analyzing .780 in phosphorus. Roughly speaking, about 1/2 of the ore developed at the 9th Level elevation is high phosphorus. Ascending the ore body to the 7th Level elevation, the length of this material is reduced to about 250'. This indicates that at depth, a still larger proportion of high phosphorus ore may be expected, but definite proof by means of exploration will be needed to qualify this statement.

Within the ore body, the transition from ore analyzing .100 in phosphorus to .700 or more material, is quite abrupt. The same is true of the footwall and hanging wall contacts of the low phosphorus sections of the ore body, so that in actual stopping operations, it is virtually impossible to hold the phosphorus content to the level indicated by development drift or raise sampling. In other words, although development samples indicate a phosphorus content of .100, actual stopping operations return a product up to double this figure due to the necessary inclusion of a very small amount of hanging or footwall material having a phosphorus content up to as much as 1 or 2%.

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3. ANALYSIS

d. High Phosphorus Ore (Cont.)

Because of the lower sulphur analysis of this ore, the theory may be advanced that this element is being replaced by phosphorus. Whether this continues with depth, and what proportion of the ore body may be affected, can be determined only by subsequent exploration and development at lower horizons. A chemical change having occurred, however, gives rise to the hope that at lower elevations it may be possible to develop certain sections of the ore body in which both the sulphur and phosphorus are lower than present limits.

4. ESTIMATE
OF ORE
RESERVES

a. Developed Ore:

Assumption: 12 cu. ft. equals one ton
10% deducted for rock
10% deducted for loss in mining
Estimate is of available ore only

| <u>Non-Bessemer:</u> | <u>Mackinaw</u> | <u>Total</u> |
|--|-----------------|----------------|
| 5th to 6th Level | 9,973 | 9,973 |
| 6th to 7th Level | 70,325 | 70,325 |
| 7th to 8th Level | 140,974 | 140,974 |
| 8th to 9th Level | 140,397 | 140,397 |
| Below 9th Level | <u>20,668</u> | <u>20,668</u> |
| Total available developed ore December 31, 1934 | <u>382,337</u> | <u>382,337</u> |

Statement showing ore reserves and new ore development for the following years:

| | <u>1930</u> | <u>1931</u> | <u>1932</u> | <u>1933</u> | <u>1934</u> |
|---------------------|----------------|----------------|---------------|----------------|----------------|
| Ore in Mine Jan.1st | 282,785 | 139,349 | 135,992 | 71,312 | 164,858 |
| Production | <u>125,157</u> | <u>79,439</u> | <u>24,769</u> | <u>3,405</u> | <u>78,353</u> |
| Balance | 157,628 | 59,910 | 111,223 | 67,907 | 86,505 |
| Ore in Mine Dec.31 | <u>139,349</u> | <u>135,992</u> | <u>71,312</u> | <u>164,858</u> | <u>382,337</u> |
| New ore Developed | -18,279A | 76,082B | -39,911C | 96,951D | 295,832E |

- A. Reported 50% of ore unavailable instead of 40%.
 B. Increase due to ore proved up on and below the 7th Level.
 C. Decrease due to elimination of high sulphur ore areas.
 D. Increase due to sinking of incline shaft to a distance of 40' below proposed 9th Level, and inclusion of small high sulphur ore area above 7th Level.
 E. Large increase due to development of 8th and 9th Levels.

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4. ESTIMATE
OF ORE
RESERVES (Cont.)

c. Estimated Analysis

Ore Reserves: Approximate Expected Natural Analysis
Developed Ore

| | <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>Ign.</u> | <u>Moist</u> |
|----------|-------------|--------------|-------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|
| Mackinaw | 52.90 | .400 | 3.10 | .22 | 1.64 | 1.88 | 1.20 | .800 | 2.45 | 12.50 |

Ore in Stock: Average Natural Analysis

| | <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>Ign.</u> | <u>Moist</u> |
|----------|-------------|--------------|-------------|--------------|--------------|-------------|-------------|-------------|-------------|--------------|
| Gardner | 52.00 | .098 | 2.89 | .29 | 1.69 | 3.12 | 2.25 | .582 | 4.28 | 10.80 |
| Mackinaw | 53.89 | .204 | 3.16 | .20 | 1.66 | 1.91 | 1.09 | .687 | 2.49 | 11.15 |

The only change in the expected analysis of ore reserves is the increase in the phosphorus from .126 to .400. The sulphur is maintained at .800 in order to utilize a portion of the higher sulphur ore on the 6th and 7th Levels to mix with the reduced analysis of ore from the lower levels.

The higher iron and phosphorus content of the ore from lower levels is reflected in the increase of each over that reported last year for the ore in stock.

5. LABOR
AND
WAGES

a. Comments

1. Labor

There has been an excess of labor all year due to general unemployment in the district.

2. New Construction

There was no new construction in 1934.

b. Comparative Statement of Wages and Product

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|--------------------------------|---------------|--------------|-----------------|-----------------|
| <u>PRODUCT</u> | <u>78,353</u> | <u>3,405</u> | <u>74,498</u> | |
| Number Shifts & Hours | 1 - 8 hr. | 1 - 8 hr. | | |
| <u>AVERAGE NO. MEN WORKING</u> | | | | |
| Surface | 23 | 10 | 13 | |
| Underground | 80 | 9 | 71 | |
| Total | 103 | 19 | 84 | |
| <u>AVERAGE WAGES PER DAY</u> | | | | |
| Surface | 4.37 | 3.65 | .72 | |
| Underground | 4.66 | 3.88 | .78 | |
| Total | 4.55 | 3.76 | .79 | |

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5. LABOR
AND
WAGES

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

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|---|----------------------|--------------------------------------|---------------------------------------|-----------------|
| <u>AVERAGE WAGES PER MONTH</u> | (10 days) | (9 $\frac{1}{2}$ days) | | |
| Surface | 43.70 | 36.50 | 7.20 | |
| Underground | <u>46.66</u> | <u>34.92</u> | <u>11.74</u> | |
| Total | 45.50 | 35.72 | 9.78 | |
| <u>PRODUCT PER MAN PER DAY</u> | | | | |
| Surface | 20.38 | 2.45 | 17.93 | |
| Underground | <u>6.64</u> | <u>3.02</u> | <u>3.62</u> | |
| Total | 5.01 | 1.35 | 3.66 | |
| <u>LABOR COST PER TON</u> | | | | |
| Surface | .208 | 1.492 | | 1.284 |
| Underground | <u>.701</u> | <u>1.286</u> | | <u>.585</u> |
| Total | .909 | 2.778 | | 1.869 |
| <u>AVERAGE PRODUCT MINING</u> | | | | |
| Stoping | 34,918 | - | 34,918 | |
| Ore Development | <u>43,435</u> | - | <u>43,435</u> | |
| Total | 78,353 | - | 78,353 | |
| <u>AVERAGE WAGES CONTRACT LABOR</u> | 4.823 | 4.74 | .083 | |
| <u>TOTAL NUMBER OF DAYS</u> | | | | |
| Surface | 3,844 $\frac{1}{2}$ | 1,390 $\frac{1}{2}$ | 2,454 | |
| Underground | <u>11,800</u> | <u>1,127$\frac{1}{2}$</u> | <u>10,672$\frac{1}{2}$</u> | |
| Total | 15,644 $\frac{1}{2}$ | 2,518 | 13,126 $\frac{1}{2}$ | |
| <u>AMOUNT FOR LABOR</u> | | | | |
| Surface | \$ 16,275.33 | 5,079.08 | 11,196.25 | |
| Underground | <u>54,929.97</u> | <u>4,379.89</u> | <u>50,550.08</u> | |
| Total | 71,205.30 | 9,458.97 | 61,746.33 | |
| <u>AVERAGE WAGES PER MONTH BASED ON MEN CARRIED ON MINE PAYROLL</u> | | | | |
| Surface | 43.70 | 36.50 | 7.20 | |
| Underground | <u>46.66</u> | <u>34.92</u> | <u>11.74</u> | |
| Total | 45.50 | 35.72 | 9.78 | |

PROPORTION OF SURFACE TO UNDERGROUND MEN

1934 - 1 to 3.48 - 1,8 hr. shift - Sinking auxiliary shaft, etc. Jan.1 to Feb. 18, 1934, 3 days per week
Feb. 19 to May 1st, 1934.
6 days per week May 1st to Aug. 31
Men staggered basis 3 days per week.
4 days per week Sept. 1 to Dec. 31
men staggered basis 2 days per week.

1933 - 1 to .90 - 1,8 hr. shift - 2 days per week Jan. 1 to Apr. 8
3 days per week Nov. 10 to Dec. 31
Mine idle from Apr. 8 to Nov. 10
Reopening mine bailing water Nov. 10 to 24.
Sinking auxiliary shaft Nov. 24 to Dec. 31

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6. SURFACE

a. Buildings, Repairs

In March the hospital room and the wash room in the dry were painted. Later in the season the office was kalsomined. In November, the steam lines to the offices, dry and shops were raised and encased in insulated boxes. This was necessary because the water level is only a few inches below surface in the spring season and this naturally caused condensation in the old lines.

At the Gardner, the top of the shaft was planked over and covered with sand, and the tunnel fitted with a second door to prevent air movement and consequent freezing in the shaft. The door in the tunnel allows travel in the shaft, thus maintaining a second outlet from the Mackinaw Mine.

b. Stockpiles

Shipments in 1934 made it necessary to dismantle an additional portion of the old wood stocking trestle. Orders to suspend pocket shipments were received September 10th and immediately arrangements were made to start stocking. Several bents adjoining the permanent trestle were repaired and during September and October ten additional bents were erected to take care of the winter's product.

d. Grounds

No expense was incurred in 1934 for care of grounds.

7. UNDERGROUND

a. Shaft Sinking (Auxiliary Incline Shaft)

The depth of the incline shaft on December 31, 1933 was 43' below the floor of the 9th Level, the bottom of the shaft being at an elevation of 367' below sea level. The footwall had entered from the floor of the shaft at a depth of 11' below the 9th Level and at 43' the shaft was in rock, except for a mixed jasper-ore contact in the southeast hanging wall corner. To secure sufficient depth for a skip pit below the 9th Level pocket, one additional cut was blasted in the shaft at the beginning of January. This resulted in an advance of 5' in footwall rock, on a continuation of a 48° inclination to a total depth of 48' below the 9th Level floor. This depth marked a suspension of shaft sinking at the Mackinaw, two new levels, the 8th and 9th, with inclined distances of 165' from each to the level above (125' vertical interval), then being available for development.

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7. UNDERGROUND

a. Shaft Sinking (Continued)

Before starting development at the 8th and 9th Level elevations, an exploratory drift to ascertain the formation and character of the ore body (and later to serve as a sump) was driven from the hanging wall side 3' above the bottom of the shaft, at an elevation of -368'. This drift, because of the dip of the footwall strata, was turned to the south and reached the jasper-ore contact at a distance of 18' from the hanging side of the shaft. From this point, the drift was again turned to the southwest and extended a distance of 52' in high phosphorus, high sulphur ore to the jasper hanging wall. The high phosphorus-sulphur content which persisted across the ore body in this drift, was somewhat disappointing but it was later proved that the condition was local in this area, probably caused by a roll or flattening of the footwall.

The cutting out of the 9th Level plat at an elevation of -334' was started on January 11th. As noted in last year's annual report, the shaft timbers had been spaced to take care of the opening for both the level and the pocket. At the end of January supporting sills across the pocket and hanging wall side of the shaft had been put in place and three 15' sets erected on them. Pocket timbers and chutes were in place and the drifts northwest and southeast had been stopped 5' outside of the line of the shaft in readiness for regular development drifting upon completion of cutting out the plat on the new 8th Level.

The work of cutting the plat and installing pockets at the new 8th Level elevation of -210', was completed on February 12th. Drifting on this level started February 19th. Work in the shaft was not completed, however, until early in March, when casing plank had been installed between the ladder road and skip roads from the 7th to 9th Levels.

b. Development

Development on the 8th and 9th Levels started February 19th. Four headings were started and at the end of 1934 two were completed, one had been stopped temporarily and the fourth was still being advanced in ore at a distance of over 900' northwest of the incline shaft on the 9th Level. The results obtained in level development southeast of the shaft were somewhat disappointing but were more than made up by the length and thickness of ore developed on the northwest side of the shaft. A small amount of development was later begun on the 7th Level at the northwest end of the ore body, where the greatest thickness of ore yet found in the Mackinaw Mine was opened up. The detail of these development drifts follows:

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7. UNDERGROUND

b. Development (Continued)

7th Level

When the mine closed down in April, 1932, the end of the drift northwest of the shaft on the 7th Level was adjacent to the hanging wall in ore averaging 1.2% sulphur. Starting in May, 1934, this drift was advanced 120' in ore averaging 58% iron, 1.4 sulphur. At this point, the northwest limit of the ore body was intersected approximately 175' farther along the strike than had been reached on the 6th Level. The ore was cut off abruptly by a jasper contact and turning the drift to the northeast, away from the hanging wall, failed to disclose any extension. The cross-cut approximately 100' southeast of the end of the ore body was also completed in 1934. The advance for the year was 100' and revealed a horizontal thickness of ore on this section of 140'. The ore under the jasper hanging wall was then stripped from the southwest side of the drift for a distance of about 70' and the drift partly timbered.

8th Level

SouthEast of Incline Shaft

As noted above, the two headings on the 8th Level were started February 19th. The No. 1 or southeast heading, was advanced a distance of 260' along the footwall contact in a gradually narrowing seam of ore. In June, this heading was stopped because the ore had become mixed with seams of jasper but in October the advance was resumed for an additional 20' in mixed material. This was done in order to put up a raise and extend the sub-level drift to the southeast in order to reach the downward extension of the 20' thickness of ore which had been mined in No. 3 stope on the 7th Level. This development was still being continued at the end of the year, the ore raise and a traveling raise having been put up to the sub-level, which was being advanced to the southeast in a 5' seam of ore.

Northwest of Incline Shaft

The No. 2 or northwest drift, was advanced a distance of 315' northwest of the incline shaft in high grade ore. In June, however, this drift also entered a narrow seam of ore in which the phosphorus content rose from an average of .150 to .800. The drift was advanced in this material an additional distance of 145' by the end of September. It is planned to advance this heading during 1935 in hopes of reaching the downward extension of the low phosphorus ore encountered near the northwest end of the ore body on the 7th Level. At the time the heading was discontinued, the breast of the drift was in approximately a 10' thickness of ore.

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7. UNDERGROUND

b. Development (Continued)

9th Level

Southeast of Incline Shaft

This heading, as in the case of the 8th Level drift, was advanced in a narrowing thickness of ore. The phosphorus content was highly irregular and the heading was stopped in June at a point 315' southeast of the incline shaft in a 5' thickness of ore, having a phosphorus analysis of about .500. This distance was about 250' less than that reached at the 7th Level elevation, so in hopes of encountering a greater thickness of ore, the advance was again resumed in July. The drift was extended an additional 140' in a narrow seam of ore mixed with slate seams. The analysis of this material was surprisingly high in iron but the phosphorus content also stayed above .500 while the sulphur averaged less than .300. An additional thickness of ore was not disclosed, so the drift was finally stopped about 100' short of the distance reached on the 7th Level when the seam narrowed to a thickness of less than 3'.

Northwest of Incline Shaft

This drift was the major development during the year, but was at first rather disappointing because at a distance of 20' northwest of the incline shaft, it entered the footwall. This curve in the footwall is thought to be the same one which the shaft entered at a point below the level. The level drift, however, after passing through 50' of this material, entered upon a length of nearly 300' of ore which analyzed 64% iron, .090 phos. and .420 sulphur. Then for a length of 440' it passed through material which analyzed 61% iron, .780 phos. and .346 sulphur. On levels above the 7th, the phosphorus content of the ore was lower on approaching the hanging wall but this was not the case on the 8th Level, because two cross-cuts, one to the footwall and one to the hanging wall, revealed nearly the same phosphorus analysis. On approaching the west boundary line of the Mackinaw Mine, however, a short length of low phosphorus ore was opened up but when the drift was turned to the north along the boundary line, the analysis again reverted to an average of about .700. At the end of the year, the drift had reached a point 900' northwest of the shaft and it was expected would be continued an additional 100' before reaching the fault line marking the northwest end of the ore body. The drift had reached the west boundary line of the present Mackinaw lease, a distance of about 120' north of the property corner dividing the C. & N. W. and D.M.&M. ownerships to the west and the remainder of the drift will be along the east side of the C. & N. W. forty.

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7. UNDERGROUND

b. Development (Cont.)

A record for drifting during the year was established in this drift in July when an advance of 160' was obtained.

The foregoing records only the drifting done on the three levels during the year. In addition, as part of the development work before mining started, raises were started and carried to the level above before stoping operations commenced. The largest amount of raising was done between the 9th and 8th Levels and a table showing the total footage appears later in this report.

c. Stoping

Stoping operations during the year 1934 were confined to levels below the 6th. The tonnage removed by regular mining operations was nearly equal from the three lower levels. Stopes above the 7th Level that were incomplete before the shutdown period in 1932 were reopened starting in February but it was not until August that development had proceeded far enough to allow stoping on the 8th and 9th Levels. From this it can be seen that much of the year's product from these two lowest levels came from development work.

At the end of the year, preparations were being made on the 5th and 6th Levels for a resumption of mining of several stopes at the northwest end of the 6th Level. The ore from this territory grades low in phosphorus and high in sulphur and makes a suitable mixture for the reverse analysis of ore on lower levels. The same is true with the ore from the northwest end of the 7th Level which allowed a balanced analysis during the year. The detail of the stoping operations follows:

6th Level

While no mining operations were carried on above this level in 1934, repairs were necessary in order to gain access to the top of the 7th Level stopes. This work was carried on intermittently both northwest and southeast of the incline shaft, starting in March. At the end of the year, the level drift had been repaired for nearly its full length northwest of the shaft so that ore can be drawn from No. 18 stope. The timber on this level was badly rotted and repairs to several extensive break-downs are necessarily slow. The drift had been completely closed off in the vicinity of No. 12 stope because upon exposure to the air several large masses of ore had broken away from the hanging wall and crushed the rotted timbers completely. It was also necessary to repair the traveling road in No. 4 raise between the 5th and 6th Levels. This raise carries fresh air to the lower workings and also provides a second outlet.

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7. UNDERGROUND

c. Stoping (Cont.)

7th Level
Southeast of Incline Shaft

Repairs were also necessary on the 7th Level in order to reach the chutes beyond No. 5. These repairs were made in February and March while stoping operations were being carried on in stopes nearer the incline shaft. In June, No. 1 raise was started near the southeast end of the ore body and put up to an inclined height of 45', where the ore pinched out. A small stope was started on the southeast side of this raise but this too was abandoned as the southeast limit of the ore had evidently been reached.

In May, a raise was started from the sub above the 7th Level and carried through to the 6th Level elevation. Stopping operations were then resumed and at the end of the year the stope had reached an inclined height of 130' in ore approximately 18' thick. The information revealed in No. 1 stope led to the widening of No. 2 above the sub-level elevation. The maximum width reached in this stope, to the southeast end of the ore body, was 55'. The persistence of a 6 to 8' seam of ore under the jasper allowed this width to be carried a distance of 60' along the slope.

No. 3 stope was completed at the 6th Level elevation in June. The advance in 1934 was 83' in an average ore thickness of 33'. This stope was carried 30' wide.

No. 5 stope reached the 6th Level elevation in May. The advance was 35' in a decreasing ore thickness of 13 to 9'.

No. 6 stope had almost been completed prior to the shutdown in 1932. The advance in 1934 was only 15' to the 6th Level elevation, in ore about 20' thick.

The advance in No. 7 stope was 63' in ore approximately 10' thick. The total inclined height at the 6th Level was 143' and the stope was completed in May.

No. 9 stope was started in March at a height of 140' in ore 22' thick. The advance was 15' to the 6th Level elevation and the upper part of the stope was widened to 35' on the right face.

Northwest of Incline Shaft

The upper part of No. 12 stope was reached by way of the 6th Level in May. The stope was completed in June with an advance of 35' from an inclined height of 110' to 145' at the 6th Level elevation. The stope width was 35' and the thickness of ore 33'.

No. 15 stope was started in May and coned upward to a vertical height of 60', just reaching the hanging wall. The analysis of the ore from this stope was rather high in phosphorus so operations were discontinued here, in June. The stope width was 30'.

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7. UNDERGROUND

c. Stoping (Cont.)

7th Level

Northwest of Incline Shaft (Cont.)

Upon completion of the No. 2 development drift and cross-cut on the northwest end of the 7th Level, the drift was widened to the hanging wall for a distance of about 70'. After timbering this portion of the drift, No. 24 stope was started in August. The stoping operation here proceeded directly, the ore being scraped from the bottom of the stope into cars under a scraper slide on the 7th Level. A manway or traveling raise, midway between the line of No. 23 and 24 stopes, provided access to the southeast side of the stope. The total inclined height reached in No. 24 was 130' and the stope, starting from the drift near the hanging wall, reduced in thickness from 20' at the bottom to 10' at the top. The north side of the stope was along a fault line, marking the northwest end of the ore body and this accounts for its irregular shape. As above noted the ore derived from this operation was low in phosphorus and averaged about 1.5 sulphur which made a suitable mixture for the ore from lower levels.

The great thickness of ore in this section will allow, at some time in the future, the opening up of another stope directly beneath No. 24 from a drift located nearer the footwall. However, before this is done, it is planned to open up No. 23 stope from the hanging wall drift by the same method used in No. 24.

8th Level

Southeast of Incline Shaft

Only one stope, No. 8, was opened up from this drift during 1934. However, as noted under development, preparations to reach the greater thickness of ore extending below No. 3 stope on the 7th Level, were under way at the end of the year. A sub-level drift 25' above the level is to be extended to this territory and the stoped ore is to be scraped to single No. 6 chute. The sub drift had reached a point 10' southeast of the ore chute and a traveling raise connection had been provided. As the level drift was being developed southeast, Nos. 7 and 8 raises were started and put up to inclined heights of 15' each.

No. 9 stope had reached a height of 70' in ore 22' thick. The raise connection has been extended through to the 7th Level elevation and the stope width is being carried at 30'.

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7. UNDERGROUND

c. Stoping (Cont.)

8th Level

Northwest of Incline Shaft

The first of the mining raises started above this level was No. 11. The raise was started in June and a raise connection midway between the line of Nos. 11 and 12 was put up to an inclined distance of 55'. The sub level drift, at an elevation of -176.5' was later carried to the line of No. 13 raise. After completing No. 11 raise at the 7th Level elevation, stoping operations were started and at the end of the year the stope was nearing this level at an inclined height of 120'. The ore thickness was approximately 30 to 32' and the stope width was carried at 30'.

In December No. 12 stope had reached a height of 90' in the greatest thickness of ore yet developed on the two lower levels. At an elevation of about 40' above the level, the ore thickness reached a maximum of 60' but the inclusion of a small seam of jasper necessitated narrowing this to 50' at higher elevations.

No. 13 stope had reached an inclined height of 95' in ore 55' thick. As an example of the quality of the ore in this territory, one month's production from this stope gave the following average analysis: 64% iron, .090 phos. and .550 sulphur. The stope width in Nos. 12 and 13 is 25'.

While the level drift was advancing, Nos. 14 and 15 raises were put up to inclined heights of 15'. Of these, No. 14, a distance of 50' northwest of the winze, is available for future stoping in low phosphorus ore. It is also hoped that when the future extension of the 8th Level No. 2 heading is completed to the northwest end of the ore body, an additional length of low phosphorus ore will be developed as was the case on the 7th.

9th Level

Southeast of Incline Shaft

As in the case on the 8th Level, No. 9 stope was the only one worked on the southeast side of the shaft in 1934. During the advance of the level drift, Nos. 7 and 8 raises were put up to heights of 15' each. In December, No. 9 stope had reached a height of 55' in ore 35' thick (compares with 22' in No. 9 above the 8th). The raise has been advanced to the 8th Level and the stope width is 30'.

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7. UNDERGROUND

c. Stoping (Cont.)

9th Level

Northwest of Incline Shaft

The first development completed northwest of the shaft was the ventilation raise connection to the bottom of the winze. This winze had been put down to an elevation of -237, and a sub level drift carried to the southeast, from which the raise was put up in 1932 on the line of the incline shaft. The 8th Level is approximately 40' on the incline above this drift. The ventilation raise was started in July, completed at the bottom of the winze in August and since that time has exhausted air from the 9th Level workings.

No. 11 raise was advanced during the last three months to an inclined height of 90' and a curve in the footwall kept the jasper in contact with the southeast side of the raise to the height of the sub level 50' above the level. A traveling raise, from a short footwall crosscut, was connected to the extension of the lower sub level. No. 11 raise was being continued at the end of the year and should connect with the sub level 50' below the 8th early in January.

After extending a raise to the sub level 50' below the 8th, No. 12 stope was started and at the end of the year had reached a height of 95'. The stope width is 30' and the thickness of ore 35'.

No. 13 stope, developed in the same manner, had reached a height of 75' in ore 40' thick.

No. 14 stope was started in November after completing the raise at the 8th Level elevation for a total inclined height of 180'. At the end of the year the stope height was 70' in ore which had been reduced in thickness from 30' to 25'. This was necessary because upon exposure to the air, the mixed jasper and slate seams forming the hanging wall contact slabbed off, contaminating the ore. This action had also started in the lower portion of No. 13 stope and it may finally become necessary to block off the lower portions of these two stopes, and scrape the ore from above into the ventilation raise chute midway between the line of the two stopes.

During the advance of No. 2 drift to the northwest, Nos. 15, 16, 17, 19, 20 raises were put up to heights of 15'. Of these No. 15 is the only one expected to reach the 8th Level in low phosphorus ore.

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7. UNDERGROUND

d. Timbering

Statement of Timber Used

| | <u>Linnear Feet</u> | <u>Amount 1934</u> | <u>Amount 1933</u> |
|---|-------------------------|------------------------|------------------------|
| 8" to 10" Timber | 720 | 41.63 | |
| 10" to 12" " | 2,143 | 126.35 | |
| 12" to 14" " | 3,016 | 238.08 | |
| Total Timber | 5,879 | 406.06 | |
| 5' Lagging | 44,100 | 254.00 | 35.00 |
| 9' - 6" Poles | 48,051 | 524.81 | 139.68 |
| Total Lagging & Poles | 92,151 | 778.81 | 174.68 |
| Product | | 78,353 | 3,405 |
| Feet of timber per ton of ore | | .007503 | - |
| Feet of Lagging per ton of ore | | .056284 | 1.85020 |
| Feet of Lagging per foot of timber | | 1.092412 | - |
| Feet of poles per ton of ore | | .006133 | 4.75000 |
| Cost per ton for timber | | .005182 | - |
| Cost per ton for lagging | | .003217 | .01025 |
| Cost per ton for poles | | .006698 | .04105 |
| Total cost per ton - All Timber | | .021197 | .06130 |
| Equivalent of stull timber to Board measure | 21.1603 | | - |
| Feet of Board Measure per ton of ore | | .002700 | - |
| Total cost for timber, lagging & poles | \$ 1,184.87 | | \$ 139.68 |

Total cost for Timber, Lagging and Poles and Cost per Ton

| <u>Year</u> | <u>Amount</u> | <u>Cost per Ton</u> |
|-------------|---------------|---------------------|
| 1934 | 1,184.87 | .0212 |
| 1933 | 174.68 | .0513 |
| 1932 | 238.81 | .0097 |
| 1931 | 876.67 | .0110 |
| 1930 | 2,300.66 | .0184 |
| 1929 | 1,722.04 | .0147 |

e. Drifting and Raising

The following table shows the separate divisions of the enormous amount of development work done during the year. The whole represents an increase in footage over 1933 as the only work done

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7. UNDERGROUND

e. Drifting and Raising (Cont.)

that year was shaft sinking.

| <u>Drifting</u> | | | <u>Raising</u> | | |
|-----------------|-------------|--------------|----------------|-------------|--------------|
| <u>Ore</u> | <u>Rock</u> | <u>Total</u> | <u>Ore</u> | <u>Rock</u> | <u>Total</u> |
| 2105' | 65' | 2170' | 2108' | 0 | 2108' |

In addition to the above, 225' of 7x8 crosscut and several hundred feet of 7x8 sub level drifts were driven. The success in developing ore reserves is pictured by the fact that of a total of nearly 1 mile of development footage only 65' was in rock.

In order to gain a comparison of development costs with actual stoping or mining costs, a record of footage, volumes, or tons and direct cost was kept over a three month period. The following resulted:

| | <u>Average</u> <u>Gross</u> <u>Section</u> | <u>Per Foot</u> | <u>Per Ton</u> |
|----------------------|--|------------------|--------------------|
| Development Drifting | 12 x 12 | \$4.50 to \$7.00 | \$.40 to \$.90 |
| Development Raising | 7 x 7 | 3.00 to 5.00 | .70 to 1.30 |
| Mining - Stopping | 30 x 30 | | .25 to .30 in cars |

It may be seen that the cost in cars from stoping is roughly one half that of drifting and one third that of raising. To decrease the amount of raising would increase the cost of stoping, but blasting experiments are being conducted in an effort to reduce the powder consumption and cost in raising.

f. Explosives, Drilling and Blasting

| <u>Statement of Explosives Used</u> | <u>Quantity</u> | <u>Average</u> <u>Price</u> | <u>Amount</u> <u>1934</u> | <u>Amount</u> <u>1933</u> |
|-------------------------------------|-----------------|--------------------------------|------------------------------|------------------------------|
| 50% Gelatin Special | 6,750# | .1125 | 759.38 | |
| 60% Gelex. A | 68,250 | .1048 | 7,148.00 | 406.69 |
| Total Powder | 75,000 | .1188 | 7,907.38 | 406.69 |
| Fuse | 188,000 | .5744 | 1,079.99 | |
| Caps | 25,000 | 1.1281 | 282.04 | 67.50 |
| Connecting Wire | | | | 13.49 |
| Tamping Bags | 10,000 | .2245 | 22.45 | |
| Exploders | | | | 86.95 |
| Fuse Igniters | 2,000 | .6760 | 13.52 | |
| Total Fuse, etc. | | | 1,398.00 | 167.94 |
| Total All Explosives | | | 9,305.38 | 574.63 |
| Avg. price per hundred for powder | | | .1188 | .1251 |

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7. UNDERGROUND

f. Explosives, Drilling and Blasting (Cont.)
Statement of Explosives Used (Cont.)

| | Amount <u>1934</u> | Amount <u>1933</u> |
|--------------------------------------|-----------------------|-----------------------|
| Product | 78,353 | 3,405 |
| Pounds of Powder per ton of ore | .9572 | .9545 |
| Tons of ore per pound of powder | 11.0447 | 1.0477 |
| Cost per ton - Powder | .1009 | .1195 |
| Cost per ton - Fuse, Caps, etc. | .0179 | .0493 |
| Cost per ton - All explosives | .1188 | .1688 |
| 11.2% of all powder used in 1934 was | 50% | |
| 88.8% " " " 1934 " | 60% | |
| 100.% " " " 1933 " | 60% | |
| 26.5% " " " 1932 " | 40% | |
| 4.3% " " " 1932 " | 45% | |
| 56.5% " " " 1932 " | 50% | |
| 12.7% " " " 1932 " | 60% | |
| 97.8% " " " 1931 " | 50% | |

The following statement shows the cost per ton for explosives for the past five years, exclusive of rock development.

| <u>Year</u> | <u>Cost per Ton</u> | <u>Product</u> |
|-------------|---------------------|----------------|
| 1934 | .1188 | 78,353 |
| 1933 | .1688 | 3,405 |
| 1932 | .0841 | 24,769 |
| 1931 | .1959 | 79,439 |
| 1930 | .1429 | 125,157 |

i. Ventilation

The natural ventilation system functioned perfectly throughout the year. Approximately 7,000 cu. ft. per minute entered the workings by way of the Mackinaw shaft, of which 3,000 reached the 9th Level. At a depth of nearly 1500' below surface, the temperature would be prohibitive of proper working conditions were it not for the controlled natural ventilating system.

j. Faults

The brecciated fault contact marking the northwest limit of the ore body on the 5th and 6th Levels, was reached on the 7th Level during 1934, and the 9th Level northwest drift, was thought to be within 100' of it at the end of the year. The greatest

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7. UNDERGROUND

j. Faults (Cont.)

thickness of ore in the Mackinaw vein is adjacent to this fault, reaching a distance of 140' horizontally across the vein on the 7th Level. It is interesting to note that to date no work has been done toward penetrating this fault at any elevation in order to examine the possibility of concentration on its north side. The direction of movement and displacement is also unknown.

k. Pumping

| <u>Month</u> | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> | <u>1929</u> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
| January | 174 | 210 | 241 | 463 | 100 | 116 |
| February | 169 | 205 | 223 | 419 | 101 | 113 |
| March | 170 | 205 | 236 | 470 | 100 | 111 |
| April | 166 | 203 | 244 | 327 | 126 | 115 |
| May | 158 | 181 | 231 | 332 | 102 | 101 |
| June | 156 | 184 | 223 | 314 | 114 | 104 |
| July | 147 | 181 | 225 | 302 | 104 | 109 |
| August | 155 | 180 | 222 | 273 | 111 | 106 |
| September | 149 | 172 | 218 | 192 | 128 | 109 |
| October | 143 | 189 | 218 | 263 | 180 | 99 |
| November | 149 | 224 | 215 | 260 | 236 | 99 |
| December | 146 | 221 | 211 | 253 | 350 | 99 |
| Total Avg. | 157 | 196 | 225 | 327 | 142 | 107 |

The average number of gallons pumped per minute over the last six years is as follows:

| <u>Year</u> | <u>Gals. per Minute</u> |
|-------------|-------------------------|
| 1934 | 157 |
| 1933 | 196 |
| 1932 | 225 |
| 1931 | 327 |
| 1930 | 142 |
| 1929 | 107 |

The tabulation above shows that the number of gallons pumped per minute has decreased considerably over the past two years. In 1933 it was 29 gallons less than in 1932 while in 1934 it was 39 less than in 1933.

9. EXPLORATIONS
AND FUTURE
EXPLORATIONS

As mentioned in "General Remarks" at the beginning of this report, the future of this mine depends upon developments to the north-west and on the dip. The dip of the ore body is to the southwest

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9. EXPLORATIONS
AND FUTURE
EXPLORATIONS

and the pitch to the west. At the western limit of the present D.M. & M. lease, the ore passes onto the C. & N. W. at the 9th Level elevation. I have recommended the securing of a permit to explore this property by drifting, and if developments are favorable, to take a lease on the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 35, 45-25. I would then sink the incline shaft to the 10th Level and drive development drifts to the northwest along the hanging.

10. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|--|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>GARDNER MINE, C. & N. W. LEASE</u> | | | | |
| SE $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 35, 45-25.... | \$ 5,000 | 110.30 | 5,000 | 81.96 |
| NW $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 2, 44-25.... | 80 | 1.76 | 80 | 1.34 |
| Personal Property..... | 100,000 | 2,206.00 | 150,000 | 2,458.50 |
| Total | \$ 105,080 | 2,318.06 | 155,080 | 2,541.80 |
| Collection Fees..... | | 23.18 | | 25.42 |
| TOTAL TAXES | \$ | 2,341.24 | | 2,567.22 |
| <u>MACKINAW MINE D.M. & M. LEASE</u> | | | | |
| N $\frac{1}{2}$ of SE $\frac{1}{4}$ & SW $\frac{1}{4}$ of SE $\frac{1}{4}$ Sec. 35-45-25..... | \$ 50,000 | 1,103.00 | 10,000 | 163.90 |
| Collection Fee..... | | 11.03 | | 1.64 |
| TOTAL TAXES..... | \$ | 1,114.03 | | 165.54 |

11. ACCIDENTS
AND
PERSONAL
INJURY

The Gardner Mackinaw stands at the head of the list of Company mines in its accident record. There were no lost time accidents in 1934 to mar its record, which on Dec. 31, showed 1681 days. The last lost time accidents was in May, 1930. It is needless to say that the men are proud of the mine's standing and are anxious to maintain the distinction of having the lowest accident record.

12. NEW CONSTRUCTION
AND
PROPOSED NEW
CONSTRUCTION

The only new construction was the completion of the sinking at the incline shaft and the cutting of the 8th and 9th Level plats and pockets. This work was finished about the middle of February.

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

The cost of this work was all written off during the year and charged to the cost of ore on cars at \$.517 per ton.

There is still an unexpended balance of \$3,673.69 in E&A #632 covering this work as follows:

| | | |
|----------------------------------|-----------------|------------------|
| E&A #632 Sinking Mackinaw Shaft. | | |
| Estimate..... | | \$ 21,883.04 |
| Expended 1933 | \$ 11,477.55 | |
| " 1934 | <u>6,731.80</u> | <u>18,209.35</u> |
| Balance unexpended..... | | \$ 3,673.69 |

Summary:

| | |
|-----------------------------|------------------|
| Sinking and stripping shaft | \$ 12,958.17 |
| Cutting Plats & Pockets | <u>5,251.18</u> |
| Total | <u>18,209.35</u> |

**13. EQUIPMENT
AND
PROPOSED
EQUIPMENT**

a. Steam Shovels

Necessary repairs to the steam shovels were made in the spring before the opening of the shipping season.

b. Stockpile Trestles

Top landing planking was repaired and 12 bents erected for stocking the winter's product.

c. Scraper Hoists

One new 15 H.P. Sullivan electric hoist was added during the year to the mine equipment

d. Pumping Equipment

The three lowest levels, i.e. the 7th, 8th and 9th, are all equipped with air pumps, which can be operated only when the compressor works. While the quantity of water handled is small, yet it might be worth while to consider the installation of electric pumping equipment.

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14. MAINTENANCE
AND REPAIRS

As reported under "Delays", the mine was shut down for one and one half days due to coils burning out in the compressor.

The cause was due to lightening getting into the panel a year ago.

The burned out coils were cut out and the transformer has operated since that time without further trouble.

15. POWER

Electric power was furnished by the Cliffs Power & Light Company at a rate of .015 per KWH from January to May 1934. From May to the close of the year, power was furnished at the rate of .01624 per KWH.

The following statement gives a detail of the power used in 1934 and 1933:

| | <u>KWH USED</u> | | <u>Increase</u> | <u>Decrease</u> | <u>Remarks</u> |
|------------------------|------------------|----------------|-----------------|-----------------|----------------------|
| | <u>1934</u> | <u>1933</u> | | | |
| Gardner Hoist | 0 | 0 | | | Idle |
| Mack. Hoist & Lighting | 182,914 | 29,904 | 153,010 | | Mine reopened. |
| Compressors | 659,850 | 114,210 | 545,640 | | " |
| Safety Department | 0 | 0 | | | " |
| Electric Haulage | 73,300 | 15,500 | 57,800 | | " |
| E&A Winz8 | 0 | 1,200 | | 1,200 | Winze completed 1933 |
| Shops | 2,122 | 668 | 1,454 | | Mine reopened. |
| Top Tram - Mackinaw | 632 | 74 | 558 | | " |
| Underground Hoist | 66,680 | 34,546 | 32,134 | | " |
| Pumping & Lighting | 286,999 | 352,474 | | 65,475 | Less water pumped. |
| Analysis, Crusher | 85 | 20 | 65 | | Mine reopened |
| " Drier | 4,032 | 0 | 4,032 | | " |
| Flood Lights Mackinaw | 1,015 | 114 | 901 | | " |
| Heating Plant | 1,485 | 0 | 1,485 | | " |
| Dry House | 3,460 | 2,044 | 1,416 | | " |
| Office | 485 | 0 | 485 | | " |
| Timbering | 1,000 | 0 | 1,000 | | " |
| Total | 1,284,059 | 550,754 | 733,305 | | |
| In Cash | \$ 20,933.22 | 8,261.31 | 12,671.91 | | |

During the year the Cliffs Power & Light Company put into effect a "demand charge" in addition to the regular charge per K.W.H. This is the reason for the mine showing the increased rate over 1933.

16. CONDITION
OF
PREMISES

No improvements were made in 1934. The premises were kept clean.

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18. NATIONALITY
OF
EMPLOYEES

| <u>As to parentage</u> | <u>1934</u> | <u>%</u> | <u>1933</u> | <u>%</u> |
|------------------------|-------------|----------|-------------|----------|
| English | 8 | 6.1 | 5 | 8.3 |
| Finnish | 42 | 32.3 | 11 | 18.1 |
| Italian | 32 | 24.6 | 9 | 14.9 |
| Swedish | 20 | 15.4 | 17 | 27.9 |
| French Canadian | 19 | 14.6 | 13 | 21.4 |
| Germans | 3 | 2.3 | 2 | 3.1 |
| Norwegians | 4 | 3.1 | 2 | 3.1 |
| Irish | 0 | | 0 | |
| Scotch | 0 | | 1 | 1.6 |
| Belgian | 1 | .8 | 0 | .0 |
| Hungarian | 1 | .8 | 1 | 1.6 |
| Total | 130 | 100.0% | 61 | 100.0% |

| <u>As to Birth</u> | <u>Total</u> | | <u>American Born</u> | | <u>Foreign Born</u> | |
|--------------------|--------------|-------------|----------------------|-------------|---------------------|-------------|
| | <u>1934</u> | <u>1933</u> | <u>1934</u> | <u>1933</u> | <u>1934</u> | <u>1933</u> |
| English | 8 | 5 | 4 | 4 | 4 | 1 |
| Finnish | 42 | 11 | 12 | 3 | 30 | 8 |
| Italian | 32 | 9 | 7 | 1 | 25 | 8 |
| Swedish | 20 | 17 | 12 | 10 | 8 | 7 |
| French Canadian | 19 | 13 | 14 | 7 | 5 | 6 |
| Germans | 3 | 2 | 3 | 2 | 0 | 0 |
| Norwegians | 4 | 2 | 2 | 1 | 2 | 1 |
| Irish | 0 | 0 | 0 | 0 | 0 | 0 |
| Scotch | 0 | 1 | 0 | 0 | 0 | 1 |
| Hungarian | 1 | 1 | 0 | 0 | 1 | 1 |
| Belgian | 1 | 0 | 0 | 0 | 1 | 0 |
| Total | 130 | 61 | 54 | 28 | 76 | 33 |
| Percentage | | | 41% | 48% | 59% | 52% |

STEPHENSON MINE
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1. GENERAL

This mine was abandoned in 1927. On account of the ore in stock, taxes are still being paid on the lands under lease from the I. Stephenson Company and the C. & N. W. Railway Company.

There were no shipments from this mine in 1934.

2. PRODUCTION
SHIPMENTS &
INVENTORIES

b. Shipments

| <u>Grade</u> | <u>1934</u> | <u>1933</u> |
|--------------|-------------|---------------|
| Stephenson | 0 | 9,590 |
| Stephenwood | 0 | 2,937 |
| Northdale | 0 | 3,373 |
| Northwood | 0 | 0 |
| Total | 0 | <u>15,900</u> |

c. Stockpile Inventories

| | <u>1934</u> | <u>1933</u> |
|---|----------------|----------------|
| Stephenson Lease | | |
| S $\frac{1}{2}$ of SW $\frac{1}{4}$ Sec. 20, 45-25 | 115,555 | 101,817 |
| N $\frac{1}{2}$ of NW $\frac{1}{4}$ Sec. 29, 45-25 (C&NW) | 18,976 | 19,777 |
| Grand Total | <u>134,531</u> | <u>121,594</u> |

An adjustment made as of January 1st, 1934 of 12,937 tons accounts for this difference.

Ore Statement

| | <u>Stephen- son</u> | <u>Stephen- wood</u> | <u>North- dale</u> | <u>North- wood</u> | <u>Total</u> |
|-----------------------|-------------------------|--------------------------|------------------------|------------------------|----------------|
| On hand Dec. 31, 1933 | 0 | 101,817 | 0 | 19,777 | 121,594 |
| Adjustment | 3,647 | 10,091 | 227 | 1,028 | 12,937 |
| Total Dec. 31, 1934 | <u>3,647</u> | <u>111,908</u> | <u>227</u> | <u>18,749</u> | <u>134,531</u> |

8. COST OF
OPERATING

a. Comparative Mining Costs

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|---------------------------|-----------------|-----------------|-----------------|-----------------|
| Underground Costs | 0 | 3.97 | | 3.97 |
| Surface Costs | 865.32 | 743.73 | 121.59 | |
| General Mine Expense | 16.26 | 968.22 | | 951.96 |
| Total | <u>881.58</u> | <u>1,715.92</u> | <u>121.59</u> | <u>955.93</u> |
| Loading & Shipping | 7.52 | 1,113.97 | | 1,106.45 |
| Taxes | 3,165.19 | 2,268.91 | 896.28 | |
| Track Agreement E.L.S.Ry. | | 313.18 | | 313.18 |
| Total Cost | <u>4,054.29</u> | <u>5,411.98</u> | | <u>1,357.69</u> |

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8. COST OF OPERATING

a. Comparative Mining Costs (Cont.)

The surface costs were practically all for watchmen, with increase due to increase in wages on April 1st, 1934.

The General Mine Expense of \$16.26 showed a reduction of \$951.96 from 1933. Last year there was a charge in this account of \$894.08 for personal injury and \$48.14 for analysis of ore shipped.

There was no loading and shipping expense in 1934 as no ore was shipped.

The valuation for 1934 was increased from \$137,060 to \$142,060. The increase of \$5,000 was placed on ore in stock.

The taxes increased \$896.28 over 1933 due to the increased valuation and higher tax rate.

10. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|---|------------------|-----------------|------------------|-----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>Stephenson Mine Lease</u> | | | | |
| 60 acres - S $\frac{1}{2}$ of SW $\frac{1}{4}$ Sec. 28, 45-25 | 1,000 | 22.06 | 1,000 | 16.39 |
| 80 " N $\frac{1}{2}$ of NE $\frac{1}{4}$ " 29, 45-25 | 160 | 3.54 | 160 | 2.66 |
| Personal Property, ore in stock | 140,000 | 3,088.40 | 135,000 | 2,212.65 |
| Personal Property, in warehouse | 900 | 19.85 | 900 | 14.75 |
| Total | <u>142,060</u> | <u>3,133.85</u> | <u>137,060</u> | <u>2,246.45</u> |
| Collection Fees | | 31.34 | | 22.46 |
| Total Taxes | | <u>3,165.19</u> | | <u>2,268.91</u> |
| Rate per \$100. | | 2.206 | | 1.639 |

PRINCETON MINE
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1. GENERAL

This mine has been idle since 1921.

During the year, 134 tons of Cambridge ore were loaded by hand and shipped to a paint Company.

The wooden shaft house at No. 2 shaft is in such bad condition that it should be blasted down this coming year as a safety measure.

Repairs should be made next summer near the collars of both No. 2 and No. 3 shafts where the timbers have rotted badly.

2. PRODUCTION
SHIPMENTS &
INVENTORIES

b. Shipments

| | <u>1934</u> | <u>1933</u> |
|-----------|-------------|-------------|
| Cambridge | 134 | 0 |

c. Stockpile Inventories

| | <u>1934</u> | <u>1933</u> |
|--------------------|----------------|----------------|
| Cambridge | 106,454 | 106,573 |
| Princeport | 9,160 | 9,160 |
| Sec. 19 Cambridge | 13,826 | 13,841 |
| Sec. 19 Princeport | <u>1,313</u> | <u>1,313</u> |
| Total | <u>130,753</u> | <u>130,887</u> |

4. ESTIMATE
OF ORE
RESERVES

a. Developed Ore

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

| | <u>Prince-</u> <u>port</u> | <u>Cambridge</u> | <u>Sec.19</u> <u>Princeport</u> | <u>Sec.19</u> <u>Cambridge</u> | <u>Total</u> |
|---------------------------|-------------------------------|------------------|------------------------------------|-----------------------------------|----------------|
| Ore above 2nd Level | 2,552 | | | | 2,552 |
| Ore above 4th Level | | 78,325 | | | 78,325 |
| Ore above 5th Level | 20,000 | 58,778 | | | 78,778 |
| Ore above 6th Level | 60,318 | 445,694 | 9,000 | 57,128 | 572,140 |
| Total | <u>82,870</u> | <u>582,797</u> | <u>9,000</u> | <u>57,128</u> | <u>731,795</u> |
| b. <u>Prospective Ore</u> | | | | | |
| Ore below 6th Level | 20,000 | 418,815 | 5,000 | 46,921 | <u>490,736</u> |
| Total Ore | | | | | 1,222,531 |

PRINCETON MINE
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4. ESTIMATE
OF ORE
RESERVES

c. Estimated 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>Ign.</u> | <u>Moist.</u> |
|------------------------|-------------|--------------|-------------|--------------|--------------|-------------|-------------|-------------|-------------|---------------|
| <u>Princeport</u> | | | | | | | | | | |
| Dried 212 ^D | 59.50 | .300 | 7.73 | .505 | 1.214 | 1.605 | 1.037 | .023 | 2.235 | |
| Natural | 50.60 | .256 | 6.57 | .429 | 1.032 | 1.365 | .882 | .020 | 1.900 | 15.00 |
| <u>Cambridge</u> | | | | | | | | | | |
| Dried 212 ^D | 59.75 | .853 | 4.42 | 1.193 | .937 | 3.676 | .840 | .023 | 1.447 | |
| Natural | 50.80 | .725 | 3.76 | 1.014 | .797 | 3.125 | .714 | .020 | 1.230 | 15.00 |

d. Estimated Tonnage as required by State Tax Commission
Non-Bessemer Ore

| | | | |
|-------------|-----------------|------------------|------------------|
| Developed | 1. Princeport | 91,870 tons | |
| | 2. Cambridge | <u>639,925</u> " | |
| | Total Developed | | 731,795 tons |
| Prospective | 1. Princeport | 25,000 tons | |
| | 2. Cambridge | <u>465,736</u> " | |
| | | | <u>490,736</u> " |
| Grand Total | | | 1,222,531 tons |

The above estimates of ore in the mine were made in December, 1921.

8. COST OF
OPERATING

a. Comparative Costs

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|----------------------|-----------------|-----------------|-----------------|-----------------|
| Underground Costs | 62.16 | 0 | 62.16 | |
| Surface Costs | 869.52 | 857.33 | | 12.19 |
| General Mine Expense | 21.95 | 15.63 | | 6.32 |
| Total | <u>953.63</u> | <u>872.96</u> | | |
| Loading & Shipping | 65.91 | 0 | 65.91 | |
| Taxes | <u>5,254.67</u> | <u>3,580.11</u> | <u>1,674.56</u> | |
| Total | <u>6,274.21</u> | <u>4,453.07</u> | <u>1,821.14</u> | |

Underground Cost. The only expense in 1934 was filling and fencing at collar of No. 1 shaft where there had been a settlement on account of rotting shaft timbers.

Taxes. The increase was due to a slightly higher valuation and higher tax rate.

PRINCETON MINE
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10. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|--|------------------|-----------------|------------------|-----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| NE $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec.19,45-25(C.& N.W.) | 10,000 | 220.60 | 10,000 | 163.90 |
| 158.27 acres in Sec.18,45-25 | 10,000 | 220.60 | 5,000 | 81.96 |
| 160.00 acres in NW $\frac{1}{4}$ Sec.20,45-25 | 100,000 | 2,206.00 | 85,000 | 1,393.16 |
| NW $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec.19,45-25 (Location) | 420 | 9.27 | 420 | 6.93 |
| S $\frac{1}{2}$ of NE $\frac{1}{4}$ Sec.19,45-25 (Location) | 420 | 9.27 | 840 | 13.86 |
| Personal Property | 115,000 | 2,536.90 | 115,000 | 1,884.85 |
| Total | <u>235,840</u> | <u>5,202.64</u> | <u>216,260</u> | <u>3,544.66</u> |
| Collection Fees | | 52.03 | | 35.45 |
| Total Taxes | | <u>5,254.67</u> | | <u>3,580.11</u> |
| Tax rate per \$100.00 | | 2.206 | | 1.639 |

The valuation was increased \$19,690 over 1933. The tax rate was increased 34.6%.

FRANCIS MINE
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1. GENERAL

The steel headframe is the only structure remaining on this property on which the lease was surrendered several years ago. The ore in stock is on an adjoining forty, the NE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 28,45-25, owned by the Company.

2. PRODUCTION
SHIPMENTS &
INVENTORIES

b. Shipments

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> |
|----------|-------------|-------------|-----------------|
| Franport | 13,883 | 11,262 | 2,601 |

c. Stockpile Inventories

| | <u>1934</u> | <u>1933</u> |
|----------|-------------|-------------|
| Franport | 154,596 | 186,414 |

There was an adjustment of 17,935 tons in the ore inventory on account of estimated shortage in stock. By deducting this and the ore shipments for 1934, the inventory can be reconciled with 1933.

3. ANALYSIS

b. Average Analysis of Straight Cargos (Dried at 212° F.)

| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Mine</u> | | | | <u>Lake Erie</u> | | | |
|--------------------------|-------------|-------------|--------------|-------------|------------|---------------|------------------|---------------|-------------|-------------|
| | | | <u>Phos.</u> | <u>Sil.</u> | <u>Al.</u> | <u>Moist.</u> | <u>Iron</u> | <u>Moist.</u> | | |
| Franport | 13,883 | 58.42 | .165 | 6.64 | 4.71 | 14.37 | 57.97 | 15.00 | | |
| <u>Complete Analysis</u> | | | | | | | | | | |
| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Al.</u> | <u>Lime</u> | <u>Mg.</u> | <u>Sul.</u> | <u>Loss</u> |
| Franport | 13,883 | 58.00 | .186 | 6.62 | .60 | 4.45 | 1.06 | 1.40 | .045 | 2.15 |

8. COST OF
OPERATING

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> |
|----------------------|-------------|-------------|-----------------|
| General Mine Expense | 128.65 | 36.13 | 92.52 |
| Loading & Shipping | 666.63 | 488.26 | 178.37 |
| Taxes | 3,135.46 | 2,656.93 | 478.53 |
| Total Cost at Mine | 3,930.74 | 3,181.32 | 749.42 |

FRANCIS MINE
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8. COST OF
OPERATING (Cont.)

General expense increased due to larger shipments.
Loading & Shipping increased due to larger shipments.
Taxes increased on account of higher tax rate although there was a reduction in valuation of \$20,000.

9. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|--|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| SW $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec.27,45-25 # | | 5.03# | | |
| SW $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec.27,45-25 | 500 | 11.03 | 500 | 8.22 |
| Personal Property | 140,000 | 3,088.40 | 160,000 | 2,622.40 |
| Total | 140,500 | 3,104.46 | 160,500 | 2,630.62 |
| Collection Fees | | 31.00 | | 26.31 |
| Total Taxes | | 3,135.46 | | 2,656.93 |
| Tax rate per \$100.00 | | 2.206 | | 1.639 |

1932-1933 taxes paid in 1934 by Cleveland office.

There was an increase of 18% in taxes due to higher tax rate.

GWINN DISTRICT MINES
ANNUAL REPORT
YEAR 1934

1. GENERAL

Conditions in the Gwinn District as regards employment, were somewhat better than they were a year ago. The Gardner Mackinaw finished its shaft sinking about the middle of February. From then until May 1st the Mine operated 3 days per week. The schedule from May 1st to September 1st was six days per week, on a staggered basis. This permitted doubling the number of men employed. From September 1st to December 31st, the working time was reduced to four days per week, also on the staggered basis.

The earnings of the men were hardly sufficient for the family wants, which were supplemented, where necessary, by Federal or County relief. A combination Township and County project enabled most families to secure fuel from designated wood lots. The men cut their own wood and helped load it. The Township and County paid for the hauling. Relief labor, principally on roads, was provided for many who could not secure work at the mines. There was also considerable jobbing in pulp wood by small operators, which gave employment to a number of men in the District.

The C.C.C. Camp located east of Swanzey was moved into the Archibald Mine buildings at Gwinn in the fall of 1933 and remained there until the spring of 1934, when it was moved to the Copper Country. The second camp is still located 18 miles west of Gwinn. The town rederived the benefit of what the boys had to spend.

Savings deposits at the Gwinn Bank increased \$15,000 during the year. This compares with a loss of \$14,000 in 1933 and \$30,000 in 1932.

The Gwinn School continued on a full time schedule for the year. School funds were reduced on account of the tax limitation and smaller receipts from the Primary fund. The teachers gracefully accepted a big reduction in their salaries which were partially restored in September.

Six lots were sold in the Business Section of the town to the Marquette County Road Commission. It is erecting a stone garage behind the town hall, which will be used for housing snow plows and other equipment.

a. Statement Showing Total Ore Produced in District by C.C.I.Co. 1903 to 1934 inclusive.

| <u>Year</u> | <u>Austin</u> | <u>Princeton</u> | <u>Stephenson</u> | <u>Gwinn</u> | <u>Francis</u> | <u>Gardner Mackinaw</u> | <u>Total</u> |
|---------------|---------------|------------------|-------------------|--------------|----------------|-----------------------------|--------------|
| Total to 1934 | 1,582,616 | 1,584,333 | 3,798,890 | 988,665 | 522,602 | 642,020 | 9,119,126 |
| 1934 | 0 | 0 | 0 | 0 | 0 | 78,353 | 78,353 |
| | 1,582,616 | 1,584,333 | 3,798,890 | 988,665 | 522,602 | 720,373 | 9,197,479 |

b. Statement Showing Total Ore Shipments by C.C.I.Co. from 1905 to 1934 inclusive.

| <u>Year</u> | <u>Austin</u> | <u>Princeton</u> | <u>Stephenson</u> | <u>Gwinn</u> | <u>Francis</u> | <u>Gardner Mackinaw</u> | <u>Total</u> |
|-----------------|---------------|------------------|-------------------|--------------|----------------|-----------------------------|--------------|
| Total to 1-1-34 | 1,589,018 | 1,453,446 | 3,693,986 | 988,325 | 336,188 | 593,634 | 8,654,597 |
| 1934 | 0 | 134 | 0 | 0 | 13,883 | 110,264 | 124,281 |
| | 1,589,018 | 1,453,580 | 3,693,986 | 988,325 | 350,071 | 703,898 | 8,778,878 |

GWINN DISTRICT MINES
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1. GENERAL

c. Ore in Stock at Mines Dec.31,1934

| <u>Princeton</u> | <u>Stephenson</u> | <u>Francis</u> | <u>Gardner Mackinaw</u> | <u>Total</u> |
|------------------|-------------------|----------------|-------------------------|--------------|
| 130,753 | 134,531 | 154,596 | 39,146 | 459,026 |

5. LABOR AND WAGES

The number of shifts worked by employees in the District in 1934 was 18,969 $\frac{1}{4}$ as compared with 2,518 in 1933.

Wages were increased 10% April 1st. Surface labor changed from \$3.20 to \$3.52 per day of eight hours.

10. TAXES

The following statement gives the taxes in detail for 1934 and 1933 from all Company properties in the District. The mine taxes, in the summary, show totals only, as the detail for each mine is included in the mine report.

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

| <u>Forsyth Township</u> | <u>1934</u> | | <u>1933</u> | |
|--|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>Mineral Lands, Gwinn Fee</u> | | | | |
| SW $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec.26,45-25, 45 acres | 80 | 1.76 | 80 | 1.34 |
| S $\frac{1}{2}$ of SE $\frac{1}{4}$ of " 27,45-25 80 " | 160 | 3.54 | 160 | 2.66 |
| NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of " 27, " 40 " | 80 | 1.76 | 80 | 1.34 |
| NE $\frac{1}{4}$ of SE $\frac{1}{4}$ of " 28, " 40, " | 80 | 1.76 | 80 | 1.34 |
| N $\frac{1}{2}$ of NE $\frac{1}{4}$ of " 34,45-25, 80 " | 160 | 3.54 | 160 | 2.66 |
| SE $\frac{1}{4}$ of NE $\frac{1}{4}$ of " 34, " 40 " | 80 | 1.76 | 80 | 1.34 |
| NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of " 34, " 40 " | 80 | 1.76 | 80 | 1.34 |
| NE $\frac{1}{4}$ of SE $\frac{1}{4}$ of " 34, " 40 " | 80, | 1.76 | 80 | 1.34 |
| NW $\frac{1}{4}$ of " 35, " 160 " | 320 | 7.06 | 320 | 5.29 |
| Lots 1,2 & 3 " 36, " 52 " | 100 | 2.19 | 100 | 1.74 |
| Lots 7,8 & 9 " 36, " 98.92 " | 200 | 4.40 | 200 | 3.37 |
| Lot 11 " 36, " 13.3 " | 20 | .43 | 20 | .36 |
| S $\frac{1}{2}$ of N $\frac{1}{2}$ of " 22, " 160 " | 500 | 11.04 | 500 | 8.22 |
| S $\frac{1}{2}$ of NE $\frac{1}{4}$ of " 28, " 80 " | 130 | 2.87 | 130 | 2.15 |
| N $\frac{1}{2}$ of NW $\frac{1}{4}$ of " 22,45-26, 87.08" | 90 | 1.99 | 90 | 1.49 |
| NE $\frac{1}{4}$ of " 2,45-26,165.61" | 190 | 4.19 | 190 | 3.14 |
| <u>Total</u> | <u>2,350</u> | <u>51.81</u> | <u>2,350</u> | <u>39.12</u> |
| <u>Collection Fees.....</u> | | <u>.52</u> | | <u>.39</u> |
| <u>TOTAL.....</u> | | <u>52.33</u> | | <u>39.51</u> |

GWINN DISTRICT MINES
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10. TAXES (Cont.)

| | <u>1934</u> | | <u>1933</u> | |
|--|------------------|------------------|------------------|------------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>Gwinn Townsite, Surface Only</u> | | | | |
| NE $\frac{1}{4}$ of SW $\frac{1}{4}$ Sec. 21, 45-25. Not included in Plat 6-A..... | 100 | 2.21 | | |
| NE $\frac{1}{4}$ of SW $\frac{1}{4}$ Sec. 21, 45-25, 27.4 Acres..... | 150 | 3.32 | 150 | 2.49 |
| That part of S $\frac{1}{2}$ of NW $\frac{1}{4}$ Sec. 21, 45-25 not included in Plat of Gwinn, 25.01 acres | 200 | 4.41 | 200 | 3.29 |
| E $\frac{1}{2}$ of SE $\frac{1}{4}$ of Sec. 21, 45-25, 65.84 acres... | 140 | 3.08 | 140 | 2.33 |
| That part of W $\frac{1}{2}$ of SE $\frac{1}{4}$ Sec. 21, 45-25 not included in Plat of Gwinn, 38.80 acres | 300 | 6.62 | 300 | 4.94 |
| Gwinn Townsite Plat..... | 90,005 | 1,987.52 | 90,895 | 1,502.71 |
| Part of W $\frac{1}{2}$ of SE $\frac{1}{4}$ Sec. 21, 45-25, Supts. residence, 1.2 acres..... | 3,000 | 66.18 | 3,000 | 49.18 |
| NW $\frac{1}{4}$ of NE $\frac{1}{4}$ Sec. 21, 45-25, except 5 acres in Cemetery, 35 acres..... | 100 | 2.21 | 100 | 1.64 |
| Part of S $\frac{1}{2}$ of NE $\frac{1}{4}$ Sec. 21, 45-25, 50.88 acres | 300 | 6.62 | 300 | 4.94 |
| Total..... | 94,295 | 2,082.17 | 95,085 | 1,571.52 |
| Collection Fees..... | | 20.82 | | 15.72 |
| Total Current Payment..... | | 2,102.99 | | 1,587.24 |
| <u>Gardner Mackinaw Dwellings</u> | | | | |
| N $\frac{1}{2}$ of NE $\frac{1}{4}$ Sec. 35, 45-25, 87.35 acres..... | 5,000 | 110.30 | 5,000 | 81.96 |
| Collection Fees..... | | 1.10 | | .82 |
| Total Taxes..... | | 111.40 | | 82.78 |
| Personal District Office..... | 500 | 111.14 | 500 | 8.30 |
| N $\frac{1}{2}$ of NW $\frac{1}{4}$ Sec. 27, 45-25, District Crusher | 1,000 | 22.28 | 1,000 | 16.54 |
| Total C.C.I.Co. Personal..... | 1,500 | 33.42 | 1,500 | 24.84 |
| <u>Austin Location</u> | | | | |
| Part of Lot 5 SW of NE Sec. 20, 45-25..... | 3,500 | 77.21 | 3,500 | 57.40 |
| NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 20, 45-25..... | 5,000 | 110.30 | 5,000 | 81.96 |
| NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 20, 45-25 BH..... | 260 | 5.74 | 260 | 4.29 |
| Total..... | 8,760 | 193.25 | 8,760 | 143.65 |
| Collection Fees..... | | 1.93 | | 1.44 |
| TOTAL..... | | 195.18 | | 145.09 |
| <u>Summary</u> | | | | |
| Stephenson Mine..... | 142,060 | 3,133.85 | 137,060 | 2,246.45 |
| Princeton Mine..... | 235,840 | 5,202.64 | 216,260 | 3,544.66 |
| Francis Mine..... | 140,500 | 3,104.46 | 160,500 | 2,630.62 |
| Gardner Mackinaw Mine..... | 155,080 | 3,421.06 | 165,080 | 2,705.70 |
| Mineral Lands..... | 2,350 | 51.81 | 2,350 | 39.12 |
| Gwinn Townsite..... | 94,295 | 2,082.17 | 95,085 | 1,571.52 |
| Austin Location..... | 8,760 | 193.25 | 8,760 | 143.65 |
| Gardner Mackinaw Location..... | 5,000 | 110.30 | 5,000 | 81.96 |
| Gwinn District Office..... | 500 | 11.14 | 500 | 8.20 |
| Gwinn District Crusher..... | 1,000 | 22.28 | 1,000 | 16.39 |
| Total C.C.I.Co..... | 785,385 | 17,332.96 | 791,595 | 12,988.29 |
| Collection Fees..... | | 173.33 | | 129.88 |
| Total Taxes..... | 785,385 | 17,506.29 | 791,595 | 13,118.17 |

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10. TAXES (Cont.)

| <u>Summary (Cont.)</u> | <u>1934</u> | | <u>1933</u> | |
|---|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| Total Taxes, C.C.I. (brt. forward)..... | 785,385 | 17,506.29 | 791,595 | 13,118.17 |
| Cliffs Power & Light Co. ... | 98,215 | 2,188.41 | 93,815 | 1,553.99 |
| Cliffs Electric..... | 0 | 0 | 4,500 | 74.54 |
| Total (Includes fee)..... | 98,215 | 2,188.41 | 98,315 | 1,628.53 |
| GRAND TOTAL | 883,600 | 19,694.70 | 889,910 | 14,746.70 |
| Rate..... | | 2.206 | | 1.639 |

Taxes Levied - Forsyth Township

| | <u>1934</u> | <u>1933</u> | <u>1932</u> | <u>1931</u> | <u>1930</u> |
|---------------------------|-------------|-------------|-------------|--------------------|-------------|
| State | 852.48 | 853.97 | 5,449.87 | 6,883.97 | 7,742.15 |
| County | 9,136.94 | 8,673.33 | 11,957.01 | 14,112.00 | 16,180.47 |
| County Road | 734.52 | 735.85 | - | 4,330.45 | 5,679.86 |
| Contingent (Twp.) | 4,700.91 | 3,296.16 | 4,500.00 | 4,504.14 | 4,007.74 |
| Highway Improvement | - | - | 2,500.00 | 4,327.50 | 5,009.91 |
| Highway Repair | - | - | 3,000.00 | 4,008.76 | 5,011.13 |
| County Debt | 800.00 | 1,965.39 | - | - | - |
| Library | - | - | - | - | - |
| School and 1 Mill | 6,610.64 | 7,954.82 | 23,607.06 | 31,904.50 | 36,101.82 |
| School Debt Service. | 9,000.00 | - | - | - | - |
| Cemetery | - | - | 500.00 | - | - |
| Township Debt | - | 1,023.32 | - | - | - |
| Rejected | 175.76 | 156.57 | 21.98 | (included in roll) | |
| Total | 32,406.21 | 24,659.41 | 51,535.92 | 70,071.32 | 79,733.08- |
| Amount paid by C.C.I.Co. | 19,649.70 | 14,746.70 | 31,150.72 | 40,159.72 | 44,811.89 |
| Percent paid by C.C.I.Co. | 60.6 | 59.8 | 60.44 | 57.30 | 56.20 |

16. WATER SUPPLY
GWINN DISTRICT

The water supply pump station of the Escanaba River above Princeton operated throughout the whole year with but one short shut down of a few hours. This was necessitated by installing 360' of spiral riveted pipe in the main line near the Central Power Plant. The operating cost increased \$967.57 over 1933 due to repairs to chlorinator, extensive pipe line repairs and increased rate on electric power.

The State Board of Health reported dangerous contamination a couple of times during the year. This condition was immediately remedied by the addition of more chlorine. The extremely low water in the Escanaba River and the intermittent running of the Escanaba Power

GWINN DISTRICT MINES
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16. WATER SUPPLY
GWINN DISTRICT (Cont.)

Plant probably aggravated the contamination.

The wooden pipe mains gave ~~us~~ continuous trouble throughout the year.

The following statement gives the cost of operating the pump station for 1934 and 1933:

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|-----------------------|-----------------|-----------------|-----------------|-----------------|
| General Expense | 90.30 | 63.58 | 26.72 | |
| Maintenance, Labor | 814.39 | 487.74 | 326.65 | |
| Maintenance, Material | 127.75 | 218.99 | | 91.24 |
| Operating - Labor | 1,495.70 | 1,452.32 | 43.38 | |
| Operating - Supplies | 4,942.51 | 4,280.45 | 662.06 | |
| Total | <u>7,470.65</u> | <u>6,503.08</u> | <u>967.57</u> | |

| | | |
|-----------------------------|-------------|-------------|
| Cost per 1,000 gals. pumped | .028 | .025 |
| Gallons pumped | 262,800,000 | 262,780,000 |

Maintenance:

Labor:

The large increase in this account is due to pipe line repairs and renewals.

Material

This increase in 1934 is due to more materials charged to pipe line repairs.

Operating

The increase in this account of \$705.44 for the year was made up principally by the increase in power rates, .0172 in 1934 compared with .0152 per K.W.H. in 1933. This amounted to \$493.55. The increase in wages and cost of chlorinator repairs made up the balance.

The operating costs were charged off as follows:

| | <u>1934</u> | <u>1933</u> |
|-----------------------------|-----------------|-----------------|
| 1. C. C. I. Co. Mines | 0 | 35.00 |
| 2. Water Charges Receivable | 2,088.68 | 1,973.87 |
| 3. Gwinn Townsite | 5,381.97 | 4,494.21 |
| Total | <u>7,470.65</u> | <u>6,503.08</u> |

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17. CONDITION
OF
PREMISES

Gwinn Townsite

The streets, alleys and various parks throughout town were kept clean at Township expense. The premises were kept in as good condition as in previous years, although there were no prizes offered. Repairs were made only where absolutely necessary. Kalsomine, some paint and varnish were allowed and applied by tenants.

The rents accrued, collected and repair expense for Company houses in Gwinn Townsite, and the Austin, Princeton and Gardner Mackinaw Locations follow:

| <u>Number of Houses (123)</u> | <u>1934</u> | <u>1933</u> | <u>1932</u> |
|---|-------------|-------------|-------------|
| Rents accrued | 7,708.63 | 7,249.51 | 8,027.35 |
| Repair Expense | 1,508.26 | 597.32 | 597.54 |
| Excess accrued rents over repairs costs | 6,200.37 | 6,652.19 | 7,429.81 |
| Actual Rent collections | 5,636.79 | | |
| Taxes Gwinn Townsite and repair cost | 3,146.26 | | |
| Balance or net income | 2,490.53 | | |

Austin Location

| <u>Number of Houses (59)</u> | | | |
|---------------------------------------|----------|----------|----------|
| Number occupied | 30 | 32 | 33 |
| Rents accrued | 1,114.00 | 1,452.50 | 1,652.50 |
| Repair Expense | 92.63 | 47.36 | 151.23 |
| Excess accrued rents over repair cost | 1,021.37 | 1,405.14 | 1,501.27 |
| Actual Rent collections | 909.00 | 543.00 | |

Houses in this location decreased 2 on account of sale of Nos. 62 and 63.

Princeton Location

| <u>Number of Houses (14)</u> | | | |
|---------------------------------------|--------|--------|--------|
| Number occupied | 10 | 10 | 8 |
| Rents accrued | 495.00 | 499.00 | 480.50 |
| Repair Expense | 80.11 | 26.37 | 85.26 |
| Excess accrued rents over repair cost | 414.89 | 472.63 | 395.24 |
| Actual Rent collections | 427.50 | 229.00 | |

GWINN DISTRICT MINES
ANNUAL REPORT
YEAR 1934

17. CONDITION
OF
PREMISES

| <u>Gardner Mackinaw Location</u> | <u>1934</u> | <u>1933</u> | <u>1932</u> |
|--|-------------|-------------|-------------|
| <u>Number of Houses (52)</u> | | | |
| Number occupied | 5 | 5 | 6 |
| Rents accrued | 257.50 | 240.00 | 417.50 |
| Repair Expense | 27.78 | 28.20 | 109.35 |
| Excess accrued rents over repair cost | 229.72 | 211.80 | 308.15 |
| Actual rent collections | 277.00 | 273.50 | |

Statistical statement of rented buildings for 1934

| <u>Location</u> | <u>No.</u> | | <u>Total</u> | <u>Cost of Repairs</u> | <u>Repair Cost per House</u> | <u>Rent</u> | |
|------------------|---------------|-----------------|--------------|----------------------------|----------------------------------|----------------|------------------|
| | <u>Vacant</u> | <u>Occupied</u> | | | | <u>Accrued</u> | <u>Collected</u> |
| Princeton | 4 | 10 | 14 | 80.11 | 5.72 | 495.00 | 427.50 |
| Austin (1) | 29 | 30 | 59 | 92.63 | 1.57 | 1,114.00 | 909.00 |
| Gardner Mackinaw | 47 | 5 | 52 | 27.78 | .52 | 257.50 | 277.00 |
| Gwinn Townsite | 13 | 110 | 123 | 1,307.74 | 10.63 | 7,708.63 | 5,636.79 |
| Total | 93 | 155 | 248 | 1,508.26 | 6.08 | 9,575.13 | 7,250.29 |

Excess rent collected over repair cost \$ 5,742.03

(1) House No. 62-63 sold during the year.

19. GWINN ASSOCIATION
GWINN HOTEL

(1) Gwinn Association

The Club House is the civic center of the community. Here meetings of all kinds of groups are held, social, athletic, band practices, etc. During the past year, the Association has doubled its efforts to provide a place for wholesome recreation and amusement for the young people to combat the influence of the tavern dance halls.

The expense of operating the building was kept at a minimum and the Association finished the year with a bank balance of \$1084.90, or slightly in excess of a year ago.

As in 1933, the operating expenses were reduced by club members cutting most of the fuel needed to heat the building. Credits in the form of membership dues were granted 49 for this work.

The Superintendent of the Association supervises the High School athletics and the Association gymnasium and pool are used in lieu of the school providing these facilities. For their use, the school pays the Association \$2500.00 per year, which revenue makes it possible to keep the building open.

GWINN DISTRICT MINES
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19. GWINN ASSOCIATION
GWINN HOTEL

(1) Gwinn Association (Cont.)

During the year the whole interior of the building was redecorated with the exception of the Superintendent's quarters and the shower and locker rooms. The janitor and members provided the labor and the paint was donated.

The roof of the building was retarred.

The report of the Superintendent of the Coub House is included in detail in the Annual report of the Welfare Department, so it will not be repeated here. A brief synopsis of the activities brings out the value of the Association to the community.

On January 1st, 1935, there were 229 members, or an increase of 55 for the year. The estimated attendance at the Club House for the year was 69,960 or slightly below last year.

The physical and athletic work covers the supervision of "out of doors" activities, including baseball, basket ball, kitten ball, football, skating, tennis, etc.

There were 372 meetings and social events held at the Club House during the year. These covered various committee meetings, nursing school sessions, health and hygiene classes, 40 meetings of church organizations, dances by Firemen and Town Club and other organizations, band practices, Girl Scout meetings, cribbage and bowling league meetings, etc.

The two Girl Scout troops were active during the year. The Scout captain who had served faithfully for fourteen years, retired. A new trained leader was secured. The membership in the two troops remains the same as a year ago, i.e. 32 and 20 girls respectively.

Bass Lake Camp

The Association still retains supervision over its camp at Baas Lake. There were few requests for the cottage but there was a large attendance on Sundays and holidays during the summer. The estimated attendance on the camp grounds for the season was 1600.

The affairs of the Association are under the supervision of Mr. E. L. Miller, who has been in charge over 15 years. We are fortunate in having such an able and efficient Superintendent.

(2) Gwinn Hotel

The hotel was operated throughout the whole year. In August, the Manager, Mr. Bruce Leslie, was killed in an automobile accident and his son-in-law, Harold Brown, took charge.

On account of conditions in Gwinn, it is difficult to operate the Hotel at a profit. Townspeople take roomers and boarders whenever possible in order to provide a little income.

GWINN DISTRICT MINES
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YEAR 1934

19. GWINN ASSOCIATION
GWINN HOTEL

(2) Gwinn Hotel (Cont.)

The Company feels that it is necessary to keep the hotel open and has helped to the extent of donating the rent and water.

f. Gwinn District Crusher

The crusher operated 60 days in 1934. The ore crushed was as follows:

| | <u>1934</u> | <u>1933</u> |
|------------------|----------------|----------------|
| Gardner Mackinaw | 105,337 | 147,146 |
| Princeton | 88 | |
| Stephenson | | <u>1,532</u> |
| Total | <u>105,425</u> | <u>148,678</u> |

The cost for years 1934 and 1933 were as follows:

| | <u>1934</u> | | <u>1933</u> | | <u>Increased Cost per Ton</u> |
|--------------------------------|-----------------|--------------------|-----------------|--------------------|-----------------------------------|
| | <u>Amount</u> | <u>Per Ton</u> | <u>Amount</u> | <u>Per Ton</u> | |
| General Expense | 31.44 | | 14.18 | | |
| Maintenance | 771.45 | .007 | | | .007 |
| Operating | <u>2,636.62</u> | <u>.026</u> | <u>3,095.66</u> | <u>.021</u> | <u>.005</u> |
| Total Optg. Expense | 3,439.51 | .033 | 3,109.84 | .021 | .012 |
| Switching | <u>986.00</u> | <u>.009</u> | <u>1,378.85</u> | <u>.009</u> | - |
| Grand Total | <u>4,425.51</u> | <u>.042</u> | <u>4,488.69</u> | <u>.030</u> | <u>.012</u> |
| Tons Crushed | 105,425 | | 148,678 | | |
| Decrease in tonnage crushed | 43,253 | | | | |

The charge for maintenance in 1934 was for repairs made previous to plant going into operation. During the coming season, it may be necessary to install a new conveyor belt.

REPUBLIC MINE
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1. GENERAL

The only thing to report about this abandoned property is the sale of Location dwellings and Mine buildings. On January 1st, 1934, the Company still owned 10 single and 4 double houses. During the year all but 3 single, or 11 dwellings were sold. The new alignment of M-45 through Republic crosses land owned by The Cleveland-Cliffs Iron Company and the Cliffs Power & Light Company, follows Mine Street cutting across No. 9 stocking ground. A right of way was sold the State Highway Department across these lands, including 8 dwellings as follows:

| | |
|---|--------------------|
| Houses 5-12 inclusive and Mine Barn (C.C.I.Co.) | \$ 4,200.00 |
| 9.5 acres in Sec.18,46-29 (C.P.& L.Co.) | 443.00 |
| 14.19 acres in Sec.7,46-29 (C.C.I.Co.) | 657.00 |
| Total sale price to State | <u>\$ 5,300.00</u> |

We also sold the brick Drill Sharpening Shop to the Marquette County Road Commission for a garage for their road scraper and snow plow in the Republic District. The sale price was \$500.00 for the building with an annual ground rental of \$15.00.

Three other dwellings were sold as follows:

| <u>House No.</u> | <u>Purchaser</u> | <u>Sale Price</u> |
|------------------|---------------------|-------------------|
| 13 | Peter W.Pascoe, Jr. | \$ 400.00 |
| 42 | James Fowler | 250.00 |
| 46 | John Raher | 350.00 |

The above sales are covered by contracts and are being paid for on a monthly payment plan. The Company still owns 3 single houses, all of which are occupied.

10. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|---|------------------|---------------|------------------|-----------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| Realty described on tax receipt | 10,000 | 252.10 | 10,000 | 381.63 |
| Personal Property | 10,000 | 252.10 | 10,000 | 381.63 |
| Lots 71,72,86,108 & 126 | 95 | 2.45 | 95 | 3.68 |
| Total | <u>20,095</u> | <u>506.65</u> | <u>20,095</u> | <u>766.94</u> |
| Collection Fees | | 5.07 | | 7.67 |
| Total Republic Mine | | <u>511.72</u> | | <u>774.61</u> |
| Republic Mine Dwellings (Including Fees) | 1,590 | 38.23 | 6,750 | 260.42 |
| Total Republic Twp.(Inc.Fee) | <u>21,595</u> | <u>549.95</u> | <u>26,845</u> | <u>1,035.03</u> |
| Rate | | 2.52 | | 3.83 |

There has been no change in valuations but the rate for 1934 is lower than the previous year on account of reduction in debt service.

SPIES VIRGIL MINE
ANNUAL REPORT
YEAR 1934

1. GENERAL

The Spies Virgil Mine remained idle during all of 1934 with the exception of pumping. It was hoped some arrangement might be made with the Republic Steel Corporation to either continue the exploration of the Sherwood property through the Spies Virgil workings, begun in 1933, or else that some joint plan might be effected to operate the mine.

Pumping was done on day shift, with the clerk acting as hoisting engineer, and the other underground foremen and former pumpman as operators. The men worked on a staggered basis.

The Idle Expense for the year, exclusive of taxes, amounted to \$19,732.86; taxes were \$10,144.10, making a total of \$29,876.96.

2. PRODUCTION
SHIPMENTS &
INVENTORIES

c. Stockpile Inventories

| <u>Grade</u> | <u>Tons in Stock</u> |
|-------------------------------|----------------------|
| Virgil Crushed | 312,645 |
| Virgil Crushed (High Sulphur) | 8,879 |
| Total | 321,524 |

f. Ore Statement

| | <u>Virgil</u> <u>Ore</u> | <u>Virgil</u> <u>Hi-Sulphur</u> | <u>Total</u> | <u>1933</u> |
|--------------------------|-----------------------------|------------------------------------|--------------|-------------|
| On hand Jan. 1, 1934 | 291,745 | 8,879 | 300,624 | 300,624 |
| Adjustment Jan. 1, 1934 | 20,900 | 0 | 20,900 | 0 |
| Shipments | 0 | 0 | 0 | 0 |
| Balance on hand 12-31-34 | 312,645 | 8,879 | 321,524 | 300,624 |

1934 - Idle except pumping throughout the year.

1933 - 1-8hr. shift 4 days per week. 2 crews alternate weeks
Jan. 1st to May 1st. Idle except for pumping
and Sherwood development May 1st to Sept. 1st.
Idle except for pumping Sept. 1st to Dec. 31st, 1933.

3. ANALYSIS

| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Al.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Loss</u> | <u>Moist.</u> |
|----------------|-------------|-------------|--------------|-------------|------------|------------|-------------|-------------|-------------|-------------|---------------|
| Virgil Crushed | | | | | | | | | | | |
| Dried 212° F. | 312,645 | 57.64 | .401 | 7.00 | .19 | 1.84 | .60 | .21 | .078 | 6.50 | |
| Natural | | 53.60 | .372 | 6.51 | .18 | 1.70 | .56 | .19 | .072 | 6.05 | 7.00 |

SPIES VIRGIL MINE
ANNUAL REPORT
YEAR 1934

3. ANALYSIS

e. Average Analysis of Ore in Stockpile (Cont.)

| <u>Grade</u> | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mn.</u> | <u>Al.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Loss</u> | <u>Moist.</u> |
|-------------------|-------------|-------------|--------------|-------------|------------|------------|-------------|-------------|-------------|-------------|---------------|
| Virgil Hi-Sulphur | | | | | | | | | | | |
| Dried 212° F. | 8,879 | 57.41 | .424 | 4.09 | | | | | .369 | | |
| Natural | | 53.10 | .392 | 3.78 | | | | | .341 | | 7.50 |
| Sherwood | | | | | | | | | | | |
| Dried | 1,180 | 58.00 | .561 | 3.30 | | | | | .186 | | |
| Natural | | 53.94 | .512 | 3.17 | | | | | .173 | | 7.00 |

4. ESTIMATE
OF ORE
RESERVES

As there was no mining or development in 1934, the ore reserves remain the same as reported as of Dec. 31, 1933:

a. Developed Ore

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

| <u>Virgil Ore</u> | <u>Available</u> <u>Tons</u> | <u>Unavailable</u> <u>Tons</u> | <u>Total</u> <u>Tons</u> |
|---|---------------------------------|-----------------------------------|-----------------------------|
| Revised estimate developed ore above 6th Level, Dec. 31, 1934 | 41,008 | 507,718 | 548,726 |
| Estimate of developed ore between 6th and 8th Levels, Dec. 31, 1934 | 167,318 | 95,712 | 263,030 |
| Total Developed Ore Dec. 31, 1934 | 208,326 | 603,430 | 811,756 |

b. Prospective Ore

| | | | |
|------------------------------|---------|---------|-----------|
| Between 6th & 8th Levels | 409,151 | 278,755 | 687,906 |
| Total all ore, Dec. 31, 1934 | 617,477 | 882,185 | 1,499,762 |

We estimate we will recover between 25% and 33%, in our last mining operations, of the ore above the 6th Level tied up in pillars and shown unavailable.

SPIES VIRGIL MINE
ANNUAL REPORT
YEAR 1934

4. ESTIMATE
OF ORE
RESERVES

c. Estimated Reserve Analysis

| | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mng.</u> | <u>Alum.</u> | <u>Lime</u> | <u>Mag.</u> | <u>Sul.</u> | <u>Loss.</u> | <u>Moist.</u> |
|---------|-------------|--------------|-------------|-------------|--------------|-------------|-------------|-------------|--------------|---------------|
| Dried | 57.50 | .425 | 7.00 | .16 | 1.64 | .60 | .30 | .119 | 7.35 | |
| Natural | 51.75 | .382 | 6.30 | .15 | 1.48 | .55 | .26 | .107 | 6.60 | 10.00 |

5. LABOR
AND
WAGES

a. Comments

The mine was idle during the entire year. A crew of 12 men, including the Captain and Clerk, were employed on a staggered schedule.

Wages were increased on April 1st, 1934. General surface wages were increased 10% from \$4.20 per 8 hr. day to \$3.52, while Company Account miners were increased from \$4.05 to \$4.44.

b. Comparative Statement of Wages and Product

This statement means little as the two years were on such different bases that the comparison means nothing. It is made simply for a record.

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|-----------------------------|-------------|-------------|-----------------|-----------------|
| PRODUCT | 0 | 11,950 | | 11,950 |
| NO. SHIFTS & HOURS | | 1-8 hr. | | |
| <u>AVG. NO. MEN WORKING</u> | | | | |
| Surface | 7 | 8 | | 1 |
| Underground | 5 | 23 | | 18 |
| Total | 12 | 31 | | 19 |
| <u>AVG. WAGES PER DAY</u> | | | | |
| Surface | 3.68 | 3.29 | .39 | |
| Underground | 4.55 | 3.91 | .64 | |
| Total | 4.07 | 3.72 | .35 | |
| <u>WAGES PER MONTH</u> | | (8 days) | | |
| Surface | 44.16 | 26.32 | | |
| Underground | 54.60 | 31.28 | | |
| Total | 48.84 | 29.76 | | |
| <u>TOTAL NO. OF DAYS</u> | | | | |
| Surface | 1,085-5/8 | 651 | | |
| Underground | 956-2/8 | 1,411 | | |
| Total | 1,941-7/8 | 2,062 | | |

SPIES VIRGIL MINE
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5. LABOR
AND
WAGES

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

| | <u>1934</u> | <u>1933</u> | <u>Increase</u> | <u>Decrease</u> |
|-------------------------|-----------------|-----------------|-----------------|-----------------|
| <u>AMOUNT FOR LABOR</u> | | | | |
| Surface | 3,998.58 | 2,139.82 | 1,858.76 | |
| Underground | 3,896.28 | 5,522.01 | | 1,625.73 |
| Total | <u>7,894.86</u> | <u>7,661.83</u> | 233.03 | |

PROPORTION SURFACE TO UNDERGROUND MEN

| | | |
|------|------|------|
| 1934 | 1 to | .88 |
| 1933 | 1 to | 2.15 |
| 1932 | 1 to | 2.23 |
| 1931 | 1 to | 2.28 |
| 1930 | 1 to | 2.43 |
| 1929 | 1 to | 2.74 |
| 1928 | 1 to | 2.64 |
| 1927 | 1 to | 3.08 |
| 1926 | 1 to | 3.00 |

6. SURFACE

a. Building Repairs
1. Buildings - Mine

There were practically no repairs to mine buildings in 1934.

2. Buildings - Location

Repairs made to location buildings were made by the tenants.

7. UNDERGROUND

h. Ventilation

When the mine is in operation, the ventilation is good during the winter months, especially when tramping and hoisting is carried on. The warm weather creates a balance in the air current between the two shafts and it is necessary to operate the 5 H.P. No. 2½ B Anaconda type fan. The fan is installed on surface and air blown down the skip compartment. During this past year, when pumping only was in progress, the ventilation became very poor and it was necessary to blow air into the 3rd

SPIES VIRGIL MINE
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7. UNDERGROUND

h. Ventilation (Cont.)

and 8th Level pump houses through the 6 inch air line by means of this fan. Even then it was impossible during the summer and fall to burn a carbide light in the shaft on account of the deficiency in oxygen. If pumping continues in 1935 it may become necessary to install a larger fan at the Spies Shaft collar this winter and brattice off the levels on the shaft plats in order to give the pumpmen fresh air.

i. Pumping

Both the 3rd and 8th Level pumps were operated throughout the year on one 8 hr. shift. In order to give a little extra storage, temporary dams were built near the 6th and 8th Level Plats. The water pumped for the year amounted to 73,856,500 gallons as compared with 84,468,275 gallons for 1933, a decrease of 10,611,775 gallons or 12½%.

10. TAXES

The following tabulation is a comparative statement of taxes paid in Iron County for the year 1934-1933:

| <u>Description</u> | <u>1934</u> | | <u>1933</u> | |
|-------------------------------------|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>Iron River Township</u> | | | | |
| NE¼ of NW¼ Sec. 24, 43-35, 40 acres | | | | |
| SE¼ of NW¼ " 24, " 40 " | | | | |
| Spies Dwellings..... | 5,000 | 100.75 | 5,000 | 101.40 |
| <u>Spies Virgil (a)</u> | | | | |
| E¼ of NW¼ Sec. 24, 43-35 (Spies) | | | | |
| SW¼ of NW¼ " 24, " (Virgil) | 100,000 | 2,015.00 | 80,000 | 1,622.40 |
| Stockpile, Supplies & Equipt..... | 370,000 | 7,455.50 | 390,000 | 7,909.20 |
| Total Spies Virgil..... | 470,000 | 9,470.50 | 470,000 | 9,531.60 |
| (a) Total Iron River Twp..... | 475,000 | 9,571.25 | 475,000 | 9,633.00 |
| Rate..... | | 2.105 | | 2.028 |
| <u>Ravenna-Prickett</u> | | | | |
| <u>City of Crystal Falls</u> | | | | |
| W½ of SE¼ Sec. 19, 43-32..... | 1,000 | 28.06 | 10,500 | 280.39 |
| Rate per \$100.00..... | | 2.81 | | 2.671 |
| <u>Crystal Falls Township</u> | | | | |
| <u>Ravenna Prickett</u> | | | | |
| SW¼ of Sec. 19, 43-32.....) | 74,000 | 1,602.10 | 72,000 | 1,458.72 |
| NE¼ of SE¼ 24, 43-33.....) | | | | |
| SW¼ of NE¼ 19, 43-32.....) | 200 | 4.33 | 200 | 4.06 |
| SE¼ of NE¼ 19, " | 200 | 4.33 | 200 | 4.06 |
| SW¼ of NW¼ 19, " | 200 | 4.33 | 200 | 4.06 |
| SE¼ of NW¼ 19, " | 200 | 4.33 | 200 | 4.06 |
| SE¼ of NE¼ 24, 43-33..... | | | 200 | 4.06 |
| TOTAL..... | 74,800 | 1,619.42 | 73,000 | 1,479.02 |
| Rate per \$100.00.... | | 2.17 | | 2.026 |
| TOTAL Ravenna Prickett | 75,800 | 1,647.48 | 83,500 | 1,759.41 |

SPIES VIRGIL MINE
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10. TAXES

| | <u>1934</u> | | <u>1933</u> | |
|---|------------------|--------------|------------------|--------------|
| | <u>Valuation</u> | <u>Taxes</u> | <u>Valuation</u> | <u>Taxes</u> |
| <u>Distribution of Charges</u> | | | | |
| C.C.I.Co. Proportion..... | 57,300 | 1,246.95 | 65,300 | 1,390.67 |
| Michigan Mineral lands..... | 18,500 | 400.53 | 18,200 | 368.74 |
| (a) The mineral valuation is not divided between the Spies and Virgil and the surface of the Spies is included in the mineral assessment of the virgil. | | | | |
| <u>Village of Mineral Hills</u> | | | | |
| <u>Spies Lease</u> | | | | |
| SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec.24,43-35....) | 5,000 | 7.17 | 4,500 | 4.33 |
| NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of " 24, " ...) | | | | |
| Dwellings.....) | | | | |
| <u>Virgil Mine Lease</u> | | | | |
| (a) SW $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec.24,43-35. | 100,000 | 143.32 | 85,000 | 91.29 |
| Stockpile,Supplies,Equipment... | 370,000 | 530.28 | 385,500 | 414.02 |
| Total Opt.Spies Virgil..... | 470,000 | 673.60 | 470,500 | 505.31 |
| Total Mineral Hills..... | 475,000 | 680.77 | 475,000 | 510.14 |
| Rate..... | | .14332 | | .1074 |

The Village of Mineral Hills is in Iron River Township. The valuations as shown here are the same valuations shown by Iron River Township.

(a) The valuation of 100,000 includes both the Spies and Virgil descriptions noted above for the year 1934 and 1933. Not divided by tax appraiser and any division would be arbitrary.

14. MAINTENANCE
AND REPAIRSb. Hoisting Equipment

As there is no heat in the engine house, a heating coil was placed about the oil cylinder of the air brake, so that it can be operated in cold weather. It works perfectly. Last winter it was necessary to rely wholly on the hand brake.

c. Pumps

In February one of the 8th Level pumps was out of commission. a bolt holding a wedge block in place between the connecting rod and plunger, broke. It was repaired and worked satisfactorily for a while but later it was necessary to install a new connecting rod.

SPIES VIRGIL MINE
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14. MAINTENANCE
AND REPAIRS

c. Pumps (Cont.)

Slides of No. 1 8th Level pump were babbitted. Valves were repaired on both pumps.

17. CONDITION
OF
PREMISES

The dwellings in the location are badly in need of paint. The sheds and fences are in poor state of repair and detract from the appearance of the premises.

18. NATIONALITY
OF
EMPLOYEES

| <u>Americans</u> | <u>Percent</u> | <u>Parentage</u> |
|---------------------|----------------|------------------|
| 2 | .17 | English |
| 3 | .25 | Irish |
| 1 | .08 | Dane |
| | | |
| <u>Foreign Born</u> | | |
| 5 | .42 | English |
| 1 | .08 | Croatian |
| <hr/> 12 | <hr/> 100.00% | |

ORIGINAL

CANISTEO MINE

ANNUAL REPORT

YEAR 1934

CANISTEO MINE
ANNUAL REPORT
YEAR 1934

1. GENERAL:

In addition to the customary policing of the mine and washing plant premises and pit pumping, a force of approximately seventy men, working on staggered time, were employed on pit and washing plant equipment repair work during the first three months of the year. A track repair crew was employed during April and the fore part of May preparatory to mining activities and a repair force of twenty-eight men were employed at the washing plant during the first ten days of May.

Generally speaking, the season's ore operations, which were conducted from May 14th to August 22nd, were quite satisfactory as regards tonnage handled, grade of ore secured and the costs. Two, 120-B Bucyrus electric shovels were operated on ore and the small gasoline machine was utilized on track grading and clean-up jobs.

The 800,000-ton annual output capacity of the Canisteco Mine and washing plant was definitely demonstrated. While the mine only operated on ore from May 14th to August 22nd on a four to five day basis, of three 8-hour shifts each, (with two days in September to complete a cargo) - 430,142 tons were shipped. This is at the rate of over 120,000 tons per month, with an average of about eighteen days worked, whereas with 5-1/2 months of twenty-five operating days per month, we could produce slightly in excess of 800,000 tons in a season, or at the rate of 150,000 tons per month.

Washing plant results were fully up to expectations and the delays, which occurred during the season, were less serious than expected, based on past experience. The weight and iron unit recovery showed an improvement over the previous year.

Structure drilling was undertaken during the ore season and continued well into the fall. This was for the purpose of determining the most advantageous ore operation for the year 1935 and to outline the most feasible stripping program for the fall of 1934 and the year 1935. The necessary structure drill work will be less extensive during 1935.

The fall stripping was conducted on three 8-hour shifts, four days per week, and progressed from the first of October to December 21st. The material handled averaged over 6,000 cubic yards per day and the cost was under \$.23 per yard for the 318,763 cubic yards of lean ore material and rock removed. As the stripping cuts were short, necessitating considerable track shifting, the stripping results were quite satisfactory. The total cost of the fall stripping amounted to \$72,202.59, as compared with the budget estimate of \$75,000.00.

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1. GENERAL:
(Continued)

Pit drainage problems were considered during the year and a shaft was put down in the Southerly part of the Hemmens pit. Pumping facilities will be installed here to allow for the drainage of the pit and the conducting of mining operations at a lower elevation than attempted thus far.

The ground in the vicinity of the washing plant storage basin was tested for a water supply. This work afforded satisfactory results and arrangements are being made to install pumping equipment and augment our present supply and provide adequate water for our future washing operations.

2. PRODUCTION,
SHIPMENTS &
INVENTORIES:

a. Production by Grades:

| | | |
|--|----------------|----------|
| Snyder Crude, ----- | 443,362 | tons |
| Bovey Crude, ----- | 244,812 | " |
| Hemmens Crude, ----- | 22,956 | " |
| TOTAL CRUDE, ----- | 711,130 | " |
| Snyder Non-Bessemer Concentrates, ----- | 116,731 | " |
| Snyder Bessemer Concentrates, ----- | 141,454 | " |
| Bovey Non-Bessemer Concentrates, ----- | 135,256 | " |
| Bovey Bessemer Concentrates, ----- | 21,314 | " |
| Hemmens Non-Bessemer Concentrates, ----- | 6,792 | " |
| Hemmens Bessemer Concentrates, ----- | 8,595 | " |
| TOTAL CANISTEO MINE, ----- | 430,142 | " |

Actual ore operations started on May 14th and were completed August 22nd. On account of a reduction in our ore schedule from 500,000 tons to 430,142 tons, our season was shorter than anticipated. It was also necessary to operate two days in September in order to complete grading out cargoes.

b. Shipments:

The shipments from the Canisteco Mine during 1934 were the same tonnages as shown under the production statement, as all ore mined was forwarded to Lower Lake ports.

c. Stockpile Inventories:

No merchantable ore, either concentrates or direct shipping, was stocked at the Canisteco property during 1934, but the following lean wash material was placed on a lean ore pile:

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2. PRODUCTION,
SHIPMENTS &
INVENTORIES:
(Continued)

c. Stockpile Inventories:
(Continued)

| | <u>CU. YDS.</u> | <u>TONS</u> | <u>IRON</u> | <u>PHOS.</u> | <u>SILICA.</u> |
|----------------|-----------------|-------------|-------------|--------------|----------------|
| Snyder Lease, | 27,086 | 40,629 | 37.83 | .100 | 30.52 |
| Bovey Lease, | 9,839 | 14,758 | 30.30 | .041 | 49.14 |
| Hemmens Lease, | 16,704 | 25,056 | 40.50 | .042 | 37.38 |
| Total, | 53,629 | 80,443 | 37.28 | .071 | 36.07 |

e. Production by Months:

(1) Crude Ore:

| <u>MONTH</u> | <u>SNYDER</u> | <u>BOVEY</u> | <u>HEMMENS</u> | <u>TOTAL</u> |
|-----------------|---------------|--------------|----------------|--------------|
| May, ----- | 79,627 | 43,197 | - | 122,824 |
| June ----- | 129,792 | 68,994 | 15,585 | 214,371 |
| July ----- | 100,168 | 84,005 | - | 184,173 |
| August ----- | 119,205 | 41,277 | 7,371 | 167,853 |
| September ----- | 14,570 | 7,339 | - | 21,909 |
| TOTAL 1934----- | 443,362 | 244,812 | 22,956 | 711,130 |

(2) Concentrates:

| <u>MONTH</u> | <u>SNYDER</u> | <u>BOVEY</u> | <u>HEMMENS</u> | <u>TOTAL</u> |
|-----------------|---------------|--------------|----------------|--------------|
| May ----- | 42,898 | 22,661 | - | 65,559 |
| June ----- | 64,830 | 42,455 | 10,588 | 117,873 |
| July ----- | 56,862 | 57,621 | - | 114,483 |
| August ----- | 83,716 | 28,728 | 5,214 | 117,658 |
| September ----- | 9,882 | 5,135 | 415 | 14,602 |
| October ----- | 3 | 30 | - | 33 |
| TOTAL 1934----- | 258,185 | 156,570 | 15,387 | 430,142 |

No direct shipping ore was produced during the year 1934.

f. Ore Statement:

All material considered as ore that was mined during 1934, was shipped from the property.

g. Delays:

The following delays were reported during the year 1934:

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YEAR 1934

2. PRODUCTION,
SHIPMENTS &
INVENTORIES:
(Continued)

g. Delays:

| Date | Time Lost | | Cause: |
|----------------|-----------|---------|---|
| | Hours | Minutes | |
| May 21st | 4 | 30 | Running slowly account of burned out lining on West pump motor. |
| May 25th | 1 | 10 | Broken conveyor belt. |
| May 29th | | 50 | Large rock lodged in crude ore pocket. |
| May 31st | | 30 | Ore chute plugged. |
| June 1st | 1 | | No water - foot valve plugged. |
| June 5th | 1 | 50 | Loading chute West side out of order. |
| | | 45 | Suction pipe plugged - no water. |
| June 8th | | 30 | Yards plugged with ore. Waiting for Great Northern to pull loads. |
| June 11th | 1 | | Car overloaded - filling up tracks. |
| June 13th | 1 | | Waiting for ore. Too much rock in bank at Bovey shovel. Snyder shovel cut out. |
| June 26th | 1 | | Waiting for Great Northern empties. |
| June 27th | 1 | | Repairing Symons crushers. |
| June 28th | 1 | | Repairing rock gun. |
| July 2nd | 4 | | 30-yard car overturned in crude ore pocket. |
| July 6th | | 25 | Repairing generator. |
| July 9th | 14 | 50 | Bad electric storm. Pit flooded. Operations curtailed at 4:10 P.M. No work night shift. |
| July 10th | 6 | 50 | Waiting for ore due to broken caterpillar clutch on shovel. |
| July 11th | | 30 | Waiting for Great Northern empties. |
| July 16th | 1 | 20 | Repairing Symons crushers. |
| July 17th | | 30 | Large rock lodged in crude ore pocket. |
| July 26th | 1 | 20 | Repairing Dorr washer, Symons crusher and 36" conveyor. |
| July 30th | 1 | 30 | Symons crushers plugged - running one side only. |
| | | 15 | Waiting for ore. |
| August 1st | | 30 | No power. |
| | | 20 | Repairing 24" conveyor. |
| | | 20 | Greasing Dorr washers. |
| August 2nd | | 50 | Repairing Dorr washers. |
| August 3rd | | 40 | Repairing 8' pan conveyor. |
| August 6th | | 25 | Repairing vibrating screens. |
| August 21st | | 30 | Repairing Dorr washers. |
| | | 20 | Repairing chutes under grizzly. |
| September 27th | 2 | 15 | Waiting for loads to be pulled by Great Northern. |
| | 2 | 30 | Running one side only account of water shortage. |
| Total Delays, | 56 | 15 | |

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YEAR 1934.

3. ANALYSIS:

a. Mine Analysis of Production & Shipments:

| | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mang.</u> | <u>Alu.</u> | <u>Moist.</u> | <u>Iron Nat.</u> |
|---------------------------|----------------|--------------|--------------|-------------|--------------|-------------|---------------|------------------|
| Snyder Non-Bess. Concts. | 116,731 | 57.87 | .073 | 8.51 | .52 | .45 | 8.71 | 52.83 |
| Snyder Bess. Concts. | 141,454 | 58.41 | .041 | 8.95 | .37 | .47 | 8.23 | 53.60 |
| Bovey Non-Bess. Concts. | 135,256 | 57.57 | .091 | 10.45 | .28 | .45 | 7.37 | 53.33 |
| Bovey Bess. Concts. | 21,314 | 57.78 | .044 | 11.50 | .28 | .61 | 7.64 | 53.37 |
| Hemmens Non-Bess. Concts. | 6,792 | 57.08 | .056 | 10.73 | .22 | .46 | 8.02 | 52.50 |
| Hemmens Bess. Concts. | 8,595 | 57.77 | .047 | 9.53 | .20 | .41 | 7.64 | 53.36 |
| Total 1934, | 430,142 | 57.92 | .065 | 9.46 | .37 | .46 | 8.04 | 53.26 |

d. Average Analysis of Crude Ore Production:

| | <u>Tons</u> | <u>Iron</u> | <u>Phos.</u> | <u>Silica</u> |
|-------------------------|----------------|--------------|--------------|---------------|
| Snyder Crude, | 443,362 | 43.87 | .052 | 30.57 |
| Bovey Crude, | 244,812 | 44.26 | .071 | 30.53 |
| Hemmens Crude, | 22,956 | 46.10 | .059 | 27.11 |
| Total Crude Ore, | 711,130 | 44.08 | .059 | 30.44 |

e. Composite Analysis of Season's Shipments:

| | <u>Iron</u> | <u>Phos.</u> | <u>Sil.</u> | <u>Mang.</u> | <u>Alu.</u> | <u>Lime</u> | <u>Meg.</u> | <u>Sul.</u> | <u>Loss.</u> |
|---------------------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|-------------|--------------|
| Snyder: Non-Bess. Concts. | 58.00 | .071 | 8.40 | .52 | .46 | .12 | .12 | .017 | 7.05 |
| Snyder Bess. Concts. | 58.50 | .043 | 8.95 | .36 | .46 | .15 | .14 | .016 | 6.02 |
| Bovey Non-Bess. Concts. | 57.70 | .090 | 10.55 | .30 | .46 | .22 | .14 | .020 | 5.48 |
| Bovey Bess. Concts. | 57.90 | .045 | 11.40 | .30 | .62 | .20 | .10 | .017 | 4.40 |
| Hemmens Non-Bess. Concts. | 57.15 | .054 | 10.65 | .22 | .48 | .14 | .12 | .018 | 6.53 |
| Hemmens Bess. Concts. | 57.75 | .048 | 9.70 | .22 | .44 | .19 | .16 | .015 | 6.68 |

4. ESTIMATE OF ORE RESERVES:

a. Developed Ore:

Factors Used:

| | <u>Rock Deduction</u> | <u>Cu. Ft. Per Ton</u> | <u>% Recovery</u> |
|----------------------------|-----------------------|------------------------|-------------------|
| <u>N. Bovey:</u> | | | |
| Wash, ----- | 10% | 14 | 65% |
| Low Grade Wash, ----- | 10% | 15 | 65% |
| Rocky Wash, ----- | 20% | 14 | 65% |
| <u>S. Bovey:</u> | | | |
| Wash, ----- | 10% | 14 | 60% |
| Lean Wash, ----- | 10% | 14 | 50% |
| Low Grade Wash, ----- | 10% | 15 | 60% |
| Lean Low Grade Wash, ----- | 10% | 15 | 50% |

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4. ESTIMATE OF
ORE RESERVES:
(Continued)

a. Developed Ore: (Continued)

Factors Used:

| | Rock Deduction | Cu. Ft. Per Ton | % Recovery |
|----------------------------|-------------------|--------------------|---------------|
| <u>Hemmens:</u> | | | |
| Wash, ----- | 10% | 14 | 65% |
| Low Grade Wash, ----- | 10% | 15 | 65% |
| Lean Low Grade Wash, ----- | 10% | 15 | 50% |
| Rocky Wash, ----- | 20% | 14 | 65% |
| <u>Snyder:</u> | | | |
| Wash, ----- | 10% | 14 | 60% |
| Lean Wash, ----- | 10% | 14 | 50% |
| Low Grade Wash, ----- | 10% | 15 | 60% |
| Lean Low Grade Wash, ----- | 10% | 15 | 50% |
| Rocky Wash, ----- | 20% | 14 | 60% |

As the result of measuring the volume of ore removed during the season of 1934 and dividing this by the tonnage of ore, new factors were determined and these have been used in the estimates, as of January 1st, 1935.

| | WASH | LEAN WASH | LOW GRADE WASH | LEAN LOW GRADE WASH | ROCKY WASH | TOTAL |
|--|-----------|--------------|----------------------|---------------------------|---------------|-----------|
| <u>Snyder:</u> | | | | | | |
| SE ₁ -SE ₂ Sec.30, | 1,878,150 | 141,120 | 418,061 | 283,152 | 141,970 | 2,862,453 |
| SW ₁ -SE ₂ " | 680,918 | - | 45,850 | - | 143,797 | 870,565 |
| SE ₁ -SW ₂ " | 240,192 | - | 10,763 | - | - | 250,955 |
| Total, ----- | 2,799,260 | 141,120 | 474,674 | 283,152 | 285,767 | 3,983,973 |
| <u>Bovey:</u> | | | | | | |
| NW ₁ -SE ₂ Sec.30, | 95,345 | - | 73,719 | - | 188,163 | 357,227 |
| NE ₁ -SE ₂ " | 347,002 | - | 64,272 | - | 14,278 | 425,552 |
| NE ₁ -NE ₂ " 31, | 565,898 | 37,532 | 119,701 | 8,784 | - | 731,915 |
| Total, ----- | 1,008,245 | 37,532 | 257,692 | 8,784 | 202,441 | 1,514,694 |
| <u>Hemmens:</u> | | | | | | |
| SW ₁ -SW ₂ Sec.29, | 899,563 | - | 44,517 | 117,216 | 122,779 | 1,184,075 |
| GRAND TOTAL, --- | 4,707,068 | 178,652 | 776,883 | 409,152 | 610,987 | 6,682,742 |

Based on the results obtained from our structure drilling campaign during the summer and fall of 1934, it was necessary to make some changes in our ore classification, which resulted in reducing by approximately 550,000 tons, the merger estimate made in 1932. This reduction in

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4. ESTIMATE OF
ORE RESERVES:
(Continued)

a. Developed Ore: (Continued)

tonnage was effected, even though the factors developed from the year's operation were more favorable. The reductions in tonnage effected the Hemmens and Bovey No. 2 ore bodies.

c. Estimated Analyses:

| | <u>Iron</u> | <u>Phos.</u> | <u>Silica</u> | <u>Moist.</u> | <u>Fe. Nat.</u> |
|---------------|-------------|--------------|---------------|---------------|-----------------|
| Bessemer, | 58.61 | .037 | 10.05 | 8.00 | 53.92 |
| Non-Bessemer, | 57.49 | .090 | 10.26 | 8.00 | 52.89 |

The Bessemer ore shows a Phosphorus content of .037 and on this basis - not over 40% of the product from the Canisteeo Mine would be Bessemer. Considering all Bessemer ore as running .045 Phosphorus, approximately 50% of the total tonnage could be shipped as Bessemer, by working in some of the lower Phosphorus ore, which is set up above as Non-Bessemer, with the low Phosphorus-content Bessemer product.

5. LABOR & WAGES:

a. Comments:

(1) Labor:

Skilled and common labor was plentiful in the Canisteeo district during the year 1934 and no trouble was experienced with the Canisteeo Mine employees. Operations throughout the year were conducted strictly in accordance with the Mining Code.

The Employees' Representation Plan functioned during the year and the regular annual election was held and the organization completed.

b. Comparative Statement of Wages & Product:

| | |
|--------------------------------|---------------|
| Production, (Concentrates) | 430,142 tons. |
| Number of days operated:- | |
| 3, 8-hour shifts per day, | 70 |
| Average Daily Product, | 6,145 tons. |
| Average number of men working, | 213 |
| Average wage per day, | 4.61 |
| Amount paid for labor, | \$ 94,390.99 |

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6. SURFACE:

a. Buildings, Repairs:

No repairs were necessary to the buildings at the Canistee Mine during the year 1934.

c. Tracks, Roads, Transmission Lines:

(1) Tracks:

A crew of sixteen track men were engaged on April 18th in ditching, opening culverts and filling wash-outs. This force was increased to thirty men on April 24th and from then until the middle of May - they were engaged in conditioning the main line tracks, as well as the pit and dump tracks. A spur was laid to the North of the Bovey pit to accommodate such jig material as might be encountered on the North Bovey forty during the ore season.

In June, 3,000 feet of track was laid from the mine yards across the Morrison forty to the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 30, to provide a lean ore dump for material requiring stockpiling - that was encountered and could not be washed in mining on the Bovey lands.

Upon the completion of the ore season, the latter part of August, the track gang was employed in reconditioning the approach tracks and the lines leading to the waste dumps. Four thousand ties were replaced in the approach and two 12 degree curves were entirely retied. Oak ties were used on these curves.

When the stripping program was finished on December 21st, all dump and pit tracks were picked up and blocked - to facilitate work in the spring. A track was laid in to the new drainage shaft in the Hemmens pit.

No other than the usual maintenance work was required on the roads or transmission lines.

7. OPEN PIT:

a. Stripping:

During the fore part of May a clean-up cut was made along the North side of the Snyder island to take care of slough paint-rock and to remove the windrows of waste material which had been left along the pit bottom during the Oliver Iron Mining Company's operations.

A sinking cut was made along the East line of the Snyder pit and extended in to the Hemmens, in order to provide for a switch-back and allow for greater depth of mining in the Snyder area. A total of 24,110 cubic yards of paint-rock and waste material was moved in connection with this work. In addition, 1,620 yards of slough material was removed from the approach tracks by the gasoline shovel.

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)

The fall stripping operations were started the first of October. Three, 8-hour shifts were worked, four days per week on this job until December 21st. During the month of October, stripping operations were conducted on the upper benches adjacent to the corner where the Bovey, Snyder and Hemmens properties come together. This work was largely in paint-rock and one of the "120" electric shovels was utilized. While track work was in progress for the accommodation of the stripping job at a lower elevation, several short cuts were made in the pit bottom in the vicinity of the Snyder-Hemmens boundary.

During November, the work on the upper bench was completed and the "120" electric shovel was moved down to the Hemmens pit bottom. The Hemmens stripping to provide a permanent switch-back at the East end of the pit was completed and a run-down provided from the switch to cut across the Hemmens to the West and down in to the Snyder pit bottom. This work was practically completed in November and during the first week in December the electric shovel was moved over to the Snyder island area. A sinking cut was taken 50 feet back from the North side of the unstripped area, the track shifted down in to this cut and the full cut made along the North side. The stripping operations were in rather restricted areas, with the exception of the Snyder cuts and the work was accompanied by a large amount of track shifting. Considerable hard rock was moved in connection with the paint-rock stripping in the Bovey and Hemmens areas. Some of the slough material handled in the Hemmens pit was saturated with water and this slowed up operations to some extent.

The following tabulation shows the classification of material stripped during the year 1934:

| <u>LEASE</u> | <u>WASTE MATERIAL</u> <u>(CU. YDS.)</u> | <u>LEAN ORE</u> <u>(CU. YDS.)</u> | <u>PAINT-ROCK</u> <u>(CU. YDS.)</u> | <u>SURFACE</u> <u>(CU. YDS.)</u> | <u>TOTAL</u> <u>(CU. YDS.)</u> |
|--------------|--|--------------------------------------|--|-------------------------------------|-----------------------------------|
| Snyder, | 34,483 | 27,086 | 77,985 | - | 139,554 |
| Bovey, | 13,004 | 5,572 | 47,120 | 1,620 | 67,316 |
| Hemmens, | 15,984 | 16,704 | 106,535 | - | 139,223 |
| Total, | 63,471 | 49,362 | 231,640 | 1,620 | 346,093 |

Of this material, 27,330 cubic yards were removed during the month of May and 318,763 cubic yards during the months of October, November and December.

The Iron Dried analyses of the waste ore material was 28.24% and the paint-rock 30.72%. This ore material and paint-rock could not be treated commercially.

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7. OPEN PIT:
(Continued)

a. Stripping: (Continued)

A total of 11,158, - 30-yard capacity cars of material was taken from the pit, the average quantity per car being 28.57 cubic yards.

The estimated cost per yard was \$.30, but an actual cost of less than \$.23 per yard was realized.

d. Timbering:

The following statement shows the number of ties used at the Canisteco Mine during the year 1934:

| <u>Amount:</u> | <u>Kind:</u> | <u>Price</u> | <u>Cost</u> |
|--------------------------|----------------------------|--------------|-----------------|
| 1,686 | Standard 8 x 8 - 8' #1, | .93104 | \$ 1,569.74 (1) |
| 733 | " " " | .80 | 586.40 |
| 1,518 | " " " | .85 | 1,290.30 |
| <u>1,328</u> | " " " #2, | <u>.40</u> | <u>531.20</u> |
| Total, 5,265 | Tamarack and Jack Pine, | .7554 | \$ 3,977.64 |
| 108 | Standard 8 x 8 - 8' Oak, | 1.00 | 108.00 |
| <u>1,014</u> | " " " | <u>1.05</u> | <u>1,064.70</u> |
| Total, 1,122 | Oak, | 1.0451 | 1,172.70 |
| Total & Average 6,387 | | .8063 | \$ 5,150.34 |
| 3 | Sets Jackpine Switch Ties, | | 360.00 |
| <u>1</u> | " Oak " | | <u>100.00</u> |
| Total, 4 | Sets | 115.00 Set | \$ 460.00 |

(1) Balance on hand Inventory 1933. No ties on hand as of 12-31-34.

All ties charged to miscellaneous mine end dump tracks during ore operating season.

f. Explosives, Drilling & Blasting:

Statement of Explosives Used:

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7. OPEN PIT:
(Continued)

f. Explosives, Drilling & Blasting:

| <u>KIND</u> | <u>QUANTITY</u> | <u>PRICE</u> | <u>AMOUNT</u> |
|------------------------------------|-----------------|--------------|------------------|
| 60% DuPont Special Gel. 1-1/8 x 8, | 750 Lb. | 12.00 | 90.00 |
| 60% R.C. Extra 7/8 x 8, | 500 | 11.50 | 57.50 |
| 40% R.C. Extra 1-1/4 x 8, | 1,500 | 10.00 | 150.00 |
| 40% DuPont Special Gel. 1-1/8 x 8, | 750 | 10.50 | 78.75 |
| DuPont Extra "C" 3-1/2 x 10, | 17,500 | 11.25 | 1,968.75 |
| 25% Quarry Gel. 3 x 10, | 89,500 | 9.50 | 8,502.50 |
| R.C. Blasting No.4 Bag, | 23,000 | 10.00 | 2,300.00 |
| Crescent Fuse, | 6,000 Ft. | 6.45 | 38.70 |
| 4' No. 6 E.W. Caps, | 500 | 5.15 | 25.75 |
| 18' No. 6 E.W. Caps, | 1,000 | 8.651 | 86.51 |
| 30' No. 6 E.W. Caps, | 1,750 | 11.65 | 203.88 |
| 40' No. 6 E.W. Caps, | 600 | 15.40 | 92.40 |
| 12' 2nd. Delay #6 E.B. Caps, | 200 | 10.75 | 21.50 |
| 12' 3rd. Delay #6 E.B. Caps, | 200 | 11.05 | 22.10 |
| 12' 4th. Delay #6 E.B. Caps, | 200 | 11.35 | 22.70 |
| 12' 5th. Delay #6 E.B. Caps, | 200 | 11.65 | 23.30 |
| DuPont No. 6 Blasting Caps, | 2,000 | 11.20 | 22.40 |
| Connecting Wire No. 20, | 100 lbs. | .40 | 40.00 |
| DuPlex Lead Wire, | 500 Ft. | 1.40 | 7.00 |
| GRAND TOTAL, | | | \$ 13,753.74 |

g. Open Pit Mining & Loading:

The No. 35 electric shovel started ore loading on the 14th of May, attacking the upper layer of wash ore along the West side of the Snyder pit. This particular area contained about 55,000 tons and had been left in the previous season's operations on account of its rather lean character and the inability to absorb it and make the desired grade. Several cuts were taken across this area and the tonnage exhausted the fore part of June. The shovel was then moved to the East side of the Snyder pit. Two sinking cuts were made along the South side of the Snyder area from the Hemmens boundary line, West to the rock island, which had not been stripped. These cuts were approximately 8 feet in depth, the second one affording a drainage channel some 16 feet below the former mining level and taking care of the flow of water from the West end of the pit. A third cut was made in this area with a bank varying from 12 to 16 feet. The shovel was shifted to the North side of the area and cuts made to the West until the rock horse was encountered. Additional cuts were made during the season along the East end of the Snyder pit, being fanned to the Southward in the high grade wash ore.

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7. OPEN PIT:
(Continued)

g. Open Pit Mining & Loading:

The ore in the upper benches of the Snyder was somewhat lean and low grade, but the quality and weight recovery improved with depth and a good average concentrate was realized. Some rather leaner ores have been left in the upper levels in the Snyder pit, but they can be mined to advantage with the higher grade material underlying them - during the next season.

The No. 32 shovel was moved to the Canisteeo from the Holman Mine and set up in the Bovey pit during the fore part of May. This shovel started operating along the Walker Mine line, the first work undertaken being to cut a permanent run-down grade leading to the operations in the Snyder pit bottom. In the sinking cuts across the area a high Silica wash and jig ore was encountered. The latter material was stocked in the North end of the Bovey pit. During the season the shovel worked alternately on the high Silica upper wash area in the vicinity of the Snyder and Hemmens boundaries and the higher grade wash ore area at the North end of the Bovey pit. The machine was utilized week-ends upon several occasions in handling paint-rock, which dipped Southward and separates the upper and lower wash ores. The upper wash ores were exhausted in July and during the month of August all mining with this shovel was carried on at the North end of the Bovey pit.

The ore in the upper wash layer in the Bovey-Snyder-Hemmens area was a high Silica Bessemer wash, with a low weight recovery. The upper layer of ore at the North end of the Bovey pit was nearly all non-Bessemer, while the 10 to 15 foot layer immediately below the paint-rock was practically all Bessemer. The ore in this area was of satisfactory grade and showed a relatively high weight recovery.

In addition to the pit rock, which was moved during the season, there were 22,650 yards of paint-rock and waste material, 5,600 tons of lean wash ore and 11,750 tons of jig ore handled and either stocked or wasted, depending upon the analyses. This ore material was handled in connection with ore operations and charged into the cost of production. The 11,750 tons of jig ore was stocked in the North end of the Bovey pit and the 5,600 tons of lean wash ore was stocked on the Bovey lean ore dump. Of the 22,650 yards of paint-rock and waste ore hauled to the dump, 16,407 yards of paint-rock was taken from the Bovey; 2,310 yards from the Hemmens and 3,870 yards from the Snyder.

The ore cuts during the season of 1935 will be of considerably greater average length and while there will be some non-washable material to be handled in connection with the mining operation, it will be cared for to better advantage and the track work will be somewhat reduced.

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7. OPEN PIT:
(Continued)

k. Pit Drainage:

The pit water was drained to the old Oliver sump at the South side of the Snyder pit during 1934. The mud and fine silt was cleaned out of the sump with the gasoline shovel, rigged with its dragline equipment and clam shell attachment. The old drainage cuts leading to the sump were cleaned out with the gasoline shovel, but the arrangement was somewhat unsatisfactory, due to the constant shifting of mud and silt which was carried into and filled the sump after each heavy rain storm. This resulted in considerable ditch and sump work in the pit throughout the season.

In order to insure proper drainage and to get away from the difficulties experienced with the open cut sumps, an 8 x 12 shaft was sunk in a barren area in the Southeast corner of the Hemmens pit. This shaft was put down 45 feet through taconite and paint-rock and 21 feet of fine lean ore material, totalling a depth of 66 feet below the pit bottom. A 50-foot drift will be extended Westward at a depth of 57 feet - 6" holes will be put down from the pit bottom to this drift and cased, to take care of the pit water. The casing pipe will be extended a short distance above the ground, so that the silt and fine material washed into the pit will be accumulated in the pit bottom and not be carried down into the drift and interfere with pumping operations in the bottom of the shaft. The pumping operations from the shaft should take care of the pit drainage problems for at least the next two years.

8. COST OF OPERATION:

a. Comparative Mining Costs:

| | <u>1 9 3 4</u> | <u>1 9 3 3</u> |
|---|-----------------|-----------------|
| <u>PRODUCT:</u> | | |
| Concentrates, ----- | 430,142 tons | 302,326 tons |
| Average Daily Production, (Concts.)----- | 6,058 " | 4,799 " |
| Tons Per Man Per Day, (Concentrates)----- | 21.00 | 16.43 |
| Days Operated, ----- | 70 | 63 |
| <u>COST:</u> | | |
| <u>Total Cost at Mine:</u> | | |
| Open Pit Wash Ore (Concentrates)----- | \$.225 | \$.215 |
| General Pit Expense, ----- | .095 | .070 |
| Concentrating, ----- | .181 | .156 |
| General Mine Expense, ----- | <u>.113</u> | <u>.097</u> |
| Cost of Production, ----- | .614 | .538 |
| Depreciation, Plant & Equipment, ----- | .250 | .250 |
| Depreciation, Movable Equipment, ----- | .001 | .003 |
| Amortization, Stripping, ----- | .315 | .315 |
| Taxes - Ad Valorem, ----- | .111 | .155 |
| " - Occupational, ----- | .040 | .040 |
| " - Royalty, ----- | .022 | .011 |
| Total Cost at Mine, ----- | \$ <u>1.353</u> | \$ <u>1.312</u> |
| Administrative & Miscellaneous Expense, ----- | <u>.108</u> | <u>.106</u> |
| GRAND TOTAL, ----- | \$ 1.461 | \$ 1.418 |