

AUSTIN SURFACE.

The permanent trestle from No. 2 Shaft to No. 2 loading pocket was completed early in the year. Work was also completed on the headframe at No. 2 Shaft, where the pocket for loading ore into top tram car was built and timbers and rails installed for skip-dump. An air-operated door for closing pocket in the headframe was installed.

Erection of No. 2 engine house was started in February, excavations being made at this time for the hoist foundations. The forms for foundations were installed in March and concrete work done later in the summer. Work was continued during the summer on No. 2 engine house, the hoisting engine being moved in and set on foundations; the electric motor, switchboards, etc., were installed when No. 1 Shaft and engine house were abandoned in November.

Tram tracks leading from No. 1 Shaft to No. 2 loading pocket were installed in May, in order that ore might be shipped, as the railroad tracks to No. 1 Shaft had to be removed on account of caving ground.

During the time that No. 1 Shaft operated, rock was handled by the old gravity tram from the shaft. The trestle leading to the old rock dump finally became dangerous due to rotting of caps and stringers, so several new bents were erected for stocking rock.

The location of new stocking grounds, removed from the territory liable to cave on account of mining the shaft pillar, was determined when the diamond drill hole put down from surface showed no extension of the ore body to the North-east of the limits found on the 5th sub above the 1st Level.

The work of grading the new ground was started the last of July, and continued until completed in October. A sollar was made by laying 1" hardwood plank on the sand. A stocking trestle was built the length of the new ground and equipped; this work also being completed in October. There were 24 bents erected, five of which were part of the permanent trestle and nineteen for stocking ore. Stocking of ore started on October 1st and was

continued until the mine closed down on November 19th.

The bell-signal system were installed in No. 2 Shaft, at No. 2 head-frame and in No. 2 engine house, in September; also lighting and telephone systems.

The top tram plant was installed and put in operation on May 22nd, when shipping started. It was used to transfer ore from No. 1 Shaft to No. 2 loading pocket. When ore was stocked, starting October 1st, the top tram rope was transferred from the trestle to No. 2 loading pocket, to the stocking trestle. Up to this time the operating equipment had been located in the old top tram engine house on the landing at No. 1 Shaft. A new top tram engine house was made out of a small temporary engine house near No. 2 Shaft, which gave the operator a clear view of the tram car at all times. The cave that came through to surface on October 30th, was very near to the tram engine house, which had to be moved to a safe location.

The cave between No. 1 and No. 2 Shafts, which first appeared on October 30th, was enlarged on November 7th, and undermined the tracks leading from No. 1 Shaft to the stocking grounds. It became necessary to abandon No. 1 Shaft and transfer operations to No. 2 Shaft. The transfer was made in a week. No. 2 Shaft operated for only five days, when orders were received to close the mine.

When No. 1 Shaft was abandoned it was decided to dismantle the shaft house, removing the good timber, head sheaves, tie rods, plates in loading pockets, skip-dump plates, runners, etc. At the end of the year this work had been nearly completed. It is planned to blast the old shaft house down as it would soon fall and is a menace while standing.

The old trestles at No. 1 Shaft have been dismantled and all good material salvaged.

The transmission line from the sub-station at the Central Power Plant to Gwinn sub-station and mines, crossed the new stocking grounds. There was not enough clearance for erection of trestles, so that a longer pole had to be

provided on one side and a pole put on top of No. 2 loading pocket to raise the wires on the other side. The lighting line to the Austin Location also crossed the stockpile grounds and it was moved to another location. A power line was installed from the transmission line over to No. 2 engine house.

DIAMOND DRILLING

In order to locate stocking grounds for the ore hoisted after shipping stopped, it was decided to drill one hole from surface. It was drilled in July, being located about 40 feet North-east of the footwall on the 5th sub above the 1st Level. The material encountered in this hole was as follows:

Sandstone,	0 to 12'
Conglomerate,	12' " 18'
Chert,	18' " 30'
Gray Slate,	30' " 51'
Black Slate,	51' " 66'

No ore was encountered in this hole and it was decided to locate the new stocking grounds immediately North-east of this point.

ACCIDENT TO EQUIPMENT

At 10:00 P. M., March 13th, 1923, while hoisting, a loaded skip caught under a wall plate and pulled the hoisting drum out of the engine room through the wall of the building. The main bearings on the hoist were broken, and also the brake bands. This was a very unusual accident, ordinarily when the skip catches in the shaft, the hoisting rope breaks. The mine was idle on March 14th, while repairs were being made, work being resumed on March 16th.

AUSTIN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Austin Bessemer,	63.47	.049	-	-
Austin,	63.14	.095	4.88	.359
Austinport,	61.71	.315	5.25	.357
Austinwood,	59.07	1.206	3.47	.262

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	Mine PHOS.	SILICA	MANG.
Austin Bessemer,		(All Mixed)		
Austin,		(All Mixed)		
Austinport,		(All Mixed)		
Austinwood,		(No Shipments)		

ORE STATEMENT - DECEMBER 31ST, 1923.

	AUSTIN BESSEMER	AUSTIN	AUSTIN- PORT	AUSTIN- WOOD	TOTAL	TOTAL LAST YEAR
On hand January 1, 1923,	24,154	-	30,656	-	54,810	8,970
Output for Year,	22,931	-	56,835	2,672	82,438	50,905
Transferred,	16,330	14,814	1,516	-	-	-
Stockpile Overrun,	538	-	-	-	538	-
Total,	31,293	14,814	89,007	2,672	137,786	59,875
Shipments,	30,937	14,814	48,802	-	94,553	5,065
Balance on Hand,	356	-	40,205	2,672	43,233	54,810
Increase in Output,					32,071	
Decrease in Ore on Hand,					11,577	

1923 -- 2-8 Hour Shifts, Jan. 1st to July 1st, 1923.
 1-8 Hour Shift, July 2nd to Nov. 19th, 1923.
 Mine Idle Nov. 20th to Dec. 31st, 1923.

1922 -- Mine Idle Jan. 1st to June 4th, 1922.
 2-8 Hour Shifts, June 5th to Dec. 31st, 1922.

AUSTIN MINE

SHIPMENTS FOR YEAR-1923.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Austin Bessemer,	6,252	24,685	30,937	2,211
Austin,	1,363	13,451	14,814	140
Austinport,	27,520	21,281	48,801	2,714
Austinwood,	-	-	-	-
Total,	35,135	59,417	94,552	5,065
Total Last Year,	5,065	-	5,065	
Increase,			89,487	

AUSTIN MINE

COMPARATIVE MINING COST FOR YEAR

	1923	1922	INCREASE	DECREASE
PRODUCT	82,976	50,905	32,071	
Underground Costs	1.443	1.327	.116	
Surface Costs	.405	.271	.134	
General Mine Accounts	.188	.150	.038	
Cost of Production	2.036	1.748	.288	
Plant Account		.037		.037
Equipment	.009		.009	
Taxes	.077	.039	.038	
Central Office	.108	.079	.029	
Contingent Expense	.012	.008	.004	
Cost Adjustment	.015	.015		
Cost on Stockpile	2.257	1.926	.331	
Loading & Shipping	.119	.011	.108	
Total Cost on Cars	2.376	1.937	.439	
No. Days Operating	258	172	86	
No. Shifts & Hours	2-8 1-8	2-8hr		
Avg. Daily Product	322	296	26	
<u>COST OF PRODUCTION</u>				
Labor	1.405	1.308	.097	
Supplies	.631	.440	.191	
Total	2.036	1.748	.288	

NOTE: Production started June 5, 1922.

AUSTIN MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	82,976	50,905	32,071	
No.Shifts & Hours	2-8:1-8	2-8hr		
AVG.NO.MEN WORKING				
Surface	23	12	11	
Underground	58	40	18	
Total	81	52	29	
AVG.WAGES PER DAY				
Surface	4.15	3.70	.45-10.8%	
Underground	4.79	4.25	.56-11.7%	
Total	4.60	4.11	.49-10.7%	
WAGES PER MO. OF 25 DAYS				
Surface	103.75	92.50	11.25	
Underground	119.75	106.25	13.50	
Total	115.00	102.75	12.25	
PRODUCT PER MAN PER DAY				
Surface	11.71	13.31		1.60
Underground	4.72	4.32	.40	
Total	3.36	3.26	.10	
LABOR COST PER TON				
Surface	.354	.278	.076	
Underground	1.015	.985	.030	
Total	1.369	1.263	.106	
AVG.PRODUCT BRK'G & TRM'G	7.53	7.05	.48	
" WAGES CONTRACT MINERS	4.88	4.33	.55	
" " " TRAMMERS	5.14	4.60	.54	
" " "	4.89	4.36	.53	
TOTAL NO.DAYS				
Surface	7,085½	3,823	3,262½	
Underground	17,589	11,794	5,795	
Total	24,674½	15,617	9,057½	
AMOUNT FOR LABOR				
Surface	29429.27	14157.89	15271.48	
Underground	84234.74	50137.58	34097.16	
Total	113664.11	64295.47	49368.64	

Proportion Surface to Underground Men:

1923 - 1 to 2.52
 1922 - 1 to 3.3
 1921 - 1 to 2.1
 1920 - 1 to 3.2

No producing in 1918 on account of flood.
 Started production on small scale again in August, 1919. Closed again Dec.31, 1919.
 Not operated during 1920 or 1921. Production started June 5, 1922, - 2 8-hr shifts. Changed to 1-8hr July 2, 1923.

AUSTIN MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1923

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1923	AMOUNT 1922
4" to 6" Timber	2,239	.01384	31.00	40.54
6" to 8" "	36,822	.03701	1,362.77	294.53
8" to 10" "	36,141	.07157	2,586.53	1,080.27
10" to 12" "	7,685	.09356	719.04	866.76
12" to 14" "	1,366	.12644	172.72	507.75
14" to 16" "				44.58
Total Timber - 1923	84,253	.05782	4,872.06	
" " 1922	47,704	.0594		2,834.43
	LINEAL FEET	PER 100'		
5' Lagging	273,912	.818	2,242.18	1,187.06
7' "	21,507	.7245	155.83	
8' "	38,672	.649	251.03	397.38
Total Lagging	334,091	.793	2,649.04	1,584.44
Poles	73,504	1.11	814.31	394.59
Total Lagging & Poles - 1923	407,595	.849	3,463.35	
" " " " 1922	249,539	.793		1,979.03
5/8" Covering Boards (feet)	24,482	1.3567	332.14	136.78
Product			82,976	50,905
Feet of timber per ton of ore			1.015	.936
" " Lagging "			4.027	4.168
" " " per foot of timber			3.967	4.448
Cost per ton for timber			.0587	.0557
" " " " lagging			.0319	.0311
" " " " poles			.0098	.0077
" " " " covering boards			.0040	.0027
" " " " timber, lagging, poles & boards			.1044	.0972
Equivalent of stull timber to board measure			117,556	98,682
Feet of board measure per ton of ore			1.417	1.938
Cost for timber, lagging and boards - 1923				8,667.55
1922				4,950.24

Mine worked 6 days per week Jan. 1st, to July 1st - 2 shifts
 " " 6 " " " " July 1st, to Nov. 19th - 1 shift
 Mine idle November 19th, to December 31st, 1923.

AUSTIN MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

KIND	QUANTITY	AVERAGE PRICE	AMOUNT 1923	AMOUNT 1922
40% Powder	1,800	.1348	242.62	1,507.78
50% "	22,050	.1451	3,199.87	542.45
60% "	1,200	.1702	204.24	9.00
Total Powder	25,050	.1455	3,646.73	2,059.23
Fuse	84,500	.6387	539.01	299.52
Caps	18,100	1.16	208.49	132.45
Cap Crimpers	20	.50	10.00	3.52
Tamping Bags	1,500	2.15	3.23	0
Total Fuse, Etc.			760.73	435.49
Total All Explosives			4,407.46	2,494.72
Product			82,976	50,905
Pounds Powder per ton of Ore			.502	.297
Cost per ton for Powder			.044	.0404
" " W " Fuse, Etc.			.009	.0085
" " " " All Explosives			.053	.0489
Average price per pound for Powder			.1455	.1391

Mine operated 6 days per week Jan. 1st, to July 1st - 2 shifts
 " " 6 " " " July 1st, to Nov. 19th - 1 "
 Mine idle Nov. 19th, to Dec. 31st, 1923.

STEPHENSON MINE

The mine operated on single shift throughout the year, ore being hoisted on both day and night shifts. Only a few men worked underground at night, loading, tramping and hoisting the ore and a small crew of landers on surface. Handling of ore underground is much improved by emptying all the chutes each 24-hour period.

The product by months for the year was as follows: (Includes ore hoisted from C. & N. W. Ry. Co. Lease):-

January,	22,154 tons
February,	18,052 "
March,	20,722 "
April,	20,408 "
May,	19,386 "
June,	18,541 "
July,	20,687 "
August,	21,238 "
September,	20,045 "
October,	21,669 "
November,	22,155 "
December,	<u>21,174 "</u>
 Total Ore,	 246,231 tons
Rock,	<u>19,980 "</u>
Total Hoist, Ore and Rock,	266,211 "

The average monthly product was 20,519 tons. The product for 1923 was the largest since 1917. In 1922, the product was 199,223 tons, the increase in 1923 was 47,008 tons.

The ore statement, showing the amount on hand January 1st, 1923, the output for the year, shipments for the year and the amount on hand January 1st, 1924, is as follows:

	STEPH. BESS.	STEPH. NO. 1	STEPHEN- SON	STEPHEN- WOOD	NORTH- DALE	TOTAL
On Hand Jan. 1, 1923	13,541	0	205,625	14,095	7,104	240,365
Output for Year,	19,266	5,770	221,868	0	308	247,212
Total,	<u>32,807</u>	<u>5,770</u>	<u>427,493</u>	<u>14,095</u>	<u>7,412</u>	<u>487,577</u>
Shipments, 1923,	<u>31,178</u>	<u>5,770</u>	<u>37,420</u>	<u>0</u>	<u>0</u>	<u>74,368</u>
In Stock Jan.1,1924	1,629	0	390,073	14,095	7,412	413,209

The output for the year includes 981 tons overrun from Stephenson Bessemer stockpile.

Shipments in 1923 were only 74,368 tons as compared with 202,522 tons in 1922. On account of the small shipments, the ore in stock increased 172,844 tons.

The Bessemer product was slightly greater than in 1922, but nearly 40,000 tons lower than in 1921. The main deposit which contains the only ore now available for mining, is not yielding ore of Bessemer grade.

In 1923, only 308 tons were mined from the C. & N. W. Ry. Co. Lease, Section 29, as compared with 7,089 tons in 1922. Nearly all ore on this lease is unavailable until the water, overlying the ore body, is removed or new levels opened at greater depth.

The ore in sight on December 31st, 1923, was as follows:

	<u>STEPH. BESS.</u>	<u>STEPH. NO. 1</u>	<u>STEPHEN- SON</u>	<u>TOTAL</u>
Ore above 1st Level,	0	0	4,858	4,858
" " 4th "	0	0	72,813	72,813
" " 5th "	40,000	20,000	72,570	132,570
" " 6th "	90,000	30,000	332,100	452,100
Developed Ore,	130,000	50,000	482,341	662,341
Prospective Ore below 6th,	15,000	15,000	60,114	90,114
TOTAL ORE,	145,000	65,000	542,455	752,455

The estimated tonnage in the mine, sub-divided as required by the Tax Commission, is as follows:-

Bessemer Ore:			
Developed:	1. Stephenson Bessemer,	130,000 tons	
Prospective: 1.	" "	<u>15,000</u>	"
Total Bessemer Ore,			145,000 tons
Non-Bessemer Ore:			
Developed:	1. Stephenson No. 1,	50,000	"
	2. Stephenson,	482,341	"
Prospective: 1.	Stephenson No. 1,	15,000	"
	2. Stephenson,	<u>60,114</u>	"
Total Non-Bessemer Ore,			<u>607,455</u> tons
GRAND TOTAL,			752,455 "

Another division of the ore in sight into available and unavailable, is given below. This division is based on the present conditions of the mine as regards the water in the over-burden. Certain areas cannot be mined unless the water level in the sand is lowered so at this time the division is fairly accurate. It is hoped to solve the water problem as the result of work now underway, which, if successful, will make it safe to mine, at least a part, if not all, of the ore which is now considered unavailable:

	<u>AVAILABLE</u>	<u>UNAVAILABLE</u>	<u>TOTAL</u>
Ore above 4th Level,	59,552	18,119	77,671
" " 5th "	57,923	74,647	132,570
" " 6th "	244,492	207,608	452,100
Developed Ore,	361,967	300,374	662,341
Prospective Ore below 6th,		90,114	90,114
GRAND TOTAL,	361,967	390,488	752,455

It is probable that by risking the safety of the mine, anywhere from 20% to 50% of the unavailable ore might be mined. The unavailable ore is divided into two bodies, one at the North-east end of the ore body, the other at the South-west end, where the Stephenson ore body passes over on C. & N. W. Ry. Co., Lease, Section 29 property. The mine was drowned out in 1917 by a sudden inrush of water on Section 29, near the ore considered unavailable on the South-west side, while on the North-east side an inrush of water, estimated at 700 gallons per minute, came in 1921, with the result that this area was sealed off from the rest of the mine by a concrete dam in the North-east haulage drift on the 5th Level. The flow of water on the South-west side has diminished during the past two years slightly, while no change is noticeable on the North-east side.

Some consideration has been given to the advisability of doing more mining on the North-east side to prove if the flow will increase. There is only 10 feet of water-bearing quicksand over part of this area, and it might be possible to extend the cave here with only a slight increase in the incoming water.

It is also probable that one-half or more of the prospective ore below the 6th Level might be safely mined if it is decided to take out as much ore as possible without flooding the mine, and then abandon the property.

The above table shows that all of the available ore on the Stephenson Lease will be mined within two years at the present rate of production.

If the work of getting the water to enter the mine under control is successful, the life of the mine may be extended from two to four years, depending on the amount of ore found below the 6th Level on both the Stephenson and C. & N. W. Ry. Co., Lease, Section 29, and also on how far the water can be lowered. The release for mining of any of the ore on the C. & N. W. Ry. Co., Lease, Section 29, by the lowering of the water level will prolong the life of the mine, as this ore will be mined in conjunction with the ore on the Stephenson Lease.

The ore in sight on the Stephenson Lease shows a decrease of 159,004 tons in 1923. The product in 1923 was 245,923 tons, so that there was actually 86,919 tons developed in 1923. This increase was due to development work on subs below the 5th Level, which made it possible to more accurately estimate the ore in this territory.

From the work done during 1923, it seems probable that practically no Bessemer ore will be obtained from mining the remaining available ore. The Bessemer ore is found near the ends of the two sides of the ore trough, unfortunately, both these areas are menaced by water and are, therefore, considered unavailable at this time.

Production costs during 1923, have been increased due to expense on account of the work of trying to gain control of the water overlying the ore body, charged under account "Pumping Machinery", and on account of expense for auxiliary engine house and sinking of auxiliary shaft on Section 29. These two items can be classified as "Extraordinary Expense". There was a reduction in expense in 1923, under account "Hoisting" and "Hoisting Equipment", due to changing hoists from steam to electric in 1922. The reduction in cost in 1923 for these two items was over 13¢ per ton. The total cost on cars in 1923 is approximately 10¢ less than in 1922.

The problem of gaining control of the water overlying the ore body was continued during 1923, and is not yet solved. The situation at the end of the year seems more favorable than at any previous time, and it is expected that this work will be brought to a successful conclusion early in 1924. It had been expected that when holes were made through to the quicksand the water would enter the mine, but this did not prove to be the case. During 1923, many schemes were tried to get the water to come, and the one underway at the end of the year, which will be completed by the third week of January, is practically the last one that can be attempted underground. If it should prove unsuccessful, further efforts at this place would have to be abandoned. Probably then the only feasible method will be to sink a shaft from surface and pump the water, with the hope that it can be lowered, at least, enough to render most of the ore on the Stephenson property available for mining.

Measurements of the water level in several standpipe holes on the Stephenson and C. & N. W. Ry. Co., property on Sections 20 and 29, have been made during the year. The following table give the record of these measurements:-

Elevation of Ledge:	<u>NO. C.</u>	<u>NO. W</u>	<u>NO. 54</u>	<u>NO. 59</u>	<u>NO. 61</u>	<u>NO. 66</u>
	1030.00	999.00	1066.00	959.00	949.00	876.00
Dec. 31st, 1922,	1034.20	1066.50	1067.20	1065.20	1059.80	1035.10
Feb. 7th, 1923,	1034.00	1066.50	1067.50	1065.10	1059.40	1034.50
Mar. 13th, "	1033.50	1066.30	1067.20	1064.70	1058.90	1032.30
Apr. 4th, "	1033.30	1065.90	1067.10	1064.40	1058.60	1024.60
May 2nd, "	Hole blocked	1066.80	1067.30	1065.20	1059.30	1022.80
June 4th, "	" "	1066.90	1067.40	1065.40	1059.30	1021.90
Sept. 5th, "	1034.70	1066.80	1076.80	1065.70	1060.70	1030.70
Oct. 3rd, "	1033.90	1066.60	1070.60	1065.30	1060.10	Hole Blocked
Nov. 7th, "	1033.30	1066.20	1069.70	1064.70	1059.40	" "
Net change for year,	Lowered 0.90 ft.	Lowered 0.30 ft.	Raised 2.50 ft.	Lowered 0.50 ft.	Lowered 0.40 ft.	Lowered 4.40 ft.
Net change, 1922,	3.60	1.40	Lowered 0.20	1.70	2.50	7.50

The above table shows that the general water level remained practically stationary during 1923, while it had been lowered in the previous year, in fact, in every year since 1919, when the mine was unwatered. This signifies that a level has been reached from which there will be only the seasonal variation until more water enters the mine. It is hoped to speedily solve this problem.

STEPHENSON LEASE - SECTION 20.

Work has been done during 1923 on the following sub-levels and main levels:

1ST AND 2ND SUB BELOW 3RD LEVEL
4TH LEVEL
4TH SUB BELOW 4TH LEVEL
5TH LEVEL
1ST, 2ND, 3RD AND 4TH SUBS BELOW THE 5TH LEVEL
6TH LEVEL.

1ST SUB BELOW 3RD LEVEL:

A pillar of ore had been left between the 4th and 3rd Levels when mining stopped here many years ago, to support the haulage drift from the shaft on the 4th Level. It was no longer necessary to keep this drift open, so it was decided to mine this pillar. Work was started on this sub-level in March and completed in August; the pillar mined was approximately 125 feet long by 100 feet wide. At one point on the footwall a small pillar of ore had been left on the 3rd Level. This pillar was mined from the sub-level.

2ND SUB BELOW 3RD LEVEL:

This sub-level was opened in August in the pillar which had been left to support the 4th Level haulage drift. Mining was continued for the balance of the year. This pillar is approximately 200 feet long, by 100 feet wide, at the North-east end and 160 feet wide at the South-west end. Less than one-half of the pillar had been mined at the end of the year. It is estimated that there are 7,313 tons of ore remaining to be mined on this sub-level. The output from the gangs working here has averaged considerably higher than for any other part of the mine. Working conditions here are as near ideal as is possible in the Stephenson Mine, as the ore body is wide and the ore is dry. Also owing to there being less broken capping above this territory, the timber does not tend to break, due to pressure, consequently, the tram drifts on subs stay open, with practically no retimbering until the ore is mined.

4TH LEVEL

The haulage drift from the shaft was repaired on the 4th Level in February and March. The ore which was mined on the 1st and 2nd subs below the 3rd Level was trammed to the shaft on the 4th Level. In July, it was decided to extend the 4th Level crosscut to the East, into the ore pillar, in order to put up several raises which would be used in mining the ore on the subs below the 3rd. The crosscut was extended and two raises put up, this work was completed in September. In November, the crosscut was again extended, in order that additional raises might be put up; this work was completed before the end of the year. During the year the crosscut was extended a total distance of 125 feet, 27 feet of which was in rock and 98 feet in ore. The pillar left to support the haulage drift is considerably larger on the 4th Level.

4TH SUB BELOW 4TH LEVEL:

Mining was started on this sub-level in 1921, continued through 1922, and completed in May, 1923. All the ore on this sub-level which has been classed as available ore, has now been mined.

5TH LEVEL

Mining of ore under the hanging on the 5th Level was started the latter part of 1921. During 1922, the greater part of the product was obtained from this level, as was also the case in January and February, 1923. By this time the greater part of the ore had been mined, so that the number of gangs working here gradually decreased, mining of the available ore on this level being entirely completed in December. All of the ore mined here during 1923 was handled through raises from the 6th Level. The pillars on the North-east side were mined early in the year, and for the balance of the year mining was concentrated on the South-west side of the ore body.

Considerable repair work was necessary to keep the old 5th Level haulage drifts open so that timber could be brought in to the contracts working

on the 5th Level and subs above.

On account of the crushing of a portion of the North-east haulage drift on the 5th Level, it was decided to drive a new haulage drift further back in the footwall. This drift was needed for bringing timber into the sub-levels below the 5th and also for the mining of ore now considered unavailable, if control is gained of the water overlying the ore. This new haulage drift was driven during the summer for a distance of 370 feet, at which point it holed again into the old haulage drift. It was necessary to abandon mining operations on the 2nd sub below the 4th, tying up the East end of the ore body, on account of the water which came in on this side of the mine in 1921. To handle this water it was necessary to cut a large ditch through the new haulage drift.

1ST SUB BELOW 5TH LEVEL:

The work of opening this sub-level was started in July, 1922; a few gangs worked here for the balance of the year, developing the sub-level under the hanging where mining was started. The number of gangs employed here gradually increased in 1923, until the greater part of the product was being obtained from this sub-level. Mining was continued for the balance of the year, by which time about 85% of the ore had been mined. At the end of the year it was estimated that there were 21,891 tons of available ore remaining on this sub-level, and 12,784 tons unavailable ore, which is on the South-west side near the point where the water came in that flooded the mine in 1917.

2ND SUB BELOW 5TH LEVEL:

The latter part of 1922 a small area was opened on this sub-level under the hanging, near the center of the ore body, to break the hanging, in order to bring the water to this sub-level and make the sub-level above more dry. This work was continued in 1923, and after a fair-sized area had been mined and caved, the water came, permitting work to be carried on to better advantage on the sub-level above. In July, additional contracts were moved

to this sub-level and regular mining started under that portion of the 1st sub where mining had been completed. During the year there was an area approximately 160 feet by 160 feet in size mined on the North-east side of the ore body. The balance of this sub-level is now being opened for mining, gangs from the 1st sub being moved down as work is completed. At the end of the year it was estimated that there were 40,526 tons of available ore remaining to be mined on this sub-level, and 21,855 tons which is not now available on account of water in the over-burden. At the present rate of mining it is estimated that all ore on this sub-level will be removed during the coming year. The area of the ore body on this sub-level is smaller than on the 1st sub, and is probably not over 55% of the size of the ore body on the 5th Level.

3RD SUB BELOW 5TH LEVEL:

This sub-level was opened in 1923, work being started in January and continued through the year. The ore was outlined under the hanging which, owing to its flat pitch, permitted mining beyond the limits of the 2nd sub-level. An area approximately 300 feet long by 60 feet wide was mined on the North-east side of the ore body. At the end of the year it was estimated that there were 43,954 tons of available ore remaining on this sub, and 8,403 tons unavailable. The area on this sub-level showed a further decrease as compared with the sub-levels above.

4TH SUB BELOW 5TH LEVEL:

This sub-level was opened in 1922 at which time there was approximately 300 feet of ore drifting done under the hanging in the approximate center of the trough near the C. & N. W. Ry. Co., Lease, Section 29. Work in this area was continued during January and February of 1923, by which time the ore body under the hanging in this territory had been outlined and divided into pillars. In March, this sub-level was opened above No. 2 crosscut, and the hanging in this territory outlined by drifts. Three gangs continued to work on this sub-level for the balance of the year, by which time an area 200 feet in length by 50 feet in width had been mined under the hanging. The area

mined represent the extension of the ore body beyond the limits of the 3rd sub-level. The area of this sub-level is smaller than the subs above. It is estimated that there are 61,063 tons of available ore to be mined on this sub, and 30,981 tons which are now unavailable.

5TH SUB BELOW 5TH LEVEL:

This sub-level has not yet been opened, but an estimate of the available ore on this sub shows that there are 47,823 tons.

6TH SUB BELOW 5TH LEVEL:

This sub-level has not yet been opened in the main ore body, but an estimate of the available ore here shows only 29,244 tons, indicating a rapid decrease in the area of the ore body. As a matter of fact this is the bottom sub-level of the main Stephenson ore body. At the North-east end of the ore body, the ore has not been mined below the 2nd sub below the 4th, and this ore extends from that point down to the 6th Level and below the 6th, where it crosses on to the C. & N. W. Ry. Co., Lease, Section 29.

6TH LEVEL

There was comparatively little work done on the 6th Level on the Stephenson Lease, during 1923. There was 70 feet of rock drifting in No. 3 crosscut, which completed it. In No. 4 crosscut, there was 73 feet of rock drifting, which completed this crosscut.

During the year there were four raises put up in No. 3 crosscut, two in No. 4, and one in No. 2. Three raises that had been started in 1922 in No. 1 crosscut, and carried up through the rock to the ore, were completed in 1923.

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

The product for the year was as follows:

Northdale, 308 tons.

This ore was obtained from the extension of No. 5 crosscut on the 6th Level, which encountered a small body of ore, averaging about 57% Iron. There were no shipments of ore from this lease in 1923; the balance on hand December 31st, 1923, was 7,412 tons.

The estimate of ore in sight on December 31st, 1923, was as follows:

	<u>NORTH BESSEMER</u>	<u>NORTH- WESTERN</u>	<u>NORTHDALE</u>	<u>TOTAL</u>
Developed ore above 5th,	5,700	1,900	15,603	23,203
" " " 6th,	<u>4,000</u>	<u>4,000</u>	36,765	44,765
 Total Developed Ore,	9,700	5,900	52,368	67,968
 Prospective Ore below 6th,	<u>23,000</u>	<u>23,000</u>	101,700	147,740
 GRAND TOTAL,	32,700	28,900	154,108	215,708

The estimated tonnage in the mine, sub-divided as required by the Tax Commission, is as follows:

Bessemer Ore:

Developed:	1. North Bessemer,	9,700 tons
Prospective:		<u>23,000</u> "
	Total Bessemer Ore,	32,700 tons.

Non-Bessemer Ore:

Developed:	1. Northwestern,	5,900 tons
	2. Northdale,	<u>52,368</u> "
		58,268 "
Prospective:	1. Northwestern,	23,000 "
	2. Northdale,	<u>101,740</u> "
		<u>124,740</u> "
	Total Non-Bessemer Ore,	<u>183,008</u> tons.
	GRAND TOTAL,	215,708 "

The estimated tonnage, divided into available and unavailable ore, is as follows:

Available Ore,	88,644 tons
Unavailable Ore,	<u>127,064</u> "
Total,	215,708 "

At the present time all of the developed ore is considered unavailable, together with 40% of the prospective ore. This division is based on the present situation as regards the mine water. If the water problem is solved, the percentage of available ore will depend on the depth to which the water is lowered during the next few years. Based on conditions as they are at present, it is assumed that 60% of the prospective ore below the 6th Level can be safely mined, leaving 40% as pillars to support the capping.

The estimate of prospective ore in sight is reduced 13,902 tons from the estimate made in 1922. This is due to estimating from North and South sections, 100 feet apart in 1923, while in 1922, sections through the drill holes were used with much greater distances between the sections. It is considered that this years estimate is more accurate.

Owing to there having been no ore mined in 1923, no change is made in the estimate of developed ore.

During the past year, work has been done at the following places on this lease:

6TH LEVEL
AUXILIARY SHAFT ON 6TH LEVEL
WATER RAISE AND SUB-LEVELS NEAR NO. 66 D.D.HOLE

6TH LEVEL

In January, it was decided to extend No. 5 crosscut due East for exploration purposes. In addition to disclosing any ore which might be in this territory, it was also planned to put down several drill holes below the 6th to prove up the downward extension of the Stephenson ore body, which it was assumed, extended over on this lease. No. 5 crosscut was extended a total distance of

147 feet. After advancing 39 feet in rock, ore was encountered, which was found to be 38 feet in width. The crosscut was continued 70 feet further to the East to the hanging, where a diamond drilling station was made. Two holes were drilled here later in the summer, which will be reported under the heading "Diamond Drilling".

AUXILIARY SHAFT

In 1922, a location was decided on for the auxiliary shaft which it was planned to sink some distance below the 6th Level, and from which two levels would be opened to mine the ore body below the 6th Level on the Stephenson and the C. & N. W. Ry. Co., Lease. In September, 1922, a drift was driven to the site of the auxiliary shaft and extended beyond this point a distance of 60 feet to the site of the auxiliary engine house. At the end of 1922 this drift was being widened for the engine house. In January, 1923, this work was continued, ground being removed for the engine house. The drift from the engine house back to the site of the shaft was then widened and ground removed for the full size of the new shaft. When this work was completed a raise was put up to a point 65 feet above the 6th Level in the center of the shaft; when this raise was completed, the work of stripping the raise to the full size of the shaft was started. Bearers were put in at a point 65 feet above the 6th Level, and the shaft timber hung from these bearers down to the 6th Level. This work was completed the last of May. During June, July and August, the hoist was installed, the engine room made fire-proof; the electric equipment installed; also sheaves, power cables, etc. Sinking of the shaft below the 6th Level was started the middle of September and continued for the balance of the year. At the end of the year the shaft had reached a depth of 92 feet below the 6th Level. It is planned to operate 2, 2-ton skips in balance in this shaft, the shaft being divided into two skip roads, and a ladder and pipe road. It is planned to open two levels, one at a depth of 64 feet below the 6th; the other at a depth of 125 feet below the 6th. At the end of the year the bearers for the loading pocket in the 1st Level were being installed. When this work is completed, ground

for the pocket will be removed and drifts on level extended a few feet from the shaft so that later on when drifting is resumed there will be no danger of blasting the shaft timber. In order to make room for the 2nd Level pocket and sump at the bottom of the shaft, it will be necessary to sink the shaft from its present depth of 92 feet to a depth of approximately 152 feet, or 60 feet deeper.

Sinking was carried on on single shift until the last week of November, when a night shift crew was added, after the Austin Mine closed down. It is hoped to complete sinking and cutting of plats on the two auxiliary levels and install the loading pockets by the first of June, 1924.

Additional equipment will have to be purchased for handling the ore on the new levels at the auxiliary shaft. Two-ton skips will be used in hoisting, so that two-ton cars will have to be used on the new levels. It is planned to purchase a rocker dump car and try it out to see if it will handle Stephenson ore. If it works satisfactorily, it is planned to purchase 20 cars of this type.

WATER RAISE

The last of the year 1921, and early in 1922, a raise was put up near No. 66 diamond drill hole on Section 29, beneath the point where there was the greatest thickness of quicksand. A sub-level was opened 50 feet below the sand and efforts made to open No. 66 diamond drill hole which was 6" in diameter and also by drilling additional holes, to get from 2,000 to 3,000 gallons of water per minute to enter the mine, under control. This work was not successful, and the sub-level was extended beyond No. 66 diamond drill hole and five raises put up to a point within 10 feet of the ledge. This part of the sub-level was sealed off with a concrete dam through which there was an 18" square opening with suitable stoppers to permit re-entry again behind the dam. The raises were blasted through to the sand on November 28th, 1922. No water came in and the raises were cleaned out, when it was found that only one had broken through to the sand. Additional holes were drilled and pipes with weinbores on end pushed through the drill holes into the sand, without results. Finally, the raises were blasted again, making holes five feet or larger directly through to the sand, and some water came in. Rails had been put in the raises to act as a screen to hold back the rock broken by the blast, also any boulders which might come in, but which would let the water and quicksand through. The incoming water increased to 125 gallons per minute, and later, when some of the rock was barred from the raises, the flow increased for a short time to 250-gallons per minute. Wash pipes were pushed up in the raises and water under pressure forced into the sand, in an effort to wash the sand out of the raises. Clay was found in the water coming from the raises, indicating that there was clay mixed with the quicksand, with possibly a seam or layer of clay in the quicksand, which might be holding the water back.

Some forty motor cars of material were barred from the raises and removed from the sub-level, after which barring was resumed until the sub-level drift was again nearly filled with broken rock and boulders, with some

sand and gravel. This material was also removed from the sub-level. There was no increase in the water, in fact, it decreased to 125 gallons per minute.

It was then decided to blast the rails out of the raises and let the sand and boulders run out on the sub-level. A screen of rails were installed in the sub-level drift, 15 feet behind the dam, to keep the material away from the dam, so as to permit removal of the plug from the dam and entry to the sub-level for future work. This program was followed, the rails being blasted out of three raises, the drift filling with rock and sand. Washing was again tried to remove the sand and clay, but it was not successful.

It was then decided, as a final plan, to open a large stope in solid ground beneath the raises, to hold from 800 to 1,000 motor cars of material, and after sealing off the stope, to blast out the floor of the sub-level beneath the raises. It was thought that the stope would fill with sand, boulders and gravel from the raises which would remove sufficient material from above the ledge to let in the desired quantity of water, viz: 2,000 to 3,000 gallons per minute.

The above program was carried out, the floor of the sub-level being blasted out on December 21st. There was no increase in the water, although quicksand came in with the water for 48 hours afterwards. The plug was then removed from the dam, and an examination made of the sub-level. The material on the sub-level had fallen into the stope and the raises were empty as far as could be seen. The stope was not filled and it was apparent that the raises were blocked with boulders. It was impossible to reach the raises, so it was decided to drive a small drift alongside of the opening to the stope, and put up a small raise in the center of the 15-ft. pillar between two of the old raises. Holes are to be drilled into the small pillar on each side of the raise, and also a large number in the 8 or 10-feet of rock left in the back. It is planned to put in quite a large amount of powder in the top of the new raise, so that the ground will be thoroughly shattered. The blasting out of the pillar between the raises will make an opening approximately 25 feet long by 10 feet wide, to ledge. This should be large enough to let any boulder

through and it seems extremely unlikely that it can be blocked by boulders. This work will be completed within three weeks. It is hoped that the removal of 800 cars, or 60,000 cu. ft., of material from above the ledge will bring the water to the sub-level in the desired quantity.

If unsuccessful, further work in this territory is not recommended. The only plan remaining would be to sink a drop shaft and pump the water from the shaft. Standpiping has shown that there are several gravel beds of varying thickness which must carry water freely. If these can be reached by the shaft, the water can be lowered. Owing to the small amount of available ore in the mine, it is becoming increasingly important to solve the water problem.

DIAMOND DRILLING

In order to obtain information in regard to the ore below the 6th Level, to give more accurate information for estimating and also for location of the two levels to be opened from the auxiliary shaft on Section 29, it was decided to drill two holes from the end of No. 5 crosscut on C. & N. W. Ry., Co., Lease, Section 29.

The first hole, No. 7, was vertical. The material encountered was as follows:

Jasper,	0 to 36'
Ore,	36' " 75'
Slate and Arkose,	75' " 83'

The analysis of sludge was as follows:

	<u>IRON</u>	<u>PHOS.</u>
35 to 40	61.00	.024
40 to 45	60.50	..026
45 to 50	44.30	
50 to 55	59.30	.570
55 to 60	60.10	.590
60 to 65	60.40	.570
65 to 70	59.40	.470
70 to 75	56.40	.271

Hole No. 8 was then drilled from the same station on an incline of 36°^o, course North 43°^o East. The material encountered was as follows:

Jasper,	0 to 65'
Lean Ore,	65 to 70'
Ore,	70 to 95'
Lean Ore,	95 to 98'
Ferruginous Slate,	98 to 105'

The analysis of sludge was as follows:

	<u>IRON</u>	<u>PHOS.</u>
65 to 70	47.40	.027
70 to 75	57.30	.570
75 to 80	58.00	.483
80 to 85	60.00	.691
85 to 90	60.80	.536
90 to 95	60.00	1.388
95 to 98	53.40	1.388

FATAL ACCIDENTS--STEPHENSON MINE

A fatal accident occurred on the 1st sub above the 5th Level, at 1:25 P. M., February 3rd, Rinaldo Betteneschi being instantly killed by a fall of ground.

Betteneschi and his partner, Herman Laurila, blasted four holes on the left side of their drift on leaving work on the previous day, preparatory to starting a slice. On the morning of the accident they cleaned up the ore from the blast, but before they could put up a set of timber, they drilled three props on the right side of the slice and one on the left. These props were blasted just before lunch. On returning to their working place at 1:00, they put in several 8-ft. poles under the back, with lagging on top, to protect them while they were cutting hitches for the legs. At 1:20, the miners working in No. 23 contract on the 5th Level asked them to help place a cap on a set of timber. On returning to their raise, Laurila stopped on the 5th Level to fill a car of ore from their chute, and Betteneschi returned to their working place on the sub-level. Laurila stated that he heard some ground fall, but did not think his partner had reached their working place. Five minutes later, he went up on the sub and found his partner caught by the fall of ground.

There was a drift in rock on the sub above, slightly to the right of the new slice. It is probable that the pops blasted at noon loosened the ground between the slice and the sub-level above and just as Betteneschi reached his working place, this loosened section fell without any warning, crushing the poles which they had put in for protection, and caught him.

Betteneschi was 37 years of age and left a family consisting of a wife and five small children. He owned his home at Princeton, which is located on Section 19, on land leased from the company.

All ordinary precautions had been taken, and the accident was classified as a trade risk.

The second fatal accident occurred at 10:00 o'clock A.M., February 12th, when William Ranta, a miner, in No. 45 contract, was injured by a blast, and died on February 18th, in a hospital in Milwaukee, where he had been taken for an operation to save the sight of his right eye. Death was due to inflammation of the brain, caused by a foreign object that penetrated the brain, through the left eye.

Ranta and his partner, Charles Jacobson, worked on the 4th sub-level below the 5th Level, and were drifting in hard ore under the hanging. They blasted seven holes at noon on Saturday, February 10th, and Jacobson stated that they only heard six reports. They did not report the missed hole to either the captain or the shift boss, both of whom were in this place after they blasted and before the accident. When they were loading broken ore into the buggy, Saturday afternoon, Jacobson stated that he found a small piece of powder and also another piece Monday morning.

At the time of the accident, Ranta was engaged in picking the bottom on the right hand side, near the breast, to lay sollar. While Jacobson was cleaning up some loose ore on the left-hand side. Ranta evidently drove his pick into a piece of powder, exploding it. A depression was noticeable in the bottom, near the breast, after the explosion, which was probably the bottom of a drill hole. The missed hole was evidently one of the four bottom holes. In cleaning out the broken ore, they evidently worked above the bottom part of this hole. The holes fired on Saturday, February 10th, evidently broke the ground over to the missed hole, which would account for the loose powder found in the ore.

The explosion blew off nearly 3" from the end of Ranta's pick, and it was probably a piece of this steel which penetrated his brain.

All miners are instructed to notify the captain or shift boss of a missed hole, so they can be advised of the best way to handle it. This was not done, and this failure was probably responsible for the accident. The accident was classified as a trade risk.

Ranta was a single man, age 22 years, his parents residing on a farm near Palmer, Michigan.

STEPHENSON SURFACE

One track of the coal dock was thoroughly overhauled during the summer; new caps and stringers being installed on nearly every bent. New walks were also put in, for dumping and trapping cars. One side of the coal dock is all that is needed since coal is used for heating purposes only.

The permanent trestle leading from the shaft to the Bessemer stocking grounds and the permanent trestle leading to the C. & N. W. Ry. Co., Lease, Sec. 29 stocking grounds, were repaired during the summer and fall. Several dozen new stringers were used, as also about two carloads of 3" plank.

In August, the work of extending stocking trestles was started, and continued at various times until completed in November. The East Stephenson stocking trestle was extended 130 feet to the limit of the stocking grounds. The Stephenson stocking trestle immediately to the West was raised above the ore pile on a gradual upgrade until at the end of the pile the trestle was over 60 feet above the ground.

To replace bents torn down when the Bessemer stockpile was shipped, twelve new bents were erected. Five permanent bents and twenty-four stocking bents were erected on a trestle paralleling the Bessemer trestle. This new trestle, together with the others, will provide room for stocking the product during the winter months. Unless shipping from pockets and stockpile start promptly on the opening of navigation in 1924, the mine will have to close down, as all available stocking grounds will be filled. Some slight additional stocking ground might be made by laying new sollar and extending two trestles over on Section 29 property, but they would not prolong operations more than a month or two. With overruns, there will be at least 530,000 tons in stock by May 1st, 1924.

A concrete floor was installed in the Stephenson engine house in the fall. The old wooden floor was rotted and it was considered advisable to install a permanent fire-proof floor. The new floor has been painted, as also the sides of the engine house, resulting in a great improvement in the appearance of this building.

The steam heating lines to the mine and captain's office, were replaced in the fall, as the old pipe had rusted away. New wooden launders were built around the pipe, as the old launders had rotted.

A number of bents under the launder which carries the mine water to the Escanaba River, had rotted and new ones were installed. Two men worked on this job for a month, as over a hundred and fifty bents had to be replaced with new ones.

The timber yard was cleaned up in the fall, all bark and chips being removed to reduce the fire hazard.

ACCIDENT TO EQUIPMENT

On August 31st, 1923, at 4:00 P. M., lightning came in over the wires leading to the underground haulage motor generator set at the Central Power Plant, burning out some of the coils. There was no ore hoisted on the night shift of August 31st, as well as between 4:00 and 5:00 on the day shift. Repairs were made so that ore could be trammed underground on the 1st of September. It was figured that 400 tons product was lost on account of this accident.

STEPHENSON MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Stephenson Bessemer,	63.40	.048	3.33	-
Stephenson #1,	64.58	.065	3.34	.811
Stephenson,	60.57	.265	4.54	.965
Stephenwood,	(No Production)			
Northdale,	57.20	.666	6.97	1.135

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	Mine			Lake Erie	
		PHOS.	SILICA	MANG.	IRON	MOIST.
Stephenson Bessemer,	(All Mixed)					
Stephenson #1,	(All Mixed)					
Stephenson,	(**) 60.69	.272	-	.966	61.25	14.71
Stephenwood,	(No Shipments)					
Northdale,	(No Shipments)					

NOTE: (**) There was only one Straight Stephenson cargo.

ORE STATEMENT - DECEMBER 31ST, 1923.

	STEPHEN- SON BESSEMER	STEPHEN- SON ORE	STEPHEN- SON NO. 1	STEPHEN- WOOD	NORTH- DALE	TOTAL	TOTAL LAST YEAR
On hand Jan.1,1923,	13,541	205,625	-	14,095	7,104	240,365	229,664
Output for Year,	24,861	221,062	-	-	308	246,231	199,223
Transferred,	6,576	806	5,770	-	-	-	-
Stockpile Overrun,	981	-	-	-	-	981	14,000
Total,	32,807	427,493	5,770	14,095	7,412	487,577	442,887
Shipments,	31,178	37,420	5,770	-	-	74,368	202,522
Balance on Hand,	1,629	390,073	-	14,095	7,412	413,209	240,365
Increase in Output,						33,989	
Increase in Ore on Hand,						172,844	

1923 -- 1-8 Hour Shift, Jan. 1st to Dec. 31st, 1923.

1922 -- 2-4 Hour Shifts, 6 days per week, Jan. 1st to June 4th, 1922.
1-8 Hour Shift, 6 days per week, June 5th to Dec. 31st, 1922.

STEPHENSON MINE

SHIPMENTS FOR YEAR-1923.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Stephenson Bessemer,	10,125	21,053	31,178	66,543
Stephenson No. 1,	3,251	2,519	5,770	8,213
Stephenson,	37,420	-	37,420	77,016
Stephenwood,	-	-	-	48,808
Northdale,	-	-	-	1,942
Total,	50,796	23,572	74,368	202,522
Total Last Year,	58,623	143,899	202,522	
Decrease,			128,154	

MADE IN U.S.A.

STEPHENSON MINE
COMPARATIVE MINING COST FOR YEAR

	1923	1922	INCREASE	DECREASE
PRODUCT	247,212	213,223	33,989	
Underground Costs	1.358	1.236	.122	
Surface Costs	.225	.367		.142
General Mine Accounts	.165	.160	.005	
Cost of Production	1.748	1.763		.015
Plant Account	.032	.040		.008
Uncompleted Construction	.000	.002		.002
Taxes	.104	.104		
Central Office	.073	.074		.001
Contingent Expense	.008	.010		.002
Cost Adjustment	.027	.047		.020
Cost on Stockpile	1.992	2.040		.048
Loading & Shipping	.022	.060		.038
Total Cost on Cars	2.014	2.100		.086
No. Days Operating	298	293	5	
No. Shifts & Hours	1-8	2-4-129 1-8-164		
Avg. Daily Product	830	728	102	
<u>COST OF PRODUCTION</u>				
Labor	1.076	.972	.104	
Supplies	.672	.791		.119
Total	1.748	1.763		.015

STEPHENSON MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	247,212	213,223	33,989	
No.Shifts & Hours	1-8	2-4:1-8		
AVG.NO.MEN WORKING				
Surface	38	44		6
Underground	139	159		20
Total	177	203		26
AVG.WAGES PER DAY				
Surface	4.29	3.88	.41-9.5%	
Underground	4.91	4.30	.61-12.4	
Total	4.78	4.19	.59-12.3	
WAGES PER MO. OF 25 DAYS				
Surface	107.25	97.00	10.25	
Underground	122.75	107.50	15.25	
Total	119.50	104.75	14.75	
PRODUCT PER MAN PER DAY				
Surface	20.73	17.84	2.89	
Underground	5.90	6.00		.10
Total	4.59	4.49	.10	
AVG.PRODUCT BRK'G & TRM'G	9.25	9.76		.51
" WAGES CONTRACT MINERS	5.17	4.45	.72	
" " " Trammers				
" " " Labor	5.17	4.45	.72	
TOTAL NO.OF DAYS				
Surface	11,923 $\frac{1}{2}$	11,950 $\frac{1}{4}$		26-3/4
Underground	41,913 $\frac{1}{2}$	35,519	6,394 $\frac{1}{2}$	
Total	53,837	47,469 $\frac{1}{4}$	6,337-3/4	
AMOUNT FOR LABOR				
Surface	51164.44	46393.25	4771.19	
Underground	206019.95	152671.40	53348.55	
Total	257184.39	199064.65	58119.74	

PROPORTION Surface to Underground Men $\frac{1}{4}$

1923 - 1 to 3.67
 1922 - 1 to 3.62
 1921 - 1 to 4.14
 1920 - 1 to 3
 1919 - 1 to 1

NOTE: No mining done during 1918 and 1919
 on account of mine being flooded.

1921:

1-8hr 6 days a week Jan.1 to Mar.26;
 1-8hr 5 " " Mar 27 to May 31;
 2-4hr 6 " " June 1 to Dec.31.

1922:

1-8hr basis June 5, 1922.

STEPHENSON MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1923.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1923	AMOUNT 1922
4" to 6" Timber	935	.015	14.02	624.62
6" to 8" "	87,736	.03147	2,760.90	1,988.10
8" to 10" "	105,811	.0673	7,120.30	4,725.51
10" to 12" "	29,110	.0896	2,609.46	2,381.09
12" to 14" "	6,054	.122	736.85	1,567.39
Total Timber - 1923	229,646	.05766	13,241.53	11,286.71
" " 1922	225,636	.05002		11,286.71
	LINEAL FEET	PER 100'		
5' Lagging	495,550	.768	3,809.93	3,363.10
7' "	274,650	.6494	1,783.48	
8' "	307,304	.6768	2,079.96	2,970.40
Total Lagging	1,077,504	.7121	7,673.37	6,333.50
Poles	47,820	1.0268	491.02	5.89
Total Lagging & Poles 1923	1,125,324	.7255	8,164.39	
" " " 1922	853,680	.7422		6,339.39
5/8" Covering Boards (ft.)	26,907	1.829	492.31	488.39

Product	247,212	199,223
Feet of timber per ton of ore	.929	1.132
" " lagging "	4.358	4.283
" " " per foot of timber	4.692	3.781
Cost per ton for timber	.05356	.0566
" " " " lagging	.03104	.0318
" " " " poles	.00198	.0000
" " " " covering boards	.00199	.0025
" " " " timber, lagging, poles & boards	.08857	.0909
Equivalent of stull timber to board measure	343,399	385,869
Feet of board measure per ton of ore	1.389	1.937

Cost for timber, lagging & poles - 1923	21,898.23
1922	17,626.10
5/8" covering boards used	1921
in 1922 and 1923 in place	1920
of lagging: 1923 - 492.31	1917
1922 - 488.39	1916
	1915
	9,643.88

Mine worked 6 days per week during 1923 - 1 shift.

STEPHENSON MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

KIND	QUANTITY	AVERAGE PRICE	AMOUNT 1923	AMOUNT 1922
40% Powder	11,000	.1347	1,495.46	2,875.20
50% "	47,200	.1443	6,812.88	3,527.69
60% "	7,450	.17054	1,260.54	474.94
Total Powder	65,650	.1455	9,568.88	6,877.83
Fuse	230,000	.692	1,592.01	1,412.54
Caps	46,600	1.156	539.42	463.25
Cap Crimpers	34	.50	17.00	12.05
Tamping Bags	10,500	2.226	23.38	20.53
Total Fuse, Etc.			2,171.81	1,908.37
Total All Explosives			11,740.69	8,786.20
Product			247,212	199,223
Pounds Powder per ton of Ore			.266	.225
Cost per ton for Powder			.0387	.0345
" " " " Fuse, Etc.			.0088	.0096
" " " " All Explosives			.0475	.0441
Average price per pound for Powder			.1455	.1501

Mine operated 6 days per week January 1st, to December 31, 1923 - 1 shift.

PRINCETON MINE

SURFACE:

The only work done at this property during the summer was that which was necessary on account of loading ore from stockpile. Considerable plank and timber, used in blocking up trestles, caved down when the ore was loaded, and was cleaned up from the stocking grounds. Late in the fall, several cars of ore were shipped in gondolas, at the rate of one car per day. This ore was loaded by hand from the stockpile.

Some ore and rock was hoisted which came from repair work in the mine. The ore and rock was hoisted twice a month during the year.

UNDERGROUND:

Repair work was continued on the main levels during 1923. The following shows in detail the number of sets installed, and the distribution of the work.

The footwall drift on the 6th Level, between No. 2 and 3 shaft, was repaired during January and February. Thirty-one sets of timber, ten caps, nine legs and fourteen sets of lagging were installed in this territory.

In March, and part of April, the 6th Level drift from No. 2 towards No. 1 Shaft, on Section 20, was retimbered for a distance of 75 feet, where this drift had crushed down, so that it was only about 5 feet high. The balance of April was spent in retimbering a crosscut on the 6th Level between No. 2 and No. 3 shafts, where seven old sets were replaced with new ones.

During the month of May, and part of June, the footwall drift between No. 2 and No. 3 shaft was thoroughly cleaned up, all ore in the ditch and alongside the drifts was loaded in cars and hoisted. There were also six sets of new timber put in this drift.

The balance of the month of June, and all of the month of July, the 6th Level drift towards No. 1 shaft on Section 19 was repaired, where new timber and lagging were put in to replace old timber. The ditch in this drift was also cleaned at this time.

The month of August, and part of September, was spent retimbering a 6th Level raise which had crushed. The lower section of this raise had caved, due to timber crushing in the haulage drift, and it was necessary to first repair the haulage drift and then install new cribbing in the raise.

The balance of the month of September was spent repairing the 6th Level drift towards No. 1 shaft on Section 20, where a number of sets had crushed.

During the balance of the year the 6th Level drift towards No. 3 shaft was repaired. It was necessary to put in a number of new sets in this territory, and also re-lag a number of the old sets.

The following table gives the number of new sets put in; the number of legs and caps replaced on old sets, and the number of old sets lagged:

	<u>SETS</u>	<u>LEGS</u>	<u>CAPS</u>	<u>LAGGING</u>
January,	14	3	2	4
February,	15	7	7	10
March,	12	11	2	6
April,	10	2	1	8
May,	2			
June,	13	3		10
July,	6	11		5
August,	1			1
September,	3	2	4	2
October,	11	5	1	7
November,	9	13	1	9
December,	4	14	3	29
Total,	100	71	21	91

PRINCETON MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Princeport,		(No Production)		
Cambridge,		(No Production)		

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Princeport,		(No Shipments)		
Cambridge,		(All Mixed)		

ORE STATEMENT - DECEMBER 31ST, 1923.

	PRINCE- PORT	SEC. 19 PRINCE- PORT	CAMBRIDGE	SEC. 19 CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On Hand Jan. 1, 1923,	9,160	1,313	183,133	23,783	217,389	243,460
Output for Year,	-	-	-	-	-	74
Transferred,	-	-	2,947	2,947	-	-
Total,	9,160	1,313	186,080	20,836	217,389	243,534
Shipments,	-	-	25,642	-	25,642	26,145
Balance on Hand,	9,160	1,313	160,438	20,836	191,747	217,389
Decrease in Output,					74	
Decrease in Ore on Hand,					25,642	

1923 -- Mine Idle during Year.

1922 -- Mine Idle during Year.

PRINCETON MINE
SHIPMENTS FOR YEAR-1923.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Princeport,	-	-	-	-
Sec. 19 Princeport,	-	-	-	-
Cambridge,	-	25,642	25,642	26,145
Sec. 19 Cambridge,	-	-	-	-
Total,	-	25,642	25,642	26,145
Total Last Year,	-	26,145	26,145	
Decrease,			503	

PRINCETON MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	-	74		74
No.Shifts & Hours				
AVG.NO.MEN WORKING				
Surface	3	3		
Underground	4	6		2
Total	7	9		2
AVG.WAGES PER DAY				
Surface	4.55	3.99	.56-14.03%	
Underground	4.83	4.55	.28- 6.15%	
Total	4.70	4.29	.41- 9.55%	
WAGES PER MO.OF 25 DAYS				
Surface	113.75	99.75	14.00	
Underground	120.75	113.75	7.00	
Total	117.50	107.25	10.25	
PRODUCT PER MAN PER DAY				
Surface				
Underground				
Total				
LABOR COST PER TON				
Surface				
Underground				
Total				
AVG.PRODUCT BRK'G & TRM'G				
" WAGES CONTRACT MINERS				
" " "				
TOTAL NO.OF DAYS				
Surface	1,138 $\frac{1}{2}$	1,159 $\frac{1}{4}$		20-3/4
Underground	1,400 $\frac{1}{2}$	1,387 $\frac{1}{4}$	13 $\frac{1}{4}$	
Total	2,539	2,546 $\frac{1}{2}$		7 $\frac{1}{2}$
AMOUNT FOR LABOR				
Surface	5185.02	4628.70	556.32	
Underground	6764.81	6312.03	452.78	
Total	11949.83	10940.73	1009.10	

Proportion Surface to Underground Men:

1923 - 1 to 1.33

1922 - 1 to 2.

1921 - 1 to 2.81

1920 - 1 to 3.1

1919 - 1 to 4.63

1918 - 1 to 3.48

Mine not operating 1922.

" " " 1923.

GWINN MINE

SURFACE:

Shipments were continued from the two low grade Silica ore piles, both of which were nearly cleaned up at the end of the year. Shipments for the year and balance of ore in stock are as follows:

	<u>SHIPMENTS</u>	<u>IN STOCK DECEMBER 31, 1923</u>
Gwinport,	2,873	1,745
Gwinn Silica,	<u>25,656</u>	<u>5,709</u>
Total,	28,529	7,454

UNDERGROUND:

During the past year a crew of men have been employed retimbering. In a few cases small pillars have been mined, as it would not pay to keep drifts retimbered in order to mine these pillars later. Following is a report of the years work:

The 5th Level drift to the ore body was repaired, lining sets being put in in 800 feet of this drift, where it passes through the ore body.

A number of lining sets were installed in the 6th Level haulage drift, and two raises from the 6th to the 5th were repaired and new cribbing installed.

A drift on the 3rd sub above the 8th Level was retimbered for a distance of over 100 feet, and new cribbing put in two raises on this sub-level, one extending up to the 7th, and the other from the 8th Level up to this sub-level.

On the 2nd sub-level above the 8th, a small pillar about 15 feet square was mined, as it would be necessary to keep over 200 feet of drift on this sub-level open if this pillar had been left to be mined at some future time. A number of lining sets were put in on this sub-level to keep that part open where the ore has not yet been mined.

A drift about 200 feet in length was retimbered on the 2nd sub-level below the 8th, while on another part of this sub-level, a number of lining sets were put in.

Considerable work was done retimbering the 9th Level haulage drifts, more work being done on this level than at any other point in the mine. New timber was installed in practically 600 feet of drift on this level, and lining sets in approximately 200 feet.

Lining sets were installed in the drift used for bringing timber into the 2nd sub below the 9th Level, and two small pillars mined where it would not pay to keep the drifts retimbered.

A number of lining sets were installed in the ore drift on the 3rd sub- below the 9th, so that the drifts driven on this sub-level, just before the mine closed down, could be kept open so that mining could be started here with no delay when the mine reopened.

On the 4th sub below the 9th, a number of lining sets were installed during the year, and a small pillar about 10 feet square mined out that had been left near one of the raises where the ore body had been mined on both sides of this pillar for a distance of 60 feet. A drift was open to this pillar, but the timber was in bad condition.

A number of lining sets were installed in an ore drift on the 5th sub below the 9th. At one place the back here had caved a distance of 15 feet above the old sub-level. This was filled with lagging and old timber.

A number of lining sets were installed in the 10th Level drift, where it passes through the ore body; also in the rock drift from the shaft. Two raises from the 10th to 9th Level were repaired, the old cribbing being removed and new cribbing installed.

A number of lining sets were installed on the 4th sub below the 10th Level in an ore drift between two raises. A number of lining sets and some new sets were installed on the 7th sub-level below the 10th.

Lining sets were installed on the 9th sub below the 10th.

On the 11th Level, a few new sets were installed, and also some lining sets; additional poles were put in for lagging in the back of a number of the old sets.

The mine has been kept in condition for resumption of operations on short notice.

GWINN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Gwinport,	60.06	.167	7.71	.251
Gwin Silica,	51.91	.174	16.57	.315

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	PHOS.	Mine SILICA	MANG.
Gwinport,			(All Mixed)	
Gwin Silica,			(All Mixed)	

ORE STATEMENT - DECEMBER 31ST, 1923.

	GWINNPORT	GWINN SILICA	TOTAL	TOTAL LAST YEAR
On hand January 1, 1923,	4,618	4,031	8,649	15,000
Output for Year,	-	27,334	27,334	14,085
Stockpile Overrun,	-	-	-	6,000
Total,	4,618	31,365	35,983	35,085
Shipments,	2,873	25,656	28,529	26,436
Balance on Hand,	1,745	5,709	7,454	8,649
Increase in Output,			7,249	
Decrease in Ore on Hand,			1,195	

1923 -- Mine idle during Year.

1922 -- Mine idle during Year.

GWINN MINE

SHIPMENTS FOR YEAR-1923.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gwinport,	-	2,873	2,873	16,403
Gwin Silica,	-	25,656	25,656	10,033
Total,	-	28,529	28,529	26,436
Total Last Year,	-	26,436	26,436	
Increase,			2,093	

GWINN MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	27,334	20,085	7,249	
No.Shifts & Hours				
AVG.NO.MEN WORKING				
Surface	4	5		1
Underground	7	8		1
Total	11	13		2
AVG.WAGES PER DAY				
Surface	4.59	4.04	.55-13.61%	
Underground	4.93	4.44	.49-11.03%	
Total	4.81	4.27	.54-12.64%	
WAGES PER MO.OF 25 DAYS				
Surface	114.75	101.00	13.75	
Underground	123.25	111.00	12.25	
Total	120.25	106.75	13.50	
PRODUCT PER MAN PER DAY				
Surface				
Underground				
Total				
LABOR COST PER TON				
Surface				
Underground				
Total				
AVG.PRODUCT BRK'G & TRM'G " WAGES CONTRACT MINERS				
TOTAL NO.OF DAYS				
Surface	1,263-3/4	1,413 ¹ / ₄		149-3/4
Underground	2,314	2,005 ¹ / ₂	308 ¹ / ₂	
Total	3,577-3/4	3,419	158-3/4	
AMOUNT FOR LABOR				
Surface	5797.75	5717.22	80.53	
Underground	11413.25	8897.25	2516.00	
Total	17211.00	14614.47	2596.53	

Proportion Surface to Underground Men:

1923 - 1 to 1.75
 1922 - 1 to 1.6
 1921 - 1 to 2.61
 1920 - 1 to 2.6
 1919 - 1 to 2.64
 1918 - 1 to 3.57

1922 - Not operating. Product is stockpile overrun with exception of 21 tons.
 1923 - Not operating. Product is stockpile overrun.

FRANCIS MINE

The Francis Mine operated on single shift from January 1st to December 3rd, at which time it went on double shift; ore has been hoisted on day shift only. The change from single to double shift was due to shortage of working places, and to crushing ground on the South side of the 5th Level, with an increase in the mine water, which rendered it advisable to speed up mining operations. The mine water increased from an average of less than 100 gallons per minute to over 240 gallons per minute. It remained stationary during the last week of December, but there is no assurance that it will not increase at any time. The increase occurred on the South side of the 5th Level, following the slipping of a large block of ground between the "New Find" on the South side of the mine and the main ore body. It is probable that the movement of this block of ground, caused cracks in the overlying formation which connected with a water course that extended through to ledge.

This movement of ground caused crushing over the entire South side of the mine on and above the 5th Level. It was soon evident that it was impossible to keep the 5th Level haulage drifts open for motor haulage, as re-timbered areas would crush again within 72 hours. It was, therefore, decided to abandon motor haulage on the 5th Level and transfer the ore coming from the "New Find" on the South side of the mine through raises to the 6th Level. While this work was underway, the product showed a large decrease, due to no ore being obtained from this territory. Conditions during the last ten days of December were approaching normal again and, barring further serious trouble from crushing or a large increase in the mine water, the mine should be able to operate during the greater part, if not all of the coming year, and perhaps for a slightly longer period.

The product by months for the year was as follows:

January,	9,915 tons	July,	9,873 tons
February,	9,180 "	August,	9,779 "
March,	10,762 "	September,	8,613 "
April,	8,774 "	October,	9,138 "
May,	9,534 "	November,	7,973 "
June,	9,586 "	December,	<u>7,423</u> "
		Total Ore,	110,550 "
		Rock,	<u>7,497</u> "
		Grand Total,	118,047 "

The product for 1923 was the largest obtained in any year since the mine opened. The product was decreased in both November and December, due to heavy ground and crushing on the South side of the mine. The sudden increase of water, which appeared over a large territory, made it difficult to handle ore in the raises until launders were made and the water diverted from the dirt compartment.

The total product to date, by years, is as follows:

<u>YEAR</u>	<u>TONS</u>	
1917	1,778	
1918	41,535	30-
1919	80,528	26-
1920	80,056	36-
1921	71,075	16-
1922	98,049	11-
1923	<u>110,550</u>	0-
		<u>117</u>

Total produced to date, 483,571

The preliminary estimates showed 875,489 tons in the mine. Barring unforeseen accidents, which might render it necessary to abandon the property, it is evident that there will be a total production of approximately 575,000 tons of ore, as compared with the original estimate of 875,000 tons. The difference in the above figures of 300,000 tons largely represents ore estimated as available in the upper part of the mine, which it was later considered inadvisable to mine on account of danger of caving through to the surface.

It is also a fact that the ore body is narrow at the highest point that it has developed, been, so that, aside from the danger of caving, it is also very doubtful if it

could be mined at a profit. It is also true that development work showed that at least one of the surface diamond drill holes followed a seam of ore, indicating a large deposit when actually the ore was only drift wide. It is, therefore, evident that the original estimate was larger than development work has shown it should have been, for it must be remembered that the "New Find" on the South footwall was not disclosed by surface diamond drilling and was, therefore, not included in the original estimates. Eventually this territory will yield at least 100,000 tons. Unfortunately, the grade of the ore has been below the original estimate due to bands of lean ore and partly altered slate seams which have been found in practically all parts of the mine. This has also decreased the available tonnage, as some areas had to be abandoned due to the ore being below a merchantable grade.

The ore statement for the year 1923 is as follows:

	<u>FRANPORT</u>
On Hand, January 1st, 1923,	253,454 tons
Output for the year,	<u>110,550</u> "
Total,	364,004 "
Shipments for the Year,	<u>0</u>
In Stock December 31st, 1923,	364,004 tons.

No ore was shipped during 1923. New stocking grounds had to be prepared, sollars laid and new stocking trestles built to take care of the product. This increased the expenditures over what would have been necessary if the ore had been shipped and trestles rebuilt for stocking.

The estimate of ore in sight on December 31, 1923, is as follows:

	<u>FRANPORT</u>
Ore on South Footwall (this includes ore above the 5th Level on South footwall and also ore in the "New Find"),	28,510 tons.
Ore on 5th Level,	10,285 "
Ore above 6th Level,	<u>116,662</u> "
Grand Total,	155,457 "

The estimated tonnage in the mine, sub-divided as required by the Tax Commission, is as follows:

Non-Bessemer:

Developed: 1. Franport, 155,457 tons.

This year all ore in the mine is considered as developed ore. The ore below the 6th Level shows an increase as compared with previous estimates, due to the development work of the past year. Additional ore was also found in the "New Find". During the year, 55,203 tons of ore were developed, taking into consideration this years production and last years estimate.

Mining of the main ore body on the North footwall on and above the 5th Level was practically completed by the end of the year, and the 1st sub below the 5th Level was being developed for mining. The area of the ore body on the North footwall decreases below the 5th Level, which will soon reduce the number of gangs that can work here. There is a small amount of ore remaining to be mined on the 5th Level near No. 1 crosscut and a few pillars near the East end of the ore body.

Mining has been continued during the year in the "New Find" and, as stated elsewhere, additional ore has been developed here. This was due to the ore body being thicker than was anticipated. Additional ore was also found to the South of the "New Find" on the 1st and 2nd subs below the 4th Level, on the footwall which dips to the South on a flat angle.

Mining was completed on the 3rd Level during the year. Mining was started here in 1922, the ore being mined by the shrinkage stope method to a height of about 40 feet above the 3rd Level. It was not considered safe to mine above a point 50 feet above the 3rd Level, as any cave, or even a crack to surface would cause the mine to flood. The ore in the upper part of the ore body is very narrow, running from 8 to 15 feet in thickness, so that aside from the question of safety, it would not pay to open the upper levels for mining.

The grade of the ore produced during 1923 has averaged practically the same as in previous years. There has been, however, less lean ore and slate in the ore, consequently less sorting required underground. In some areas developed on sub-levels below the 5th, the ore is free from rock, indicating a better concentration in this territory. The greater part of the ore from the "New Find" has averaged 57.00% or better in Iron, as it is almost entirely free of rock seams.

A year ago the life of the mine was estimated at 1-1/2 to 2 years. The discovery of additional ore in 1923 would warrant an extension of the life of the mine beyond the coming year, were it not for two contingencies, viz: the danger of increase of mine water above the capacity of the pumping plant and increased cost of production beyond the point which would leave a profit, due to the area available for mining being too small to work sufficient gangs to yield a good product. It, therefore, seems advisable to assume at least a nine or ten months life for the property, which may possibly be extended to eighteen months.

During the greater part of the year the ventilation in the mine was good. Due to danger of blocking the Gwinn Mine shaft with ice, the ventilating fan was only operated part of the time during the winter months. The ventilation in the greater part of the mine was good, however, even when the fan was operated only four hours per day. The latter part of the summer the ventilation on the 1st sub above the 5th Level was poor, due to lack of opportunity to provide for circulation of the air. Considerable expense would have been necessary to overcome this difficulty and as there was only a small amount of ore to be mined, no attempt was made to remedy conditions. The working places were quite hot, the men, however, did not notice a lack of oxygen in the air. This condition lasted for only a few weeks in four working places at the East end of this sub-level. The fan was operated 24 hours each day during the warm weather. It continued to operate on this schedule until severe cold weather set in, since which time it has been operated from 6 to 12 hours each day.

The cost of production for the year has been slightly higher than in the previous year. It had been hoped to reduce it slightly, but this proved impossible. The small ore bodies, making a large percentage of drifting necessary as compared with slicing, the frequent changes in location of contracts and the increased cost of November and December due to extraordinary expense caused by crushing, and increase in the mine water, account for the increase.

The plunger pump from the Gwinn Mine was installed on the 6th Level in January. Piping for suction and discharge were then installed, the pump remaining idle until in the summer, when part of the mine water started to come down to the 6th Level, due to mining on and below the 5th Level. The amount of water coming to the 6th Level gradually increased until this pump was operating three hours each day. No further change occurred until the last of November, when the mine water increased, since which time the 6th Level pump has been operated five hours each day, seven days per week.

In order to make the report more clear it is deemed advisable to divide the Francis ore body into three parts, viz: the "New Find", the "South Footwall" and the "North Footwall". This is in line with the Annual Report of 1922.

During the past year work has been done in the following territories:

NORTH FOOTWALL

6TH LEVEL TO 2ND SUB ABOVE THE 5TH, ALSO 3RD LEVEL.

SOUTH FOOTWALL

6TH LEVEL TO 4TH LEVEL

NEW FIND

FROM 4TH LEVEL ELEVATION TO 1ST SUB BELOW THE 3RD LEVEL.

NORTH FOOTWALL

3RD LEVEL

Mining of the main ore body on the North footwall, above the 3rd Level, was started in 1922, work being completed in July, 1923. During the

first two months of the year there were two gangs stoping ore above the 3rd. In March, one gang was taken away, as the territory was too small for two gangs. Mining was completed in July. No ore was obtained from this territory for the last two weeks of April, due to repair work which was necessary in the transfer raise from the 3rd to the 4th Level, where the cribbing had rotted, and it was necessary to install new cribbing. Ore was mined by stoping without timber above the 3rd Level, the method of mining used being a modification of the shrinkage stope system. The ore varied in thickness from 10 to 16 feet, between the foot and hanging. The dip of the formation varied also, so that in some stopes the ore could be mined 50 feet above the 3rd Level, while in others, it could not be mined at a profit more than 20 feet above the level. Some pillars were left between the stopes to prevent caving. The ore ran from 55.50% to 58.00% in Iron, averaging about 56.50%. Due to the method of mining, the ore was produced at a reasonable cost.

The ore was mined to the West limit of the ore body, which is approximately 500 feet from the shaft. When mining was completed on the 3rd Level, all rails and pipes were removed from the 3rd and 4th Levels, and sent to surface.

2ND SUB ABOVE 5TH LEVEL:

About 70% of the ore on this sub-level was mined in 1922; the balance of the ore was removed during the first three months of the year. The area of this sub-level was approximately, 500 feet by 40 feet.

1ST SUB ABOVE 5TH LEVEL:

Development work started on this sub the last of the year 1922, one gang working here. The number of gangs employed here was increased to four early in 1923, and the main ore body on the North footwall was mined out in June. The area mined here was approximately 300 feet in length by 40 feet in width, with an extension to the South, on the West side of the roll in the footwall, 120 feet by 25 feet in size.

The ore near No. 1 crosscut, which is separated from the main ore body on the North footwall by a roll in the footwall, was developed for mining in the summer, and four gangs worked here for several months. Mining was completed here in the early part of December. More ore was found above No. 1 crosscut than had been anticipated from work done on sub-levels at higher elevations in this territory. The ore body near No. 1 crosscut was approximately, 140 feet x 50 feet, in size.

Considerable difficulty was experienced in maintaining the haulage drifts on the 5th Level during the last two months that mining was in progress on the 1st sub above the 5th. This interfered with the output from this territory, as the miners employed here often had to be taken to the 5th Level to make repairs, so that motors and cars could be brought in to tram out the ore from the chutes.

5TH LEVEL

In April, a crosscut was started from the North haulage drift in the footwall to the South-east. Ore was encountered after passing through about 38 feet of rock, the crosscut being continued in ore in a South-easterly direction until it holed to No. 1 crosscut, a distance of 127 feet. Some ore was then mined from the side of this drift near No. 1 crosscut, as it did not extend up to the elevation of the 1st sub above the 5th. The above described work was done in the ore body near No. 1 crosscut, which is separated by a roll in the footwall from the main ore body on the North footwall.

In June, the work of developing the main ore body on the North footwall was started, drifts being driven from the tops of raises put up from the 6th Level. After developing this ore body from five raises, mining started, and was 80% completed at the end of the year, by which time all but two of the contracts had dropped down to open the 1st sub below the 5th. The ore body mined here was approximately 300 feet by 40 feet, in size.

In order to mine the ore on the 5th Level, near No. 1 crosscut, it was necessary to drive a drift in rock through the roll in the footwall, so that the ore mined could be trammed to a raise from the 6th Level, due to crushing

of the haulage drifts on the 5th Level. This drift was started the latter part of the year, and by the end of the year had been driven through the roll in the footwall, and was advancing to the East in ore. Mining will be pushed in this territory as rapidly as possible, as it is holding up the mining of the ore on the West side of the roll in the footwall.

At this time it is not considered that there is sufficient ore East of the roll in the footwall, near No. 1 crosscut, to warrant opening sub-levels in this territory at lower elevations.

At the end of the year the only ore remaining on the 5th Level consisted of four small pillars on the North footwall, several pillars near No. 1 crosscut East of the roll in the footwall, and pillars on the West side of the roll in the footwall. It was estimated that there are 10,285 tons of ore remaining to be mined on the 5th Level.

1ST SUB BELOW 5TH LEVEL:

Work of opening this sub-level was started in November, and at the end of the year there were three contracts working here.

2ND SUB BELOW 5TH LEVEL:

At the West end of the ore body it was decided to open two raises at the elevation of the 2nd sub-level instead of opening the 1st sub. This was due to the fact that there was a large amount of water coming into this territory on the 5th Level. By dropping down two sub-levels it will be possible to drive the original developing drifts and do some slicing before caving, during which period the ore will be dry and also the raises. A drift was driven on this sub-level in 1922, following the hanging. It has been used for the transfer of timber to the sub-levels above. This drift was so badly crushed at the end of the year that it was decided to drive a new drift alongside of it rather than to attempt to repair it. Work on the new drift was underway at the end of the year.

6TH LEVEL

It has been decided to report the work done in the North haulage drift

on the 6th Level under the work done on the North footwall, as the raises from this drift will be used for mining all of the ore on this side of the mine. This drift was completed in May, being driven a distance of 120 feet in 1923.

Three raises were put up in 1923 to the elevation of the 5th Level, which, with the two put up in 1922, make five raises in this drift.

SOUTH FOOTWALL

2ND SUB BELOW 4TH LEVEL:

This sub-level was developed the latter part of 1922, a drift being driven for the full length of the ore body which did not average over nine feet in width. Stopping of ore between this sub-level and the 4th Level was started at the West end of the ore body in 1922 and continued in 1923 until all of the ore in this territory had been mined.

4TH SUB BELOW 4TH LEVEL:

This sub-level was developed in 1923 for a distance of 200 feet at the West end of the ore body; it averaged about 9 feet in width. The West 120 feet of this sub-level was mined up to the 2nd sub, the ore being stoped without timber.

The work on the above two sub-levels comprise the only work on the South footwall above the 5th Level. It is not deemed advisable to mine more ore in this territory as it might throw weight on the 5th Level drifts. A pillar, approximately 60 feet in thickness, was left between the floor of the 4th sub and the back of the 5th Level South haulage drift. Contrary to expectations, however, this pillar of ground moved in the latter part of November, causing heavy crushing in the South haulage drift on the 5th Level. As stated elsewhere in this report, this movement was due to the mining of the "New Find" on and above the 4th Level elevation in connection with the mining of the main ore body on the North footwall. Sufficient openings had been made at these two points so that the block of solid ground between them broke loose from the hanging at a point some distance above the ore body. It is possible

that this break occurred 150 feet or more above the 5th Level. It is not planned to do any further mining of the ore left on the South footwall above the 5th until mining is completed in the "New Find", after which ore will be stoped from sub-levels opened at approximately 20-foot intervals. The ore body is too narrow to warrant mining on sub-levels by the ordinary caving system.

5TH LEVEL

During the past year constant repairs have been necessary in the South haulage drift. This is the drift which extends the entire length of the ore body on the South side of the 5th Level. A crosscut also extends from this drift to the South, and then to the West, from which raises were put up to mine the ore in the "New Find". The timber in the greater part of this drift had rotted, as the ventilation had been poor throughout the entire mine until the large ventilating fan was installed in 1922. One or more gangs were employed repairing this drift during most of the year, up to the latter part of November, when the ground on this side of the mine took weight and crushed the timber throughout the entire drift. At this time it was necessary to put six gangs repairing to keep the drift open for motor haulage until the work could be completed for transferring the ore to the 6th Level. Repair work was continued on an extensive scale in December, by the end of which month, however, it had been practically completed. A number of wood pillars were built in the haulage drift, as it is desirable to keep it open so that timber can be brought in for the contracts working in the "New Find". It will probably be necessary to keep one gang doing repair work in this drift until all the ore above the 5th Level has been removed.

1ST SUB BELOW 5TH LEVEL:

This sub was opened at the West end of the ore body in 1922, and an area approximately 110 feet in length by 15 feet in width mined out. Due to danger of caving the haulage drift, no further work has been done on this sub-level during 1923.

2ND SUB BELOW 5TH LEVEL:

This sub-level was opened the first half of the year, a drift being driven along the hanging from the West end of the ore body to the East for a distance of 220 feet. The ore encountered here was poor grade, not averaging over 55% in Iron. The developments on this sub-level on the South side of the ore body were distinctly unfavorable, as it indicated that the enrichment had not been complete at this elevation. It is probable that it will not pay to mine the ore from this point up to the 5th Level, as the grade is low. A small amount of development work was done from two raises to the East of the above described drift, at both of which points the ore was also lean.

3RD SUB BELOW 5TH LEVEL:

This sub-level was opened in the fall from two raises in about the center of the ore body, on the South footwall. Drifts were driven across to the hanging, one of which showed the ore to be 45 feet in width; the other 40 feet. A drift was driven connecting these two raises following the hanging, which was found to be quite irregular, indicating that the average width of the ore between the two raises would not exceed 30 feet. There was a total of 165 feet of drifting done on this sub-level. In addition to the drift along the hanging, one slice was taken on the side of this drift for a distance of 40 feet. The grade of the ore on this sub-level was considerably better than on the sub above, so that it is anticipated that mining can be carried on from the 3rd sub down to the bottom of the deposit, near the 6th Level.

4TH SUB BELOW 5TH LEVEL:

This sub-level was opened in the fall from a raise on the South side. A drift was driven to the hanging which showed the ore to be 55 feet in width at this point. A drift was then driven along the hanging a distance of 70 feet, and a raise put up in about the center of this drift which indicated that the hanging was standing vertical at this point, the ore extending some distance

above the sub-level. The sub directly above this was then opened, as it was planned to mine the ore at a higher elevation, near the hanging. The ore, however, on the upper sub was cut off by the hanging in the crosscut driven from the same raise at such a point that, to reach the ore discovered by the raise in the drift along the hanging on the 4th sub, would make it necessary to drift some distance in rock to reach it. It was then decided to resume work on the 4th sub, stoping the ore out above the back of the drift along the hanging, working upward until the overturn in the hanging was reached. This work was done the last of December, a stope being opened approximately 30 feet in length by 15 feet in width, with a maximum height of 25 feet. The work done here showed that the steepness of the hanging was local to a small area, from which all the ore has now been mined.

1ST SUB ABOVE 6TH LEVEL:

This sub-level was opened from one raise in the early part of the year, and a drift driven to the North to locate the overturn in the hanging, which information was needed in order to plan the necessary extension of the 6th Level haulage drift and the location of raises. The ore at this point was high grade, averaging 58.50% in Iron and seemed entirely free from seams of lean ore or slate, indicating a much better concentration near the bottom of the deposit.

6TH LEVEL

During the year the South haulage drift on the 6th Level was extended a distance of 180 feet in rock, and five raises put up to the elevation of the 5th Level.

The above several paragraphs cover the work done in the main ore body on the South footwall during the year 1923. Comparatively little ore has been produced from this territory. The 3rd and 4th subs opened below the 5th Level indicate a widening of the deposit; however, from the 3rd sub up to the top of the present ore body on the 4th sub below the 4th Level, the ore is very narrow, probably not exceeding 15 feet in the widest part, running from this down to 6 feet in width. This ore can only be mined at a profit by stoping methods, as it is not thick enough to warrant opening sub-levels at regular intervals of 10 or 11 feet.

NEW FIND

1ST SUB BELOW 3RD LEVEL:

This sub-level was opened in 1922 at a point in the "New Find" where the ore had been found to extend some distance above what had formerly been assumed to be the top of the ore body. During 1922 it was developed for a length of 220 feet at this elevation, and the greater part of the ore mined. In 1923, the balance of ore around the raises was mined, which completed all mining in the "New Find" at this elevation.

6TH SUB ABOVE 4TH LEVEL:

This sub-level in the "New Find" had been opened in 1922 at a point 20 feet below the sub-level described in the previous paragraph. At first, this was thought to be the top of the ore in the "New Find", but mining operations disclosed that the ore extended near the center of the ore body to higher elevations, at one place it reached the elevation of the 3rd Level, or 40 feet above the floor of this sub. The ore body had been entirely developed on this sub in 1922, and the greater part of the ore mined; its length was 580 feet.

When mining was completed on the 1st sub below the 3rd, the remaining ore on this sub-level was mined. The ore mined in 1923 consisted of some small pillars near the center of the ore body which could not be mined until work had been completed on subs above.

5TH SUB ABOVE 4TH LEVEL:

Some work had been done on this sub-level in 1922, but the greater part of the sub-level was developed during the past year. The ore body was found to be 530 feet in length, with an average width of 30 feet. The greatest width of the ore was 40 feet near the center, for a length of 100 feet; the average width of the balance at the East end was 20 feet, while the West end averaged 25 feet in width. Mining was completed here in the fall.

4TH SUB ABOVE 4TH LEVEL:

This sub-level was opened in the summer from raises put up from a drift on the 1st sub above the 4th Level. The East end of the "New Find" was mined, work being completed here the last of the year. This sub-level had a total length of 265 feet, the West 100 feet averaging 40 feet in width; the East 165 feet only averaged 8 feet in width. The East end of the ore body was split by a sharp overturn in the footwall which appeared on this level, dividing the ore body into a North and South lense. The South lense was only 50 feet in length while the North was 165 feet. Developments, however, at a lower elevation showed that the South lense again extended to this elevation at a point further to the East. This extension of the South lense was mined by a shrinkage stope opened from the 1st sub above the 4th.

3RD SUB ABOVE 4TH LEVEL:

This sub-level was opened in 1922 and an area 200 feet in length was mined out in 1923. This comprise the portion of the "New Find" near the center of the ore body which part has been mined to lower elevations than at the East end.

The latter part of 1923 work was started developing the East end of

the ore body on this sub-level. It was developed from two raises put up from the 1st sub for transferring the ore. Both of these raises were in ore, but when drifting started from the raises, rock was immediately encountered, indicating that the raises had been put up in the South lense of the ore body, which was apparently not over 8 feet in width. Drifts were driven to the North through the sharp overturn of the foot, which showed rock to average about 15 feet in width, in each drift. The North lense of the ore body was then encountered in which the ore was 12 feet in width. This ore was being mined by two gangs at the end of the year. Another gang of miners worked here repairing an old drift which had caved, which connects with a raise from the 5th Level, to this old drift, so that the ore on this sub could be trammed directly to a 5th Level raise, which would eliminate the transfer which now has to be made on the 1st sub above the 4th. It is estimated that there are 2,588 tons of ore remaining to be mined on this sub-level.

2ND SUB ABOVE 4TH LEVEL:

This sub-level was opened the last of the year, there being 150 feet of drifting done here. This drift connected two of the 5th Level raises, and at the end of the year was being extended to the East to connect to a third raise from the 5th. This sub-level is being opened beneath that portion of the 3rd sub which has already been mined. It is estimated that there are 4,150 tons of ore remaining to be mined on this sub-level, at the end of 1923.

1ST SUB ABOVE 4TH LEVEL:

This sub-level was opened in 1923, a drift being driven to connect two of the 5th Level raises, and then extended to the East to the limits of the ore body at this elevation. Two raises were put up from this drift which were used in mining the East end of the "New Find" at higher elevations, the ore being transferred at these raises and trammed on this sub-level to a raise from the 5th Level. The ore was found to extend further to the East on this sub-level than on the 3rd sub, 22 feet above. Raises were put up near the East end of the drift, and the ore mined out by a shrinkage stope for a length of 80 feet. This ore varied in width from 8 to 15 feet, and at one point

extended nearly 40 feet above the sub-level. . As the "New Find" is gradually decreasing in length with each succeeding sub-level, it is estimated that there are only 2,278 tons of ore remaining to be mined on this sub-level.

4TH LEVEL

A small area approximately 100 feet in length by 35 feet in width was mined near the West end of the "New Find". It is estimated that the "New Find" extends some distance to the East of this point, and that in this territory there are 4,218 tons of available ore.

1ST SUB BELOW 4TH LEVEL:

A small area at the West end of the "New Find" was mined on this sub-level. This ore was mined at the point where the footwall overturns, the area being approximately 130 feet in length by 40 feet in width. One gang worked here part of December, mining the last pillar left near a raise from the 5th Level.

To the South of this area, and extending a distance of 300 feet to the South-east, an area was developed and mined on the footwall which dips to the South on a flat angle. This ore body had been developed by a drift along the foot in 1922, but mining was not started here until in 1923. The ore varied in width from 70 feet at the West end to 10 feet at the East end; its average height was approximately 12 feet, although in some portions it was barely drift high. A seam of ore, extending further to the East was developed by a drift for a distance of 55 feet, at which point the ore was found to extend in a South-easterly direction for a distance of 160 feet, its average width being approximately 20 feet. This was merely another portion of the ore formation which was enriched to the South of the "New Find". North of this latter ore body there is that portion of the "New Find" which has not yet been mined, and in which it is assumed there are 2,109 tons of available ore. As no development work, however, has been done in the "New Find" at this elevation, this tonnage may be either increased or decreased when mining work starts here.

2ND SUB BELOW 4TH LEVEL:

This sub-level was opened in 1922 to the South of the "New Find" on the footwall which dipped to the South on a flat angle. Connections were made in 1923 to two raises from the 5th Level, and a strip of ore approximately 20 feet in width and 110 feet in length mined under the flat hanging to the North of the drift which had been driven along the foot in 1922. There is still ore to be mined in the "New Find" at this elevation, the estimate showing 3,138 tons of available ore on this sub-level. It is assumed that this sub-level is the bottom of the "New Find", and that no ore will be developed at lower elevations. It may, however, develop that one more sub-level can be opened in the "New Find", but if this proves to be the case, only a small tonnage would be available, probably not to exceed 1,000 tons.

The above description of the work in the "New Find" during the year 1923 shows that mining was carried on on ten different elevations. Mining was completed on the four upper sub-levels, leaving six sub-levels in the "New Find" on which mining has not yet been completed. However, the top sub of these six is nearly worked out, while some development work has been done and some ore mined on all of the remaining sub-levels.

FATAL ACCIDENT

A fatal accident occurred on April 10th, 1923, John Koski, a miner receiving injuries at 4:50 P. M., which caused his death about four hours later. Koski, with his partner, were seated on a bench near the shaft on the 6th Level, waiting for the cage. They had finished their work for the day and were ready to go to surface. Without warning, a small piece of granite fell through the lagging on the side of the drift from the pillar left between the drift to cage and the drift to the shaft pocket. It struck Koski a glancing blow on the side of the head, inflicting two small cuts, only one of which penetrated the skin. Koski walked to the cage, came to surface and walked to the dry. He was taken in an automobile to the hospital where his wound was examined and dressed, after which he walked home. He died a few hours later, the cause of death being either a fracture at base of skull, causing hemorrhage, or a hemorrhage at the base of the skull, without fracture. The fracture, or hemorrhage, was due to the shock transmitted through the skull to the base of the brain.

The piece of rock which struck him was approximately 12" x 16" x 4" in size, was wedge-shaped and rolled down the side of pillar a few inches, then slipped out between the side lagging at a point within a foot of the back of the drift. The side was closely lagged to a point within two feet of the back where a projection on the pillar made it necessary to put the lagging 8" to 10" apart. The piece that fell weighed fifteen pounds. It was probably loosened due to the action of the air, as there was some evidence of lime on the exposed face behind the piece. The accident occurred at a place where to all appearances, an accident was impossible.

Koski was 30 years of age, was married, with a wife and two young children, aged 12 months and 1 month, respectively. He had been employed as a miner in the Gwinn District at various times since 1915.

FRANCIS SURFACE

In May, the clearing of ground for additional stockpiles was started, as the sales sheet showed no ore would be shipped from this mine. The timber on the ground was cut into lagging, cribbing and stulls, the stumps blasted, and the ground leveled. Land was cleared for two stockpiles, one running North and South, the other East and West. It was decided to lay a sollar of 1" hardwood boards, which could be purchased at a reasonable cost. There was no lean ore available for making a sollar.

In July, twenty-four bents were erected on the new West stocking trestle, this trestle having a height of forty feet.

The old center trestle running to the South was raised on a 2% grade, which provided additional capacity of approximately 20,000 tons. When filled, this ore pile will average about 55 feet in height.

The work of clearing ground for the new North and South trestle was completed and ten stocking and eight permanent bents erected in the fall. The ground was leveled and 1" sollar laid. This new ground will be used as soon as the South trestle, which has been raised on a 2% grade, is filled.

It is figured that sufficient stocking room has been provided for the ore hoisted during the winter 1923-1924. If no ore is shipped in 1924, additional stocking capacity will have to be provided by raising trestles and preparing additional grounds.

ACCIDENTS TO EQUIPMENT--FRANCIS MINE.

At 10:20 A. M., Friday, August 24th, the West skip rope broke, as the skip was going into the dump. The skip fell to the bottom of the shaft, breaking two sets of timber and wrecking the loading pocket. The mine was idle the balance of the day and all day Saturday, hoisting being resumed on Monday, August 27th. Repair work was continued on night shift until completed. The accident was probably due to the skip catching slightly, as it was about to enter the dump, throwing an extra strain on the rope. The wires on the interior of the rope were badly eaten by acid in the mine water, and there were a few broken wires on the outside of the rope. Preparations had been made for changing the rope on Sunday, as it had been in service for some time, and the few broken wires, (less than the number given in the rule on wire rope) indicated that it should be changed within a short period.

At 4:45 P. M., on September 19th, while the brakeman was hoisting a loaded skip of ore, he felt a jar on the rope, shortly after the skip had passed the 3rd Level. Hoisting was stopped and an examination made of the shaft, which showed that the skip had caught under an end piece, bending it out so that it was not possible for the skip to pass through until repairs had been made. As it would be necessary to saw out the end piece, and replace it, it was decided that it would not be possible to work the mine on the following day. Repairs were completed, so that work was resumed on Friday, September 21st. On account of this accident, it was decided to carefully gauge all the steel sets from the collar of the shaft to the bottom. This work was done on night shift during the following week in both the skip roads and also the cage road, at which time a careful examination was made of the runners, a number of which were found to be loose, due to the plates to which they are attached having worn loose on the bolts which attach the plates to the steel sets. The steel sets were found to have a clearance of 2", except for a short distance near the 3rd Level, where, due to pressure of ground, the clearance was only from $\frac{1}{4}$ " to $\frac{1}{2}$ ". Repairs were continued on

night shift, plank being put in between the steel sets near the 3rd Level so it would be impossible for the skip to catch even if it should rub against the steel sets. The work of rebolting the plates holding the runners to the steel sets was also started and completed before the end of the year. This work was done on night shift, so as not to interfere with the operation of the mine.

FRANCIS MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.
Franport,	55.67	.134	6.77	.526

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	PHOS.	Mine SILICA	MANG.
Franport,				(No Shipments)

ORE STATEMENT - DECEMBER 31ST, 1923.

	FRANPORT	FRANWOOD	TOTAL	TOTAL LAST YEAR
On hand January 1, 1923,	253,454	-	253,454	166,842
Output for Year,	110,550	-	110,550	98,049
Total, Shipments,	364,004	-	364,004	264,891
				11,437
Balance on Hand,	364,004	-	364,004	253,454
Increase in Output,			12,501	
Increase in Ore on Hand,			110,550	

1923 -- 1-8 Hour Shift, Jan. 1st to Dec. 31st, 1923.

1922 -- 1-4 Hour Shift, 6 days per week, Jan. 1st to June 4th, 1922.
1-8 Hour Shift, 6 days per week, June 5th to Dec. 31st, 1923.

FRANCIS MINE
SHIPMENTS FOR YEAR 1923

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Franport,	-	-	-	11,437
Total,	-	-	-	11,437
Total Last Year,	10,437	1,000	11,437	
Decrease,			11,437	

FRANCIS MINE

COMPARATIVE MINING COST FOR YEAR

	1923	1922	INCREASE	DECREASE
PRODUCT	110,550	98,049	12,501	
Underground Costs	1.382	1.266	.116	
Surface Costs	.300	.244	.056	
General Mine Accounts	.209	.179	.030	
Cost of Production	1.891	1.689	.202	
Plant Account	.600	.600		
Taxes	.102	.105		.003
Central Office	.087	.082	.005	
Contingent Expense	.010	.011		.001
Cost Adjustment	.022	.028		.006
Cost on Stockpile	2.712	2.515	.197	
Loading & Shipping	-	.010		.010
Total Cost on Cars	2.712	2.525	.187	
No. Days Operating	297	301		4
No. Shifts & Hours	1-8	1-8		
Avg. Daily Product	372	326	46	
<u>COST OF PRODUCTION</u>				
Labor	1.290	1.133	.157	
Supplies	.601	.556	.045	
Total	1.891	1.689	.202	

FRANCIS MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	110,550	98,049	22,501	
No.Shifts & Hours	1-8hr	1-8hr		
AVG.NO.MEN WORKING				
Surface	21	23		2
Underground	75	84		9
Total	96	107		11
AVG.WAGES PER DAY				
Surface	4.32	3.90	.42- 9.7%	
Underground	4.81	4.25	.56-11.7%	
Total	4.70	4.18	.52-11. %	
WAGES PER MO. OF 25 DAYS				
Surface	108.00	97.50	10.50	
Underground	120.25	106.25	14.00	
Total	117.50	104.50	13.00	
PRODUCT PER MAN PER DAY				
Surface	17.03	17.21		.18
Underground	4.94	5.09		.15
Total	3.83	3.93		.10
LABOR COST PER TON				
Surface	.254	.227	.027	
Underground	.973	.836	.137	
Total	1.227	1.063	.164	
AVG.PRODUCT BK'G & TRM'G	7.92	7.87	.05	
" WAGES CONTRACT MINERS	4.90	4.30	.60	
" " " LABOR	4.90	4.30	.60	
TOTAL NO.OF DAYS				
Surface	6,493-3/4	5696-3/4	797	
Underground	22,372 1/2	19269	3,103 1/2	
Total	28,866 1/4	24965-3/4	3,900 1/2	
AMOUNT FOR LABOR				
Surface	28032.84	22237.41	5795.43	
Underground	107571.48	81985.07	25586.41	
Total	135604.32	104222.48	31381.84	

Proportion Surface to Underground Men:

1923 - 1 to 3.6
 1922 - 1 to 2.54
 1921 - 1 to 3.39
 1920 - 1 to 2.56
 1919 - 1 to 2.32

FRANCIS MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1923.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1923	AMOUNT 1922
4" to 6" Timber	9,401	.03104	291.79	20.88
6" to 8" "	59,676	.03614	2,156.73	1,447.22
8" to 10" "	42,678	.07060	3,013.30	1,810.64
10" to 12" "	5,433	.07785	422.95	628.53
12" to 14" "	854	.0923	78.82	306.52
14" to 16" "	156	.1162	18.12	19.43
Total Timber - 1923	118,198	.0506	5,981.71	4,233.22
" " 1922	96,265	.0440	4,233.22	
	LINEAL FEET	PER 100'		
5' Lagging	190,400	.8196	1,557.20	726.53
7' "	21,315	.6708	142.98	
8' "	300,223	.7049	2,116.15	2,228.90
Total Lagging	511,938	.7455	3,816.33	2,955.43
Poles	6,732	1.001	67.39	98.31
Total Lagging & Poles - 1923	518,670	.7497	3,883.72	3,053.74
" " " " 1922	399,305	.7648		3,053.74
5/8" Covering Boards (ft.)	16,839	1.200	202.07	541.18
1" " "	23,994	1.7317	415.40	
Total Covering Boards - 1923	40,833	1.5122	617.47	
" " " 1922	42,512	1.273		541.18
Product			110,550	98,049
Feet of timber per ton of ore			1.069	.982
" " lagging "			4.630	3.993
" " " per foot of timber			4.331	4.067
Cost per ton for timber			.05418	.04317
" " " " lagging			.03452	.03014
" " " " poles			.00061	.0010
" " " " covering boards			.00558	.00552
" " " " timber, lagging, poles & boards			.09489	.07983
Equivalent of stull timber to board measure			161,942	151,151
Feet of board measure per ton of ore			1.465	1.542
Cost for timber lagging and poles - 1923				9,865.43
1922				7,286.96
Covering boards used during year 1923				617.47
in place of lagging 1922				541.18

Mine operated Jan. 1st, to Dec. 1st, 1923 - 1 shift
 " " Dec: 1st, to Dec. 31st, 1923 - 2 shifts

FRANCIS MINE

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE

KIND	QUANTITY	AVERAGE PRICE	AMOUNT 1923	AMOUNT 1922
40% R. C. Powder	24,525	13.43	3,294.71	4,520.33
40% Gelatin "	8,325	13.66	1,137.58	
50% R. C. "	100	14.50	14.50	134.86
60% Gelatin "	1,750	17.16	300.25	335.34
Total Powder	34,700	13.68	4,747.04	4,990.53
Fuse	134,300	.6909	927.93	1,124.80
Caps	24,700	1.1507	284.21	318.48
Cap Crimpers	25	.50	12.50	5.43
Tamping Bags	4,450	2.413 M	10.74	12.09
Leading Wire (Lbs.)	5	.342	1.71	
Total Fuse, Etc.			1,237.09	1,460.80
Total All Explosives			5,984.13	6,451.33
Product			110,550	98,049
Pounds Powder per ton of Ore			.3138	.350
Cost per ton for Powder			.04294	.0509
" " " " Fuse, Etc.			.01119	.0149
" " " " All Explosives			.05413	.0658
Average price per pound for Powder			.1368	.1453

Mine operated Jan. 1st, 1923, to Dec. 1st, 1923 - 1 shift
 " " Dec. 1st, 1923, to Dec. 31st, 1923 - 2 shifts.

GARDNER--MACKINAW MINE.

Some ore was shipped from the Gardner stockpile during the summer.

The following statement shows the ore shipped in 1923, and the ore in stock on January 1st, 1924:

	<u>SHIPMENTS</u>	<u>IN STOCK JANUARY 1, 1924</u>
Gardner,	5,370	1,557
Gardner High Sulphur,	<u>4,894</u>	<u>42,880</u>
Total Gardner Mine,	10,264	44,437
Mackinaw High Sulphur,	<u>0</u>	<u>6,125</u>
GRAND TOTAL,	10,264	50,562

During the summer, the water storage tank at the mine was kept filled with water to provide fire protection for the mine and location. The electric pump was kept in commission on surface at the mine so that in case of fire water could be pumped directly into the water lines at the mine, as also the water line from the mine to the location. A plowed strip, 18 feet in width, extending entirely around the location, was kept free of grass and brush during the summer months, to provide protection from forest fires on the sand plains.

The last of April, the pumpman noticed that the timber on the plat at the 4th Level of the Mackinaw shaft was in bad condition. A shift boss and three miners were sent to the mine and worked for about two weeks, installing new timber on the 4th Level plat and at various places throughout the mine, where repairs were needed. The ventilation in the mine is good, but as is the case in all idle mines, there is no appreciable movement of air during the summer months and the mine timber rots.

In November, it was decided to stop pumping at this property and let the mine fill with water. Due to the fact that the ore here is hard and there is comparatively little timber in the mine, it was thought that there would be no damage if it were allowed to fill with water. The average in-

coming water is less than 100 gallons per minute, so that there would be comparatively little difficulty in unwatering the property. Owing to the acid in the mine water it was considered advisable to remove the main pump on the 4th Level, Mackinaw Mine, also the motor cars, haulage locomotive, and electric cables, all of which might be seriously damaged if left under water for several years.

All loose timber and lagging were cleaned off the levels and some fifty props put in the timbered drifts where there might be danger of the ground caving, after the water was pumped out again. A crew of twelve men were employed here for several weeks removing the equipment and storing it on surface. Several of the motor cars and one motor were on the 1st Level, Gardner Mine, and these were hoisted through the Gardner shaft. The electric equipment had been taken from the Gardner hoist in 1922, and sent to the Stephenson Mine, so that in order to hoist from the Gardner shaft, it was necessary to install a temporary sheave at the Mackinaw and one at the Gardner, and extend the Mackinaw rope line to the Gardner, and use the hoist at the Mackinaw engine house. This increased the cost of removing the equipment.

The 1000-gallon plunger pump was removed from the mine; the small plunger pump of 200-gallon capacity, 1000-ft. head, on the 5th Level, was operated during the time that the large pump was being removed. The motor and gear of the small pump were then taken out of the mine, the balance of this pump being left underground. It was given a heavy coating of grease and oil, and it is not thought that it will be seriously damaged by being left in the mine under water. When the mine is unwatered it will only require a short time to install the pump motor and other electric equipment, as also the gear, so that this pump can be quickly gotten into operating condition again.

It was figured that the cost of getting the mine in condition to fill with water, and unwatering it again, assuming that it would be idle for at least the next four or five years, would be considerably less than the cost of keeping it pumped out. It was also figured that there would be less rotting of timber and no expense for keeping the levels in repair.

GARDNER-MACKINAW MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1923.

GRADE	IRON	PHOS.	SILICA	MANG.	SULPH.
Gardner,					(No Production)
Gardner High Sulphur,					(No Production)
Mackinaw,					(No Production)
Mackinaw High Sulphur,					(No Production)

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1923.

GRADE	IRON	PHOS.	Mine SILICA	MANG.	SULPH.
Gardner,					(All Mixed)
Gardner-High Sulphur,					(All Mixed)
Mackinaw,					(No Shipments)
Mackinaw High Sulphur,					(All Mixed)

ORE STATEMENT - DECEMBER 31ST, 1923.

	GARDNER	GARDNER HIGH SULPHUR	MACKINAW	MACKINAW HIGH SULPHUR	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1923,	6,927	47,774	-	6,125	60,826	101,006
Output for Year,	-	-	-	-	-	-
Total,	6,927	47,774	-	6,125	60,826	101,006
Shipments,	5,370	4,894	-	-	10,264	40,180
Balance on Hand,	1,557	42,880	-	6,125	50,562	60,826
Decrease in Ore on Hand,					10,264	

1923 -- Mine Idle during Year.

1922 -- Mine Idle during Year.

GARDNER-MACKINAW MINE
SHIPMENTS FOR YEAR-1923

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gardner,	-	5,370	5,370	21,217
Gardner High Sulphur,	-	4,894	4,894	680
Mackinaw,	-	-	-	-
Mackinaw High Sulphur,	-	-	-	18,283
Total,	-	10,264	10,264	40,180
Total Last Year,	-	40,180	40,180	
Decrease,			29,916	

GARDNER-MACKINAW MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 3	1 9 2 2	INCREASE	DECREASE
PRODUCT	-	-		
No.Shifts & Hours				
Avg.No.MEN WORKING				
Surface	3	3		
Underground	2	3		1
Total	5	6		1
AVG.WAGES PER DAY				
Surface	4.10	3.49	.61-17.48%	
Underground	4.23	3.78	.45-11.9%	
Total	4.12	3.62	.50-13.8%	
WAGES PER MO. OF 25 DAYS				
Surface	102.50	88.25	14.25	
Underground	105.75	94.50	11.25	
Total	103.00	90.50	12.50	
PRODUCT PER MAN PER DAY				
Surface				
Underground				
Total				
LABOR COST PER TON				
Surface				
Underground				
Total				
AVG.PRODUCT BRK'G & TRM'G				
" WAGES CONTRACT MINERS				
" " " TRAMMERS				
TOTAL NO.OF DAYS				
Surface	1,081 $\frac{1}{4}$	836	245 $\frac{1}{4}$	
Underground	788 $\frac{3}{4}$	732- $\frac{3}{4}$	55- $\frac{3}{4}$	
Total	1,869- $\frac{3}{4}$	1,568- $\frac{3}{4}$	301	
AMOUNT FOR LABOR				
Surface	4435.06	2915.27	1519.79	
Underground	3335.23	2766.12	569.11	
Total	7770.29	5681.39	2088.90	

Proportion Surface to Underground Men:

1923 - 1 to .67
 1922 - 1 to 1
 1921 - 1 to 2
 1920 - 1 to 3.3
 1919 - 1 to 3.

Mine idle since Nov.30, 1920.

GENERAL SURFACE

GWINN DISTRICT CRUSHING PLANT:

There were only a few repairs necessary on the crusher before it went into operation the last of April. It was operated on single shift during the summer, but owing to the small shipments, the operation was very intermittent. Crushing was completed in October, when the crusher was closed down. The gyratory crusher was repaired in December, new lining plates being put in and the bearings re-babbitted. There is a new head shaft, key and sprocket for the steel conveyor on the ground, which it had been planned to install after crushing was finished. Owing to other work, this job was postponed until the spring of 1924.

Following is a summary of the ore crushed in 1923, and 1922:

<u>MINE:</u>	<u>TONS CRUSHED 1923</u>	<u>TONS CRUSHED 1922</u>
Stephenson,	36,863	78,914
Austin,	48,759	2,714
Gwinn,	28,529	26,436
Gardner-Mackinaw,	10,264	40,180
Francis,	0	11,437
Princeton,	<u>3,127</u>	<u>5,449</u>
Total,	127,542	165,130
DECREASE, 1923,		37,588 tons.

The crusher was operated 90-3/4 days in 1923 as compared with 96 days in 1922. There were a number of days in 1923, as also in 1922, when there was not sufficient ore to keep the crusher operating to capacity.

The operating costs in 1923 were slightly higher than in 1922, due to the small tonnage crushed and extraordinary expense for maintenance of railroad tracks, which was charged under "Operating". This increase amounted to .019¢ per ton. There was a slight decrease in the General Expense, as also in Maintenance.

AUSTIN LOCATION:

The work of raising the Austin houses, where the sills and floor joist had rotted, due to resting on the ground, was continued during the past summer. All of the houses on the lower street of this location have now been raised and set on concrete posts. There are a number of houses on the upper street which will have to be raised and repaired, but it was not possible to do this work in 1923.

PRINCETON LOCATION:

During the past year new fences have been built on the front of the lots at all of the company houses in this location. Woven-wire fencing, 42" high was used, taking the place of the old board and barbed wire fences. The material from the front fences was then used for repairing the side and rear fences.

DISTRICT OFFICE AND GROUNDS:

The Central Power Plant has operated more during 1923 than for many years past. This was due to the low stage of the water in the rivers, which rendered it necessary to operate the steam generating plants to supply current needed to operate the mines. Just before the close of navigation the coal dock was entirely filled, and additional stocking capacity was obtained by using a scraper and double-drum puffer to move coal away from the trestle so that more could be dumped.

The work of preparing and planting the area between the laboratory and the new coal dock, this area being formerly covered by the old coal dock, was completed late in the fall. The ground was graded and leveled, several inches of good soil put on top and grass seed planted. Poplar trees have been set out around this area and also shrubbery. The lawn area North of the office has been extended down to the fence a distance of about 100 feet, the ground leveled and seeded to lawn grass.

GWINN ASSOCIATION:

Under the able management of Mr. E. L. Miller, Secretary, the Gwinn Association club house has been the center of all social and athletic activities of the district. The club house has been used more during the past year than ever before.

The following report of the years work, compiled by Mr. Miller, gives a record of all activities:

ATTENDANCE:

Every effort has been made during the year to secure an actual record of the number of persons using the Association building or attending activities that are under the direction of the Association. Although these totals are estimated we submit them with the note that they are conservative.

Total attendance at building,	77,335
Average monthly attendance,	6,445

Total estimated attendance for all outdoor activities conducted by the Association; including, Ice Skating Rink, Tennis Court, Playground, Swimming Pool, Baseball Games and Bass Lake Camp, Attendance,	11,810
--	--------

MEMBERSHIP:

Membership January 1st, 1923,	436
Membership January 1st, 1924,	366
Low membership for year (June)	342
High membership for year (April)	441
Average monthly membership,	395

According to the number of men employed in the district during the year, the membership roll was maintained at a very satisfactory point and the pleasant feature regarding this is the fact that those holding membership make very good use of the Association Building and the facilities it has to offer. The annual membership drive was made in August.

TOTAL RECEIPTS AND DISBURSEMENTS:

RECEIPTS:

Total receipts including 1922 balance,	\$ 8,124.25
Total expenditures for year,	<u>8,030.47</u>
Balance,	93.78

THEATRE:

Receipts for 1923,	5,325.54
Expenditures for 1923,	<u>4,527.63</u>
Profit,	797.91
Deposited on future pictures,	87.25

TOTAL RECEIPTS AND DISBURSEMENTS. (Cont'd)

BUFFET:

Receipts for 1923,	\$ 983.95
Expenditures for 1923,	<u>724.47</u>
Profit,	259.48
Inventory of Buffet stock, Jan. 1st, 1924,	32.50

BOWLING POOL AND BILLIARDS:

Receipts for 1923,	519.20
Expenditures for 1923,	<u>318.63</u>
Profit,	200.57

GENERAL ACTIVITIES AND ORGANIZATIONS USING
BUILDING.

- 43 - Rehearsals by Association Band and Orchestras
11 - Engagements by Band
20 - Rehearsals by Glee Club and Carol Singers.
5 - Sales of Fancy Work Articles by Church Organizations
2 - Suppers by Church Organizations
4 - Social Parties by young people (no dancing)
6 - Dancing Classes under supervision of School
2 - Card Parties
10 - Weekly Matches played by Inter-Club League
14 - Meetings by Church Organizations for Social work and sewing lessons. Two conducted by outside workers.
31 - Dances held during year - including ordinary dances and those covering some special event.
39 - Meetings - 12 by Directors of the Association and committees - 3 C. C. I. Power Club - 12 by Sportsmen's Association - 4 American Legion and 9 by other organizations.
54 - Lunches served at different functions during the year
400-- Visitors were shown through the building during the year.

EVENTS OF SPECIAL INTEREST.

Easter Monday Ball	by Basketball Team
Married Folks Dance	by Association
Junior Prom	by High School
Card Party	by Girl Scouts Council
Musical	by Boy Scouts
Fete and Carnival	by Girl Scouts
Farewell Dinner Party in honor of Mr. O. E. Brown	
Reception and Dance	by Baseball Team
Annual Bachelor Club Dance	by Association
Hallow'een Ball	by American Legion
Annual Supper	by St. Anthony's Guild.

EVENTS OF SPECIAL INTEREST (Continued)

Annual Parent-Teachers' Reception and Dance by
Association and School.
Annual Ball - Proceeds to fund for Children's
Christmas Treat.
Sportsmen's Annual Roundup and Stunt Night
Community Christmas and Tree for Children by
Entire Community.
Annual New Years Ball by Firemen.

MOVING PICTURE THEATRE.

149 - Different Pictures Shown
543 - Shows held during year
38,988 - Total paid attendance: Adults - 28,194
Children - 10,794

SPECIAL FREE SHOWS:

1 - Show Sportsmens Association,	130
2 - Shows "Nanook of the North" for School Children,	250
2 - Shows in connection with Ball for Christmas Treat Funds	152
5 - Shows for Children at Christmas	638

Grand Total for Year, 40,158

The grade of pictures shown during the year was much higher than in previous years, and many favorable comments were expressed by the members on the majority of the films exhibited.

ADMISSION PRICES CHARGED DURING YEAR

39 - Shows at 10 cents	An admission price of
69 - Shows at 15 cents	5 cents was charged for
36 - Shows at 20 cents	all afternoon shows for
4 - Shows at 25 cents	the children except on
1 - Show at 30 cents	four occasions.

LIBRARY AND READING ROOM.

LIBRARY:

Number books contained in library,	1,248
Number books purchased during year,	6
Number books donated during year,	18
Number books withdrawn (bad condition)	73
Number books loaned on cards,	3,265
Number books loaned per month,	272

READING ROOM:

The Reading Room proved very popular during the year. It is impossible to ascertain the number making use of this privilege, but all of the newspapers and magazines are enjoyed. The most popular magazines are those that describe out-door life.

LIBRARY AND READING ROOM (Cont'd.)

READING ROOM:

The following number of magazines and newspapers are received and placed on the tables in the reading room:

Weekly magazines, 8	Weekly Newspapers,	4
Monthly " 21	Daily " "	3

MUSICAL ORGANIZATIONS.

ASSOCIATION BAND:

The Association Band after enjoying a successful run without a break for four years, had the misfortune to lose several of its members during the latter part of the year, and in December it was decided to postpone rehearsals until the spring of 1924.

At the beginning of 1923, all instruments in the Band were changed from high to low pitch, and during the summer the band was at its height in musical ability and popularity. At that time the band contained 24 members, but at the present time it numbers but fourteen.

During the year, the Band held 39 rehearsals and filled 11 engagements.

The December statement from the Treasurer shows a balance of, \$62.78.

ASSOCIATION GLEE CLUB:

The Glee Club was organized in 1922, and proved very popular. They were again on the job this year and were responsible for bringing four very fine entertainments to the district. Three of them have been given and the final number will come early in January. The entertainment course was secured through the Red-path Bureau. This has proved very popular with the entire community and the course was a success financially.

The club is also rehearsing for their annual concert and from the enthusiasm shown by the entire personnel, it will be well worth hearing.

During the year they held 16 meetings, and rehearsals. Attendance at the three entertainments, 1,100.

One of the fine features of this organization is that they are always willing to assist at any community event where vocal numbers are desired, without charge.

Financial statements at the end of the year shows a balance of \$40.31.

As in other years, the Association assisted the Band and Glee Club when possible, and besides the moral support, contributed \$ 210.35. This was paid out as salary for the leader of the band, and to purchase music.

INTER-CLUB CRIBBAGE LEAGUE.

During January, the Inter-Club Cribbage League was organized, with six teams and eight men to the team. Matches were played, one every week, and the schedule was completed in ten weeks. The Masonic Club were the winners.

RADIO PHONE

In March, the Association received as a gift from the Cleveland-Cliffs Iron Co., a fine Radio Receiving Set fully equipped with loud speaker, and with two stages of amplification. Many Radio fans have developed since its arrival, and the present schedule is arranged so that the children as well as the older members have the opportunity to hear the fine programs that are received. During the summer results of baseball games were secured early in the evening, and during the football season the important games were received play by play.

Number of hours Radio Phone was used,	435
Total attendance at programs (estimated)	4,500

BOWLING:

Bowling proved one of the most entertaining of the indoor pastimes. The bowling league conducted for the men consisted of six teams of four men each. The league completed its full schedule of 60 games and the standings of the different teams at all times was close and the interest was maintained until the finish. The alleys were in good condition during the entire season.

The team bowling under the name of "Professionals" won the Championship, and the privilege of having their name placed on the M. M. Duncan bowling Trophy, presented to the Association in 1921.

During March and April a league was organized for the women. They completed the schedule and have requested the use of the bowling alleys one night per week during the coming year.

PHYSICAL AND ATHLETIC DEPARTMENT.

Including all work conducted in the Gymnasium, Swimming Pool, and all outdoor recreations; such as Baseball, Football, Track, Tennis and Playground Courts, also outdoor swimming pool.

All physical activities of the Local High School were conducted through the Association and by Association employees.

PHYSICAL AND ATHLETIC DEPARTMENT (Cont'd)

The High School program began early in January and was brought to a close the latter part of April, with an Exhibition illustrating the work they received during their class periods.

Although there were no regular classes organized for the seniors, they were active and used the Gymnasium as often as convenient. The business men met weekly and had a fine class.

SUMMARY OF THE ACTIVITIES OF THE PHYSICAL DEPARTMENT.

	<u>Periods</u>	<u>Attendance</u>
Boys High School Physical Training Classes,	68	2,411
Girls " " " " "	72	2,190
Boys and Girls Basketball Practice,	56	674
Business Men's Organized Classes,	12	122
Boy Scouts using Gymnasium for Recreation,	13	245
Supervized Swimming (Girls)	23	270
Supervized Swimming (Boys)	24	518
Seniors using gymnasium for Basketball, handball, indoor baseball, volley- ball, boxing, wrestling and re- creative games,	72	<u>598</u>
Total,		7,028
Number baths taken (estimated)		6,300

Basketball games during year - 12 games between local teams - 12 games at home with visiting teams and 13 games away from home. The Gwinn High School Team entered the Class "B" Tournament at Marquette and the Association Team entered the Independent Tournament at Crystal Falls.

Both teams made a creditable showing. Local Scout and High School Class basketball tournaments were held and created much interest.

The outdoor skating rink was maintained as in other years, and the schedule arranged permitted all those desiring a chance to enjoy the pastime. The rink was in good condition for 47 days during January, February and March.

Attendance, 4,765

Attendance on Playground and Tennis Courts,..... 798

BASEBALL:

The fourth season of the Mine Baseball League was opened with 4 teams and although they were handicapped by short evenings, they were able to play out a four week schedule. The Stephenson Mine team were the winners and share the honor with the Francis Mine team of having their name twice placed on the Baseball Trophy Cup, presented to the Association in 1920 by Mr. Wm. G. Mather.

SUMMARY OF THE ACTIVITIES OF THE PHYSICAL DEPARTMENT

BASEBALL: (Continued)

As in other years, the Association finances the league and all games were free to the spectators. The fans are all hoping that we will have daylight saving time the coming summer, so that the league schedule may be increased and the same number of games played as in previous years.

The Association team which is made up of the best players in the mine league had a full schedule with some of the best teams in the county. They were successful in winning 5 games of the 11 played. The team continues to keep its amateur standing, and the men play the game for the actual sport they get out of it.

Total attendance for all home games, 2,450.

FOOTBALL:

The Association did not maintain a football team, but the local high school played inter-class games which were interesting. The material for these games was furnished by the Association.

The final game was played election day and the winners received a football trophy donated to the Gwinn High School. These games brought out a fine spirit of fair play, and sportsmanship.

BASS LAKE CAMP COTTAGE.

Camp opened June 1st. Closed October 15th.

Estimated attendance for season, 1,600.

Number families using camp at different periods for entire week,	6
Parties using camp week ends,	14
All day picnics,	11
Parties using grounds for basket-picnics,.....	42
Girl Scouts had use of camp (days).....	8
Boy Scouts had use of camp (days).....	6

Receipts for boat hire for season, \$ 21.15.

Two new boats were added and old boats repainted. Two new docks were constructed and a slide for children to use while bathing was installed. Many more people made use of the bathing facilities and no doubt in the future it will be necessary to construct change rooms.

SCOUT ACTIVITIES.

GIRLS:

The Girl Scout movement in Gwinn is now three years old and the entire community may well feel proud of the results obtained.

SCOUT ACTIVITIES (Continued)

GIRLS:

Two complete troops are being instructed and they meet weekly in the Gymnasium.

The following report covers the work of both troops:

Class Meetings: 78, Attendance, 1,508.

13 - Social Events and Parties, including entertainments to raise funds.

8 - Hikes and Outdoor picnics.

1 - Ceremonial night and presentation of badges, at which event 84 merit badges, 10 second class and 2 attendance stars were awarded.

2 - Addresses were given to the Scouts by outside parties, and several special events to raise funds were held during the year. The Local council held its annual rummage sale, which was very successful.

The Association assisted when possible and donated the sum of \$20.00 to the Local Council to be used as they found necessary.

BOYS:

The following covers the activities of both troops. The larger boys or Troop number one has been active since 1919. Troop number two was organized during the fall of 1922.

58 - Meetings: Attendance, 1,080
11 - Recreation Periods " 183
7 - Days at Bass Lake Camping,
2 - Over-night Hikes.

Baseball and Basketball tournaments were held for both troops.

BUILDING MAINTENANCE.

The usual amount of equipment to keep all the departments in good working condition was purchased by the Association.

This covers Bowling pins, bowling balls, replaced pool balls and cues, athletic supplies, new cloth for pool tables, janitor and library supplies.

CONSTRUCTION AND REPAIR WORK.

2 - New boats for Bass Lake Camp.

2 - New docks at Camp.

All old boats re-painted. Fence and Tennis Court put in good shape. Floors throughout building oiled, cabinet for Radio Phone Moving picture machines put in good condition Bowling alleys sand-papered and shellaced Roof and tin gutters repainted. Gymnasium thoroughly cleaned, walls scrubbed and floors repaired. Ladies toilet re-arranged.

- - - - -

It is recommended that cement walks be built in the Club House grounds, as it is impossible to keep the building clean in the spring and fall, with the present soft limestone walks.

It is earnestly hoped that the present motion picture room will be enlarged in 1924. The present room is very small and is usually crowded, the ventilation is very poor, and it is also hard on the eyes, as the seats extend within ten feet of the screen.

ACCIDENT TO EQUIPMENT.

CENTRAL POWER PLANT:

On Saturday, January 20th, the high-pressure cylinder on the compressor at the Central Power Plant cracked near the top of the cylinders; the crack extended longitudinally, and was 18" in length. The attention of the engineer was drawn to it by the noise of the escaping air, and the compressor was immediately shut down. It was fortunate that the cylinder did not explode, in which case there would have been serious damage to all machinery and electrical equipment in the engine room. For several days following this accident, the mines were furnished air by the small compressor at the Francis Mine. A pressure of 75 pounds was maintained at the Francis, but the air pressure at the Austin and Stephenson Mines did not average 55 pounds. It was necessary to stop all rock work at these mines, but it was possible to continue mining ore as the auger drill machines would work at a pressure of 55 pounds. A heavy casting was obtained from the Lake Shore Engine Works, which permitted of the

temporary repair of the cylinder, the compressor going into operation again on Thursday, January 25th. The governor was set at 70 pounds, and air was furnished the Austin and Stephenson at this pressure until the new cylinder was received and installed early in March. An air pressure of 70 pounds pressure was sufficient for operating the auger drill machines in ore, but good results were not obtained with the Leyner machines in rock, as this pressure was too low for efficient operation. As soon as the new cylinder was installed, air was supplied at 80 pounds pressure.

REPUBLIC MINE.

The production for the year 1923 from this property was less than the average for full time operation, due largely to the fact that the new ore developed could not be mined due to the close proximity of the Pascoe Shaft. We never have any large quantity of ore reserves, the ore being broken and hoisted usually as fast as it is opened up and can be mined, as will be seen in a table shown in this report.

The tonnage hoisted for the year follows:-

Basic Lump ore,	62,219 tons,
Basic Crushed Ore,	56,636 "
Pascoe Crushed Ore,	126 "
Total,	105,864 "

New ore developed, assuming the ore lenses on the bottom level to only go down 50 feet below the present working level, exceeds production by approximately 55,000 tons. The following table shows the ore produced and new ore developed since 1915:-

YEAR	ORE HOISTED TONS	NEW ORE DEVELOPED TONS
1915	185,187	18,611
1916	173,096	18,732
1917	153,425	117,541
1918	142,476	155,939
1919	155,315	189,447
1920	153,951	100,046
1921	73,014	159,510
1922	98,588	88,569
1923	105,864	161,465

Previous to 1917, practically no new ore was opened up due to lack of development work. Since January 1st, 1917, we have opened up 125,768 tons more than has been mined. The gain in ore reserves has been slow but steady and the Republic Mine would be in good shape to produce a good tonnage in 1924 were it not for the fact that the main ore body lies too close to the Pascoe Shaft on the bottom or 2670' Level to permit mining.

As this condition may also exist and probably does lower down in the Pascoe Shaft, we have started a drift over to No. 9 Shaft on the bottom level, with the intention of raising the main No. 9 Hoisting Shaft and abandoning the Pascoe Shaft below the 2570' Level.

ESTIMATE OF ORE IN SIGHT DECEMBER 31ST, 1923.				
NO. 9 SHAFT.				
LEVEL	DEVELOPED ORE		PROSPECTIVE ORE	TOTAL ORE
	AVAILABLE ORE	SHAFT PILLARS		
911 -				
1153		14,720		14,720
2170	25,040			25,040
2270	16,100			16,100
2370	6,780			6,780
TOTAL,	47,920	14,720		62,640
PASCOE SHAFT.				
1570	36,430			36,430
1640		2,700		2,700
1710	4,180	31,700		35,880
1780		42,940		42,940
1850	16,720	13,200		29,920
1950		58,570		58,570
2050	610	18,960		19,570
2570		9,660		9,660
2670	108,390	78,950	67,800	255,140
TOTAL,	166,330	256,680	67,800	490,810
GRAND TOTAL,	214,250	271,400	67,800	553,450

The ore reserves exclusive of shaft pillars subdivided into grades are as follows:-

GRADE	DEVELOPED ORE	PROSPECTIVE ORE	TOTAL ORE
Bessemer Ore,	125,720	67,800	193,520
Basic Ore,	40,610		40,610
Pascoe Ore,	47,920		47,920
Total,	214,250	67,800	282,050

	1920	1921	1922	1923
Ore in Sight January 1st,	410,582	381,712	398,608	391,073
Prospective Ore, " "	64,595	39,660	109,260	106,776
Total,	475,277	421,372	507,868	497,849
Product,	153,751	73,014	98,588	105,864
Balance,	321,326	348,358	409,280	391,985
Ore in Sight December 31,	381,712	398,608	391,073	485,650
Prospective Ore, " "	39,660	109,260	106,776	67,800
Total,	421,372	507,868	497,849	553,450
Developed during year,	100,046	159,510	88,569	161,465

SHIPMENTS.

The shipments for 1923 were much larger than the two years previous. We shipped out two cargoes of Republic Crushed ore on November 27th and December 3rd, after regular shipments to the Dock had been suspended for two weeks previous.

The shipments by grades were as follows:-

Bessemer Lump,	245 tons
Basic Lump,	66,041 "
Bessemer Crushed,	335 "
Basic Crushed,	94,306 "
Pascoe Crushed,	<u>8,087</u> "
Total,	169,014 "

The mine analysis of the cargoes compare very favorably with those secured by the lower lake chemists, as shown by the following table, which is the calculated average of the individual cargoes as sampled at the mine and the Lake Erie Ports:-

	MINE ANALYSIS			LOWER LAKE ANALYSIS		
	IRON	PHOS.	SILICA	IRON	PHOS.	SILICA
Basic Lump,	65.49	.036	4.82	65.08	.036	6.34
Bessemer Crushed	63.02	.036	6.92	63.54	.034	5.05
Basic Crushed	63.27	.037	6.80	63.63	.060	7.18
Pascoe Crushed	55.55	.046	17.03	57.19	.053	16.85

The Basic Lump shipments averaged higher than the guaranteed analysis. The Bessemer Crushed cargoes were a little under published analysis, while the Basic and Pascoe grades shipped were better than the guarantees.

In addition to the above calculated averages, the Republic Mine Office and also the lower lake chemists take a portion of the powder from each cargo and run a complete analysis, from which the principal components run as follows:-

	MINE RESULTS			LOWER LAKE RESULTS		
	IRON	PHOS.	SILICA	IRON	PHOS.	SILICA
Republic Basic Lump,	65.40	.038	4.70	65.05	.033	6.04
Republic Basic Crushed,	63.40	.038	6.90	63.42	.035	7.34

You will note in each case the lower lake chemists get much higher Silica results than the Mine Office for corresponding Iron determinations. The Pascoe Crushed is no exception because the average Iron content reported by Crowel & Murray runs $1\frac{1}{2}\%$ higher than the local results, and their Silica determination is way too high.

Last year we had the same trouble and Fred Baker and the Republic Mine chemist invariably got lower Silica results on Republic powders sent to us by the lower lake chemists. We used extreme care in making these check determinations, and I have come to the conclusion that the lower lake chemists do not report correct Silica determinations.

PRODUCTION FOR 1924.

The estimate for 1924 calls for an average of only 425 tons per day out-put. That seems low when the estimate of ore in sight on December 31st, 1923, shows approximately 500,000 tons of developed ore, but you will note that over half that tonnage is tied up in shaft pillars. The Pascoe Shaft lies right in the axis of the Republic trough, and as mentioned before, it is imperative that the main No. 9 Hoisting Shaft be deepened so that all development work can be carried on from No. 9 instead of the Pascoe Shaft.