a number of pillars in this area, some of which are part rock and part ore, and it was found that there was not sufficient ore in two of them to warrant mining. It is possible that other pillars may be found to be too lean, in which case the available tonnage estimated on the 360' sub will be further reduced.

There was a total of 415 feet of rock drifting done beyond No. 1 Shaft, on the main 6th level haulage drift. There were four rock raises put up to mine the shaft pillars. It will require at least another year after the mine re-opens to take out the balance of the ore remaining at No. 1 Shaft. Since the mine closed down, a considerable part of the repair work has been done in the drift on 6th level, from No. 2 to No. 1 Shaft.

C. & N. W. LEASE - SECTION 19.

This lease is worked inconjunction with, and the ore hoisted through the Princeton No. 2 Shaft.

The Ore Statement for the year 1921 is as follows:

	SECTION 19 PRINCEPORT	SECTION 19 CAMBRIDGE	TOTAL
On hand January 1st, 1921,	270	19,906	20,176
Output for Year,	1,650	8,982	10,632
TOTAL,	1,920	28,888	30,808
Shipments,	607	2,100	2,707
in Stock January 1st, 1922,	1,313	26,788	28,101

The ore produced from this lease is stocked with the Princeton ores. When operations first started, this ore was stocked separately, but an agreement was made with the C. & N. W. Ry. Co., which permitted the ore to be hoisted and stocked with the Princeton Mine ore. There was 10,632 tons mined in 1921 on the C. & N. W. Lease, Sec. 19, as compared with 47,148 tons in 1920. This large decrease was due principally to the transfer of contracts from Sec. 19 to No. 1 Shaft territory on Section 18. It was necessary to leave a 40-ft. pillar to protect the haulage drift to No. 1 Shaft. This, together with the fact that mining on Section 19 had been completed down to the 1st sub above the 6th, decreased the available territory for mining on Section 19 until the cross-cuts were completed on the 7th level and raises put up to the 6th. Completion of the development work on the 7th would have permitted an increased production from Section 19, as it would have been possible to start mining under the hanging on both the 6th level as well as to work more gangs on the 1st sub above the 6th, in that part of the ore body which had not yet been mined South of the pillar left to protect No. 1 haulage drift.

The estimate of ore in sight on December 31st, 1921, is as follows:

	PRINCEPORT	CAMBRIDGE	TOTAL
Ore above 6th Level,	9,000	57,128	66,128
Prospective Ore below 6th,	5,000	46,921	51,921
TOTAL,	14,000	104,049	118,049

The estimate of ore in sight a year ago was 125,303 tons as compared with 118,049 tons on December 31st, 1921, the decrease amounting to 7,254 tons in 1921. The product was 10,632 tons, which shows that there was 3,378 tons of ore developed on this lease in 1921. Practically no additional information was gained during 1921 of the size of the ore body below the 6th level; the increase in the estimate was due to a slight increase in the size of the ore body on the 6th level. When work is resumed, information will be gained of the ore below the 6th level, by raises from the 7th level. This will permit an accurate estimate to be made of this ore which is now "prospective ore".

Estimated tonnage on this Lease, sub-divided as required by the State Tax Commission:

Non-Bessemer:

Developed	1. Sec. 19 Princeport,	9,000 tons
	2. Sec. 19 Cambridge,	57,128 "
Prospective	1. Sec. 19 Princeport,	5,000 "
	2. Sec. 19 Cambridge,	46,921 "
	TOTAL,	118,049 "

The work on this lease during 1921 was confined to the following territory:

1ST SUB ABOVE SIXTH LEVEL.
SIXTH LEVEL
SEVENTH LEVEL

- - - - -

1ST SUB ABOVE SIXTH LEVEL.

This sub-level was opened in 1920 and an area approximately 70 x 150 feet in size mined out. There were 4 gangs working here in January, 1921, and 2 in August, when the mine closed. A little over half of the ore body has been mined. A pillar 40 feet in width has been left near the footwall on this sub-level in order to protect the haulage drift to No. 1 Shaft. The unmined portion of the ore has been developed by drifts, so that mining can be resumed here as soon as the mine re-opens. The pillar left to support the haulage drift cannot be mined, however, until mining is completed at No. 1 Shaft. Very little of the ore produced in 1921 has been of Princeport grade. As stated in previous reports, the character of the ore on this lease has changed with depth, from a non-plastic to plastic. It is evident that practically all the remaining ore on the lease will be plastic.

SIXTH LEVEL.

Some work was done at the East end of the ore body on the 6th level. A rock drift was driven from the top of a raise which had been put up from the 7th level over to the drift to No. 1 Shaft, a distance of 40 feet. The water pumped at No. 1 Shaft was then diverted through this drift to the raise, hence to the 7th level, and by ditches on the 7th to the main pumping plant. This cut down the height which No. 1 Shaft water had been pumped, by several feet, and also shortened the distance by several hundred feet. In March a drift was started to the South from the raise which had been put up from the 7th level in which ore was encountered after drifting about 40 feet in rock. The ore was then followed under the hanging to the South and West, up to the time the mine closed, by which time this drift was in 150 feet from the raise. It is planned to extend it to the

South-West until it holes to a drift which had been driven along the hanging from the South-West end of the ore body. Two raises were also put up from the 7th level to the 6th, and one raise connected to this hanging wall drift. Practically all the ore on the 6th level will have to be mined by raises put up from the 7th level. This work had been started at the North end of the ore body when the mine closed.

SEVENTH LEVEL.

In 1921, three raises were put up from the 7th to the 6th levels in the Section 19 ore body. In addition to this work, No. 3 crosscut, which is located near the North end of the ore body, was extended 84 feet to the West. This crosscut was practically completed at the time the mine closed down. When the mine re-opens it is planned to put up several raises. There is approximately 250 feet of rock drifting to be done on this lease, in order to complete the development work on the 7th level. There will be at least eight or more raises to be put up.

PRINCETON MINE SURFACE.

Aside from the construction work authorized by E. & A. No. 401, there has been comparatively little surface work done at this mine during the past year.

E. & A. NO. 401:

Under E. & A. No. 401, the following work has been done during 1921: The new brick engine house has been completed, and the new hoist installed. It is planned to use the old motor on this hoist, as well as the other electric equipment. This material has not as yet been transferred from the old engine house.

A new Rotary Dump for the 7th level has been received and installed. The 20 haulage cars purchased for the 7th level have also been received and taken underground.

The permanent trestles for stocking Princeport ore in the area North and West of the shaft were completed and ore was stocked here during the past year.

Considerable expense was incurred in raising the tracks on the Cambridge stocking grounds, in order to make additional stockpile room.

PRINCETON MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1921.

GRADE	IRON	PHOS.	SILICA	MANG.
Princeport,	61.85	.278	5.09	.429
Cambridge,	60.05	.811	4.12	1.112

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1921.

GRADE	Mine IRON	PHOS.	SILICA	MANG.
Princeport,	(All Mixed)			
Cambridge,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1921.

	PRINCE-PORT	SEC. 19 PRINCE-PORT	CAMBRIDGE	SEC. 19 CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On hand Jan.1,1921,	155	270	149,895	19,906	170,226	167,089
Output for Year,	13,466	1,650	73,052	8,982	97,150	157,746
Total,	13,621	1,920	222,947	28,888	267,376	323,835
Shipments,	4,461	607	16,748	2,100	23,916	153,609
Balance on Hand,	9,160	1,313	206,199	26,788	243,460	170,226
Decrease in Output,					60,596	
Increase in Ore on Hand,					73,234	

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
1-8 Hour Shift, 5 days per week, March 26th to June 1st, 1921.
1-4 Hour Shift, 6 days per week, June 1st to Aug. 26th, 1921.
Mine closed August 26th, 1921.

1920 -- 2-8 Hour Shifts, Jan. 1st to May 1st, 1920.
1-8 Hour Shift, May 1st to Dec. 31st, 1920.

PRINCETON MINE

SHIPMENTS FOR YEAR 1921.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Princeport,	878	3,583	4,461	21,579
Sec. 19 Princeport,	94	513	607	40,405
Cambridge,	3,008	13,740	16,748	74,023
Sec. 19 Cambridge,	294	1,806	2,100	17,602
Total,	4,274	19,642	23,916	153,609
Total Last Year,	67,887	85,722	153,609	
Decrease,	63,613	66,080	129,693	

PRINCETON MINE

COMPARATIVE MINING COST FOR YEAR

	1921	1920	INCREASE	DECREASE
Product	97,150	156,746		59,596
Underground Costs	1.862	2.250		.388
Surface Costs	.418	.394	.024	
General Mine Accounts	.223	.227		.004
Cost of Production	2.503	2.871		.368
Original Cost	.316	.248	.068	
Plant Account	.053		.053	
Uncompleted Construction	.015	.039		.024
Taxes	.149	.154		.005
Central Office	.080	.097		.017
Contingent Expense	.009		.009	
Idle Expense	.261		.261	
Cost Adjustment	.103	.104		.001
Cost on Stockpile	3.489	3.513		.024
Loading & Shipping	.019	.114		.095
Total Cost on Cars	3.508	3.627		.119
No. Days Operating	189	303		114
No. Shifts & Hours	1-8hr-115 1-4hr- 74	2-8hr- 26 1-8hr-277		
Average Daily Product	514	517		3
COST OF PRODUCTION				
Labor	1.581	2.097		.516
Supplies	.922	.774	.148	
Total	2.503	2.871		.368

1-8hr 6 days a week to Mar. 26;
1-8hr 5 " " May 31;
1-4hr 6 " " June 1 to Aug. 27;
Idle - Aug. 28th to Dec. 31st.

PRINCETON MINE.

PRINCETON MINE

COMPARATIVE WAGES AND PRODUCT

	1 9 2 1	1 9 2 0	INCREASE	DECREASE
PRODUCT	97,150	156,746		59,596
No.Shifts and Hours	1-8;1-4	2-8hr-26 1-8- 277		
AVERAGE NO.MEN WORKING				
Surface	32	41		9
Underground	90	126		36
Total	122	167		45
AVERAGE WAGES PER DAY				
Surface	4.80	5.44		.64
Underground	5.57	6.48		.91
Total	5.37	6.22		.85
WAGES PER MONTH OF 25 DAYS				
Surface	120.00	136.00		16.00
Underground	139.25	162.00		22.75
Total	134.25	155.50		11.25
PRODUCT PER MAN PER DAY				
Surface	13.24	12.28	.96	
Underground	4.73	4.05	.68	
Total	3.48	3.04	.44	
LABOR COST PER TON				
Surface	.362	.443		.081
Underground	1.179	1.601		.422
Total	1.541	2.044		.503
AVG.PRODUCT BRK'G & TRM'G	7.46	7.45	.01	
" WAGES CONTRACT MINERS	5.96	6.98		1.02
" " " LABOR	5.96	6.98		1.02
TOTAL NUMBER OF DAYS				
SURFACE	7,333¾	12,767½		5,433¾
Underground	20,544¼	32,724½		12,180¼
Total	27,878	51,492¼		17,613¼
AMOUNT FOR LABOR				
Surface	35207.36	69417.87		34210.51
Underground	114506.03	251048.31		136542.28
Total	149713.39	320466.18		170752.79

Proportion Surface to Underground Men:

1921 - 1 to 2.81
1920 - 1 to 3.1
1919 - 1 to 4.63
1918 - 1 to 3.48
1917 - 1 to 1. not producing

1-8hr 6 days a week to Mar.26;
1-8hr 5 " " May 31;
1-4hr 6 " " June 1 to Aug.27;
Idle - Aug.28th to Dec.31st.

PRINCETON MINE

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1921.

KIND	LINEAL FEET	AVG.PRICE PER FOOT.	AMOUNT 1921	AMOUNT 1920
4" to 6" Timber	6,844	.0323	220.07	150.84
6 to 8 "	50,058	.042	2,112.41	2,693.41
8 to 10 "	45,759	.1082	4,951.29	6,240.38
10 to 12 "	12,172	.1382	1,682.48	3,367.84
12 to 14 "	1,858	.1918	356.35	1,224.49
14 to 16 "	462	.2094	96.75	293.99
16 to 18 "				24,36
Total - 1921	117,153	.0804	9,420.25	13,995.31
Total - 1920	201,977	.0692	13,995.31	
	LINEAL FEET	PER 100'		
5' Lagging	299,412	1.0809	3,256.61	5,113.98
8' "	255,305	.959	2.448.63	2,735.59
Total Lagging	554,717	1.0283	5,705. 24	7,849.57
Poles	20,719	1.465	303.65	1,014.43
Total - 1921	575,436	1.044	6,008.89	8,864.00
Total - 1920	957,817	.925	8,864.00	
Covering Boards (ft)	17,091	2.009	343.50	

Product	97,150	156,746
Feet timber per ton of ore	1.21	1.28
" lagging "	5.709	5.58
" " " foot of timber	4.735	4.33
Cost per ton for timber	.097	.089
" " lagging	.059	.050
" " poles	.003	.006
" " covering boards	.004	
" " timber, lagging, poles & boards	.163	.145
Equivalent of stull timber to bd.measure	183,391	356,885
Feet of bd.measure per ton of ore	1.888	2.277

Total cost for timber, lagging & Poles - 1921 15429.14
1920 22859.31
5/8" maple covering boards used in 1919 19090.70
place of lagging. 1918 17910.94
1913 3314.03

Mine worked 6 days per wk. until Mar.26,1921;
" " 5 " " Mar.26 to June 1st;
" " 3 " " June 1st to Aug.27th; closed Aug.27,1921.

PRINCETON MINE.

PRINCETON MINE

STATEMENT OF EXPLOSIVES USED FOR STOPING & DEVELOPING IN ORE (BREAKING ORE)

KIND	QUANTITY	AVERAGE PRICES	AMOUNT 1921	AMOUNT 1920
40% Powder - - - - - - -	14,800	.1705	2,524.75	3,929.99
50% " - - - - - - -	4,050	.1873	758.87	1,963.93
60% " - - - - - - -	2,000	.2166	433.38	350.85
Total Powder -	20,850	.1782	3,719.00	6,244.77
Fuse - - - - - - - - - -	72,500	8.587	622.55	1,053.24
Caps - - - - - - - - - -	18,000	14.14	254.57	481.55
Cap Crimpers - - - - - -	14	.49	6.86	8.69
Tamping Bags - - - - - -	-	-	-	5.50
Total Fuse, Etc. -			883.98	1,548.98
Total All Explosives-			4,600.98	7,793.75
Product - - - - - - - -			97,150	156,746
Pounds Powder per ton of Ore			.2156	.2102
Cost per ton for Powder			.0383	.0398
" " " " Fuse, Etc.			.0091	.0099
" " " " All Explosives			.0474	.0497
Avg. Price per Lb. for Powder			.1782	.1786

For operating conditions see "Comparative Wages & Product".

GWINN MINE.

The Gwinn Mine was operated on one 8-hour shift, six days per week, until the latter part of March, when it went on a 5-day per week basis. It was operated five days per week from the last week of March until May 31st, when it was closed down. The product by months was as follows:

January,	8,438	tons
February,	9,117	"
March,	9,033	"
April,	8,291	"
May,	8,120	"
TOTAL,	42,999	"

The product by grades was as follows:

Gwinnport,	42,999	tons
Rock,	5,217	"
Total Ore and Rock,	48,216	"

In 1920 there was 96,595 tons of ore produced; the decrease in 1921, when the mine operated only five months, was 53,596 tons. The average monthly product in 1921 was higher than in the previous year. This was due to starting mining operations on sub-levels between the 11th and 10th levels.

Development work on the 11th level was practically completed when the mine closed down. This work was very disappointing in that it indicated the ore body pinched out at a point near the 11th level; also that a portion of the ore body was too lean to be mined. This has resulted in a decrease in the estimated tonnage below the 10th level.

The drift from the Gwinn to the Francis Mine, to provide a second outlet and for ventilation, was completed and a connection made to the Francis drift in March. There was an immediate improvement in the ventilation, which had been bad. It continued good up to the time that the Gwinn Mine closed down, after which it gradually grew worse, until it became dangerous

for the timber crew at the Gwinn Mine to go underground on their repair work. A fan of 40,000 cu. ft. capacity was purchased and installed at the Gwinn Mine, since which time the air has been good in both mines. If both the Gwinn and Francis Mines were operating, it is probable that there would not have been any particular trouble in regard to ventilation, except in warm weather, but with one mine idle it was impossible to obtain ventilation by natural means. It is planned to move the fan from the Gwinn Mine to the Francis Mine and install it on the 5th level.

Comment was made in the annual report for 1920 of the sulphur encountered on the 3rd sub below the 9th level. After a thorough sampling of the ore on this sub it was decided to abandon mining a small area, containing about 2,000 tons, where the sulphur averaged so high as to contaminate the whole product.

The Ore Statement for 1921 is as follows:

	GWINNPORT	
On Hand January 1st, 1921,	16,014	
Output for Year,	42,999	
Estimated Stockpile Overrun,	20.502	
TOTAL,	79,515	
Shipments,	64,515	
In stock January 1st, 1922,	15,000	(stockpile overrun)

A careful estimate was made of the balance of ore in stock after shipments were completed the last of October, which showed that there was approximately 15,000 tons remaining in stockpile. Shipments gave an overrun of 5,502 tons, making the total overrun 20,502 tons.

The ore in sight at the Gwinn Mine on December 31st, 1921, is as follows:

	GWINNPORT	GWINNWOOD	TOTAL
Ore above 5th Level,	18,413		18,413
" " 6th "	170,734		170,734
" " 7th "	21,617		21,617
" " 8th "	118,663		118,663
" " 9th "	101,067		101,067
" " 10th "	155,077		155,077
Total developed ore,	585,571		585,571
Prospective ore above 11th Level,	80,159	40,079	120,238
GRAND TOTAL,	665,730	40,079	705,809

On December 31st, 1920, the estimate of total ore was 783,495; this shows a decrease of 77,686 tons in 1921. Taking into consideration the 42,999 tons produced in 1921, it is evident that the developed ore decreased 34,687 tons or actually only 14,185 tons if the overrun be included. The decrease is due to a reduction in the estimated prospective ore between the 10th and 11th levels, based on the development work of 1921.

Estimated tonnage in mine, sub-divided as required by the Tax Commission:

Non-Bessemer:

Developed,	1. Gwinnport,	585,571	
Prospective,	1. Gwinnport,	80,159	
	2. Gwinnwood,	40,079	
	TOTAL,		705,809 tons.

During 1921, work was carried on in the following territories:

FIFTH LEVEL
SUBS BELOW FIFTH LEVEL
SUBS ABOVE EIGHT LEVEL
SUBS BELOW EIGHT LEVEL
SUBS BELOW NINTH LEVEL
TENTH LEVEL
SUBS BELOW TENTH LEVEL
ELEVENTH LEVEL.

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GWINN MINE:

FOURTH LEVEL.

Frequent examinations have been made on this level to determine if there had been any falls of ground above the 5th Level stopes which have caved some distance above the 4th. During 1921, no falls of ground occurred in this territory. It had been thought possible that there might be some caving due to the mining operations on the sill floor of the 5th Level, but as yet this work has not effected the level of the broken ground in the stopes, nor caused any additional ground to fall.

FIFTH LEVEL.

In the early part of the year four gangs worked on the 5th Level, mining the ore on the sill floor. Two of these gangs worked near the West end of the level, and two near the center of the deposit. Later in the year, one of the gangs which worked at the West end dropped down and started to open the 1st sub below the 5th; three gangs continued to work on the 5th, until the mine closed down at the end of May. In 1920, 200 feet at the West end of the level was mined out; in 1921, 110 feet was mined out here and approximately 95 feet of the ore body near the center of the deposit. The ore body is quite narrow, particularly at the West end of the 5th level, and some of it has not averaged above 56.50% in Iron. When the mine reopens, it is planned to conduct mining operations on a small scale on the 5th level to help out the product over a considerable period of time, due to the fact that there are not enough working places available in ore near the bottom of the mine to permit of obtaining a product at a reasonable cost.

SUBS BELOW FIFTH LEVEL.

This sub-level was opened in February from a raise near the West end of the ore body. There was 150 feet of drifting in jasper to reach the ore body, which proved to be only 25 feet wide at this point. A small amount of drifting to the West in ore had been done at the time the mine closed down. It is planned to develop this sub-level by driving a drift

along the hanging. Some ore will be obtained from this drift, and it is thought that with the present good ventilation, the timber on this sub-level will stand until mining operations are started here.

SUBS ABOVE EIGHT LEVEL.

Two gangs worked on the 3rd sub above the 8th level until the mine closed. They mined a pillar approximately 80 ft. x 30 ft. in size; also removed some ore along the hanging. There is still an area nearly 150 feet long to be mined to complete work on this sub-level, the ore, however, is narrow.

Two gangs worked on the 2nd sub above the 8th Level until the mine closed down. They mined all the ore near the West end of the sub for a distance of nearly 200 feet. There is still a small territory to be mined here, but it is very limited in extent, as the ore is not thick enough to permit of opening a sub-level over part of this territory.

These two subs are located in the small isolated ore body between the 8th and 7th Levels.

3RD SUB BELOW EIGHT LEVEL.

This is the sub-level where sulphur was encountered, and on which a small area was abandoned. One gang worked here until the mine closed down. It is planned to mine out a small area at this point. This area lies almost due East of the shaft; it is approximately 200 ft. in length. At one point it has a width of 100 feet, this unfortunately is in the section where the sulphur is too high to permit of mining. The general width of that portion which has been mined is approximately 50 feet. It extends from the 8th Level down to the 9th, and apparently is an extension of the ore to the North along the line of the main fault at the East side of the ore body.

1ST SUB BELOW NINTH LEVEL.

Seventy-five percent of the ore on this sub-level was mined in 1920; the balance, consisting of three pillars near the hanging, was mined out in 1921. The pillar at the winze, from the 9th level to the 10th level,will be mined later.

2ND SUB BELOW NINTH LEVEL.

Two gangs worked on this sub-level in 1921. More than one-third of the ore was mined in 1920; of the remaining two thirds, fully 80% was mined in 1921. When the mine closed down there were two small pillars left besides the winze pillar.

3RD SUB BELOW NINTH LEVEL.

Mining was continued on this sub-level in 1921; an area of approximately 110 feet in length by 30 feet in width had been mined when the mine closed. Approximately one-half of this sub-level has now been mined.

4TH SUB BELOW NINTH LEVEL.

This sub-level was opened in 1921 from three raises at the South end of the ore body. Mining was completed to the South of the inside raise and about one-half completed at the other two when the mine closed down. Less than 20% of the ore on this sub had been mined when the mine closed.

5TH SUB BELOW NINTH LEVEL.

This sub-level was developed under the hanging in 1920 and the ore was found to extend further to the South than had been expected from mining operations on sub-levels above. In 1921, shortly before the mine

closed, crosscuts were started on this sub-level from the hanging to the footwall. In one of these crosscuts the ore was proven to be 90 feet in width; the other crosscut still had a full breast of ore when the mine closed. There is a possibility of an increased tonnage on the 5th sub, as compared with the sub-levels above, due to the lengthening of the ore body in a Southernly direction.

6TH SUB BELOW NINTH LEVEL.

Development work was started on this sub shortly before the mine closed down; a drift being driven a distance of 90 feet to the South following the hanging. It was planned to mine the ore out under the hanging on this sub.

TENTH LEVEL.

Just before the mine closed a drift was started on the main level to develop the Southerly extension of the ore body proven up by work on the 5th and 6th subs. This drift had advanced 45 feet in ore at the time the mine closed. Indications are that the ore will be found to extend 30 or 40 feet further to the South at this point.

The drift from the Gwinn to Francis Mine, on the Gwinn Mine side, was completed the middle of January. A raise was then started which holed to the drift from the Francis Mine early in March; the difference in elevation between the two drifts was 120 feet; the length of the raise on the incline, was approximately 135 feet.

In addition to the above outlined work there was one raise put up from the 10th level to the elevation of the 6th sub below the 9th.

4TH SUB BELOW TENTH LEVEL.

Some development work was done on this sub level in 1920. This work was continued until the mine closed, and two areas were mined, one

80 feet by 30 feet in size; the other 20 feet x 60 feet. In addition, the footwall was located by two crosscuts. This is the sub-level where it was decided to start mining operations under the hanging in order to increase the output. It is planned to mine the ore from this sub-level down to the bottom of the deposit, just above the 11th level. In order to support the haulage drift on the 10th level, which cannot be caved until mining is finished above the 10th, it is necessary to leave a pillar near the footwall which, on this sub-level, is about 40 feet in width.

5TH SUB BELOW TENTH LEVEL.

This sub-level was opened from a raise put up from the 11th level, and a drift driven 140 feet to the West, to the footwall. This work is preliminary to actual mining operations which will start on this sub after mining has been completed on the sub above.

7TH SUB BELOW TENTH LEVEL.

This sub-level was opened from two raises near the South end of the 11th level haulage drift. Crosscuts were driven to the footwall which was 90 feet distant, from one raise, and 80 feet from the other. The ore at this point was crossed by narrow bands of chert and jasper, so that the actual product obtained from the crosscut did not average over 54.00% Iron. A small area, 20 x 25 feet in size, was mined out at the South end of the ore body.

9TH SUB BELOW TENTH LEVEL.

This sub-level was opened in 1921 from the fourth raise back from the breast of the 11th level drift. The ore at this point was closer to the 11th level than at any other point, due to a drop in the foot and hanging. A crosscut had been driven 40 feet to the West

towards the footwall, at the time the mine closed.

The ore obtained from the development work on the various subs between the 10th and 11th levels is largely responsible for the trouble with the grade of ore shipped from the stockpile in 1921.

ELEVENTH LEVEL.

The main haulage drift on the 11th level was advanced a distance of 85 feet to the South, in 1921. A raise which was started near the breast had just encountered ore at the time the mine closed. In addition to the above work a number of raises have been put up from this drift to the top of the ore body. In order to keep a connection between the Gwinn and Francis Mines it will be necessary to continue the 11th level drift a distance of approximately 80 feet to the East from its present Southern limit, and put up a raise in rock to the 10th level; this will provide a rock opening all the way from the Gwinn to the Francis Mine. It will be necessary, from the fact that part of the 10th level haulage drift is driven in ore and this part will cave within a year after mining operations are resumed.

The development work done in the main haulage drift proves conclusively that the ore body does not extend down to the elevation of the 11th level. At one point a small seam of ore was encountered in the main level drift, but it was only a few feet in thickness with arkose below and jasper above. The formation in the breast of the 11th level haulage drift is dipping to the North, which showed that the drift has passed under the bottom of the basin to the point where the formation rises again on the South side. The drilling on the 10th level, near the Wadsworth boundary line, which is approximately 104 feet East of the 11th level drift, proves that there is no extension of the ore body to the East. Therefore, it has been proven conclusively

that the main ore body pinches out at a point 15 or 20 feet above the 11th level.

It should be noted that the grade of the ore near the bottom of the deposit will not average as high as in other parts of the mine. This is due to seams of chert and jasper in the ore, which it is impossible to separate after blasting.

In addition to the above work on the 11th level, there has also been a small sump and pump house cut near the shaft. Including the incline to the sump, the bottom of which is 12 feet below the 11th level, the sump has a total length of 140 feet. The pump house is 10 x 15 feet in size. One of the pumps from the Princeton Mine, formerly used at No. 1 Shaft, was installed here shortly before the mine closed down. It throws the water which comes from the shaft, as also all the water from the 7th level down, up to the sump of the main pumping plant on 7th level. This water had previously been handled by an electric pump on the 9th level, an air pump on the 11th level and an air pump on the 10th. The one pump now does the work of the three pumps formerly used, at a considerable reduction in cost.

GWINN MINE SURFACE.

The Mining Captain and several of the timbermen have continued working since the mine closed, keeping the underground timber in repair on the various levels. The timber on the 5th, 6th, 9th and 10th levels have all required some repairs. This work was particularly heavy on part of the 10th level, and also on part of the 5th. Work was carried on at a great disadvantage, and with actual hardship to the men, until the new fan was installed. It is evident that retimbering will have to be continued. If the mine remains closed long enough, so that practically all the old timber is replaced, there would come a time when this work could be temporarily stopped. The timber does not break down from pressure in most cases, but from decay, due largely to the poor vemtilation of the past several years. Owing to the system of mining which has been followed at this property, it is necessary to keep all of the old levels open. Since the mine closed, there has been over 300 sets of timber installed on the main levels.

The East stockpile ground at the Gwinn Mine was filled with ore the latter part of April. It was necessary to erect several bents on the West stockpile ground, where ore was stocked until the mine closed.

During the shipping season there were several men employed steadily on surface, laying shovel tracks, picking rock from stockpile and other jobs connected with shipping.

The greater part of the timber in stock at the Gwinn Mine, as also lagging, will be transferred to the operating mines. At the end of the year, all ties and cribbing timber had been removed, as also 64 cords of 5-ft. lagging. Enough timber and lagging will be kept to provide for the retimbering work which must be continued.

GWINN MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1921.

GRADE	IRON	PHOS.	SILICA	MANG.
Gwinnport,	59.48	.187	7.70	.296

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1921.

GRADE	Mine IRON	PHOS.	SILICA	MANG.
Gwinnport,	(All Mixed)			

ORE STATEMENT - DECEMBER 31ST, 1921.

	GWINNPORT	TOTAL	TOTAL LAST YEAR
On hand January 1, 1921,	16,014	16,014	116,352
Output for Year,	42,999	42,999	96,595
Stockpile Overrun,	20,502	20,502	0
Total,	79,515	79,515	212,947
Shipments,	64,515	64,515	196,933
Balance on Hand,	15,000	15,000	16,014
Decrease in Output,		33,094	
Decrease in Ore on Hand,		1,014	

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
1-8 Hour Shift, 5 days per week, March 26th to June 1st, 1921.
Mine closed May 31st, 1921.

1920 -- 1-8 Hour Shift for Year.

GWINN MINE

SHIPMENTS FOR YEAR 1921.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gwinn,	0	0	0	166
Gwinnport,	0	64,515	64,515	196,767
Total,	0	64,515	64,515	196,933
Total Last Year,	42,755	154,178	196,933	
Decrease,			132,418	

GWINN MINE

COMPARATIVE MINING COST FOR YEAR

	1921	1920	INCREASE	DECREASE
Product	63,501	96,595		33,094
Underground Costs	1.296	2.298		1.002
Surface Costs	.2877	.492		.205
General Mine Accounts	.142	.247		.105
Cost of Production	1.725	3.037		1.312
Original Cost		.002		.002
Plant Account	.577	.570	.007	
Equipment		.001		.001
Extraordinary drifting	.023	.159		.136
Taxes	.104	.181		.077
Central Office	.054	.102		.048
Contingent Expense	.006		.006	
Idle Expense	.514		.514	
Cost Adjustment	.078	.047	.031	
Cost on Stockpile	3.081	4.099		1.018
Loading & Shipping	.143	.357		.214
Total Cost on Cars	3.224	4.456		1.232
No. Days Operating	112	301		189
No. Shifts & Hours	1-8hr	1-8hr		
Average Daily Product	433	321	112	
COST OF PRODUCTION				
Labor	1.128	2.023		.895
Supplies	.597	1.014		.417
Total	1.725	3.037		1.312

1-8hr 6 days a week to Mar. 26th;
1-8hr 5 " " May 31st;
Idle from June 1st to Dec. 31st.

GWINN MINE

COMPARATIVE WAGES AND PRODUCT

	1921	1920	INCREASE	DECREASE
PRODUCT	63,501	96,995		33,494
No.Shifts and Hours	1-8hr	1-8hr		
AVERAGE NO. MEN WORKING				
Surface	15	29		14
Underground	38	73		35
Total	53	102		49
AVERAGE WAGES PER DAY				
Surface	4.74	5.43		.69
Underground	5.53	6.81		1.28
Total	5.31	6.42		1.11
WAGES PER MONTH OF 25 DAYS				
Surface	118.50	135.75		17.25
Underground	138.25	170.25		32.00
Total	132.75	160.50		27.75
PRODUCT PER MAN PER DAY				
Surface	15.28	10.60	4.68	
Underground	6.04	4.27	1.77	
Total	4.33	3.05	1.28	
LABOR COST PER TON				
Surface	.310	.512		.202
Underground	.917	1.595		.678
Total	1.227	2.107		.880
AVG.PRODUCT BRK'G & TRM'G	10.70	8.01	2.69	
" WAGES CONTRACT MINERS	5.71	7.46		1.75
" " " LABOR	5.71	7.46		1.75
TOTAL NUMBER OF DAYS				
Surface	4,157	9,110		4,953
Underground	10,515¾	22,604¼		12,088½
Total	14,672¾	31,714¼		17,041½
AMOUNT FOR LABOR				
Surface	19696.52	49496.60		29800.08
Underground	58202.88	154028.21		95825.33
Total	77899.40	203524.81		126625.41

Proportion Surface to Underground Men:

1921 - 1 to 2.51
1920 - 1 to 2.5
1919 - 1 to 2.64
1918 - 1 to 3.57
1917 - 1 to 3.63

1-8hr 6 days a week to Mar.26th;
1-8hr 5 " " May 31st;
Idle from June 1st to Dec.31st.

GWINN MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1921.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1921	AMOUNT 1920
4" to 6" Timber	595	.0271	16.10	56.79
6" to 8" "	17,538	.0545	956.15	639.70
8" to 10 "	13,923	.1191	1,658.27	2,242.76
10 to 12 "	6,231	.1382	860.89	1,646.07
12 to 14 "	1,376	.1829	251.71	801.88
Total - 1921	39,663	.0944	3,743.12	
Total - 1920	69,788	.0772		5,387.20
	LINEAL FEET	PER 100'		
5' Lagging	124,610	.9260	1,153.89	1,808.31
7' "	1,680	1.0000	16.80	
8' "	190,384	.9803	1,866.38	4,056.63
Total Lagging	316,674	.9591	3,037.07	5,864.94
Poles	4,400	.9105	40.06	105.46
Total - 1921	321,074	.9584	3,077.13	5,970.40
Total - 1920	702,911	.8494		5,970.40

Product	63,501	96,595
Feet of timber per ton of ore	.625	.722
" lagging "	4,987	7.197
" " " foot of timber	7.984	9.961
Cost per ton for timber,	.059	.056
" lagging,	.048	.061
" poles,	.001	.001
" timber, lagging & poles	.108	.118
Equivalent of stull timber to bd.measure	67,467	139,625
Feet of board measure per ton of ore	1.06	1.45

Total cost for timber, lagging & poles -	1921	6820.25
	1920	13357.60
	1919	1771548
	1918	14307.71
	1917	11775.63
	1916	6297.88

15,000 tons estimated stockpile overrun included in above tonnage of 63,501 tons Mine ceased operating May 31,1921; operated 1 shift full time 6 days per week from Jan.1 to Mar21st; 1 shift full time 5 days a week Mar.21 to May 31st.

GWINN MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND.	QUANTITY.	AVERAGE PRICE.	AMOUNT 1921.	AMOUNT 1920,
50% Red Cross Powder,	1,700	.1850	314.50	[illegible]
50% Gelatin "	8,350	.2050	1,711.75	3,551.20
60% " "	8,400	.2225	1,869.00	4,875.91
Total Powder	18,450	.2111	3,895.25	8,427.11
Fuse,	68,900	8.524	587.30	1,202.48
Caps,	13,200	14.614	192.90	376.19
Cap Crimpers	6	.50	3.00	3,67
Tamping Bags,	21,00	.2114	4.44	7.33
Total Fuse, Etc.,			787.64	1,589.67
Total All Explosives,			4,682.89	10,016.78
Product			63,501	96,595
Pounds Powder per ton of Ore			.291	.421
Cost per ton for Powder,			.061	.088
" " Fuse, Etc.			.013	.017
" " All Explosives,			.074	.105
Avg. Price per Lb. for Powder,			.211	.210

15,000 tons estimated stockpile overrun included in above tonnage of 63,501 tons.

Mine ceased operating May 31, 1921.
" operated 1 shift full time 6 days per week Jan. 1 to Mar. 21;
" " 1 " " " 5 " " Mar.21 to May 31.

FRANCIS MINE.

The Francis Mine operated on single shift six days per week until the last week in March, when it went on a 5-day-a-week schedule. It continued to operate five days per week until the first of June, when it went on half-time basis. After going on half-time basis, ore was hoisted on the morning shift only, the mine being closed down at 12:00 o'clock. It continued to operate in this way until in November, when, due to a shortage of working places, it became necessary to work the miners on alternate days, in order to keep up the product. Under this method of operation, ore was hoisted eight hours per day.

The product by months for the year was as follows:

January,	7,889	tons	July,	3,979	tons
February,	7,815	"	August,	4,113	"
March,	8,536	"	September,	4,121	"
April,	7,356	"	October,	5,284	"
May,	6,755	"	November,	4,770	"
June,	4,420	"	December,	6,037	"

Total Franport,	71,075
Rock,	9,044
Total Ore and Rock,	80,119

A study of the above table shows clearly the big drop in production starting with the month of June, when the mine went on half-time basis. Owing to the shortage of available working places in the mine, it was impossible to obtain a good product, operating all places half time only. On December 19th, authority was granted for a slight increase in the number of miners employed, which was plainly reflected in the increased output for the month, the daily increase after December 19th, amounting to sixty tons.

The Francis Mine with its small ore body is subject to periods when it is impossible to have a large number of available working places in ore. The discovery of ore on the South foot-wall at the elevation of the 4th level, and above, has improved this condition, as it will soon provide a number of working places.

The Ore Statement for 1921 is as follows:

	FRANPORT	FRANWOOD	TOTAL
On hand Jan. 1st, 1921,	110,398	1,589	111,987
Output for year,	71,075	0	71,075
TOTAL,	181,473	1,589	183,062
Shipments,	16,220	0	16,220
In stock Jan. 1st, 1922,	165,253	1,589	166,842

From the above it will be noted that the amount of ore in stock increased 54,855 in 1921, the total ore in stock at the end of the year being 166,842 tons. The stockpile grounds were further extended during the past year, to provide stocking room for the next six months.

The ore in sight on December 31st, 1921, was 266,287 tons; a year ago there was 241,530 tons. This shows that during the past year 95,832 tons have been developed. This was largely due to the new find on the South footwall. The estimate of ore in sight December 31st, 1921, is as follows:

	FRANPORT	FRANWOOD	TOTAL
Ore above 4th level,	18,743		
" " 5th "	157,544		
Total Developed,	176,287		176,287
Prospective ore below 5th level,	80,000	10,000	90,000
			266,287

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

Non-Bessemer:

Developed	1.	Franport,	176,287
Prospective:	2.	Franport,	80,000
	2.	Franwood,	10,000
		TOTAL,	266,287

The prospective ore is the same as in the previous year. The estimate of ore above 4th level shows a slight increase as compared with the previous year.

FRANCIS MINE:

due to the development of a small tonnage on a roll in the foot-wall just above the 4th level at the East end of the mine.

As stated before, the greater part of the increased tonnage is due to the discovery of what is called the "New Find" on the South foot-wall. Development work is being continued in this new ore body and its actual limits have not yet been determined. It is possible that it may extend to the South on the other side of the over-turn of the foot-wall. It was followed up on the South foot-wall, which dips to the North, and has been developed over the top of a roll to the point where the foot-wall dips to the South. It is possible that eventually more ore will be obtained from this new find than is estimated at this time.

Reference was made in the report for 1920 to development work which had been done during that year on the 3rd level. This work was continued for several months in the early part of 1921. A study of the probable tonnage on 3rd level has forced the conclusion that it would not be profitable to mine on this level. It had been expected that part of the ore body would prove to be from 15 to 25 feet in width, but the general average width will not exceed 10 feet, and in some places is not over 7 feet. If this ore were mined out to a height of 40 feet above the 3rd level for the entire length of the ore body, only a limited tonnage could be obtained, the cost of which would average so high as to make it unprofitable. It is figured, however, that a small tonnage adjacent to the exploratory drift can be mined at a profit. The exploratory work done in 1921 near #2 diamond drill hole from surface proved that there was a local fold in the foot-wall at this point which accounted for the apparent large tonnage which might be expected in this territory, based on the drill hole. Due to the fold, the foot-wall had steepened at this point, and as the drill hole deviated slightly to the South it followed the ore for a considerable distance.

During the past year ore has been sorted in the working places, and as much lean ore as possible removed underground. In certain areas there has been considerable lean ore mixed with the good ore; in other areas the ore has

been consistently high grade.

A year ago the life of the mine was estimated at 2-1/2 years, based on an output of 100,000 tons per year. Due to the discovery of additional ore and a decrease in the output for 1921, the probable life of the mine, based on the present system of operating, will be approximately 3-1/2 years.

Some rock work has been done during the past year. This, however, has been confined to an average of approximately two contracts on rock. Comparatively little work has been done in opening the 6th level; this work was temporarily stopped while the rock work was done on the 5th level in connection with the development of the new find on the South footwall. At the end of the year, this work on the 5th level had been practically completed and attention will again be given, starting early in 1922, to the development of the 6th level.

The ventilation at the mine was poor, until the connection was made to the Gwinn Mine. At this time there was an improvement, but owing to the warm weather, even with the second out-let, the ventilation was not as good as it should have been. After the Gwinn Mine closed, the last of May, the ventilation grew steadily worse. Various schemes were tried in an effort to improve it, such as heaters in the shaft and two small ventilating fans in the drift to the Gwinn Mine. Conditions finally became so bad, particularly at the Gwinn Mine, that it was decided to purchase a ventilating fan of large capacity. A fan of 40,000 cy. ft., capacity per minute was purchased in August and installed at the Gwinn shaft, since which time the ventilation has been as good as could be desired. Prior to the installation of the large fan, the timber in all parts of the mine was covered with a fungus growth. After the new fan was installed, this fungus growth started to disappear, and within a few weeks none could be found in either the Gwinn or Francis Mine. In addition to improving the working conditions for the men, it will also eventually reduce the cost for retimbering. This will not be apparent until the old timber which has badly rotted, is replaced, but after this is done, future replacements should be exceedingly small, in both the Gwinn and Francis mines.

FRANCIS MINE:

In October, the work in preparation for installing a concrete dam in the drift connecting the Gwinn and Francis Mines, was started, and the dam was installed in November. In order to provide ventilation, two openings were provided through the dam by using steel cylinders, 30" in diameter. Heavy doors were provided for these cylinders, so that they could be quickly closed in case water ever entered either of the mines. This is a safe-guard which it was considered very important, as without it both mines might be permanently drowned out, if one mine was so unfortunate as to cave through to surface. The dam is 14 feet in thickness, and is heavily reinforced throughout with steel, so that it can withstand the pressure, if one of the mines were to fill with water.

The cost of production has been high during 1921, due to the low product. By increasing the production, through adding a few contracts, will cause an immediate drop in the cost. This has been provided for, starting December 19th, and it will influence the results obtained in 1922.

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

THIRD LEVEL AND SUBS ABOVE
SUBS ABOVE FOURTH LEVEL
FOURTH LEVEL
SUBS ABOVE FIFTH LEVEL
FIFTH LEVEL
SIXTH LEVEL

- - - - - -

THIRD LEVEL AND SUBS ABOVE:

The development of the 3rd level was started in 1920, and the ore followed to the East to the vicinity of diamond drill hole #2 from surface, which showed a large amount of ore near the elevation of the 3rd level. A raise was put up near the line of this drill hole, and a sub-level opened the latter part of 1920. Explorations on this sub-level was continued during the month of January, when it was decided to abandon work. This drill hole had evidently followed the line of a sharp fold in the foot-wall. The fold was fully proven up by the exploratory work done on the sub-level which

showed that there was only a small amount of ore here, and that it would not be profitable to continue explorations. The work of developing the 3rd level to the West of the raise put up from the 4th was continued for several months. The findings here were more favorable in that the ore was apparently from 10 to 20 feet in width. The West drift was driven 185 feet when work was stopped and several crosscuts put in. The width of the ore in the crosscuts did not average over 10 feet, and the ore in the breast of the drift dropped to 54.00%. In addition to the above work, another raise was put up from the 4th to the 3rd level early in 1921. This raise was located 400 feet West of the original raise. The raise was located in the foot-wall, and when it reached the 3rd level, a cross-cut was driven to the South, to the hanging. The ore formation here, however, was very lean. The contact was followed to the East towards the drift which was being driven to the West of the first raise put up to the 3rd level; the drift advanced 47 feet in lean ore which averaged about 45.00% in Iron. When work was stopped the breast of the two drifts were 65 feet apart. It is planned to later connect these drifts so as to improve the ventilation. The showing of ore on this level is so poor, however, that it will not pay to drive this level to the shaft, which is 350 feet distant from the raise which was put up in 1921. The drift on the 3rd level has proven the ore to be 500 feet in length; its everage width will not exceed 10 feet. It is evident that it will not be profitable to postpone mining in this territory until all the ore has been removed from the bottom of the deposit, for the reason that it would not be possible to work more than two gangs on the 3rd level without putting up a number of additional raises and there is not sufficient ore here to warrant any further expense for development. At the present time, it is planned to take a small amount of ore from the back of the drift, and then abandon operations.

SUBS ABOVE FOURTH LEVEL.

While mining the small amount of ore remaining at the East end of the 4th level, a discovery was made of a small deposit lying on a flat

fold in the foot-wall above the 4th level. A sub-level was opened 18 feet above the 4th and the ore followed 40 feet to the South, where the foot-wall was again encountered, dipping at an angle of about 80° to the North. A raise was put up at this point to the top of the ore body and a sub-level opened, 42 feet above the 4th. The ore at this point proved to be 50 feet in length and 9 feet in width. When mining was completed on this sub-level, the gangs working here dropped down to the sub 18 feet above the 4th, and stoped out the pillar between the two sub-levels. Mining was not quite completed on the sub 18 feet above the 4th level, at the end of the year.

The latter part of the year, mining was started in the pillar near #1 cross-cut, which had been left to protect the timber road between the 4th and 5th levels. This pillar had previously been mined down to the first sub above the 4th level. The ore on this sub was mined out the latter part of the year. The pillar on this sub was only 20 ft. x 30 ft. in size.

NEW FIND - SOUTH FOOT-WALL. SUBS ABOVE 4TH.

In developing the new find, a raise was put up and a sub-level opened, 69 feet above the 4th. The ore at this point, however, was too narrow for mining, as it was less than 5 feet in width. Another sub was opened from this raise at an elevation of 53 feet above the 4th level. Here also the ore was found to be less than drift wide. Another sub was opened from this raise, at a point 38 feet above the 4th level. Here the ore was about 10 feet wide, and work was continued on this sub-level for the balance of the year. The ore was followed for a distance of 110 feet to the West, when it was decided to stop and take the available ore from the back. Beyond this point, a sub-level would later be opened from another raise which is being put up from the 5th level. The mining of the ore to the West of the raise on this sub was practically completed at the end of the year. While the gang was taking the ore from the back of the

drift to the West, another gang started driving to the East. At the end of the year, the East drift was in about 70 feet from the raise, with high grade ore in the breast of the drift. The last of the year a cross-cut was started near the breast of the East drift which is in nearly 10 feet, with no sign of the foot-wall. The indications are that to the East of the raise, the ore may extend some distance above the elevation of this sub-level. There had been no previous indication that the ore would extend any distance to the East of the raise. This extension for a distance of 70 feet was, therefore, entirely unexpected, and with a full breast of ore in the main drift, as well as in the cross-cut, the possibilities in this direction are still very good. Mining of the ore body to the West of the raise can be continued on sub-levels opened at a lower elevation, while the ore body to the East is being opened.

In developing the new find, the first sub-level opened was 14 ft. above the 4th level. The ore at this point was found to be 50 feet in width fromfoot to hanging. It was developed for a distance of 50 feet to the East of the cross-cut, at which point a raise was put up to the top of the ore, which raise is the one referred to in the previous paragraphs in regard to the other sub-levels opened in this same ore body. This raise was later connected with a raise put up from the 5th level, so that the ore from the sub-levels during the past several months has been loaded in motor cars on the 5th level without any transfer. For the purpose of developing this sub, a drift was later driven for a distance of about 35 feet West of the cross-cut, and an incline raise put up from a drift on the 4th level, in this same ore body, connecting with this sub-level. The ore body at the elevation of this sub has a developed length of 100 feet and an indicated width of 50 feet at one point.

FOURTH LEVEL.

At the East end of the 4th level, the ore was followed 40 feet to the South, at which point the foot-wall was encountered. In following the

ore up over the foot-wall, it was found that there was a roll in the foot-wall which flattened out about 18 feet above the 4th level, and during the balance of the year ore has been mined on the sub levels developed above this flat roll. Inconjunction with mining this ore it was decided to drift to the South on the 4th level through this roll in the foot-wall, with the expectation that possibly the ore might turn down to the 4th again beyond the roll; also from the fact that it was advisable to get further to the South to put up a raise, so that the ore coming from the sub-levels above the 4th could be loaded directly into cars without transferring it on the subs. There was a total of 30 feet of rock drifting done at this point, and 60 feet of ore drifting, after which a raise was put up connecting with the raise which had been put up from the 18-ft. sub level.

There is a pillar left to be mined on the 4th level at this end of the deposit which will provide work for one or two contracts for the next several months. On completion of mining at this point it will be possible to abandon about 250 feet of the 4th level haulage drift.

The ore pillars left to support the timber road in old No. 1 cross-cut were mined out on the 4th level after mining had been completed on the sub-level above.

Considerable repair work has been necessary to keep the main foot-wall drift open on the 4th level. This is due to the rotting of the timber, caused by poor ventilation prior to installation of the ventilating fan.

NEW FIND - SOUTH FOOT-WALL - FOURTH LEVEL.

The ore on the South foot-wall was originally discovered by several raises which were put up to develop a narrow seam of ore lying on the foot-wall. A total of three raises were put up to the elevation of the 4th level, at which point it was decided to develop the ore by cross-cuts as the foot-wall had disappeared at a point below the elevation of the 4th. Development work was continued for the balance of the year, there being a grand total of 681 feet of drifts and cross-cuts driven on the 4th level

at the end of the year. This work showed that there was a narrow seam of ore between the foot and hanging, about 155 feet in length, at the West end of this ore body. This footwall apparently extends up above the elevation of the 4th, and at some point above, again turns over and dips to the South. One crosscut showed this sharp upturn in the footwall to be only three feet thick; in the other crosscut it was 22 feet in thickness, and seems to be increasing in width to the West. (The work on the 1st sub above the 4th was done at a point further to the East where this footwall disappears, the ore having a width of nearly 50 feet between the foot and hanging, at a point about 70 feet further to the East.) In addition to developing this narrow seam of ore between the foot and hanging, the ore has been followed to the South-West under a comparatively flat hanging dipping 20° to the South, for a distance of nearly 200 feet. It is evident that a part of the 4th level is actually at the point where the foot-wall over-turns and again resumes its regular dip to the South. The main ore body at the Francis Mine is found in a trough caused by an up-turn in the foot-wall. The general dip of the formation is to the South and the new find on the South foot-wall had lead, at least at one point, to the top of this roll and over it to the regular dip of the footwall to the South. The development work has not yet been entirely completed at this point, so that the possibilities have not been thoroughly exhausted. There is a chance for an extension at lower elevations below the 4th on this South-pitching foot-wall, information concerning which will be gained later.

At one point further to the East a stope was opened in a narrow seam of ore on the South foot-wall, and an area 65' x 10' mined out, up to the elevation of the 4th level. The ore encountered on the sub 38 ft. above the 4th in the new find lies a short distance to the South of this stope, there being rock between the two ore bodies. There has evidently been an over-turn in the foot here also, the great difference between this over-turn and the one further to the West being that both the foot and hanging

are standing very steeply, while further West the hanging is dipping at an angle of 20° to the South.

SUBS ABOVE FIFTH LEVEL.

8TH SUB ABOVE 5TH:

In the early part of the year mining was completed on this sub-level on the North foot-wall, with the exception of the pillar left to support the timber road near old No. 1 cross-cut, on the 4th level. Mining of this pillar started in the fall, and the ore left in this area on this sub-level was removed the latter part of November.

On the South foot-wall in the new find, a drift 15 feet in length was driven at the elevation of this sub-level to the South of a raise which had been put up from the 5th level. This drift encountered the hanging near the raise; it was not located low enough to permit of drifting under the hanging to the South. This work was done to gain information relative to the point where the hanging dipped to the South at a flat angle, at which point there is a possibility that the ore body may widen.

7TH SUB ABOVE 5TH:

A small area was mined on this sub-level on the North foot-wall in the early part of the year. Mining of the pillar left to support the timber road under No. 1 cross-cut on the 4th level was started the last of the year and about one-half the ore removed at the end of December. With the removal of this pillar, mining will have been completed on the North foot-wall, at the elevation of this sub-level.

6TH SUB ABOVE 5TH:

Mining was in progress at the West end of this sub-level on the North foot-wall the first of the year, and continued throughout the year. About 95% of the ore remaining on this sub-level on the North foot-wall was mined out during 1921.

5TH SUB ABOVE 5TH:

A considerable area was mined out on this sub on the North foot-wall during 1921. There is still a small pillar left to mine in this territory.

On the South foot-wall there were several raises put up from this sub level to the elevation of the 4th level, and in addition, an area approximately 80 feet in length by 8 feet in width was stoped out.

4TH SUB ABOVE 5TH:

Mining was started at three points on the North foot-wall in the latter part of the year. A little more than one-half the ore on the North foot-wall to the West of No. 1 cross-cut remained to be mined at the end of the year. This pillar is approximately 150 feet in length.

At the East end of the deposit a small area was mined out early in the year.

3RD SUB ABOVE 5TH:

An area 80 ft. x 30 ft. in size was mined at the East end of the deposit on the flat foot-wall. There was also a drift driven on the South foot-wall following a narrow seam of ore for a distance of about 120 feet. The ore at the West end of the ore body on the South foot-wall was also mined out in 1921. This ore averaged about 15 feet in width.

2ND SUB ABOVE 5TH:

There has been considerable mining on this sub particularly at the East end of the deposit where all the ore has been mined out on both the North and South foot-walls, above No. 1 and No. 2 cross-cuts on the 5th level. There was an irregular enrichment in part of this area, the good ore being mixed with lean ore and slate.

Just West of No. 1 cross-cut on the 5th level, a narrow seam on the South foot-wall was mined, without timber; it was only 6 feet in thickness between the foot and hanging. One contract worked here for more than four months.

FRANCIS MINE:

At the West end of the ore body, on the South foot-wall, an area 150 feet in length was mined on this sub-level, early in the year. To the East of this area, a drift was driven on the sub-level a distance of 90 ft. following the ore, and two incline raises put up on the foot-wall to the elevation of the 4th level.

On the North foot-wall near the shaft, an area 60' x 50' in size was mined out; this comprising the West end of the ore body on the North foot-wall.

There were seven gangs working on this sub-level for several months.

1ST SUB ABOVE 5TH:

A small area on this sub, located near the South foot-wall in the center of the deposit, was mined out early in the year.

Mining started at the East end of the deposit on this sub-level in the fall, and three gangs were working here at the end of the year. There will not be very much ore available here, as the ore in this territory is badly mixed with lean ore.

At the West end of the deposit, on the North foot-wall, an area 50' x 40' in size had been mined out at the end of the year.

At the West end of the deposit on the South foot-wall, an area 150 feet in length was mined out during the latter part of 1921.

FIFTH LEVEL.

Only a comparatively small amount of work had been done during the past year on the 5th level. The main work consisting of driving a rock drift 335 feet in length in the South foot-wall. One raise has been completed through to the subs above the 4th level in the new find and two raises are now being put up, these three raises being located in this rock drift. One of these raises is up 79 feet above the 5th, the last 8 feet being in ore. The third raise was up 58 feet in rock

at the end of the year. It may later be necessary to extend this drift and put up additional raises. The deposit as developed to date, however, can be mined from these three raises.

In the early part of the year the drift following the small seam of ore on the South foot-wall was extended 48 feet which connected it with the East section of this drift which had already been driven. This made two outlets for this territory and improved the ventilation.

In the fall, a drift was started to the South-east from the North cross-cut in the foot-wall, and a full breast of ore was encountered after drifting 45 feet. This drift is being continued in ore and raises will later be put up from it to mine the North foot-wall ore body on the 1st sub above the 5th. The foot-wall drift from which raises were put up in 1920 to mine this ore body, is located so far in the foot that there would be considerable rock drifting to reach the ore at the elevation of the 1st sub above the 5th; the new drift being located in the ore, will permit raises to be put up at a small expense.

Mining was started at the West end of the ore body on the South foot-wall in December, in a small section that had been mined out on the subs above the 5th.

One raise was put up in No. 1 cross-cut to replace a raise which had crushed. This raise extends up to the elevation of the 1st sub above the 5th.

The drift connecting the Gwinn and Francis Mines was driven 165 feet in rock, drifting being completed the first week of February. It will be recalled that a connection was made by a raise from the Gwinn Mine drift early in March. After the drifts holed, and before the tracks and trolley were removed, three diamond drill stations were cut in the Francis drift on Wadsworth lands, on Section 28. It is planned at some future date to put down some diamond drill holes here to determine whether there is any ore on the Wadsworth lands. When the work of cutting the drill stations was completed, the rails and trolley were removed from the drift, in preparation for the installation of a dam. The dam was installed in October

and November, at a point 570 feet from the Francis shaft, in order to safeguard the two mines from any sudden inflow of water, due to breaking of the capping. It is planned to install the ventilating fan in this drift, at a point about 500 feet from the Francis shaft.

It has been necessary to re-timber certain drifts on the 5th level, due to crushing, in order to provide for ventilation; this was particularly true of the drift West of No. 1 cross-cut on the 5th level where the ore has been mined out to a point within 20 feet of the floor of the 5th level.

A number of doors to control the air currents have been installed in the 5th level. By means of these doors, it is possible to force air into all the workings.

SIXTH LEVEL.

Shaft sinking was completed from the 5th to the 6th level in 1920. The work of cutting plat was completed early in 1921 and a drift towards the ore body started. Work on this level was stopped the first week of April, the contract being moved to the 5th level. Approximately 1200 feet of rock drifting must be done and 13 raises put up to complete the development of this level. It is planned to resume work on the 6th level in January, 1922, and continue it until the level is developed.

FRANCIS SURFACE.

The new stocking trestle erected in the fall of 1920 was entirely filled by the fall of 1921. The original stocking trestle, part of which had been torn down to permit of shipping ore, was put up again in the fall of 1921. In addition to this, a new sollar and stockpile ground was made where a trestle had been formerly erected for stocking lean ore; the balance of the lean ore in stock was used for making this sollar. Stocking is now being done at two points; the old stocking ground is being filled again but as the tram to this point is so long that it is not possible to handle the dirt now being hoisted on day shift, the excess is put on the new stocking ground. Sufficient ground has been prepared to permit of taking care of the product during the winter of 1921-1922.

During the past year it has been necessary to replace most of the steam and water lines on surface, as they had rusted out and were leaking badly.

A new top tram side-dum car was built for the Francis Mine at the District Shops during the past summer. It is now planned to use this car in order that as large a quantity of ore as possible may be stocked on the old trestles. It was originally planned to use this car to fill in the space between the stockpiles. However, this will not be done unless all other available ground is filled, as it would increase the surface expense of stocking ore, due to additional men being required to keep the tracks in shape for dumping.

FRANCIS MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1921.

GRADE	IRON	PHOS.	SILICA	MANG.
Franport,	58.07	.280	5.94	.614
Franwood,	(No Production)			

AVERAGE ANALYSIS ON STRAIGHT CARGOES FOR YEAR 1921.

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

ORE STATEMENT - DECEMBER 31ST, 1921.

	FRANPORT	FRANWOOD	TOTAL	TOTAL LAST YEAR
On hand January 1, 1921,	110,398	1,589	111,987	66,130
Output for Year,	71,075	0	71,075	80,056
Total,	181,473	1,589	183,062	146,186
Shipments,	16,220	0	16,220	34,199
Balance on Hand,	165,253	1,589	166,842	111,987
Decrease in Output,			8,981	
Increase in Ore on Hand,			54,855	

1921 -- 1-8 Hour Shift, 6 days per week, Jan. 1st to March 26th, 1921.
1-8 Hour Shift, 5 days per week, March 26th to June 1st, 1921.
1-4 Hour Shift, 6 days per week, June 1st to Dec. 31st, 1921.

1920 -- 1-8 Hour Shift during Year.

FRANCIS MINE

SHIPMENTS FOR YEAR 1921.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Franport,	10,630	5,590	16,220	34,199
Franwood,	0	0	0	0
Total,	10,630	5,590	16,220	34,199
Total Last Year,	23,424	10,775	34,199	
Decrease,			17,979	

FRANCIS MINE

COMPARATIVE MINING COST FOR YEAR

	1 9 2 1	1 9 2 0	INCREASE	DECREASE
PRODUCT	71,075	80,056		8,981
Underground Costs	1.777	2.083		.306
Surface Costs	.295	.471		.306
General Mine Accounts	.238	.233	.005	
Cost of Production	2.310	2.787		.477
Plant Account	.605	.600	.005	
Extraordinary Drifting	.043	.183		.140
Taxes	.150	.117	.033	
Central Office	.099	.098	.001	
Contingent Expense	.012		.012	
Cost Adjustment	.098	.051	.047	
Cost on Stockpile	3.317	3.836		.519
Loading & Shipping	.028	.072		.044
Total Cost on Cars	3.345	3.908		.663
No.Days Operating	291	301		10
No.Shifts & Hours	1-8;1-4	1-8		
Avg.Daily Product	244	266		22
COST OF PRODUCTION				
Labor	1.537	1.999		.462
Supplies	.773	.788		.015
Total	2.310	2.787		.477

FRANCIS MINE

COMPARATIVE WAGES & PRODUCT

	1921	1920	INCREASE	DECREASE
PRODUCT	71,075	80,056		8,981
No. Shifts & Hours	1-8hr 1-4hr	1-8hr		
AVERAGE NO. MEN WORKING				
Surface	23	25		2
Underground	78	64	14	
Total	101	89	12	
AVERAGE WAGES PER DAY				
Surface	4.49	5.46		.97-17.7%
Underground	5.13	6.55		1.42-21.7%
Total	4.97	6.24		1.27-20.3%
WAGES PER MONTH OF 25 DAYS				
Surface	112.25	136.50		24.25
Underground	128.25	163.75		35.50
Total	124.25	156.00		31.75
PRODUCT PER MAN PER DAY				
Surface	13.50	10.75	2.75	
Underground	4.50	4.21	.29	
Total	3.37	3.02	.35	
LABOR COST PER TON				
Surface	.332	.508		.176
Underground	1.141	1.558		.417
Total	1.473	2.066		.593
AVG. PRODUCT BRK'G & TRM'G	7.61	7.97		.36
" WAGES CONTRACT MINERS	5.15	6.50		1.35
" " " TRAMMERS	5.47	6.42		.95
" " " LABOR	5.15	6.61		1.46
TOTAL NUMBER OF DAYS				
Surface	5,263	7,450		2,187
Underground	15,810¾	19,032¾		3,222
Total	21,073¾	26,482¾		5,409
AMOUNT FOR LABOR				
Surface	23606.97	40662.59		17,055.62
Underground	81124.70	124758.22		43,633.52
Total	104731.67	165420.81		60,689.14

Proportion Surface to Underground Men:

1921 - 1 to 3.39
1920 - 1 to 2.56
1919 - 1 to 2.32
1918 - 1 to 2.20

1-8hr 6 days a week to Mar. 26;
1-8hr 5 " " Mar. 28 to May 31;
1-8hr 4 " " June 1 to Dec. 31.

FRANCIS MINE.

FRANCIS MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1921.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	AMOUNT 1921	AMOUNT 1920
4" to 6" Timber	13,392	.0193	258.40	228.27
6" to 8" "	43,496	.0491	2,147.43	800.20
8" to 10 "	22,992	.0932	2,143.40	2,023.93
10 to 12 "	10,472	.1431	1,499.25	1,257.63
12 to 14 "	3,136	.1945	609.86	312.59
14 to 16 "	384	.2624	100.76	
Total - 1921	93,872	.0720	6,759.10	
Total - 1920	75,305	.0614		4,622.62
	LINEAL FEET	PER 100'		
5' Lagging	182,750	.95508	1,744.93	1,153.65
8' "	229,688	1.014	2.338.91	2,650.95
Total Lagging	412,438	.99026	4,083.84	3,804.60
Poles	5,658	1.1090	62.66	28.91
Total - 1921	418,096.	.99177	4,146.50	
Total - 1920				3,833.51

Product	71,075	80,056
Feet of timber per ton of ore	1.320	.9406
" lagging "	5.803	5.365
" " " foot of timber	4.394	5.704
Cost per ton for timber	.0951	.0577
" " lagging	.0575	.0475
" " poles	.0088	.0004
" " timber, lagging & poles	.1614	.1056
Equivalent of stull timber to bd.measure	154,677	129,524
Feet of board measure per ton of ore	2,176	1,619

Total Cost for timber, lagging & Poles - 1921 10905.60
1920 8456.13
1919 8117.15
1918 5210.68

Mine operated 1 shift full time 6 days per week Jan. 1st to Mar.21st;
" " 1 " " " 5 " Mar.21st to May 31st;
" " 1 " half " 6 " June 1st to Dec.31st

FRANCIS MINE.

S TATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY.	AVERAGE PRICE.	AMOUNT 1921	AMOUNT 1920
40% Powder,	26,800	.1677	4,493.62	4,424.32
50% "	200	.1700	34.00	27.75
60% "	250	.2025	50.63	142.35
Total Powder	27,250	.1680	4,578.25	4,594.42
Fuse,	123,100	7.758	954.96	1,017.41
Caps,	21,200	13.080	277.38	299.50
Cap Crimpers,	11	.643	7.08	1.28
Tamping Bags,	10,400	2.159	22.46	20.23
Total Fuse, Etc.			1,261.88	1,338.42
Total All Explosives,			5,840.13	5,932.84
Product			71,075	80,056
Pounds Powder Per ton Ore			.383	.334
Cost Per Ton for Powder			.0644	.0574
" " Fuse, Caps, Etc.			.0177	.0167
" " All Explosives			.0821	.0741
Avg. Price per Lb. for Powder			.1680	.1718

Mine operated 1 shift full time 6 days per week Jan.1 to Mar.21;
" " 1 " " 5 " " Mar.21 to June 1st;
" " 1 " half " 6 " " June 1 to Dec.31st.

GARDNER-MACKINAW MINE.

These mines closed down on November 30th, 1920, and were idle during 1921.

Some ore was shipped from the Mackinaw during the summer.

The mine water is pumped six days per week by two pumpmen and two helpers, working half time. The Mining Captain acts as watchman on day shift and a policeman is employed as night watchman.

Several inspection trips have been made through the mine and the drifts and stopes were found in good condition. A few sets on the 3rd Level were repaired, this being the only expense incurred during the year for maintenance in the mine.

The Ore Statement for 1921, is as follows:

	ON HAND JAN. 1, 1921	PRODUCT	SHIPMENTS	BALANCE OF ORE IN STOCK
Mackinaw,	5,657	159*	5,816	0
" High Sulphur,	38,481	0	14,073	24,408
Gardner,	28,144	0	0	28,144
" High Sulphur,	48,454	0	0	48,454
TOTAL,	120,736	159	19,889	101,006

* Overrun - shipments from stockpile.

The following is an estimate of the ore in mines, sub-divided as required by the State Tax Commission:

Non-Bessemer:

Developed,	1. Mackinaw,	10,000	
	2. " High Sulphur,	60,285	
Prospective,	1. Mackinaw,	92,198	
	2. " High Sulphur,	276,594	
	TOTAL,		439,077

Non-Bessemer:

Developed,	1. Gardner,	80,000	
	2. " High Sulphur,	106,348	
	TOTAL,		186,348

These estimates are the same as were submitted a year ago.

It is hoped that permission will be granted to sink the Mackinaw Shaft prior to the re-opening of these mines.

All the available ore has been mined and the shaft must be sunk and new levels opened before any product can be obtained.

GARDNER-MACKINAW SURFACE.

Due to the fact that the mine closed down the last of November, 1920, it was not possible to clean up the surface on account of snow. Some expense was incurred in the spring of 1921 when this work was done.

The alleys at the Gardner-Mackinaw Location were cleaned several times during the summer.

GARDNER-MACKINAW MINE

AVERAGE MINE ANALYSIS ON OUTPUT FOR YEAR 1921.

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 1921.

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

ORE STATEMENT - DECEMBER 31ST, 1921.

	GARDNER	GARDNER HIGH SULPHUR	MACKINAW	MACKINAW HIGH SULPHUR	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, 1921,	28,144	48,454	5,657	38,481	120,736	39,399
Output for Year,	0	0	0	0	0	130,388
Stockpile Overrun,	0	0	159	0	159	0
Total,	28,144	48,454	5,816	38,481	120,895	169,787
Shipments,	0	0	5,816	14,073	19,889	49,051
Balance on Hand,	28,144	48,454	0	24,408	101,006	120,736
Decrease in Output,					130,229	
Decrease in Ore on Hand,					19,730	

1921 -- Mine Idle during Year.

1920 -- 2-8 Hour Shifts, Jan. 1st to Dec. 1st, 1920.
Idle Dec. 1st, to Dec. 31st, 1920.

GARDNER-MACKINAW MINE

SHIPMENTS FOR YEAR-1921.

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Gardner,	0	0	0	0
Gardner High Sulphur,	0	0	0	0
Mackinaw,	0	5,816	5,816	37,809
Mackinaw High Sulphur,	0	14,073	14,073	11,242
Total,	0	19,889	19,889	49,051
Total Last Year,	24,972	24,079	49,051	
Decrease,			29,162	

GARDNER-MACKINAW MINE

COMPARATIVE MINING COST FOR YEAR

	1921	1920	INCREASE	DECREASE
Product	159	130,388		130,229
Underground Costs		1.999		
Surface Costs		.363		
General Mine Accounts		.193		
Cost of Production		2.555		
Plant Account		.450		
Taxes		.040		
Central Office		.084		
Idle Expense		.025		
Cost Adjustment		.023		
Cost on Stockpile		3.177		
Loading & Shipping		.064		
Total Cost on Cars		3.241		
No. Days Operating		275		
No. Shifts & Hours		2-8hr		
Average Daily Product		474		
COST OF PRODUCTION				
Labor		1.835		
Supplies		.720		
Total		2.555		

Idle entire year 1921.
Product shown is stockpile overrun.

GARDNER-MACKINAW MINE

COMPARATIVE WAGES AND PRODUCT

	1921	1920	INCREASE	DECREASE
PRODUCT		130,388		
No.Shifts and Hours		2-8hr		
AVERAGE NO.MEN WORKING				
Surface	2	29		27
Underground	4	97		93
Total	6	126		120
AVERAGE WAGES PER DAY				
Surface	4.17	5.47		1.30-23.76%
Underground	5.05	6.33		1.28-20.22
Total	4.71	6.13		1.42-23.16
WAGES FOR MONTH OF 25 DAYS				
Surface	104.25	136.75		32.50
Underground	126.25	158.25		22.00
Total	117.75	153.25		35.50
PRODUCT PER MAN PER DAY				
Surface		14.83		
Underground		4.45		
Total		3.43		
LABOR COST PER TON				
Surface		.369		
Underground		1.423		
Total		1.792		
AVG. PRODUCT BRK'G & TRM'G		6.24		
" WAGES CONTRACT MINERS		6.44		
" " " TRAMMERS				
" " " LABOR		6.44		
TOTAL NUMBER OF DAYS				
Surface	557½	8,792¼		8,234¾
Underground	866½	29,267		28,400½
Total	1,424	38,059¼		36,635¼
AMOUNT FOR LABOR				
Surface	2323.33	48089.74		45766.41
Underground	4379.40	185523.07		181143.67
Total	6702.73	233621.81		226919.08

Proportion Surface to Underground Men:

1921-1 to 2
1920-1 to 3.3
1919-1 to 3.

Mine idle since Nov.30, 1920.

GENERAL SURFACE.

GWINN ASSOCIATION:

The Club House has been the community center for all the social and athletic activities of the district. Under the able management of the Secretary, Mr. Miller, the activities during the past year have been further increased. The half-time operating schedule, effective since last June, gave the employees more leisure time. Recreation and entertainment were provided by increasing the athletic activities, and by opening an outdoor swimming pool below the falls on the East Branch of the Escanaba River. The following is a brief summary of the activities of the Association during 1921:

ATTENDANCE:

Total attendance at building,	82,608
Average monthly attendance at building,	6,886
Total estimated attendance for all outdoor activities conducted by the Association, including: Ice Skating Rink, Tennis Courts, Swimming Pool, Baseball Games, Track Meet and Bass Lake Camp. Attendance, -	21,265

MEMBERSHIP:

Membership January 1st, 1921,	519
Membership January 1st, 1922,	367
High membership for year - 519	
Low membership for year - 367	

GENERAL ACTIVITIES AND ORGANIZATIONS USING BUILDING:

67 - Rehearsals by Association Band, Orchestra, Carol Singers and Junior Chorus.
12 - Home Engagements by Band.
5 - Out-of-town engagements by Band.
3 - Sales of Fancy work articles.
7 - Dancing Classes under supervision of High School
29 - Dances held during year - including regular and special dances,
5 - Parties were held by Young Ladies.
30 - Meetings - By Board of Directors - American Legion, Church organizations and special committees.
130 - Out-of-town visitors were shown through the building during the summer.

EVENTS OF SPECIAL INTEREST.

Easter Monday Ball by Basketball Team.
Banquet by Association for the different active organizations.
Dance and Reception by Local Order of Owls.
Supper by Episcopal Church.
Carnival by Ladies Guild of Episcopal Church.
Reception and Dance by the Association for the Stephenson Mine Baseball Team - Champions of the Mine League, 1921.
Bachelor Club Annual Dance.
Parent-Teachers Annual Musical and Reception.
Hallow'een Dance by Association Football Team.
Annual Charity Ball by Association.
Married Folks Dance.
Community Christmas Tree by Gwinn Fire Dept.

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MOVING PICTURE THEATRE:

161 - Different Pictures Shown
514 - Shows held during year
37,521 - Total Paid Attendance - Adults 30,293
Children 7,228

SPECIAL FREE SHOWS:	ATTENDANCE:
8 - Shows - Films furnished by C. C. I. Power Club,	804
1 - Show - Films from Mine Rescue Car,	140
1 - Show - "Last of The Mohicans" to students of Gwinn High School,	145
5 - Shows - December 28th, to Children as A Christmas Treat,	630
Grand Total for Year,	39,240

LIBRARY AND READING ROOM.

LIBRARY:

Number of books contained in Library,	1,248
Number of books drawn during year,	4,479
Number of books drawn per month,	374
Number of new books added during year,	25

READING ROOM:

The following number of Current Magazines and Newspapers are placed on the reading tables:

Weekly Magazines,	11
Monthly Magazines,	19
Weekly Newspapers,	4
Daily Newspapers,	4

GENERAL SURFACE:

EDUCATIONAL DEPARTMENT:

Educational Classes were conducted during January, February, March and April. Those attending were very much interested in the work - especially the beginners:

	Classes Held.	Attendance
Beginners English (Men)	41	242
Advanced English (Men)	31	121
English Classes (Women)	15	55
Total,	87	418

The expense of conducting these classes was paid by the Association - No charge was made for books and instruction work.
The work was given by five instructors.

PHYSICAL AND ATHLETIC DEPARTMENT.

Including all work conducted in the Gymnasium, Swimming Pool and all Outdoor Recreations - Skating Rink, Tennis Courts and Playground, Baseball, Football, Track and Outdoor Swimming Pool.

- - - - - - - - - -

This part of the Association's activities increased over other years and is now one of the most interesting departments of the institution.

The Association is represented in all branches of sport by teams that are above the average. These teams have been able to finance themselves on the receipts from home games.

The baseball mine league is financed by the Association and for the number of people that enjoy the sport, it is well worth the expenditure:

General Activities of Physical Department:

	Periods	Attendance
Boys Gym Classes, including Boy's High School Basketball Practice -	83	1,713
Girls Gym Classes, including High Basketball Practice,	43	894
Seniors using Gym for - Class work, Basketball, Handball, Volley-ball, Indoor Baseball, Boxing and Wrestling,	102	1,515
Older Girls Gym	8	78
Boys Supervised Swimming,	73	1,478

General Activities of Physical Dept. (Continued)

	Periods	Attendance.
Girls Supervised Swimming,	66	773
Number Baths taken during year,		5,850

Basketball games during year - 5 games between local teams - 15 games at home with outside teams and 10 games away from home.

Estimated attendance on playground and tennis court, 1,500

The association Ice Skating Rink constructed and cared for by the Association, in the rear of the Club House, proved very popular. The rink was in good condition during January, February and March.

Attendance, 3,590

The Outdoor Swimming Pool, used during the summer was very successful and very much appreciated. It is near the town and accessible to all. The older people using the pool enjoyed the sport as much as the children. Supervision was provided in the afternoon and evening.

Estimated Attendance for Season , 4,100

BASEBALL:

The second season of the Mine Twilight Baseball League proved to be even more successful than the first. The brand of ball playes was much better and the games continued to draw large crowds.

The Stephenson Mine Team won the Championship and the Trophy Cup presented to the Association by Mr. Wm. G. Mather was turned over to them by the former champions "The Francis Mine Team" at the Reception and Dance held September 24th.

Practice games played by teams before league opened,		6
Games played in Mine League,		40
	Attendance,	7,200

The Association Baseball Team, which is made up from the best players of the Mine League, had a very successful season as to victorys, and in a financial way; being able to pay all expenses.

Games played at home,	8	Attendance,	2,500
Games played away from home,	3		

GENERAL SURFACE:

FOOTBALL:

The Association organized a football team and although many of the players were without any previous experience, the team made a very creditable showing.

5 - games were played during the season - all games being played away from home.

The team was able to pay all its traveling expenses and for the necessary equipment, by the guarantees received on these trips.

TRACK:

The First Association Track and Field Meet was held in July. It aroused much interest throughout the entire district.
The prizes were offered by local merchants.
Good time was made in all the running events and the field events brought out some good material.
There were 18 events - and 202 persons entered
43 - prizes were offered:
Attendance, 600

BOWLING:

The Mine Bowling League organized during the latter part of 1920 and completed in March, 1921, was a great success. The entire schedule was run off and the standing of the teams was close throughout the season.

The M. M. Duncan Bowling Trophy was presented to "The Town Team", the winners of the league, at the Banquet held in honor of all of the organizations of the Association, March 28th.

Number of games rolled in League, 135

The Association entered a team in the Upper-Peninsula Bowling Tournament, held at Ishpeming.

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SCOUT ACTIVITIES.

BOYS:

The boys troop is now in its third year and continues with a full special troop membership of 40.
There are 18 members of the troop that have been members since its organization. The meetings for class work are held every Friday night. The recreation or play period is held on Saturday morning under direction of the scoutmaster.

GENERAL SURFACE:

SCOUT ACTIVITIES (Continued)

	Periods	Attendance
Class Meetings during year,	31	832
Recreation periods in Gym.	20	478
Outdoor recreation periods	16	318

During the winter an inter-patrol basketball league is formed. Also a scout team to play outside Scout Organizations is maintained. Two such games were played during the past year.

During the summer months all recreation activities are held outdoors and consists of Hikes and Camping Trips.
A scout baseball team was organized and played three games with other scout troops.

Special Scout Activities.
- 2 - Parties
- 1 - Banquet
- 2 - Hikes
- 1 - Overnight Camping Trip
- 1 - 3-day camping trip to Bass Lake.

GIRLS:

The girl scout movement has met with fair success. At present there are two full troops.

Troop No. 1 - is the most active as it consists of the larger and older members and was organized first.
Troop No. 2 - is just now being re-organized under new leadership.
The following report covers both troops for the entire year. The greater part of the work has been done by Troop No. 1

Meetings are held every Thursday - and covers the regular class and ceremonial work; after which a play hour is held.

	Periods	Attendance
Class meetings during year,	34	948

Troop No. 1 is at full strength and all members have been registered with the National Council.

Troop- No. 1.
- 4 - Socials and Picnics
- 1 - Lawn Social
- 1 - Entertainment for Their Mothers
- 1 - Social for Boy Scouts
- 1 - Social for Girl Troop No.2
- 1 - Xmas Party for Boy Scouts

GENERAL SURFACE:

SCOUT ACTIVITIES - (Continued)

GIRLS:

Troop No. 1 -
Served Lunch at Parent-Teachers Musical and Reception.

Troop No. 2 -
3 -Socials and Picnics
1 -Party for Troop No. 1

The Girl Scout movement is under control of 5 local members; known as Local Council Girl Scouts and during the year they have held one Dance and Rummage Sale to raise funds to help carry on the work.

BASS LAKE CAMP.

Camp opened May 21st, and closed September 30th.

Estimated attendance for season,	1,775
Number of Families using Camp at different periods for entire week,	7
Parties using camp week-ends,	5
All day Picnics (School & Church)	7
Families using camp for basket picnics	19
Families using camp evenings	11
Girl scouts had use of camp (Days)	4
Boy scouts had use of camp (Days)	3
Receipts for boat hire for season	$ 18.80

Special repairs and new equipment added during year, the expense of which was met by the Association.

Equipment:

New large Bass Horn for Association Band
New Candy Show Case
New Rugs for Living Quarters
New Stair Matting and Nosing for all Steps
New Scale installed in Lobby
New lights installed in Men's Locker Room
New Bath Towels purchased (30)

CONSTRUCTION WORK AND REPAIRS.

Individual Dressing Rooms installed in ladies dressing room.

Repairs on Motor and Pump for Swimming Pool.

GENERAL SURFACE:

CONSTRUCTION WORK AND REPAIRS (Continued)

Repaired tin gutters on roof.
All lockers re-painted and put in good condition.
Frame work around windows in rear re-painted
Screens constructed for gym stage
A large portion of the building was re-calcimined and woodwork re-varnished.

Bowling alleys re-planed and put in good condition. Walls and ceiling repainted.
4 - bowling balls repaired and 4 sets of pins purchased.

Billiard and Pool - one table completely re-covered - one new set pockets and new cushion cloth on another.
One set Billiard ball repaired.

Gymmasium and Athletic - Purchased - baseball, handball, basketballs and leather basketball nets.

The usual stock of office, janitor and library supplies were purchased during they year.

All boats for Bass Lake Camp were overhauled and placed in good condition.

GWINN TOWNSITE:

Lot 15 of Block 11, was sold to an employee, who planned to build a home. Excavation for the basement was under way when the mines went on a half-time basis. The work was dropped until times improved.

A number of the company houses were re-shingled in 1921. The contract to paint six houses which was let in 1920, was completed in the spring of 1921. All of the double houses with the exception of those built since 1916, need painting and it is hoped this work will be done in 1922.

DISTRICT OFFICE:

The new county road, constructed in 1921, passes on the North side of the office grounds. New fences were erected on this side in

GENERAL SURFACE:

1921, and a new entrance constructed. New planting was made along the fence and adjacent to the new entrance. This work was not entirely completed. Some additional landscape work is necessary back of the coal pile behind the Central Power Plant.

A part of the slack coal, left after the fire which destroyed the coal dock in 1920, was removed to the Stephenson and Francis Mines in the fall of 1921. No coal was shipped to the mines this year, the two operating mines being supplied from the stock at the Central Power Plant.

The work of installing coal crushing and handling machinery at the Central Power Plant was completed this year. The roof of the power plant building was finished in the summer.

GWINN DISTRICT CRUSHER:

The Crusher went into operation in July. It operated intermittently until in August, when shipments increased. In September it operated double shift, and crushing was completed in October.

The following is a summary of ore crushed in 1921 and 1920:

NAME OF MINE:	TONS CRUSHED 1921	1920
Princeton,	6,014	60,010
Stephenson,	76,935	73,573
Gwinn,	64,427	197,022
Francis,	16,220	34,199
Gardner-Mackinaw,	19,889	49,051
TOTAL,	183,485	413,855

The following gives a comparison of operations for the years 1921 and 1920:

		DECREASE	INCREASE
Year 1921 - Tons crushed,	183,485	230,370	
" 1920 - " "	413,855		

GENERAL SURFACE:

	1921	1920
Average tons crushed per day,	2,109	2,351
Number of days operated,	87	176
Shifts - No. hours,	1, 10-hr. 32 days 2, 10-hr. 55 "	2, 10-hr. 176 days
Rated capacity per 10 hours,	1,000 tons.	

The maintenance cost increased in 1921 due to the purchase of a new belt for the conveyor from the crusher to railroad loading pocket. The old belt had been in service since the crushing plant went into operation. Outside of this, item, the maintenance cost was much lower than in the previous year.

The operating expense was lower in 1921 due principally to the reduction in wages.

STEPHENSON MINE
ANALYSIS OF COST SHEETS EXPLAINING INCREASE OR DECREASE
IN VARIOUS ACCOUNTS BETWEEN YEARS 1921 AND 1920.

UNDERGROUND COSTS:

Development in Rock,	Year 1921	$ 29,101.70	Cost per ton	.148
	Year 1920	47,002.47	" " "	.269
	DECREASE	$ 17,900.77	DECREASE	.121

The decrease is due to lower wages, and to a decrease of 631 feet in the amount of rock drifting and raising. In 1921, there was 3,400 feet of drifting and raising as compared with 4,031 feet in 1920. The cost per ton in 1921 was 8.55, in 1920, 11.66, the reduction in 1921 amounting to 27%.

Development in Ore,	Year 1921	5,394.79	Cost per ton	.027
	Year 1920	00		0
	INCREASE	5,394.79	INCREASE	.027

This account was included under "Stoping" in the old Card of Accounts.

Stoping,	Year 1921	98,718.07	Cost per ton	.503
	Year 1920	113,985.74	" " "	.652
	DECREASE	15,267.67	DECREASE	.149

In analyzing this account, the cost of development in ore in 1921 should be included in Stoping. With this account included, the decrease in 1921 is $9,872.88 and the decrease per ton .122. The decrease in 1921 amounted to 18.7%, which amount is approximately equal to the reduction in wages when figured over the entire year.

Timbering,	Year 1921	74,145.33	Cost per ton	.377
	Year 1920	87,215.05	" " "	.499
	DECREASE	13,069.72	DECREASE	.122

The decrease is due to reduction in wages. The cost per ton for timber, lagging and poles was .1231 in 1921, in 1920, it was .1430, the decrease in 1921 was $.0199. There was a decrease in 1921 in the amount of timber used per ton of ore, due to less retimbering of main level drifts. In 1920, when the mine re-opened, considerable re-timbering was necessary in ore drifts on the 5th level.

Tramming,	Year 1921	31,745.23	Cost per ton	.162
	Year 1920	34,159.11	" " "	.195
	DECREASE,	2,413.88	DECREASE	.033

The decrease is due to lower wages. The product increased in 1921, and there were more chutemen, motormen and brakesmen employed, otherwise the reduction in wages would have shown a greater decrease in the expense. The cash expenditure decreased 7.6%, while the cost per ton decreased 17%.

UNDERGROUND COSTS:

Pumping,	Year 1921	42,781.83	Cost per ton	.218
	Year 1920	48,675.22	" " "	.279
	DECREASE,	5,893.39	DECREASE	.061

The decrease is due principally to lower wages. Power consumption increased in the last three months of 1921, due to increase in the amount of water pumped on account of increase in water entering the mine on October 13th, at the South-East end of the ore body.

Compr. & Air Pipes,	Year 1921	17,886.77	Cost per ton	.091
	Year 1920	24,116.44	" " "	.138
	DECREASE	6,229.67	DECREASE	.047

The decrease is due to the mine operating day shift only from June 1st to December 31st, and to reduction in wages. Until June 1st, the Central Power Plant compressor operated 16 hours per day, as compared with 8 hours after June 1st. Due to the closing of the Gwinn and Princeton Mines, the proportion charged to Stephenson increased.

Underground Superintendence,	Year 1921	11,349.88	Cost per ton	.058
	Year 1920	15,367.37	" " "	.088
	DECREASE	4,017.49	DECREASE	.030

The decrease is due to reduction in wages and change in operating time from two shifts to one shift, on June 1st.

Maint. Accts:

Compr. & Pwr. Drills,	Year 1921	69.63	Cost per ton	.000
	Year 1920	770.67	" " "	.004
	DECREASE	701.04	DECREASE	.004

No drill machines were purchased in 1921, while in 1920 four BBR-13 drills were purchased.

Hand-Tramming Equipt.	Year 1921	2,172.23	Cost per ton	.011
	Year 1920	2,852.14	" " "	.016
	DECREASE	679.91	DECREASE	.005

The decrease is due to less repairs to sub-level cars and to reduction in wages. On re-opening the mine the latter part of 1919 and early in 1920, considerable extra expense was incurred in repairs to the sub-level cars that had been under water for about two years.

UNDERGROUND COSTS:

Elec.Tram Equipment,	Year 1921	11,162.38	Cost per ton	.057
	Year 1920	21,424.11	" " "	.123
	DECREASE	10,261.73	DECREASE	.066

The detail of charges for 1921 and 1920 are as follows:

	1921	1920	INCREASE	DECREASE
Generator & Dynamo,	106.55	22.59	83.96	
Mine Locomotives,	1255.82	2839.42		1583.60
Wiring,	1588.07	2108.75		520.68
Main Line Tracks,	4633.43	11489.10		6855.67
" " Cars,	3324.01	4828.43		1504.42
Spotting Engines,	254.50	135.82	118.68	
TOTAL,	11162.38	21424.11		10261.73

Repairs to mine locomotives and main line cars were lower in 1921. In 1920, the locomotives and cars had to be overhauled very thoroughly, due to the mine having been flooded. There was less wiring in 1921 due to less main level haulage drifting. There was a large decrease in expense for cleaning tracks, due to lower wages, and to half time operation of mine after June 1st. The handling of more ore on the 6th Level, and the decrease in the number of wet working places since October have decreased the expense for cleaning tracks.

Pumping Machinery,	Year 1921	10,614.43	Cost per ton	.054
	Year 1920	27,304.68	" " "	.156
	DECREASE,	16,690.25	DECREASE,	.102

The detail of expenditures for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Steam Pumps,	122.79	92.23	30.56	
Electric Pumps,	1560.88	5642.97		4082.09
Keystone Drill Hole #66,	5829.24	8981.13		3151.89
Pump House, Sump-	16.89		16.89	
Launders, Ditches, Dams, Etc.	3084.63	5698.85		2614.22
Pipe, 6th Level,	00	6889.50		6889.50
	10614.43	27304.68		16690.25

The decrease is due to less expenses for repairs to electric pumps; to less expense account of drill hole #66, and to less expense for dams. The two latter items, as also the cost of pipe for 6th Level, charged out in 1920, are expenses incurred in connection with the attempt to drain the water in the over-burden.

UNDERGROUND COSTS:

Year 1921	335,188.20	Cost per ton	1.706
Year 1920	422,873.00	" " "	2.419
DECREASE	87,684.80	DECREASE	.713

The decrease is due to decrease in wages and cost of supplies, together with increased efficiency. The decrease is 29.4% of which approximately 18.6% represents decrease in wages over the entire year. The remaining 10.8% covers the decrease in supplies and increased labor efficiency.

ANALYSIS OF COST SHEETS: STEPHENSON MINE:

SURFACE COSTS:

Hoisting,	Year 1921	20,349.75	Cost per ton	.104
	Year 1920	20,580.57	" " "	.118
	DECREASE	230.82	DECREASE	.014

The labor cost decreased $3,527.56, or 46%, while the boiler house expense increased $3,368.40, or 26.8%. The decrease in labor cost is due to lower wages and change in operating time after June 1st. The increased product in 1921, adjustment of shortage of coal in dock, and the burning of inferior coal transferred to the Stephenson from the Central Power Plant, together with an increase of $1.52 in the price of coal in 1921, account for the increase in boiler house expense.

Stocking Ore,	Year 1921	14,112.68	Cost per ton	.072
	Year 1920	15,840.52	" " "	.090
	DECREASE,	1,727.84	DECREASE,	.018

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Erecting Portable Trestles,	3956.81	4214.59		257.78
Optg. Tram System,	9079.97	11136.20		2056.23
Rock Pickers, etc.,	1075.90	489.73	586.17	
	14112.68	15840.52		1727.84

The main decrease occurs in the cost of operating tram system, due to decreased wages and to operating mine, day shift only, after June 1st. There was an increase in the cost for rock pickers, due to lower analyses obtained from shipments from stockpile in the summer of 1921.

Dry House,	Year 1921,	9,043.93	Cost per ton	.046
	Year 1920	8,422.10	" " "	.048
	INCREASE	621.83	DECREASE	.002

The increase is due to more expense for heating and for water used in dry. The labor cost decreased due to lower wages and change in operating time. The cost of coal increased $1.52 per ton in 1921, while the amount burned increased, due to inferior quality of coal transferred from the Central Power Plant; there was also more coal charged out account of adjusting shortage of coal in the dock. The expense for water increased due to closing of the Gwinn and Princeton mines, as the Stephenson then stood all the cost of operating district pumping plant, aside from the small revenue received from water service.

Gen'l. Surface Expense,	Year 1921,	2,423.46	Cost per ton	.012
	Year 1920,	3,179.69	" " "	.018
	DECREASE	756.23	DECREASE	.006

The decrease is due to decrease in wages and to change in operating time on June 1st.

ANALYSIS OF COST SHEETS: STEPHENSON MINE:

Maint. Accounts. SURFACE COSTS:

Hoisting Equipment,	Year 1921	3,201.85	Cost per ton	.016
	Year 1920	3,254.87	" " "	.019
	DECREASE	53.02	DECREASE	.003

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Steam Hoists,	553.86	1300.99		747.13
Signal System,	222.38)			
Wire Rope,	111.40)	1953.88	694.11	
Skips, Cages & Skip Roads,	2314.21)			
	3201.85	3254.87		53.02

The decrease is due to less expense for maintenance.

Shaft,	Year 1921	711.99	Cost per ton	.004
	Year 1920	1,282.88	" " "	.007
	DECREASE	570.89	DECREASE	.003

The decrease is due to less repairs required in 1921.

Top Tram Equipment,	Year 1921	3,371.53	Cost per ton	.017
	Year 1920	4,503.47	" " "	.026
	DECREASE	1,131.94	DECREASE	.009

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Engine and Motors,	693.64		693.64	
Tracks and Cars,	1873.58	4108.90		2235.32
Wire Rope,	450.02	394.57	55.45	
Sheaves, Rollers, etc.	354.29		354.29	
	3371.53	4503.47		1131.94

The expense for repairs to top tram cars shows a large decrease. In 1920, one new car was built and the others rebuilt.

Docks, Tres. & Pkts.	Year 1921	411.22	Cost per ton	.002
	Year 1920	317.39	" " "	.002
	DECREASE	93.83	---	

The increase is due to more expense for repairs in 1921.

Mine Buildings,	Year 1921	2,021.58	Cost per ton	.010
	Year 1920	3,986.81	" " "	.023
	DECREASE	1,956.23	DECREASE	.013

(Continued on next sheet)

ANALYSIS OF COST SHEETS: STEPHENSON MINE:

SURFACE COSTS:

Mine Buildings: The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Office,	39.93	439.26		399.33
Warehouse,	5.94	22.34		16.40
Stables,	463.55	89.59	373.96	
Shaft House,	37.75	1397.59		1359.84
Engine House,	15.65	63.67		48.02
Boiler House,	6.35	62.67		56.32
Dry House,	443.83	153.39	290.44	
Coal Dock & Trestle,	880.44	1023.40		142.96
Misc.Fire Protection,	128.14	734.90		606.76
	2021.58	3986.81		1965.23

The main decrease is due to expense in 1920, for enclosing shaft house and to purchase of fire hose. The increase in expense for stables in 1921 is due to new sills and floor in carriage shed; for the dry house it is due to repairs to steam pipes and water heater, to new drain for waste water and to transformer and other changes in the lighting system.

SURFACE COSTS:

Year 1921	55,647.99	Cost per ton	.283
Year 1920	61,368.30	" " "	.351
DECREASE	5,720.31	DECREASE	.068

The surface costs show a decrease of 9.3% as compared with the previous year, while the cost per ton decreased 19%. There was practically no decrease in the two accounts "Hoisting" and "Dry House", these two amounting to 52.5% of the total surface cost. The explanation of these two accounts is given in detail above.

GENERAL MINE ACCOUNTS.

Engineering,

Year 1921,	3,801.41	Cost per ton	.019
Year 1920	3,849.79	" " "	.022
DECREASE	48.38	DECREASE	.003

The cost for the two years is practically the same. The closing of the Gwinn and Princeton Mines left only two operating mines. The engineer's helpers were laid off and the engineers retained. The cost does not show the decrease in wages, due to more time by higher salaried men in the last half of the year.

Analysis,

Year 1921	7,995.26	Cost per ton	.040
Year 1920	10,256.02	" " "	..059
DECREASE	2,260.76	DECREASE	.019

The detail for 1921 and 1920 is as follows:

ANALYSIS OF COST SHEETS: STEPHENSON MINE:

GENERAL MINE ACCOUNTS:

Analysis (continued)

	1921	1920	DECREASE	
Laboratory Cocts,	5359.92	6733.99	1374.07	
Sampling, etc.,	2635.34	3522.03	886.69	
	7995.26	10256.02	2260.76	
No. Determinations,	22,969	22,557	INCREASE	412

The decrease is due to decrease in wages and to decrease in cost of operating laboratory, as compared with 1920, when costs were abnormal during the time the laboratory was being rebuilt after the fire in May.

Personal Inj. Expense,	Year 1921	9,743.41	Cost per ton	.050
	Year 1920	1,987.41	" " "	.011
	INCREASE	7,756.00	INCREASE	.039

The increase is due to fatal accident in March and to more serious accidents which increased the Compensation payments.

Safety Dept. Exp.	Year 1921	190.84	Cost per ton	.001
	Year 1920	60.04	" " "	.000
	INCREASE	130.80	INCREASE	.001

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Wages First-Aid Men	155.27	9.08	146.19	
Supplies,	35.57	50.96		15.39
	190.84	60.04	130.80	

The increase is due to more men receiving instruction in first-aid.

Tel. & Safety Devices,	Year 1921	404.76	Cost per ton	.002
	Year 1920	960.64	" " "	.006
	DECREASE	555.88	DECREASE	.004

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Lighting, Shaft and Levels,	278.90	854.36	[illegible]	575.46
Telephone,	29.51	69.68	[illegible]	40.19
Safety Gates,	7.01	4.82	2.19	
Sign Boards and Signals,	37.34	0	37.34	
Miscellaneous,	52.00	31.78	20.22	
	404.76	960.65		555.88

The decrease is due to extraordinary expense in 1920 for lighting shaft and levels, account of reopening the mine after it had been flooded.

ANALYSIS OF COST SHEETS: STEPHENSON MINE:

GENERAL MINE ACCOUNTS:

Local Gen'l. Welfare,	Year 1921	2,512.58	Cost per ton	.013
	Year 1920	1,887.82	" " "	.011
	INCREASE	624.76	INCREASE	.002

In 1920, the Stephenson Mine was charged 24.8% of the Local General Welfare district expense; in 1921, it was charged 28.5%. The expense for Club House and Visiting Nurse increased in 1921.

District Office,	Year 1921	9,525.49	Cost per ton	.048
	Year 1920	9,755.89	" " "	.056
	DECREASE	230.40	DECREASE	.008

The District Office expense decreased approximately $6,900.00 in 1921. The Stephenson was charged 24.1% in 1920 and 28.5% in 1921, making the net decrease for the Stephenson Mine only $230.40.

Mine Office,	Year 1921	6,005.99	Cost per ton	.031
	Year 1920	6,752.27	" " "	.039
	DECREASE	746.28	DECREASE	.008

The decrease is due to decreased salaries and to less expense for supplies and exchange.

GENERAL MINE ACCOUNTS:

Year 1921	40,365.96	Cost per ton	.205
Year 1920	35,696.12	" " "	.205
INCREASE	4,669.84	---	

The increase is mainly due to increase in "Personal Injury Expense".

COST OF PRODUCTION

Year 1921	431,202.15	Cost per ton	2.194
Year 1920	519,937.42	" " "	2.975
DECREASE	88,735.27	DECREASE	.781

The Cost of Production decreased 17.07% in 1921, while the cost per ton decreased 26.25%; the difference in these figures is due to the increased product in 1921. The decrease in wages figured over the entire year was 18.6%.

FRANCIS MINE
ANALYSIS OF COST SHEETS EXPLAINING INCREASE OR DECREASE IN VARIOUS ACCOUNTS BETWEEN THE YEARS 1921 AND 1920.

UNDERGROUND COSTS:

Sinking in Shaft,	Year 1921	.56	Cost per ton	.000
	Year 1920	19,429.71	" " "	.243
	DECREASE	19,429.15	DECREASE	.243

In 1920, the shaft was sunk from the 5th to the 6th Level. There was no sinking in 1921.

Development in Rock,	Year 1921	9,936.91	Cost per ton	.140
	Year 1920	3,899.41	" " "	.049
	INCREASE	6,037.50	INCREASE	.091

The increase is due to more rock drifting and raising. In 1921, there was 1066-1/2 feet, as compared with 376 feet in 1920. The greater part of the rock work in 1921 was done in developing the new find on the South footwall.

Development in Ore,	Year 1921	9,774.16	Cost per ton	.138
	Year 1920	0	" " "	0
	INCREASE	9,774.16	INCREASE	.138

During 1920 all ore drifting was included in the "Stoping" account.

Stoping,	Year 1921	40,026.38	Cost per ton	.563
	Year 1920	64,744.84	" " "	.809
	DECREASE,	24,718.46	DECREASE	.246

The 1920 charges to this account included items charged to "Development in Ore" in 1921. Including this item for purposes of comparison, the decrease is $14,944.30 and the decrease per ton .108. The decrease in expenditures is 23% and the decrease in cost per ton is 13.3%. The cost of stoping for 1921 is high, due to more development in ore, and to more sorting of ore in the mine. The decrease of 13.3% is due to reduction in wages.

Timbering,	Year 1921	27,141.28	Cost per ton	.382
	Year 1920	34,918.16	" " "	.436
	DECREASE	7,776.88	DECREASE	.054

There was a small decrease in 1921, amounting to 22% in expenditures, and 12.3% in cost per ton. The cost of timber, lagging and poles was $.1534 in 1921, as compared with $.1056 in 1920, also more stull timber was used in 1921, due to more retimbering of main level drifts. The decrease is due to reduction in wages.

UNDERGROUND COSTS:

Tramming,	Year 1921	12,306.41	Cost per ton	.173
	Year 1920	10,606.29	" " "	.132
	INCREASE	1,700.12	INCREASE	.041

The increase is due to hand-tramming of ore on the 4th Level in 1921. At the time the motor haulage equipment was moved to the 5th Level it was thought that only a few thousand tons remained on the 4th Level. Additional ore was discovered on an overturn of the South footwall and mining is not yet completed. The haulage drifts have crushed so that motor haulage has not been possible for many months and there was not sufficient ore to warrant re-timbering. Two motors have been used on the 5th Level, to handle ore and rock. The cost of tramming on the 5th Level was lower in 1921, due to reduction in wages, but the total cost of tramming is higher due to expense for hand-tramming to shaft on the 4th Level.

Ventilation,	Year 1921	1,582.55	Cost per ton	.022
	Year 1920	387.00	" " "	.005
	INCREASE	1,196.55	INCREASE	.017

The increase is due to installation of two small fans, early in the summer, in the drift connecting the Francis and Gwinn Mines. Later in the year a 40,000 cu. ft. fan was purchased and installed at the collar of the Gwinn shaft; one-half of the cost of fan and installation was charged to the Francis. Also a number of ventilating doors were installed on the 5th Level to control the air circulation.

Pumping,	Year 1921	2,762.59	Cost per ton	.039
	Year 1920	3,738.54	" " "	.047
	DECREASE	975.95	DECREASE	.008

A detail of the decrease is as follows:

New Decrease, Labor,	$ 813.38
Oil, Waste and Packing,	39.15
Electric Power,	123.42
	$ 975.95

The labor decrease is due to lower wages and to a slight decrease in the time worked by the pumpmen. The amount of water pumped shows a decrease of approximately 6,500,000 gallons for the year, which accounts for the lower cost for power and other supplies.

Compr. & Air Pipes,	Year 1921	12,027.54	Cost per ton	.169
	Year 1920	13,807.73	" " "	.172
	DECREASE	1,780.19	DECREASE	.003

ANALYSIS OF COST SHEETS: FRANCIS MINE:

UNDERGROUND COSTS:

Compr. & Air Pipes, (continued)

A detail of the charges is as follows:

	1921	1920	INCREASE	DECREASE
Compressors,	10056.37	12077.02		2020.65
Air Pipes,	1971.17	1730.71	240.46	
	12027.54	13807.73		1780.19

The detail of charges for Compressors is as follows:

MONTH	AMOUNT	TIME MINE OPERATED	COMPRESSOR FURNISHING AIR	REMARKS.
January,	1100.01	1,8-hr.shft.6 dys.	Francis Compr.	
February,	1089.53	"	" "	
March,	1109.25	"	" "	
April,	1115.48	1,8-hr.shft 5 dys.	" "	
May,	1145.67	"	" "	
June,	704.61	1,4-hr.shft.6 dys.	" "	
July,	715.31	"	" "	
August,	1115.75	1,8-hr.shft.6 dys.	" "	(Ore mined & hoisted 4 hrs.
September,	1082.08	"	" "	(Rock drifting afternoon (shift, 4 hours.
October,	948.03	"	C.P.P. Compr.	" " "
November,	897.79	"	" "	
December,	1008.03	"	" "	Ore hoisted 8 hours.

UNDERGROUND COSTS:

Undgr. Superintendence	Year 1921	4,765.78	Cost per ton	.067
	Year 1920	5,930.02	" " "	.074
	DECREASE	1,164.24	DECREASE	.007

The expenditures decreased 19.6%, the cost per ton 9.4%. The salary paid the mining captain was reduced, while the time worked by the shift boss and also his wages, were reduced. The decreased product in 1921 caused the cost per ton to decrease less than was indicated by the reduction in wages and salaries.

Maint. Accts.

Compr.& Pwr.Drills,	Year 1921	809.59	Cost per ton	.011
	Year 1920	1,424.15	" " "	.018
	DECREASE	614.56	DECREASE	.007

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Compressor, Elec.	627.78	239.15	388.63	
Air Lines,	26.81		26.81	
Power Drills,	155.00	1185.00		1030.00
	809.59	1424.15		614.56

The expense for repairs to the Francis compressor increased in 1921, while there was a decrease in the number of drill machines charged out. Only one BBR-13 drill was charged out in 1921.

ANALYSIS OF COST SHEETS: FRANCIS MINE:

UNDERGROUND COSTS:

Maint. Accts:

Hand-Tramming Eqpt.	Year 1921	852.46	Cost per ton	.012
	Year 1920	760.64	" " "	.010
	INCREASE	91.82	INCREASE	.002

The division of charges for 1921 is as follows:

Cars,	503.67
Tracks,	348.79
	852.46

This is a new account, included in 1920 under account "Tracks and Cars". The expense increased due to hand-tramming on the 4th Level and to development work in the new find on the South footwall.

Elec. Tram Equipt.	Year 1921	2,600.25	Cost per ton	.037
	Year 1920	4,277.62	" " "	.053
	DECREASE	1,677.37	DECREASE	.016

The detail of charges for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Locomotives,	421.17	487.63		66.46
Wiring,	354.11	683.83		329.72
Main Line Tracks,	1207.37	2309.20		1101.83
Main Line Cars,	617.60	796.96		179.36
	2600.25	4277.62		1677.37

All sub-divisions of this account show decreases in 1921, the main decrease, however, is in sub-account "Main Line Tracks". In 1920, the track in the drift connecting the Francis and Gwinn Mine was charged to this account; this made the cost higher than in 1921, when less drifting was done and less track laid.

Pumping Machinery,	Year 1921	1,688.60	Cost per ton	.024
	Year 1920	499.97	" " "	.006
	INCREASE	1,188.63	INCREASE	.018

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Electric Pumps,	259.64	499.97		240.33
Water & Steam Pipe Lines,	98.24		98.24	
Dams,	1307.45		1307.45	
Launders, Ditches, etc.	23.27		23.27	
	1688.60	499.97	1188.63	

The cost for repairs to electric pumps decreased approximately 50% in 1921. The increase in expense in 1921 is due to installation of dam in the drift connecting the Francis and Gwinn Mines, one-half the cost of which was taken up by the Gwinn Mine. This dam is a safe-guard to prevent flooding in case either mine should break through to surface.

ANALYSIS OF COST SHEETS: FRANCIS MINE:

UNDERGROUND COSTS:

Year 1921	126,281.60	Cost per ton	1.777
Year 1920	166,732.00	" " "	2.083
DECREASE	40,450.40	DECREASE	.306

There was a decrease of 24.26% in expenditures, while the cost per ton decreased only 15.23%. The decrease was due to the mine operating on half-time, part of the year, and to decreased wages. The cost per ton did not decrease proportionally due to low product for several months, caused by a lack of working places in ore.

SURFACE COSTS:

Hoisting,

Year 1921	6,260.20	Cost per ton	.088
Year 1920	9,631.13	" " "	.120
DECREASE	3,370.93	DECREASE	.032

The decrease in expenditures is 35%, in cost per ton, 26.67%. It is due to lower wages, decreased operating time, and lower product.

Stocking Ore,

Year 1921	5,103.11	Cost per ton	.072
Year 1920	9,119.38	" " "	.114
DECREASE	4,016.27	DECREASE	.042

The detail of charges for 1921 is as follows:

Erecting Portable Trestles,	705.00
Optg. Tram System,	3330.85
Rock Pickers, etc.	1067.26
	$ 5103.11

All sub-accounts show decreases, the main decrease, however, is in sub-account "Operating Tram System". This was due to change in operating time, and to reduction in wages.

Dry House,

Year 1921	2,363.90	Cost per ton	.033
Year 1920	3,733.37	" " "	.046
DECREASE	1,369.47	DECREASE	.013

The cost for dryman decreased $575.63, due to wage reduction and to change in operating time. Charges from boiler room decreased $553.51, due to same reasons; the balance of decrease is due to less miscellaneous charges.

Gen'l. Surf. Expense,

Year 1921	2,045.11	Cost per ton	.029
Year 1920	2,700.14	" " "	.034
DECREASE	655.03	DECREASE	.005

The decrease is due to decreased wages. Expenditures decreased 24%, while the cost per ton decreased 15%.

ANALYSIS OF COST SHEETS: FRANCIS MINE:

Maint. Accts.	SURFACE COSTS:			
Hoisting Equipt.	Year 1921	1,700.75	Cost per ton	.024
	Year 1920	4,615.09	" " "	.058
	DECREASE	2,914.34	DECREASE	.034

The detail of charges for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Electric Hoists,	387.18	690.97		303.79
Wire Rope,	16.75	1377.41		1360.66
Skips, Cages & Sk. Roads	1296.82	2546.71		1249.89
	1700.75	4615.09		2914.34

The decrease is due to less repairs to hoists, no new hoisting ropes in 1921, and less repairs to skips, cages and skip roads. A skip rope broke in 1920 wrecking the skip and damaging the cage and skip roads, which account for the large expense in 1920.

Shaft,	Year 1921	247.12	Cost per ton	.003
	Year 1920	2,263.37	" " "	.028
	DECREASE	2,016.25	DECREASE	.025

The large decrease is due to extraordinary expense in 1920 for repairs to shaft, due to damage done by falling skip, and to replacing some steel sets that had buckled.

Top Tram Equipment,	Year 1921	2,453.91	Cost per ton	.034
	Year 1920	1,855.84	" " "	.023
	INCREASE	598.07	INCREASE	.011

The detail of charges for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Engine and Motors,	112.43)			
Tracks and Cars,	750.18)	1332.01	303.08	
Sheaves, Rollers, Etc.	772.48)			
Wire Rope,	818.82	523.83	294.99	
	2453.91	1855.84	598.07	

The increase is due to building side-dump car for Francis Mine at District Shop; also more new trestle was equipped with rollers, spools, etc., in 1921, and two new haulage ropes were charged out, as compared with one in the previous year.

Dks. Tres. & Pkts.,	Year 1921	551.29	Cost per ton	.008
	Year 1920	3,594.98	" " "	.045
	DECREASE	3,043.69	DECREASE	.037

The detail of charges for 1921 and 1920 is as follows:

ANALYSIS OF COST SHEETS: FRANCIS MINE:

Dks. Tres. & Pkts. (continued)

	1921	1920	INCREASE	DECREASE
Grading and Planking,	472.89	1529.83		1056.94
Permanent Trestles,	78.40	2011.12		1932.72
Pockets, Chutes, etc.		54.03		54.03
	551.29	3594.98		3043.69

The decrease was due to less extensions of trestles; to less expense for grading stock-pile grounds and to no repairs to pockets or chutes.

SURFACE COSTS:

Mine Buildings,	Year 1921	267.85	Cost per ton	.004
	Year 1920	239.35	" " "	.003
	INCREASE	28.50	INCREASE	.001

The detail of charges for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Office,	9.77	.74	9.03	
Warehouse,	11.97	1.46	10.51	
Shops,	10.61	34.18		23.57
Stables,		3.67		3.67
Shaft House,	63.74	59.75	3.99	
Engine House,	31.68	35.51		3.83
Boiler House,	1.08		1.08	
Dry House,	55.60	83.34		27.74
Coal Docks & Trestle,		.09		.09
Misc. Fire Protection, etc.	83.40	20.61	62.79	
	267.85	239.35	28.50	

There was a slight increase in maintenance expense in 1921, due to repairs to top tram engine house, caused by car going off top tram trestle and wrecking one end of the building.

SURFACE COSTS:

Year 1921	20,993.24	Cost per ton	.295
Year 1920	37,752.65	" " "	.471
DECREASE	16,759.41	DECREASE	.176

Expenditures decreased 44.3% while the cost per ton decreased 37.3%. Lower wages, decreased operating time and lower maintenance expense account for the decrease.

GENERAL MINE ACCOUNTS:

Engineering,	Year 1921	2,414.98	Cost per ton	.034
	Year 1920	2,011.63	" " "	.025
	INCREASE	403.35	INCREASE	.009

There was a small increase in this account due to more time by higher salaried engineers and to more survey and geological work account of the new find on the South footwall. The closing of other mines was indirectly responsible for the increased cost for engineering.

ANALYSIS OF COST SHEETS: FRANCIS MINE:

GENERAL MINE ACCOUNTS:

Analysis,	Year 1921	3,752.20	Cost per ton	.053
	Year 1920	5,174.24	" " "	.065
	DECREASE,	1,422.04	DECREASE	.012

The detail of charges for 1921 and 1920 is as follows:

	1920	1921	INCREASE	DECREASE
Laboratory Costs,	4115.64	3012.89		1102.75
Sampling, etc.	1058.60	739.31		319.29
	5174.24	3752.20		1422.04
No. Determinations,	13,377	12,887		490

The decrease is due to decrease in number of determinations; to lower cost for operating laboratory and for sampling, due to lower wages and change in operating time.

Pers. Inj. Expense,	Year,1921	1,266.24	Cost per ton	.018
	Year 1920	1,117.49	" " "	.014
	INCREASE	148.75	INCREASE	.004

The increase is due to more compensation payments, due to two serious accidents, in 1921.

Safety Dept. Exp.	Year 1921	172.54	Cost per ton	.003
	Year 1920	228.39	" " "	.003
	DECREASE	55.85	----	

There was less expense for first-aid practices and less supplies used.

Tel. & Saf. Devices,	Year 1921	286.83	Cost per ton	.004
	Year 1920	253.66	" " "	.003
	INCREASE	33.17	INCREASE	.001

The detail for 1921 and 1920 is as follows:

	1921	1920	INCREASE	DECREASE
Lighting, Shaft and Levels,	237.25	151.89	85.36	
Mine Telephones,	16.49	19.92		3.43
Safety Gates & U.G. Imp.	23.50	45.14		21.64
Sign Boards,	9.59	4.68	4.91	
Miscellaneous,		32.03		32.03
	286.83	253.66	33.17	

The increase is due to more expense for lighting shafts and levels, due to opening 6th Level and to extensions of drifts on 5th Level.

Local Gen'l. Welfare,	Year 1921	1,193.70	Cost per ton	.016
	Year 1920	994.91	" " "	.013
	INCREASE	198.79	INCREASE	.003

In 1920 the Francis Mine was charged with 13.1% of the Local General Welfare expense; in 1921 it was charged 13.5%. The expense for Club House and Visiting Nurse increased in 1921.

ANALYSIS OF COST SHEETS: FRANCIS MINE:

GENERAL MINE ACCOUNTS:

Mine Office,	Year 1921	3,221.33	Cost per ton	.045
	Year 1920	3,537.71	" " "	.044
	DECREASE	316.38	INCREASE	.001

The decrease is due to lower salaries paid clerks. In 1920 more time was charged to district crusher, as it went into operation two months earlier.

Dist. Office,	Year 1921	4,460.43	Cost per ton	.063
	Year 1920	5,148.45	" " "	.064
	DECREASE	688.02	DECREASE	.001

The total District Office expense decreased approximately $6,900.00 in 1921. The Francis was charged 12.7% in 1920 and 13.5% in 1921, making the net decrease to this mine $688.02.

TOTAL GENERAL MINE ACCOUNTS:

Year 1921	16,947.25	Cost per ton	.238
Year 1920	18,650.34	" " "	.233
DECREASE	1,703.09	INCREASE	.005

Expenditures decreased 9.1% while the cost per ton decreased only 2.1%. The lower product accounts for the above difference in percentage of decrease. Five of the accidents show decreases, while four show increases.

COST OF PRODUCTION:

Year 1921	164,222.09	Cost per ton	2.310
Year 1920	223,134.99	" " "	2.787
DECREASE	58,912.90	DECREASE	.477

Expenditures decreased 26.4%, while the cost per ton decreased 19.1%. Costs were high during several months of the year, due to the low product, otherwise the cost per ton would have shown a greater decrease.

- - - - - - -

Mine operated 1 shift full time 6 days per week January 1st to March 21,1921.
" " 1 " " " 5 " " " March 21st to June 1st,1921.
" " 1 " half " 6 " " " June 1st to December 31st.

- - - - - - -

Wages decreased February 1st, 1921, August 1st, 1921 and October 1st, 1921.

Salaries decreased October 1st, 1921.

REPUBLIC MINE.

PRODUCTION:-

The Republic Mine produced the following tonnage in the year 1921:-

Basic run-of-mine,	491	tons,
Basic Lump,	41,716	"
Pascoe Lump,	1,765	"
Basic Crushed,	25,373	"
Pascoe Crushed,	3,669	"
Total,	73,014	"

The total tonnage is the least produced since the mine was opened up in 1872. In 1893, production was 88,572 tons.

On February 12th, we suspended operations on Saturdays going on a five day a week basis day and night shift. On June 1st, forces were again reduced to three single shifts a week, employing half of the men half time.

Production was also curtailed during June, July, August and September, while the Pascoe Shaft was undergoing repairs. As a result of hoisting only one shift and sinking the Pascoe Shaft and rock drifting both day and night shifts, we are catching up on the development work. For the first time in years, we proved up over twice as much new ore as was hoisted. The following table shows the ore hoisted and new ore developed since 1915:-

YEAR	ORE PRODUCED	NEW ORE DEVELOPED
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

In the years 1915 - 1916, little ore was developed and it was not until 1918 that we began to gain on our ore reserves.

ESTIMATE OF ORE IN MINE, DECEMBER 31ST, 1921.				
NO. 9 SHAFT.				
LEVEL	DEVELOPED ORE			
	AVAILABLE ORE	SHAFT PILLARS	PROSPECTIVE ORE	TOTAL
911'-1153'		14,720		14,720
2172'	25,040			25,040
2270'	16,400			16,400
2370'	6,784			6,784
TOTAL,	48,224	14,720		62,944
PASCOE SHAFT.				
1640'		2,700		2,700
1710'	16,066	31,700		47,766
1780'		42,940		42,940
1850'		13,200		13,200
1950'	12,080	58,570		70,650
2050'	610	18,960		19,570
2270'	6,448			6,448
2470'	77,850			77,850
2570'	54,540		54,540	109,080
2670'			54,720	54,720
TOTAL,	167,594	168,070	109,260	444,924
GRAND TOTAL,	215,818	182,790	109,260	507,868

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

GRADE	DEVELOPED	PROSPECTIVE	TOTAL
Bessemer Ore,	151,528	109,260	260,788
Basic "	16,066		16,066
Pascoe "	48,224		48,224
	215,818	109,260	325,078

The following statement shows ore reserves, production and new ore developed each year since 1918:-

	1918	1919	1920	1921
Ore developed Jan. 1st,	367,779	398,450	410,582	381,712
Prospective ore " "	59,903	42,695	64,595	39,660
Total,	427,682	441,145	475,277	421,372
Product,	142,476	155,315	153,751	73,014
Balance,	285,206	285,830	321,326	348,358
Ore developed Dec. 31st,	398,450	410,582	381,712	398,608
Prospective ore " "	42,695	64,595	39,660	109,260
Total,	441,145	475,277	421,372	507,868
Developed during Year,	155,939	189,447	100,046	159,510

It will be noted that although the new ore developed for the year 1921 is exceeded in tonnage by 1919, that we showed up over twice as much as was mined in the past year.

SHIPMENTS.

Very little ore was loaded from the stockpile and no ore was shipped from the pockets in 1921. The total tonnage was only 5,931 2010 tons. Two cargoes of Lump ore and two of Crushed ore were forwarded.

BOAT	GRADE	MINE ANALYSIS			LOWER LAKE ANALYSIS		
		IRON	PHOS.	SILICA	IRON	PHOS.	SILICA
Pioneer,	Basic Lump,	62.85	.046	8.01	63.55	.036	6.88
Mather,	Basic Lump,	63.33	.048	8.00	62.41	.030	8.34
Munising,	Bessemer Crushed,	62.07	.033	8.81	62.90	.036	6.92
Munising,	Basic Crushed,	61.83	.044	8.57	63.30	.035	

There were some complaints from the United Alloy Steel Corporation of Canton, Ohio, on nine cars of ore from the Steamer Pioneer. They claimed the Silica ran considerably in excess of the guaranteed Silica of 6.95. You will note that the lower lake Chemists only report an average Silica of 6.88. There was about 20% Pascoe ore mixed in with the Bessemer and Basic ore and so apparently the greater proportion of this Pascoe or Siliceous ore must have gone into these nine cars.

The Cleveland Office also complained about the Silica in the second or "Mather" cargo. The was less Pascoe Lump in this shipment than in the first but for some reason, the lower lake chemists report considerably lower Iron than the mine analysis. The tally sheet in the Mine Office shows that of the twenty-four cars of ore making up this shipment, six cars averaged 62.40 Iron; three, 62.70 Iron; three, 62.80; three, 62.90; three, 63.50; three, 64.00; and three, 65.90 Iron. Apparently, the lower lake sample consisted entirely of ore that was loaded into the first six cars enumerated above.

It is extremely difficult to grade cargoes with only a few cars of ore at the docks. When shipments are normal, we can hold out certain cars that make for a lower mixture and then mix these cars with high grade pocket ore. We have had little trouble or complaints as far as I know with the grading and mixing in the past six years.

We don't anticipate any difficulty in keeping the shipments well within the Silica guarantee next season, as we have dumped no Pascoe ore on the Basic Lump stockpile since April, 1921, and the average Silica of the whole pile is now down to about 6.40 and will probably be down to about 6.25 by May 1st, 1922.

FARM.

Crops were poor this season. Due to the drought and hot weather, the hay crop only amounted to about 15 tons or half a normal crop. No oats were harvested at all. We usually got about 300 bushels

ESTIMATED PRODUCTION FOR 1922.

We are assuming that the mine will only operate three single shifts a week up until November 15th, 1922. Production is figured at the rate of 275 tons per shift.

DELAYS.

We had but two delays that interferred with production.

On May 18th, between shifts, the hanging of the Pascoe Shaft collasped between the 1640' and 2050' Levels. At 2:00 P.M. on the same afternoon, the Captain reported that the ground near the 1710' Level Plat was moving and cracking and we immediately ordered all the men out of that part of the mine. At 6:50, the 1950' Level Plat collapsed pulling down the shaft timbers for a considerable distance both above and below this plat. Nothing could be done that night, but the following morning the Captain and Superintendent crossed over from the No. 9 to the Pascoe Shaft above the break and climbed down the shaft to the 1640' Level. Below this level the hanging sets were damaged and further progress was unsafe. There was still movement as indicated by the cracking sounds and so no repairing was attempted to that part of the shaft for three or four days. Below the break, a timber pentice was built above the 2050' Level to prevent anything further from falling into the shaft. As soon as this was finished, hoisting from the lower levels to the motor haulage level was resumed on May 19th.

On May 23rd, another examination proved that everything was quiescent in the upper part of the shaft and so repairs were started. It was decided to abandon the East skip way as it was no longer required to handle the ore, the bulk of the product being hoisted from the bottom levels to the 2050' Level only. From the 1640' to the 1850' Levels, the East skip-road and the ladderway were blocked from foot to hanging, as the hanging timbers were repaired. From the 1850' Level down for 200 feet, the shaft was completely filled with debris and hanging rock. Some of these pieces that fell from the hanging were 20' and 30' long and as wide as the shaft.

A skip-road had to be drilled out by hand as all the air pipes were completely severed. No air could be secured from the top of the shaft except by laying about 2500 feet of new air pipe and this expense was prohibitive. Only short holes could be drilled in any event because we could use only light charges of powder in order to prevent damaging the new shaft sets that were being put in. It was actually more work to repair the shaft that it would have been to sink a new shaft. It took us four months to finish that 200 feet, so that hoisting could be resumed from the top levels. After October 1st, hoisting was done on the day shift and the repairs were finished up on the night shift. The whole job was not completed until December 1st, 1921.

The total cost of the repairs was $4,266.29 and product lost by the accident totalled 5,750 tons.

On October 19th at 3:00 P.M., the underground skip at the Pascoe Shaft was hoisted too high breaking the head-frame and tearing up the skip road. It took 24 hours to repair the damage and loss of product was 50 tons.

LABOR & WAGES.

There was an abundance of labor due to the hard times and after the curtailment, it was a difficult matter to ascertain the most deserving ones to be kept on the Pay-Roll.

Wages were reduced three times:-

15%	decrease	on	February 1st,	1921,
12½%	"	"	August 1st,	"
10%	"	"	October 1st,	"
37½%				

That brings the wages about on a par with those paid during the period October 1st, 1917 to April 16th, 1918. The underground rates are almost exactly the same, but there is a little variation in the rates paid the surface men.

COSTS.

The Cost Sheets for the years 1920 and 1921 can not be compared directly, as in previous years, due to the curtailment in 1921 and also due to the changes in the new Cost Sheet compared with the old one. For instance, Breaking Ore in 1920 includes both stoping and ore drifting and raising. Maintenance Hoisting Equipment on the new Cost Sheet includes both the Shaft and Hoisting Equipment Maintenance, whereas in 1920, we had two separate acounts. There are other similar changes.

EXPLORING IN MINE:-

In 1920 we drilled 3621 feet at a total cost of $17,969.57 or $4.963 per foot. In the past year, the total expense was $10,352.72 at a cost of $4.11 per foot.

The labor charge was $2.77 per foot in 1920 and $1.84 in 1921. Although the labor charge decreased .93¢ per foot in the last year, the total cost per foot decreased but .85¢. The reason for this is that the carbon loss was greater in the past year for the amount of footage drilled.

The repairs to the drill equipment cost almost as much in 1921 as in 1920, whereas the footage drilled was 30% less.

SHAFT SINKING:-

In the past year, we sunk 126 feet of shaft. After June 1st, although the mine operated only one shift, the shaft sinking was kept going both day and night shift. The night shift sinking ran up the cost per foot for this reason: A hoisting engineer has to be employed night shift and also a bucket lander to handle the rock from the shaft. All of their time is charged to shaft sinking. On the day shift, both of these men are chargeable to other accounts. The hoisting engineer's time goes against hoisting and the skip-tender, whose time is chargeable to the tramming expense, lands