The Cleveland - Cliffs Iron Company

Mining Department

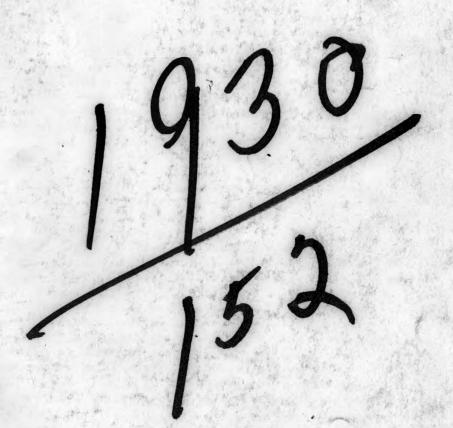
Annual Report of General Manager

For Year ending December 31st. 1928

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THE CLEVELAND-CLIFFS IRON COMPANY ry, 1st, 1929

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Gwinn OTHER MICHIGAN MINES & MINNESOTA MINES: 1. General 2. Production, Shipments & Inventories 3. Analysis 4. Estimate of Ore Reserves 5. Labor and Wages 6. Surface 7. Underground & Open Pit 8. Cost of Operating 9. Explorations & Future Explorations 10. Taxes 11. Accidents & Personal Injury 12. New Construction & Proposed New Construction 13. Equipment & Proposed Equipment 14. Maintenance & Repairs	24 25 25 26	246 7-252 253 253 4-255 6-260 1-263 4-265 265	SPIES VIRGIL 268 268-272 273 274-275 275-276 277-280 280-285 286-293 293-294 294-295 296	300 300–301 301–302 302–303 303–304 304 305–306 306–307 307 308	HILL TRUMBULL 309 309-311 312 313-314 315 315-317 317-321 322-324 324-325 326 326-328 328-329 329 329 329-331	HOLMAN CLIFFS 334-33
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Gwinn THER MICHIGAN MINES & MINNESOTA MINES: 1. General 2. Production, Shipments & Inventories 3. Analysis 4. Estimate of Ore Reserves 5. Labor and Wages 6. Surface 7. Underground & Open Pit 8. Cost of Operating 9. Explorations & Future Explorations 10. Taxes 11. Accidents & Personal Injury 12. New Construction & Proposed New Construction 13. Equipment & Proposed Equipment 14. Maintenance & Repairs 15. Power 16. Water Supply	24 24 25 25 26 26	246 7-252 253 4-255 6-260 1-263 4-265 - 265 - 266 - 266	SPIES VIRGIL 268 268-272 273 274-275 275-276 277-280 280-285 286-293 293-294 294-295 296 297 297-299	300 300–301 301–302 302–303 303–304 304 305–306 306–307 307 308	HILL TRUMBULL 309 309-311 312 313-314 315 315-317 317-321 322-324 324-325 326 326-328 328-329 329 329 329-331	HOLMAN CLIFFS 334-33
Gwinn OTHER MICHIGAN MINES & MINNESOTA MINES: 1. General 2. Production, Shipments & Inventories 3. Analysis 4. Estimate of Ore Reserves 5. Labor and Wages 6. Surface 7. Underground & Open Pit 8. Cost of Operating 9. Explorations & Future Explorations 10. Taxes 11. Accidents & Personal Injury 12. New Construction & Proposed New Construction 13. Equipment & Proposed Equipment 14. Maintenance & Repairs 15. Power 16. Water Supply 17. Mine Location-Condition of Premise	24 24 25 26 26 26	246 7-252 253 253 4-255 6-260 1-263 4-265 265 265	SPIES VIRGIL 268 268-272 273 274-275 275-276 277-280 280-285 286-293 293-294 294-295 296 297 297-299	300 300–301 301–302 302–303 303–304 304 305–306 306–307 307 308	HILL TRUMBULL 309 309-311 312 313-314 315-317 317-321 322-324 324-325 326 326-328 328-329 329-331	243-24 HOLMAN CLIFFS 334-33
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CHE: ED

2-18-29

-3-

Mr. Wm. G. Mather, President, Cleveland, Ohio

Notel host lime Assidents

Since early in the fall of 1926, a Targe part of my efforts have been devoted to Safety. What has been accomplished in this line is plainly shown Dear Sir:- in tabulation:

Mr. Mather

I beg to submit the report of the operations of the Mining Department for the year 1928.

The inventories, maps and statements relative to the 1928 report have gone forward to you under separate cover.

The colored portions of the maps show the work for the year. The reports of the different mines of the Company were made by the Superintendents in charge and the reports of the Engineering, Mechanical, Electrical, Geological, Safety and Welfare Departments by the heads of these Departments. Paramey 8th, 1929, the Morris Lloyd Mine has worked 277 days without a single lost

In 1927 the Company was able to dispose of the larger part of the high sulphur ore which was in stock at the Gardner-Mackinaw and it was reported that the furnaces using this ore had no serious trouble with the sulphur. Early in 1928 we started to unwater the property and mine the remaining ore. This is a semi-hard ore, the stopes requiring no timber. The mining cost is therefore low.

In the latter part of the year we secured an option on a large acreage of land in Sections 14,23,24,25 and 26, T. 58N - Range 24 W., Minnesota. Indications of iron ore were found along one of the rivers, it being evident that this material was being washed out by underground water courses. This property is to the north of Marble on the Mesaba Range. Three shallow holes were drilled and as no iron ore formation was encountered, the option was thrown up.

The only outstanding lease to the Empire From Company, covering the SW2 of

In April, the Company purchased 23/24ths of the fee of the Joan No. 3 property, located on the S_2^1 of the NE $_4^1$ of Section 34,47-29, Cuyuna Range. We are now endeavoring to secure the fee of the remaining 1/24th interest.

By decree of Court, dated October 4th, Corbit's Second Addition and the remaining portion of the Maas, Lonstorf & Mitchell Addition, adjacent to the Negaune Mine, were abandoned. This has been one of our most difficult problems and has been hanging fire for a number of years. We are now permitted to continue our mining operations at the Negaunee and Maas Mines and on the Race Course without danger of caving surface improvements which we did not own.

The following statement shows a comparison of all of the Company's mines for the year 1928 as compared with 1927. In figuring the Tons Per Man Per Day, all of the labor under the jurisdiction of the Mining Department has been included. On this basis the Tons Per Man Per Day shows a decrease of .42. Some explanation is necessary and a detailed sheet entitled "Comparison of Total Days Worked and Tons of Ore Mined for Years 1927 and 1928" will be found in the report. You will notice by this that the Tons Per Man Per Day for Underground mines shows an increase in 1928 of .55.

	TONS	TONS PER MAN PER DAY	COST ON CARS	AVERAGE RATE PER DAY	PER TON
1927	3,497,273	5.17	2.181	5.16	.999
1928	3,073,679	4.75	2.145	5.15	1.084
Increase Decrease	423,594	.42	.36	.01	.085

PARTSON OF TOTAL DAYS CORKED AND TONS OF ORE MINED FOR

Mr. Mather 1927-2- 1938 1937 1-1-2928

Since early in the fall of 1926, a large part of my efforts have been devoted to Safety. What has been accomplished in this line is plainly shown by the following tabulation:

Average (Production)	1926	1927	1928
Total Lost Time Addidents	347	209	117
Percentage of Reduction	150/151	40%	$66\frac{1}{2}\%$

Aside from the humanitarian viewpoint and the peace of our own minds, safety has a direct bearing on effeciency. Facts can be submitted to prove this beyond doubt. During the present year, certain of our mines have established records which have never been even approached by our Company in the past. Up to the date of this letter, February 8th,1929, the Morris Lloyd Mine has worked 277 days without a single lost time accident. The corresponding record for the Maas Mine is 184 days and for the Athens 176 days. By examining the reports of Messrs. Moulton and Conibear, it will be evident that aside from all other reasons, the reduction in cost is a considerable figure.

The only outstanding lease is the Empire Iron Company, covering the $SW_{4}^{\frac{1}{4}}$ of Section 19-47-26. This property has been sub-let to the Clement K. Quinn Company who operated it in 1928.

The state of the s	mund sand		4.000	
de des	Yours very	truly,	Milling	
SRE:DP per man per may	6:49	6.39	/	Manager
CON PTY PRODUCTION				
Spins Pils Symbull Spins	174,106 516,385 316,59%	115,415 488,397	#,008 \$ 19,574} 14,004	1,402 15,2921
	1,007,068	605,312	35,5874	16,9944
Not D.G. Days Not D.G. Production	0,255,682	2,170,230	480,889	417,220 %
U.G. Tous per Han per Day	4,6493	5.201		v.
# Open Pit Production	30.13	21.81		

COMPARISON OF TOTAL DAYS WORKED AND TONS OF ORE MINED FOR YEARS 1927 & 1928

	1927		1928	1927	1928
	DAYS	1925	DAYS	DAYS	DAYS
	- 1 10 500		10000000	10000000	1.120.33
Product	* 1 052	90,915	394,972	466,382	413,994
Re-Opening Gardner-Mack.	1,252		3,071		
Stephenson (Production)			863 4	11	
Princeton	1,3974		334 34	LUNCH	
Austin (Production)		95,260	280 34	314,981	141,390
Miscel.Payroll	9,249	21,200	$11,044\frac{1}{2}$	-49,550	49,400
Shops & Storehouse	9,2942	-	13,299 4	22,250	133,900
Opg. & Eq. Tilden	-	40.00	6,201	918	21,350
Francis Total Ibs.	154		25½	386,761	346,040
Negaunee - Misc. & Gen.	7,515		7,625 34	The Tay Labour Street	
Athens 1988 "	$2,971\frac{1}{4}$		3,107	54,765,02	47,860.12
C.C.I.Co. " "	69,390		$61,042\frac{1}{2}$	The second second	Children Lags
C.P.& L.Co.	$11,003\frac{1}{2}$	13,600	20,939	600,440	511,350
M.C.I.M.Co.	20,502	93,950	22,516	102,345	116,445
Gwinn Crimers + + +	697		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	27	24
B. & H. Mg Mags	3873	41.890	22.830	3,370	
hilphiters	133,6774	-	150,350%		
BlockExpluders	-	4 0	58		- 00 - 00
Demosting Wire	- A	det 161	20		
Grand Total all Operations	650,093		584,565 4		
goinl Gost Puce,	Ste. IS	685.2	4,829,48	45,691,80	4,249,42
Milini, Cost. All Da	Plane mel	253.6	1.00 451.75	50-120-1201	FOR STANKING TO
Net for Operating Mines	516,4164		434,215	516,4164	434,215
Total Tons Exclusive				1-3-42-1000	
of Wade Mine	3,358,640	2	,775,542	.1616	1383
Less Overruns	15,956	N. S	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	12 10 10 10	
Towns of Poster - A	3,342,684	.1194	.1358	b1174	-1156
Figs, Ca. W.D	0,010,001	40094	,6122	*02.00	w01.08
Tons per Man per Day	6.47	,1288	6.39	.1274	,1256
The Studios Rose flow flow		2000			
OPEN PIT PRODUCTION		8095	.9432	,829B	-0258
Ogden	174,106		116,415	2,008	1,702
Hill Trumbull	516,385		488,897	19,5742	
Boeing	316.572			14,004	20,0004
	316,572	7	605,312	35,5874	16,994
The state of the s				400 000	
Net U.G.Days	0 005 -05			480,829	417,220
Net U.G. Production	2,235,621	2	,170,230		
			5.201		
U.G. Tons per Man per Day	4.6495		3.401		
U.G. Tons per Man per Day Open Pit Production	4.6495		3.201		

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STATEMENT SHOWING COMPARATIVE COST FOR ALL EXPLOSIVES USED AT HARD ORE MINES

	1925	1926	1927	1928
Product	390,915	394,972	466,382	413,994
POWDER	1.07 570	2,900		
Lbs. 40%	175,900	186,445	113,075	258,650
" 50%	295,260	326,406	314,961	141,390
" 60%	21,200	46,150	49,550	49,400
" E.P. 23	300	2,300	22,250	133,900
Total Lbs.	316,460	372,556	386,761	346,040
Total Cost	46,668.46	53,625.27	54,763.92	47,860.12
Fuse - Feet	413,600	538,355	600,440	511,350
Caps - Number	93,950	113,406	102,345	116,445
Cap Crimpers	33	44	27	24
Tamping Bags	11,890	22,830	3,370	
Ignitors	200	1,200		
Elec.Exploders	112,915	50	112,450	718,93
Connecting Wire	3399	26	199	17
Leading Wire Total Cost Fuse, Etc.	2 605 02	500	A 603 64	4 949 49
	3,685.23	4,829.48	4,691.64	4,243.42
Total Cost All Expls.	50,353.69	58,454.75	59,455.56	52,103.54
Total All Explosives	135,815,76	142,197,54	139,500 g	1 1 43,403
Avg.Price Per Lb.Powder	.1474	.1439	.1416	•1383
Cost Per Ton Powder	.1194	.1358	.1174	-1156
" " Fuse, Caps, Etc -	•0094	.0122	.0100	.0102
" " All Expls	.1288	•1480	.1274	.1258
Lbs.Powder Per Ton Ore	.8095	.9432	.8293	.8358

Open pit mines not included

JAP:EER

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STATEMENT SHOWING COMPARATIVE COST FOR ALL EXPLOSIVES USED AT SOFT ORE MINES

STANDARM SHOUTED COMPARATIVE COST FOR ALL MINE THORSE USED AT SOFT ORS MINES

	1925	1926	1927	1928
Product	1,825,884	2,052,255	1,335,406	1,756,236
POWDER	572,1	86 543	275 48	1,217 . 518
Lbs. 30%	107,370	2,900	550 . 37	311
40%	178,900	186,445	113,075	158,650
50%	204,700	315,420	339,950	318,950
60%	226,488	251,800	325,350	338,725
80%	300	2,300	148 7 78	14 test 1
35%	- 1, 188;0	76,150	312	4.00
#2,#3,#4 Spec	1,614,8	74 1,643	3,250	55,600
Total Lbs.	717,758	835,015	781,625	871,925
Total Cost	106,628,94	119,487.81	113,557.94	123,312.40
Fuse (Feet)	2,147,200	2,322,700	2,364,900	2,529,868
Caps (No.)	441,755	499,476	423,907	425,099
Elec.Explosives	222	76	15 17	8,500 1 91
Connecting Wire	48#	18#	2#	6,960 J 3,220
Leading Wire	650	1 1 009	672 1 107	6,843 . 591
Tamping Bags	112,915	132,230	112,459	118,930
Crimpers	177	140	178	173
Delay Igniters				
Total Cost Fuse, Etc.	19,186,82	22,709.73	19,051.53	20,090.82
Total All Explosives	125,815.76	142,197.54	132,609.47	143,403.22
Avg.Price Per Lb Powder	1486	.1431	•1453	.1414
Cost Per Ton - Powder	•0584	.0582	.0619	.0702
" " - Fuse, Caps, Etc.	.0105	.0111	.0104	.0114
" - All Explosives	•0689	.0693	•0723	.0816
Pounds Powder Per Ton of Ore	.3931	•4068	.4259	•4964

OPEN PIT MINES NOT INCLUDED

. 10

Timber -

Polas.

Lagelug - -

Cover Brds -

Lago long

Sout Per Ton for

5 6

28

P 10 11

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3,177 3,399 1,215

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-0214 .0118 40182 .0018 .0017 *0843

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3,398

10478

2,913

1.189

STATEMENT SHOWING COMPARATIVE COST FOR ALL MINE TIMBER USED AT SOFT ORE MINES

							1925	1926	1927	1928
Product -	-	-	-	1	-	•	1,825,884	2,052,255	1,835,406	1,756,236
	TI	MBER				1				
Feet 4 to 6	swaters.	-	-	-	-		4,648	45,294		
6 to 8		-	-	-	. 4		572,126	543,275	484,217	515,639
8 to 1		1	-	-	-		406,867	471,550	372;289	319,807
10 to 1		map 1	Les.		-	-	245,548	269,767	268,634	193,780
12 to 1		-	**				83,794	85,282	104,591	93,890
14 to 1	20.000				-		176	5,939	16,511	108
7 to 9		-		-			133,096	76,442	Treated	14,291
9 to 1	AND MANY TON	THE ST				1,000	168,619	146,312		
Total F			-	2.4	2	3,18	1,614,874	1,643,861	1,246,242	1,137,515
Total C			-		04,04	2000	128,792.52	115,102.94	79,754.35	75,578,00
		11.4								
	T.A	GGING	3							
Feet 5' -	_	-	-		-	-	2,008;550	2,348,612	1,553;163	1,202;025
6' -							385,800	747,840	173,500	95,000
7' -	-				-		2,374,426	2,869,971	3,434,969	3,220,789
8' -			-			-	1,031,632	1,009,672	1;076,343	598,784
Total F	eet						5,800,408	6,976,095	6,237,975	5,116,598
Total C			-		-		44,359.56	52,292,53	45,264.93	37,679.62
Sanar	al									
Covering Bo	ards-	Feet	-		-		734,585	798,527	165,106	163,39
Total C	ost	AND S				-	11,319.54	11,960.39	3,049.89	3,230.13
Lugalis		Sinily on				24,60				
Poles (Feet) -	-	-			19,00	1,970,783	2,493,741	1,544,937	2,053,550
Total C	Water of the	CECE				34, 21	22,891.59	29,585,21	21,748.28	31,760.23
			-	1					323, 2000	025100020
The state of		-	-		-	THE ST				
Average Cos							.0797	.0700	.0640	.0642
" "		.00 F				-	.7648	.7496	.7288	.7361
H H H H		.00 Ft				s	1.5409	1.5409	1.8472	1.977
The 15	38 -	.00 Ft	t 1	Poles	3 88	The	1.1615	1.1615	1.4077	1.547
114	225 097	manus	i ac	PEDR	r eq	n lymi	(4) 1 1 1	T. STAR		
HOYS.	Per	Ton	of O	re -	ne	54h	:884	.801	.679	.6478
The same of the	-		10 10			48 0	3,177	3.399	3.398	2.913
Feet Timber					-		1.079	1.215	.842	1.169
Feet Timber	g "								H. HIRCOLD A.	To the last of the last
Feet Timber " Laggin " Poles	g "	3			DATE A	Carin	A CONTRACTOR OF THE PARTY OF TH			
Feet Timber " Laggin	g "	is it o	ont	In ,	0874	Inn				4
Feet Timber " Laggin " Poles ost Per Ton	g "			In .	0874 masa	Inn	.0705	•0561	•0434	.0430
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Feet Timber " Laggin " Poles ost Per Tor	for	Timbe Laggi Poles Cover	er ing		10074	Instruction of the last of the	.0243	.0255	.0247	.0214
Feet Timber " Laggin " Poles ost Per Tor	g "	Timbe Laggi Poles	er ing		0874 1003 1003	instruction of the last of the	.0243 .0125	.0255	.0247 .0118	.0214

STATEMENT SHOWING TOTAL COST FOR SUPPLIES CHARGED TO "COST OF ORE AT MINES"

SOFT ORE MINES

YEAR	1,825,884		1926 2,062,255		1,835,406		1928	
PRODUCT								
CLASSIFICATION	AMOUNT	PER TON	AMOUNT	PER TON	AMOUNT	PER TON	AMOUNT	PER TON
General	87,283,11	.0478	93,473,76	.0455	85,520,88	.0465	92,928,54	.0529
Iron & Steel	26,849.93	.0147	31,656,04	.0154	28,956.99	.0157	31,679,66	.0180
Machinery Supplies	99,663,91	.0545	126,562,61	.0616	85,936,53	.0468	117,816,27	.0670
Explosives	141,760,34	.0776	166,713,88	.0812	151,669.06	.0826	161.089.99	.0917
Lumber & Timber	231,884,16	.1269	238,095,23	.1160	180,515,49	.0983	182,139,31	.1037
Fuel	42,396.64	.0232	47.348.57	.0230	34.728.59	.0189	30,550.11	.0174
Electric Power	341,884,27	.1872	364,360,25	.1775	361,104,77	.1967	363,365,39	.2068
Miscellaneous	93,175.06	.0510	79,162,37	.0385	56,414,20	.0307	31,071,56	.0177
TOTAL	1.064.897.42	. 5832	1,147,372,71	.5590	984,846,51	.5365	1.010.641.13	.575

HARD ORE MINES

YEAR	19	25	1926		1927		1928	
PRODUCT	446,670		366,882		467,510		413,994	
CLASSIFICATION	AMOUNT	PER TON	AMOUNT	PER TON	AMOUNT	PER TON	AMOUNT	PER TON
General	35,776,65	.0300	35,756.69	.0974	29,726,59	.0638	41,435.40	.1001
Iron & Steel Machinery Supplies	14,413.77	.0322	18,051.52 36,827.06	.1003	32,525.13	.0695	37,849,48	.0914
Explosives	66,808.36	.1495	67,362,55	.1836	74, 384.99	.1591	61,290.29	.1480
Lumber & Timber Fuel	14,014.51 29,010,78	.0313	12,995.23 21,497.48	.0354	9,431.02 14,371.32	.0201	7,065.76 12,449.56	.0171
Electric Power	64,172.04	.1436	77.042.33	.2099	84,106.40	.1798	80,072.05	.1936
Miscellaneous	7,324,64	.0163	7,461,34	.0203	8,269,92	.0176	7,364.12	.0178
TOTAL	268, 395, 83	.6008	276,994,20	.7549	266,254,73	.5694	263,551,42	.6368

SOFT ORE MINES

Superintendent and General Ball = 4 except Miss Clorks and Captains will

The 1928 unit cost is .0385 increase over 1927. Mostly in General, Machinery and Explosives classifications. More underground scraper equipment is primarily the cause for increase in General and Machinery Classifications. Development of Holmes Mine 5th level also a factor in the increased cost for Machinery Supplies.

Increased cost for Explosives due almost entirely to this 5th Level Development.

HARD ORE MINES

The 1928 unit cost is .0674 increase over 1927. Approximately all in General, Iron & Steel and Machinery Classifications. More underground scraper equipment accounts for a large part of these increases. Underground storage battery sets, stator coil for hoist motor, power drills and drill sharpener repairs are other large items.

More detail of these increased supply costs will be found in the Analysis of Cost Sheets for the various mines.

		.925		926	1	927	1	928
TOTAL PRODUCT	3,166,062		3,336,557		3,358,640		2,775,542	
Se Salay Produ	DAYS	AMOUNT	DAYS	AMOUNT	DAYS	AMOUNT	DAYS	AMOUNT
Surface Cost per ton	222,9541	1,012,074.57	220,5894	998,311.45 .2965	208,2813	945,048.09 .2813	207,0474	946,889.42 .3441
Underground Cost per ton	404,188	2,057,956,52 6500	420,686	2,136,173.30 .6345	392,9841	2,008,260,19 .5979	3 28,222 ³ / ₄	1,670,341.35
Supt. & Gen. Roll Cost per ton	56,0484	434,551.24 .1373	52,694	423,770.23 .1259	48,8272	403,457.86 .1201	49,2953	391,671.46 .1411
Grand Total Cost per ton	683,190 ¹ / ₂	3,504,582,43 1,1070	693,9693	3,558,245.98 1.0569	650,093 ¹ / ₂	3,356,766.14 .9993	584,565 ³ / ₄	3,008,902.23 1.084
Average Rate Per Day	Tele to 4 Le	5.13	s and south to Marth Tel: up lower lev	20.5.13 1s. have		5, 16		5,15
Tens Per Man Per Day	Wing son for process of in	4.635	mt mat be	4.85		5.166		4.75

NOTE: -

Above is total of all wages and salaries for all employees of the Mining Department - Including the Cliffs Power & Light Company.

be concentrated in this area in the coming your.

tunity seems to be to the moreh and northeast, and work atil

The mine continued on a single shift basis, working our

Superintendent and General Roll - Days and Amounts shown is all of the General Payroll, except Mine Clerks and Captains which are included in surface and underground.

Wade Mine not included - Contract mining by the A. Guthrie Company.

Stockpile overruns not included in 1928 Total Product

CLIFFS SHAFT MINE

ANNUAL REPORT

YEAR 1928.

1. GENERAL:

Production in 1928 was not quite as large as in 1927, and the stockpile overrun taken up into production was also not as large. There was no over-time hoisting in 1928, and there was more development-work being done, and more advancing work in the stopes. There are in the mine sixty-six contracts and eighty working-places, of which thirteen are in rock. Part of this rock-work has been done to prepare known orebodies for mining, and part in search of new ore.

The development campaign has been more successful in "A" shaft than in "B" shaft, where the areas having possibilities of new ore are very limited. The diamond-drill has been used entirely in "A" shaft, and new ore has been found by drilling, drifting and raising in the North Vein in both Bancroft and Cliffs Shaft territory and in the South-East Deposit.

In "B" shaft promising results have continued to be found on the first level in both the Main Vein and South Lens, and on lower levels to a lesser extent in the North Vein. The limits of the ore in the Main Vein on the lower levels have apparently been reached, but there are still a few possibilities of finding ore further west.

This program of intensive development must be continued, if the ore-reserves are to be maintained. The greatest opportunity seems to be to the north and northeast, and work will be concentrated in this area in the coming year.

The mine continued on a single shift basis, working six days a week.

The Bancroft Lump stockpile was the only pile cleaned up, and an overrun of 876 tons was found here. By measurement and calculation substantial overruns were found in both the Lump and Crushed ore piles.

the everage daily product was 1306 tone. There was no over-

2. PRODUCTION, SHIPMENTS & INVENTORIES:

a. Production by Grades:

time hoisting in 1928.

Total Last Year

Increase in Milments

Grade	Product	Overrun	Total Tons
Cliffs Shaft Lump	249,593	ons Year	249,593
Cliffs Shaft Crushed	106,663	395 267,	106,663
Total Cliffs Shaft	356,256	314 93,	356,256
Bancroft Lump	24,549	876	25,425
Bancroft Crushed	10,181	-	10,181
Total Bancroft	34,730	876 876	35,606
Total Ore	390,986	876	391,862
Rock	7,8,392 14,	472 29	27,278

188.054

366,319

22,414

Shipments to the dear began on April 18th and ended on

All-rail shipments were in small quantities throughout the year.

- Potal L

Oliffa Shaft

2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

Dividing the ore by shipping grades, production was as follows:-

Lump Ore	275,018 Tons	70.2%
Crushed Ore	116,844 "	29.8%
Total	391,862 "	29.8%

45,087

2,736

27,278

884

.488 .518

1246

This is a decrease of 1.5% in the proportion of lump, and is due in large part to the change in the method of handling the ore on surface. Since the early part of 1928 the whole product has been put through the No. 8 gyratory crusher, which is set at nine inches, and the product from the crusher is screened. In this way the very large lumps are eliminated at much less expense than would be the case if they were broken underground. The ore was screened over $\frac{1}{2}$ inch holes.

All rock was dumped underground.

Comparison of product for 1928 and 1927.

Fourth	1928	1927	Decrease
Picth	Tons	Tons	Tons
Production	390,986	399,716	8,730
Stockpile Overrun	876	2,816	1,940
Total	391,862	402,532	10,670
Percentage of Lump	70.2%	71.7%	1.5%
Percentage of Bancroft	8.9%	9.6%	.7%

In 1927 the mine worked 291 days, and the average daily product was 1383 tons. In 1928 the mine worked 300 days, and the average daily product was 1306 tons. There was no overtime hoisting in 1928.

21,200

b. Shipments:

Shipments:				
Production by Months:				Total
C.S.	400000	Banba Ba	no. To av	Last
Month Dave Lown	Pocket	Stockpile	Total	Year
Grade	Tons	Tons	Tons	Tons
Cliffs Shaft Lump	156,898	110,393	267,291	240,781
Cliffs Shaft Crushed	47,764	45,314	93,078	98,849
Total Cliffs Shaft	204,662	155,707	360,369	339,629
Bancroft Lump	10,320	9,729	20,049	22,051
Bancroft Crushed	3,572	4,743	8,315	4,639
Total Bancroft	13,892	14,472	28,364	26,690
Total Ore	218,554	170,179	388,733	366,319
Total Last Year	238,285	128,034	366.319	1 200 T
Increase in Shipmen	ts 6,949	3,616 1	22,414	1,842 8
			2	Carrier State

Shipments to the dock began on April 18th and ended on November 22nd.

All-rail shipments were in small quantities throughout the year.

2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

c. Stockpile Inventories:

Grade	Tons
Cliffs Shaft Lump	36,491
Bancroft Lump	3,182
Total Lump 1928 4	39,673
Cliffs Shaft Crushed	29,072
Bancroft Crushed	7,891
Total Crushed	36,963
Total Ore	76,636

On Dec. 31st, 1927 there was in stock 73,507 tons, 3,129 tons less than in 1928. There is ample room for stocking ore.

Ban+

876

86 17,268 80 25,261 Total

376 2,916

Cost

20.50

6.75

734.90

6,10

78.307

465,369 489,026 388,788 366,819

Total Last

Tons

03 8,069 6,409 73,507 57,294 83 24,549 10,161 590,968 599,716

d. Division of Product by Levels:

SECTION SECTION	170 E-350 HV	Thus	"A" Shaft	"B" Shaft	Total
Level	Notice	Loss	Tons	Tons	Tons
First	2	200	7,394	37,673	45,067
Second	3	600	26,864	4,528	31,392
Third	验	200	1,253	483	1,736
Fourth	7	125	6,399	8,995	15,394
Fifth	2	300	25,082	probe in armed	25,082
Sixth	1	1.35	30,149	10,339	40,488
Seventh	- 1		32,474	14,131	46,605
Eighth	4	500	26,370	11,471	37,841
Ninth			14,994	8,487	23,481
Tenth	4	2.05	33,095	7,951	41,046
Eleventh	1	180	15,933	tongewalkalar	15,933
Twelfth	12	350		26,098	26,098
Thirteenth	8		- Datto Dog a	22,895	22,895
Fourteenth		133		17,490	17,490
Fifteenth	be	1.60	Janes am	438	438
Total			220,007	170,979	390,986
Nov. Rock	2		21,200	6,078	27,278

e. Production by Mon	tha:
----------------------	------

Dang.	400	C.S.	C.S.	Banc.	Banc.	Total	
Month	Days	Lump	Crushed	Lump	Crushed	Ore	Rock
January	25	21,283	8,228	1,613	626	31,750	1,848
February	24	19,648	8,841	1,427	646	30,562	1,834
March	27	21,791	9,080	2,053	880	33,804	2,442
April .	23	19,965	8,630	1,556	499	30,650	2,228
May	26	22,982	10,576	1,866	707	36,131	2.488
June	25	22,683	9,632	1,901	805	35,021	2,518
July	25	22,646	9,986	1,481	502	34,615	2,494
August	27	22,901	10,028	3,188	1,244	37,361	2,160
September	23	20,178	8,544	1,404	827	30,953	1,946
October	27	23,274	9,623	1,346	647	34,890	2,488
November	24	16,787	6,949	3,616	1,490	28,842	2,200
December	24	15,455	6,546	3,098	1,308	26,407	2,632
Year	300	249,593	106,663	24,549	10,181	390,986	27,278
Stockpile					4.00	and the same	
Overrun	100	WE SALL	(Comments	876		876	
Total	300	249,593	106,663	25,425	10,181	391,862	27,278

600 Waine Parkka's funeral.

Stringer broke on loop treatlant 24.89

a. Averses Sine Analysia on Output:

2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

f. Ore Statement:

•	Assess Case Calabid	27 610	7.00	1982 1980 / - 3 1	4.1936	pitotike to	Total
	Deletron Frank	C.S.	C.S.	Ban.	Ban.	Total	Last
	Banoror Ordened	Lump	Crushed	Lump	Crushed	Tons	Year
	On Hand Jan. 1, 1928.	46,926	15,103	5,069	6,409	73,507	37,294
	Output for Year	249,593	106,663	24,549	10,181	390,986	399,716
	Stockpile Overrun	1800	Palesta	876	A SHOW	876	2,816
	Transfers	7,263	384	7,263	384		SEC. 52.5
	Total	303,782	122,150	23,231	16,206	465,369	439,826
	Shipments	267,291	93,078	20,049	8,315	388,733	366,319
	Balance on Hand	36,491	29,072	3,182	7,891	76,636	73,507
*	Decrease in Output	Latines.				8,730	
	Increase in Ore or	n Hand				3,129	

81110a 6.88

g. Delays:

Mary Mary	THE STATE OF THE PARTY OF THE P	Tons	was shart subsahart Total Co-
Date	Hours	Lost	Cause
Jan. 24	2	300	No current. Low voltage.
Jan. 25	3	400	Testing out new crushing plant.
Jan. 26	22	300	# 2 Knock (1985) 48 900
Feb. 1	1	125	"A" shaft pocket blocked.
Feb. 8	2	300	Casting broke in crusher bldg. \$ 12.50
Feb. 14	1	125	Repairing lump pocket " " 11.03
Feb. 14	2	75	Tip loose on crusher motor. 4.75
Feb. 29	4	300	Stator burnt out on "A" shaft
SING WORK	LAL MARKET		hoist motor. 734.90
May 9	1	125	Lump stockpile car off track.
July 26	100	125	"A" shaft top-tram car off track.
Aug. 8	14	150	No current. Low voltage.
Nov. 2	2	250	Bearing on big crusher motor running hot. 6.10
Nov. 14	Rook 2	150	Large chunk caught between rock chute on 2nd level "A" and skip.
Nov. 24	2	250	"A" shaft pocket blocked.
Nov. 27	4	600	Waino Tarkka's funeral.
Dec. 3	1=	200	Stringer broke on lump trestle. 24.89
Dec. 4	1	150	Lump stockpile car off track.
Dec. 8	1 2	75	"A" shaft top-tram car off track.
Dec. 8	1	125	Chute blocked - crusher bldg.
Dec. 19	4	600	Mr. M.M. Duncan's funeral.
Dec. 22	1=	200	Top tram controller. 7.50
Year	384	4925	\$ 801.67

h. Delays Due to Lack of Current:

Date	Hours	Tons	A'	Journal of the	O	ause
Jan. 24	2	300	No	current.	Low	voltage.
Aug. 8	14	150		10	11	"
Year	34	450				

haft

Total

Tone.

tiet.

21,000

Prospective

Tons

CLIFFS SHAFT MINE ANNUAL REPORT YEAR 1928.

3.	ANALYSIS	

a.	Average Mine Analysis on	The state of the s	TW-	G17444
	Grade	Iron	Phos.	Silica
14	Cliffs Shaft Lump	59.25	.104	6.88
	Cliffs Shaft Crushed	57.02	.108	9.09
	Bancroft Lump	61.14	.097	4.96
*	Bancroft Crushed	58.80	.101	7.09

b. Average Analysis on Straight Cargoes:

TOTAL TOTAL	Mi	ne	Lake Erie		
Grade Grade	Iron	Phos .	Iron	Moisture	
Cliffs Shaft Lump	59.47	.096	58.99	.79	
Cliffs Shaft Crushed	(All Mi	xed)	and a state of	16,000	
Bancroft Lump	**	"		66,000	
Bancroft Crushed	0				

4. ESTIMATE OF ORE RESERVES:

LABOR AND WAGES:

a.	Developed	Ore -	Cliffs	Shaft	Grade:

	The second secon	
"A" Shaft	"B" Shaft	Total
Tons	Tons	Tons
1,450,000	720,000	2,170,000
1,717,000	793,000	2,510,000
22,000	18,000	40,000
3,189,000	1,531,000	4,720,000
1,910,000	1,195,000	3,105,000
1,279,000	336,000	1,615,000
		45.00
256,000	67,000	323,000
1,023,000	269,000	1,292,000
6.72 P.LT .89	3 1.60 1.50 /	010 2.66
	Tons 1,450,000 1,717,000 22,000 3,189,000 1,910,000 1,279,000	Tons 1,450,000 1,717,000 22,000 3,189,000 1,910,000 1,279,000 256,000 256,000 1,000 256,000 1,000 256,000 1,000 256,000 1,000 256,000 256,000

Devaloped

RECAPITULATION SECRETARION

Available Ore	Tons 1,575,000	Prospective Tons 40,000	Total <u>Tons</u> 1,615,000
Less 10% Rock and 10% Loss in Mining Net Available Ore	315,000 1,260,000	8,000	323,000

Thora was no shortage of labor during the year, but

there was no change in the wage scale during the

at times on unusually large number of men were temperarily absent from work on account of illness or mere working on their forms. This condition was most acute during the second half of November and the first half of December, first on second of the deer-hunting season and them on account of the evidence of influence.

7,684

2.47

* BS

115

.05

Inorgess

CLIFFS SHAFT MINE ANNUAL REPORT YEAR 1928.

Ommartive Statement of Vassa and Products

ESTIMATE OF ORE RESERVES: (Continued)

a. Developed Ore - Bancroft Grade:

PROMERY	THE 852	399.715"A" Sha	aft
No. of Shifts & Hours	148	Tons	1
Pillars	390	86,00	00
Floors		37,00	00
Partly Developed	234	21,00	
Total	61	144,00	00
To Support Surface	824	62,00	00
Available Ore	400	82,00	00
Less 10% Rock and 10% Los	s in Mining	16,00	00
Net Total		66,00	00
Surinos	6149	4×39	+01

RECAPITULATION

ANG. PRODUCE THE B A SEARING 10:61

AVE. WAGES OCCUPANT RUBBIS - 5.44

AVG. WAGES DANIEL LANGE 5.90

Available Ore	Developed Tons 61,000	Prospective Tons 21,000	Total Tons 82,000
Less 10% Rock and 10% Loss in Mining Net Available Ore	12,000	4,000	16,000

Assumptions: - 8, 9 and 10 cu. ft. equals one ton. 10% deduction for rock. 28.00 10% deduction for loss in mining. Percentage of Bessemer is 0.

stimated Analysis:

<u>Iron Phos. Sil. Alum. Mang. Lime Mag. Sul. Igni. Moist.</u> Dried 212 58.30 .100 6.71 2.45 .593 1.69 1.33 .010 2.66 Natural 57.02 .098 6.56 2.40 .580 1.65 1.30 .010 2.60 2.20

19,076; 18,169;

1924 - 1-8 Hr. Shift 5 days gar week from

pos week from April 50th. - 1-8 Rr. Shift 6 days per week.

to Oct. lat. 1-8 Hr. Shift 6 days per weak Oct. let to Dec. let. 1-8 Hr. Shift 5 days per week from Dec. let. 1407 - 1-8 Mr. Mairt 5 days per week Jan. lat to apr. Soth. 1-8 Br. Shift & days /

LABOR AND WAGES:

Comments:

(1) Labor:

2882 W 1 VE 2-08

1994 - 1 10 1-19

There was no shortage of labor during the year, but at times an unusually large number of men were temporarily absent from work on account of illness or were working on their farms. This condition was most acute during the second half of November and the first half of December, first on account of the deer-hunting season and then on account of the epidemic of influenza.

There was no change in the wage scale during the year. The of furface to Underground

July 50th. 1925 - 1 to 5.03 1925 - 1-8 Hr. Shift 5 days per week.

1926 - 1-10 m. 1 1926 - 1-8 Hr. Whift 5 days per week Jen. lat

5. LABOR AND WAGES: (Continued)

De Petrolog West Ste		1927		Decrease 7,854
PRODUCT		399,716		7,004
No. of Shifts & Hours No. of Days	300	201	9	
		as put on for		
AVG. NO. OF MEN WORKING:		100		
Surface	61	57	4	
Underground	224	220	4	7215-1787
Total terior of the	285	marine and a second and	relater.8	
AVG. WAGES PER DAY:				
Surface	4.40	4.39	.01	
Underground			splaced by	.04
hooks Total wins in February was pain	4.86	4.91	e the in-	.05
WAGES PER MO. OF 25 DAYS:	AND DESCRIPTION OF		The state of	
Surface	110.00	109.75	.25	
Underground	125.00	126.00	No.	1.00
Total	121.50	122.75		1.25
PRODUCT PER MAN PER DAY:	and when o	ld chops year	- 05303mipo	4
Surface	20.53	22.00		1.47
THE STATE OF THE S	5.80		con , and	.39
Tarin Total days on the	4.52	4.85	country the	.33
LABOR COST PER TON:				
Surface	.214	.200	.014	1
Underground	.861	.814	.047	6
for a Total of 150 rooms	1.075	1.014	.061	
AVG. PRODUCT BRK'G & TRAM'	10.61	11.14		.53
AVG. WAGES CONTRACT MINERS	5.41	5.57		.16
AVG. WAGES CONTRACT LABOR	5.40	5.45	was regrad	
momar no on payo	th marrow	sy were built	Desire.	
TOTAL NO. OF DAYS:	19,076	18.1691	907	
Underground	67,526	64,611	29154	
Total		82,7802		100
torege-fard:			A Well 128	
AMOUNT FOR LABOR:	095 77	70 705 70	4 200 00	
Underground 337				
Total 42				No.
THE PARTY OF THE P		Cole Col	Sales and Sales and	
Proportion of Surface to	Undergrou	and Men:	MARLEMANN.	1.19030
1928 - 1 to 3.67 1924	- 1-8 H	r. Shift b da	lys per week	from
1927 - 1 to 3.86	July	outh.	Call Call Table	
1926 - 1 to 3.89 1929	- 1-8 H	shift 5 de	ys per week	7-1
1925 - 1 to 3.41 1926	- 1-8 H	snirt 5 da	ys per week	Jan. lsi
1924 - 1 to 3.19	to Uci	. 1st. 1-8	Hr. Shift 6	days per
	week (oct. 1st to I	Dec. 1st. 1	-8 Hr.
On May 39th the epile	Shift	b days per v	veek from De	c. 1st.
The raplaced by one 1 1927	- 1-8 H ₁	r. Shift 5 de	ys per week	Jan. 1st
also broke, but has been	to Apı	r. 30th. 1-8	Hr. Shift	6 days
			A STATE OF THE STA	
was repaired and to range	per we	ek from Apri	1 30th.	

ANNUAL REPORT YEAR 1928.

6. SURFACE:

a. Buildings and Repairs:

Hoist:

200

On February 29th the stator on "A" shaft hoist motor burned out, and was replaced by the new stator purchased late in 1927. The old stator has been rewound.

In March a new hoisting rope was put on for "A" shaft skip and on April 1st a new rope was put on for "B" shaft skip.

dotte use built south of and payallal with the ala

Engine-House:

The interior of the engine-house has been painted, and is much improved in appearance.

Dry:

The drying-hoods in the south room were replaced by hooks and chains in February. Later in the year the interior of the dry was painted and calcimined.

Office:

The office was calcimined late in the fall.

Shops:

Both the drill-shop and the old shops were calcimined inside and the wood-work painted.

New oil-burners were put on the drill-forges, and Maxim silencers on the sharpeners in order to reduce the noise.

Coal-Dock:

The coal-dock roof at the upper end has been repaired for a length of 150 feet. Further repairs will be necessary in 1929.

ore are ascalaping new ground, or as

Roads, Walks and Fences:

The path between the office and the shops was regraded, and hand-rails and concrete perrones were built.

The road between the mine and the General Office grounds was repaired and new fences were built, leaving more space for the road.

Storage-Yard:

Much of the scrap in the storage-yard was sorted over and two carloads of steel were sold. Some of the remaining scrap was moved to the old ore-dock south of the coal-dock, where the new storage-yard is to be placed.

Gravel Pit:

The L.S. & I. Ry. knocked down the trestle leading from the gravel-pit to the coal-dock, and the trestle was rebuilt and equipped with a scraper and hoist to load gravel for the Tilden Mine.

is on lot 2 of Section 3, and is leased from

Crusher:

On May 29th the spider of the No. 8 crusher broke and was replaced by one taken from the South Jackson Mine. This also broke, but has been continued in service. The old one was repaired and is ready for service.

SURFACE: (Continued)

a. Building and Repairs: (Continued)

Teaming:

The only remaining horses were sold in November.

Stockpiles:

Some changes had to be made in the stockpile trestles on account of the new loading track at the pocket, and a new trestle was built south of and parallel with the old one, in order to stock the winter's production.

The Bancroft Lump stockpile was cleaned up. Measurements taken in November indicate substantial overruns in all piles.

UNDERGROUND:

Development:

Development at the Cliffs Shaft Mine is divided into two classes:-

1. Opening new ore.

2. Preparing known ore for mining.

New ore is opened by drifts, raises and breast-stopes. In this work breast-stopes and large raises are used mostly, because of greater economy in breaking ore. Drifts and raises are used for preparing known ore for mining.

As a breast-stope proves up approximately as much additional ore as is mined with it, the ore reserves can be maintained without much decrease, if half the workingplaces in ore are developing new ground, or as it is often put, if they are advancing. Mining floors, pillars and backs is called retreating.

The average classification of contracts for the past year is given as follows:-

TOTAL TOTAL TOTAL TOTAL TOTAL	"A" Shaft	"B" Shaft	Total
Stopes	14	6	20
Floors	13	13	26
Backs	1	1	2
Drifts and Raises in Ore	4	3	7
Rock	9	1	10 65
Total	41	24	65
Developing New Ore	17	8	25
Mining Known Reserves	15	15	30
Rock	9	_1	10 65
Total	41	24	65

Fifteen of the contracts have two machines and two working-places, and the total number of active working places is eighty.

"A" Shaft: Bancroft Ore:

This ore is on Lot 2 of Section 3, and is leased from the Oliver Iron Mining Co.

Consuct to fellowed by Philadelphia by britting to

FROM SPACE CONTRACTOR SOUTH TRACTOR MAN

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7. UNDERGROUND: (Continued)

b. <u>Development</u>: (Continued)

"A" Shaft: <u>Bancroft Ore</u>:

Second Level:

A cross-cut was driven north 95 feet, following Drill-Hole No. 372, 540 feet northeast of "A" shaft, and a raise was put up in ore to the first level. The ore in Drill-Hole No. 373, 30 feet further east, was then followed to the north.

Third Level:

A raise was put up from the fifth level, and a cross-cut stope opened up in the ore found in Diamond-Drill Hole No. 374, 620 feet northeast of "A" shaft. At the same time a raise was put up from the north drift on the fifth level, and a cross-cut is being driven south in the second run of ore found in Diamond-Drill Hole No. 374, 1050 feet northeast of "A" shaft.

Fifth Level:

The east drift along the boundary was continued for 180 feet, and crossed only a very narrow vein of ore before passing into the hanging-wall. A raise was put up in this ore, but it was too small to mine. A cross-cut was also driven to the south for ventilation and outlet, and three raises were put up to the third and fourth levels.

A branch drift was driven northeast for 330 feet in rock from the boundary-line, 530 feet north of the shaft, and a raise was put up to the ore on the third level.

Sixth Level:

1580 feet northeast of the shaft a stope was opened on the foot-wall, and the ore was followed east and west a short distance.

Seventh Level:

On a sub-level 1130 feet northeast of the shaft one contract is opening up new ore in a breast stope, and 200 feet further west another contract is opening a small stope at the top of a raise put up from the eighth level.

A narrow vein of ore found by Drill-Hole No. 378 was followed east and west for 130 feet, 800 feet north-east of "A" shaft.

Eighth Level:

Two cross-cuts have been driven north into Bancroft ore, and another is following Drill-Hole No. 396, 1750 feet northeast of the shaft. 900 feet northeast of the shaft the drift was turned to the north, and cut more than 30 feet of ore beyond the contact. A raise was put up here to the seventh level, passing through 20 feet of rock and 30 feet of ore. 300 feet further east another contract is following the ore found in Drill-Hole No. 381.

7. UNDERGROUND: (Continued)

b. <u>Development</u>: (Continued)
"A" Shaft: Bancroft Ore:

Tenth Level:

A cross-cut has been started to the north in rock 1400 feet northeast of "A" shaft, which is expected to reach the Bancroft Vein in about 400 feet.

"A" Shaft: Cliffs Shaft Ore: First Level: North Vein:

One contract stoped east for 120 feet just south of the boundary, 550 feet northwest of "A" shaft, and drove two short cross-cuts to the Bancroft ore.

Second Level: North Vein:

The stope under Lake Bancroft, 600 feet northwest of "A" shaft, was driven west 60 feet and two raises were put up to the first level.

550 feet northeast of "A" shaft a stope was driven east along the boundary in ore found in Drill-Hole No. 373, until it holed to an old stope.

Fifth Level: North Vein:

450 feet northwest of "A" shaft a cross-cut was driven northwest for 40 feet in rock, and cut a small vein of ore. Forty feet further another vein was cut, and a stope is being driven northwest in this ore.

At the east end of the vein, just beyond the Bancroft Lease one contract has opened a fine stope of ore 180 feet long, and is now following the ore north along the Bancroft boundary.

Fifth Level: South-East Deposit:

The ore in the east stope, 2000 feet southeast of the shaft, was followed east for a short distance, but pinched out. Two cross-cuts were driven south at 1800 and 1900 feet southeast of the shaft, and both found ore, which is being followed east and west by two contracts. A raise was also put up to the fourth level in ore and a stope started 1930 feet southeast of the shaft.

Sixth Level: North Vein:

At the east end of the vein two contracts are driving stopes to the east in good ore 2190 and 2370 feet northeast of the shaft. The eastern contract is about 350 feet from the workings of No. 3 Mine.

Sixth Level: Main Vein:

One contract opened a stope in good ore 2250 feet east of "A" shaft in December. They have been stoping in this vicinity most of the year, and drove stopes in two places for 180 feet.

a relaw not up from the tenth level was continued to the eighth level, 1940 feet east of the shaft.

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7. <u>UNDERGROUND</u>: (Continued)

b. <u>Development</u>: (Continued)

"A" Shaft: Cliffs Shaft Ore:

Sixth Level: South-East Deposit:

One contract has been stoping most of the year from 1900 to 1990 feet southeast of the shaft, but the ore was cut off in November, and they are now cross-cutting south 180 feet further west.

avout south through the millar

girlyon west from on wid

Seventh Level: North Vein:

One gang is drifting west in jasper, 800 feet northeast of the shaft, to get under a floor left in a stope on the sixth level. They have drifted 90 feet.

1800 feet northeast of the shaft a raise is being put up in jasper and mixed ore to the sixth level. 120 feet further east early in the year a cross-cut was driven southeast 75 feet to the hanging without finding ore.

Seventh Level: South-East Deposit:

In the stope at the east end of the vein the ore was cut off early in the year, and a drift was driven 80 feet east along the hanging-wall, and two cross-cuts, 70 and 85 feet long respectively, were driven to the south without finding ore.

Eighth Level: North Vein: The west the Level 1480 Zone

One contract continued a stope east for 100 feet from a point 2000 feet east of the shaft, but came to the end of the ore, and are now raising to the north near the breast.

Eighth Level: South-East Deposit:

One gang is driving a breast-stope to the southeast in good ore, 1850 feet southeast of the shaft.

Another contract drifted west 100 feet in jasper from a raise 1620 feet southeast of the shaft, and now have good ore in the breast.

A third contract has been drifting northeast most of the year, starting at a point 2060 feet southeast of the shaft, and have followed the hanging-wall for 400 feet without finding ore in commercial quantity. This is the extension of the Incline Mine vein, and the results of the exploration have been very disappointing.

Ninth Level: North Vein:

The ore is being followed to the east, 1860 feet east of the shaft, by one contract. It is not wide, but has been improving in quality. A cross-cut was also driven south from this same ore-body 50 feet in rock, and a raise was put up to the eighth level. There was 10 feet of ore in the floor of the eighth level.

would for 50 feet, 350 feet north of

Ninth Level: Main Vein:

A raise put up from the tenth level was continued to the eighth level, 1940 feet east of the shaft.

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7. UNDERGROUND: (Continued)

b. <u>Development</u>: (Continued)

"A" Shaft: Cliffs Shaft Ore:

Tenth Level: South Lens:

A raise was put up to the ninth level, 960 feet east of the shaft. This was in rock for ten feet.

Eleventh Level: Main Vein:

One contract cross-cut south through the pillar 1440 feet east of the shaft, but found little ore. They are now cross-cutting north on Drill-Hole No. 328, 1460 feet east of the shaft, and have ore in the breast.

Another contract working two machines, drove a stope east along the north foot-wall for 100 feet to the end of the ore 1860 feet east of the shaft. They also cross-cut south 70 feet to the south foot-wall, 1660 feet east of the shaft, and stoped west for another 70 feet. They are now raising in the back 1680 feet east of the shaft.

Twelfth Level: Main Vein:

A raise was put up to the eleventh level 1460 feet east of the shaft.

Approint ore 100 fest northeast of the section corner.

eat nouth of the shaft.

Fifteenth Level: 201 louid part revelop font and a refrespat

A raise was put up to the twelfth level 1420 feet east of the shaft. The last 60 feet was in ore.

"B" Shaft: Cliffs Shaft Ore:

First Level: Main Vein:

A drift 270 feet long was driven west from an old stope 600 feet southeast of "B" shaft, and a raise was put up to the 1165 foot sub-level. In this drift 60 feet of ore was found and a stope was driven in this ore to the northwest, holing to an old sub-level 520 feet southeast of "B" shaft. From this stope a raise was put up to the 1190 foot sub-level.

First Level: South Lens:

The ore found last year 1040 feet southeast of the shaft has been followed east for 140 feet, but has been cut off by a dike. Three gangs are working here, two raising and one stoping.

2 stope is coing opened.

stope in the hanging-wall pinched

First Level: North Vein:

A stope 110 feet long has been driven northeast and southwest 330 feet north of "B" shaft and a crosscut driven north into the hanging-wall.

Your of ere, 1950 feat hornwest of "B" shaft.

Fourth Level:

An irregular vein of ore has been followed east for 130 feet and west for 50 feet, 350 feet north of the shaft.

7. <u>UNDERGROUND</u>: (Continued)

b. <u>Development</u>: (Continued)

"B" Shaft: Cliffs Shaft Ore: Gen described under Develop-

Fifth Level: Main Vein:

The plat has been enlarged and the cross-cut north of the shaft and the drift to "A" shaft straightened and enlarged for motor-haulage.

Sixth Level: North Vein:

Drifting and raising has been done to the west and north on a sub-level 750 feet northwest of "B" shaft, and new ore was found at the end of the year. Its extent is unknown.

Working from a raise 350 feet northeast of "B" shaft new ore was opened in a stope 65 feet long. This ore will probably go down to the seventh level.

the first level 260 feet northeast of "B" shaft,

dming the floor 570 feet north-

Seventh Level: North Vein: and the second lavel.

The known limits of the ore have been extended in a stope 470 feet north of the shaft.

Eighth Level: North Vein:

The northeast drift was extended 160 feet in rock, and struck ore 100 feet northeast of the section corner. This has been followed east for 160 feet and a raise put up to the seventh level. Apparently the end of the ore has been reached.

Thirteenth Level: Main Vein:

At the west end of the vein on a sub-level 1500 to 1640 feet west of "B" shaft stopes have been driven, which are in the aggregate 285 feet long. The ore is good, but the back is treacherous, and apparently the limits of the ore have been reached. Three gangs are working here.

1330 feet west of the shaft on a sub-level 15 feet below the twelfth level a cross-cut has been driven to the north in ore, and a stope is being opened.

On the main level a drift is being driven southwest in very hard jasper to reach the ore found in Drill-Hole No. 317.

from 1660 to 1880 feet east of the shaft.

Fourteenth Level: Main Vein:

The ore in the stope in the hanging-wall pinched out 1640 feet northwest of the shaft.

Fifteenth Level: Main Vein:

dest of the shaft.

A drift is being driven northeast, following a narrow vein of ore, 1930 feet northwest of "B" shaft.

to the banging wall, 900 feet southeast of the shaft.

Ninth Level: Main Vein:

One contract has been mining floors from 1100 to

1300 feet east of the shaft, and another, further north,
from 1240 to 1400 feet east of the shaft.

7. <u>UNDERGROUND</u>: (Continued)

c. Stoping: (Continued)

Development stoping has been described under Development. Under the heading of stoping will be described all retreating work, i.e. the mining of known ore-bodies.

"A" Shaft:

First Level: North Vein:

One contract has mined the floor of a stope 600 feet northwest of "A" shaft.

First Level: Main Vein:

One contract has mined the floor of the level for a length of 200 feet, starting at a point 220 feet north of the shaft and working towards the northeast.

Another contract mined the floor of a sub-level and of the first level 360 feet northeast of "B" shaft, and are now mining the floor of the second level.

posterior with two machines has been stoping

ptpassa have been mining the floor of

then mining floors all year 300:

Second Level: Main Vein: wall and mining Tlawre of the

One contract is mining the floor 370 feet northeast of "B" shaft.

Third Level: South Lens: work partie your 500 feet seath

One contract mined some ore on a sub-level 350 feet south of "A" shaft early in the year.

Angeler many opened to stone on the 1160 foot sub-

Fourth Level: South-East Deposit:

Two contracts have been stoping and mining floors near the boundary from 1460 to 1580 feet southeast of the shaft.

Sixth Level: North Vein: 500 feet portheset of the

One contract has been mining floors between the sixth and seventh levels throughout the year, 1200 feet northeast of the shaft.

During the first balf of the year one contract

Seventh Level: North Vein:

Two contracts have been mining floors all year from 1250 to 1500 feet northeast of the shaft.

Another contract has mined the ore in the back of the stope from 1660 to 1880 feet east of the shaft.

Eighth Level: Main Vein:

One gang has mined the floor of a stope 1420 to 1540 feet east of the shaft.

Eighth Level: South Lens:

One contract has mined the floor of the level close to the hanging-wall, 900 feet southeast of the shaft.

Ninth Level: Main Vein:

1520 feet southwest of "B" shaft.

and December 5

One contract has been mining floors from 1100 to 1300 feet east of the shaft, and another, further north, from 1240 to 1400 feet east of the shaft.

7. <u>UNDERGROUND</u>: (Continued)

c. Stoping: (Continued)

"A" Shaft:

Ninth Level: Main Vein:

Another contract, further south, has mined the floor westward from 1080 to 970 feet east of the shaft.

Ninth Level: South Lens:

One gang has been mining floors 1200 feet southeast of the shaft all year.

Tenth Level: Main Vein:

One contract stoped up to the ninth level, 1100 feet southeast of the shaft, and another has been stoping most of the year in a raise, 1860 feet east of the shaft.

"B" Shaft: Wall Jault Vein

First Level: Main Vein: 100 floors throughout the year

One contract with two machines has been stoping in good ore on the foot-wall and mining floors of the sub-levels from 320 feet south to 500 feet southwest of "B" shaft.

Two more contracts have been mining the floor of the 1190 foot sub-level most of the year 500 feet south of the shaft and from 520 to 620 feet southeast of the shaft.

Another gang opened a stope on the 1160 foot sublevel, 900 feet southeast of the shaft, and followed the ore east till it was cut off by the hanging-wall.

Fifth Level: North Vein:

During the first half of the year one contract was mining floors 400 to 500 feet northeast of the shaft.

Sixth Level:

One contract has been mining floors all year 300 to 380 feet northwest of the shaft.

Seventh Level: 4 is less than that of standard sympates.

One contract has been mining floors throughout the year from 580 to 680 feet northwest of the shaft.

Eighth Level: Main Vein:

One contract is mining floors 1320 feet southwest of the shaft.

Eighth Level: Fault Vein:

One contract has been mining floors from 1440 to 1360 feet southwest of the shaft, and have found some unexpected ore.

Ninth Level: Main Vein:

One contract has been mining floors most of the year between the eighth and tenth levels from 1400 to 1520 feet southwest of "B" shaft.

7. <u>UNDERGROUND</u>: (Continued)

c. Stoping: (Continued)

"B" Shaft:

Ninth Level: Fault Vein:

One gang is mining floors 900 feet southwest of "B" shaft.

d blasting: (Continued)

Eleventh Level: Main Vein: 438.50

One contract has been mining floors 1000 feet
west of "B" shaft all year, and still has some ore to
take out.

Eleventh Level: Fault Vein: 52765 38 2.529.30

One gang has mined floors nearly all year from 1250 to 1320 feet west of "B" shaft.

Twelfth Level: Fault Vein:

One contract has mined floors throughout the year 1300 to 1400 feet west of the shaft.

Thirteenth Level: Main Vein:

Two contracts have been mining floors all year from 1300 to 1420 feet west of the shaft, and from 1350 to 1460 feet northwest of the shaft.

e. Drifting and Raising:

The drifting and raising done in 1928 has been described under "Development."

 Year
 Rock Drifting
 Ore Drifting
 Rock Raising
 Ore Raising

 1927
 3784 Ft.
 868 Ft.
 1090 Ft.
 1626 Ft.

 1928
 3595 Ft.
 695 Ft.
 1167 Ft.
 1153 Ft.

*G088

276189

5-4-9A - 5-57

185,26

f. Explosives, Drilling and Blasting:

In 1927 six new drills were purchased and in 1928 eleven.

In the last three months of 1927 and in all of 1928 part of the powder used, in 1928 nearly half, was a new bulk powder, called "Hercomite," of which the cost per stick is less than that of standard dynamites. This powder makes a good deal of smoke, and does not shatter the ore so well, so that the cost for secondary blasting is excessive. For these reasons it was decided to discontinue its use.

UNDERGROUND: (Continued)

		Drilling an		(Continue	ed Incresse	Decrease
St	atement	OI EXPIOSIV	es used.	Average	Amount	Amount
	Kind	mind Gosta	Quantity	Price	1928	1927
	50% L.F.	Powder	114,550	.1362	15,604.00	31,962.00
	60% "	" Owaer	49,400	.1457	7,196.50	7,432.5
	Hercomit	o No. 3	133,900	.1369	18,328.75	3,115.0
	E.P. 23	9 40. 0	21,350	.1350	2,882.25	0,110.0
		Powder	319,200	.1379	44,011.50	42,509.5
16	Fuse	Desta	459,800	5.775	2,655.38	2,529.3
	Caps	UJIZAGU:	107,400	10.993	1,180.68	987.1
	Crimpers	Belefal	23	.667	15.35	13.9
	10:00 (9:00 E/9/00)	Fuse, Etc.	4 0/8/25	:019	3,851.41	3,530.4
	TOTAL	EXPLOSIVES	9 999	2.079	47,862.91	46,039.9
	Product	4 salpping	.035	.034	391,862	402,53
		owder per 1	on of Ore	2/113	.8146	.745
		Ton for Po		291	.1123	.105
		Ton for Fu		2=8	.0098	.008
	AND STREET	Ton for Al	RESULTED TO THE RESULTED TO TH	1,383	.1221	.114
-100	Laboran	N PRINCE PAGE	27085	1.048	037	NASK-1881.
		Development	*** **********************************	529	-1817	- F790 M - 10
	THE RESIDENCE OF THE PARTY OF T	Powder	6,500	1.577	892.25	5,789.0
	60% "	D. Marie Co.	18,300		2,724.00	7,402.5
	Hercomit	e No. 3	33,250		4,538.25	546.0
	E.P. 23	to worked a!	1,400	ein days w	189.00	E, a
2774	Fuse	SOth a to	133,700	ave opraga	772.13	882.4
Tom	Caps	overtime	14,100	intervals	153.38	276.8
1975.6	Crimpers	imo noiezia	6		3.98	4.6
	TOTAL	EXPLOSIVES	- ROCK DEV	ELOPMENT	9,272.99	14,901.4
DERG	TOTAL	EXPLOSIVES	USED IN MI	NE	57,135.90	60,941.4
1927	Average	Price per F	ound for Po	wder	.1383	.141
1922	THE STATE OF THE S	9066 90	.028	Sor S vi	onena in 192	ond.
In	crease	4584191	\$.023	1 cont	he in 1928.	
		A	4 175		09 feet cost	
					t. In 1988	
					st \$ 2.82 pr	
DATE	lopment	in Breke		100	1927 4374 1	Post and
1927		\$ 54568.9E			Des foot.	
1928		E6480.95			et cost & 1)	

\$ 1005

root.

54566.90 612.07

Incresse

ANNUAL REPORT YEAR 1928.

8. COST OF OPERATING:

a.	Comparative	Mining	Costs:
----	-------------	--------	--------

•	Comparative Mining Costs:		18000		
10	TOURSMAN ADDRESS FRANCIS	1928	1927	Increase	Decrease
-55	PRODUCT	391,862	402,532	3000000004	10,670
	Underground Costs	1.451	1.333	.118	74 1000
	Surface Costs	.201	.170	.031	12 7550
	General Mine Accounts	.083	.074	.009	HOS S IOO
	Cost of Production	1.735	1.577	.158	Machalicinae.
	Depreciation	all's.	100	1000 man	
	Plant and Equipment	.051	.051	1945 more	orest
	Movable Equipment	.003	.012	Mare Morses	.009
	Taxes	.276	.277	pances - Er	.001
	Central Office	.116	.093	.023	were not
	Welfare, Safety,	- Periodica	as good	學出一致說。這分27	· Br
	Hospital, Etc.	.042	plogive	.042	sayed
*	Cost Adjustment		:019	in 1928. I	.019
	Contingent Expense		.050	an also his	.050
	Cost on Stockpile	2.223	2.079	.144	
	Loading & Shipping	.035	.034	.001	13" 0.000
	Total Cost on Cars	2.258	2.113	.145	1000
	No. of Days Operating	300	291	the and gala	110-
	No. of Shifts & Hours	1-8	1-8	decreased	\$ 457 +
	Average Daily Product	1.306	1,383		77
	COST OF PRODUCTION:		100	1927, 291 0	Gyn bost
	Labor	1.085	1.048	.037	1925 500
	Supplies	.650	.529	.121	Ser Ange
	Total 6168.76	1.735	1.577	.158	MON DIE
			DERET DE	12 1928.	

b. Detailed Cost Comparison:

The mine worked single shift six days a week in 1928, a total of 300 days. In 1927 the mine worked six days a week after April 30th, a total of 291 days; but hoisting was done for 1/4 shift overtime at frequent intervals. In 1928 there was no overtime hoisting.

.006

-046

There was no change in the wage scale in either year.

UNDERGROUND COSTS:

Inorease

Back Filling:

Increase \$

Exploring i	n M	ine:	\$	A \$925
1927	\$	4681.23	\$.012
1928	900	9066.20	15	.023
Increase	\$	4384.97	\$.011
1-60		20204 ASS		1973

The diamond-drill was loaned to the Holmes Mine for 5 months in 1927, and 12 months in 1928. In 1927 1509 feet cost \$ 3.10 per foot. In 1928 3174 feet cost \$ 2.82 per foot.

heavier rainfull.

Development	in	Rock:	4	-020
1927	\$	54868.90	\$.136
1928	0	55480.97	4	.141
Increase	\$	612.07	\$.005

15913.49 \$.040

1919.65

In 1927 4874 feet cost \$ 11.26 per foot. In 1928 4762 feet cost \$ 11.65 a foot.

essistant captain in 1928 and the mine worked mine more days.

8. COST OF
OPERATING:
(Continued)

ERGROUND C		AND DESCRIPTION OF THE PERSON		Jan Barrell	In 1927 2494 feet cost
927	\$	25420.00	\$.063	\$ 10.19 per foot. In 1928
928	8	17774.58	- 0	.046	1848 feet cost \$ 9.62 a foot.
Decrease	\$	7645.42	\$.017	six, an increase or 0 1000.
toping:		2150.30		200	In 1928 more breast
.927	\$	157651.93	\$.392	stopes were worked and more
.928	8	165333.21	1 9	.422	narrow places. Stoping con-
Increase	\$	7681.28	\$.030	ditions in general were not
Amorease	0	4044.08	-	1068	as good as in 1927. Explosives cost increased \$.008 in 1928. Drill steel was also higher.
imbering:		-1000		100	In 1928 lumber and
927	\$	10510.06	\$.026	timber decreased \$ 265
928		9787.43	100	.025	and plates and chute-
Decrease	\$	722.63	\$.001	fingers decreased \$ 457.
ramming:		COLUMN TO THE REAL PROPERTY.		Sin.	In 1927 291 days cost
.927	\$	143376.36	\$.356	\$ 492 per day. In 1928 300
928	P	149519.12	. 9	.382	days cost \$ 498 per day.
Increase	\$	6142.76	\$.026	There was not so much ore handled in 1928.
entilation	1:				1 Charging Set " "
927	\$	61.22	\$.000	2 New Batteries
928		29.48	u a	.000	Mard Ore Labor Sep. Conspetor
Decrease	\$	31.74	\$.000	Repres to Wheels & Appartures Wiring & Motor Repairs
umping:		Strong Stadion		JAN	Power charges increased
927	*	29709.52	Š	.074	\$ 1027 on account of the
928	bir	30732.56		.078	heavier rainfall.
Increase	\$	1023.04	\$.004	early in 1989;
	ar	d Air Pipe	8:	1008	The increase is due to
927	\$	35199.88	\$.087	nine more work-days in 1928.
928	-	36304.23		.093	Control of the Contro
Increase	\$	1104.35	-	.006	There were nime more work-days in 1923.
ack Fillin	g:	19120.88	- 4	049	The increase is due to
927	\$	11206.95	\$.028	nine more work-days in 1928.
928		11911.00		.030	
Increase	\$	704.05	\$.002	ABBANA MANAGANAN
	Su	perint ender	nce:		There was a second
927	\$	15913.49	\$.040	assistant captain in 1928
928		17833.14	1	.046	and the mine worked nine
Increase	\$	1919.65	\$.006	more days.

8. COST OF OPERATING: (Continued)

UNDERGROUND COSTS: (Continued)

Maintenance Accounts:

 Compressors and Power Drills:

 1927
 \$ 2755.88 \$.007

 1928
 4072.86 .010

 Increase
 \$ 1316.98 \$.003

 Hand Tramming Equipment:

 1927
 \$ 26010.53
 \$.065

 1928
 35104.55
 .090

 Increase
 \$ 9094.02
 \$.025

Electric Tram Equipment:
1927 \$ 17394.16 \$.043
1928 24906.02 .063
Increase \$ 7511.86 \$.020

7529.49

\$ 1019

Pumping Machinery:
1927 \$ 1842.90 \$.004
1928 894.73 .002
Decrease \$ 948.17 \$.002

SURFACE COSTS:

Indresse 8

1928

\$ 1220.50 \$ 100S

1987 - 2 2100.72 \$.005 1987 - 1021.45 .002 1993 - 1021.45 .002 In 1928 eleven drills were purchased and in 1927 six, an increase of \$ 1800.

The impressor is in .

In 1928 there were the following increases:-

Labor on Scrapers increased \$ 951 Transformers 383 Magnetic Switches 1666 Floodlights 676 Motor Repairs 421 Scraper-Hoists (5 New 1928) 1027 Cables, Etc. 1270 700 Wire-Rope Scrapers, Slides & Sheaves 2000 9094 Total

In 1928 there were the following increases:-

40 lb. Rail \$ 193
2 Locomotives from Republic 1824
1 Charging Set " 350
2 New Batteries 1393
Hard Ore Labor Rep. Generator 830
Reprs. to Wheels & Armatures 938
Wiring & Motor Repairs 1983
Total \$ 7511

The sump was cleaned out early in 1927.

There were nine more work-days in 1928.

9 891. Three new holating ropes cost \$ 4796 in 1988;

to the hoist-motor cost

In 1927 \$ 820 was a direct charge for making top-tram care.

8. COST OF OPERATING: (Continued)

SURFACE COSTS:	(Continued)	Mind.
Stocking Ore:	9356.66	\$.023
1928 Incréase	9934.47 577.81	\$.002
Mine Building	4766-07	.012

Screening-C	rus	hing at Mir	10:	
1927	\$	10906.49	\$.027
1928		15222.67		.039
Increase	\$	4316.18	\$.012

Dry-House:		4542
1927	\$ 7529.49	\$.019
1928	8801.85	.022
Increase	\$ 1272.36	\$.003

ENSEAL MINE ACCOUNTS:

Increase \$

General Su	rface	Expense:	- 2	- Aller
1927	\$	8276.92	\$.021
1928		9677.04	3/20	.025
Increase	. \$	1400.12	\$.004

3275 - 08

8- 5018458

8675.89 \$.007

Maintenance A	CCOI	ints:	-	-122
Hoisting Eq	uipr	nent:	9	388
1927	\$	4251.30	\$.011
1928	rin	8374.40		.021
Increase	\$	4123.10	\$.010

Shaft:	9	1200,00	- 8	,003
1927	\$	1220.50	\$.003
1928	1	1283.92		.003
Increase	\$	62.42	\$.000

Telmhoppy and Safety Dayloca:

Top Tram Eq	ulpr	nent:	. = 7.	-332
1927	\$	2100.72	\$.005
1928	9	1021.45		.002
Decrease	\$	1079.27	\$.003

The increase is in labor charges handling snow and picking rock. There were two men on the lump pile in 1928 and one in 1927.

In 1928 the screening and crushing arrangement went into operation in February. This requires more power and one more man.

Heating expense increased \$ 1374 in 1928.

The path to the shops was improved in 1928 and a new fence was built along the road on the north side of the mine. Much of the scrap from the storage-yard was moved, and the mine worked nine more days. The bill for rebuilding the road by the laboratory, work done in 1927, was paid in 1928.

In 1928 a new stator for the hoist-motor cost \$ 1476 and other repairs to the hoist-motor cost \$ 691. Three new hoisting ropes cost \$ 1796 in 1928; nothing in 1927. An 8 ft. bicycle sheave cost \$ 385. Total \$ 4348.

Introduced \$ 220. Firstness cost \$ 118; And underground labor increased \$ 300.

Whis is a Control Office

In 1927 \$ 820 was a direct charge for making top-tram cars.

COST OF OPERATING: (Continued

9. EXPLORATIONS AND FUTURE

MXPLORATIONS:

SURFACE COSTS		(Continued)	Constitution of	nued)
Docks, Tres	tre	1114.44	TS:	.003
1928		1372.47	- 0	.004
Increase	\$	258.03	\$.001
Mine Buildi	ngs	· second		
1927	\$	4766.07	\$.012
1928		3899.55		.010
Decrease	\$	866.52	\$.002

The increase is in pocket repairs and plates.

was charged to this account to the emount of \$ 1348;

In 1927 direct charges on E and A. 495, heating plant, amounted to \$ 178 per month. In 1928 the engine-house, shops and dry were painted and the coal-dock repaired.

GENERAL MINE ACCOUNTS:

Insurance:		Company of the Company		
1927	\$	3253.27	\$.008
1928	0. 89	133.80	94	.000
Decrease	\$	3119.47	\$.008
drazer da	LLP.	lent to m	Dist.	SEN :

In 1927 a large amount of back insurance was charged out to operations. sylas

variage of thirty-pight feet

Engineering: 1927 \$ 2416.87 1928 2518.09 2518.09 A A general 101.22 \$.001 Of fast at the first of the year.

This is a Central Office \$.006 charge.

1927 1928 3275.06 \$.002 Increase \$ 599.17 led ous north on the eighth level.

catimus for 163 feet in quarter Central laboratory \$ 2675.89 \$.007 charges increased \$ 487. .009 Balance is labor sampling.

Personal Injury Expense: 1927 5018.38 28 8710.57 .022 2% of the pay-roll was Increase \$ 3692.19 \$.009 charged to this account. 1928

In 1927 charges were \$.013 actual payments. In 1928

Safety Department Expense: 1927 \$ 132.23 \$.000 151.11 \$.000 this hole were ore, 41% it 18.88

in rook to a Septh of 93 feet. Telephones and Safety Devices: 2396.15 \$.006 1927 1928 3549.17

1153.02

In 1928 loss on hard hats and goggles cost \$ 415; .009 bells, safety-lights, etc. \$.003 increased \$ 220. Fire-hose cost \$ 118; and underground labor increased \$ 400. of 193 feet. It out two minsble veine of ore, and two narrow

Local General Welfare: 1927 \$ 1192.80 \$.003 charge. 1928 1126.18 .003 Decrease \$ 66.62 \$.000 vein of ore 20 feet wi

This is a Central Office

Hele No. 336 was also drilled due north on the eighth layed, starting at a point 1890 feet northeast of "A" shaft. and out one run of good ore, 35 feet wide. It was stopped at a depth of 110 feet.

Hole Way Nos was drilled to the

Hele Bo. Isw was drilled to the

COST OF OPERATING: (Continued)

GENERAL MINE ACCOUNTS: (Continued) Mine Office: .032 12665.69 12983.92 033 1928 Increase 318.23 .001

in slate at a coath of 105 feet.

wall of the Usin Vain on the sixth

"A" photo. It round no mercuantable

In 1928 the overhead of the General Storehouse was charged to this account to the amount of \$ 1348; but this was partly offset sixth level 200 feet cout of Hole No by a decrease of \$ 220 in superintendent's choreman and no charge for superintendent in February and March.

7 feet wide. It was stopped at

EXPLORATIONS AND FUTURE EXPLORATIONS:

Underground Diamond Drilling:

a depth of 110 feat.

On hole was finished and nineteen others were drilled in 1928, a total of 3174 feet. Twelve holes found ore in quantity sufficient to mine, an average of thirty-eight feet in each hole. All of the holes were drilled in "A" shaft and all were horizontal. A detailed description of this drilling will be given in the Geologist's report. A general resume' follows:-

Hole Ho. 390 was drilled due south on the fifth level

in the South-Seet Deposit 1760 feet southemet of the shaft.

Hole No. 379 was in 404 feet at the first of the year, and was continued for 163 feet in quartzite and slate till stopped. It was drilled northeast from a Bancroft stope on the seventh level 900 feet northeast of "A" shaft. This hole tried to cross the Bancroft syncline, but was unsuccessful.

Hole No. 380 was drilled due north on the eighth level. starting at a point 940 feet northeast of "A" shaft, and was stopped in the hanging-wall at a depth of 129 feet. It cut three small veins of ore.

Hole No. 381 was drilled due north on the eighth level, starting at a point 950 feet northeast of "A" shaft. It cut three runs of ore, and was stopped at a depth of 116 feet.

Hole No. 382 was drilled due north on the sixth level in the North Vein, starting at a point 1060 feet northeast of the shaft. The first 43 feet of this hole were ore, and it was continued in rock to a depth of 93 feet.

Hole No. 383 was drilled due north on a sub-level above the seventh level, 920 feet northeast of "A" shaft, and was continued in rock to a depth of 85 feet.

Hole No. 384 was drilled due north on the seventh level 1000 feet northeast of "A" shaft, and was continued to a depth of 193 feet. It cut two minable veins of ore, and two narrow veins, 93 feet in all.

Hole No. 385 was drilled due north on the eighth level 1230 feet northeast of "A" shaft, and was continued to a depth of 98 feet. It was stopped in the hanging-wall, after crossing one vein of ore 20 feet wide.

Hole No. 386 was also drilled due north on the eighth level, starting at a point 1390 feet northeast of "A" shaft. and cut one run of good ore, 33 feet wide. It was stopped at a depth of 110 feet.

Toxon

2,978.6

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671.98

7,841,18

2.000.00

5,327.04 2.827.44

1,793,54 206,45

158-82

\$ 20,000.00 8 11,258.57 8 8.741.43

CLIFFS SHAFT MINE ANNUAL REPORT YEAR 1928.

remained almost unchanged.

9. EXPLORATIONS AND FUTURE EXPLORATIONS: (Continued)

> Hole No. 387 was drilled due north from a stope on the sixth level near the Bancroft boundary 1740 feet northeast of "A" shaft, and cut two veins of ore aggregating 93 feet. It was stopped in the hanging-wall at a depth of 182 feet.

Taxes were alightly lower in 1928, but the cost per ton

Hole No. 388 was drilled to the north in jasper on the sixth level 230 feet east of Hole No. 387, and was stopped in slate at a depth of 105 feet.

Hole No. 389 was drilled to the south into the hangingwall of the Main Vein on the sixth level 1980 feet east of "A" shaft. It found no merchantable ore and was stopped at a depth of 110 feet.

Hole No. 390 was drilled due south on the fifth level in the South-East Deposit 1780 feet southeast of the shaft, and found one vein of ore 17 feet wide. It was stopped at the boundary at a depth of 120 feet.

Hole No. 391 was drilled due north from the same location as No. 390, and went directly into the hanging-wall. It was stopped at a depth of 71 feet.

Hole No. 392 was drilled due south for 490 feet from a point 220 feet east of Hole No. 390 on the fifth level, and cut 63 feet of material that averaged as merchantable ore. Much of it, however, is sideritic, and its value is doubtful. This hole is on Moro Mine ground, and passed through the anticline between the two mines, and cut the north limb of the Moro syncline. There was no merchantable ore at this point.

Hole No. 393 was drilled to the southeast, from the same stope on the fifth level as No. 392, but 50 feet further east, and was in foot-wall material for 112 feet.

Hole No. 394 was drilled due north for 160 feet from the sixth level 1490 feet northeast of "A" shaft. It went into the hanging-wall right away, and was stopped in slate.

Hole No. 395, 170 feet west of No. 394 on the same level, was drilled to the north also. It had 23 feet of ore at the start, and then went into the hanging-wall. It was stopped at a depth of 136 feet.

Hole No. 396 was drilled due north from the end of the northeast drift on the eighth level, 1740 feet northeast of "A" shaft. It cut 17 feet of ore at a depth of 86 feet, and was stopped at 195 feet.

Hole No. 397 was drilled due north on the fourth level at the boundary 700 feet northeast of the shaft, and cut three small veins of ore. There was some pyrite in this hole. It was continued to a depth of 356 feet.

Hole No. 398 was drilled N. 70° E. on the seventh level. 2180 feet northeast of the shaft, in jasper, siderite and dike, and was stopped at a depth of 150 feet at the end of the year.

The best chance for future explorations is in this territory to the north and east, especially in the Bancroft syncline. Thurs & Minings &

5 Railread Poolest

Total

7 Contingencies

6 6 Ft. Revolving Screen

2,500.00

8,000.00

2,000.00

2,000,00

11. ACCIDENTS AND PERSONAL

12. HEW CONSTRUCTION

10. TAXES: TRUCTION

Taxes were slightly lower in 1928, but the cost per ton remained almost unchanged.

Comparative Statement of Taxes for Years 1928 & 1927:

THE DESIGN WHEN HER IN	192	8	192'	7
	Valuation	Taxes	Valuation	Taxes
Realty placed by Tax Comm.	2,580,000	85,289.92	2,747,250	90,737.21
Personal	573,000	18,942.26	510,000	16,843.87
Lot 2, Sec. 3, 47-27	BOTH BUILDING		Bullian Acc.	or Mercusar
60-A. Minerals	90,000	2,975.22	90,000	2,972.62
Lot 174, Nelson Addition	100	3.31	100	3.30
South 35.91 Ft. of Lot 179	50	1.65	50	1.65
Total	3,243,150	107,212.36	3,347,400	110,558.65
Collection Fees		1,072.12		1,105.58
Total		108,284.48		111,664.23

A geoond-hand tralley locusative sam purchased from the

sterage-pathorn lacomutives were brught from the Republic Pine

ACCIDENTS AND PERSONAL INJURY:

13. NEW HOULFMENT

One fatal accident marred the record for 1928.

At 9:50 P.M. Saturday, November 24th, Waino Tarkka was instantly killed by falling down "A" shaft from the tenth level. Tarkka, who was acting as cage-rider, Fred Paju, and Matt Renowden, shift-boss, came up in the cage from the fifteenth level, and, when the cage reached the tenth level, it almost stopped, and Tarkka, who had just opened the door, started to step out on the plat. The cage did not stop, however, until it had gone about seven feet higher. Tarkka was thrown off, and fell down the shaft.

Tarkka was a single man, American born of Finnish parentage, and was 27 years old. He had worked at the Cliffs Shaft Mine for three years.

12. NEW CONSTRUCTION AND PROPOSED CONSTRUCTION:

18. MATIONALITY

E and A. No. 508:

Certain changes in the crusher-building, started in 1927 in order to crush all large lumps of ore, were completed in January, but when tried out gave some trouble, and needed adjustment. A change in plan was allowed, whereby all the ore was put through the crusher, and the plant went into operation in February.

The last statement of this E and A. was as follows:-

Acct.		7,4	Expenditures	Unexpended
No.	Paragona and the second second	Estimate	To Date	Balance
1	Crusher Changes	\$ 1,500.00	\$ 1,326.34	\$ 173.66
2	Rotary Grizzlies & Drives	1,500.00	828.02	671.98
3	Trestle Changes &			
	Stockpile Pockets	2,500.00	1,824.41	675.59
4	Chutes & Linings &	TEAL ME DIRECT	ex September 2019	
9,210 D	Building Changes	2,500.00	5,327.44	2,827.44
5	Railroad Pocket	2,000.00	1,793.54	206.46
6	6 Ft. Revolving Screen	8,000.00	158.82	7,841.18
7	Contingencies	2,000.00		2,000.00
	Total	\$ 20,000.00	\$ 11,258.57	\$ 8,741.43

YEAR 1928.

NEW CONSTRUCTION AND PROPOSED CONSTRUCTION: (Continued)

> E and A. No. 508: days a week on The entire cost was charged out in 1928.

13. NEW EQUIPMENT AND PROPOSED NEW EQUIPMENT:

PRODUCTION,

SHIPPERES &

INVESTORIES:

bifta throughout the year, and the fifth level was Tugger Hoists and Scrapers:

Holmes Lamp

day.

Two new 10 H.P. single drum air-hoists were bought for spotting cars at the pocket.

on development. Shaft-sinking was started in November 1927.

and was continued until February 1928, the shaft being sank

130 feet to the fifth level. Development work was dentimed

Five new scraper-hoists were bought during the year and several others were rebuilt.

A new, large scraper-slide was built and sent underground, and it is planned to build several portable scraper-slides during the coming year.

A second-hand trolley locomotive was purchased from the Stephenson Mine in November and put in service. Two two-ton storage-battery locomotives were bought from the Republic Mine during the summer.

In the drill-shop one of the drill-sharpeners was rebuilt, and Maxim silencers were put on both sharpeners to reduce the noise. New burners were also purchased for the drill-forges. Eleven new rock-drills were purchased during the year.

MAINTENANCE AND REPAIRS:

The spare skip was almost entirely rebuilt, and so was one top-tram car. This car had trammed 220,000 tons.

53,220.

On February 29th the stator on "A" shaft hoist-motor burned out, and was replaced by a new stator, purchased last year. The old stator was then rewound.

The spider of the No. 8 Crusher split in the head on May 29th, and was replaced by one from the South Jackson Mine. The old one was repaired, and is ready to go into service. The spider from the South Jackson Mine is also cracked, but has been continued in service.

age of 653 tons per day, exclusive of stockpile everyons.

In 1927 the mine worked 262 days and produced 674 tons per

The mine worked 262 days in 1928, and produced an aver-

Dots1

Tona:

19,811 18,923

37.437

43,960

WIE.

Lest Year

Total Tons

17,580

25,836

47,666

18. NATIONALITY OF EMPLOYEES:

C5.2007 v		
139	Americans	20
Ship	English	45
2000	Irish	9
	French	20
Holm	Finnish	100
Holm	Scandanavians	74
Holm	Germans	4
James	Italians	285
Juna	Total	285
A. A. A. A. A.	474000	- 15.C.A

This statement shows the nationality of the father at birth, and not the man's nationality at birth. Nearly all are U.S. citizens.

HOLMES MINE

ANNUAL REPORT

YEAR 1928.

The Holmes Mine continued to work five days a week on single shift for producing ore, but worked night shift as well on development. Shaft-sinking was started in November 1927, and was continued until February 1928, the shaft being sunk 130 feet to the fifth level. Development work was continued on both shifts throughout the year, and the fifth level was nearly all opened.

One diamond-drill-hole was put down near the boundary north of the shaft to test some iron formation cut by the shaft, but no ore was discovered.

There was no change in the wage-scale and no shortage of labor in 1928.

5,452

Cottal

PRODUCTION, SHIPMENTS & INVENTORIES:

Production by Grades:

Junetion Bessemer

Grade	Large Ser	Product	000
Fourth Level	Yearly	Stockpile	Total
Pi sen Taral	Product	Overrun	Tons
Ontal .	Tons	Tons	- 27 - 25 - 25
Holmes Bessemer	2,446	6,629	9,075
Holmes Lump	24,281		24,281
Holmes Crushed	33,220	Two Sunchi	33,220
Junction Bessemer	35,416	5,962	41,378
Junction	75,833	tone Cons	75,833
Total	171,196	12,591	183,787
Rock	36,140	REAL SERVICES	36,140
Total	207,336	12,591	219,927

Excluding stockpile overruns the product was 5,298 tons less than in 1927, but the combined ore and rock was 20,886 tons more in 1928 than in 1927. All hard ore was screened in 1928, and the Holmes Crushed and Holmes Bessemer were separated during the shipping season only.

The mine worked 262 days in 1928, and produced an average of 653 tons per day, exclusive of stockpile overruns. In 1927 the mine worked 262 days and produced 674 tons per

Dea

Sto

Shipments:	4.1504	CT 1587 V 514	ATA TORK	195 195 N
Grade	Pocket	Stockpile	Total	Last Year
state of the state	Tons	Tons	Tons	Total Tons
Holmes Bessemer	2,796	17,015	19,811	26,173
Holmes Lump	10,986	7,937	18,923	17,580
Holmes Crushed	14,788	22,649	37,437	25,836
Junction Bessemer	18,704	25,256	43,960	47,666
Junction	19,086	42,070	61,156	51,269
Total	66,360	114,927	181,287	168,524
Total Last Year	58,105	110,419	168,524	- 22.0
Increase in Shipments	8,255	4,508	12,763	

Total

43,960 61,166 181,887 168,6 ,389 5,452 109,288 146,663 143,1

Jan. let - Dec. Slet.

43,168 185,1

HOLMES MINE ANNUAL REPORT YEAR 1928.

2. PRODUCTION, SHIPMENTS & INVENTORIES: (Continued)

5. ANALYSIS:

Shipments were slightly less than production including stockpile overrun, but more than net product, so that the actual balance on hand is less than a year ago.

There is ample stocking room for all grades of ore this winter.

Shipments to the dock began early in May and continued intermittently to November 16th.

c. Stockpile Inventories: 1 3 507 52,778 49,412 170,444 835,950 511,6

rade	Tons
Holmes Lump	15,584
Holmes Crushed	15,339
Junction Bessemer	5,452
Junction	109,288
Total Total	145,663

d. Division of Product by Levels:

Third Level 93,339 Tons

Fourth Level 77,217 "

Fifth Level 640 "

Total 171,196 "

e. Production by Months:

7	25 g, m.	Holmes	Holmes	Holmes	Junction	Junction	Total	Rock
Month	Days	Bessemer	Lump	Crushed	Bessemer	Tons	Tons	Tons
THE PERSON	77112	Tons	Tons	Tons	Tons			
Jan.	22		2,196	3,188	2,692	6,156	14,232	2,512
Feb.	21	ine Anslys	2,405	3,553	588	7,763	14,309	1,496
Mar.	22		2,507	3,771	1,776	5,940	13,994	3,460
April	21	d Beasemer	2,368	3,891	2,544	4,882	13,685	2,952
May	23	1,235	2,209	2,562	3,468	5,392	14,866	2,928
June	21	649	1,332	1,514	4,510	6,198	14,203	3,396
July	22	570	1,319	1,223	5,548	5,946	14,606	3,912
August	23	967	1,974	2,290	2,193	8,326	15,750	3,360
Sept.	20	613	1,980	2,081	2,913	5,592	13,179	3,172
Oct.	23	800	2,148	2,067	4,055	5,865	14,935	3,508
Nov.	22		1,969	2,580	3,300	5,952	13,801	3,444
Dec.	22	1.366	1,874	2,112	3,320	6,330	13,636	2,000
Total	262	4,834	24,281	30,832	36,907	74,342	171,196	36,140
Transfe	rs	2,388	A37	+2,388	1,491	+1,491	State Car	TOTAL EN
Total	Holme	2,446	24,281	33,220	35,416	75,833	171,196	36.140
Stockpi	le	Lon Boaucon	r All	Minne	Tables .			40.44
Overrun	Munot	6,629	All	Mixed	5,962	The result of	12,591	
Year	262	9,075	24,281	33,220	41,378	75,833	183,787	36,140

2. PRODUCTION, SHIPMENTS & INVENTORIES: Novel med Cres (Continued)

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62 C

f. Ore Statement:

T. OIG Decendingste.	DOMESTIC STREET, SALES AND		A STATE OF THE PARTY OF THE PAR			The state of the s	20 77 77 5 1 E
	Holmes	Holmes	Holmes	Junction	Junction	Total	Total
Third 1	Bessemer	Lump	Crushed	Bessemer	Tons	1928	1927
Fourth	Tons	Tons	Tons	Tons	5,000 168	Tons	Tons
On Hand Jan. 1, 1928.	10,736	10,226	19,556	8,034	94,611	143,163	135,193
Output for Year	4,834	24,281	30,832	36,907	74,342	171,196	176,494
Transferred	2,388		2,388	1,491	1,491		
Stockpile Overrun	6,629	12,000		5,962	1000000	12,591	Marine C
Total	19,811	34,507	52,776	49,412	170,444	326,950	311,687
Shipments	19,811	18,923	37,437	43,960	61,156	181,287	168,524
Balance on Hand	0	15,584	15,339	5,452	109,288	145,663	143,163
Decrease in Output	68,000	64,000	116.0		5,000 98	5,298	
Increase in Balance	on Hand					2,500	
and the Academy State St				Laborator and Section 2			

g. Delays:

Date Hours Tons Lost Cause
Aug. 8 2 175 No current. Main line trouble.

h. Delays from Lack of Current:

Date Hours Tons Lost Cause
Aug. 8 2 175 No current. Main line trouble.

de in calculating tonuage.

Junetien Junetion Total

3. ANALYSIS:

a.	Average Mine Analysis	on Output	for Year:	
	Grade	Iron	Phos.	Silica
June	Holmes Bessemer	60.56	.045	6.59
	Holmes Lump	61.42	.058	7.85
	Holmes Crushed	62.09	.063	5.55
	Junction Bessemer	62.42	.040	5.07
June	Junction	58.52	.078	7.53

b. Average Analysis on Straight Cargoes:

	Tmom Modet	
Holmes Bessemer All Mixed	Iron Moist	ure
Holmes Lump All Mixed		
Holmes Crushed 63.52 .052 6	3.05 4.7	3
Junction Bessemer All Mixed		
Junction All Mixed		

4. ESTIMATE OF ORE RESERVES:

a.	Developed Ore:			A Company		
	CHSALE THE	Holmes	Holmes	Junction	Junction	Total
	<u>Level</u>	Bessemer	Tons	Bessemer Tons	Tons	Tons
	Third	10,000	6,000	6,000	70,000	92,000
	Fourth	50,000	46,000	80,000	505,000	681,000
	Total	60,000	52,000	86,000	575,000	773,000
b.	Prospective On	·e:				349
	Fourth	8,000	12,000	San Alle	6.004.04	20,000
	Fifth	m production of the		32,000	160,000	192,000
	Total	8,000	12,000	32,000	160,000	212,000
	Total Ore	68,000	64,000	118,000	735,000	985,000
	Assumptions:-	Hard Ore		ft. per t		

Deductions of 10% for loss in mining and 10% for rock were made in calculating tonnage.

c. Estimated An	alysis	APRIL ST				1				
245	Iron	Phos .	Sil.	Mang.	Alum.	Lime	Mag.	sul.	Igni.	Moist.
Holmes Bessemer										
Dried at 212	61.98	.039	6.56	.179	.267	.410	.179	.007	1.09	
Natural	59.50	.037	6.30	.172	.256	.402	.172	.007	1.05	4.00
Holmes										
Dried at 212'	59.40	.100	8.13	.110	.244	.300	.220	.021	1.41	
Natural	57.08	.096	7.80	.106	.234	.288	.211	.020	1.35	3.90
Junction Besseme	r									
Dried at 212'	60.50	.045	7.55	.228	.178	.145	.166	.023	1.52	
Natural	52.94	.039	6.61	.200	.156	.127	.145	.020	1.33	12.50
Junction						48.	75.5	4		
Dried at 212'	56.67	.100	8.50	.244	.283	.141	.161	.029	5.09	
Natural	51.00	.090	7.65	.220	.255	.127	.145	.026	4.58	10.00

LABOR AND WAGES:

SURFACE:

Comments:

1. Labor:

Labor conditions at the mine were satisfactory during the year. There are a great many old men in the organization, inherited from the Lake and Salisbury Mines, who have passed their greatest usefulness and are approaching pension age. Three of the older employees died during the year.

The tons per man were low and the cost per ton high during the year on account of sinking the shaft and opening the fifth level. All of this development work was charged against operations. The Head Market Days How Took

There were no changes in the wage scale during 1984 - 1-8 Mr. Shift from Jan. 7th. the year.

		1927		Decreas
PRODUCTION	The second secon	176,494		5,298
No. of Shifts and Hours	1-8	1-8		
AVG. NO. MEN WORKING:	Asia.		-	
Surface	46	45	1	
Underground		112	8	
Total ping was repaire	166	157	9	
AVG. WAGES PER DAY:		11-1596AV	San Ayes	
Surface The sugar and the	4.40	4.37	.03	
Underground			.00	
Total and a now key to		5.09	.01	S. S. S. S. S. S.
ma loth and the gear shrunk	DBv			
WAGES PER MO. OF 25 DAYS:		HI DERES		
Surface	110.00	109.25	.75	
Underground			.00	
ere of Total up, visiting ore	127.50	127.25	.25	COLUMN TO SERVICE
capactively.				
PRODUCT PER MAN PER DAY:	: san went	alderes Sho	Jungtlon.	183
Surface . That has been in	13.07	14.06	100 foet	.99
Underground			estine.	.63
Total	3.80	4.20	Section Sectio	.40
ubaidenog:				
LABOR COST PER TON:	red on the	Holmes-Min	e property.	
Surface the opened up about	.336	.311	.025	
Underground				
y. mai Fotal tracks north of f the Cliver Iron Mining Co.			.132	A Proposed
AVG. PRODUCT BREAK'G & TRAM'	9.21	8.72	.49	
AVG. WAGES CONTRACT MINERS	5.60	5.66	I flow of	.06
AVG. WAGES CONTRACT LABOR			t from Water	.06
87 on the third level to Rai	se 361, sh	owing that	American Con	
POTAL NO. OF DAYS:	ur again a	the result	0.0000000	
FOTAL NO. OF DAYS:	13,090	12,549	5412	
Underground	31,934	29,464	2,470	
929. Total		42,013	3,011	ERR VENEZ

^{*}Based on production without stockpile overrun.

^{**}Mine works 22 days per month.

5. <u>LABOR AND WAGES</u>: (Continued)

b.	Comparative Statement of	f Wages and Pr	oduct: (Con	tinued)	1000000
3.5	and the shaft was punk	1928	1927	Increase	Decrease
	AMOUNT FOR LABOR:	The Distance	to appropries	19 Mentals	Carlo Bell Canal
	Surface	57,593.79	54,900.42	2,693.37	
	Underground	172,405.49	158,958.64	13,446.85	
	warm impotaled. Serout	229.999.28	213.859.06	16.140.22	· · · · · · · · · · · · · · · · · · ·

1928 1 to 2.60	1928		1-8	Hr.	Shift	5	Days	per	Week
1927 1 to 2.49	1927	-	1-8	Hr.	Shift	5	Days	per	Week
1926 1 to 2.36	1926	he_3	1-8	Hr.	Shift	5	Days	per	Week
1925 1 to 2.30	1925	e 20	1-8	Hr.	Shift	5	Days	per	Week
	1924								
Hard Ore vein, whi				Hr.	Shift	4	Days	per	Week
d cross-out w					12-1.		0.80	1	Julia

923 and 481 have been put up to the third

6. SURFACE

a. Buildings and Repairs:

3. Buildings:

The interior of the office was calcimined in December. Piping was repaired in the dry.

4. Skip-Hoist: Tel has been mourly completed. A organisment

On August 29th the key in the drum of the skiphoist became loose, and a new key was fitted. This also worked loose, and a new key was again fitted on Sept. 15th and 16th and the gear shrunk on.

b. Stockpiles:

The Holmes Bessemer and Junction Bessemer stockpiles were cleaned up, yielding overruns of 6629 and 5962 tons respectively.

Q feet in rock and 50 feet in ore.

A cut was finished along the west side of the Junction pile in ore that has been in stock for ten years. 150 feet of new trestle was built for this stockpile in November.

d. Subsidence: A A Balaine in Cra

No new cracks have appeared on the Holmes Mine property, but a new one opened up about half-way between the Chicago and North-Western Ry. and the Duluth, South Shore and Atlantic Ry. main line tracks north of the drainage ditch on the land of the Oliver Iron Mining Co.'s Section 16 Mine.

The caved area in the limits of the old cracks has gone down appreciably during the year, and the principal flow of water from the hanging-wall has moved east 400 feet from Raise 367 on the third level to Raise 361, showing that cracks in the eastern part have opened up again as the result of ground movement.

It would be well to move the main-line tracks during 1929.

UNDERGROUND:

DIO

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Shaft-Sinking:

Shaft-sinking was continued in January and February, and the shaft was sunk 46 feet, completing the skip-pit below the fifth level. The pocket was completed in March, and the tail-drift in April. A small pump-house and a large sump were cut on the west side of the plat, and two pumps were installed, throwing water to the main pump-room on the fourth level.

tree gangy finished the bre west of Raise Sed from b. Development: on the third level west to No. 10 proze-cut-

Third Level:

Raise 312 was put up to the 310 foot sub-level 50 feet west of Raise 312. Between the two raises a cross-cut was driven south through the dike 50 feet, and then crossed the Hard Ore vein, which is 20 feet wide at this point.

A cross-cut was also driven from the foot-wall drift just west of Raise 322 to the hanging-wall drift half-way between Raises 365 and 367, a distance of 155 feet. The last 70 feet was in rock.

a contracts are atoping south of Baises 514 and

Fourth Level: to delicate west feets Balas Bills Palis Farri-Raises 421, 423 and 481 have been put up to the third level, and Raise 466 to the 240 foot sub-level.

aghaping of the year, and this has all been mined.

Fifth Level: contracts worked bers during gurt of the year. The fifth level has been nearly completed. A cross-cut was driven 880 feet south from the shaft, and drifts driven east and west. The east drift was advanced 460 feet, all in diorite. The west drift struck ore in November and was in ore during the remainder of the year. This drift is in 230 feet, 170 feet in rock and 60 feet in ore.

Stoping:

267

172022

The number of contracts averaged one more than in 1927, the increase being on the fifth level. At one time there were two more contracts than last year. The number and classification for the year is as follows:-

from the third level.

Stoping	20	Contracts
Drifting and Raising in Ore	14	
Drifting and Raising in Rock		Sp. 78 Soul
Total		f, one one
root he still working here-		CHIEF IST
Hard Ore Vein	14	
Soft Ore Vein	20	

Much rock-drifting was done by contracts classified as on ore, because it was incidental to their work. For this reason the production of rock from the mine is much larger than the classification would indicate. The number of contracts on rock amounted to 3 out of 37, or 8%, whereas the production of rock was 36,140 out of 207,336, or over 17%. At the beginning of the year most of the ore cant

of Raise 465 had been mined. Host of the wain has now been mined for eighty feet further west, and there are four con-

tracts working mear Baless 465, 465 and 466.

7. UNDERGROUND: (Continued)

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c. Stoping: (Continued)

Hard Ore Vein:

An average of fourteen contracts was distributed over nine sub-levels from the 330 foot sub-level on the west at the beginning of the year to the 250 foot sub-level on the east. The 330 foot sub-level was finished in April.

ne . LConkismadl.

330 Foot Sub-Level: Ther of contracts was in the said

Three gangs finished the ore west of Raise 368 from No. 8 cross-cut on the third level west to No. 10 cross-cut, a distance of 200 feet. The average width of the ore was 30 feet.

320 Foot Sub-Level:

Four gangs finished the ore from Raise 317 west to No. 10 cross-cut, and a narrow pillar east of Raise 317, a total distance of 280 feet.

310 Foot Sub-Level:

Three contracts are stoping south of Raises 311 and 312, and another is drifting west from Raise 317. This territory was all opened in 1928.

sa irregular pro-body 120 feet

There was some ore left between Raises 360 and 368 at the beginning of the year, and this has all been mined. As many as six contracts worked here during part of the year.

300 Foot Sub-Level: Adam aland most the diag action

The ore between Raises 361 and 368 that was so wide on the two sub-levels above the 300, pinched out on this sub-level, and was mined in two narrow veins. One gang is still mining 30 feet east of Raise 363. The ore around Raise 361 was mined from the third level.

Third Level:

The ore around Raise 361 was mined as far west as the main cross-cut, and has just been finished. Another gang is stoping in a small vein in the hanging-wall between Raises 367 and 368.

280 Foot Sub-Level: ar the ore north of the dike, that

The hard ore was mined for a distance of 70 feet northwest from a point 20 feet east of Raise 467, and one contract is still working here.

270 Foot Sub-Level:

At the beginning of the year the vein had been mined as far west as Raise 463, and some development had been done west of this. The vein has now been mined west and northwest of this point for 160 feet, and there are three gangs working near Raise 467.

260 Foot Sub-Level:

At the beginning of the year most of the ore east of Raise 463 had been mined. Most of the vein has now been mined for eighty feet further west, and there are four contracts working near Raises 463, 465 and 466.

w on this sub-level.

7. UNDERGROUND: (Continued)

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c. Stoping: Hard Ore Vein: (Continued)

250 Foot Sub-Level:

A small amount of hard ore has been mined on this sub-level between Raises 462 and 463.

soft Ore Vein: wall and as for marth so Raise 454. One

The average number of contracts working in the Soft Ore Vein has been twenty. They have been distributed over eleven sub-levels from the 330 foot sub-level on the north and west to the 230 foot sub-level on the south and east.

undery near Raise 460.

330 Foot Sub-Level:

A piece of ore sixty feet long and fifty feet wide was mined out east of Raise 321.

320 Foot Sub-Level:

East of Raise 321 an irregular ore-body 120 feet long and 20 feet wide has been opened up and partly mined. West of the same raise ore was followed along the foot-wall for 180 feet, and one contract is now stoping 60 feet west of the raise. The vein near the hanging-wall has been mined for 200 feet west of a point 20 feet north of Raise 323, and one gang is now mining east of Raise 316.

310 Foot Sub-Level:

Some ore has been mined near the dike south and west of Raise 325, and south of the dike south of Raise 326. Ore has also been mined along the contact with the Hard Ore Vein from Raise 425 west nearly to Raise 317, a distance of 330 feet.

300 Foot Sub-Level:

Three gangs have worked on this sub-level in the last ore mentioned above, and have mined nearly all of it.

Three more contracts mined the ore north of Raises 328, 333, 430, 450 and 336.

Third Level:

During the year the ore north of the dike, that lies between the Hard Ore and Soft Ore Veins, was mined from Raises 346 and 452 west for 200 feet to No. 5 Cross-Cut, except a small pillar west of Raise 333 and 430. There are two gangs stoping here.

280 Foot Sub-Level:

East and north of Raises 456 and 452 the ore has been mined on the foot-wall over a length of 120 feet and a maximum width of 80 feet. Next to the hard ore contact ore has also been mined around Raises 451, 488 and 490. Three gangs are now working on this sub-level.

270 Foot Sub-Level:

Ore on the foot-wall north and east of Raises 452, 453, 454 and 464 has been mined during the year, and there are now two gangs working in Raise 452.

7. UNDERGROUND: (Continued)

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c. Stoping: Soft Ore Vein: (Continued) 260 Foot Sub-Level:

Between the foot-wall and the Hard Ore Vein an area 180 feet long and 90 feet wide has been finished during the year, extending from a point 50 feet west of Raise 454 east to the foot-wall and as far north as Raise 453. One contract is now working in Raise 453.

10,519 .0986 12N - 14th 250 Foot Sub-Level:

814 In 1927 a small amount of ore was mined on the foot-1.8" wall close to the south boundary near Raise 460. In 1928 the ore was mined along the boundary as far west as Raise 462 and on the foot-wall east and north of Raise 464. Four contracts are now working in Raises 445, 455 and 464.

1,826,72

5,084,70

1,489,95

5.648,38

5 Ft. Las 240 Foot Sub-Level:

The northwest part of this sub-level has been retimbered.

Except for connections to raises and retimbering the second outlet no other work has been done on this sublevel, except north of Raise 461, where one contract has started stoping on the foot-wall.

230 Foot Sub-Level:

St. Brd. Messure per Ten of Ore

Ton of Gre

Oost for Timber Year 1926 - \$ 20.013.24 и и и и 1389 - 19,113,78

Post.

686

2536

One contract mined a small area south of Raise 461 along the south boundary early in the year. 171.196

Pt. Brd. Messure

o. Drifting and Raiging:

The cost for timbering was \$ 5544 higher in 1928 than Btw in 1927, the increase being in labor repairing and retimbering underground. The cost for timber (supplies alone) was slightly lower in 1928.

In 1928 the fifth level was opened, largely in rook, and two cross-outs were criven on the third level.

Drifting Drifting

Rook Ore Rook

175

Baising

387

1.37

Foot Foot Foot

Balaing

468

Treated timber is being used on the fifth level.

7. UNDERGROUND: (Continued)

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	ber Used:	Total Control of the	All the same of the same of the same	time .
hard Samuel and asked	Linear	Avg. Price	Amount	Amount
Kind	Feet	Per Foot	1928	1927
6" - 8" Timber	44,145	.0414	1,827.92	2,639.68
8" - 10" "	46,669	.0658	3,072.94	3,943.47
10" - 12" "	33,328	.0874	2,914.51	2,629.78
12" - 14" "	18,519	.0986	1,826.72	1,489.95
10" Treated Timber	814	.3712	302.14	
12" " "	568	.2775	157.64	MILE STATE OF THE
Total Timber 1928	144,043	.0706	10,101.87	10,702.88
" 1927 dela	182,361	.0586	15-22	665.50
Total Powder		Per C. Ft.	10:01	THESE 14.0
5 Ft. Lagging - 785 Cds.	667,250	.7622	5,084.70	5,648.88
1 In. Covering Boards	33,913	2.4534	832.01	346.06
Total Lagging, Etc.	701,163	.8438	5,916.71	5,994.94
Tamarack Poles	239,412	1.668	3,994.66	2,412.79
Total Lagging, Poles,	到现代的			THE RESERVE
Etc. 1928	940,575	1.062	9,911.37	8,407.73
Total - 1927	961,766	.8742	-	177 196
PRODUCT				and a second
SUCRE SUMPER THE TON	ler	-	171.196	176.494
PRODUCT Par Ton for Pour	ler Cape. M	0.	171,196	176,494
PRODUCT Ft. Timber per Ton of Ore		0.	.841	.962
PRODUCT Ft. Timber per Ton of Ore	estves	0.		.962 4.424
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti	estves		.841 3.897 4.663	.962 4.424 4.221
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti Cost per Ton for Timber	estves	1,050	.841 3.897 4.663 .0590	.962 4.424 4.221 .0606
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti Cost per Ton for Timber Cost per Ton for Lagging	estves	1,050 5,950	.841 3.897 4.663 .0590 .0297	.962 4.424 4.221 .0606 .0339
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti Cost per Ton for Timber Cost per Ton for Lagging Cost per Ton for Poles	mber	1,050	.841 3.897 4.663 .0590 .0297	.962 4.424 4.221 .0606 .0339
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti Cost per Ton for Timber Cost per Ton for Lagging	e mber	1,050 5,950	.841 3.897 4.663 .0590 .0297	.962 4.424 4.221 .0606 .0339
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Ore Ft. Lagging per Ft. of Ti Cost per Ton for Timber Cost per Ton for Lagging Cost per Ton for Poles Cost per Ton for All Timb Ft. Brd. Measure per Ton	mber oer of Ore	1,050 5,950 5,800	.841 3.897 4.663 .0590 .0297 .0233 .1120 1.674	.962 4.424 4.221 .0606 .0339 .0137
PRODUCT Ft. Timber per Ton of Ore Ft. Lagging per Ton of Or Ft. Lagging per Ft. of Ti Cost per Ton for Timber Cost per Ton for Lagging Cost per Ton for Poles Cost per Ton for All Timb	mber of Ore	1,050 5,950	.841 3.897 4.663 .0590 .0297 .0233 .1120 1.674	.962 4.424 4.221 .0606 .0339 .0137

e. Drifting and Raising:
In 1928 the fifth level was opened, largely in rock, and two cross-cuts were driven on the third level.

- TATE:	Rock	Ore	Rock	Ore
Year	Drifting	Drifting	Raising	Raising
- DESA	Feet	Feet	Feet	Feet
1928	2816	324	37	468
1927	585	175	137	731

1223.20

ANNUAL REPORT YEAR 1928.

UNDERGROUND: (Continued)

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TOTAL EXPLOSIVES

Explosives, Drilling and Blasting:

All hollow steel, except that used in the shaft, was sharpened at the Cliffs Shaft Mine. During the past year there has been a notable increase in hardness of the ore

throughout the mine.	Quantity	Friez	Amount
Statement of Explosives Used for th	e Year 192	8: 15.68	52,00 940,25
Developing Ore and Stoping:	19 050	12.00	3832.00
and surface advantage and	1957	Average	2446.00
Kind	Quantity	Price	Amount
50% Powder L.F. Standard	22,400	13.56	3036.75
60% " " "	58,950	14.67	8648.50
60% " Amm. Gelatin	4,300	15.22	654.50
Total Powder	85,650	14.41	12339.75
Eagle Brand Fuse Per M.	257,800	.572	1475.24
No. 6 Blasting Caps " M.	67,900	10.95	743.33
Tamping Bags " M.	10,000	2.10	21.00
Crimpers Each	11	.805	8.85
Total Fuse, Caps, Etc.	3,700	14.82	2248.42
TOTAL EXPLOSIVES	4,150 5,850	19.06	14588.17
PRODUCT	1770000	7.70	171,196
Pounds Powder per Ton of Ore	9,600	1.07	.500
Cost per Ton for Powder	TROOP	4.554	.072
Cost per Ton for Fuse, Caps, Etc.			.013
Cost per Ton for Explosives		The same pain	.085
Sinking Shaft:		W. Sch	
60% Powder Amm. Gelatin	1,850	15.42	285.25
80% " " "	3,950	19.50	770.50
Total Powder	5,800	18.20	1055.75
Fuse TOTAL EXPLOSIVES	7,500	.571	42.82
No. 6 Blasting Caps	1,400	10.65	14.91
Electric Blasting Caps No. 8 Per C		11.45	103.04
Connecting Wire (Spools)	8	.777	6.18
Crimpers	200	705	.50
Total Fuse, Caps, Etc.	1	and section	167.45
RODAL EXPLOSIVES			1 × 78 8 407

7. UNDERGROUND: (Continued)

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Developing in Rock:		The state of the s	
	To be seen a	Average	994
Kind	Quantity	Price	Amount
50% Powder L.F. Standard	600	13.66	82.00
60% " " "	5,100	14.52	740.25
60% " Amm. Gelatin	12,250	14.79	1812.00
00/0	12,400	19.00	2355.50
Total Powder	30,350	16.44	4989.75
Fuse (Eagle Grand)	52,900	.559	295.74
Caps Ho. 6 Heroulas	11,900	10.89	129.64
Crimpers & Magazia	901	11,450	.75
Total Fuse, Caps, Etc.	10,000	77.5	426.13
TOTAL EXPLOSIVES	14	-757	5415.88
Cutting Out Pump-House and	Sump - 5th	Lawal.	2002755
60% Amm. Gelatin Powder	1.700	14.82	252.00
80% " " "	4,150	19.04	790.25
Total Powder	5,850	17.81	1042.25
Puse	9,600	5.73	55.09
Caps	1,800	1.07	19.31
Total Fuse and Caps	A CANADAMA	A Challenger	74.40
TOTAL EXPLOSIVES			1116.65
Cutting Out Car Barn - 5	ith Level:		
80% Amm. Gelatin Powder	50	19.50	9.75
Fuse	100	.57	.57
Caps	100	1.06	1.06
TOTAL EXPLOSIVES			11.38
Blasting Stockpile:	Les a	1955	
50% L.F. Standard Powder	250	13.10	32.75
Fuse	300	.58	1.76
Caps	100	1.06	1.06
Crimpers	1	100	.50
TOTAL EXPLOSIVES			36.07

7. UNDERGROUND: (Continued)

f. Explosives, Drilling and Blasting: (Continued)

Recapitulation of All Explosives Used at the

Holmes Mine for Year 1928:

Holmes Mine for Year 1928:	\$ 140 hours	The same of	0.5248
Underground udate	1:455	Average	
Surface Cours	Quantity	Price	Amount
50% L.F. Standard Powder	23,250	13.55	3151.50
60% " " " " " "	64,050	14.66	9388.75
60% Amm. Gelatin "	20,100	14.94	3003.75
80% "	20,550	19.10	3926.00
Grand Total Powder	127,950	15.22	19470.00
Fuse (Eagle Brand)	328,200	.5710	1871.22
Caps No. 6 Hercules	83,200	10.92M	909.31
Caps No. 8 Electric	900	11.45C	103.04
Tamping Bags	10,000	2.10M	21.00
Connecting Wire	8	.77-	6.18
Cap Crimpers	14	.757	10.60
Total Blasting Supplies	2 268	+2.64	2921.35
TOTAL EXPLOSIVES AS PER COST	SHEET		22391.35

Costs per ton for both years are based on product exclusive of stockpile overrum.

b. Datailed Cost Comparison:

The mine worked one more contract than in 1927, but two more contracts were in rock. In 1927 5.7% of the gross product was rack and in 1926 17.4%. Correcting coats per ten by this factor we have \$ 1.76 for 1927 and \$ 1.85 for 1928 as cost per ten of one and rock combined.

The number of days worked was the same in both years, but in 1928 both real-work and holating were carried on at night, and there was talay in holating from excessive reak and from wet are observed the conselers.

Employing 1	20 10	Spa		
1927	4	8508.76 884.18	4	-014
Decrease	-	1624.58	0	.009
Sinking in	Sha	ft:		
1927	\$	19068.90	÷	-Q66
Ingresse	à.	6460.34	8	.940

per foot. In 1928 424 feet test \$ 2.09 per foot.

In 1927 80 feet cost \$ 145.71 per foot. In 1928 45 feet cost \$ 593.54 per foot. Included in this cost is all the steel sets; outling the pecket, cutting and concreting the piet and

294 feet of drift.

In 1927 1870 feet of Simbonsodrilling cont 8 1.88

8. COST OF OPERATING:

a.	Comparative	Mining	Costs:
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COMPALACTAS WITHING COS CR.		1-10	A STATE OF THE STA	-9" -QC03790"
DESCRIPTION OF THE PARTY LAND	1928	1927	Increase	Decrease
PRODUCT	171,196	176,494	1977-722 1	5,298
Underground Costs	1.737	1.455	.282	1928 280
Surface Costs	.293	.271	.022	er foot.
General Mine Accounts	.139	.123	.016	
Cost of Production	2.169	1.849	.320	Dec at the con-
Movable Equipment	.002	(SIN	.002	cost gost
Plant & Equipment	.120	.120	ber foot	In 1928
Development	.079	.079	cost 8 7.	49 page-
Taxes are 8 2091.05	.263	.321		.058
Central Office	.148	.113	.035	
Welfare, Hospital, Etc.	.054	684	.054	sorosee.
Cost Adjustment	8 .700	.018	tons in 1	.018
Contingent Expense	4 GERRYS	.061	aperd Rev	.061
Cost on Stockpile	2.835	2.561	.274	A LOCAL STATE
Loading & Shipping	.067	.064	.003	
Cost on Cars	2.902	2.625	.277	legranded
No. of Days Operating	262	262	mt laggin	and pol
No. of Shifts and Hours	1-8	1-8	4 8 150%	a not The
Average Daily Product	653	674	2 8 9022	The 0.21
the first than an a work to be deared		te in la	Dor repuls	ding.
COST OF PRODUCTION:	1000	active.	MARKET	
Labor	1.336	1.207	.129	
Supplies 3 14795.79	.833	.642	.191	
1988 Total 14834.74	2.169	1.849	.320	STANSON.

Costs per ton for both years are based on product exclusive of stockpile overrun. in 1988 new doors were

b. Detailed Cost Comparison:

PARANT for swellingy fame . The mine worked one more contract than in 1927, but two more contracts were in rock. In 1927 5.3% of the gross product was rock and in 1928 17.4%. Correcting costs per ton by this factor we have \$ 1.76 for 1927 and \$ 1.85 for 1928 as cost per ton of ore and rock combined.

The number of days worked was the same in both years. but in 1928 both rock-work and hoisting were carried on at night, and there was delay in hoisting from excessive rock and from wet ore clogging the crushers.

UNDERGROUN	n coome.
OMPRINGIOUM	n conta:

Exploring i	n M	ine:		- 100
1927	\$	2508.76	\$.014
1928		884.18		.005
Decrease	\$	1624.58	\$.009
Sinking in	Sha	ft: 184.60	9	*001
1927	\$	11628.56	\$.066
1928	3	18088.90		.106
Increase	\$	6460.34	\$.040
1927	9	7154.40	. 0	1067
1938		8395,25		

Increase \$ 1228.60 \$.014

In 1927 1370 feet of diamond-drilling cost \$ 1.83 per foot. In 1928 424 feet cost \$ 2.09 per foot.

ten months. In 1928 it ran on both ebaybavellypened

built and pipe and rubing

In 1927 80 feet cost \$ 145.71 per foot. In 1928 46 feet cost \$ 393.24 per foot. Included in this cost is all the steel sets, cutting the pocket, cutting and concreting the plat and 294 feet of drift.

during part of the year.

None in 1927.

HOLMES MINE ANNUAL REPORT YEAR 1928.

COST OF OPERATING: (Continued)

00

0 .

00

Development	11	Rock:		- 1000	In 1927 722 feet cost
927	\$	5600.50	\$.032	\$ 7.76 a foot. In 1928 2853
928		22230.75		.130	feet cost \$ 7.82 per foot.
Increase	\$	16630.25	\$.098	
evelopment	ir	Ores		1	In 1927 906 feet cost
927	\$	8022.36	\$.045	\$ 8.85 per foot. In 1928
928	8	5931.31	. 8	.035	792 feet cost \$ 7.49 per
Decrease	\$	2091.05	\$.010	foot e cost \$ 1208, an in-
toping:	9.	2200174 .	8	.007	There was a decrease
927	#	123648.77	\$.700	of 5,298 tons in 1928, and
928	*	112056.93	-	.655	more scrapers were used.
Decrease	db	11591.84	ě	.045	more sorebors were asea.
Teorease	4	5843.81	-	040	Tracks - properties
imbering:		24,000			Timber used decreased
927	\$	46209.30	\$.262	\$ 601, but lagging and poles
928		51753.49		.303	increased \$ 1503, a net in-
Increase	\$	5544.19	\$.041	crease of \$ 902. The balancis in labor repairing.
ramming:		A LANGE LOS		with the	motors cost @ 2090.
927	\$	14795.79	\$.085	
928	SIDE	14824.79		.086	Charges were as follows
Increase	\$	29.00	\$.001	Generator & 27 3.21 3
entilation		3248.65	6	1020.	In 1928 new doors were
927	\$	245.92	\$.001	built and pipe and tubing
928		421.26		.002	bought for auxiliary fans.
Increase	\$	175.34	\$.001	7976 4020 3658 B
ammi mar		445			\$ 3.0209 \$ 3.0006 \$ 500
cumping:	dh	0440 00	-	040	There was more rain in
927	\$	8448.27	4	.048	1928 and some relay-pumping
.928		8571.20	- 16	.051	from the fifth level.
Increase	4	122.93	*	.003	varelesse aren a species o
ompressors	aı		3:	stru	In 1927 the compressor
927	\$	14564.29	\$.082	ran on day shift only for
.928	2	20562.52	. 2	.120	ten months. In 1928 it ran
Increase	\$	5998.23	\$.038	on both shifts all year. In 1928 the fifth level air-
					line was installed.
ack Filling	2:				and two pumps installed
927	4	210.00	4	.001	there.
928	W	184.00	4	.001	
Decrease	\$	26.00	4	.000	
Declease	4	20.00	4	.000	In 1927 there was no
Inderground	SI	AND DESCRIPTION OF THE PARTY OF	nce	200.00.00	In 1928 there were two
.927	\$	7154.43	\$.041	bosses on the fifth level
1999		0707 97		OFF	

1928

Increase \$

8393.23

1238.80

.055

\$.014

8. COST OF OPERATING: (Continued)

18 0

00

UNDERGROUND COSTS: (Continued)

Cave-In:
1927 \$ \$.000
1928 8.47 \$.000
Increase \$ 8.47 \$.000

Maintenance Accounts:

1928

Decrease 0

Doorease

Impresse 6

Degrazas

Compressors	and	Power Dr	ills:
1927	\$	987.71	\$.006
1928	mak	2256.42	.013
Increase	\$	1268.71	\$.007
was and a second		Calculation of Contract	

Hand Trammin	g	Equipment:	-	4508
1927	\$	4029.30	\$.023
1928		10873.11		.063
Increase	\$	6843.81	\$.040

5889.37

5533 .69

6827.09

8 .038

\$,039

å . gos

0 +002

\$.006

Electric T	ram	Equipment:	- 6	-00h
1927	\$	7046.21	\$.040
1928	300	10289.84		.060
Increase	\$	3243.63	\$.020
1000				

leneral Surface Expense:

Pumping Machinery:

1927 \$ 1623.11 \$.009

1928 8973.95 .052

Increase \$ 7350.84 \$.043

 SURFACE COSTS:

 Hoisting:
 1927
 \$ 12548.00
 \$.072

 1928
 14543.71
 .085

 Increase
 \$ 1995.71
 \$.013

In 1927 four drills cost \$ 680. In 1928 eight drills cost \$ 1908, an increase of \$ 1228.

In 1928 IS more bents

loavessing charges \$ 827;

operating charges increased \$ 2806, on account of night

were erected in the treatles.

metal - house to	1928	1927
Cars	\$ 533	\$ 1520
Scrapers	10159	2080
Tracks	181	429
Total	\$ 10873	\$ 4029

There were nine scrapers built in 1928 and seven in 1927. Six new scraper-hoists cost \$ 3426, and six 15 H.P. motors cost \$ 2098.

Charges were as follows:-1928 1927 Increase Generator \$ 37 \$ 21 \$ 16 Locomotive1329 1031 298 Wiring 966 585 381 3937 1911 2026 Tracks Cars 4020 3498 522 \$ 10289 \$ 7046 3243

Wiring and tracks increased on account of opening the fifth level, and cars on account of purchases from Stephenson Mine.

In 1927 the centrifugal pump was overhauled and new bearings were put on the Aldrich pump. In 1928 a pump-house and sump were built on the fifth level and two pumps installed there.

500

In 1927 there was no hoisting at night until No-vember. In 1928 rock was hoisted at night throughout the year.

on one treatle.

COST OF OPERATING: (Continued)

6 0

mo

(Continued) SURFACE COSTS: Stocking Ore: \$.056 9948.67 1927 13339.29 .079 1928 .023 3390.62 Increase Screening-Crushing at Mine: 3237.10 .018 1927 1928 3436.01 .020 198.91 .002 Increase time on account of wet dirt. Dry House: 1927 5889.37 .033 1928 5531.69 .032 expense. Decrease 357.68 .001 General Surface Expense: .039 1927 6827.09 .037 1928 6374.54 repairs in 1928. 452.55 .002 Decrease sotual payments . . . La they were 2% of the pay-ru Maintenance Accounts: Hoisting Equipment: 1927 4979.39 .028 1928 .019 3334.52 Decrease 1644.87 .009 pinions were bought. to the hoist \$ 1169. 1927 205.84 .001 1928 .004 703.66 .003 497.82 Increase the fifth level. Top Tram Equipment: 1927 1015.85 .006 1928 1392.84 .008 .002

Docks, Trestles and Pockets: 1927 1729.30 .010 1928 644.24 .004 Decrease .006 1085.06

376.99

Increase

luorease \$

In 1928 13 more bents were erected in the trestles, increasing charges \$ 837; operating charges increased \$ 2805, on account of night shift hoisting; but rockpicking decreased \$ 252.

The No. 6 crusher for soft ore was re-babbited in 1928, and an extra man was employed for a short

The decrease is in water bills and heating

There was less teaming expense, and less road

In 1927 a new cage-rope and counterweight rope cost \$ 734, and a new motor was added to the hoist and three

In 1928 two new skipropes cost \$ 946 and repairs

The increase is in cost of plates and labor installing in pockets underground. A new pocket was built on

DUCOR CROW	1927	1928
Engines & Motors	\$ 122	\$ 270
Tracks & Cars	659	637
Wire-Rope	208	362
Sheaves, Etc.	27	124
Total	\$ 1016	\$ 1393

In 1927 new floors were put on permanent trestles and the rock-trestle was extended. In 1928 a new floor was put on one trestle.

8. COST OF
OPERATING:
(Continued)

10. TAXES:

15. EQUIPMENT AND PROPOSED EQUIPMENT:

by steel care.

SURFACE COSTS		(Continued	1	ens for	mation found in the shart
Mine Buildi	ings	-levelusin		s deltas	In 1927 all the roofs
1927	\$	1434.24	\$.008	were painted and the dry
1928	No.	777.91		.005	and shops were painted and
Decrease	\$	656.33	Ŕ	.003	calcimined inside.
passod three	esarb.	the rollo	nesan ories	or Stores	A 1 dona :-
GENERAL MINE	ACC		- 210		
Insurance:	lior.	terstingen		457	In 1927 a large amount
1927	\$	2223.00	\$.013	of accumulated insurance
1928	Hor)	87.30	Secretary.	.001	from past years was dis-
Decrease	\$	2135.70	\$.012	tributed and charged to
- 4115-11	100	atal Emech			operating mines regardless
					of its source.
Disagu	200	ralking in	Sur	tire of	cold be tripp again in
Engineering	2:	1200 25		(C)	Central Office charge.
1927	\$	1725.32	\$.010	of No. 6 Gross-Out on the
1928		1698.74	d b	.010	ended 160 feet farther.
Decrease	\$	26.58	\$.000	of the Castleford Vein.
found in th				F 4.	Constitution of the control of
Analysis:	ert		19 22	ic. elle	
1927 nortson	\$	6096.92	\$.035	charges increased \$ 870.45.
1928	QT	6979.65	Cha	.041	m 16 Mine pitches west under
Increase	\$	882.73	\$.006	
Personal In	1111	Wynenee:		-	In 1927 charges were
1927	ê	2217.98	. 4	.013	actual payments. In 1928
1928	-	4800.63	4	CONTRACTOR OF STREET	
Increase	A	The state of the s	A	.028	they were 2% of the pay-roll.
Increase	*	2582.65	4	.015	1927
Safety Depa	rtme	ent Expens	0:	711	Taxes Valuation Teams
1927	\$	238.94	\$.001	28,231,52 2 600,000 \$ 20,002
1928	70.00	291.74	2.00	.002	16,396,77 1,392,000 36,069
Increase	\$	52.80	\$.001	44,828,30 3-1,700,000 8 56,160
Collabeles	Feet	occidence of			146.28 4 551
Telephones	and		vice	18:	Underground lights
1927	\$	214.05	\$.001	increased \$ 470.
1928		607.00	4	.003	
Increase	\$	392.95	\$.002	
Local Gener	al 1	lel fares			*
1927	6	CONTRACTOR	6	007	
	DER.	623.38		.003	-heiste were gurchased Suring
1928	DO S	631.28	A	.003	Desrened from the Cliffs Short
Increase	n. pi	7.90		.000	-C. motor, and was used for
Mine Office			por.	fights:	In 1020 & 556 42 man
1927	4	+ 162 YEAR DOLLAR MEDICAL PARTY	4		In 1928 \$ 556.42 was
1928	BAN .	8318.37	4	.047	charged to this account
- TET 907 TORON LAND AND A TORON AND A	ě	8736.30	A	.051	for General Storehouse
Increase	4	417.93	4	.004	overhead. None in 1927.
433 05 484	CHEA	dr-domp of	NP8	MOZO S	old to the Cliffs Shaft Mine.
by stanl on	+ CHICK	THYTE MAGE	arm al	Bro-Te	vel says have been replaced
Service and the State of the St	- 10 0				

9. EXPLORATIONS AND FUTURE EXPLORATIONS:

In order to test the iron formation found in the shaft below the fifth level and to determine the elevation of the basal contact of the main diorite sheet a vertical diamond-drill hole, No. 29, was put down during the summer from the cross-cut north of the shaft on the fifth level. This hole passed through the following formations:-

Diorite ----- 23 Feet

Jasper ----- 102 "

Diorite ----- 269 "

Jasper ----- 30 "

Total Depth -- 424 "

Diamond-drilling in future should be tried again in two places:-

- 1. Vertically from the end of No. 6 Cross-Cut on the fourth level, when it has been extended 160 feet farther. This will test for the extension of the Castleford Vein, found in the Section 16 Mine.
- 2. Vertically from the east end of the fourth level and horizontally from the east end of the fifth level to see if the main ore-body of the Section 16 Mine pitches west under our foot-wall dike.

10. TAXES:

Total valuation was decreased \$ 350,000, realty being increased \$ 246,000 and personal property decreased \$ 596,000.

	1928	3	19	27
2755	Valuation	Taxes	Valuation	Taxes
Realty, SW4 SE4 Sec. 9-47-27 Personal	\$ 854,000 496,000	\$ 28,231.53 16,396.77	\$ 608,000	\$ 20,082.69
Total Collection Fees Total Tax	\$ 1,350,000	\$ 44,628.30 446.28 \$ 45,074.58	\$ 1,700,000	\$ 56,150.47 561.50 \$ 56,711.97

13. EQUIPMENT AND PROPOSED EQUIPMENT:

a. Tugger Hoists and Scrapers:

Five 15 H.P. electric scraper-hoists were purchased during the year, and a scraper-slide was borrowed from the Cliffs Shaft Mine and equipped with a 15 H.P. D.C. motor, and was used for loading ore and rock on the fifth level. These 15 H.P. electric hoists are much superior to the smaller air-hoists, but are not as easy to move and erect.

b. Cars:

Three rocker-dump cars were sold to the Cliffs Shaft Mine. All of the remaining wooden sub-level cars have been replaced by steel cars.

HOLMES MINE NNUAL REPORT YEAR 1928.

NATIONALITY

YEAR 1929

English	66
Swedish	25 cw improvement in 1922.
French Canadian	17st we have ever shows with
Irish	S. no recent sentent and our
Norwegian	adu to car reserves so that
German	Priset by new township developed.
Finnish	42 total of 592,194 tems being
Italian	2
Total	160

This classification is based on the father's nationality at birth and not on the man's nationality at birth. Practically all employees are United States citizens, and all speak English. A large percentage are American born, many of mixed parentage.

Year	Horris	Manganese	Dillos	Mant	Mayadale
1920	46,578		68,675	105,327	45,000
1921	60,595		45.529	86,741	171
1922	109,239		22,850	09,902	
1923	132,418		25,147	101,145	1,650
1984	76,088		69,253	88,672	12,098
0,005	100,648		59,945	105,316	
1835	230,830	3,486	55,088	49,678	73,097
1927	IN 1326	1,557	28,691	58,251	60.817
1986	166,655	38,847	49,704	5g. 161	205,469

The following table shows much grade produced in 1982.

Grade	Sons
Morris	184,455
Morris Manganess	35,347
Horrisville	34,879
Lloyd	32,161
Lloyddale	100,407
Lloyd Silice	26,875
Total for 1969	355,364

The area abiyeds show a name agreement to

Lloyd Silion

Fores

The B

Produced

G 15 CAN 24 Day 4

the pro

forward

Shine

Shirmonts by Granes		se ou	relug. Int	less-		
Gyacos		150	1205	1926	1927	1926
Morris	40,234	27 . 127 4	128,406.	86,415	148,118	195,086
Morris Hanganese					66	
Morrisville	87,775	80,975	88,672		15,790	
Lloyd			67,955			
Migradala -					55.64%	

18,668 31,050 31,084 21,664 21,030 Daniel

813, 592 269,228 260,145 224,775 297,258 200 Dec

MORRIS-LLOYD MINE

ANNUAL REPORT

YEAR 1928

1,786

GENERAL:

The Morris-Lloyd Mine continued to show improvement in 1928. Production and tons per man are the best we have ever shown with a consequent reduction in costs.

Our development work continued to add to our reserves so that the production for 1928 is more than offset by new tonnage developed. Shipments were fairly satisfactory, a total of 393,184 tons being forwarded in 1928. 22,849

22,849

2,391

56,440

83.786

24.675

mine on Doc. Blat each year:

14,530

Total

207,417

347,060

Lloyddale

78,821

31,250

1B,417

PRODUCTION. SHIPMENTS &

STOCKPILE BALANCES:

Production by Grades:

Morris Manganese

Morrisville

Eloyd

The production each year since 1920 shown by table that follows:-

50,936

Year	Morris	Manganese	Silica	Lloyd	Lloyddale	Total
1920	45,572		63,873	105,327	45,000	261,772
1921	68,593		45,529	84,741	171	209,034
1922	109,227	metion	22,850	89,902		221,979
1923	132,413	La Douis	25,147	101,145	1,630	260,335
1924	76,038	Wa U	69,253	88,672	12,393	246,356
1925	100,568	From Co.	59,945	105,316		265,829
1926	110,863	3,436	53,088	49,678	73,097	290,162
1927	173,118	1,357	33,871	58,251	60,217	326.814
1928	134,455	33,347	49,754	32,161	106,447	356,164

The following table shows each grade produced in 1928: -

Mant Jordan "

Grade	Tons
Morris arious crades	134,455
Morris Manganese	33,347
Morrisville	34,879
Lloyd	32,161
Lloyddale	106,447
Lloyd Silica	14,875
Total for 1928	356,164

Year

o. Stockoile Ba

The follows

Morr

26.9

The ores shipped show a marked increase in tonnage over any previous year as will be noted from the following tables:-14,579

117,575

Shinments by Grades:

186,709

Grades	1923	1924	1925	1926	1927	1928
Morris	45,394	27,084	122,435	86,413	148,118	193,093
Morris Manganese	4-43			3,259	86	22,849
Morrisville	39,773	80,975	28,673	12,372	15,790	2,391
Lloyd	80,267	104,115	67,953	33,948	58,615	66,440
Lloyddale	20,390	25,171		67,119	53,641	83,736
Lloyd Silica	24,868	31,883	21,084	21,664	21,038	24.675
Total	210,692	269,228	240,145	224,775	297,288	393.184

2. PRODUCTION.
SHIPMENTS &
STOCKPILE BALANCES:
(Continued)

b. Shipments: Continued-

Shipments as forwarded from pockets and stockpiles were as follows:

5

lance from 1920 to

EX. CAL

2,860

Grade qui red	Pocket	Stockpile	Total
Morris	82,748	110,345	193,093
Morris Manganese	22.849	0	22,849
Morrisville	1,726	665	2,391
Lloyd	15,514	50,926	66.440
Lloyddale	46,039	37.697	83,736
Lloyd Silica	24.675		24,675
Total	193,551	199,633	393,184

The ores shipped in 1928 were consigned to the docks and charcoal furnaces as shown:-

Destination	Total Tons
L. S. & I. Dock	288,421
C. & N. W. 000	8,687
Antrim Iron Co.	15,688
Newberry Furnace	20,355
Pioneer #2	36,556
Wells "	20,685
Cadillac " Product	100 1701,747
East Jordan "	
Total	393,184

c. Stockpile Balances:

December

Over-run Grand Fot

date, Sino

The following are various grades stocked at mine on Dec. 31st each year:

Year	Morris	Morris Mang.	Morrisville	Lloyd	Lloyddale	Lloyd Silica	Total
1920	26,917	82 0,9	52,514	33,840	73,821	39.077	226, 169
1921	87,371	2.7	74.849	90.270	73.992	42.871	369.353
1922	65,658	25,0	59,651	96,674	31,250	44.184	297.417
1923	137,758	NA 29.5	31.985	132,977	The same of the sa	31,923	347.060
1924	186,709	02 47,8	5.568	117,373	0	14,538	324,188
1925	164,842	66 48,9	15,759	154,733	40	14,538	349,872
1926	194,820	15 29,0	34,783	164.763	6,354	14.538	415,259
1927	219,820	1,271	31,786	164,399		14,579	444.785
1928	167,324	10,656	53,282	124,884	In the second second second	15,680	407.765

Accrues To Dec.51, 1928 To Dec. 31, 1928 Balance . 9 805.099 24 286,086 223,148 02,940 286,088 51,245 234,842 276,715 9,045 267,670 27 254,215 176 254,085 28 127,107 127,107 Totals 1,452,492 1,290,997 141,495

2. PRODUCTION, SHIPMENTS &

ANALYSIS:

STOCKPILE BALANCES:

(Continued)

e. Production from Chase Leases by Months:

Leases	No. 9	No. 24	No. 25	No. 26	Nos. 27 & 28	Total
Minimum Yearly Tonnages Required	10,000	15,000	15,000	15,000	22,500	77,500
January 1920	9,748	3,230	2,7660	469.03	0	12,978
February 1923	9.414	3.238	8.7290	471.05	0	12,652
March 1922	8,237	3,402	4,8480	442.0	0	11,639
April 1928	8,059	4,005	7,4880	587.0	0	12,064
May 1994	8,879	2,705	8,4660	364.0	0	11,584
June	10,462	2,662	18,0280	521,0	0	13, 124
July	10,050	2,215	18,9180	285,07	0	12,265
August	11,048	986	8,7920	132 0	0	12,034
September	9,106	1,071	10,9970	141.0	0	10,177
October	9,739	1,403	0	0	0	11,142
November	10,569	1,904	0	0	0	12,473
December	11,774	1,719	0	0	0	13,493
Totals	117,085	28,540	0	0	loyd- LlOyd	145,625
Over-run	2,030	550	0	lagd 0	dale Silora	2,580
Grand Total	119,115	29,090	1,7600	0	2,930 14,079	148,205
Production in 1928	204,405	30,367	34,879	32,16110	6,447 14,875	356, 164

Production from Leases by Years: 5 4 565 196,550 119,577 29,454 500,949

The following table shows production from each lease from 1920 to date. Since the year 1921, production has exceeded the minimum requirements.

Lease No.	9	24	25	26	27	28	Totals
Minimums	10,000	15,000	15,000	15,000	15,000	7,500	77,500
Year							
1920	33,411	19,073	1,527	1,320	0	0	55,331
1921	56,794	12,075	4,843	2,075	0	0	75,963
1922	97,082	6,980	2,057	0	0	0	106,119
1923	104,522	9,148	7,109	1,831	0	0	122,610
1924	97,123	13,047	699	137	2	0	111,008
1925	77,244	29,526	10,367	2,425	0	0	119,562
1926	53,102	47,876	14,604	303	0	0	115,885
1927	88,956	48,931	10,040	952	0	0	148,879
1928	119,115	29,090	0	0	0	0	148,208

Total Royalties Accrued and Production from Leases:

No. of Lease	Accrued To Dec.31, 1928	Mined To Dec.31, 1928	Balance
9	202,283	1,007,382	805,099
24	286,088	223,148	62,940
25	286,088	51,246	234,842
26	276,713	9,043	267.670
27	254,213	178	254.035
28	127,107	0	127, 107
Totals	1,432,492	1,290,997	141,495

Molesure

10.75

11,25

MORRIS-LLOYD MINE ANNUAL REPORT YEAR 1928

PRODUCTION. 2.

SHIPMENTS &

STOCKPILE BALANCES: A ANALYSIA ON STRAIGHT GARAGE AND THAN 1988.

(Continued)

e. Table Showing Balances Due on Accrued Royalties For Leases Nos. 9 to 28 Inclusive since 1920:

Mos	Year	Tons	Tons	Balance
N 100	1920	812,492	342,766	469,726
BEST TRYIN	1921	889,992	418,729	471,263
ptonicac	1922	967.492	524,848	442,644
-	1923	1,044,992	647.458	397,534
Grade	1924	1,122,492	758.466	364,026
Morris	1925	1,199,992	878.028	321.964
	1926	1,277,492	993,913	283,579
Morris	1927	1,354,992	1,142,792	212,200
	1928	1,432,492	1,290,997	141,495

Matural

Dried

f. Ore Statement:

Average Mine Oras Stocked

Eloyddale	Morris	All the second s	Morris ville	Lloyd	Lloyd- dale	Lloyd Silica	Total
On Hand Jan. 1, 1928	219,820	1,271	31,786	164,399	12,930	14,579	444,785
Production in 1928	134,455	33,347	34,879	32,161	106,447	14,875	356,164
Total	354,275	34,618	66,665	196,560	119,377	29,454	800,949
Transfers	6,142	1,113	10,992	5,236	298	10,901	6
Net Total	360,417	33,505	55,673	191,324	119,675	40,355	800,949
Shipments	193,093	22,849	2,391	66,440	83,736	24,675	393,184
Balance	167,324	10,656	53,282	124,884	35,939	15,680	407.765
Increase in Output	Netu	ral 5	4.82	058	6.02		29,350
Dec. in Ore on Hand	Date	d 5	0.80	110	5.93	11.20	37,020
	Digita	ral B	2.20	100	5.26		

47.85

59.40

.068

6.90

g. Delays:

Date	Cause of Delay	Loss of Production
Aug. 8th,	91 Hours Delay. No Power	800 Tons

NALYSIS:

Average Mine Analysis on Output For Year 1928:

110%	Lloyd Mine				
Grade	Iron	Phos	Silica		
Lloyd	59.32	.097	6.29		
Lloyddale	58.37	.156	7.05		
Lloyd Silica	51.65	.086	17.46		
	Morris Mine				
Morris	59.24	.080	7.38		
Morrisville	52.26	.072	16.39		
Morris Manganese	60.47	.060	6.49		

Sec. 2 Bops 12,700

251,017

470,334

23,630

6,100

117

508

66,107

1,101,148

8,655,105

152

21,620

2,468

615, 574 Tons

 α .

11.

40,016

85,273

715,101

49,934

MORRIS-LLOYD MINE ANNUAL REPORT YEAR 1928

MORGRIS-SERVED MINI AUDUAL NEEDS

3. ANALYSIS: (Continued)

RETIMATE OF ORR RUSERVES:

Above et

Bel

Average Analysis on Straight Cargoes For Year 1928: Ore Shipped:

m or uro	Mi	ne	Lake Eri	
Grade	Iron	Phos	Iron	Phos
Morris	59.08	.094	58.82	10.60

Average Mine Analysis for Year 1928: Ores Stocked:

Ore in Sight as of December Blat. 1938;

Grade	NO.	Iron	Phos	Silica	Moisture
Morris Chang	Dried	58.40	.090	8.21	10.75
	Natural	52.12	.080	7.33	2018
Morris Manganese	Dried	60.70	.056	6.30	10.50
	Natural	54.30	.050	5.64	6 30
Morrisville	Dried	52.80	.076	16.02	10.50
	Natural	47.25	.068	14.32	2 1,080
Lloyd	Dried	59.40	.096	6.18	11.25
77.79 T.)	Natural	52.72	.085	5.48	200
Lloyddale	Dried	58.40	.158	6.54	11.25
payson of Ore	Natural	51.83	.140	5.80	0.0

Ores Shipped:

Grade	TOWN HOSE	Iron	Phos	Silica	Moisture	
Morris	Dried	59.10	.086	7.04	10.75	
	Natural	52.76	.077	6.28	10	
Morris Manganese	Dried	60.70	.065	6.74	10.50	
	Natural	54.32	.058	6.02	132	
Lloyd Below 4th M	Dried	58.80	.110	5.93	11.25	
	Natural	52.20	.100	5.26	8.62	
Lloyddale	Dried	58.00	.167	6.90	11.25	
Line Land	Natural	51.48	.148	6.10		
Lloyd Silica	Dried	51.80	.091	17.14	11.00	
	Natural	46.10	.081	15.25		

ESTIMATE OF ORE RESERVES:

Assumption: -

12 cu. ft. equals one ton 512,466 10% deduction for rock " loss in mining 10%

So,25, +

Total Ore in Morris-Line: Miss. 2,055,105 Tons

945,508

11

Total Ore on All Louran

Total Ore on G.C.I.Co. Labour.

ESTIMATE OF ORE RESERVES: (Continued)

Ore in Sight as of December 31st, 1928: yound as reported to the State

Butimated tennings

20077	-	3
MORR		

Location	of Or	е		As Duck	Bessemer	Morris	Total
Above 6th I	Level.	C.C.I	.Co. L	ands		12,700	12,700
Midda-Berthsen	of Gr	Chase	Lease	No. 9.		1,350	1,350
" 7th	**	C.C.I	.Co. L	ands,	49,065	242,152	291,217
Clayd	**	Chase	Lease	No. 9,	49,934	422,590	472,524
Magaini	9.8	**		No. 24.	111	21,620	21,620
# Total	11.	"	11	No. 25,	2,26	22,937	22,937
	**	**	**	No. 26,		9,687	9,687
Below "	#	C.C.I	.Co. L	ands.	18,208	54,622	72,830
Oms Remery	0.00	Chase	Lease	No. 9.	29,138	110,662	139,800
The soll	OMPTR	15.0		No.24,	AL SELE LANSING	18,394	18,394
year; halo				No. 25,	ANTINI NEWS STR	10,336	10,336
		. "		No. 26,		16,453	16,453
Total Ore	in M	orris l	Mine	104	146,345	943,503	1,089,848

LLOYD MINE 285,029 290,162 \$18,814 855

Location of Ore	Lloyd	Lloyddale	Total	
Above 3rd Level,	57,922	4,286 47	57,922	
Below " "	6,185		6,185	
Total Ore in Lloyd Mine	64,107		64,107	

LLOYD MINE EAST

17 72,700	
77 107 007	
33 107,023	122,55
01 98,971	107,872
29 633,774	862,503
912,468	1,181,148
(98,971 29 633,774

SUMMARY OF TOTAL ORE

Mine	Bessemer	Morris	Lloyd	Lloyddale	Total Tons
Morris	146,345	943.503	9277		1.089.848
Lloyd	Year Sur	Case Und	64,107	Total/	64,107
Lloyd East	1921	4.6	268,680	912,468	1,181,148
Total	146,345	943,503	332,787	912,468	2,335,103

1-6 Br.

Total	Ore	on	Chase	Lease	No. 9,		613,674	Tons
	"	**	- #	11 3	No. 24.		40,014	
100	**	**	65 M		No. 25,		33,273	
1 11 7	"	"	50.1	11	No. 26,		26,140	#
Tota	1 01	re c	n All	Leases	3,		713,101	
Total	Ore	on	C.C.I	.Co. L	ands,		1,622,002	"
Tota	1 01	e i	n Mor	ris-Lle	oyd Mir	10.	2,335,103	

4. ESTIMATE OF ORE RESERVES:

Estimated tonnage of ore underground as reported to the State Tax Commission. All tonnages reported this year as developed ores.

Bessemer Grades	Morris Shaft	Lloyd & Lloyd East	Total
Morris Bessemer	146,345		146,345
Non-Bessemer Grades	以表现10-1-1120000000000000000000000000000000	1985 5.5583	10-11-602
Morris	943,503	6.00	943,503
Lloyd	6.12	332,787	332.787
Lloyddale	hall dath	912.468	912,468
Total	1,089,848	1,245,255	2,335,103

Ore Reserves:

The following table shows ore in sight January 1st; product for year; balance in sight and new ore developed during year.

4.38

Estimated Ore	1924	1925	1926	1927	1928
Ore in Mine Jan. 1st.	3,306,270	3,309,075	3,325,341	2,891,893	2,612,722
Production	246,356	265,829	290,162	326,814	356,164
Balance	3,059,914	3,043,246	3,035,179	2.565.079	2.256.558
Ore in Mine Dec. 31st.			2,891,893		
New Ore Developed	Section 1. Section 1. Proceedings of the Contract of the Contr	The state of the s	143,286	The second secon	

5. LABOR AND WAGES:

a. General:

Labor conditions were most satisfactory during the year. The labor turn over was practically nil and the force worked steadily with few exceptions.

b. Comparative Statements:

Product - Shifts - Hours:

3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1928	1927	Increase
Product	356, 164	326,814	29.350
No. of Shifts & Hours	1-8 Hr.	1-8 Hr.	V. HEED BOOK

Average Number of Men Working:

	Year	Surface	Underground	Total
	1921	46	203	249
	1922	48	162	210
	1923	44	156	200
	1924	44	144	188
	1925	45	145	190
	1926	45	149	194
	1927	50	178	228
	1928	52	173	225
Decrease	for 1928	- 3 Men		1

5. IABOR AND WAGES:

b. Comparative Statements:

Product - Shifts - Hours:
(Continued)

Average Wages Per Day:

Year	Surface	Underground	Total
1922	3.72	4.19	4.08
1923	4.12	4.65	4.53
1924	4.29	4.94	4.78
1925	4.34	5.02	4.86
1926	4.32	5.02	4.85
1927	4.33	5.14	4.94
1928	4.34	5.09	4.90

Surface rate increased .01 in 1928, while underground average rate decreased .05 and the average rate for both surface and underground was reduced .04 per day.

Wages Per Month of 25 Days:

	1928	1927	Increase	Decrease
Surface	108.50	108.25	0.25	Carl Basis
Underground	107.25	128.50		1.25
Total	122.50	123.50		1.00

Product Per Man Per Day:

Year :	Surface	Underground	Total
1920	17.67	4.33	3.48
1921	18.78	4.22	3.44
1922	17.40	5.33	4.08
1923	18.47	5.58	4.28
1924	19.08	6.42	4.80
1925	20.45	6.85	5.13
1926	21.42	6.97	5.26
1927	20.93	6.61	5.02
1928	23.09	7.59	5.71
	1928	1927	Increase
Surface	23.09	20.93	2.16
Underground	7.59	6.61	.98
Total	5.71	5.02	.69

South-west of

ad adjacent to

MORRIS-LLOYD MINE ANNUAL REPORT YEAR 1928

LABOR AND WAGES:

b. Comparative Statements:

Product - Shifts - Hours: overed with Asbestos roofing. The roof on (Continued) give here and shops was given a coating of "Save All"

Labor Cost Per Ton:

b. Spanieni

c. Tracks.

langing A 820

East al

strime

G. Historia

A- Shart

b. Davelowment:

FORTS -

There were d this, there wa but by far the levels. The :

3

the Lite

the old

A nev the Mor

Year	Surface	Underground	Total	
1920	.307	1.482	1.791	a water to
1921	.242	1.248	1.490	South-west o
1922	.214	enough.786 m. fo	1.000	ad adjacent t
1923	.223	.634	1.057	4
1924	.225	.770	.995	hotrous the
1925	.212	.733	.945	Wor II Jesus
1926	.201	.721	.922	he centre of
1927	.207	will harrand i	.984	ng poles and
1928	.188	.671	.859	
the Morris	WAR SANO	pus in between	rue two I	colos tradica
	1928	1927	Decrease	en nefertwee
Surface	188	.207	.019	
Underground	14 40	.777	.106	
Total	.859	.984	.125	

balliting. She ald tipe this undergo	1928	1927	Increase	Decrease
Average Product Stoping & Tramming " Wages Contract Miners	13.64	12.04	1.60	0.11

The water line between the Lloyd shaft and the storage tank Total Number of Days:

1 30h A 13	1928	1927	Increase	Decrease
Surface	15,425	15,618	was a leg	193
Underground	46,9482	49,4792	new-line	2,531
Total	62,3732	65,097		2,724

by Classing out the old store-house and putting in beating colls. Amount For Labor: and henchese

		1928	1927	Increase	Decrease
Shaft.	Surface	66,965.09	67,551.48	-	586.39
	Underground	238,962.49	254,175.60	he 8th leve	15,213.11
o face	Total	305,927.58	321,727.08	atorage po	15,799.50

1927 2210 2232 1928 0211 2778

All of the rock expavated was scraped into the storage pocket. Proportion Surface to Underground Men:

tis, there we at by far the creis. The	1 to 3.22 1 to 3.31 1 to 3.56			3.22 3.31 3.56	tage driven in ore on the main level ore drifting was confined to the su the comparison for the last three			main levels to the sub-
SPA-	Year	r.	T		Drifting	Ore Ba	ising	
	1926	ã			2849			

SURFACE:

a. Buildings:

The mine office roof was covered with Asbestos roofing. The roof on the dry, engine house and shops was given a coating of "Save All" roofing paint.

The laboratory, dry and office were painted.

b. Stockpiles: we tonnego developed was confined lasgely to the Morris

The Lloyddale stocking area was increased by grading South-west of the Lloyd shaft, leaving just enough room for a new road adjacent to the old cave. feet hish and from 40 to 50 feet in wisth

the 180 foot sub, on Chase Louss No. 9, half way between the

increseed to 11.24 tons per man in 1988,

c. Tracks, Roads, Etc.: we found the main ove deposit well Bo. 21 deposit

A new track was laid by the L. S. & I. Ry. through the centre of the Morris timber yard. This will be used for unloading poles and lagging.

A cross-over track was also put in between the two pocket tracks East of the Morris shaft, making it possible to spot two separate strings of empties above the crusher pocket.

d. Miscellaneous:

A new steam line was laid from the dry to the laboratory and crusher building. The old line laid underground, gave us constant trouble and we replaced it by putting one overhead.

A new heating boiler was put into service at the Lloyd shaft crusher

plant, replacing an old up-right diamond drill boiler.

J831

The main water line between the Lloyd shaft and the storage tank back of the location, was repaired where it crosses the main line of the L. S. & I. Ry. A small lake existed for years near the tracks and we had been suspicious for some time that there was a leak in the water line near by. The lake was pumped out and a new line laid under the old lake bed.

A new dry was constructed for the surface men near the carpenter shop by cleaning out the old store-house and putting in heating coils. lockers, wash basins and benches.

Tons Por Man

18,99

UNDERGROUND:

a. Shaft Sinking:

The Morris shaft was bottomed 80 feet below the 8th level. By the end of the year, we had put in a large concrete storage pocket and finished cutting the plat. A part of the pump-house was also cut out. All of the rock excavated was scraped into the storage pocket.

b. Development:

There were driven 307 feet of main level drifts in rock. Besides this, there was a considerable footage driven in ore on the main levels. but by far the greatest amount of ore drifting was confined to the sublevels. The following figures give the comparison for the last three years.

	Year	Ore Drifting	Ore Raising	
In order to inci	1926	2249	1703	TO
provided most of t	1927	two dr 2210 s michi	2232	110
35 contracts on or	1928	have 8 3211 250 In	2778	gen

we have

normally

ger drille,

7. UNDERGROUND:

(Continued)

It will be noted that the footage of ore drifts increased by 50%, while there was approximately a 25% increase in the amount of raising. In 1926, we were getting 8.90 tons per man in our development work. This was increased to 11.24 tons per man in 1928.

The new ore tonnage developed was confined largely to the Morris shaft area. On the 180 foot sub, on Chase Lease No. 9 between the 6th and 7th levels, a new ore area was discovered 350 feet in length, at least 110 feet high and from 40 to 50 feet in width.

On the 180 foot sub, on Chase Lease No. 9, half way between the 6th and 7th levels, we found the main ore deposit and No. 21 deposit joined together, adding a considerable tonnage to the reserves.

c. Stoping:

For 1928, we show a notable increase in the tons per man secured from stoping operations. The unit cost was cut from .460 to .417 per ton.

of timber

Amount

1987

0.620,51

4,140.88 5,005.14 487.76 1,697.02

5,260.42

7.654.96

5,149,42

12,804.38

#1000011

1928

5,682.43

5,925,49

4,042,14

4,509.84

Stoping Tons Per Man:

The following	Year	Tons Per Man	WEIFT 57-00
san merant was	1919	8.75	
-	1920	9.27	belles
	1921	10.20	Park .
of the sale distribution	1922	13.82	F00%
THE ACT THE M	1923	15.54	1000
THE PART OF THE	1924	15.67	100
N SO LEN H	1925	17.10	92
a to la" "	1926	17.33	70
Potal Winker	1927	17.46	0
Total Timber	1928	20.26	64

The Averages by Months for the Year 1928 follows

Batas Taunta	Month	Tons	Per Man
Total Laggin	Jan.	18	.99
" Poles	Feb.	E 100 C 100	.84
	Mar.		.51
otal Lagging	May 1928	20	.01
	June 1927	1, 405, 19	63
	July	21	.54
	Aug.	21	. 68
	Sep.	19.	. 63
	Oct.	20	.30
	Nov.	20.	.37
	Dec.	20	. 67

In order to increase the efficiency of the stoping gangs, we have provided most of them with two drilling machines. There are normally 35 contracts on ore and we have 51 No. 230 Ingersoll-Rand auger drills, 8 No. 10 auger machines and 7 No. 12 or a total of 65 machines.

.0467

MORRIS-LICYD MINE ANNUAL REPORT YEAR 1928

7. UNDERGROUND:

c. Stoping:

(Continued)

Product

Cost Per

All stoping contracts are provided with scraper outfits and some gangs have two scraper hoists. At the end of the year, we had the following hoists available for use.

Sullivan Air Hoists	12	In	Number
" Electric Hoists	14	**	. "
Ingersoll-Rand Air Hoists	5	**	11
Waugh Air Hoists	2	**	
" Electric Hoists	7	**	
Total	40		

d. Timbering:

The unit cost for timbering shows a decrease for 1928. This is partially due to less repairing in the Section Six raises and also because some of the production came from No. 8 shrinkage stope and No. 20 sub stope where little timber was required.

1926 21,787.66

Timber Statement:

The following statement shows the various quantities of timber used during 1928.

	Lineal Feet	Avg. Price Per Foot	Amount 1928	Amount 1927
6" to 8" Timber	87,513	.043	3,682.43	3,620.51
8" to 10" "	62,622	.063	3,923.49	4,140.53
10" to 12" "	31,166	•099	3,071.29	5,005.14
12" to 14" "	13,509	•115	1,555.21	487.76
Treated Timber	990	.35	346.40	1,697.02
Total Timber 1928	195,800	.064	12,578.82	14.950.96
" " 1927	215,792	.0693	14,950.96	
Trans in new ore remove, be	A JUNE OR IN	Per 100'	a next has	
5' Lagging - 6262 Cords	532,525	.759	4.042.14	3,260.42
8. arreding is me conberge	598,784	.753	4.509.84	4.394.54
Total Lagging	1,131,309	.756	8,551.98	7,654.96
3" Poles	450,056	1.46	6,560.14	5,149.42
Total Lagging & Poles 1928	1,581,365	.956	15,112.12	12,804.38
" " 1927	1,405,339	.911	12,804.38	

46

MORRIS-LLOYD MINE ANNUAL REPORT YEAR 1928

7. UNDERGROUND:

d. Timbering: Prilling and Blastings (Continued) wear, we made another change in the kind of preparation

Timber Statement: 5 yours part, the practice was to use it a (Continued)

bjackiomable and we finally standardized on I	Amount 1928	Amount 1927
Product tak of 18" x 8" - 40% Low Freezing !	356,164	326,814
Feet of Timber Per Ton of Ore	. 550	.66
Thou Lagging " TH with #065 for the late	3.18	3.07
remaining to the " Pt. " Timber maturally	5.78	4.65
	.0353	.0457
" " " Lagging	.0240	.0234
ntant no Poles	.0184	.0158
" " All Timber	.0777	.0857
Equivalent of Stull Timber to Board Measure	333,836	364.741
Feet of Board Measure Per Ton of Ore	Amount . 937	1.12
Cost of Timber, Lagging, Poles Etc 1928	27,690.94	1937 3
400 Pollder Whatra" " " - 1927	27,993.33	844.50
300 defeating # 1689475 # 3- 1926	21,787.65	011,25
# # # # - 1925	17,701.50	147100
M. H. H. H. H. H. H 1924	16,664.69	E 0.00
Total Portler " 168"475 " 15.1923	15,207.16	100
" " " - 1922	11.735.86	

e. Drifting and Raising:

It will be noted from the table that follows that we did more development work in 1928 than had been done for years past. This is partially accounted for by the fact that all the dirt from development drifts is mechanically handled, either by the Armstrong loader or by scrapers. As a result, most of the gangs driving these drifts in new ore lenses, get just as much footage and cars per month as the gangs doing regular stoping operations.

591,168 5.77

95,499 11,29 1,078,72

50,000 2,05 101,50

Following is the comparison for the past five years.

Year	Total Footage	Ore Drifting	Ore Raising	Rock Drifting	Rock
1924	3,107 Ft.	1,945 Ft.	803 Ft.	* /=	359 Ft.
1925	4,896 Ft.	2,794 Ft.	1,288 Ft.	390 Ft.	424 Ft.
1926	5,350 Ft.	2,249 Ft.	1,703 Ft.	868 Ft.	530 Ft.
1927	4,845 Ft.	2,210 Ft.	2,232 Ft.	9 Ft.	394 Ft.
1928	6,296 Ft.	3,211 Ft.	2,778 Ft.	237 Ft.	70 Ft.

Puse 5.77 115,42 Came-4,310 51,14 -29 :84 Elec. Delay Poses & Caps 1,200 7.85 94.18 Commeeting Wire .587 9.28 24 18,56 +25 Sealing Compound - Can * 25 2,236,19 Total Caps. Fuse Etc. 2,527,27 Grand Total Explosives as per Cost Sheet 32,422,10 51,401.44 Average Price Per Lb. for Powder 1818

7. UNDERGROUND:

COST OF OFFIRA

0

f. Explosives. Drilling and Blasting:

During the year, we made another change in the kind of powder used at the mine. For some years past, the practice was to use $1\frac{1}{2}$ " x 8" - 40% Low Freezing Ammonia and $1\frac{1}{2}$ " x 8" - 60% Gelatine. Then we changed to the new bulk powders, using #4 so-called. The fumes were objectionable and we finally standardized on $1\frac{1}{4}$ " x 8" Gelatine for all our powder. If a stick of $1\frac{1}{4}$ " x 8" - 60% Gelatine is substituted for one stick of $1\frac{1}{2}$ " x 8" - 40% Low Freezing Ammonia Extra, the cost is less because at the current cost of explosives, the former costs .078 per stick compared with .083 for the latter. As the former has more strength than the latter, you naturally cut the cost per ton for explosives. The following table shows that very clearly.

Statement of Explosives Used: Ore Development and Stoping:

The most radical chang	Quantity	Average Price	Amount 1928	Amount 1927
40% Powder "Extra" 60% Gelatine	168,475	15.14	25,518.75	4,244.50
No. 2 Extra "Bulk"	all the cor requirement	itracta we	ven to the	308.00
Total Powder	168,475	15,14	25,518.75	24,310.75
Fuse com all our workin	591,168	5.77	3,412.89	3,570.76
Capsted to one man. A	95,499	11.29	1,078.72	1,104.12
Tamping Bags	50,000	2.03	101.50	75.78
Hand Crimpers	storag14ar	d mas412	5.75	12.79
Bench Crimpers	pplies. 3	22.00	66.00	
Cap Seal, Cans	5	.46	2.30	A STATE OF THE STA
Total Caps, Fuse Etc	•		4,667.16	4,763.4
" Explosives			30,185.91	29,074.1
Product	no rest sil	15 150051	356,164	326,814
Pounds Powder Per Ton	of Ore	Cost	.473	.50
Cost Per Ton For Powde	revoduet.	Labor 5	.0716	.0744
" Fuse,	Caps Etc.	1,751	.0131	.014
# # # # A11 R	xplosives	1-482	.0847	.089

40% Powder "Extra" 97.50 60% Gelatine 12,925 15.13 1.955.66 1,752.56 12,925 Total Powder 15.13 1,955.66 1,850.06 Fuse 22.132 5.77 127.92 115.42 4,310 Caps 51.14 48.01 11.29 Crimpers of production .89 .84 Elec. Delay Fuses & Caps 1,200 7.85 94.18 291.00 Connecting Wire 24 .387 9.28 18.56 Sealing Compound - Can .25 .25 Total Caps. Fuse Etc. 2.236.19 2.327.27 Grand Total Explosives as per Cost Sheet 32.422.10 31,401.44 Average Price Per Lb. for Powder . 1487 . 1513

7. UNDERGROUND:

f. Explosives, Drilling and Blasting:

Ore Development and Stoping: (Continued)

The following table shows comparisons for four years back: -

Sout of Puningtion	1928	1927	1926	1925
Pounds Powder Per Ton of Ore	.473	.50	.514	.518
Cost Per Ton for Powder	.0716	.0744	.0739	.0764
" " " Fuse Etc.	.0131	.0146	.0145	.0132
" " " Breaking Ore	.0847	.089	.0884	.0896
Average Price Per Lb. for Powder	.1513	.1487	.1438	.1474

225,814

+684

Increase Decrease

as found

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s hole.

It will be noted that despite the increase in the average price per pound for powder in 1928, that we show a saving in every item in the fore-going table.

The most radical change in the handling of powder at any of the company's mines was put into effect in the North Lake District this past year.

Most of the contracts had powder delivered to them by the stick instead of by the box. All the contracts were provided with Jute bags and only the daily requirements were given to the men.

The fuse and caps were made up in specially constructed cap houses and given to the men in sealed containers. That practice removed caps from all our working places and the job of crimping caps was delegated to one man. All fuses were cut in standard lengths.

The whole idea was to eliminate nearly all the hazards in connection with the transportation, storage and use of explosives and to do away with wasting valuable supplies.

8. COST OF OPERATING:

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to

Cost of Production for the Past Nine Years:

dismona deilling	na drilling w	Daily	Cost of Production		
Year	Production	Product	Labor	Supplies	Total
1920	261,772	873	1.751	.734	2.485
1921	209,034	723	1.482	.870	2.352
1922	221,979	737	1.019	. 649	1.718
1923	260,335	882	1.083	. 682	1.765
1924	246,356	940	1.026	. 658	1.684
1925	265,829	1,022	.978	.595	1.573
1926	290,162	1,120	.949	.531	1.480
1927	326,814	1.224	1.018	. 624	1.642
1928	356,164	1,362	.877	.589	1.466

The cost of production for 1928 is the lowest the mine has ever shown, being a reduction from last year of .18 per ton.

890 foot sub, driving development drifts both North and South and

East and West and found nothing but narrow stringers of ore

8. COST OF OPERATING:

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The following tables show	1928	1927	Increase	Decrease
Product	356 16A	326,814	29,350	Pass
Underground Costs	1.154	1.288		. 134
Surface Costs	.181	.222		.041
General Mine Accounts	.131	.132	1927	.001
Cost of Production	1.466	1.642	mation As	.176
Rouley	36,450 12,79	4,05 39	6,450 16,8	08,84
Depreciation	35,000 .234	.225	•009	07.74
	69 450 .153	178	17,480 80.6	.022
Central Office	•096	.093	.003	
Welfare, Safety, Hospital Etc.	72 600 .036	050	55,600 11.2	.014
Cost Adjustment	33,000 18.94	.018	0.000 15.9	.018
Cost on Stockpile	05 8001.985	2.206	55 600 27.2	.221
Loading and Shipping	75.050 .044	.063	3.050 58.0	.019
Total Cost on Cars	2.029	2.269	32	.240
Royalty ta- Tons	.104	1525		•010
D-11 1 -1-11	.640	.640	20	
Lake "	.760	.760		17450
Cargo, Insurance	•100	•100		
and Analysis	.010	.010		
Shrinkage	.028	.030		•002
Total Cost Lower Lake Port	0.07400	3.823	2 00 0	.252
TOTAL COST BONG! BEAG TOTA	6 400 00	0,020	1 50	1.000
No. of Days Operating	261 2	267	0.00	51/2
No. of Shifts and Hours	1-8	1-8	0 20	- 22
Average Daily Product	1362	1224	138	000000
Cost of Production	5 2006	1004	0112 200	. 600.00
Labor	.877	1.018	7.38 6	,000.00
Supplies	.585	.624	5.98 16	75 - 141
Total	1.462	1.642	7.00 1	.039
Kayustad.	11406	1.042		.180

9. EXPLORATION:

No diamond drilling was done for the year. Some new ore was found by raising and drifting in leaders and ore lenses that were followed up from sub-level to sub-level.

We have had very little luck in finding ore lenses proved up by old drill holes.

In two or three instances in the Morris shaft territory, drifts and raises were driven looking for ore shown in the drill holes. In every case, we failed to find anything but narrow ore lenses.

In the Section Six territory, we spent considerable effort trying to prove up the ore shown in Diamond Drill Hole No. 60. This hole, located South-west of the 3rd and 4th level workings, proved up 140 feet of high grade ore close to the main dike. Geologically, the ore was located where one would expect to find a large ore body.

We raised up to the 795 foot sub, cross-cutted and raised to the 890 foot sub, driving development drifts both North and South and East and West and found nothing but narrow stringers of ore

10. TAXES:

ACCIDENTS AND PERSONAL INJU

00

The following tables show tax data for Ely and Ishpeming Townships and the valuations and taxes paid by our company in these two townships.

Ocumby	1928		1927	
Lloyd Mine	Valuation	Amount	Valuation	Amount
Realty	336,450	12,794.05	396,450	14,886.24
Personal	433,000	16,464.61	421,000	15,807.74
Total Lloyd & Sec. 6	769,450	29,258.66	817,450	30,693.98
Morris Mine		PERSONAL PROPERTY.	2,010:00	211000
Realty	172,600	6, 134.01	355,600	11,348.62
Personal	533,000	18,942.22	500,000	15,959.01
Total Morris	705,600	25,076.23	855,600	27,307.63
Grand Total	1,475,050	54,334.89	1,673,050	58,001.61
Product- Tons	356.164		326,81	
Taxes Per Ton Produced	.1525		.177	
Shipments- Tons	393,184		297.2	
Taxes Per Ton Shipped	.1382		.195	

Taxes Raised Ishpeming Township:

Tax	1928	1927	1926
State	3,259.46	4,141.88	3,221.41
County	6,422.87	6,315.58	6,760.15
County Road	3,245.90	2,914.20	3,281.91
Township Contingent	2,500.00	1,010.35	1,000.00
Highway Improvement	5,000.00	6,996.79	6,600.00
Road Repair	4,000.00	4,497.38	5,000.00
School	18,820.00	18,486.98	16,750.00
One Mill	1,180.16	1,227.00	1,253.00
Rejected	2.54	10 A 20 10 10 10 10 10 10 10 10 10 10 10 10 10	1.11
Total Tax	44,430.93	45,590.16	43,867.58
Tax Paid By C.C.I.Co.	33,698.97	35,073.20	34,026.34
Percentage of Tax Paid by C.C.I.Co.	75.84	77.05	77.65
Assessed Valuation	1,180,160.00	1,227,000.00	1,253,000.00
Tax Rate	3.764	3.717	3.502

I believe the reduction in accidents is due to three ressons:-First; Standardisation of proper methods of doing each piece of work; Second; Discipline; and Third; Cooperation of men and bosses.

The accidents that the year lour months of the year

Palls of Grand Delegating Timber Waster Op Private

10. TAXES: (Continued)

Continued)

Taxes Raised Ely Township:

Tax on of all handage s	1928	1927	1926
State	4,524.57	6,132.88	4,512.02
County	8,915.79	9,359.17	9,468.52
County Road	4,505.74	4,314.26	4,596.76
Highway Improvement	5,000.00	5,000.93	4,000.00
Road Repair	6.000.00	5,999.91	4,500.00
School and an amazanta	13.000.00	12,999.95	13,000.00
One Millow three days.	1.638.22	1,816.60	1,755.00
Bridge fine comeration	3.000.00	2,999.06	2,000.00
School Building	8,000.00	4,251.18	net due to
Township Contingent	3,000.00	3,500.35	2,500.00
Total Tax	57,636.55	57.407.90	46,372.87
Tax Paid by C.C.I.Co.	26,818.13	34,222.89	31,546.14
Percentage of Tax	MI TO STORA		
Paid By C.C.I.Co.	46.53	59.80	68.15
Assessed Valuation	1,638,220.00	1,816,600.00	1,755,000.00
Tax Rate	3.519	3.160	2.657

ACCIDENTS AND We did no new construction during the year 1928 and there is PERSONAL INJURIES: ing of any importance planned for 1929 around the mine surface.

EQUIPMENT AND

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13. NEW CONSTRUCTION ARD PROPOSED MAN O

> We are very pleased to report a marked reduction in the number of accidents. We had a total of 9, but all of them occurred before May 3rd. In the last 8 months of the year, we were extremely fortunate in not having a lost time accident.

derground, we expect to open up the 8th level and install pumps

The following table shows the days worked and the number and frequency of accidents for the past few years.

Year ad	Man Days For Year	Number Of Accidents	Accident Frequency Rate
1922	55,822	base to49ake root	Zan E .880
1923	62,628	43	. 687
1924	54,032	47	.868
1925	53,986	45	.835
1926	58,526	39	• 666
1927	68,323	26	.366
1928	64,242	9	.140

The accidents that occurred the first four months of the year 1928 were classified as follows:

was excessive. I	Falls of Ground Unloading Timber	6
Since the dupli	Making Up Primers Shaft Total	1 9

I believe the reduction in accidents is due to three reasons: -First: Standardization of proper methods of doing each piece of work: Second: Discipline: and Third: Cooperation of men and bosses.

that the voltage drop

d Heat Miny, when the

voltage was reduced to ed motor failures.

stion, we have burned

11. ACCIDENTS AND PERSONAL INJURIES: (Continued)

First, standards were adopted for the erection, maintenance and operation of all haulage equipment and transportation of ore, rock and supplies. Second, we fixed the proper routine and handling of all explosives, how they should be stored, transported etc. We also adopted certain fixed methods for the operation of scrapers and hoists.

Discipline was enforced by laying off men that failed to follow the standards of operation. For their first offence, each man was laid off for three days.

We had fine cooperation between the bosses and workmen. Every-body was very anxious to extend the record of no-time lost due to accidents to the end of the year at least. Now that we have entered a new year, we are going to try our best to carry the no-time lost period to May 3rd, 1929.

12. NEW CONSTRUCTION sired or replaced 15 armatures and in 1926, 12 were sent to dor

PROPOSED NEW CONSTRUCTION: a kept clean and haulage-ways clear of all rabbis

We did no new construction during the year 1928 and there is nothing of any importance planned for 1929 around the mine surface. Underground, we expect to open up the 8th level and install pumps removed from other mines.

supplies. New ties and rails were installed in various section of

In the mine location, we should put in a sewer system and paint the houses.

lined head-sheaves, discarding the old cast iron sheaves. The bear

13. EQUIPMENT AND ing ropes are oiled daily and as a result, we put into service said PROPOSED EQUIPMENT: of new heisting rope in 1926 compared with 7350 feet is 1

b. Stockpile Trestles:

There was no change from last years lay-out except at the Lloyd shaft where additional stocking area was graded and new trestles built South-west of the shaft house to make room for Lloyddale ore.

d. We added a few hoists to our equipment in order to have spares to take care of break-downs. By the end of the year, we had a total of 40 hoists. We made no changes in ropes, blocks, guards or scrapers used last year.

f. Electric Haulage Equipment: A Lake Basin. This started of water also

A new 4/0 haulage cable was placed in the Morris shaft doubling our capacity. We found that with the new electric scraper hoists drawing power from the trolley wire system, that the voltage drop was excessive. In some sections of the Lloyd East Mine, when the haulage locomotives were pulling loads, the voltage was reduced to less than of normal. This voltage drop caused motor failures.

his draws water from the drainage ditch connecting the

Since the duplicate cable has been in operation, we have burned out no armatures.

14. MAINTENANCE AND REPAIRS:

a. Shafts: In 1925 an for the execution the mine location were not

All three shafts are in excellent condition. During the past year, we installed 11,376 feet of new runners in the skip and cage roads. We also placed steel plates on top the dividers and end plates in the skip roads in both hoisting shafts in order to stop the wearing away of the timber by chunks dropping down the shaft compartments.

In the lift between the 7th and 8th levels Morris shaft, the casing planks, dividing the skip and cage compartments, were placed flush with the skip road side of the dividers.

We have been three years getting the shafts back into first class condition.

b. Electric Tram Equipment:

The electric haulage system gave us very little trouble during the year. The installation of the duplicate power cable, kept the voltage so satisfactory that no armature burn-outs resulted. In 1927, we repaired or replaced 15 armatures and in 1926, 12 were sent in for repairs.

Tracks were kept clean and haulage-ways clear of all rubbish and supplies. New ties and rails were installed in various sections of the mine. Planks were laid down between the rails to provide better walking.

otal

operations carried on in the various portions of the

c. Hoisting Equipment:

The life of the hoisting ropes has been doubled by making a few changes. In the shaft-house, we have installed the new type steel lined head-sheaves, discarding the old cast iron sheaves. The hoisting ropes are oiled daily and as a result, we put into service 3450 feet of new hoisting rope in 1928 compared with 7350 feet in 1927.

16. WATER SUPPLY:

19.

Twice during the year, the regular underground water supply, because contaminated by Ferruginous slate slabbing off the old rock drift leading to the sump, discoloring the water so badly we could not pump it into the water supply tank. As the drift between the sump and the point where the water flows into the pipe is caved down, we can't timber up the caving ground.

When the regular supply fails us, the pump at the Morris shaft shop is utilized. This draws water from the drainage ditch connecting the Carp River with the old North Lake Basin. This source of water also became unfit for use a few times last year, when beavers dammed up the Barnes-Hecker Mine drainage ditch, causing it to overflow into the old North Lake.

The Department of Conservation was notified and the beavers were trapped and removed.

The North-west limb of the same deposit, above the Erd main sub on both sides of \$41 raise, was taken out by \$20 by sub-stoping. We established a limit 25 feet West of \$51 raise in order not to under-out Ecs. 9 and 10 mining 120 feet above.