8. COST OF

03

OPERATING:

a. Comparative Mining Costs:

PRODUCT 261,454 270,006 Underground Costs 1.427 1.354 .073	8,552 .007
Underground Costs 1.427 1.354 .073	.007
	.007
Surface Costs .146 .153	
General Mine Accounts116 .127	.011
Cost of Production 1.689 1.634 .055	
Loading and Shipping039 .047	.008
Total Cost on Cars 1.728 1.681 .047	
Depreciation - Original	
Cost .073 .073	
Plant Account .046 .046	
Development .039 .039	
Movable Equipment .010 .000 .010	200
Taxes .287 .286 .001	Total
Central Office .105 .093 .012	\$1,589
Welfare, Safety, Hosp046 .027 .019	1,634
Cost Adjustment .000 .032	.032
Total Cost at Mine 2.334 2.277 .057	
No. of Days Operated 261 263	11
No. Shifts & Hours 1-8 hr. 1-8 hr.	-
Average Daily Product 1,000 1,027	27
COST OF PRODUCTION:	
Labor .982 .999	.017
Supplies .707 .635 .072	
Total 1.689 1.634 .055	

b. Detailed Cost Comparison:

(1) Days and Shifts:

During 1928, the mine worked one eight hour shift for $26\frac{1}{2}$ days, and the average number of men employed during the year was 189, for a total of $51,074\frac{1}{4}$ days. During 1927 the mine worked one eight hour shift for 263 days, and the average number of men employed during the year was 197, for a total of 53,626 3/4 days.

A. 9784 89

(2) Wages:

Derold

Devo Log

The mine operated on the same wage schedule in both 1928 and 1927.

(3)	Comparison of	Production:
	Production,	1928 -
	Production,	1927 -
	Decrease .	

1, 1928 -	261,454	tons	
1, 1927 -	270,006		
ə –	8,552		
1926 America \$11	,466,58 (Cost per ton, \$.044	k

orals in 1928, while in 1967 mars/; all

18

+025

18.1

(4) Comparison of Number of Men and Wages:

10.00 P

	No. Men	No. Days	Amount	Rate per day
1928	189	51,074 1/4	\$250,157.16	\$ 4.90
1927	197	53,626 3/4	264,990.17	4.94
Decrease	1928 - 8	2,552 1	14,833.01	.04
	Indresse	6491		

The increase in cost per ten was don to here the increase and raising during the year. The cost per feet the account of sain level are drifting as well as the said 1928, while in level persons no are drifting, all said the

8. COST OF

33

OPERATING: b. Deta: 1 ...

(5)	Tons per man per day:	sont.)	0081 p	er ton S.An	
	The tons of ore mine	ed per man per 1928	day were 1927	as follows: INCREASE	DECREASE
	Surface	25.51	25.21	.30	-
	Underground	6.40	6.29	.11	
	Total	5.12	5.03	.09	20.8%
(6)	Cost of Production:	20,022,50	4.8%	Bacr. 1,685,53	4.5%
	1928 - \$441,671.58	Cost per ton	\$1.689	in the law in	
	1927 - 441,221.38		1.634	10 10 10 10 10 10 10 10 10 10 10 10 10 1	
	Incr 450.20	4626	.055	1623	
		and the second second			

	Total Cost		Cost per ton				
	Labor	%	Supplies	%	Labor	Supplies	Total
1928 -	\$256,847.96	58.2%	\$184,823.62	41.8%	\$.982	\$.707	\$1.689
1927 -	269,849.49	61.2%	171.371.89	38.8%	.999	.635	1.634
Incr	State more	10 10 10 10 10 10 10 10 10 10 10 10 10 1	13,451.73	and in success	distant strength	.072	.055
Decr	13.001.53	all and a	in a statement in hard		.017		

Labor cost decreased slightly in 1928, but supply cost increased. and accounts for the net increase of \$.055.

(7) Detail of Accounts:

UNDERGROUND COSTS:

Development in Rock

1928	Amount	\$10,503.47	Cost	per	ton,	\$.040
1927	Amount	5,543.78	**	=		.021
Inc	rease	4,959.69				.019

	an about an include	Sub Division	1.	11 - SA P - N	10.00
THEF.	Drifting	Raising	Total	Cost per	foot
1928 -	1,101'	2091	1,310'	\$8.02	5 D.0
1927 -	405'	581'	986 *	5.62	23 1 C A
Increase	696 '	0011 OX 010 -	324 '	2.40	0701
Decrease	in for all e	372	4000	17	045%

Your 1.9. 200 die double drum house, stating 52668.00 and

ore seel while M.F. electric boist, orating minted.

The large increase in cost per foot was due to rock drifting on main levels in 1928, while in 1927 nearly all drifting was on sub levels.

was less mining in areas where ore was tight and hard to

Development in Ore

Timbering

1928 Amount	\$11,488.38	Cost	per	ton,	\$.044
1927 Amount	6,883.37	11	**	=	.025
Increase	4,605.01	Cost	pur		.019
1927 Amount	No. of feet		Cost	per	foot
1928 -	1,898'	L ages	1 04	\$6.05	
1927 -	1.249 '			5.51	30.
Increase	649'			- 54	

The increase in cost per ton was due to more ore drifting and raising during the year. The cost per foot increased on account of main level ore drifting as well as raising in 1928, while in 1927 there was no ore drifting, all raising.

105,300

" ora datroased.

161

MAAS MINE ANNUAL REPORT YEAR 1928

8. COST OF OPERATING:

03

12

Stoping

1928 Amou:	nt \$122,982.9	7 Cost p	er ton, \$.471	
1927 Amou:	nt 141,320.1	4 "	" " .523	
Decreas	e 18,337.1	.7	.052	
	the sport shall be	Detail.		
	Labor		Supplies	
1928 -	\$ 92,282.87	75 %	\$30,700.10	25. %
1927 -	112,305.37	79.5%	29,014.77	20.5%
Decrease	20,022.50	4.5%	Incr. 1,685.33	4.5%
	Cos	t per ton;	.009	
	Labor	Supplie	s Total	
1928 -	\$.353	\$.118	\$.471	est with
1927 -	.416 in 1	.107	.523	
Decrease	.063	aprasmi at	.052	
Increase	level drives	.011		

Labor cost per ton decreased due to the use of more scraper hoists. Supply cost increased on account of purchasing more scraper hoists and other scraper equipment.

The following scraper hoists were charged in 1928: Six Sullivan and one Denver $6\frac{1}{2}$ H.P. double drum hoists, secondhand, costing \$2832.02; two Waugh model #300 air hoists, cost ing \$671.15; one Sullivan air hoist, second-hand, costing \$312.50; two Ingersoll Rand 6H.C. air hoists, new, costing \$1290.00. This is compared with the following in 1927: Four I.R. 6HC air double drum hoists, costing \$2668.00 and one Sullivan 15 H.P. electric hoist, costing \$1160.00.

fan to increase the Explosives.

	1920	1927
Production	261,454	270,006
Total pounds of powder	94,450	106,300
Average price per pound	.14074	.14324
Total amount for powder	\$13,293.27	\$15,227.09
Fuse, caps, etc.	2,566.80	2,742.73
Cost of all explosives	15,860.07	17,969.82
Pounds of powder per ton of ore	.3612	.3937
Cost per ton for powder	.0509	.0564
Cost per ton for all explosives	.0607	.0666

There was 8.2% decrease in pounds of powder per ton of ore and 8.8% decrease in cost per ton for all explosives. The cost per pound for powder decreased .4% in 1928. There was less mining in areas where ore was tight and hard to break, so that the pounds of powder per ton of ore decreased.

Timbering

1928 Amount \$84,970.72 Cost	per ton, \$.325	
1927 Amount 84,292.97 "	" " .312	
Increase 677.75	.013	
Detailed cost	of timber.	REALS FORE
M	1928	1927
Timber cost	\$13,978.89	\$11,695.14
Lagging, poles, etc.	14.104.73	11,402.17
Total	28,083.62	23,097.31
Feet of timber per ton of ore	.7962	.7277
Cost per ton for all timber	.1074	.0855
Average price per foot	.0671	.0595

MAAS MINE ANNUAL REPORT YEAR 1928

Timbering (Cont.)

The cost per foot for timber used in 1928 increased 12% due to more large sizes used on account of more main level drifting. More poles were used for covering down and for scraper slides in the floor of drifts.

16

Tramming

00

1928	Amount	\$31,530.97	Cost	per	ton,	\$.121
1927	Amount	30,350.99	- 11			.112
Inc	rease	1,179.98				.009

There were $26l\frac{1}{2}$ working days in 1928 as compared with 263 working days in 1927. Tramming cost increased due to the extra expense on account of handling material from new main level drifts on the third and fourth levels. An extra motor was used on the third level part of the year and then moved to the fourth level. The cost per ton increased also on account of lower product.

Ventilation

 1928 Amount \$3,520.19
 Cost per ton, \$.013

 1927 Amount 2,519.05
 " " " .009

 Increase 1,001.14
 .004

The expense in both years represents the Maas Mine proportion of the expense of operating a joint ventilation system at the Negaunee Mine. Also one $\#2\frac{1}{2}$ Anaconda fan was charged in 1928, costing \$344.00, and used as a booster fan to increase the air supply on sub levels.

Pumping

1928 Amount	\$47,059.41	Cost	per	ton,	\$.180
1927 Amount	43, 581.98	H	=		.162
Increase	3,477.43				.018

	1928	1927
Total gallons of water pumped	553,419,346	534,129,791
Gallons pumped per minute	1,052	1,013
Cost for power	\$38,196.15	\$35,049.30
Increase	3,146.85	

The increase in expenditures was due to pumping more water in 1928. The cost per ton was also increased on account of a lower product.

Compressors & Air Pipes

1928 Amount \$31,155.95 1927 Amount 25,639.40 Increase 5,516.55	Cost per ton, \$.119 .095 .024
Cubic feet of air used	in 1928 - 679,005,000 cubic f
11 11 11 11	" 1927 - 521,730,000 "
Increase, 1928 -	157,275,000 "

More air was used on account of more air scraper hoists in operation. (Buring short periods of the year, one compressor was run at night to supply air for underground work.)

eet "

MAAS MINE ANNUAL REPORT YEAR 1928

Main Line Tracks

ram Deinn District.

Decrease

Compressors & Air Pipes (Cont.)

See Sugar	The detail of this account for th	e two years is	as follows:
	ane of any and an increase	1928	1927
	Compressors	\$25,457.14	\$20,577.87
	Air Pipes	5,698.81	5,061.53
	E Dertestie over an iter after sports	31,155.95	25,639.40
of some finance we			

ton, 3.046 Cost for power, 1928 -\$22,633.50 Cost for power, 1927 -17,394.00 Increase, 1928 -5,239.50

Sub Division. Increase in Air Pipes was due to more extensions of air lines on account of new main level drifts on third and 24.4 fourth levels, and to installation of larger air lines in 1,062,38 569,89 raises for air scraper hoists.

3,219.76 1,224.57 995.21

.013

.015

+001

Back Filling

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Main Line Care 1928 Amount \$126.48 Cost per ton, \$.000 1927 Amount 66.00 " " " .000 Increase n 1 60.48 ives due to overhauling locomotive 45691

mider was added to equipment, costing \$185.00.

Increase due to more filling broken in 1928.

Underground Superintendence and more extensions and renewals to main like tracks

1928 Amount \$11,754.42 Cost per ton, \$.045 Increase 242.63

1928 Amount \$3,584.27 Cost per ton, \$.014

1927 Amount 3,968.89 " " "

584.32

with four saddle back cars purchased in 1927 at a coat of Increase due to more days worked by shiftbosses in 1928 on account of more repairing and track cleaning on days that the mine was idle.

MAINTENANCE ACCOUNTS:

Pusping Machinery

Compressors & Power Drills

1928 Amount	\$2,384.83	Cost per ton,	\$.009	orcelsin plunger
1927 Amount	104.25	extension of	.001	charge line on
Increase	2,280.58	Constant on the	.008	attes the state at

Potal Inderground	Cost	The	detail	Of	this	account	for	the	two	years	is	as	follows:
warner mundre Di navier		-				and Land			70	990			1097

1 928 1001195 20073 00 74133	COMPLETER PROFESSION	
Compressors	91.41	104.25
Air Lines 7 475.05	491.63	-
Power drills	1,801.79	
Total par ton increased	2,384.83	104.25

and rook, and to less : The charge for air lines in 1928 was for connecting an old boiler to be used as an air receiver.

The following power drills were charged in 1928: Three N-72 I.R. Drifters, costing, \$1,056.79 One 91-A Cleveland Auger drill, 170.00 One Sull. Class 8 " " 155.00 Six second-hand I.R. Auger drills, 420.00 1,801.79

Hand Tramming Equipment

SURFACE COSTS:

\$ 92.11	Cost	per	ton,	\$.000
839.14		=		.003
747.03				.003
	\$ 92.11 839.14 747.03	\$ 92.11 Cost 839.14 " 747.03	\$ 92.11 Cost per 839.14 " " 747.03	\$ 92.11 Cost per ton, 839.14 " " " 747.03



Increase

Decrease .

Wire rope.

Hand Tramming Equipment (Cont.)

There was only a small expense for repairs to sub level cars in 1928, due to an increase in the number of scraper units used.

1928 Amount \$11,902.86 Cost per ton, \$.046

1927 Amount 8,959.53 " " "

2,943.33

Decrease due to the mine operating 12 less days in 1928,

.033

.013

Electric Tram Equipment

Stocking Gre

Dry House

1927 Amount 6,250.0	Sub Divisi	on023	
Decresse 1,336.6	1928	1927 INCREASE	DECREASE
Generator and Motor	\$ 33.46	\$ 57.94	24.48
Locomotives	2,955.95	1,398.14 1,557.81	nts
Wiring in the fall	1,632.27	1.062.38 569.89	, 8.8
Main Line Tracks	3,219.78	2,224.57 995.21	
Main Line Cars	4.061.40	4,216.50	155.10
Total tocked in 19	11,902.86	8,959.53 2,943.33	
There was less exper	ise for stor	oking treatles in 192	

Increase in locomotives due to overhauling locomotive #5691 from Gwinn District.

There was more expense for wiring in 1928. One electric welder was added to equipment, costing \$185.00. There was more extensions and renewals to main line tracks in 1928.

Three second-hand rocker dump cars were purchased from the Gwinn District in 1928 at a cost of \$510.00, as compared with four saddle back cars purchased in 1927 at a cost of \$576.00. and cost of coal used in heating plant.

Pumping Machinery

\$5,645.95 \$5.54 per ton 1928 Amount \$3,584.27 Cost per ton, \$.014 1927 Amount 3,968.59 " " " .015 Decrease 384.32 .001

Decrease due to 1927 cost including four porcelain plungers costing \$456.00, and to extension of the discharge line on surface. 14

Cost per ton increased due to more development work in

Total Underground Costs

General Surface Expense

1928 Amount \$373,057.03 Cost per ton, \$1.427 1927 Amount 365,580.98 " " 1.354 Increase 7,476.05

MAINFERANCE ACCOUNTS:

Hoisting Equipment SURFACE COSTS:

Hoisting

1928 Amount \$3,146.55 Cost par ton, \$,012

ore and rock, and to less product.

Skips, cages, & skip roads

 1928 Amount \$16,322.90
 Cost per ton, \$.063

 1927 Amount 17,181.43
 " " " .064

 Decrease
 858.53

 .001 Decrease 858.53

to shart

MAAS MINE NNUAL REPORT YEAR 1928

1928 ABOOM 3 600-

Hoisting (Cont.)

Cost of electric power, 1928 - \$10,922.55 Cost of electric power, 1927- 11,268.15 Decrease - 345.60

Decrease due to the mine operating 12 less days in 1928. and a smaller product.

dos't per ton, 3.002

Shaft

Ó

Stocking Ore

Fop Trass Equiptort

1928 Amount	\$4,913.22	Cost	per	ton,	\$.019
1927 Amount	6,250.02	**			.023
Decrease	1,336.80	years	1 723	TOT.	.004

Sub Division.

the There were 21 double ore bents and 8 single rock bents erected in the fall of 1928 on the stocking trestle, as compared with 26 double bents erected in 1927. Tons stocked in 1928 - 134,176 tons. Tons stocked in 1927 - 139,920 tons. There was less expense for stocking trestles in 1928 and less tons stocked.

Dry House

1928 Amount 1927 Amount	\$6,364.22	Cost per ton,	\$.024 .026	\$ 62.05
Decrease	592.50	57,88	.002	OCETO

The dry house proportion of heating plant expense in 1928 was \$4,703.57, as compared with \$5,303.24 in 1927.

Tons and cost of coal used in heating plant. 1928 - 657 tons \$3,645.96 \$5.54 per ton 1927 - 767 tons 4,265.11 5.56 " " Decr. 110 tons 619.15

Docks, Trestles & Pockets Decrease due to less tons of coal used in heating plant.

1928 Amount 240.25 Cost par ton. 3.000 General Surface Expense

> 1928 Amount \$4,515.46 Cost per ton, \$.017 1927 Amount 5,987.83 .022

Decrease due to 1927 costs including expense of building new road into the Maas Mine.

Cost per ton. \$.005

+005

MAINTENANCE ACCOUNTS:

Mine Buildings

Hoisting Equipment

1928 Amount	\$3,146.56	Cost	per	ton,	\$.012
1927 Amount	3,457.48				.013
Decrease	310.92			6	.001

1927 Amount 520.84 " " " .001

1920 Amount \$1,684.87

Insrease 1,864.05

Die moter	Sub Division		200120
aun be		1928	1927
Electric Hoists	:	\$ 876.38	\$ 607.67
Wire rope		810.91	845.18
Skips, cages, & ski	p roads	1,459.27	2,004.63
Coal Dock		3,146.56	3,457.48
Miscell sneous		426,35	
Total		3,684.87	320,84

1927

MAAS MINE NNUAL REPORT YEAR 1928

1928 Amount \$38,265.44

Hoisting Equipment (Cont.)

Increase in repairs to electric hoists due to repairing coupling on cage hoist motor.

Decrease in skips, cages, and skip roads due to 1927 charge including expense of purchasing and remodeling a cage from the Gwinn District to fit the Maas shaft.

Retaining walls of concrete replaced the old wooday walls

Shaft

69

1927 Amount 315.	06 #	2127.037	16 0.21		1 10 10 10 10 10 10	
	.00	and there		.001		
Increase 290.	.14	17 50	the s	.001	and the bigge	-

The main cost in both years was for repairs to shaft pockets. The 1928 charge included the cost of casing the skip road in the shaft between the third and fourth levels.

Cost par ton, S.

Total Surface Costs

Top Tram Equipment

1928 Amount \$672.75 Cost per ton, \$.003 1927 Amount 697.70 " " " 003 Decrease .000 24.95

A Dial at an

GENERAL MINE ACCOUNTS:

Insurance

	Sub	DIVISION.		
1000 50	Engine & Motors	Tracks & Cars	Wire Rope	Sheaves, etc
1928 -	\$ 18.26	\$ 383.86	\$208.55	\$ 62.08
1927 -	186.09	325.98	102.88	82.75
Increas	0	57.88	105.67	
Decreas	e 167.83	oost charged w	th AD. DER.	20.67

Decrease in Engine and Motors due to less expense for maintaining machinery in 1928. Small increase in Tracks and Cars due to general maintenance of cars during the year being greater. More new rope was required in 1928. Less replacements of sheaves and rollers were necessary.

Docks, Trestles & Pockets

1928 Amount	\$40.26	Cost	per	ton,	\$.000
1927 Amount	50.75	steder			.000
Decrease	10.49				.000

Analysis

Engineering

There were small repairs to ore pockets in shaft house required in both years.

Mine Buildings

Personal Injury Eries

1928 Amount	\$1,684.87	Cost	per	ton,	\$.006	
1927 Amount	320.84				.001	
Increase	1,364.03		18.0	14.29	.005	

Increese

Sub Division.

Decrosse due to shifthosses	1928	1927
Office	\$ 54.10	to a sende
Warehouse	148.82	102.12
Shops	3.31	.20
Barn	6.44	23.99
Shaft House	6.55	.73
Engine House	119.71	21.15
Dry House	630.01	55.75
Coal Dock	289.58	-
Miscellaneous	426.35	-
Total	1,684.87	320.84

MERS KIDS aktup trestle.

MAAS MINE ANNUAL REPORT YEAR 1928

Mine Buildings (Cont.) Decrease due to 1927 costs including \$5,558.0

Doors were built on the pipe rack after it had been enclosed. The engine house roof was asphalted in 1928. The dry house roof was repaired and asphalted in 1928. A concrete abutment was built at the end of the sand fill of the coal dock, the old wooden abutment having rotted.

Retaining walls of concrete replaced the old wooden walls of the open timber tunnel. A fuse capping room and a carbide distributing room was

Safety Department Brown built adjoining the timber tunnel.

A room was built at the rear of the warehouse to house the gasoline pump.

+003

.001

elfare.

Roofs were repaired on two storage sheds.

Total Surface Costs

1928 Amount	\$38,265.44	Cost per	ton,	\$.146	TR 70
1927 Amount	41,217.83		11	.153	008150
Decrease	2,952.39			.007	

as due to bosces attending as

Celephones & Safety De GENERAL MINE ACCOUNTS:

Local General Welfare

Insurance

 1928 Amount \$ 113.94
 Cost per ton, \$.000

 1927 Amount 2,681.98
 " " .010

 Decrease 2,568.04
 .010

1928 Amount \$401,85 Jost per ton, \$.002

1927 Amount 312.37 # # #

Increase

Mora aroan

1928 Amount \$2,525.26

Decrease due to 1927 cost charged with \$2,562.78, which should have been charged off previous to December, 1926, adjusting fire and boiler insurance premiums.

Cost per ton, \$.010

Engineering

Mine Office

Analysis

1927 Amount 2,427.82 " " " .009 Increase 97.44 .001 Increase due to more time by engineer on Maas Mine

se in 1928 for local

surveys, and time on erection of steel stocking trestle.

 1928 Amount \$7,689.30
 Cost per ton, \$.029

 1927 Amount 8,235.70
 " " .030

 Decrease
 546.40
 .001

This account	t includes the op	perating laborato	ry charge.
Eibbing to	No. of dets.	Cost per det.	Amount
1928 -	33,188	\$.148543	\$4,947.01
1927 -	33,012	.1429	4.757.94
Increase	176	.005643	189.07

Decrease due to shiftbosses taking the stope samples since February 1st, 1928. Previous to this date a sampler was employed half a shift each day doing this work.

Decrease in General Mine Scoounce due to less personal

Personal Injury Expense

Total General Mine Acc

1928 Amount	\$ 5,262.94	Cost	per	ton,	\$.020
1927 Amount	10,215.66	**		"	.038
Decrease	4,952.72				.018

MAAS MINE ANNUAL REPORT YEAR 1928

16

Personal Injury Expense (Cont.) 9.) REPLORATION Decrease due to 1927 costs including \$5,558.00 on account of the total disability of Isaac Salmi, report #371. Effective April 1st, 1928, the charge to this account No exploring was was on the basis of 2% of labor expense as per cost sheet was obtained from set up as a reserve. available as the Gave) wall side. Addits Fatal accident to Harry Spencer, January 25th, 1928. work advances. report #423. in 1929 near the southwest corner of the It is planned to information concerning the depth of this ore body below Cost per ton, \$.001 Safety Department Expense 1928 Amount \$306.46 levels needed to m .000 1927 Amount 79.89 Increase 226.57 .001 10. TAXES: Increase due to bosses attending safety meetings, also DESCRIPTION captain attending safety council in Duluth, \$38.72. CITY OF NEGLUS Telephones & Safety Devices 1928 Amount \$401.85 Cost per ton, \$.002 1927 Amount 312.37 257.18 acres of mi " 43, 494, 01 .001, 160,000 87, 952, 88 ered by State Ta Stockpile, Supplies Increase 89.48 Equinment. More expense for safety devices in 1928, and more expense TOTAL VALUE PLAC for lighting at shafts and on main levels. TAX COMMISSION -Local General Welfare rris Addition, a 1928 Amount \$1,075.06 Cost per ton, \$.004 Property, Lobb A . .004 .. = 1927 Amount 1,038.80 and Kirkwood and Re Increase 36.26 722.49 778.74 Addition --More expense in 1928 for local general welfare. 763.54 77,115,05 Mine Office 1928 Amount \$12,974.30 3.3793. 3.272 Cost per ton, \$.050 1927 Amount 9,430.35 Increase 3,543.95 .015 11. ACCIDENTS Central Office charges, 1928 - \$11,127.62 PERSONAL Central Office charges, 1927 - 7.471.55 INJURY: Increase, 1928 - 3,656.07 Increase due to Maas proportion of General Storehouse Overhead amounting to \$1,150.39 charged to this account in 1928. Also expense of moving assistant superintendent from Hibbing to Negaunee, and additional salary expense on account of assistant superintendent. insido a concrata men the train was only two fest away. Spanshr was ap Total General Mine Accounts Cost per ton, \$.116 1928 Amount \$30,349.11 1927 Amount 34,422.57 " " " .127 Injured Soria Decrease 4,073.46 .011 man. To avoid a red Decrease in General Mine Accounts due to less personal injury expense in 1928. warn the motormen.



the use received compensation during the entire

This street was finished and the var a

9. EXPLORATIONS

AND FUTURE EXPLORATIONS:

No exploring was done during the past year. Some interesting information was obtained from the development of the Race Course ore body on the foot wall side. Additional information will become available as the development work advances.

It is planned to drill a hole in 1929 near the southwest corner of the Race Course to gain information concerning the depth of this ore body below the fourth level. This information is needed to locate the one or two levels needed to mine all of this ore. Shaft sinking should be started in 1930.

10. TAXES:

12.

DESCRIPTION CITY OF NEGAUNEE	VALUATION	2 8 TAXES	19 VALUATION	2 7 TAXES
MAAS MINE - (Lease and Und.	at the mine in	volving the los	na or solve th	usa one
257.18 acres of minerals cov	-			
ered by State Tax Comm.	1,285,000	43,424.01	1,160,000	37.952.88
Stockpile, Supplies and				-
Equipment,	890,000	30.075.77	1,150,000	37,625.70
TOTAL VALUE PLACED BY				
TAX COMMISSION -	2,175,000	73,499.78	2,310,000	75.578.58
Miscellaneous Parcels:		1.14.45.8.8.19.25		
Harris Addition, Anthony	louras Houses:	(Not Completed	6.)	
Property, Lobb Addition,		\$135,951,00		
and Kirkwood and Kellan's		85.577.89		
Addition -	21,350	721.49	23,650	773.74
Collection Fees	1 Alexandress	742.21		763.54
TOTAL MAAS MINE -	2,196,350	74,963.48	2,333,630	77,115.86
Tax Rate	ants.	3.3793		3.272
Total City of Negaunee Tax	Uly completed	571,083.87		589,686.71
Maas Mine % of City Tax	11 section abo	13%	they and	13%
widebed in front of the five	lots at the	ast and pr the		

Regenues Eine houses were moved in 1928.

Lake Street:

(2) Streets in the New Plats

AND PERSONAL INJURY:

11. ACCIDENTS

There was one fatal accident at the Maas Mine in 1928, the first one in several years. Harry Spencer was injured on January 25th at 9:45 A.M., and died two days later. The accident occurred on the fourth level about 225' from the shaft, and was caused by Spencer being hit by a motor car. Two motors had taken a broken car to the shaft a few minutes before, and one motor had passed Spencer on its way back to the mine. He was standing just inside a concrete frame in the drift, that obscures the motorman's view, and stepped on the track when the train was only two feet away. Spencer was an elderly man, 67 years of age, and was working as a track cleaner at the time of the accident.

The accident was classified as 3-A-3, Violation of Rules by Injured Workman. To avoid a recurrence of an accident of this character, a rule was adopted by the Central Safety Committee that no main line tracks were to be cleaned when the mine was operating, unless otherwise impossible, in which case two red lanterns were to be hung, one on each side of the workman, to warn the motorman.



11. ACCIDENTS

AND PERSONAL INJURY:

There were 17 minor accidents in 1928, as compared with 11 in 1927; the increase in 1928 was six minor accidents and one fatal.

The 17 accidents were classified as follows:

Eleven were slight injuries, the men returning to work in less than a month.

Three were injuries that kept the men home from one to two months. Three were injuries that kept the men home more than two months. Of these, one was the loss of three fingers, one a fractured finger, and one severe bruises of the thigh. Some walks from the street to the houses are yet

One man received compensation during the entire year for injuries received in previous years, and one received compensation to October 15th for an injury received in November, 1927. Two men were paid the difference in wages during 1928.

No accident has occurred at the mine involving the loss of more than one day since August 6th. on the north side, as houses were moved on these lots late in the fall. Baldwin Kiln Road.

No sidewalks will be built on this street unless the City refuses to

12. NEW CONSTRUCTION AND PROPOSED NEW

CONSTRUCTION:

Infs Street. Completed on both sides of this street.

build in front of the company houses fading wast on this street.

a. E. & A. #504 - Moving Race Course Houses: (Not Completed.)

Total estimate,	\$135,951.00
Total expended in 1927,	83, 577.89
Total expended in 1928, estimated,	17,330.95
Unexpended balance Jan. 1, 1929,	35,042.16

(1) New Road from Cherry Street:

This road was practically completed in 1927, and no work was done in 1928. The pavement on a small section about 250' in length has to be widened in front of the five lots at the east end of Cherry Street, on which Negaunee Mine houses were moved in 1928.

Lake Street:

100.0 This street was finished and the tar penetration surface put on by the City of Negaunee during 1928, for its entire length from the Baldwin Kiln Road to Prince Street. A portion of the alley south of Lake Street was surfaced with mine rock. connections to the additional 44 houses moved in

1928. An extension of the sewer to the east

Elm Street:

Some additional grading was done, and mine rock filling was necessary to even off the street after the curbing was put in. A considerable amount of material excavated from the basements of houses was moved across the street for filling lots; this excess had to be removed and the street grade restored. At the street intersections 30' radius curves were used for curbing, and the additional areas thrown into the streets were sub-graded with mine rock. Part of the alley between Lake and Elm Streets was surfaced with mine rock. This street could not be surfaced on account of grading lots, moving houses, etc. some Prince Street: ginally with the house at its former site, and the r

Similar work was done on Prince Street after the lot grading was completed. There was more grading required for side walks here than on the other streets.



12. NEW CONSTRUCTION

AND

PROPOSED NEW

CONSTRUCTION:

a. E. & A. #504 - Moving Race Course Houses: (Cont.)

(2) Streets in the New Plat: houses was finished in 1928. All the material

Baldwin Kiln Road:

Tron This street will be graded and surfaced by the City. It is immediately west of the C. C. I. Co. First Addition to the City of Negaunee. (3) Sidewalks:

Course Houses: (Cont.)

Lake Street.

(Cont.

Completed the entire length on the south side and in front of the houses on the north side. Some walks from the street to the houses are yet to be laid on the north side of the street.

Elm Street.

lot Completed, except for 100' on the south side. No sidewalks were built on the north side, or concrete walks to the houses on either side.

Prince Street.

place Completed on south side. Nothing done during the year to extend walks on the north side, as houses were moved on these lots late in the fall.

Baldwin Kiln Road.

No sidewalks will be built on this street unless the City refuses to build in front of the company houses facing west on this street. (4) Curbing:

Lake Street. Completed on both sides of this street.

Elm Street. Completed on both sides of this street.

Prince Street. Completed on the south side of the street.

Baldwin Kiln Road. It is expected that the City will install curbing on both sides of this street.

Gonstruction Commanded work on the

(5) Sewer System:

a. Storm Sewers.

No main storm sewer mains were laid in 1928, as this was completed in 1927. Several laterals to curbing and catch-basins were constructed during the latter part of the summer as the curbing was being put in. A few catch basins men will be installed in 1929. Houses moved

b. Sanitary Sewers.

House connections for the additional 44 houses (E. & A. #513) constituted the chief expense in 1928. An extension of the sewer to the east was made in the alley between Cherry and Lake Streets for the five Negaunee houses (E. & A. #531) moved to the six lots to the east of the former end of Cherry Street.

(6) Water System:

The cost of water connections to the additional 44 houses moved in 1928 was included in this account. not be finished until that summer.

(7) Transferring 22 Houses to New Location:

Moving completed in 1927.

Repairs to the 22 houses moved in 1927 were not completed in 1928. Porches and covered rear entrances were erected at some of the houses, the former to improve the general appearance of the location, and the latter to provide shelter. Front porches have to be built on several houses in 1929 to complete this work. Garages and sheds were provided for all the houses, some being those originally with the house at its former site, and the rest being extra structures from the Race Course plat.

Wiring: All completed in 1928. Street just before the ground froze. All fepting

will be completed in 1929.

MAAS MINE ANNUAL REPORT YEAR 1928

12. NEW CONSTRUCTIO

12. NEW CONSTRUCTION AND PROPOSED NEW

CONSTRUCTION: (Cont.)

Se.

a. E. & A. #504 - Moving Race Course Houses: (Cont.) ipated. All the preliminary

(7) Transferring 22 Houses to New Location;

Preparing Grounds:

All grading around the houses was finished in 1928. All the material from the basement excavations of the 44 additional houses was used for this purpose, and extra filling was secured from the Maas Mine surface adjacent to the location. to provide lots for seven Mermunes Mine houses.

Additional Race Course Houses:

Digging Trees: hous

Shade trees were set out on all streets during 1928 where they would not interfere with house moving operations. Maple trees were placed on Lake Street, elm trees on Elm Street, and oak trees on Prince Street. The trees were placed in the parkway between sidewalks and the curbs, on the lot lines. oll was set up as a reserve.

Fencing:

Some fences were built in 1927, and those put in during 1928 were placed where the lot grading was completed early in the season. The balance of fencing will be completed in 1929.

(8) Superintendence and Engineering:

A surface foreman and engineer were employed during the year to superintend all of the work incidental to the new location.

b. E. & A. #513 - Moving 44 Additional Race Course Houses:

Total estimate,	\$109,815.47
Total expenditures in 1928,	83, 532.58
Unexpended balance Jan. 1, 1929,	26,282.89

Moving, and Foundations.

Early in May the Pfeffer Construction Company commenced work on the foundations at the New Location. A. J. Lindsley, of Hibbing, Minnesota, commenced house moving late in May, and houses were moved as fast as the concrete basements were ready. The following table shows the progress of the work:

Urnand Strings 2001	Foundations	finished	Houses moved	
May	9	76-10	3	
June July August Total	$ \begin{array}{r} 11\\ 15\\ -4\\ \overline{39} \end{array} $	t were placed in the year,	11 15 10 39	forms fo

\$1,800.00

Repairing.

Repairing was commenced as soon as the houses were moved, but there was so much to do, however, that this work will not be finished until next summer. Garages and Sheds.

All houses were supplied with sheds or garages. Some were new, some were brought from the Race Course, and some from the Negaunee Location. A considerable amount of work remains to be done in siding and painting these buildings. ditures, 1928,

Wiring.

All electrical work for these houses was finished in 1928. Fencing.

Ten lots were fenced on the south side of Lake Street, completing this block. It was impossible to do any fencing on the other streets, as the grading was not finished until late in the season. Fence posts were placed along the north side of Lake Street just before the ground froze. All fencing will be completed in 1929.

Liske Mine

ump was received

MAAS MINE ANNUAL REPORT YEAR 1928

12. NEW CONSTRUCTION

AND PROPOSED NEW

CONSTRUCTION: (Cont.)

b. E. & A. #513 - Moving 44 Additional Race Course Houses:

Grading and Seeding:

There was more grading necessary than was anticipated. All the preliminary grading has been completed, except the top soil and the seeding. Shrubbery has been planted around approximately 20 houses. This work will be completed in 1929 after fences are erected. 137.98

Seven Additional Lots:

These lots are on the north side of Prince Street, east of the Maas Mine Road, and were needed to provide lots for seven Negaunee Mine houses. The houses have been moved to the lots, sewer and water lines installed, and grading completed except surface soil and seeding. No curbs or sidewalks have as yet been constructed in front of these lots.

Compensation Insurance:

There was a small expense in this account in 1928. Starting in April, 2% of the payroll was set up as a reserve.

Superintendence and Engineering:

A regular location foreman and engineer supervised the work under these E. & A's.

D. Insta ling Plunger Fump on Fourth Lavels

5	& A. #527 - New Pockets, Stocking Tr	estle, and Pumphouse:	
	Total estimate,	\$39,985.00	
	Estimated expenditures, 1928,	3,460.8 35,906.62	
	Unexpended balance, Jan. 1, 1929,	39.18 4,078.38	
	An 850 gallons per minute, 350	hand, Aldrich plunger	

a. Installing Lake Mine Ore Pockets at Maas: ta in July. It has been taken (1) Dismantling and Moving: the there installed of the new purchases was

Estimate, and the	\$700.00
Expenditures, 1928,	625.02
Unexpended balance.	74.98

The steel shaft house at the Lake Mine was pulled over on its side, and the shipping pockets were dismantled and moved to the Maas Mine. The work was commenced late in June and was completed in July.

(2) Piers: 1 pumphouse, was started in August. It was completed at the end Estimate, year. Early in Octo\$150.00 was stopped, owing to lack of Expenditures, 1928, die rock on 73.90 to while the steel treated and

Unexpended balance, 76.10 The four piers of the south pocket were placed in August. The forms for the north pocket were built late in the year, but the concrete was not

poured due to freezing weather.

(3) Erecting Pockets: Estimate, are no expenditore\$1,800.00 account in 1928. The foundations

Unexpended balance,

Expenditures, 1928, 990.22 809.78

300.00

m 7988.

The erection of the south pockst was commenced in August and it went into service the middle of September. The erection of the north pocket was postponed until next spring owing to the pressure of other work. (4) Planking

Flanking and Flaves:	rea for nining in
Estimate, and Brectings	\$500.00
Expenditures, 1928,	664.34
Balance, ditures, 1928	164.34 (red)

knough good planking and plates were salvaged from the Lake Mine Shaft house pockets to line the south pocket. New plate and plank will be required for lining the north pocket when it is built next spring.

This pump should be installed and in operation in February, 1929.

MAAS MINE ANNUAL REPORT YEAR 1928

12. NEW CONSTRUCTION

AND PROPOSED NEW

CONSTRUCTION: (Cont.)

c.	E. & A.	#527 -	New	Pockets.	Stocking	Trestle.	and	Pumphouse:	ļ

Chute Closers:	
Estimate,	\$150.00
Expenditures, 1928,	12.02
Unexpended balance,	137.98
The second second second second second	a second second

Chute closers were obtained from the Francis Mine head frame, as the ones used at the Lake Mine were not suitable.

Gene	r	al:	in i	1		63	¢e	8	10	

(1)

(4)

(5

Total estimate,	\$3,300.00
Expenditures, 1928,	2,365.50
Unexpended balance,	934.50

These two shipping pockets are to handle Race Course ore, which according to the lease must be kept separate from Maas ore. They are located immediately west of the present shaft house, and ore will be transferred in top tram cars from the skip dump, a distance of about 25'.

ad arection charges.

as soon as the forme and ifts were required to fill

b. Installing Plunger Pump on Fourth Level:

Aldrich Pump from Boeing	Mine:
Estimate,	\$3,500.00
Expenditures, 1928,	3,460.87
Unexpended balance,	39.13

An 850 gallons per minute, 350 head, Aldrich plunger pump was received from the Boeing Mine, Hibbing, Minnesota, in July. It has been taken underground but has not yet been installed as the new pumphouse was not finished until the end of the year.

(2)	Addition	to	Pumphouse	and	Sump:
-----	----------	----	-----------	-----	-------

B	Estimate,	\$1,800.00
-	Expenditures, 1928,	1,356.28
	Unexpended balance,	443.72
-	Manual Contraction of the second seco	

A new pumphouse, 20' x 30' in size, just south of the present fourth level pumphouse, was started in August. It was completed at the end of the year. Early in October work was stopped, owing to lack of facilities to handle rock on surface while the steel trestle was being erected. Work was resumed late in November.

(3) Foundations: Estimate.

Expendi

\$100.00
318.66 (red)

Unexpended balance,		100.00			us to the v	and of more					
There	were	no	expendi	tures	in	this	account	in	1928.	The	foundations

will be installed in January.

(4) <u>Pipes:</u> Estimate, \$150.00

θ,	\$150.00
tures, 1928,	2.54+.07
ded balance,	150.00

Unexpended balance, 150.00 There were no expenditures for piping in 1928.

- (5) Freight and Erecting: Estimate, \$500.00 Expenditures, 1928, 469.28
- Unexpended balance, 30.72
 - The expenditures in this account cover freight on the pump from Hibbing, Minnesota. There were no erecting charges in 1928.

This pump should be installed and in operation in February, 1929.

off, and a portion of the sheadened county road was cut down about two feet. The high ground was broken with a plow, and the success material moved with scraper and tractor to the low areas.

		MAAS MINE	
		ANNUAL REPOR	<u>r</u>
		YEAR 1928	
12.	NEW CONSTRUCTION		
	AND PROPOSED NEW		
	CONSTRUCTION: (Cont	.)	
	C. E. & A	. #527 - New Pockets, Stocki	ng Trestle, and Pumphouse:
	C. 5	steel Trestle:	
	()) Cost of Trestle, 1026 Ft.	#00 000 00
		Estimate,	\$20,000.00 20,755,79
		Balance	755.78 (red)
		The contract with the Word	en-Allen Company covered the entire
		cost of trestle, including	freight and erection charges.
	(2	2) Excavating Nine Piers:	ing east of the mine courance real. A
	1	Estimate,	a Ish \$450.00
		Expenditures, 1928,	465.53
		Balance,	15.53 (red)
		Excavating for the nine pic	ers commenced in July and was completed
		material was used for level	ling the stocking ground.
	12	Concreting Nine Piers:	THE WE STOCKING STOLIN.
		Estimate.	\$5,900.00
		Expenditures, 1928,	4,451.60
	()	Unexpended balance,	1,448.40
		The pouring of concrete ba	ses was begun as soon as the forms and
		re-inforcing bars were in p	place. Two shifts were required to fill
		one pler. The bases were co	ompleted in October, and were finished in
		filled with concrete as so	on as the steel erectors had completed
	(10	their work. The last of the	he concrete was poured early in November.
		There was approximately 35	cubic yards of concrete required for each
		base, and 40 cubic yards p	er column.
	(4	Bolts, Washers, Forms:	345.16 (red)
		Estimate,	\$400.00
		Expenditures, 1928,	627.51 (mod)
		The expense overran the es	timate in this account. The niers under
	Ge	the columns were excavated	in loose gravel, and much bracing was
		required to line up the ba	ses. 950,270.00
	(8) Reinforcing Steel:	43,192.14
		Estimate,	\$1,600.00
		Expenditures, 1928,	1,913.66
		Balance,	313.66 (red)
		steel reinforcing hars in	each nier than were used at the Athens. (The
	d+ Ba to A	estimated cost was based or	n the cost at the Athens.)
	(1)6) Decking Ties, Walks, Raili:	ngs. Fastenings:
	10	Estimate,	\$2,400.00
		Expenditures, 1928,	2,541.07
	· · ·	Balance, Balance,	141.07 (red)
		Fir ties, 5"x6" x 42" long	, spaced 18" apart, creosoted on the job,
1.1		were used on the steel tre	sties with a 2" plank runway. Cross walk
1		in 1928.	at each pier. All this work was completed
-	(7) Grading:	
	0. Propos	Estimate.	\$800.00
	(1)	Expenditures,	661.59
	1 A. C.	Balance, shop buildi	ng was 138.41 many years ago, the use of
	tunne.	Prior to spreading the roc:	k sollar, the ground surface was leveled
	W25 8	off, and a portion of the	abandoned county road was cut down about
	00 00	meterial moved with service	was broken with a plow, and the excess
		material moved with scrape.	r and tractor to the low areas.

		NA A G AT THE GATA A A AN
		ANNILAT. REDORT
		VEAD 1928
		1001 1920
12	NEW CONSTRUCT	MT ON
TO.	AND DDODOGED	NTAUE
	AND FRUPUSED	About)
	CONSTRUCTION	: (CONto)
	G.	K. & A. #227 - New Pockets, Stocking Trestie, and Pumphouse:
		C. Steel Trestle:
		The (6) ROCK Sollar: then the ones built today for mines with less
		life the Estimate, the mine \$ 2,500.00 it ion to produce ore at
		Expenditures, 1928, 2,575.00
		Balance, Balance, 75.00 (red) little southeest
		An 8' rock sollar was spread over the entire stocking area, and
		rolled with the City of Negaunee steam roller. The rock was secured
		from the mine rock pile lying east of the mine entrance road. A
		small revolving shovel from Ishpeming was used at first to load, but
		proved too slow and a Model #60 shovel was later substituted. The
		rock was hauled by dump trucks and a tractor pulling two wagons,
		and was spread by hand. Almost the entire pile was moved; the bal-
		ance must be moved in 1929 as it is on the new stocking grounds. In
		addition, 1225 truck loads of rock were taken by the City of Negaunee
		for street sub-grading, for which they paid 50¢ per load. The work
		on the rock sollar was started in September and was completed late
		in November.
		(9) Sheaves, Rollers, and Rope:
		Estimate. \$2,000.00
		Expenditures, 1928. 1.269.72
	matter wanters	Balance, 730.28
22.0	MALL PRIMT	All sheaves, rollers and rope required for equipping the trestle
	ABD	were installed in November.
	PROFINISD	(10) Laving Rail:
	EQUI PARKY *	Estimate \$300.00
	.B.	Expenditures 1928 645.16
		Balance 345.16 (red)
		About equal amounts of new and second-hand 40-nound wail was used
		on the new steel trestle. The estimate did not contemplate the
		murchase of any new rail
		An ad purchase reclany den rail. be prected beyong the north tram at the
		east end of the new steel treatle, to give additional stocking capacity
		General:
		Total estimate, #00,270,00
	De	Expenditures, 1920, 40,192.14
		The re will be editional amountitures in 1000 to semilate the
		There will be additional expenditures in 1929 to complete the
		shipping pockets and pump installation on the fourth level. The steel
		stocking trestle was completed in 1928.
		Denver sir, 1 2
	d.	E. & A. #533 - Painting 30 Houses. Maas Location:
		(1) Painting Houses and Sheds:
		Bulli Estimate, electric, 1 \$4,713.00 0
		Expenditures, 1928, 1,455.94
		Unexpended balance, 3,257.06
		During 1928, eighteen houses were painted. Rainy weather and uncom-
		pleted exterior repairs prevented the rest of the work from being done.
		This E. & A. will provide for painting the houses that are badly in
		the Bueed of paint. 8 from Swinn. These second-hand holats from Gwinn ware
		received at the mine late in 1927.
	θ.	Proposed New Construction: 1929 will be 15 F.P. electrics, which have been
		(1) New Shop Building:
		When the present shop building was erected many waars ago, the use of

176

When the present shop building was erected many years ago, the use of tunnels to convey material to and from the shaft was not considered. This was a later development, and as a result the Maas Mine shops are not located so as to use the tunnel. All material has to be hauled to and from the shaft.

MAAS MINE ANNUAL REPORT YEAR 1928

12. NEW CONSTRUCTION

15. POWER:

AND PROPOSED NEW

CONSTRUCTION: (Cont.) were no extraordinary repairs made during the year. Some expense b. Proposed New Construction: he dry roof where the lumber hed rotted due to (1) New Shop Building: (Cont.)

The shops are also smaller than the ones built today for mines with less life than the Maas Mine. When the mine is in condition to produce ore at a lower cost, comparable with the cost at the Negaunee Mine, consideration should be given to the erection of a new modern shop building southwest of the office and near the tunnel to the shaft.

(2) Steel Stocking Trestle West of the Shaft:

It is expected that the accumulation of ore in stockpiles west of the shaft will be removed prior to 1931, when it is planned to increase production to 400,000 tons per year. A steel stocking trestle should be built west of the shaft not later than next year, so as to have it installed prior to the time the mine increases production. If the stocking situation warrants, an E. & A. may be prepared and submitted next fall, and the trestle built.

(3) Development of Fifth Level:

Preparations must be completed in 1929 for sinking the shaft and opening the fifth level. The tonnage of Race Course ore above the fourth level will not last more than two years, so that a new level must be opened and developed in 1930. The planted near the feate on the west line of the lawn. Additional bushes are needed to complete this planting.

13. EQUI PMENT

17. CONDITION

AND LITY PROPOSED EQUIPMENT:

19. MAAS CRUSHER

EMISES:

a. Stockpile Trestles: ored under two statements. The first statement pives Twenty wooden bents were erected west of the shaft from the end of the permanent steel trestle for stocking Maas ore. Eight bents were put up at the east end of the south track of the new steel trestle for permanent rock trestle. Amploye

An additional rock trestle will be erected beyong the north tram at the east end of the new steel trestle, to give additional stocking capacity for rock. 22 Finland

Italy

9

b. Scraper Hoists:

[ta]lana

The mine is now equipped with the following scraper hoists:

Danish Irish	2	On Hand 1/1/1928	Receive 1928	ed On Hand 1/1/1929
Ingersoll-Rand air,	8	20	2	22
Denver air,	12	1	Scotland 1	1 2
Sullivan air,	168	1	0	188 1
Sullivan 62 H.P. el	ectric,	7	0	7
Sullivan 15 H.P. el	ectric,	18	0	1
Denver 72 H.P. elec	tric, 1926	0	1927 1	Decrease, 1928
Total	137,19	30	221,865 4	84,6734

Two new Ingersoll-Rand air hoists were purchased and charged out in 1928. Ten second hand hoists were charged out during the year as follows: 2 from the Boeing Mine and 8 from Gwinn. These second-hand hoists from Gwinn were received at the mine late in 1927. None shifts in 1928, as some we will New hoists purchased in 1929 will be 15 H.P. electrics, which have been proven to be best suited for this work.

2 - 9 4 B 1 - 11 hour " 28 2 - 11 " 14

1,687,24

567.93

MAAS MINE ANNUAL REPORT YEAR 1928

14. MAINTENANCE

AND REPAIRS:

There were no extraordinary repairs made during the year. Some expense was incurred in repairing the dry roof where the lumber had rotted due to heat and sweating.

15. POWER:

Cost at Crusher for 1928 and 1927;

Electric power was supplied during the year by the Cliffs Power and Light Company, a subsidiary of the Cleveland-Cliffs Iron Company. There were no serious delays due to lack of current. The minor delays from this cause are listed under 2-h.

The rate charged for current was $l_{2}^{1} \neq per k.w.$ hour, the same as last year.

The steam turbine was operated once during the year, September 10th, on account of an accident to a hydroelectric plant.

17. <u>CONDITION</u> <u>OF</u> PREMISES:

The 1928 figures are for the months only, on account of not having the November or December crusher statements. The 1927 figures are for verive months.

The premises at the Maas Mine were kept in good condition during the past year. Some additional planting was done in the spring, completing work started in the fall of 1927.

1,517.60

160.42

In the fall barberry bushes were planted near the fence on the west line of the lawn. Additional bushes are needed to complete this planting.

reduction crusher.

Wearing plates renewed,

Jaw plates.

18. <u>NATIONALITY</u> OF EMPLOYEES: Jaw Platos.

Wearing plates renewed,

Repair 100 H.P. motor and

This has been prepared under two statements. The first statement gives the report as has been ordinarily submitted to the Company, that is, it shows the nationality of employees according to parentage. The second statement divides the employees according to country of birth.

Nationality of amployees:	country of Birth	Percent
Americans 38	United States	72 39
English 44	England	38 20
Finnish 51	Finland	42 22
Italians 18	Italy	17 9
Swedish 15	Sweden	13 7
French 8	Canada	4 orusher and 2
Danish 2	Denmark	diamantled and is
Irish 5		
Germans 5	ext spring and shipped t	to the Holmon
Scotch 2	Scotland	ra pry crusher 1
will be installed age 188 druch he	matite ores. Some chang	188 100%
will have to be made at this time.	All expense in connecti	on with this
WAT'S BRITILLY DE DORTONIA ON PAGE SOME A	State of the second - manual 1 and the second	An and the second of the second

19. MAAS CRUSHER:

re now being crusher	1928	1927 pe	Decrease, 1928
PRODUCT	137,194	221,866	84,672
Composed of:	1,72=	313,304	
Hard Ores	118,197	177,880	59,683
Hematite	18,997	43,986	24,989

The crusher operated 136 single 9 hour shifts in 1928, as compared with 201 shifts in 1927 as follows:

129	1	-	9	hour	shifts
8	2	-	9	11	**
28	1	-	11	hour	
14	2	-	11		

MAAS	MINE
ANNUAL	REPORT
YEAR	1928

19. MAAS CRUSHER:

E. PRODUCTION, SHIPMENTS A Average tons crushed per shift, 1928 - 1,009 tons Average tons crushed per shift, 1927 - 1,104 "

as made up by working Saturdays.

cost at or usiter It	IT ITEO and ITE	PUT PUTUD POLLINAL	TER PINYA MOVO NO	ATTIC MATLOR
in 1927, namely, a	1928	Cost per ton	1927	Cost per tor
PRODUCT below th	137,194	on both the nort	221,866	es of the
General Expense	\$ 1,046.81	\$.008	\$ 6,542.31	\$.029
Maintenance	7,465.06	.055	20,208.06	.091
Operating	9,120.02	.068	13, 385.57	.061
Depreciation	6,739.30	.050	11,093.30	.050
Switching	1.743.06	.013	2.858.40	.013
Total	26,114.19	.194	54,087.60	.244
The grade of ore	was slightly	shave the guarde	ream extents on a	26 17 See

The 1928 figures are for ten months only, on account of not having the November or December crusher statements. The 1927 figures are for twelve months.

The main items for maintenance for each year were as follows:

was negligible	1927.	
\$1,918.24	New conveyor belt,	\$1,823.52
714.00	Two new toggles,	229.50
164.35	New main shaft for	
1,517.60	reduction crusher,	1,687.24
160.42	Jaw plates,	567.93
	Wearing plates renewed,	238.52
	Concaves for reduction	
1.044.70	crusher,	394.44
5,519.31	he parcels owned in fee, the	4,941.15
	\$1,918.24 714.00 164.35 1,517.60 160.42 <u>1,044.70</u> 5,519.31	1927.\$1,918.24New conveyor belt,714.00Two new toggles,164.35New main shaft for1,517.60reduction crusher,160.42Jaw plates,Wearing plates renewed,Concaves for reduction1,044.70crusher,

General repairs, involving the re-assembly of the pan conveyor, were commenced in March and were completed when the first Ogden ore reached the crusher April 27th. The premises were also cleaned up, and all the ore spilled under belts was loaded into railway cars and shipped. The last ore was crushed early in November.

During October and November the second unit, consisting of screens, Superior fines crusher, conveying belt, steel building housing crusher and screens, and frame work supporting the conveying belt, were dismantled and shipped to the new Tilden Pit.

The jaw crusher will be removed next spring and shipped to the Holman Cliffs Pit on the Mesaba Range, and the old $\#7\frac{1}{2}$ McCulley gyratory crusher will be installed again to crush hematite ores. Some changes of chutes, etc., will have to be made at this time. All expense in connection with this work should be charged to the jaw crusher. The small amount of hematite ore now being crusher at the Maas plant will not permit a low cost for crushing these soft ores in 1929.

318,328 320,240 247,076 242,879 247,076

75,449 73,158

Shipments increased in 1928, and acceeded production by 88,650 tons.

1,912

8,287

Total Last Year

Dentesse

Increase

ATHENS MINE

ANNUAL REPORT

YEAR 1928

. GENERAL:

2.

The mine operated throughout the year on one eight hour shift, five days per week, the same as in 1927. All time lost on account of holidays was made up by working Saturdays. P (34

Stoping continued in 1928 in the same territories that were being mined in 1927, namely, above the fourth level on the south foot wall, just above and below the sixth level on both the north and south sides of the fault dike, and north of the fault dike just below the fourth level. The last of the year, mining started south of the fault dike just below the fourth level. The only development work done in 1928 consisted of raising on the north and south side of the fault dike from the sixth level, nearly to the fourth level, and driving a new ore drift on the eighth level.

The grade of ore was slightly above the guarantee except on the Mitchell Lease, where the product averaged 59.50 iron. The ore on the hanging side on this lease is now high grade, but on the foot side it is low grade.

Labor conditions were quite satisfactory during 1928. As in previous years, the labor turnover was negligible.

5,520

4,363

The mine is in good condition, and a much larger product can be obtained on short notice by adding a night shift to tram and hoist.

14,380

2. <u>PRODUCTION</u>, <u>SHIPMENTS &</u> INVENTORIES:

a. Production by Grades:

There is only one grade of ore at this mine, namely, Athens ore. Most of the ore produced in 1928 came from the parcels owned in fee, the balance from the Mitchell Lease. The distribution of the product is as follows:

Grade	1928	1927	INCREASE	DECREASE
Athens Ore	184,205	187,457	943 E00	3,252
Mitchell Lease	57,385	45,291	12,094	A 577
Total Ore	241,590	232,748	8,842	Same and States
Rock	3,252 387	473	0,025	86

During the year twelve tons of ore were transferred from Corbit Lease to Athens fee.

b. Shipments:

Output for Year	Pocket	Stockpile	Total	Total
Grade of Ore	Tons	Tons	Tons	Last Year
Athens Ore	1,912	255,422	257,334	200,746
Mitchell Lease	257 291 0 82	62,866	62,866	46,602
Lucky Star	76,204 0 9	40	40	0
Total	1,912	318,328	320,240	247.078
Total Last Year	4,199	242,879	247,078	23
Decrease	2,287			
Increase	dams way much	75.449	73.162	0001

Shipments increased in 1928, and exceeded production by 88,650 tons.

2. PRODUCTION.

4. BETIMATE OF

SHIPMENTS & INVENTORIES:

0	Ctoolmaila	Tumontonion.	
0.	STOCKDITE	inventories:	
-			

The ore by grades in stock December 31, 1928, is shown below: Athens Fee 78,204 tons Mitchell Lease 9,258 " Total 87,462 "

On December 31st, 1927, there was in stock 166,112 tons. The decrease in 1928 was 78,650 tons. There was an increase in overrun in 1928, so that stockpile capacity is not much greater than in the previous year.

delay due to no power.

10 28 10

d. Division of Product by Levels:

The ore hoisted from the various levels was as follows: Fourth Level 60,314 tons Eighth Level 181,276 " Total 241,590 "

3. AMALYSIS e. Production by Months:

The production by months is as follows: Month Athens Mitchell Lease Total Rock January 15,384 4,681 20,065 February 15,971 3,998 19,969 March 14,360 5,520 19,880 April 15,250 5,036 20,286 131 4,353 May 16,464 20,817 18,803 June 14,993 3,810 July 5,078 21,095 16,017 August 16,171 5,348 21,519 September 3,985 14,205 18,190 October 16,319 5,117 21,436 109 14,205 November 5,203 19,408 147 December 14,866 5,256 20,122 Total 184,205 57,385 241,590 387 Total, 1927 187.457 45.291 232,748 473 Increase 12,094 8,842 Decrease 3,252 86

f. Ore Statement:

in a few localities.

when and a rout - rus 10 orb	To rear ad	Mitchell	Corbit	Lucky		Total
10% deduc	Athens	Lease	Lease	Star	Total	Last Year
On Hand Jan. 1, 1928	151,281	14,739	1ng+12	40	166,072	180,442
Output for Year	184,205	. 57,385	0	0	241,590	232,748
Transferred	12		12(r	ed)	9,489 hory	
Total level to sixt	335,498	72,124	. 0	40	407,662	413,190
Shipments	257,294	62,866	ike, o	40	320,200	247,078
Balance on Hand	78,204	9,258	ike, O	0	87,462	
Increase in Output	ghth level			1,14	8,842	
Decrease	h lavel,			44	78,650	

1928 - 1-8 hour shift 5 days per week, January 1st to December 31st, 1928.

1927 - 1-8 hour shift 5 days per week, January 1st to December 31st, 1927.

was due to the ore being cut off by jaspar, which decreased the ore area

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	- a	ATHENS MINE ANNUAL REPORT YEAR 1928	
2.	PRODUCTION, SHIPMENTS & INVENTORIES:	Prospective Cres	
	g.	Delays: The non-electrical delays were as follows: December 14th. Eight hours delay due to broken strand in hoisting rope, on south skip. This delay was made up by working on	
		Saturday, December 29th.	
	h.	Delays from Lack of Current: The delays from lack of current during the year were as follows:	
		March 15th, $\frac{1}{2}$ hour delay due to no power. August 8th, 2 hours " " " " "	85.
		September 7th, 4 " " " " " " " September 17th, 1 hour " " " " " " October 8th. 3 hours delay due to burning out of case hoist oil switch	SD.
		during an electrical storm.	5t.
3.	ANALYSIS:	And and an an Annotang by Andreas and their	
5.	LABOR AND Wa.	Average Mine Analysis on Output:	
	,24	Grade IRON PHOS. SILICA Athens 61.12 .126 5.42 Mitchell Lease 59.50 .126 5.86	
	b.	Average Analysis on Straight Cargoes:	
	b.	GradeIronPhos.Moist.IronMoist.Athens61.32.118-(All mixed)Mitchell Lease(All mixed)	
		Corbit Lease (All mixed) Lucky Star (All mixed)	
	с.	High Sulphur Ore: No high sulphur ore was encountered during the year in mining or development work.	
A .		AVERAGE WAGES FER DAY'S	
	ORE RESERVES.	Surface 4.46 4.48 .02	
	ALL ILLING	Developed Ore. 5.01 5.08	
		Assumption: 12.75 cubic feet equals one ton. 10% deduction for rock. 10% deduction for loss in mining.	
		Percentage of Bessemer equals 0.	
		Fourth Level and above, 1,079,489 tons	
		Fourth level to sixth, north side of dike, 357,162 "	
	-	Sixth level to 660' sub, north side of dike, 198,863 "	
		Sixth level to 660' sub, south side of dike, 352,326 "	
		Bighth level to eighth level, 1,146,674 "	
	· · ·	Ninth level to fonth level, 464,050 "	
		Below tenth level, 380,938 "	
		Motel developed and	
		10tal ueveloped ore 4,037,036 "	
		Demological and despended 204 220 hours The market and 242 500 hours	

182

Developed ore decreased 294,239 tons. The product was 241,590 tons, so that the ore reserves decreased 52,649 tons in excess of the product. This was due to the ore being cut off by jasper, which decreased the ore area in a few localities.

	ATHE	NS MINE L REPORT			
	YEA	R 1928			
- ESTIMATE OF	233 1				
ORE RESERVES:	Comparative Statement of W	1000 and Product	its (Cont.)	· Promission	
b.	Prospective Ore:		1287	Ingrease	Megrease
	Fourth level to sixth leve	el, south side	of dike,	1,864,066 t	ons
	Total all ore		8.06	5 901 102 1	ons
	Decrease from 1927 estima	te,	18,70	304,489 1	tons
	AND BANKS COPPENDE SAME				
	by raises in the undeveloped	d area south o:	f the fault di	to ore remo .ke.	oved
с.	Estimated Analysis:	20,8112	10,080	181社	
	Ore Reserves; Approximat	e Expected Nati	ural Analysis.	276.3/8	
	Iron Phos.	Silica Alum.	Mang. Lime	Mag. Sul.	Igni. Moist.
	Athens Ore 52.50 .120	5.00 2.50	•430 •870	.851 .011	1.44 13.25
	Ore in Stock: Average Na	tural Analysis	45,162.40	397.56	i i contrat
	Iron Phos.	Silica Alum.	Mang. Lime	Mag. Sul.	Igni. Moist.
	Athens Ore 53.16 .110	4.49 2.51	.436 .870	.851 .011	1.44 13.00
TADOD AND HAAT	. Proportion of Surface to	Underground 10	9214		
LABUR AND WAG	Comments: - 1 to 3.54 One I	a hour shift f	ive days yer w	eelt.	
	(1) Labor: 1 to 3.61 One 4	a hour shift f	lve days per w	oek.	
	There was no labor	shortage durin	g the year.	neek.	
	(2) New Construction:	9 hour shift t	tve days per w	wek.	
	PRODUCT No. Shifts and Hours	1928 241,590	<u>1927</u> 2 32, 748	INCREASE 8,842	DECREASE
-bi	Stockpiles:		+		
	AVERAGE NO. MEN WORKING:	a the east end	of the south	treatle for	stouking
	Surface	35	35	urill coime	NALL .
	Underground	124	123	Citt Poters	
	for three or four months b	afore being sh	ipped. It als	o increases	12:0
	AVERAGE WAGES PER DAY	stely 50,000	tons.		
	Surface	4.46	4.48		.02
0	Underground	5.01	5.08		.07
	Total	4.88	4.94	Parastona.	•06
	WA AT & C ETA THUNKA IN CHIEF OF DATA		1928	1	
	Surface	108.48	107.53	.95	
	Underground	112.58	114.20		1.62
	Total	111.65	112.72		1.05
	Decilities		-0074		
	Surface	23.66	23.00	57	-0325
	Underground	7.23	7.02	.21	.0095
	Total	5.54	5.38	.16	*1022
	Increase, 1928 -	in the free	.108		
	LABOR COST PER TON:			of fast 1	018
	Surface	.189	.194	of feet, 2	.005
	Total	.882	.918		.036

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0

ATHENS MINE NNUAL REPORT YEAR 1928

5. LABOR AND WAGES:

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

18.52 10.33 17.96 5.57	17.04 8.85 16.70	1.48 1.48 1.26	524 425 535 617	
17.96 5.57	16.70	1.26	617	
5.57	oyd mine		67.5 X	
	5.66	2,024	2,816	•09
0 0111	10.000	1011		
33,431	33,154 3/4	276 1/4	timber	
13,6422	43,234 3/4	407 3/4	The P	
A	126	658.		
15,559.78	45,162.40	397.38		
57.475.94	168,557.42	1, OFT	1.0	81.48
13,035.72	213,719.82	69400	6	84.10
	$ \begin{array}{r} 0,211\frac{1}{2} \\ 33.431 \\ 43,642\frac{1}{2} \\ 45,559.78 \\ 57.475.94 \\ 13,035.72 \\ \end{array} $	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

1	ropor		Jn	OI	Suria	ce to)	under	grouna	Men:		2210	C. march	Same and stress and stress of
TE	1928	-	1	to	3.54	One	8	hour	shift	five	days	per	week.	verring hipes
OT	1927	-	1	to	3.51	One	8	hour	shift	five	days	per	week.	s covered to
21	1926	-	1	to	3.68	One	8	hour	shift	five	days	per	week.	surriciant neat
270	1925	-	1	to	3.80	One	8	hour	shift	five	days	per	week.	however, cooled
88	1924	-	1	to	3.99	One	8	hour	shift	five	days	per	week.	iter which

6. SURFACE:

7. UNDER GROUND :

a. Buildings, Repairs:

WB

V8

tr

51

There were only a few minor building repairs during 1928.

b. Stockpiles:

Two bents were erected on the east end of the south trestle for stocking ore from the Mitchell Lease. Six other bents have been framed and will be erected early in the new year. This wooden trestle will give another stocking area for Mitchell Lease ore, so that this ore can remain in stock for three or four months before being shipped. It also increases the stockpile capacity approximately 50,000 tons.

It soon developed that the concrete tanks would not stand the higher ton-

, parmitting the treating solution to escape. Treating

e below the fourth level in the territory on the

c. Timber Treating Plant:

The comparative cost of treating timber for 1928 and 1927 is as follows:

	Ift was driven through the fault dibe, which	Cost of	treating.	per foot
5.5	the set the south side of the dike they may	1928	arad a Pro	1927
Rain	Peeling non stanted from the sixth lavel on	.0312	st this el	.0312
	Framing	.0128	SURTHE DOT	STTRT 00
the s	Treating	.0416	100 010 01	.0279
8510	Decking	.0126	131 7927 20	.0083
been.	Unloading	.0074	Nose raise	navi.
ramet	Zinc Chloride	.1021	Mirth Teve	.0325
-480	Heat, Water, etc.	.0098	pe comec	.0093
Bel	Total	.2175	and sixth	.1092
alst	Increase, 1928 -	.1083	t to the w	est, the
the s	lith level. This is the point where the is	the prove have	tine mill	0 00100

Number of pieces treated, 1928 - 2,098 Number of feet, 18,018 Number of pieces treated, 1927 - 2,661 Number of feet, 23,135

Early in May a drift was started to the west from the old diamond drill hole prossent on the eighth level. This drift was driven to the northwest corner of the ore area being mined above the eighth level in order that two raises might be put up to mine the ore that is too far away from the other raises for economical mining. The drift was finished in November and the

ATHENS MINE ANNUAL REPORT YEAR 1928

6. SURFACE:

Ъ.

0.

7. Under Crouder Treating Plant: (Cont.)

Developmen!	tr (Cont.)			1928	1927
Number of	pieces use	d at th	e Athens Mine -	1,210	524
11	" shi	pped to	Maas Mine -	106	425
Stopings	" shi	pped to	Negaunee Mine -	483	286
At the be	shi	pped to	Holmes Mine -	225	617
in three se	" shi	pped to	Morris-Lloyd Mine -	mallealor	964
Total 1	pieces used	and shi	pped -th level: (2) On t	2,024	2,816
Decreas	se in 1928 -	O venti	lation raise just below	792	level:

Treated Timber Pe	eled untreated timber
on hand 12/31/28	on hand 12/31/28
9' pieces 1,173	589
8' pieces 226	458
7' pieces <u>q 19</u> Total 1,418	1,047

The new two compartment concrete treating tank that was built in the summer of 1927 was put in service last summer. Additional heating pipes were installed and the steam line from the heating plant was covered to decrease the loss by radiation. It was not possible to get sufficient heat until these improvements were made. The treating solution, however, cooled very rapidly, and covers were then made for the hot tank, after which treatment was conducted under proper temperatures to give good penetration. It soon developed that the concrete tanks would not stand the higher temperature and cracked, permitting the treating solution to escape. Treating of timber was then abandoned, as there was a fairly large stock on hand. A study is now being made of treatment tanks, and definite recommendations will shortly be made.

7. UNDER GROUND:

discontinued below this sub level, as it can be more easily reached from the east when the next step in this torritory reaches this elevation.

a. Shaft Sinking:

There was no shaft sinking at the Athens Mine during the year.

was opened in May and completed in Getober. b. Development:

Early in the year raising was completed in the last of the five raises put up to develop the ore below the fourth level in the territory on the north side of the fault dike, at the northeast end of the sixth level. When this territory had been mined down to the third sub below the fourth level. a drift was driven through the fault dike, which encountered a greater width of ore on the south side of the dike than was expected at this elevation. Raising was then started from the sixth level crosscut running parallel to and south of the dike. Six raises were needed between the old workings on the south side of the dike and the new mining limit set in 1927 to protect #610 ventilation raise. At the end of the year two of these raises had been put up to the jasper hanging wall, just below the fourth level, and the remaining four were up more than 120', or high enough to be connected on the -480' sub, the intermediate sub level between the fourth and sixth levels. Below the sixth level on the south side of the dike and to the west, the slate foot wall was found coming in from the south on the third sub below the sixth level. This is the point where the jasper hanging wall makes contact with the footwall, and is the elevation where the greatest width of ore may be expected south of the dike.

Early in May a drift was started to the west from the old diamond drill hole crosscut on the eighth level. This drift was driven to the northwest corner of the ore area being mined above the eighth level in order that two raises might be put up to mine the ore that is too far away from the other raises for economical mining. The drift was finished in November and the

ATHENS MINE ANNUAL REPORT YEAR 1928

7. UNDERGROUND:

b. Development: (Cont.)

first raise was started at the end of the year.

c. Stoping: March and was continued until June. Operations were then storped

At the beginning of the year mining operations were being carried on in three separate territories: (1) On the south foot wall along the east edge of the property above the fourth level: (2) On the south side of the fault dike west of #610 ventilation raise just below the fourth level; (3) To the west of the second territory on both the north and south sides of the fault dike below the sixth level.

On the north side of the dive mining started at the west and of the ore

Mining was continued in these three territories throughout the year without any decided changes, except as mentioned under "Development." The territory on the south side of the dike, #2 in the preceding paragraph. was opened and mining was started under the jasper hanging wall in September. This area will take the place of the territory above the fourth level which is diminishing in size on each sub level.

The detail of mining on the various levels and sub levels is as follows: Subs above the fourth level:

Most of the ore mined above the fourth level during the year came from Mitchell Lease lot #11, with a small proportion from Athens lots #10 and #12. -300' Sub Level:

Mining was completed on this sub level in February. On this sub level the jasper mixed with dike stringers, which forms the east boundary of the ore body, started pitching rather flatly to the west to decrease successively the areas mined below. the east and were put up in one to the paper happen -315' Sub Level: below the courth level, and the remaining four are all many

Work was started on this sub level late in 1927, and was completed in June, 1928, the outline of the ore being only slightly smaller than on the sub level above. The mining of the ore body north of the jasper split was discontinued below this sub level, as it can be more easily reached from the east when the next step in this territory reaches this elevation. -330' Sub Level: completed in March.

This sub level, again showing a decrease in ore area from the one above. was opened in May and completed in October. -340' Sub Level: leted in November. The available areas and replocical con-

Work was started at this elevation in October, and the ore limits have been outlined and show that the ore area is again smaller than on the sub above, due to farther encroachment of the jasper and dike on the east side. Six contracts were working here in December. of the ore area on this sale Subs above the sixth level: year, and the slate foot wall was encountered for -415' Sub Level: coming in from the south. The width of the ore south of

This sub level is immediately below the fourth level, and was opened on the north side of the fault dike in 1927 and mining completed in April. 1928. A greater width of ore was found than had been expected between the jasper hanging wall and the fault dike at the east end of the sub level. Two of the raises put up from the sixth level on the south side of the dike proved the jasper hanging wall to be approximately the same elevation as on the north side of the dike. Mining was started on the south side in September. The ore area was small, due to the downward curvature of the jasper hanging wall on all sides, and mining was completed in December. -430' Sub Level:

Mining was started on the north side of the dike early in the year, and was completed in October. As was expected, the ore area was larger than on the sub above, due to the northward dip of the jasper hanging wall. Mining was started south of the dike by one contract, which worked there during the latter part of December. than was anticipated. This has reduced the ore area

on this sub level. There were six contracts working here in December.



7. HIDER GROUND 7. UNDER GROUND:

Stonizur (Cont.) c. Stoping: (Cont.)

-445' Sub Level: ted is Gotomer of the sub level, on the most baile of

On the north side of the dike mining started at the west end of the ore area in March and was continued until June. Operations were then stopped because the development drift to the south of the dike encountered a greater width of ore than was expected. Mining was resumed in October. after mining had started two subs above on the south side of the dike. There were four contracts working on this sub level in December. -480' Sub Level: Revel aids ventilation and provides a

A double compartment branch raise was put up from the east raise on the north side of the dike from the -480' sub level to the -430' sub level to speed up the mining of ore at the east end of the -415' sub level. A drift was driven through the dike to connect with the new raises on the south side of the dike.

One contract was advancing this drift in December. -575' Sub Level: " also to be put up from this new drift was started in

A short drift from #630 to #631 raise was completed at this elevation in October. It was driven to enable #631 raise, which was caving, to be carried through this caving area. Sixth Level: December

#642, the west raise of the five in #4 crosscut on the north side of the dike, was extended 68' in January to the -430' sub level.

Six double compartment raises, #629 to #634 inclusive, were started from #3 crosscut on the south side of the dike during the last half of the year. Two of these raises on the east end were put up in ore to the jasper hanging immediately below the fourth level, and the remaining four are all pres 110' up to the elevation of the 480' sub level. 4,631,85

One contract was raising in the west, or #634, raise in December. Subs above the eighth level: .0695

-600' Sub Level:

Mining on the south side of the fault dike on this sub level was started in 1926, and was completed in March, 1928. -615' Sub Level: 5,854. 0,423,86

Mining on the south side of the fault dike on this sub level was started in 1926 and completed in November. The available areas and geological conditions were practically the same as on the sub level above. 84,800 -635' Sub Level: 1,575.48 18.5782 M

This sub level was opened in 1927 on the north side of the fault dike, and mining is now 80% completed. The west part of the ore area on this sub level was mined during the year, and the slate foot wall was encountered for the first time coming in from the south. The width of the ore south of the dike will decrease as mining is carried to lower elevations, because of the northerly dip of the slate foot wall toward the dike. Mining of the east area on this sub level was started in November. Three contracts were working here in December.

-645' Sub Level:

Mining was started on this sub level on the north side of the dike late in 1927, and was completed in October, 1928. The outline of the ore was practically the same as on the sub level above.

Mining was started on the south side of the dike in October, 1928, and two contracts were working here in December. -660' Sub Level:

Mining was started on this sub level in March, 1928. The area on the north side of the fault dike is being mined. The jasper hanging wall in the northeast corner of this area has descended farther to the west along the south side of the dike than was anticipated. This has reduced the ore area on this sub level. There were six contracts working here in December.

ATHENS MINE ANNUAL REPORT YEAR 1928

7. UNDER GROUND:

c. Stoping: (Cont.)

-675' Sub Level:

Mining was started in October on this sub level, on the north side of the dike. There were five contracts working here in December. -720' Sub Level:

This sub level, which is half way between the -625' sub level and the eighth level, was opened in 1927 and drifting continued until July, 1928. About 850' of ore drifting was done to connect all the raises from the eighth level, including the two ventilation raises to the sixth level. The development work on this sub level aids ventilation and provides a traveling road and facilities for handling and storage of timber. <u>Bighth Level</u>:

In May a drift was started to the west towards the old workings from the old diamond drill crosscut. It was completed early in December. The other haulage drifts on the eighth level were not located in the right position for raises to be put up to mine an ore area on the -675' sub level. One of the two raises to be put up from this new drift was started in December. When mining is started from this new raise, the large area now mined from the three present raises will be reduced to economical haulage limits for scraper hoists. One contract was raising from the eighth level in December.

d. Timbering:

Statement of Timber Used:

The following statement	LINEAR	AVG. PRICE	AMOUNT	AMOUNT
or the years 1928 and 192	7. FEET	PER FOOT	1928	1927
6" to 8" Timber	93,290	.0411	3,838.68	3,961.67
8" to 10" "	69,840	.0620	4,329.76	4,631.85
10" to 12" "	39,714	.0878	3,488.82	2,419.12
12" to 14" "	26,100	.1627	4,245.40	2,020.71
Total Timber - 1928	228,944	.0695	15,902.66	997
Total Timber - 1927	207,431	.0628		13.033.35
Increase in drifting and	raising - 9	Per 100'		
7' Lagging Loore Lag	806,315	.7298	5.884.23	5.423.86
Poles, 921, for ventils	369,048	1.5712	5.798.42	3.762.28
Total, 1928 -	1,175,363	.9940	11,682.65	the previous
Total, 1927 -	1,015,411	.9047	n completed	9,186.14
Covering Boards, 1"	84,800	18.5782 M	1,575.43	1,068.88
Product for year	Lasting		241,590	232,748
Feet of Timber per ton c	of ore		.948	.891
Feet of Lagging per ton	of ore	Lyarage	3.338	3.303
Feet of Lagging per foot	of timber	Price	3.522	3.706
Cost per ton for timber	65,100	13,89 0 9,	.0658	.0560
60" lagging	30.450	15.14 0 4.	.0244	.0233
" coverin	ng boards	14.29 13.	.0065	.0046
" poles	85,200	14,62	.0240	.0162
" " timber.	lagging, po	les & boards.	.1207	.1001
Pase	315,100*	5.91 H 1,	861,24	1,811,39
Equivalent of stull time	er to board	measure	428,408	333,603
Feet of board measure pe	r ton of ore	8.00 Da	1.773	1.433
Connecting Wire	10	.383	3.83	
Tamping Bags	5,000	2.15 1	10.75	
Total Fune, etc. 1928		3.	447.23	
Total Pase, etc. 1927		Stalle .		2,829.05

Total All Explosives = 1928 Total All Explosives = 1927 14,796.22

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THENS MINE ANNUAL REPORT YEAR 1928

7. UNDER GROUND:

d. Timbering: (Cont.) ne and lasting: (Cont.)

otal	cost for	timber,	lagging, and poles	, and cost per ton:	
Pro	YEAR		AMOUNT	COST PER TO	N 32,74
Pou	1928	wier yer	\$29,160.74	\$.1207	.366
0.04	1927	for you	23, 288.37	.1001	+053
	1926	rus.	21,637.70	.0956	+030
	1925	a11	27,082.05	.1288	.063
	1924		24,403.00	.0984	
	1923	Sin	23,356.15	.0951	
	1922		16,566.21	.0857	1927
	1921		23,169,19	.1316	
50%	1920		22,622.15	.1146	
	1.1				

The feet of timber per ton of ore increased again in 1928, due to more development drift in ore and to more repairing of drifts. The cost per ton for timber increased due to the use of more large sizes of timber on account of more ore development. The cost for poles increased 50%, or .8 of a cent per ton, on account of more poles used for covering down on sub levels.

The cost for timber, lagging, etc., increased 20% in 1928, due to the reasons enumerated above.

e. Drifting and Raising:

The following statement gives comparative figures of drifting and raising for the years 1928 and 1927.

YEAR	ORE DRIFTING	ORE RAISING	ROCK DRIFTING	ROCK RAISING	TOTAL
1928	951' Used	1,097'	- 30'	0'	2,078*
1927	arie 38' r pou	nd: 10 922'der	121'	1489 0'	1,081'
Decreas	0		91'		
Increase	913	an ind175the of	12% in the appr	mi of ponde w	997"
1.6m . 9.20	In margine to an	AND NOODAR MATTIN	W and then have		

Increase in drifting and raising - 92%.

This large increase was due to opening the -720' sub level as an intermediate level, for ventilation and access to the sub levels being mined above. The total feet of raising was slightly greater than in the previous year. The immediate program of raising has not been completed, but should be finished early in 1929.

play an thods during the past year. The

re was no change in the f. Explosives, Drilling and Blasting: Statement of

the second se
Explosives Used:

The mine is now fully equipped	Average 1928	1927
of the machines in two arQuantity	Price Amount	Amount
50% Am. Gel. 65,100	13.89 C 9,040.04	8,599.92
60% Am. Gel. 30.450	15.14 C 4,609.50	3,867.25
Total Powder - 1928 95,550	14.29 13,649.54	2 mi-1 2 19. 14
Total Powder - 1927 85,300	t word4.621 vod in Horses	12,467.17
Fuse following statement 315,100	5.91 M 1.861.24	1.811.39
Caps 51,500	10.91 M 562.09	506.99
Cap Crimpers 14	8.00 Dz 9.32	10.67
Connecting Wire 10	.383 3.83	
Tamping Bags 5,000	2.15 M 10.75	. showeline
Total Fuse, etc. 1928	2,447.23	THE RECTO
Total Fuse, etc. 1927	5 91,6% 74,0%	2,329.05
Total 241,590 232,74	8 100 % 100 %	
Total All Explosives - 1928	16,096.77	· · · · · · · · · · · · · · · · · · ·
Total All Explosives - 1927	All and a second se	14,796.22

ATHENS MINE ANNUAL REPORT YEAR 1928

7. UNDERGROUND:

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f. Explosives. Drilling and Blasting: (Cont.)

	Se	1'8191'5		1920	ovelingly	21
	1928	192	7	Amount	Amo	unt
Product	38,97	20.2	3 2	41,590	232,	748
Pounds of powder per ton	n of ore			.3955	.3	665
Cost per ton for powder				.0565	.0	536
" " fuse,	caps, etc.	d during	the pa	.0101	.0	100
" " all exp	plosives	r fans W	are ins	.0666	.0	636
into the subs above the s	Swith level	where;	the air	0008111	90.00 NO.00	wet.
Sinking	g, Rock Deve	elopment	, etc.	Shis	nomic TV-see	
due to rotting of the tim	bar mat ove	Average	a level	1928	19	27
avviduate una incurrad in 1	Quantity	Price	to full	Amount	Amo	unt
50% Am. Gel.	300	13.75	C	41.25	21	.37
60% Am. Gel.	850	15.00	C	127.50	124	.00
Total Powder - 1928	1,150	14.67		168.75		
Total Powder - 1927	950	15.30	1.5		145	.37
Fuse	1,900'	5.86	M	11.13	ed with 13	.71
Caps	200	10.65	M 1000	2.13	1926 7	.40
Cap Crimpers	4	8.00	Dz.	2.67	020	.67
Total Fuse, etc. 1928		283	257	15.93	243	
Total Fuse, etc. 1927		228	253		274 21	.78
Floor L		227	239		285	
Total All Explosives - 1	1928	227	233	184.68	276	
Total All Explosives - 1	1927	227	233	5	280 167	.15
July		227	235	1	874	
Total Explosives Used in	n Mine, 192	8 -	16,	281.45	274	
Total Explosives Used in	n Mine, 192	7 -	236		14,963	.37
Average price per pound	for powder	230	2.33	.1429	277 .1	462

This statement shows an increase of 12% in the amount of powder used in 1928, while production increased only 3.8%. The increase in amount of powder used was due to more mining in areas where the ore was tough and hard to break, to more raising, and more drifting. The price of powder decreased 2.2% in 1928.

The total cost per ton for all explosives increased 4% in 1928.

g. Mining and Loading:

There was no change in the mining methods during the past year. Sub levels have been opened at intervals of about 12', the same as in previous years.

The mine is now fully equipped with scraper hoists, but the horsepower of the machines in two areas is not large enough to give good results. This condition will be remedied by the purchase of 15 H.P. electric hoists to replace the present $6\frac{1}{2}$ H.P. electrics. Three new double drum air hoists were purchased in 1928, making a total of thirty. Several secondhand hoists from the Gwinn District were received in November, 1927, and paid for in 1928.

The following statement shows the product handled by mechanical loaders and by hand shoveling in 1928:

Starting in skin road divi	1928	1927	1928 % of	1927 % of	man over hand
mathima Jones	Tons	Tons	Product	Product	shoveling
Hand Shoveling	20,348	59,363	8.4%	25.5%	apports back of al
Scrapers	221,242	173.385	91.6%	74.5%	67%
Total	241,590	232,748	100 %	100 %	1d dividers, The

work of installing these new dividers was started several months ago. This work is being done gradually over the week-onds, the old dividers in the worst condition being replaced first. It will be continued until all the old dividers are replaced.

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	ANNUAL	REPORT
X	YEAR	1928

7. UNDERGROUND:

8. COST OF

g. Mining and Loading: (Cont.)

gonaltions in the mine hav	Scra	apers	Hand S.	hoveling	interests.
of the method of mining by a	1928	1927	1928	1927	alor
Average tons per man	18.97	20.23	11.38	11.05	
ore has been handled entirel	y by seraj	pers. Cond.	itions in ;	courly all	work-

i. Ventilation: re ideal for scrapers; in a few places water interfores

Ventilation, on the whole, was good during the past year. The main fan worked satisfactorily. Three booster fans were installed to force air into the subs above the eighth level, where the air conditions were not good, due to heat and low oxygen content of the air. This condition was due to rotting of the timber mat over the sub levels. Considerable expense was incurred in 1928, in re-opening to full size the airways on and between levels, that had crushed. This work was not entirely completed at the end of the year.

j. Pumping has also been under way for the past six months to open

2, 00

The number of gallons pumped per minute in 1928 as compared with 1927 and 1926 is shown by the following report:

	1928	1927	1926	
	233	261	262	14
	231	257	243	
1928	228	251	274	SATORA S
341,590	227	239	285	CAPITAL
1.848	227	232	274	
+ 225	227	233	280	01
-082	227	239	274	
1.885	228	238	274	
+035	230	236	277	
1.590	230	236	277	
	227	235	254	
,138	224	234	256	.01
+058	228	242	268	.00
	1929 541,590 1.848 .225 .058 1.590 .138 .088	1928 233 231 228 227 227 227 227 227 227 227 227 227 228 230 227 227 228 230 227 228 230 227 227 228 230 227 228 230 227 228 230 227 228 230 227 228 228	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

The average gallons pumped per minute for the past seven years is as follows:

1000-001-0

Voor dole no		9-00-0		+5/05
1928 23 1927 24 1926 26	28 12 58	+ 800 + 058 + 015	+008 +017	
1925 25 1924 21	1 .003(red)	+013(red)	.010(rs#)	100
1923 1923 19 1922 16	95 a. 642 54	2.669		+021
the said therein the second is a	10.00 T			

The average number of gallons pumped per minute decreased both in 1928 and 1927, and are now down near the average in 1924.

k. Shaft: Bootor

There is no evidence of disintegration of the concrete in the section of shaft from 200' to 400' below the collar that was gunited in 1926.

Starting in 1927 and continuing through 1928, it was found that the steel skip road dividers in the shaft from surface to 700' below the collar were getting loose and in some cases were cracked. This apparently followed excessive wear of rivets, and was due to lack of brace supports back of the skip runners. 90 new steel dividers were purchased in the fall, of a changed design, to overcome structural weakness in the old dividers. The work of installing these new dividers was started several months ago. This work is being done gradually over the week-ends, the old dividers in the worst condition being replaced first. It will be continued until all the old dividers are replaced.

ATHENS MINE ANNUAL REPORT YEAR 1928

7. UNDERGROUND:

1. Underground in General:

Conditions in the mine have been good throughout the year. The success of the method of mining by separate steps ascending from west to east along the fault dike is now well established. Since the middle of the year the ore has been handled entirely by scrapers. Conditions in nearly all working places are ideal for scrapers; in a few places water interferes and ditching is necessary.

No changes were necessary in primary ventilation, but three blowers were installed on the -720' sub level, the new intermediate sub level between the sixth and eighth levels, to improve ventilation on the sub levels being mined above.

Considerable repairing was done during the year on the main levels, due to crushing of timber. This was due to rotting of treated timber that had been in service for several years, and also to comparatively new treated timber that broke down, due to excessive pressures. A systematic repair program has also been under way for the past six months to open up all ventilation drifts and raises, many of which were partially crushed.

The mine operated on the same wage achedule in 1928 and 1927. a. Comparative Mining Costs:

(2) Wages:

(a) Comparison or Product	1928	1927	INCREASE	DECREASE
PRODUCT Coduction, 1928 -	241,590	232,748	8,842	
Underground Costs	1.248	1.245	.003	
Surface Costs	.225	.235		.010
General Mine Accounts	.082	.075	.007	a line and
Cost of Production	1.555	1.555		Contraction of the second
Loading and Shipping	.035	.031	.004	Ate nor day
Total Cost on Cars	1.590	1.586	.004	S 14.08
Depreciation - Plant	45,8	<u>34 8/4 212</u>	719,82	168.94
and Equipment	.138	.155		.017
Depletion	.082	.086	674.10	.004
Movable Equipment	.002		.002	
Development	.089	.089		
Taxes tons of ore min	.396	.434	followst	.038
Increment Depletion	.200	.200		Inc. in 1927
Central Office	.066	.058	.008	over 1926
Welfare, Safety, Hosp.	.032	.015	.017	.09
Cost Adjustment	- 7,33	.009	21	.009
Misc. Debits & Credits	.003(red)	.013(red)	.010 (red)	.17
Administrative Expense	.050	.050		
Total Cost at Mine	2.642	2.669		.027
No. of Days Operated	261출	260	1클	
No. Shifts & Hours	1-8 hr.	1-8 hr.		
Average Daily Product	921	895	26	
COST OF PRODUCTION:	Suppl	las 3	Labor Supoli	us Total
Labor	.898	. 70 .938 25	3.898 \$.687	.040
Supplies 218,297.00	.657	.617 75	.040	. 1.855
Total	1.555	1.555	.040	

The cost of production for the two years is exactly the same, a very unusual occurrence. The interesting feature is the decrease in labor cost being offset by a corresponding increase in supply cost. Labor costs decreased due to the use of more scrapers (the mine has operated 100% scrapers for the past several months). Supply costs increased due to expenditures of \$3,109.33 more in 1928 for scraper hoists. (.013 per ton), to more supplies

8. COST OF

OPERATING:

8. COST OF

OPERATING:

a. Comparative Mining Costs: (Cont.)

on account of using more scraper hoists, to more timber and explosives used, to more expense for personal injury on account of setting up a 2% reserve, and to more expense for loading and shipping on account of a larger tonnage shipped in 1928.

The decrease in total cost in 1928 of .027 per ton was in "Depreciation Account (Plant and Equipment)", and in "Taxes".

Amount 575.46 ... " "

b. Detailed Cost Comparison:

(1) Days and Shifts:

During 1928, the mine worked one eight hour shift, five days per week, the same as in 1927. There were 2612 days worked in 1928, and the average number of men employed during the year was 159, for a total of 43,6421 days. During 1927 the mine worked 260 days, and the average number of men employed during the year was 158, for a total of 43,234 3/4 days. Less rook drifting in 1928.

Sub Division.

Develo (2) Wages:

(6

The mine operated on the same wage schedule in 1928 and 1927.

- 4,990.76 (3) Comparison of Production: Production, 1928 -
 - 241,590 tons Production, 1927 -232,748 " Increase - -8,842 "

(4) Comparison of Number of Men and Wages:

	No. Men	No. Days	Amount	Rate per day
1928 -	159	43,6422	\$213,035.72	\$ 4.88
1927 -	158	43,234 3/4	213, 719.82	4.94
Increase	work, 1 an a	407 3/4	tons per men pe	er day, within
Decrease	ts 1927 there	were 5,222 tons	674.10	.06
	or 8,85 tons	per man per day,	or an increase	12 1928 of

(5) Tons per man per day:

The tons of ore mined per man per day were as follows:

Surface Underground Total	1928 23.66 7.23 5.54	<u>1927</u> 23.09 7.02 5.38	<u>Increase</u> .57 .21 .16	Inc. in 1927 over 1926 .09 <u>.28</u> .17
5) <u>Cost of Production</u> : 1928 - \$375,952.87 1927 - <u>361,978.43</u> Incr 13,974.44	Cost per ton, """	\$1.555 <u>1.555</u> .000	<u>Supplies</u> \$28,578.11 22,896.26 5,681,85	28.1% 21.1%

.000

2,0481

Cost per Ft.

9 2.56

	tions.	Total	Cost	S. DET D	an per C	ost per to	on 1927	
	Labor	%	Supplies	%	Labor	Supplies	Total	ľ
1928 -	\$217,040.17	57.75	\$158,912.70	42.25	\$.898	\$.657	\$1.555	ż
1927 -	218,297.00	60.25	143.681.43	39.75	.938	.617	1.555	
Increas	e In 1	928, th	15,231.27	9 new D	agereol.	.040	a oraper	
Decreas	e 1.256.83	coati	nir \$1.981.00.	five s	.040	and Incars	ot1-7and	

air scraper holsts, costing \$1,694.50, and two second-hand Sullivan 62 H.P. electric scrayer holats, conting \$750.00. charged out, a total of 04,455.50. In 1927 two Ingereoli-Rand air scraper hoists were charged, costing 31,344. . There was also more expense in 1928 for explosives, ser wire rope, for repairs to acraper hoists, and an increase, in other supplies due to a larger product.

2,329,65

ATHENS MINE NNUAL REPORT YEAR 1928

Avarage trics par pound.

Increase 2,339.10

1928 -

1927 -

Increase

Deamagaa

8. COST OF Stoping (Cont.) OPERATING

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

UNDERGROUND COSTS:

Development in Rock

1928 Amount	\$ 111.9	3 Cost	per ton	n, \$.00	00	let la
1927 Amount	575.4	.6		.0	02	
Decrease	464.5	3 explos	ives	.0	02	
TALL DISCOUNTS	Sub	Divisio	n.	10 m 1		
Inoreas Dr	ifting	Per Foo	t Rai	ising	Per fo	ot
1928 -	30'	\$3.70	N	one	In cost	100 7
1927 -	121 .	4.36	cated No	one	nereose	14
of powder u	sed. Me	ra 60% m	owdar us	is una	1 50 305	

Cost of fuse, oups, etc. 2,448.13

1928 Amount \$7,329.86 Cost per ton, \$.030 1927 Amount 4,990.76 " " " .021

951'

111'

840'

Sub Division. Drifting Raising Total

175'

Total amount for porder \$15,649.64 018,467.17

The decrease in expenditures and in cost per ton was due to less rock drifting in 1928.

1,097'

922'

Increase due to more drifting and raising in 1928. In 1928, there were 9,401 tons of ore mined in development

.009

010

2,048'

1.033'

1,015'

Cost per Ft.

4.83

1.25 Decr.

\$ 3.58

Development in Ore

3	+	-	-	4	-	~	
-	ъ	o	D	а	n	5	

Praming

work, at an average of 10.33 tons per man per day, while in 1927 there were 5,222 tons of ore mined at an average of 8.85 tons per man per day, or an increase in 1928 of 4,179 tons and 1.48 tons per man per day. bought from the Stephenson Mise equipment at a 27 two were bong 1928 Amount \$101,707.14 Cost per ton, \$.421 1927 Amount 102,455.27 " " " .440 749 77

Decrease	THE ME CAN LAD UP	THE ON CALL			
laval the _6601	Detail.	a traveline rank			
Labor	Eveluper and	Supplies			
1928 - \$73,129.03	71.9%	\$28,578.11	28.1%		
1927 - 79,559.01	77.7%	22,896.26	21.1%		
Decrease 6.429.98		Incr. 5.681.85			

In 1928, there were 232,189 tons mined in stoping operations, averaging 18.52 tons per man per day, while in 1927. 227,526 tons were mined, averaging 17.04 tons per man per day. The increase in 1928 was 4,663 tons and 1.48 tons per man per day.

In 1928, there were three new Ingersoll-Rand air scraper hoists, costing \$1,981.00, five second-hand Ingersoll-Rand air scraper hoists, costing \$1,694.50, and two second-hand Sullivan 62 H.P. electric scraper hoists, costing \$780.00, charged out, a total of \$4,455.50. In 1927 two Ingersoll-Rand air scraper hoists were charged, costing \$1,346.17. There was also more expense in 1928 for explosives, for wire rope, for repairs to scraper hoists, and an increase in other supplies due to a larger product.
binero.

THENS MINE INUAL REPORT YEAR 1928

Stoping (Cont.)

Fumping

1928 Amount 55,958,84 Explosives:

ravel monthly the sparse	1928	1927
Total pounds of powder	95,550	85,300
Average price per pound	.1429	.1462
Total amount for powder	\$13,649.54	\$12,467.17
Cost of fuse, caps, etc.	2,447.23	2,329.05
Cost of all explosives	16,096.77	14,796.22
Lbs. of powder per ton of ore	.3955	.3665
Cost per ton for powder	.0565	.0536
Cost per ton for all explosives	.0666	.0636
SALAR REAL REAL REAL REAL REAL REAL REAL	a second of the second	

Increase in 1928 was \$.003 per ton. Due to a lower cost per pound for powder, the increase in cost per ton was not as much as was indicated by the increase in pounds of powder used. More 60% powder was used in 1928, on account of more development drifting and raising, and more mining in tough ground.

There was a decremes in 1928 of 5,968,585 callons of

Timbering

Tramming

Underground Superintend

1928 Amount \$89,431.49 Cost per ton, \$.370 1927 Amount 78,122.88 " " " .336 Increase 11.308.61 .034

Detailed Cost of Timber.

1928	1927
\$15,902.66	\$13,033.35
13,258.08	10,255.02
29,160.74	23,288.37
.948	.891
6 26	
.1207	.1001
.0206	
	1928 \$15,902.66 13,258.08 29,160.74 .948 .1207 .0206

Cubic feet of air compressed in 199 In 1928, three second-hand single drum tugger hoists were bought from the Stephenson Mine equipment at a cost of \$469.00, while in 1927 two were bought at a cost of \$325. More timber was used in 1928, and in larger sizes, on account of more repairing of main level drifts, and more new development drifts. Repairs on the intermediate sub level, the -660', used for a traveling road, ventilation,

1928 Amount	\$25 921.00	Cost ner	ton	\$.107	Larger & Lo
1927 Amount	25,517.00	" "	"	.110	
Increase	404.00	Decreas	58	.003	
1928 Amount	020,008.80	Cost per	ton.	0.013	
1927 Ausoon's	Sub	Division.	. 10	.051	
Decrease	1,922.03	South parts	1928	8.4009	1927
Tramming		\$20	0,683	.43	20,768.02
Skips Tender	s & Bellmen	was due to	3,416	.89	3,157.41
Cleaning ski	p pitere for	ir shiftbo	1,820	.68	1,591.65

and for handling timber, were especially heavy in 1928

as mining approached this elevation.

as in 1927.

There was a small decrease in tramming expense and an increase in the two other accounts. The cost per ton decreased on account of a larger product.

Ventilation

1928 Amount \$3,938.84 Cost per ton, \$.016 .013 Compressors & Power Dr 1927 Amount 2,944.71 Increase 994.13 COME THE LINE, .003

Decrease

The increase in expense was due to purchasing one new #22 Anaconda type fan costing \$311.00 and putting two of the idle fans in service. There was also an increase in the amount of ventube charged out in 1928. 1927 -

Pumping

1928 Amount \$20,872.94 Cost per ton, \$.087 1927 Amount 21,713.16 " " " .093 Decrease 840.22 .006 twice during 1927.

1927 1928 Hand Traming Equipmen Total gallons of water pumped 120,178,303 127.086.869 Gallons pumped per minute 228 242

> There was a decrease in 1928 of 6,908,566 gallons of water pumped, or 14 gallons per minute. Labor cost remained the same; the decrease was in supply cost for current. efore there was very little excepts in 1020.

Compressors & Air Pipes

1928 Amount	\$34,005.62	Cost per	ton,	\$.141
1927 Amount	32,735.38	10 11 SIT		.141
Increase	1,270.24			.000
	Sub	Division.		
	Sub	1928	1	1927
Compressors		\$29,388.9	61927	\$28,425.68
Air Pipes	ni Motor #	4,616.6	6109.	4,309.70
Locamovives		1,105,68 1	.956.	44

Cubic feet of air compressed in 1928 - 710,640,000 Cubic feet of air compressed in 1927 - 679,815,000 Cost per thousand cubic feet in 1928 - \$.0419 Cost per thousand cubic feet in 1927 - .0418 Decrease in departer and Motor due to lune

The increase in 1928 was 30,825,000 cubic feet, at an increase in cost of \$.0001 per thousand cubic feet. In 1928 there were six more air scraper hoists put in service during the year, and three which operated a few months in 1927 were in service all of 1928.

The increase in air pipes was due to extra piping for air scraper hoists put in service in 1928. Larger air lines were installed in the raises. Decrease in Main Line Cars due to less realize to the the

Underground Superintendence

Pumping Machinery

1928 Amount \$10,008.80 Cost per ton, \$.042 1927 Amount 11,930.83 11 11 11 .051 Decrease 1,922.03 .009 1927 Amourot 1.12 18.

The decrease in 1928 was due to not having an underground foreman. There were four shiftbosses in 1928, the same as in 1927, here were eight pump plungers and bushings

replaced, while in 1927 there were only four replaced. There was also a charge on account of replacing a section of page cable in 1928, which was burnt through.

20

2

MAINTENANCE ACCOUNTS:	
and have the set of the second set of a	1928 Amount \$201,525.88 Goat per ton, \$1.248
Compressors & Power Dr	·ills Amount 289,909.60 1.245
	1928 Amount \$ 364.87 Cost per ton. \$.002
	1927 Amount 1.471.22 " " " .006
STRPACE CORNE.	Decrease 1,106.35 .004
DUILDEND OOD AN F	
Noisting	Repairs to compressors To power drills
TOTPACHO	1928 - \$ 364.87 None
	1927 - 1.471.22 None
	Decrease 1.106.35
	The decrease in repairs to compressors was due to
*	replacing piston rings in the Ingersoll-Rand compressor
	twice during 1927.
	The increase in 1925 was 5,756 tens, and a decrement in
Hand Tramming Rauinmer	tlanth of ning fost.
mente ar emanue aderbuot	1928 Amount \$ 9.95 Cost per ton \$.000
Stating Ora	1927 Amount 423.20 " " " " 002
Deserves or a	Decrease 413.25
	One commence have menlaged tramming by out level care
	and therefore there was very little evenue in 1928.
	and therefore there was very little expense in 1920.
Plaatnia Man Paulamon	+ while in 1990 there were 295 F40 tone stocked; as increases
Preceire tram Pdarbmer	1928 impunt \$6 131 34 Cost non ton \$ 025
1 / The Mandom P	1920 Amount 5 897 03 # # # 025
Martin Marriel	Transaco 304 31 000
Dry House	Increase 504.51 .000
	1000 Another payment is the Division and 1000
	Compare and Motor & 21 50 & 100 00 & 000000
	Constitute 1 145 49 1 056 94 011 76
	1,143.40 1,750.04 011.00
	Wein Line Macelia 1 005 57 556 59 1 349 00
	Main Line Come 9 500.57 550.50 1,040.55
General Burrade Expen	Main Line cars 2,300.52 2,407.50 100.70
	1928 Amount S6,058.30 Cost per ton, 9.020
	becrease in Generator and Motor due to less repairs to
	generator. 50.86
	Decrease in Locomotives due to less repairs to motors in
	1928. In 1927 two armatures were rewound and two sets of
	locomotive wheels were replaced.
	Increase in Wiring due to extending and repairing trolley
	19lines. due to more repairs to reads and fencia in 1927.
	Increase in Main Line Tracks due to more repairs and exten-
MAINTENARSE LCCOUNTS:	sions to tracks in 1928.
	Decrease in Main Line Cars due to less repairs to cars in
Hoisting Bouigment	1928.
	1928 Amount 3 8,840.34 . Cost per ton, 1.027
Pumping Machinery	1927 Amount 11,063:97 " " " " (48
	1928 Amount \$1,691.07 Cost per ton, \$.007
	1927 Amount 1,202.62 " " " .005
	Increase 488.45 .002
	1928 - \$3,251.55 \$2,548,76. \$5,045.03
	In 1928 there were eight rum nlungers and hushings

replaced, while in 1927 there were only four replaced. There was also a charge on account of replacing a section of pump cable in 1928, which was burnt through.

Total Underground Costs

10

	1928 Amount \$301,523.85 Cost per ton, \$1.248 1927 Amount 289,909.60 " " " 1.245 Increase 11,614.25 .003
Cos TS :	Shop darges of 2000, and repairs to hrist motors and bell signals. Decrease in chur we to skirs and ship rouds due to less
	1928 Amount \$22,745.03 Cost per ton, \$.094 1927 Amount 21,921.80 " " " .094 Increase 823.23 .000
	In 1928, there were 241,977 tons of ore and rock hoisted from an average depth of 2100 feet. In 1927, there were 233,221 tons hoisted from an average depth of 2109 feet. The increase in 1928 was 8,756 tons, and a decrease in depth of nine feet.
Ore	1928 Amount \$5 602 01 Cost non ton \$ 027

 1928 Amount \$5,602.01
 Cost per ton, \$.023

 1927 Amount 5,139.13
 " " • 022

 Increase
 462.88

In 1928, there were 239,678 tons placed on stockpile, while in 1927, there were 228,549 tons stocked; an increase of 11,129 tons in 1928.

Dry House

Top Tran Dau 1 -----

SURFACE (

Hoisting

Stocking

1928 Amount 01,925.51 Cost per ton, 0:008

1928	Amount	\$5,432.17	Cost	per	ton,	\$.023
1927	Amount	5,386.89	**			.023
Inc	rease	45.28	Divis	ston.	100	.000

The heating charge to dry house in 1928 was \$3,885.83; in 1927 it was \$3,898.42; a decrease in 1928 of \$12.59.

808117

General Surface Expense

 1928 Amount \$6,068.30
 Cost per ton, \$.025

 1927 Amount 6,119.16
 " " .026

 Decrease
 50.86

rollers replaced during the year.

racks and Cars

The charges to improvement and care of grounds in 1928 were \$646.08, while in 1927 they were \$636.42; an increase in 1928 of \$9.66. The decrease in surface expense in 1928 was due to more repairs to roads and fences in 1927.

MAINTENANCE ACCOUNTS:

Nacion Manashina & Deal

Hoisting Equipment

1928 Amount \$ 8.840.34 Cost per ton, \$.037 1927 Amount 11,063.97 11 11 11 .048 .011 Decrease 2,223.63 Sub Division.
 Sub Division.

 Mach. Parts
 Skips & Skip Roads

 1928 \$3,251.55
 \$2,543.76
 Wire Rope \$3,251.55 \$2,543.76 \$3,045.03 1927 - 1.885.07 4.443.71 4.735.19 Increase - 1,366.48 Decrease - 1,899.95 1,690.16

45.90

.008

.006

.002

2.49

ATHENS MINE NNUAL REPORT YEAR 1928

Laboratory

Hoisting Equipment (Cont.)

Increase in Machinery parts for 1928 due to new shaft and turnbuckle from Lake Shore Engine Works for cage hoist. costing \$616.50. There was also an increase in Hard Ore Shop darges of \$200, and repairs to hoist motors and bell signals. Decrease in charges to skips and skip roads due to less repairs to skips and skip roads on account of accident of May 13th, 1927. In 1928, two new 1 3/8" hoisting ropes, one costing \$1,773,

and the other costing \$1,172, were charged out, while in 1927 two 1 3/8" ropes costing \$2,437.70 and one 1 3/8" special Leschen rope costing \$2,206.31 were charged. One of the new ropes charged out in 1927 replaced the rope that was broken in the accident of May 13th.

Increase 479.75 .001 The increase in 1928 was due to repairing and replacing the steel dividers in the skip compartment of the circular shaft, water pipe and to the dry house benches. Charges to coal dock mure for repairs to dook. The charges to tunnel

1928 Amount \$1,923.31 Cost per ton, \$.008

11 11 11

Shaft

166

ak Ta

Top Tram Equipment

(TTWERLE MINE ACCOUNTS:

Insurance

Engineering

1928 Amount 654,508 Sub Division. er ton, \$.226

1928 Amount \$2,229.67 Cost per ton, \$.009

1927 Amount 1,749.92 " " "

505.10

118,74

1927 Amount 1,418.21

Increase

Decrease

	1928	1927	INCREASE	DECREASE
Engine and Motors \$	62.98	\$ 102.40	A low line	\$ 39.42
Tracks and Cars	808.17	904.36		96.19
Wire Rope	695.52	202.25	\$493.27	
Sheaves, Rollers, etc.	356.64	209.20	147.44	

Decrease in Engines and Motors in 1928 due to less repairs. Decrease in Tracks and Cars in 1928 due to less repairs to cars.

In 1928, there were 8,070 feet of 5/8" wire rope charged to top tram, while in 1927 only 2200 feet were charged. Increase in Sheaves, Rollers, etc. in 1928 was due to more rollers replaced during the year.

as due to less time spent by engineer an under-

Docks, Trestles & Pockets

A younger angine wie employed mine. 1928 Amount \$1,271.04 Cost per ton, \$.005 11 11 11 1927 Amount 1,231.19 .005 Increase 39.95 .000

Analysis

In 1928 two bents of wood stocking trestle were erected at the end of the southeast steel trestle, and legs and timbers were framed for six more bents.

The 1927 charges cover the cost of replacing the decking timbers on the north permanent steel trestle, painting part of the steel trestle, and repairing the skip dump.

ATOC FA

1000 Amora

Mine Buildings

1270 Hulomic \$220.04 ODSt bet.	1011, p.002	the Discrete arts	
1927 Amount 596.88 " "	.003	foried in 1926	
Decrease 200.34	.001	\$.146545, whi	1
10 1927 there were 16,622 dete	rad an tions wo	rked, at a co	s
Detail of Mine H	uildings.	1925 of 720	
determinations and 1.008583 pe	1928	1927	
Office	\$ 54.75	\$ 64.43	
Shops	9.24	68.53	
Stables	per ton . +1.01	18.97	
Shaft House	m m	6.11	
Engine House 1,941.90	30.98	94.01	
Boiler House	2.27	8.42	
Dry House this account was cha	209.35	229.90	
Coal Dock he mine to be used as	76.31	of for person	3.
Storage Building	-	49.10	
Laboratory	-	46.90	
Transfer House		2.49	
Tunnel mount \$364.29 Cost por	13.64	8.02	
3007 (manual 000 20 - 4 H			

In 1928 the charge to office was for interior decorating. The charges to shops, engine house, and boiler house were for repairing windows and doors, and replacing broken window lights. The charges to dry house were for repairs to hot water pipe and to the dry house benches. Charges to coal dock were for repairs to dock. The charges to tunnel were for repairing the sheet iron covering and replacing broken window lights.

Telephones & Bafety Da	Jvides
Total Surface Costs	1928 Amount \$54,508.41 Cost per ton, \$.226
	1927 Amount 54,627.15 " " " .235
ALC: ALC: ALC: ALC: ALC: ALC: ALC: ALC:	Decrease 110.14 .005
GENERAL MINE ACCOUNTS:	Sub Division. 1928 1941
Tu	Lighting shaft and levels \$739,69 . 060 .66
Insurance	1000 treamt à 10.00 fact per ten à 000
-	1988 Amount \$ 19,92 Cost per ton, \$.000
	Increase 30.90 .000
	20,97 20,57
Engineering	the transfer to don to the busic light of some lights
have been build and	1928 Amount \$1,850.71 Cost per ton, \$.008
	1927 Amount 2,315.46 " " " .010
	Decrease 464.75 .002
Special Appendes	
224 - 224 - 14	Decrease due to less time spent by engineer on under-
	ground work at the mine. A younger engineer was employed
	at a lower salary for the full year, as compared with nin
	months in 1927.
	In 1928 this account was charged with an assessment
Analysis	of 365.58 for the lake Superior Iron Ore Lasortation, and
	1928 Amount \$4,158.71 Cost per ton, \$.017
	1927 Amount 3,959.26 " " .017

199.45

Increase

.000

Personal Injury Expens

Surel Aspartment Expe

la

16

Analysis (Cont.) Mine Office

The Athens Mine samples are worked at the Negaunee Mine laboratory. The number of determinations worked in 1928 was 17.342. at a cost per determination of \$.148543, while in 1927 there were 16,622 determinations worked, at a cost of \$.1430 per determination; an increase in 1928 of 720 determinations and \$.005543 per determination.

Personal Injury Expense

1928 Amount,	\$4,463.71	Cost	per	ton,	\$.018	
1927 Amount,	2,521.81			036	.011	
Increase	1,941.90				.007	
The Increase	an in Control	J DPP	Inc.	00000	500 TICLD 1	drin . dr

8627288

In 1928 this account was charged with 2% of the labor cost at the mine to be used as a reserve fund for personal injury expense.

Sotal General Mine Accounts Safety Depar

9. EEPLORATIONS

10. TAXES:

T. Cuneur	Expense	AMOUNT	1619.920.	BI G	052	1 790	02. 8.0	
	1928	Amount	\$364.20	Cost	per	ton,	\$.001	73
	1927	Amount	278.65	93 .			001	0
	In	crease	85.55				.000	

There was an increase in labor of \$32.26 and supplies of \$53.29. The increase in supplies was due to buying a pair of new blankets for the first aid room, an increase There were no explin first aid supplies, and the cost of cigars for all employees for working three months without an accident.

Telephones & Safety Devices

and Eugeliss.

Lots 31 to 38 (C purchase, 1927 MARVEY PLAT Lots 1, 2, 3, Po.

Collection Fees

STRAIN STADITION

		1928 Amount	\$911.50	Cost per ton,	\$.004
	Saw Coursel	1927 Amount	838.09	76 385.00	.004
Ore in t	Steole, lies	Increase	73.41	10,000000	.000

The comparison of the total taxes for the Athens Iron Wining Company for

Sub Division.

23,595,87 1928 1927

22,700

1927

Lighting shaft and levels	\$739.69	\$606.66
Mine Telephones	112.39	178.58
Safety Gates and U.G. Improvement	15.79	27.93
Sign boards, signals, etc.	17.66	4.35
Fire equipment	25.97	20.57

The increase is due to the installation of more lights on levels and in raises used for traveling roads between levels and air ways. Better lighting is a safety measure.

Special Expenses 11, 12, 15, 1419, 20, 22, 23

11,	12,	18	14,	1928 Amount	\$152.06	Cost	per	ton,	\$.001
123	20,	22,	20,	1927 Amount	95.65		=	=	.000
28,	89.4	30	, 72,	Increase	56.41	0	76	7407	.001
Co11	1000:	1,011	FOOS					10.34	

In 1928 this account was charged with an assessment of \$65.58 for the Lake Superior Iron Ore Association, and Par Mate another item of \$86.48 by the Cleveland Office. Total City of Negaunee Tax Athens Mine 2 of City Tax

	ATHE	NS MINE L REPORT			
	YEA	<u>R 1928</u>			
11. / COIDENTS					
Mine	Office				
PERSCEAL	1928 Amou	nt \$7,999.80	Cost per ton.	\$.033	
IEJURY:	1927 Amou	nt 7.443.74		.032	
and the second second	There were no fateIncreas	556-06	thens Mine in	192,001 1927	. There
	were 12 accidents as doman	0 000000	1927. a decra	ase of three	for the
	vasy. The tuelve solidents	Cub B:	miction College	1	
	Three man all the behavior	Sub Di	VISION.	1 0001	
	THEY WILL BELOW THE	Direct Cha	rges <u>Centra</u>	al Office	A.F.
	1928 -	\$855,19	\$7,1	14.61	
	1927 -	837.29	6,6	06.45	
	Increase .	- 17.90	home for th5	38.16	nenn*
	and he is still unable to w	DYK:			
	The inc:	rease in Centr	al Office expe	ense was due	to a
	charge for 1928.	r a proportion	n of central wa	arehouse over	rhead in
Tota	1 General Mine Accounts				
12.	1928 Amour	nt \$19 990 61	Cost new ton	\$.082	
CONSTRUCTOR	1007 Amou	10 919, 560.01	tost per ton	1, 000	
ATED	1927 Amou	9 479 07		.075	
100 COLUMN - 500	Increase	3 2,410.90		.007	
	Contraction and start start from a formalia				
9. EXPLORATIONS	Now Annahmahian				
AND	New Construction:	intelle and			
FUTURE	There was no new constrat	1200 In 1938.			
EXPLORATI ONS:					
13, ROUI HERIT	There were no explorations a	at the mine in	1928.		
AND					in an
10. TAXES:	The comparison of the tota	al taxes for t	he Athens Iron	Mining Com	any for
BOULFREN T:	the years 1928 and 1927 are	as follows:			
Bi	Steam Thornels:	1 9	28	19	27
	The letters will sorted a	VATITATION	MATER	WAT TTA MTON	MATTR
	Peoltr (Mor Commission)	2 259 000	76 779 00	2 377 000	76 771 00
	Realty (Tax commission)	2,259,000	10,000.00	2,000,000	10,001.09
1	ore in Stock, Equipment,				
D+	and Supplies,	541,000	18,282.01	715,000	23, 395.37
	STERLING ADDITION	Te Mars extends	il source (
	Lots 31 to 38 (C.C.I. Co.	will be extend	led ely bent		
	purchase, 1927)	4,600	155.44	4,600	150.46
	HARVEY PLAT BAR to dr	y out in stock	pile for at le	east three as	rictitis
	Lots 1. 2. 3. Portion of	1,300	43.93	1 300	42.53
	Total	2 805 900	94 819 78	3 053 900	99 917 17
G.,	Collection Deer	2,000,000	040.70	0,000,000	55,511.41
	MOMAT ODDDA MTTER A MTTER	Por hasting to	940.19	1 1400 1414	999.17
	TOTAL OPERATING ATHENS MINE	Sol en anna de bée	95,767.97	Snot and the	100,916.64
	Rented Buildings (Harvey	and the bould be a	TOPH OF PERS	THE MUTHERN	
	Plat) Lots #5, 6, & 7.	7,900	266.92	7,900	258.47
	STERLING ADDITION	a greatment by	ant installed.	x230 302.00 0000	Les de Maren
	Lots No!s. 1, 2, 3, 7, 8, 9.	a timber as co	espared with h	and make of	
	11, 12, 13, 14, 15, 16, 17,	18. Metlgation	i is being made	a to be lamely	or could,
	19, 20, 22, 23, 24, 25, 26	27 acriy erous	h to permit a	the later to	
	28 29 30 72 73 74 2 75	22 700	767.07	22 700	749 69
	Collection Poce	22,100	101.01	22,100	146.00
	COLLECTION LEGS		10.34		10.01
51	TOTAL RENTED BUILDINGS	30,600	1,044.33	30,600	1,011.16
	TOTAL ATHENS IRON MINING CO.	2,836,500	96,812.30	3,084,500	101,927.80
	Tax Rate	c sages It mo	3.379		3.272
	Total City of Negaunee Tax	ave more servi	571,121.55	over slippe of	589,686.71
	Athens Mine % of City Tax	s to justify i	te cost 17%	is nearly (171%

that of other ropes. The other skip rope wore out in Lay and was replaced. It want in service in February, 1927, was reversed July 17th, and taken off in May, 1928. It was in service about 16 months, and hoisted 139,129 tags. Two new ropes were put on in 1928. Further experiments are being made with different ropes, in the hopes that the rope best suited to conditions at this mine will be found.

There were no uniquely and the daring the year, only show repairs to buildings and ecuin

There were no fatal accidents at the Athens Mine in 1928 or 1927. There were 12 accidents as compared with 15 in 1927, a decrease of three for the year. The twelve accidents were classified as follows: Three were slight injuries, the men returning to work in one week.

Three were injuries that kept the men home for two weeks.

Five were injuries that kept the men home for two months.

One was an injury which kept the man at home for the past six months. and he is still unable to work.

One man who was totally disabled in July, 1926, received compensation throughout 1928, and one man who received injuries in 1926 was paid the difference in wages during 1927 and 1928.

18. NATIONALITY 12.

260

NEW CONSTRUCTI ON AND

This has been prepared under two statements. The first gives the report as ordinarily submitted to the Correcty. It shows the metionality of the PROPOSED NEW exployees as to perentage. The serves responses the sectoral ties into CONSTRUCTION: CONSIGNATION and aner income bara the latter being along the second seco

80

a. New Construction:

There was no new construction in 1928.

13. EQUI PMENT AND

11. ACCIDENTS AND PERSONAL

15. POwert

17. CONDITION

INJURY:

PROPOSED

EQUIPMENT:

a. Steam Shovels:

The Athens Mine rented a shovel during the year, as none has been bought for the mine.

b. Stockpile Trestles:

The southeast steel trestle was extended two bents (wood extension) in 1928, and early in January will be extended six bents further. The wooden extension will provide a second stocking ground for Mitchell ore, and permit this grade to dry out in stockpile for at least three months before being shipped.

c. Timber Treating Plant:

The present concrete wat for heating timber, built in 1927, did not prove a success, due to cracking which caused a loss of treating solution. During the coming year, either steel vats will have to be installed inside the concrete vats, or a pressure treatment plant installed. The pressure treatment doubles the life of the timber as compared with hot and cold treatment in the open air. A careful investigation is being made to determine costs. and some plan will be adopted early enough to permit starting up the treating plant in the summer.

g. Hoisting Ropes:

The special Leschen hoisting rope was turned end for end on January 8, 1928, and taken off December 14th. It was in service about 19 months, and hoisted 186,865 tons. It gave more service that the other types of rope. but not enough extra service to justify its cost, which is nearly double that of other ropes. The other skip rope wore out in May and was replaced. It went in service in February, 1927, was reversed July 17th, and taken off in May, 1928. It was in service about 16 months, and hoisted 139,129 tons. Two new ropes were put on in 1928. Further experiments are being made with different ropes, in the hopes that the rope best suited to conditions at this mine will be found.

14. MAINTENANCE AND REPAIRS:

There were no unusual repairs during the year, only minor repairs to buildings and equipment.

15. POWER:

1; GENERAL:

S. SURPA

Power was supplied by the Cliffs Power and Light Company, a subsidiary of the Cleveland-Cliffs Iron Company. The rate per kilowatt hour was $l\frac{1}{2}$ cents, the same as in the previous year.

17. <u>CONDITION</u> <u>OF</u> <u>PREMISES</u>:

The grounds around the buildings were kept in good condition during the year.

18. <u>NATIONALITY</u> <u>OF</u> EMPLOYEES:

10. TAXES:

Re

This has been prepared under two statements. The first gives the report as ordinarily submitted to the Company. It shows the nationality of the employees as to parentage. The second separates the nationalities into foreign-born and American-born, the latter being shown as Americans.

As to Parentage	1928	PERCENT		1927	PERCENT
English	34	21		38	24
Finnish	60	38	ATES	58	37
Italian	21	13	0.0.00	20	13
Swedish	15	9		13	8
Irish	3	2	1.80	2	
Scotch	1		0.43	1	2
French	17	11.	5.99	18	11 0 8014 20
German	4	3		4	3
Norwegian	4	3	6.89	4	2
Total	159	100%	.37	158	100%
Tokal			12 10.0	10.40 10	an and a dar and a star

As to Birth	Total	American born	Foreign born	í
English	34	21	13	
Finnish	tax = 60	1020, 20	40	
Italian	21	4	17	
Swedish	15	10	5	
Irish	3	3		
Scotch	1	1		
French	17	17		
German	4	4		
Norwegian	4	4		
Total	159	84	75	
Percentage	100%	53%	47%	

NORTH JAC	KSON MINE
ANNUAL	REPORT
YEAR	1928

1. GENERAL:

.

Re

The North Jackson Mine has not operated since 1908.

6. SURFACE:

4. ESTIN

a. Buildings:

During 1928 the old Jackson barn was torn down and the material salvaged for use in the new location. The building had been unused for many years.

The fences around the pits sere repaired during the somer of 1928.

The top tram shanty on the landing of the headframe at #5 Open Pit was torn down, as it was being used as a hang-out by boys living in the neighborhood.

c. Roads: Total,

The City of Negaunee widened and paved with tar penetration surface the road between the end of Iron Street and the Jackson Monument. Concrete walls were built along the edge of the open pits.

10. TAXES:

8. COST OF

10. TAXES:

	19:	2 8 mayne 22	192	7
47% of Sec. 1-47-27, except certain small parcels and right of way, Collection Fees.	235,000	7,941.36 79.41	235,235	7,696.42 76.96
Total, Bented Buildings:		8,020.77		7,773.38
Old Jackson Office, Collection Fees,	500	16.89 .17	(Included and in So.	d in above Jackson.)
Total,	7350	17.06	THOLANG	-1001 and (
Total Taxes North Jackson,	0 158.15	8,037.83	34+85	7,773.38
Increase due to higher tax	rate in 192	125.28	35.86	
Taxes, Welfare, Safety, Hosp.	9,045+69 195.83	8,765.73	278.96	9.44
Sotal Cost at Mine,	9,399,65	9,095.30	304.35	
DESCRIPTION	. Valuation	7 2 8 Taxes	Valuation	127 Dittati

DESCRIPTION	Valuation	Taxes	Waluation	Texper
3% of Bec. 1-47-27, arcept				
ight of way, Collection Fees, .	285,000	8,955.14	265,265	8,678.94
otal Taxes, South Jackson,		9,044.69		8,765,73

SOUTH JACKSON MINE ANNUAL REPORT YEAR 1928

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0.6

1. GENERAL:					
	There have not been any open	rations cond	ucted at the	South Jackso	n Mine
	for the past four years. The	crusher pla	nt has not op	erated since	1926.
6. SURFACE:	The fences around the pits w	were repaire	d during the	summer of 19	28.
	a. Buildings:				
4. ESTIMATE O	Two dwallings belonging to	the Locy His	ne, situated a	No the persh	1020
ORE RESERV	ES: of the County Hoad, were sold	during 1926	8, and the gro	and reptals	
	a. Available Ore:	tnent.			
	Above present pit available	by present	system of min	ing:	
10. TAXES:	On Southwest side,		35,000	tons	
	North of Lucy Pit.	192	8 5,000		4
	South and Southwest of Luc	v Pit.	3,000	INTER AND FAR	OL: WHE
	Total of See 6 47.96		43 000	11	
	bug of bull of star and		,		
	Bolow present nit and shows	duping the	mal amailahl	a her milling	
	West of Grusher	uramage tu	106 000	e by milling	ST PORTZ
	west of grusher,		100,000	tons	16,58
	Area below bottom of prese	ent pit	1,733,81		1,688,64
	shown by churn drilling,		105,226		
	The Total, to was higher in	1920,	291,226		
	GRAND TOTAL,		334,226	tons.	
	c. Estimated Analysis:				
	Iron Phos. Sil	lica Alum.	Mang. Lime	Mag. Sul.	Igni. Moist.
	Natural 34,55 .066 36	6.00 1.42	2.00 .435	175 .010	2.00 7.00
8. 0090 00					
OTODI OF					
OPERATING:	a damanating with the damate				
	a. Comparative Mining Costs:			a chinese and a	State State
		1928	1927	Increase	Decrease
	PRODUCT	0	0		
	Underground Costs,	0	0		
	Surface Costs,	158.13	123.28	34.85	
	General Mine Accounts.	0	0		
	Total as per Cost Sheet.	158.13	123.28	34.85	
	Taxes	9 044 69	8 765.73	278.96	
	Welfare Safety Hoan	196 83	206 20	210.00	0.46
	motol doct of Wine	0 700 65	0.005.70	704 75	7.40
	Total Cost at Mine,	9,099.00	9,095.30	304.35	
10					
TO. TAXES:					
		19	28	19	27
	DESCRIPTION	Valuation	Taxes	Valuation	Taxes
	53% of Sec. 1-47-27, except				
	certain small parcels and	2			
	right of way.	265.000	8.955.14	265 265	8.678.94
	Collection Rees	,	89.55	200,200	86.79
	Motal Mayor South Tackson		9 044 60		0 765 77
	Total laros, bouth Jackson,		9,044.09		0,100.10

1. GENERALS

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LUCY MINE ANNUAL REPORT YEAR 1928

1. GENERAL:

The Lucy Mine has not been operated since 1911.

be made to remove all the

6. SURFACE:

2. PRODUCTION

a. Buildings:

PRANTYLINE Line Local

Two dwellings belonging to the Lucy Mine, situated on the north side of the County Road, were sold during 1928, and the ground rentals transferred to the Land Department.

"Jist List, shed all the ary Was

provide the reasonal from the property

in the destruction was short for

10. TAXES:

Grade or tre	1 9	28	19	27
DESCRIPTION	VALUATION	TAXES	VALUATION	TAXES
except Right of way and	0			35,547
roads,	50,500	1,706.25	50,500	1,652.12
Collection Fees,		17.06	and the second second	16.52
Total Taxes, Lucy Mine,	ly in this.	1,723.31		1,688.64

The tax rate was higher in 1928.

This was due in part to alconing the effective frequence and complex the ere against the accompile, where is would be leaded to the abovel. Here is only a few thousand sizes of institution baff in this pile, together with 2,600 tone of high memphorus, or sortimeted, ore. The columns of the this pid without is shown be channed up before loading shorts in the most stockpile work to this and 1927.

c. Stockpile Leveler

Grade of cos	1920	1927	Sections
Austinpart,	50,352	77,835	
stra tinucou.	2,672	2. 6.V.R.	0
Total;	71,024	60,807	0,483

Including the overran, there is in excess of 60,000 terms of any is stock.

C. Una Utatement:

all brewster 1	Austin Bessensr	Austin-	Anation		
On Hand Jan. 1, 1928, Output for Year	0	77,835	2,572	100,001	
Total Shipmonte Balance on Hand, Decrease in Output, Decrease in Ore on Hand	0	77,835 9,485 68,352	2, 572 0 2, 572	60,807 9,468 71,094 19,067 9,488	113,854

1928 - Mine idle during per-

mber 12, 1927.

AUSTIN MINE ANNUAL REPORT YEAR 1928

1. GENERAL:

100

This mine was abandoned on September 12th, 1927, when all the ore was mined. All underground and surface equipment was removed from the property and the lease surrendered on November 26th, 1927. Provision was made for reserving the land on which the ore is stocked for two years, or until November 26th, 1929. There is a clause in this agreement which permits a one year renewal, or until November 26th, 1930. Provision must therefore be made to remove all ore by the end of the shipping season in 1930.

of shipments back near to the avarage of the ors in ato

SHIPMEN TS & INVEN TORIES:

2. PRODUCTION

0037 OF

8.

b. Shipments: some expense for building feaces around caves of the lutin

brobered' reduries of arous	Pocket	Stockpile	Total	Total Last
Grade of Ore	Tons	Tons	Tons	Year
Austin Bessemer,	0	0	0	20,693
Austinport,	0	9.483	9,483	44,654
Total	0	9,483	9,483	65,347
Total Last Year,	51,926	13,421	65,347	20.000
Decrease, 1928,	51,926	3,938	55,864	

Shipments decreased greatly in 1928, as other grades of ore were used in place of Austinport. The ore shipped in 1928 came from the old pile stocked in 1923, and did not average as high in iron as had been expected. This was due in part to cleaning the stockpile grounds and dumping the ore against the stockpile, where it would be loaded by the shovel. There is only a few thousand tons of Austinport left in this pile, together with 2,600 tons of high phosphorus, or Austinwood, ore. The balance of ore in this old stockpile should be cleaned up before loading starts in the new stockpile made in 1926 and 1927.

c. Stockpile Inventories:

Grade of Ore	1928	1927	Increase	Decrease
Austinport,	68,352	77,835	at the section	9,483
Austinwood,	2,672	2,672	Providence of	0
Total,	71,024	80,507		9,483

10. TAXES:

Including the overrun, there is in excess of 80,000 tons of ore in stock.

f. Ore Statement:

39.05 " " Sec. 28-45-25. Personal Property.	Austin	Austin-	Austin-	280	Total Last
Carol.	Bessemer	port	wood	Total	Year
On Hand Jan. 1, 1928,	0	77,835	2,672	80,507	66,787
Output for Year	0	0	0	0	79,067
Total	0	77,835	2,672	80,507	145,854
Shipments	0	9,483	0	9,483	65,347
Balance on Hand,	0	68,352	2,672	71.024	80,507
Decrease in Output.	Nor. Agramment	01 12 1250.		79.067	
Decrease in Ore on Hand,	and the later of the			9,483	

VARIATION DI CON

1928 - Mine idle during year.

1927 - Mine idle after being closed September 12, 1927.

USTIN MINE NNUAL REPORT YEAR 1928 3. ANALYSIS: b. Average Analysis on Straight Cargoes: Silica Mang. bigerevising 11s Phos. Grade Iron . traitico, std., (All mixed) Austinport Some farther dian sta dano in 1926, as it is The analysis of ore shipped in 1928 was nearly 3% under the average analysis of ore in stock. The remainder of the old stockpile will probably not average any higher than the ore shipped in 1928, but as there are only a few thousand tons here, loading from the new pile will bring the grade of shipments back near to the average of the ore in stock. 6. SURFACE: There was some expense for building fences around caves on the Austin property, required by state law. Production by Grades: 8. COST OF Hone. Mine abandened July 29, 1927. OPERATING: a. Comparative Mining Costs: 1927 1928 Decrease Increase 79,067 PRODUCT 79.067 Underground Costs 72,653.56 97.08 72,556.48 Surface Costs 1.009.00 6,839.69 7,848.69 General Mine Accounts 3,980.56 12.099.86 8,119.30 Cost of Production, 5.086.64 92.602.11 87.515.47 Loading & Shipping 445.98 4.181.40 3,735.42 Total Cost on Cars, 5.532.62 96.783.51 91,250.89 Taxes 2.550.12 3.270.51 720.39 Central Office 173.07 6,091.18 5.918.11 Welfare, Safety, Hosp. 1,422.43 21.89 1,400.54 Cost Adjustment, 2.994.22 2.994.22 110,415.01 Total Cost at Mine 8.277.70 102,137.31 The high cost in 1928 was due to setting up an amount sufficient to pay the balance of compensation due former employees for injuries for which they are still receiving compensation. The amount this set up was approximately \$3,385.00, or 40% of the total expenditures for the year. 2. Dispanetron Ore. 10. TAXES: suin) Stephapeon Defes, 1928 1927 DESCRIPTION VALUATION VALUATION TAXES TAXES 346.37 Acres in Sec. 20-45-25, 20,000 576.84 39.05 " " Sec. 28-45-25, 280 8.09 Personal Property, 80,000 2,524.87 92,000 2,653.20 Total. 80,000 2.524.87 112,280 3,238.13 Collection fees, 25.25 32.38 Total Taxes, 2,550.12 3,270.51 Tax Rate per \$100, 3.1561 2.885 tons of any Er a Taxes decreased due to a lower valuation in 1928. exhausted, leaving a maralderable

grades are necessary to class ap piles that interfere with I walles of Staphanson and Morthdale ore.

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STEPHENSON MIN ANNUAL REPORT YEAR 1928

1. GENERAL:

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The Stephenson Mine was abandoned on July 29th, 1927. All underground equipment was salvaged and part of the surface equipment, trestles, etc., dismantled. Some further dismantling work was done in 1928, as it is necessary to have all material removed from the property by the time the ore is shipped, when the leases will be surrendered. Shipments from stockpile increased in 1928, and the Stephenson ore in stock will soon be all shipped. This leaves a large tonnage of Stephenwood or high phosphorus ore, which moves slowly. It is hoped sales of this grade will increase in 1929, otherwise it will require many years to clean up this grade. Shipmonts

30,927 44,000

2. PRODUCTION. SHIPMENTS & INVENTORIES:

3. ARALYBIS:

6. SURPASS

Production by Grades: None. Mine abandoned July 29, 1927. 1927 - Mine closed July 29

Balance on Hand

Decrease in Gatput

Decrease in Ore on Hand

65,799

b. Shiphends:			
	Pocket	Stockpile	Total
Grade of Ore	Tons	Tons	Tons
Stephenson Lease, Sec. 20:	A1.150%	Shi Me	
1. Stephenson,	0	192,792	192,792
2. Stephenwood,	0	12,676	12,676
Total Stephenson Lease,	0	205,468	205,468
C. & N.W. Ry. Co. Lease, Sec. 29	:		
1. Northdale,	0	3,267	3,267
2. Northwood,	0	0	0
Total C. & N.W. Railway Co. Leas	e, 0	3,267	3,267
Grand Total,	0	208,735	208,735
c. Stockpile Inventories:	sell from the be	ballen ma loade	1 452
shiged to various mises, the black	1928	1927 Increase	Decrease
Stephenson Lease, Section 20:			
1. Stephenson Ore.	63,799 256.	591	192,792
2. Stephenwood Ore,	161,259 173	935	12,676
Total Stephenson Lease.	225,058 430	526	205.468

hoist was discussion in November and C. & N.W. Ry. Co. Lease, Section 29: 1. Northdale, 30,937 34,204 3,267 44,008 2. Northwood, 44,008 Total C. & N.W. Ry. Co. Lease, 74,945 78,221 3,267 impd to charge the Gardasr-Grand Total, 300,003 508,738 208,735 winders inin at the dr

With the overrun there is now in excess of 260,000 tons of ore in stock. The Stephenson and Northdale ore will soon be exhausted, leaving a considerable amount of high phosphorus grades. Heavier shipments of the high phosphorus grades are necessary to clean up piles that interfere with loading of Stephenson and Northdale ore.

being taken to the Gardner-Mackinaw Mine, and the balance to the General Storehouse. All these supplies were taken off the inventory.

STEPHENS ON MINE ANNUAL REPORT YEAR 1928

2. PRODUCTION.

SHIPMENTS &

INVENTORIES:

f. Ore Statement:

Stephenson Lease		Lease,	Sec. 29		Total	
Stephen- son	Stephen- wood	North- dale	North- wood	Total	Last Year	
256,591	173,935	34,204	44,008	508,738	526,991	
0	0	0	0	0	109,318	
256,591	173,935	34,204	44,008	508,738	636,309	
192,792	12,676	3,267	0	208,735	127, 571	
63,799	161,259	30,937	44,008-	300,003	508,738	
35 111 PE	tutitie.	W SERVE	to vilua.	109,318	ding.	
nd	5 61 11575			208,735		
	<u>Stephens</u> Stephen- <u>son</u> 256,591 0 256,591 192,792 63,799 nd	Stephenson Lease Stephen- Stephen- son wood 256,591 173,935 0 0 256,591 173,935 192,792 12,676 63,799 161,259	Stephenson Lease Lease, Stephen- Stephen- son wood 256,591 173,935 34,204 0 0 256,591 173,935 34,204 192,792 12,676 63,799 161,259 nd	Stephenson Lease Lease Sec. 29 Stephen- Stephen- Stephen- North- North- son wood dale wood dale wood 256,591 173,935 34,204 44,008 0	Stephenson Lease Lease, Sec. 29 Stephen- Stephen- son wood 256,591 173,935 0 0 0 0 256,591 173,935 34,204 44,008 508,738 0 0 0 0 256,591 173,935 34,204 44,008 508,738 192,792 12,676 3,267 0 208,735 63,799 161,259 30,937 44,008- 300,003 109,318 208,735	

A . M. W. D.-. A.

visitized as pristing the received for this

1928 - Mine idle during year. 1927 - Mine closed July 29th, 1927.

3. ANALYSIS:

•	Average Analysis	on	Straight	Cargoes:	NI 38528 -	· working
	Grade	1	Iron	Phos.	Silica	Mang.
	Stephenson,			(All mix	ed)	
	Stephenwood,			11		
	Northdale,					
	Northwood,					mon that

The analyses of ore shipped held up to those of previous years.

6. SURFACE:

All of the remaining stocking trestles and part of the permanent trestles were dismantled and the usable material shipped to the Gardner-Mackinaw Mine. All the dismantling expense was charged to the Gardner-Mackinaw in lieu of billing the material. The rail from the trestles was loaded and shipped to various mines, the basis of payment being 50% of the cost of new rail.

One top tram unit was dismantled and shipped to the Gardner-Mackinaw Mine the last of the year. Two of the former Stephenson plants are now at the Gardner-Mackinaw, the other two are still in place at the Stephenson.

The cage hoist was dismantled in November and early December and shipped to the Gardner-Mackinaw Mine, where it is being installed at the Gardner.

The old dry building, used in recent years as an auxiliary warehouse, was dismantled in sections in December and taken to the Gardner, where it will be used as an engine house. There was no sale for this building, so that it is not planned to charge the Gardner-Mackinaw for it. The Gardner-Mackinaw paid all dismantling and shipping charges.

The south change room at the dry was dismantled. The trusses, windows, doors and frames, usable roof lumber, toilets, etc., were shipped to the Spies-Virgil Mine.

The Layne and Bowler pump, with the exception of the pipe, was shipped to the Holman-Cliffs Mine on the Mesaba Range.

The last of the year all material in the warehouse was removed, some being taken to the Gardner-Mackinaw Mine, and the balance to the General Storehouse. All these supplies were taken off the inventory.

identing and solve with the shore in 1928, and ions one was shipped, into a solve of the shore in 1928, and ions expense for

Taxes los were a set a second as a higher rate, due to low r valuation.

the at such a such a second of 1980.

blasting the clothe last

STEPHENSON MINE ANNUAL REPORT YEAR 1928

6. SURFACE: (Cont.)

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At the end of the year the following buildings remained on the property: Steel Shaft House, in bad condition, due to rusting. Wood Pulley Stands. Will be dismantled to recover the good 10" x 10" fir timber. Top Tram Shanties. No value. Still housing some electrical equipment and the rock tram. Engine and Boiler House. Contains skip hoist and boiler plant. Dry House. One-third dismantled. Nearly all equipment removed. Office and Warehouse. All supplies removed, building for sale. Captain's Office. For sale. Oil House. Equipment still in building. No salvage value, brick building. Old Top Tram Engine House. Used as storage building. No value.

Considerable equipment remains on the mine property, including underground motor cars, heavy pipe, part of Layne and Bowler equipment, and a large steam pump. This will be removed as orders are received for this material. Some of it will be sold for scrap.

If opportunity develops to use any building or equipment left on the property, it will be removed.

8. COST OF OPERATING:

a.

	7 months		
1928	1927	Increase	Decrease
0	109,318		109,318
39.06	157,900.97		157,860.91
1,034.95	23,484.21		22,429.26
11,420.48	35,218.52	and an and a start of the	23,798.04
12,494.49	216,603.70		204,108.21
Card State	4,091.86	the second	4,091.86
12,283.86	12,301.29	the second second	17.43
24,778.35	232,996.85	Carl Har Strange	208,218.50
	The start	Skiller and skiller	
Tree	1,336.95		1,336.95
16,894.54	19,281.78	a spinist for the	2,387.24
1,002.57	12,878.97		11,876.40
127.67	2,700.84	and my Train	2, 573.17
- 11 - 11 - 11 - 11 - 11 - 11 - 11 - 1	16,997.81	Start Street	16,997.81
and the second		and the state	and the second
5,136.72		5,136.72	
47,939.85	286,193.20		238,253.35
0	153		153
0	1-8 hr.	AT STAR	
0	714	and the second second	714
	$ \begin{array}{r} 1928 \\ 0 \\ $	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$

Underground costs in 1928 cover repairs to fences around surface caves. Surface costs cover the salary of the policeman that guards the property. General Mine Accounts cover the cost of measuring stockpile by engineers, analysis of shipments, 2% of payroll set up as a reserve for personal injuries and the calculated amount still payable for compensation due for former injuries, and a proportion of the district office expense.

There was no abandonment expense for 1928.

Loading and shipping expense was lower in 1928, although more ore was shipped. Less expense for moving the shovel in 1928, and less expense for blasting the stockpile.

Taxes decreased in 1928, in spite of a higher rate, due to lower valuation.

		SUBDIENCO.	MT ND				
		ANNUAL RE	PORT				
in and		YEAR 19	28				
10							
10. TAXES	This Prince bor Mine	i m bazafa	1 9	2 8	47910 781000	100	7
	DESCRIPTION	uge 18th, 17	ALUATION	TA	XES VAL	UATION	TAT DE
	S1 of SW1 Sec. 20-45-25, 8	30 acres,	35,000	1,104	.65	55,000	1,586
	No of NW4 Sec. 29-45-25, 8	30 acres,	5,000	157	.82	5,000	144
	Personal Property,		490,000	15,464	.80 6	02,000	17,360
SHIPMEN	Collection Fees.		550,000	10,727	.27	02,000	19,090
DTHEVEL	Total Taxes,	-200-20		16.894	•54	*****	19,281
	Tax Rate per \$100,			3.1	561		2.1
		Poulce	E Btoc	Epile	Total		LES
	. Grade of Ore	Tons		111B	Tons	TUNE	Tear
	Princaport	0		0	0,009		
	Total	. 0		864	5,864	23	
	Total Last Year	0	11,	507	11,507		
	Decreane, 1928				7,643		
-	a. Stashulla Invastoria						
	The ore by grades	in stock Dec	ember Sis	1: 1928:	ware as f	0110991	
1		1926	1	927			
12		rons	1	ons	Increase	Deary	0.0.0.0
	Cambridge ore	122,755	126,	175		5	,420
	San, 10 Cambridan	15 042	16	286			4414
	Sec. 19 Princeport	1,513	1.	313			
	Tostal	149,170	153,	034		\$	064
		and a second second	La contra	-	And to the		
	shiubed during 1928.	tempretten)	Tem Dece	The Common	Tuße co ce	thot.reWa	
	f: Ore Statement:						
		Testana	SWO 29				
		Prince	PTLBGe	ambertd of	Denvin yet of ann	inata7	200
-	On Hand Jan. 1, 1928	9,160	1,313	126,173	16,386	153,036	
	Output for Year	0	0	0	. 0	0	
-	Transferred			444	464.		
	2012.1 Shi man ha	9,160	1,313	126,619	15,912	153,034	166
	Rajance on Fund	9,160	1 51 5	122 755	15 949	140 770	
	Decrease in Ore on H	and	-,	3,864	and a series	5,664	
	1928 - Mine idle dur	THE ABRA.					
	172/ - Mine idle dur.	THE AGEST					
S. ARALYSTS							
	b. Average analysis on	Straight Car	2008 1				
	Grade	Irou Phos	· Sili	os Ma	RET.		
	Cambridge	(A22	mixed)				

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							240
							214
							19310
			PRINCHPON	ALE NOR			
			PRINCETON I	MINE			
			ANNUAL REI	PORT			
A. BATCALD	SD. 10		YEAR 19	28			
note prov	HRVES:						
1. GENERAL	B.	The Princeton Mine	alocad on A	10010+ 27+h 105		more least	
		in operation until Ju	ne 18th 19	27. when they	vere removed a	nd the mine	
		flooded. The mine di	d not fill v	with water for	several month	s. No	
		changes in condition	occurred in	1928.			
		hernen refe di Passeus	L GUNTE O.		and 20		
2. PRODUCT	ION,		Pringa		Prince Sex		
SHIPMEN	TS &		port	Cambridge	DOPE 060	betden	total
INVENTOR	HIED:	Shinmente.	2,552		and the second s		,552
		SHI PHONES.	Pocket	Stockpile	Total	Total	,325
		Grade of Ore	Tons	Tons	Tons	Last Year	,778
		Cambridge	00.0100	3,864	3,864	11,507	140
		Princeport	02,0700	DOX, 197 0	9,000 · 007	0	# 795
	b.	Total	0	3,864	3,864	11,507	
		Total Last Year	0	11,507	11,507		
		Decrease, 1920	20,000	418,815	5,000 7,040 46	.921 490	756
	c.	Stockpile Inventories			and the second second		
		The ore by grades in	n stock Dece	mber 31st, 192	28, were as fo	llows:	1232
	-	Satimated Instants	1928	1927			
	0.0	-Grade, Iron W	Tons	Tons	Increase	Decrease	
		Cambridge ore	122,755	126,175	- ALACIE MONTI-	3,420	20102.
		Sec. 19 Cambridge	300 15 94.2	9,100	1.605 1.037	AAA*	
		Sec. 19 Princeport	256 1.313	1,313	1,365 .082	1020 1,900	15.00
		Total	149,170	153,034		3,864	
		Cambridges					
		* This tonnage was tra	ansferred fi	om Sec. 19 Can	nbridge to Cam	bridge when	
		shipped during 1928.	000 0110 1		0.175 0.174	.020 I. 230	15:00
		Ome Statement.	tenuired by	State Tax Com	iestoni		
		ore statement:		Sec.19	and a state of the		
			Prince	Prince	Sec.19	То	tal
		Developed,	port	port Cambrid	ge Cambridge	Total Las	t Year
		On Hand Jan. 1, 1928	9,160	1,313 126,17	16,386	153,034 16	4,541
		Output for Year	0	Obec.	0 0	0	0

Transferred			- 444	444		
Total	9,160	1,313	126,619	15,942	153.034	
Shipments	0	0	3,864	0	3,864	
Balance on Hand	9,160	1,313	122,755	15,942	149,170	<i>I</i> G
Decrease in Ore on Hand	Grand	Total,	3,864	N.G. B.G.	3,864	55
without the state of the					- 1	

164,541 11,507 153,034

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1928 - Mine idle during year. 1927 - Mine idle during year.

3. ANALYSIS:

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×. 5 b. Average Analysis on Straight Cargoes:

Grade	Iron	Phos.	Silica	Mang.	to maint	1 des tag
Cambr lage	noors of th	(All mixe	a sguiblings	ra in poor	condition,	and mant
be plyin astantle	0000 im 1000					

												215
				PRI ANN	NCETON IUAL R TEAR 1	MINE EPORT 928						
ESTIMATE O	F				and he set a							
ORE RESERV.	a.	Developed O Assumption:	re: 12 cu. 10% do 10% do	. ft. e eductio	quals m for on for	one ton rock loss in	mining	1927 0 77×62	Inors	9009	Doare	19
		General M	ine Augo	Pr	ince-	000.08 834, 63	2,0	Sec. 19 Prince-	- Sec	. 19	1,035	17
		Ore above 2	nd level	18 2	ort , 552	Cambr.	325	port	Can	bridge	397	<u>rotal</u> 2,552
		" " " 5 " " " 6	th " th "	20	,000	58 445	,778	9,000	57	,128	78	8,778 2,140
	b .	Total Prospective	Safety,	esc. 82	,870	582	,797	9,000	57	,128	73]	1,795
		Ore below 6	th Level	1 ne 20	,000	418	,815	5,000	46	,921	490	736
		Total Ore		 Levels	•••••	•••••	•••••			ine in	1,222	, 531
	c.	<u>Grade</u> Princeport:	Iron	Phos.	<u>Sil.</u>	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
		Dried 2120 Natural	59.50 50.60	.300 .256	7.73 6.57	•505 •429	1.214 1.032	1.605	1.037	.023 .020	2.235 1.900	15.00
		Cambridge: Dried 2120	59.75	.853	4.42	1.193	.937	3.676	.840	.023	1.447	ng t-
	d.	Natural Estimated To	50.80	•725	3.76	1.014	.797	3.125		.020	1.230	15.00
		Non-Besser	mer Ore:	onsati	on pays	PEDTA fo	r old i	njury o	ig the same	ta.	mped	
		Develope shovel.	only on in 1927	1. 2.	Prince Cambri Total	port, idge, Develor	ped,	91,87 <u>639,92</u>	0 tons 5 "	73	1,795 t	ons
		Prospect	tive,	1. 2.	Prince Cambri Total	eport, idge, Prospec	tive,	25,00 <u>465,73</u>	0 " <u>6</u> "	te da Che 490	0,736	
		paid increas	ue of t ed (190	1991) 1992-	Grand	Total,	areased	\$20,000	0 in 19	1,22	2,531	•

6. SURFACE:

in:

hospital closed to September. There was no cost aljustment expense in 1926, while in 1927 considerable a. General: was incorred in this account.

The only work done on surface at this mine in 1928 consisted of loading ore with scraper hoist for all-rail shipment to Illinois to paint manufacturers. The roofs of the mine buildings are in poor condition, and must be given attention in 1929.

Welfare, safety, and hespital expanse was nominal in 1926, while in 1927 the The above estimates of ore in the mine were made in December, 1921.

PRINCETON MINE ANNUAL REPORT YEAR 1928

8. COST OF OPERATING:

RET

Sg 0 Pers Tu

Tota

arative Mining Costs:	2.9	2.8	- 19	2.7
CPT LOW 2	1928	1927	Increase	Decrease
ODUCT	0	315,610	10,000	288,42
lerground Costs	58.44	6,477.62	10,000	6,419.18
rface Costs	1,030.08	2,065.25	115,000	1,035.17
neral Mine Accounts	9,834.63	8,036.12	1,798.51	- 12+11
Total	10,923.20	16,578.99	0.60	5,655.79
ading & Shipping	519.94	931.56	160,000.	411.62
osing Expense	1161,200	396.37	001,200	396.37
tal as per Cost Sheet	11,443.14	17,906.92		6,462.98
ntral Office	142.49	0,900200	142.49	01110100
xes	8,965.66	8,775.80	189.86	24000
lfare, Safety, etc.	16.93	2,371.39		2,354.46
st Adjustment	al by Et ma	1,056.48		1,056.48
pply Inventory	35.34		35.34	
Total Cost at Mine	20,603.56	30,110.59		9,507.03
	CDUCT derground Costs rface Costs neral Mine Accounts Total ading & Shipping osing Expense tal as per Cost Sheet ntral Office xes lfare, Safety, etc. st Adjustment pply Inventory Total Cost at Mine	arative Mining Costs:1928CDUCT0derground Costs58.44rface Costs1,030.08meral Mine Accounts9.834.63Total10,923.20ading & Shipping519.94osing Expense-tal as per Cost Sheet11,443.14ntral Office142.49xes8,965.66lfare, Safety, etc.16.93st Adjustment-pply Inventory35.34Total Cost at Mine20,603.56	light 1928 1928 1927 ODUCT 0 0 Ider ground Costs 58.44 6,477.62 rface Costs 1,030.08 2,065.25 neral Mine Accounts 9,834.63 8,036.12 Total 10,923.20 16,578.99 ading & Shipping 519.94 931.56 osing Expense 396.37 tal as per Cost Sheet 11,443.14 17,906.92 ading & Shipping 142.49 ses 8,965.66 8,775.80 lfare, Safety, etc. 16.93 2,371.39 ading & Sigut mont - 1,056.48 pply Inventory 35.34 -	Increase Increase ODUCT Increase ODUCT ODUCT Increase ODUCT ODUCT Increase ODUCT ODUCT Increase ODUCT ODUCT ODUCT Increase ODUCT ODUCT ODUCT Increase ODUCT ODUCT ODUCT Increase Increase Increase<

In 1928 the underground expense covered the cost of repairing fences around caves on surface. In 1927, it covered the cost of timber repairs in the mine, props on levels, etc., before the mine was flooded in June.

The expenditures under surface costs in 1928 cover the expense for a policeman guarding this idle property. In 1927 there were some surface expenses, in addition to policeman, on account of repair work in the mine up to the time the pumps were pulled in June.

The expense in general mine accounts in 1928 was due to setting up of an amount calculated as necessary to pay out on old injury cases still getting compensation. This amounted to over \$9,600.00. 2% of the pay roll, starting in April, was set aside as a reserve for personal injury expense. The balance of expense was for engineers measuring stockpiles, analysis of ore shipped, and a small proportion of District Office expense. The expense in 1927 was largely incurred in connection with keeping the mine pumped until in June, compensation payments for old injury cases, etc.

Loading and shipping expense in 1928 was lower due to less ore loaded by shovel. Only one small cargo was loaded in 1928, while several cargoes were loaded in 1927. About the same amount of ore was loaded by hand, using a scraper hoist, in both years, but there was some expense in 1927 for the scraper hoist.

Taxes were a little higher in 1928, due to a higher tax rate on account of a decrease in total valuation of the township property. The actual assessed value of the Princeton Mine decreased \$20,000 in 1928, while taxes paid increased \$190.00.

Welfare, safety, and hospital expense was nominal in 1928, while in 1927 the old proportion of this expense continued until the Gwinn District hospital closed in September.

There was no cost adjustment expense in 1928, while in 1927 considerable expense was incurred in this account.

The total cost at the mine in 1928 decreased, \$9,507.03; due to the larger amount set up in "Personal Injury Expense", which is non-recurrent, there will be a further decrease in 1929.

PRINCETON MINE ANNUAL REPORT YEAR 1928

10. TAXES:

0

The mine closed on Novembe	1 30 th 1 9	2 8 and on Nor	rember 30th 1 9	2 7
DESCRIPTION:	VALUATION	TAXES	VALUATION	TAXES
NE4 of NE4 of Sec. 19-45-25 (C.& N.W.)	10,000	315.61	10,000	288.42
158.27 Acres in Sec. 18-45-25,	5,000	157.82	10,000	288.42
NW4 Sec. 20-45-25, 160 acres,	120,000	3,787.32	115,000	3,316.84
NW_4^1 of NE_4^1 Sec. 19-45-25 Location,	420	13.27	420	12.11
S_{2}^{1} of NE ₄ ¹ of Sec. 19-45-25 "	840	26.54	840	24.22
Personal Property,	145,000	4,576.33	165,000	4.758.90
Total,	281,260	8,876.89	301,260	8,688.91
Collection fees,	Trang and n	88.77	the short digits in	86.89
Total Taxes,	d increase	8,965.66	0 0 7 20 000	8,775.80
Total Tax Rate per \$100	the mine.	3.1561	of mining the	2.885

both properties calls for the removal of approximately 2/3 of the one by stoping operations, followed by the removal of part of the one remaining in pillars and floors on the levels. Work connected with equipping the Mackinaw shaft for sinking was started in Becember, and will be completed in the last week of January. Sinking and drifting to the one body will start in February and be rushed on double shift, so that some Mackinaw ore will be available for snipping in 1929.

An unexpected development was the change in physical character of the ore above the first level. It was much softer than the ore previously mined, and contained more moisture. The average moisture in ore shipped in 1928 was 12.77%, as compared with 9% in Mackinaw ore mines in 1919, and 10.50% moisture in Cardner ore shipped from stockpile in 1927. Mining in this softer area has new been practically completed, and only a small amount of are is left in the stopes in this area. It is safe to assume that the ore attacked this winter should not average over 11.50% in moisture when leaded from stockpile next summer, and that the ore hoisted next summer should also average lower in meisture than the ore produced in 1928.

Two-thirds of the ore area above the first level was smaller than had been anticipated, due to japper. Two seams of ore were found in several stopes with 10! to 20' of lean ore and jupper between them. The ore was cut off by jasper considerably below the mining limit, so that the estimated tommage in the Gardner Mine had to be induced 80,000 tons. The reduction would have been larger if some additional ore had not been developed at the southeast end of the ore body as both the second and first levels.

Only one grade of ore was produced in 1928, averaging about .720 sulphur. The ore from the Mackinaw fight level may average .600 in sulphur, but no lower sulphur can be expected in the balance of product from the Bardner Mine.

2. <u>SHIPPENTS</u> A INVENTORIES:

Production By Grades:	
Grade of Ore	Tons
Gardner	90,886
Total Ore	90,066
Rock Country Rockey	226

1. GENERAL:

0

The mine closed on November 30th, 1920, and on November 30th, 1927, orders were received to re-open. This work was started on December 1st, 1927, and the water lowered to the fourth level plat on March 8th. Bailing was continued until March 21st, until the pumps on the fourth level had been installed and were operating satisfactorily. Repairing of levels was started, also other work preliminary to stoping. Actual mining started in April, and was gradually extended over the entire available area. A small product was obtained in April, which was gradually increased as more gangs started stoping.

By the end of the year stoping was nearly completed, and authority had been given for sinking the Mackinaw shaft and opening the fifth level. It was estimated that this would increase the available ore 120,000 tons and add one year to the life of the mine. The sequence of mining the ore in both properties calls for the removal of approximately 2/3 of the ore by stoping operations, followed by the removal of part of the ore remaining in pillars and floors on the levels. Work connected with equipping the Mackinaw shaft for sinking was started in December, and will be completed in the last week of January. Sinking and drifting to the ore body will start in February and be pushed on double shift, so that some Mackinaw ore will be available for shipping in 1929.

An unexpected development was the change in physical character of the ore above the first level. It was much softer than the ore previously mined, and contained more moisture. The average moisture in ore shipped in 1928 was 12.77%, as compared with 9% in Mackinaw ore mined in 1919, and 10.50% moisture in Gardner ore shipped from stockpile in 1927. Mining in this softer area has now been practically completed, and only a small amount of ore is left in the stopes in this area. It is safe to assume that the ore stocked this winter should not average over 11.50% in moisture when loaded from stockpile next summer, and that the ore hoisted next summer should also average lower in moisture than the ore produced in 1928.

Two-thirds of the ore area above the first level was smaller than had been anticipated, due to jasper. Two seams of ore were found in several stopes with 10' to 20' of lean ore and jasper between them. The ore was cut off by jasper considerably below the mining limit, so that the estimated tonnage in the Gardner Mine had to be reduced 80,000 tons. The reduction would have been larger if some additional ore had not been developed at the southeast end of the ore body on both the second and first levels.

Only one grade of ore was produced in 1928, averaging about .720 sulphur. The ore from the Mackinaw fifth level may average .600 in sulphur, but no lower sulphur can be expected in the balance of product from the Gardner Mine.

		and the second se			
	On Hand Jan. 1, 1928,	0	0	50,562	
	Overrun and Shortage.	0,000	0,000	1.118 (red)	
	Cotal	90,858	90,866	49,444	
•	Grade of Ore	Tons -	70,675	49,444	
	Gardner	90,866	20,191	1	
	Total Ore	90,866	April 7th to	Becember 31, 195	8.
	192 Rockine idle during	226		and and and and	

91.092

Grand Total

2. <u>PRODUCTION</u>, <u>SHIPMENTS &</u> INVENTORIES

			NER	
	~	GARDNER-MACKINAW MI	NIS	
		YEAR 1928		
. PRODUCTIO	127			
PRODUCTI	DN.			
SHIPMENTS	3 &			
INVENTOR	ES: Delays:			and a second second
	b. Shipments:	erlous delays during	the year. The min	or delays were as
	10110001	Pocket S	tockpile Tota	1 Total
	Grade	Tons	Tons Ton	Last Year
	Gardner,	70,675	0.00 0.070,67	5 0
	Machinew Wich Sul	phur, 0	urnet out ringer o	0 40,972
	Total	70 675	0 70 67	0,412 15 19 114
	Total last year		49 44	A 49,444
	Increase 1928	of Currents	21 22	1
	The re-ware no	erious electrical del	avs during the yea	r. The minor dela
	c. Stockpile Invento	ries:		
	Grade	hour delay 1928 to no	1927 Increase	Decrease
	Gardner ore.	20,191 5	0.562	30.371
	June 2432, 2	n n n ,n		
	d. Division of Produ	act by Levels:	8	
	The ore hoisted	from the various lev	els was as follows	·
	First Level,	45,574	tons	
	Second Level,	44,303	H 10	
	Third Level,	989		
	octoberotal,	90,866	tons	
. AWATWOTO	m	1 and man thankanned	and haistad from	the third level .
		I ULE WAS LEADSTRIPPEN	And nuls with Trom	
" ADALISTO	there is no come	ation to the Gardner	shaft on the secon	d level
anaurune	there is no conne	ection to the Gardner	shaft on the secon	d level.
e Annually	there is no conne e. Production by Mon	ection to the Gardner	shaft on the secon	d level.
e annunung	e. <u>Production by Mon</u> Month	ths:	shaft on the secon	d level.
annururo	e. <u>Production by Mon</u> <u>Month</u> April	ths: <u>Gardner Or</u> 1.693	shaft on the secon	d level.
ANALINIA	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May	ths: <u>Gardner Or</u> 1,693 6,495	shaft on the secon	d level.
ANALIUNO	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June	ths: <u>Gardner Or</u> 1,693 6,495 10,157	e <u>Rock</u> 28	d level.
ANALINA	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July	ths: <u>Gardner Or</u> 1,693 6,495 10,157 10,093	e <u>Rock</u> 28	d level.
ANALINIA	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August	<u>Gardner Or</u> <u>(ths:</u> <u>Gardner Or</u> <u>1,693</u> <u>6,495</u> 10,157 10,093 12,594	e <u>Rock</u> - 28 20	d level.
· ZBTINATE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September	<u>Gardner Or</u> <u>Gardner Or</u> <u>1,693</u> 6,495 10,157 10,093 12,594 12,614	e <u>Rock</u> 28 20	d level.
* ESTIMATE CER RESE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October	<u>Gardner Or</u> <u>(ths:</u> <u>Gardner Or</u> 1,693 6,495 10,157 10,093 12,594 12,614 19,553	Baft on the secon	d level.
* ESTIMATE CEE RESE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November	<u>Gardner Or</u> <u>iths</u> : <u>Gardner Or</u> 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561	e <u>Rock</u> 28 20 58 10	d level.
* <u>ESTIMATE</u> CRE RESE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November December	<u>Gardner Or</u> <u>iths</u> : <u>Gardner Or</u> 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 <u>8,106</u>	e <u>Rock</u> 28 28 20 58 10 110	d level.
• ESTIMATE CRE RESE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November December Total	<u>Gardner Or</u> <u>iths</u> : <u>Gardner Or</u> <u>1,693</u> <u>6,495</u> <u>10,157</u> <u>10,093</u> <u>12,594</u> <u>12,614</u> <u>19,553</u> <u>9,561</u> <u>8,106</u> <u>90,886</u>	<u>e Rock</u> 	d level.
• ESTIMATE CRE RESE	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November December Total	Gardner Or iths: Gardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,886	<u>e Rock</u> - 28 - 20 - 58 10 <u>-</u> 10 <u>-</u> 226	d level.
* <u>ESTIMATE</u> <u>GRE RESE</u>	The second leve there is no conne e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November December Total f. <u>Ore Statement</u> :	Gardner Or iths: Gardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,886	e <u>Rock</u> 28 28 20 58 10 <u>110</u> 226	d level.
• ESTIMATE CRE RESE	 The second leve there is no connection by Mone e. Production by Mone Month April May June July August September October November December Total f. Ore Statement:	Gardner Or iths: Gardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,886	Be Rock 28 28 20 58 10 110 226	Last Year
* <u>Estimate</u> <u>Cee ress</u>	The second leve there is no connect e. <u>Production by Mon</u> <u>Month</u> April May June July August September October November December Total f. <u>Ore Statement</u> : On Hand Jan. 1, 1	Gardner Or (Gardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,886 90,886	e <u>Rock</u> 28 28 20 58 10 <u>110</u> 226	Last Year 50,562
* ESTIMATE CRE RESE	 The second leve there is no connective there is no connective there is no connective there is no connective to the term of te	Gardner Or (dardner Or (ardner Or 928, (ardner Or (ardner Or <th< td=""><td>e Rock 28 28 20 58 10 110 226 90,866</td><td>Last Year 50,562 0</td></th<>	e Rock 28 28 20 58 10 110 226 90,866	Last Year 50,562 0
ESTIMATE CRE RESE	 The second leve there is no connection by Mone e. Production by Mone Month April May June July August September October November December Total f. Ore Statement: On Hand Jan. 1, 1 Output for Year Overrun and Short 	Gardner Or (Gardner Or (ardner Or (1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 <u>8,106</u> 90,886 Gardner Or 928, 0 90,866 age, 0 90,866 age, 0	<u>e Rock</u> 28 28 20 58 10 <u>110</u> 226 <u>90,866</u> 0 90,866	Last Year 50,562 0 1,118 (red)
* <u>ESTIMATE</u> CRE RESE	 The second leve there is no connective the term of term o	Gardner Or iths: Gardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,886 928, 0 928, 0 90,866 70,875	<u>e Rock</u> <u>-</u> 28 <u>-</u> 20 <u>-</u> 58 10 <u>110</u> 226 <u>-</u> <u>58</u> 0 <u>90,866</u> 70,625	Last Year 50,562 0 1,118 (red) 49,444
· ESTIMATE CRE RESE	 The second leve there is no connective the term of term of the term of the term of the term of term of the term of term of the term of te	Gardner Or (Gardner Or (ardner Or 1,693 6,495 10,157 10,093 12,594 12,594 12,614 19,553 9,561 <u>8,106</u> 90,866 30,866 age, 0 90,866 70,675 20,101	<u>e Rock</u> <u>-</u> 28 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 10 <u>-</u> 226 <u>-</u> 58 0 <u>90,866</u> 70,675 20 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 226 <u>-</u> 226 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 20 <u>-</u> 58 10 <u>-</u> 226 <u>-</u> 0 90,866 70,675 20 10	Last Year 50,562 0 1,118 (red) 49,444 49,444
* ESTIMATE CRE RESE	 The second leve there is no connective the term of term of the term of the term of the term of term of the term of term o	Gardner Or (Gardner Or (ardner Or 1,693 6,495 10,157 10,093 12,594 12,614 19,553 9,561 8,106 90,866 age, 0 90,866 70,675 20,191	E Rock 28 - 20 - 58 10 10 110 226 - 90,866 0 90,866 0 90,866 70,675 20,191 20,191	Last Year 50,562 0 1,118 (red) 49,444 49,444 0

6

The setimates this year of available and probable ore are calculated in the set are from those submitted in previous passe. Herstofore, it was constably nearly all of the pillars left in the mine could be at the bottom of the deposit and working upward. It is

			22
	GARDN	ER-MACKINAW MINE	
	CEA RETA	NNUAL REPORT	
	1	YEAR 1928	
1		YEAR 1928	
2. PRODUCTIO	DN,		
SHIPMENTS	<u>i &</u>		
INVENTOR	ES:		
	g. Delays: we Gree (Cont.)		
-	There were no serious	delays during the year	r. The minor delays were as
	follows: . and as a resu	it the estimates of o	re reserves are lower than in
	June 8th, 2 hours d	elay due to broken ro	d on compressor. 1 ore below
	June 9th, 6 hours d	elay due to broken ro	d on compressor.
	July 27th, 12 hours	delay due to burned or	ut finger on first level motor.
	October 8th, 12 hours	delay due to trouble	with hoist motor.
	November 26th, 1/2 hour	delay due to trouble	with motor generator set.
	0. Estimated Analysis:	- 5. 21°	
	h. Delays from Lack of Curr	ent: Axpected Natural	Analysis.
	There were no serious	electrical delays dur	ing the year. The minor delays
	were as follows:	Silica Mange Alum.	Lims Mag. Bul. Igni. Moist.
	May 21st, 2 hour d	elay due to no power.	2,95 1,70 ,619 3,91 13,00
	June 14th, ball 2 "26	12.70 .317 1164	2.85 1.29 .749 4.18 9.00
	June 24th, 32"		
	July 26th, 3/4 "		
	August 8th, 12"	Billon Manga Arun.	Line Maga Sul. Igni. Moist.
	September 5th, 12"	2.73 .317 11:54	2+06 1+29 +717 4+47 9+00
	September 14th, 3/4		
	September 21st, 3	Bataral Analyniss	
	October 10th, 12	BALLON MARR. ACUNI.	Line Mag. Dul. Igni. Moist.
-	Garder press aner	2,26. 1230 1.75	2:40 1:10 :519 3:31 13:00
S. ANALYSIS			to ad two modes of our disc
	a. Average mine Analysis on	Du tout:	is of two grades of ore from
	Grade Ir	10 101 5111Ca	DUL.
	Geruner 28.	10 .101 0.72	Bandman and and and and and age
	h Arranges Anglardia on Chus	i oht Comment	Gardner property, 1115
	b. Average Analysis on Stra	ight cargoes:	tion, desremes the humber of
-	Canada	Mine Diales	Lake Erie
-	Grade Iron	Phose Silica	Bul. Iron Phos. Moist.
	Garaner 57.89	.101 3.74	.711 58.60 .663 12.25
A. PORTMAND	Tular curled pars		
TOP DECEN	UTPC .		
ORE RESEL	R. Developed One.		
	a. Developed ore:	annala ana tan	
	Assumption: 12 cu. it.	equals one ton.	
	10% deducti	on for rock.	e throughout the year, repre-
		on for loss in mining	og for a chacos to resume work
	Demonstrate of December	in pillars left to su	pport the surface is unavailable.
	rercantage of pessemer e	quais 0.	
A strengthere	Heobening mine -	andren Machinem	r other headings.
An APPROPTION	Non Becomer	50 201 Mackinaw	of 147
	Non-Dessemer,	50,201 20,002	65,143
	h. Promoting One.		
	D. Prospective ore:	Wagos and Product:	
1	npeopening started on	ardner Mackinaw	Total
	Non-Bessemer,	0 354,582	354,582
	PRODUCT	90,866	
	Total all ore, a lours	Two yr.	439,725
	The estimates this yea	r of available and nr	ohable are are calculated in

0)

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24

The estimates this year of available and probable ore are calculated in a different way from those submitted in previous years. Heretofore, it was assumed that eventually nearly all of the pillars left in the mine could be removed, starting at the bottom of the deposit and working upward. It is

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rative Statement of Wages and Products (Cont.)

4. ESTIMATE OF ORE RESERVES:

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b.Prospective Ore: (Cont.)

now assumed that only 40% of the ore left in pillars and floors will be recovered, and as a result the estimates of ore reserves are lower than in previous years. The estimate of prospective ore represents all ore below the fourth level down to the bottom of the deposit as shown by diamond drilling. The estimate is conservative, as comparatively little information is available of the ore body below the fourth level.

c. Estimated Analysis:

Ore Reserves: Approximate Expected Natural Analysis.

Surfa	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Gardner	51.24	.091	2.92	.295	1.75	2.96	1.70	.619	3.91	13.00
Mackinaw	53.16	.126	2.70	.317	1.64	2.85	1.29	.749	4.18	9.00

Prospective Ore:

Ore Develor

Surfac	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Mackinaw	53.11	.130	2.73	.317	1.64	2.84	1.29	.717	4.47	9.00

Ore in	Stock:	Average	Natural	Analys	is.					
TONS 1	Iron	Phos.	Silica	Mang.	Alum.	Lime	Mag.	Sul.	Igni.	Moist.
Gardner	51.24	.091	2.92	.295	1.75	2.96	1.70	.619	3.91	13.00

The previous annual reports show the analysis of two grades of ore from Mackinaw property, a high and a low sulphur ore. This year it is assumed that only one grade of ore will be produced from the Mackinaw, that will average about the same in sulphur as the ore from the Gardner property. This arrangement simplifies the stocking proposition, decreases the number of analyses, and thus reduces the cost of production.

Due to a lower moisture content, the natural iron is higher in the Mackinaw ore than in the Gardner. The ore is also harder and of better physical character.

17,247,25

70.488.34

5. LABOR AND WAGES:

5. SURFACE:

a. Comments:

(1) Labor:

There was an excess of labor available throughout the year, representing former employees who were waiting for a chance to resume work with the Company.

(2) <u>New Construction</u>: the life prevalence years.

Reopening Mine - This is covered under other headings.

Development of fifth level, Mackinaw - This is fully covered under #12-a.

Considerable new piping was installed in the dry house and the building

•	comparative	Statement	0ľ	vages	and	Product:
				_	_	the second se

Re-opening started on December 1st, 1927.

The stens and return water 11	nes to 1928 heating plant fr	on all the mine
biPRODUCT had to be replaced, a	al a 90,866 oden combatt bal	1t. The steam
No. Shifts and Hours	1-8 hr.	

AVERAGE NO. MEN WORKING:	
Surface	15늘
Underground	46
Total	61호

5. LABOR AND WAGES:

0

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

	The permanent stocking trest.	e at 11928 aroner shart was repaired daring
	AVERAGE WAGES PER DAY:	of new legs were installed, also some new
	Surface	er, 34.24 bents leading to the stocking
	Underground	a pass 4.97 rotted, paveral bents were
	erecte Total the storration erected	a, and 4.77 was stocked until salpping started
	in May. In the fall tharbest of	Cocaing pents were erected.
	WAGES PER MONTH OF 25 DAYS:	a from the Stephenson Mine and Maid ou the
	Surface	106.00 sollar was rough, and some of
	Underground	124.25 land sollar was installed, care-
	fal ha Total & would be necessar	119.25 up the ore when mining was
	Tinished.	
	PRODUCT PER MAN PER DAY:	
	Surface	23.36
	Underground	8.50 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -
	Total Total	na war 6.16 and by the opening of the shipping
	seabon, which the mine operated	In TERN' WIT FOG DIE MED BROOKEN' OF AUGLE
	LABOR COST PER TON:	at the property and with wine week persons
	Surface	.2995
	Underground	•7903
7. mining ARCIN	Total	1.0090
A P. MARTING MARTING MIL	MONG THE MAN DEED DAY.	•
	TONS PER MAN PER DAI:	the 15 0007-Vacilinaw Mine during 1998.
	Ore Development	9.60
	Total	14.03
	There was comparatively littl	a development work done during the year, as
	AVERAGE WAGES CONTRACT MINER	well 5.12 ad prior to the shat-down in 1920;
	Some additional tonnage was fou	nd at the northwest end of the ore body,
	TOTAL NUMBER OF DAYS:	wels, where either faulting or an overturn
	Surface occurs.	4.062 3/4
	Underground out up in 19	10.684 3/4 g a narrow one body to a point
	18' berotalhe first level. A s	14.747 1/2 was installed here last spring
	to handle the ore, and work was	resonad. The ore was followed to a point
	AMOUNT FOR LABOR:	pe opened by widening the raise. The ore
	body Surfacently extends as a th	117,247.25 rom 5' to 20' thick, to the north
	Underground,	53.218.09 ty. This ore was developed on
	the firotalevel in the fall, an	70,465.34 he hearly ready to be started at
	the and of the year. It is ant	icipated that several thousand cons will be
	Proportion of Surface to Unde	rground Men: all quantity on the Mackinaw.
	1928 - 1 to 2.32 One 8-hou	r shift six days per week.
	migh in sulphur, and hMine idle	previous years.
	previously operated. As any ma	r no longer promibits the sale of the ore,
SURFACE:	Dittato in Dia topo de ale ale	ging has been under way since inet sucher.
	a. Buildings, Repairs:	are out resemptos the ore mined on the
	considerable new piping was 1	installed in the dry house and the building
	put in condition while the mine	was unwatered.
	A new roor was put on the off	ice and warehouse building.
	The steam and return water li	nes to the heating plant from all the mine

buildings had to be replaced, and a new wooden conduit built. The steam lines were also covered. here, while water Leyners were required elsewhere. The ore was also high in moisture, averaging over 13%. Wining has been completed in this area.



6. SURFACE:

b. Stockpiles:

The permanent stocking trestle at the Gardner shaft was repaired during January and February. A number of new legs were installed, also some new stringers and an entire new floor. Seven bents leading to the stocking ground were replaced, as the old ones had rotted. Several bents were erected on the stockpile grounds, and ore was stocked until shipping started in May. In the fall thirteen stocking bents were erected.

Old sollar planks were shipped from the Stephenson Mine and laid on the stockpile grounds at the Gardner. The rock sollar was rough, and some of the slate rock contained pyrite. Unless plank sollar was installed, careful hand work would be necessary to clean up the ore when mining was finished.

c. Tracks and Roads:

that the transfor raise can be abandoned.

During April the grade and tracks were put in by the C. & N.W. Railway Company to the Gardner shaft, and were ready by the opening of the shipping season. When the mine operated in 1920, all the ore was stocked, as there were no tracks to the shaft.

The road to the mine was filled in and surfaced with mine rock across the swamp near the mine buildings, a distance of about 200 feet.

7. UNDERGROUND:

a. Shaft Sinking:

There was no shaft sinking at the Gardner-Mackinaw Mine during 1928.

b. Development:

There was comparatively little development work done during the year, as the limits of the ore body were well defined prior to the shut-down in 1920. Some additional tonnage was found at the northwest end of the ore body, between the first and second levels, where either faulting or an overturn in the foot occurs.

A raise had been put up in 1920, following a narrow ore body to a point 18' below the first level. A scraper hoist was installed here last spring to handle the ore, and work was resumed. The ore was followed to a point above the first level and a stope opened by widening the raise. The ore body apparently extends as a thin sheet, from 5' to 20' thick, to the north from the Gardner on to the Mackinaw property. This ore was developed on the first level in the fall, and stoping was nearly ready to be started at the end of the year. It is anticipated that several thousand tons will be available on the Gardner and possibly an equal quantity on the Mackinaw.

The southeast end of the ore body was developed in 1928. This area is high in sulphur, and had been opened by one or two raises, when the mine previously operated. As sulphur no longer prohibits the sale of the ore, this area was developed and stoping has been under way since last summer. The ore in this area is quite hard and resembles the ore mined on the Mackinaw property.

The northwest half of the ore body above the first level was split by jasper into two ore bodies, one near the foot and one near the hanging. The ore was also intirely cut off by jasper much below the mining limit of 140' above the first level. The ore in this area was quite soft, auger drill machines being used here, while water Leyners were required elsewhere. The ore was also high in moisture, averaging over 13%. Mining has been completed in this area.

the side of the stope. Plugs had been put in this drill hole in 1920, but the ground cracked and considerable water entered the stope. A raise was put



7. UNDER GROUND:

c. Stoping: (Cent.)

ation of

The ore hoisted the past year has practically all been secured from two levels, the first and the second. A small amount of ore was broken on the third level late in the year, but the transfer raise interferes with stoping operations at the southeast end of the ore body between the third and second levels. There was probably 10,000 tons of broken ore in the stopes at the end of the year.

Stoping operations above the first level were completed at the end of the year in all but three stopes at the southeast end of the ore body, and in the narrow trough of ore found at the northwest end of the ore body. Stoping at the southeast end will be completed in 60 days, while at the northwest end the life of the stopes will depend on the developments. The ore body here is thin, and if it extends upwards any distance will cross the boundary over on the Mackinaw property.

Stoping between the second and first levels was also nearly completed at the end of the year. Two stopes were in operation at the southeast end of the ore body and at least two stopes can be opened near the Mackinaw boundary at the northwest end.

Practically no ore was mined above the third level. One stope was started late in the year near the southeast end of the ore body. Some additional ore can be mined here after mining is completed above the second level, so that the transfer raise can be abandoned.

the first level

The following is a detail of stoping operations during the year: First Level:

377.6

When the mine closed down in 1920, raising was in progress above the first level, preliminary to stoping. Stoping had been started in two of the seven stopes that were being opened above the first level. When mining was resumed last April, work was started immediately in the first level stopes. Raises were pushed up to an elevation of 100' above the first level, where a connection was made to a traveling road that had been put up before the mine shut down. Another stope was opened at the southeast end of the mine where the flat foot wall made it necessary to use a scraper for handling the dirt to the chute. Later on, two additional stopes were opened in this territory, and the ore body was found to extend to the east on the flat foot wall far enough to permit opening at least one and possibly two additional stopes. Brief comment will be made on each stope, using the numbers by which the stope has been designated throughout the year in the monthly report. #74 Stope:

Number 74 stope, located at the northeast end of the main level ore body. was opened and stoping started on the foot wall when the mine closed in 1920. The raise in the center of this stope had only been extended up about 40' above the first level, and a connection made through the pillar to an adjoining stope, which was used as a traveling road to the stope. Stoping was resumed when the mine re-opened, but the ore gradually pinched out until there was only a narrow seam left between the foot wall and what was assumed to be the jasper hanging. A second level stope almost directly below this stope showed the ore to be nearly 50' thick between foot and hanging, so that a small raise was put up in the stope through the jasper in the back and 20' of ore found near the hanging. Mining was then abandoned on the foot wall side of the stope, and the ore on the hanging side was mined. This ore was cut off by seams of jasper at an elevation of 45' above the first level. A description of the work done in #74 stope would not be complete without including the plugging of #9 drill hole, which was encountered on the side of the stope. Plugs had been put in this drill hole in 1920, but the ground cracked and considerable water entered the stope. A raise was put

7. UNDERGROUND:

c. Stoping: (Cont.)

up on the line of the drill hole and an attempt made to plug it soon after work was resumed last spring. The water was temporarily cut off, but soon entered the stope at higher elevations. It was then decided to put up a raise parallel with the drill hole and about 10' distant from it, until hard jasper was encountered, then drift to the drill hole and make another effort to plug it. A raise was put up a distance of 50' before solid ground was encountered. After drifting to the drill hole, plugs were inserted and at least 95% of the water cut off. This had an immediate effect on pumping, as it decreased the mine water and cut down the hours that the pump was operated. There has been no further trouble with water from this drill hole. #75 Stope:

Conditions in this stope, with respect to the jasper seam that separated the ore into two bodies, were practically the same as in #74 stope. The ore on the foot side extended about 40' above the level, but the hanging wall ore continued to a point about 75' above the first level. #77 Stope:

This stope had been opened a distance of 40' above the level when the mine closed down, but the raise in the center stope had been extended to an elevation of 100' above the level, and a connection made to the traveling road. Stoping was started here as soon as the mine was in condition to operate, and continued until the stope was completed, jasper being encountered at an elevation of 123' above the first level. #78 Stope:

A raise in the center of this stope had been put up about 80' above the level when the mine closed. It was extended 20' and a connection made to the traveling road, after which stoping was started. This stope reached an elevation of 118' above the first level, where it was cut off by jasper. #79 Stope:

The raise in the center of this stope was continued from an elevation of 50' up to the traveling road, a distance of 50'. Stoping was then started and was continued till the stope reached an elevation of 115' above the first level, at which point jasper was encountered. #80 Stope:

The raise in this stope was up about 20' when the mine re-opened. It was continued to an elevation of 100' and a connection made to the traveling road. This stope was extended to an elevation of 140' above the first level, which is the limit of mining.

#81 Stope:

This stope was opened on the flat foot wall near the southeast end of the ore body. It started at a point 30' above the first level, and was extended to a point 140' above, or to the limit of mining. While this stope was being put up, the ore was followed in an easterly direction and later on other stopes were opened further to the east. All ore mined in this stope, as also stopes #82 and #83, was handled by scraper hoists, which moved the ore on the flat foot wall and through a drift to a raise which connected with the haulage road on the first level. #82 Stope:

This is a branch stope put up from #81 stope. It started at an elevation of 40' above the main level and was put up 54' by the end of the year, with 48' to go to reach the limit of mining. #83 Stope:

This stope started as a branch stope from #82 stope, at an elevation of about 50' above the first level. It has been extended in an easterly direction on the flat foot wall, and at the end of the year had advanced 60' to an elevation of 112' above the main level, or within 30' of the limit of mining.

7. UNDERGROUND:

c. Stoping: (Cont.)

Another stope, #84, will be opened as a branch stope from #83. It will advance about 70' to reach the limit of mining. be was used as a traveling

First Level General:

The ore in the stopes from #74 to #79, inclusive, was quite soft, particularly near the hanging, and auger drills were mainly used in drilling. The sulphur in this ore averaged around .500. The ore in stopes #81 to #83 inclusive, is hard and high in sulphur. The ore body averages only about 15' in thickness between the foot and hanging in these stopes. As shown by the above detailed report of work in the stopes, they have practically all been completed, except #82, #83, and another branch stope to be known as #84. Only a limited quantity of ore will be obtained from these stopes, due to the ore body not averaging over 15' in thickness.

Some development work was done during the year at the northwest end of the first level, where a narrow seam of ore was found near the Mackinaw boundary as a result of following this ore upward in a small stope from a point midway between the first and second levels. After this ore was proved to extend to the first level, the main level drift was extended and the ore followed at the elevation of the first level until it was cut off by rock. The ore was then followed up on the rock, which dipped from the north at a flat angle, for a distance of about 50', when the ore was cut off by jasper. The last of the year a drift was started through the rock on the main level to extend the motor haulage drift to this ore. All ore found from this development work was pulled by scraper to the incline raise from the second level, from which point it was transferred by another scraper to a second level stope which connected with the second level haulage road. The extension of the first level haulage drift will permit this ore to be loaded directly with scraper into motor cars. It is not anticipated that much ore will be found in this territory, but there is enough to warrant opening at least three small stopes. If the ore continues upward following the foot wall, it will extend across the boundary on the Mackinaw property, where mining will be continued and the ore hoisted through the Mackinaw shaft. Second Level: elevation of the first level, stoping being completed in

One contract worked practically the entire year at the northwest end of the ore body mining the ore in the narrow body discovered here prior to closing the mine in 1920. They first drove a drift through a pillar at a point 30' above the second level connecting #50 stope with this narrow ore body. A scraper hoist was set here and all the ore which they have mined has been transferred by scraper to #50 stope. They enlarged the raise. that had originally been put up to follow this ore, to stope size, and continued in the ore until they had reached the elevation of the first level. They also opened two small stopes to the north, one of which was extended to the Mackinaw boundary. There is still ore in the breast. Mining will be resumed here after the Mackinaw shaft is in condition for hoisting ore. In the latter part of the year they followed a seam of ore at an elevation of 30' above the second level that was found to extend back in under the foot of #53 and #54 stopes. When these stopes were put up it was thought that they were following the foot wall, but it was found this fall that there was considerable ore left in the foot, due to a roll which caused the ore to extend down some 25' deeper. All available ore was mined here at the end of the year. Only a limited amount of ore can be obtained from this territory until mining can be started on the Mackinaw and the ore followed upward on this property.

When the mine was closed down ore was being mined in stopes #55 and up to #59, inclusive. Mining had been completed in #54 stope and was nearly

7. UNDERGROUND:

c. Stoping:

Stoping: (Cont.)

Second Level: (Cont.) a to the east it will be pessible to open at least finished in #55 and #56. The raise in #57 stope was used as a traveling road from the second to the first levels. #58 and #59 stopes were about half finished when the mine closed down. #55 Stope:

When work was resumed last spring, this stope was continued through to the first level, work being completed here early in the summer. The ore in the foot wall of this stope was cleaned out by scraper hoists. #56 Stope: to the shaft on the third level. The second level does, not

This stope was also up about 75' above the second level, and it was continued through to the first level. The ore on the foot wall here was also cleaned down with a scraper hoist. #57 Stope: ted during the time the mine was idle, and new timber had to be

This stope had been set aside as a traveling road, and was used for a short time after the mine re-opened. It was then decided to put up a new traveling road in the pillar between #54 and #55 stopes, so that stoping operations could start in #57. The new traveling road was completed in the summer, and stoping started in #57 stope. At the end of the year stoping on the foot wall side had been completed to the first level, and there was still about 25' to complete on the hanging side. This stope was nearly full of ore at the end of the year. #58 Stope: other work done during the year in the stopes above the third

This stope was up about 70' when the mine closed. Stoping was resumed here in May and it was found that the ore extended further into the hanging than had been thought when the stope was previously worked. The ore was cleaned out of the stope and stoping on the hanging side resumed at an elevation of 50' above the second level, and a considerable quantity of ore removed near the hanging. Stoping was continued here until all the ore was removed up to the first level. In the east and extension of the one body. #59 Stope: has been done on the first and second levels

This stope was up about 50' when the mine re-opened, and it was carried through to the elevation of the first level, stoping being completed in the fall hority was received to open the fifth level, Makinaw Mine, work #60 Stope: g up the fourth level has been started. Tracks and ditches have

The ore was known to extend further to the southeast beyond #59 stope, but it had not been developed when the mine closed down, as it was high in sulphur and it was not considered advisable at that time to mine it. Arrangements were made for handling ore by scraper hoist to the main transfer raise to the third level, and drifting was started to the east near the transfer raise on the sill floor. This drift advanced about 50' before encountering the foot wall. A raise was then put through to the second level, which for a time was used as a traveling road. Stoping was started here in the fall. and at the end of the year #60 stope was up about 50'. The ore body between foot and hanging from this point up to the first level is between 50' and 60' in thickness, so that quite a large tonnage of ore will be obtained from #60 stope. upact hanging wall, no timber is required. When the mine re-#61 Stope: neiderable timber on the main levels had to be replaced due to

At the point where the foot wall was encountered in the drift driven from the transfer raise, a drift was started in a southeasterly direction following the foot wall, and after advancing about 30' the ore was cut off on the line that is the limit of the southward extension of the ore body. In the fall a stope was started up over the foot from this point, which advanced in a due easterly direction, and at the end of the year was up about 50'.

7. UNDER GROUND:

c. Stoping: (Cont.)

#61 Stope:

If this stope continues to the east it will be possible to open at least two branch stopes to take out the block of ground left between this stope and #60 stope. The ore here is hard, high in sulphur, but when mixed with ore from other stopes gives a produce that is close to the average of .730 sulphur.

Third Level:

All the ore mined in stopes above the second level was trammed to the transfer raise by motor haulage and in #60 and #61 stopes by scraper hoist. and taken to the shaft on the third level. The second level does not connect with the Gardner shaft. Considerable re-timbering was necessary on the third level, as the haulage drift here averaged 15' or more in width. extending in part of the area from the foot to the hanging wall. This timber rotted during the time the mine was idle, and new timber had to be installed before haulage started. Part of the third level territory was not repaired when the mine re-opened, but repair work was started here late in the fall and was still under way at the end of the year. The latter part of the year a raise was started in a large pillar at the southeast end of the ore body, which raise was put up to a distance of 50', where a connection was made to an old traveling road from the transfer raise to #16 stope. Access to the top of this raise is gained through the old stopes. The last of the year stoping started just above the third level. The only other work done during the year in the stopes above the third level was in #19 stope, which had been stoppedat a point 20' below the second level. This stope was extended through to the second level. The ore in this stope is narrow between the foot and hanging, averaging only 15' in thickness.

As soon as mining is completed above the second level, so that the transfer raise can be abandoned, it will be possible to open a stope here and one or more branch stopes in the eastward extension of the ore body. the same as has been done on the first and second levels. the mine Fourth Level:

The fourth level ore body is almost entirely on the Mackinaw property. Since authority was received to open the fifth level, Mackinaw Mine, work of cleaning up the fourth level has been started. Tracks and ditches have been cleaned from the Mackinaw shaft to the ore body, and for some distance in the ore drift. This is anticipating work that would have to be done when the raises hole from the fifth level. The chutes in #1 and #2 stopes. fourth level, have been thoroughly blocked at the bottom, as it is planned to dump the rock that will come from sinking the Mackinaw shaft into these stopes on the third level. If they are filled, #3 stope will then be used for a rock dump. AVERAGE

d. Timbering:

Timber at this mine is used for timbering the main levels and building chutes. The ore body is mined by the open stope method, and due to the hard and compact hanging wall, no timber is required. When the mine reopened, considerable timber on the main levels had to be replaced due to rotting. +624

The following is a statement of timber used:

TRADUCE BARS. Connecting Wire. Total Fuse, etc ..

Total All Explosives.

5.00 42

7. UNDERGROUND: d. <u>Timbering</u>: (Cont.) ne and Blasting: (Cont.)

	LINEAR	AVG. PRICE	AMOUNT
KIND	FEET	PER FT.	1928
8" to 10" Timber.	332	.06913	22.26
10" to 12" "	2,800	.1101	308.41
12" to 14" "	1,220	.1072	230.80
14" to 16" "	108	.1079	11.66
Total timber,	4,460	.1060	473.13
Potel explosives used in mine,		per 1000'	012190
5' Lagging.	2,250	7.835	19.98
Poles, 9'6".	17,174	14.20	244.71
Total Lagging and Poles.	19,724	WT TT AND MUNTED	264.69
And where ventilation was not g	Dours The dos	t per ten rer ex	DIORI MAN WAY
Product,	Tara oberared		90,866
Feet of timber per ton of ore,			.0049 -
Feet of Lagging per ton of ore.	atum mathada	t- 1020 . Dans do	.002806
Cost per ton for timber.	arng mernous.	TU TASA' COLAIN	.0052
" " lagging.	overed iron s	toping operation	.0002
" " poles.	ow mought th	at with or the or	.0027
" " timber laccing	and noles	bing is started,	-0081
Rouivalent of stull timber to be	ard measure		16.0530-
Past of hoged measure ner ton of	P one	to chutes with a	00176
reat of board measure per ton of	the ore at a	profit, whereas	.00110
	transfers wi	th tram cars it	nonla nelse
latal cast for timber langing	and malor	and an own over sol wa	777 00
Fotal cost for timber, lagging,	and poles,	an aroun correct re	737.82
Fotal cost for timber, lagging,	and poles,	re used in the t	737.82
Total cost for timber, lagging, Drifting and Raising:	and poles,	re used in the t	737.82
Total cost for timber, lagging, Drifting and Raising: ORE DRIFTING	and poles,	ROCK DRIFTING	737.82
Total cost for timber, lagging, Drifting and Raising: 1928 - <u>ORE DRIFTING</u> (1928 - 330'	and poles, DRE RAISING 667'	ROCK DRIFTING	737.82 ROCK RAISI
Total cost for timber, lagging, <u>Drifting and Raising:</u> 1928 - <u>ORE DRIFTING</u> 1928 - 330'	and poles, DRE RAISING 667'	ROCK DRIFTING	737.82 <u>ROCK RAISI</u> 0
Total cost for timber, lagging, <u>Drifting and Raising:</u> <u>ORE DRIFTING</u> 1928 - 330' There was comparatively little	and poles, <u>RE RAISING</u> 667' e drifting or	ROCK DRIFTING 0 raising necessa	737.82 <u>ROCK RAISE</u> 0 ry at this

a new traveling road from the second to the first levels, and in extending 20 raises in ore above the first level to the top of the ore body or to the mining limit. the fourth level was ready to operate. Installation of the

f. <u>Explosives, Drilling and Blasting</u>: The following is a statement of explosives used:

Statement of Explosives Used: ware minute.

Maw	1.97	AVERAGE	AMOUNT
Terms	QUANTITY	PRICE	1928
Dupont, Extra A, Powder,	51,300	13.50	6,925.10
Gel. Spec., 50%, "	20,400	13.75	2,805.00
Red Cross, 50% "	500	13.50	67.50
Total Powder,	72,200	13.57	9,797.60
Fuse, November	145,000	.624	904.78
Caps,	24,300	1.108	269.36
Cap Crimpers,	33	5.00 dz	13.75
Tamping Bags,	1,500	2.15	32.25
Connecting Wire,	4#		1.59
Total Fuse, etc.,		COLUMN STREET	1,221.73

Total All Explosives.

11,019.33

<u>ARDNER-MACKINAW MINE</u> <u>ANNUAL REPORT</u> <u>YEAR 1928</u>

7. UNDERGROUND:

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

Statement of Explosives Used:(Cont.)Product,90,866Pounds of powder per ton of ore,.1258Cost per ton for powder,.107Cost per ton for all explosives,.121

Total explosives used in mine, the line is not a \$11,019.33 acted

Due to good natural ventilation, Dupont Extra A, a low density explosive, was used in the stopes and 50% Gelatin Special in the drifts and raises and where ventilation was not good. The cost per ton for explosives was lower than when the mine previously operated.

g. Mining and Loading:

There was no change in the mining methods in 1928. Careful computations show that 58% of the ore is recovered from stoping operations and 42% left in pillars and floors. It is now thought that 40% of the ore left in the pillars and floors can be recovered when robbing is started, after regular stoping operations are completed.

The ore from certain areas has been moved to chutes with scrapers. This method made it possible to mine the ore at a profit, whereas under the former system, with one or more transfers with tram cars, it could only have been mined at a loss.

Three ten H.P. Sullivan electric hoists were used in the transfer work. Several air hoists were used to scrape ore off the foot of the stopes, doing work that was formerly done by hand, with greater speed and safety.

h. Ventilation:

last and Equipment.

Ventilation at this mine is by natural means and is very satisfactory. Ventilation doors on the levels control the draft in cold weather. If ice forms in the downcast shaft the draft can be reversed.

i. Pumping: ly Inventory

Bailing was continued until March 17th, when the small pump which had been left on the fourth level was ready to operate. Installation of the 2,000 gallon plunger pump was completed on March 21st, but it did not operate satisfactorily until April 29th, since which time pumping has been done on day shift only.

The following table gives the gallons pumped per minute:

08T 01	Month	Gals. per minute	
Labor	May	127 .776	
Supp.	June	135 .499	
20	July	134 1.275	
	August	138	
atlad	September	193	
1) D	October	231	
	November 28 the mine.	worked 132 eight hour shi	ift for 226 days.
	December	of men 110oloyed was 51%	for a total of
24	Average	150	

(2) Mages:

There was no change in the wage schedule during the year.

8. COST OF

PERATING
\$ 6e77

GARINER-MACKINAW MINE

GARDNER-MACKINAW MINE ANNUAL REPORT YEAR 1928

S. COST OF

7. UNDERGROUND:

i. Pumping: (Cont.)

The increase in September and October was due to water from #9 drill hole on the first level. The water in earlier months was also increased by leakage from this drill hole. When the mine operated before, the water averaged from 125 to 175 gallons per minute. It is not expected that it will now exceed 125 gallons per minute. Rate per day

370,465,35

j. Underground in General:

The tonnage of ore in the Gardner Mine is not as great as was expected when the mine re-opened. This was due to jasper cutting off the ore in a number of the stopes some distance below the mining limit, and to the ore not being of average thickness in other stopes.

The mine is in good condition, the levels are clean, and the safety standards are being followed.

8. COST OF OPERATING:

a. Comparative Mining Costs:

(6) Cost of Production:

Cost per ton, \$1.275

PRODUCT Underground Costs, Surface Costs,	<u>1928</u> 90,866 •985 •202	<u>%</u> <u>Labor</u> 39% .776	Cost per ten Supplies Total .499 1.275
General Mine Accounts, Cost of Production, Loading and Shipping, Total Cost at Mine.	<u>.088</u> 1.275 <u>.063</u> 1.338	7, no detailed usual expendit	cost comparison ures in a few
Depreciation - Movable Equipment, Plant and Equipment, Development, Taxes,	.002 .180 .199 .017	ase of seven s are of great b his mine, due	craper heists, endfit at this to repair of a the time the
Central Office, Welfare, Safety, Hospi Unwatering and Re-open Supply Inventory, Total Cost at Mine,	.097 tal, .012 ing, .150 .000 1.995	ring the fact rain on the se caded on third	that nearly cond level to level and
No. of Days Operated, No. Shifts & Hours, Average Daily Product,	226 1-8 hr 402	lls" was high Nordberg compr toted. With t no delays hav	due to changing concre son he cld wilves e occurred. The

 COST OF PRODUCTION:
 .776

 Labor,
 .499

 Total,
 1.275

cable Total, ning Company. the Q b. Detailed Cost Comparison:

grids. The grids belonging to the Mackinaw helst (1) Days and Shifts: During 1928 the mine worked one eight hour shift for 226 days, and the average number of men employed was $6l\frac{1}{2}$, for a total of outi

14,7472 days. Ith level, Machinaw, made it necessary to install a The en Cordner Mine. There was considerable expense for dismantling (2) Wages: ardner. There was no change in the wage schedule during the year.

GARDNER-MACKINAW MINE ANNUAL REPORT YEAR 1928

8. COST OF

10. TAXES:

Dairs

OPERATING:

Detailed Cost Comparison: (Cont.) (3) Comparison of Production:

90,866 tons casing plank, knocked orr Production, 1928 -Production, 1927 ldings" was high due to repairs necessary on

didle. In December, this (4) Comparison of Number of Men and Wages:

An monthing subility	No. Men	No. Days	Amount	Rate per da;
1928 -	61 =	14,7472	\$70,465.34	\$ 4.77
5) Mone per men	nen dere	Water Power job	, after the O	Andrew Belgt

also more than the astal

(5) Tons per man per day:

The tons of ore mined p	per man per day were as foll	ows:
Surface.	incre 23.36 dety, elso more	thad
Underground,	8.50	
Total,	6.16	

(6) Cost of Production:

expen

1928 - \$115,865.15 Cost per ton. \$1.275

sone went.	Total Cost			Cost per ton			
	Labor	%	Supplies	%	Labor	Supplies	Total
1928 -	\$ 70.541.27	61%	\$ 45,323.88	39%	.776	.499	1.275

On account of the mine not operating in 1927, no detailed cost comparison can be made. Comments are made to explain unusual expenditures in a few of the accounts.

Stoping cost was increased due to the purchase of seven scraper hoists. five new ones and two second-hand. Scrapers are of great benefit at this property, due to the flat foot wall.

Timbering cost was higher than normal for this mine, due to repair of timber and chutes on the main levels, that had rotted during the time the mine was idle.

Tramming costs were very reasonable considering the fact that nearly 50% of the product was transferred by motor train on the second level to a transfer raise from the third level, then loaded on third level and trammed to the shaft.

Maintenance cost "Compressors and Power Drills" was high due to changing valves. The complicated valve system on all Nordberg compressors was scrapped and a new simple valve system substituted. With the old valves delays were common, while with the new valves no delays have occurred. The Total balance of maintenance cost was due to the purchase of four drill machines.

Maintenance cost "Pumping Machinery" was high due to the purchase of 905' of #2 conductor cable, for electric line in the shaft. The old pump cable was used at the Gwinn Mine and was included with the equipment sold the Quinn Mining Company.

Maintenance cost "Hoisting Equipment" was above normal due to the purchase of a complete new set of grids. The grids belonging to the Mackinaw hoist were used on the cage hoist at the Stephenson mine, where several burned out. The load when bailing out the Mackinaw caused others to burn out, so that to avoid delays a new set was bought from the Barnes-Hecker hoist. The opening of the fifth level, Mackinaw, made it necessary to install a hoist at the Gardner Mine. There was considerable expense for dismantling the Stephenson Cage hoist, and moving and setting it up at the Gardner.

		CARDNER	-MACKINAW MINE			1
		ANN	UAL REPORT			
		GARTNEY	EAR 1928			
ale assessed		-74 <u>200</u>	UAL REPORT			
8. COST O	<u>.</u>	X	EAR 1928		*	
OPERAT.	NG:		10			
11. 40015	b. Detail	led Cost Comparison:	(Cont.)			
	Maii	itenance Cost "Shaft"	was due to repl	acing casing	plank, knocked	i off
PhilSO	Wnen	the mine was palled o	ut.	ch due to re	maine magageem	
Insun	accour	t of the long period	the mine had he	en idle. In	December this	y on
	accour	t was charged with t	he cost of disma	ntling the o	ld Stephenson	drv
	house.	moving and setting	it up for an eng	ine house at	the Gardner Mi	ine.
	(The	ld Gardner engine ho	use was sold to	the Cliffs P	ower and Light	
	Compar	ny for use at the Cat	aract Water Powe	r job, after	the Gardner he	oist
	was so	old.) Inf	ection of finger	All the state of the	4 *	
	Tele	phones and Safety De	vices expense wa	s high due t	o extending the	e
	lighti	ing system undergroun	d to increase sa	fety, also m	ore than the us	sual
10. 100	expens	se for safety devices	•			
O TOTOT	TONS					
J. MAPLOR	TIONS					
RIN	RR					
EXPLOR	TIONS:					
	The	e were no exploration	ns at the mine d	uring the year	ar.	
	29.1	E. G A. mas approve	d in November an	d the work o	f preparing the	
10. TAXES	Mackin	aw shaft for hols tin	g and other work	Lucidents1	therate was als	Artoi.
	27be 11a	ickinaw shaft is down	971 below 1091	208th level,	192	7.0
	DES	CRIPTION	VALUATION	TAXES	VALUATION	TAXES
	C. & N.W.	Lease, Gardner:	ad pocket, and d	rifting 850	to the cro boo	13.
	SEA OF SEA	Sec. 30-40-25,	7,000	220.93	10,000	288.42
	NW4 OI NE4	5ec. 2-44-25,	15 000	173 45	200	5.77
	Total	opercy,	22 000	700.69	30,200	870.99
18. 11910	Collectio	nFees. Macking and	dumn it into th	7.00	level stopas.	8.71
	Total Taz	es an be started jus	t as soon as the	707.69	st is in commin	879.70
100						
13. EQUIP	D.M.& M.	Lease, Mackinaw:				
AN	No of SE4 8	SW1 of SE1, Sec. 35	-45-25, 25,000	789.04	22,000	634.53
PROPO	Collectio	n Fees,		7.89		6.35
BQUIP	Total Tap	tes,		796.93		640.88
	A He	Clure top tram plant	, for the Mackin	aw top tram,	was obtained i	rom
	Gardner-Mac	kinaw Dwellings,	7,500	236.72	5,000	144.22
	Collectic	n Fees, lat from the	Stephenson Mane	2.37	the Cardber at	1.44
	Total Tap	es, set on roundatio	BBa	239.09		145.66
	Motal Maxes	Cardner-Mackinaw	abtainad from a	urplus motor	s at the Stanha	a line-orm
	Mine and	Location	Apartube Tran a	1 743.71	a wa with boopie	1 666 24
		hood of one,		1,110011		1,000.54
	Increase, 1	928 -		77.47		
19. 105-105	The	following scraper he	lats are used in	the stopes :	and on the leve	818
10	The	assessed valuation of	f the Gardner Mi	ne was reduce	ed in 1928, due	to
	ore in	stock having been sl	hipped, and to a	further redu	action in the t	aluation
	placed	on ore reserves.	On Hand	Furchase	d Oe Haz	hú.
	A sl	ight increase was mad	de in the valuat	ion of the Ma	ackinaw ore res	serves,
	enough	to offset the decrea	ase at the Gardn	er.	2	
	The	valuation of location	n houses was inc.	reased, due	to some of the	houses
1	Deing	total valuation of th	he mines and the	logation day	manad \$2500	hut
	taxes	increased due to a h	igher tax rate.	Tocation dec	102860 @2000,	but

One 10 H.P. Sullivan electric hoist was received too late in December to be charged out. The two Sullivan air hoists were second-hand machines from the Republic Hine.

	231
	234
	GAR DERR-MACKINAW MINE
	GARTNER-MACK INAW MINE
	ANNUAL REPORT
	YEAR 1928
14. MAINTERNARCE	
11. ACCIDENTS	
AND	There were no extraorainary repairs made after the mine started to operate.
PERSONAL	A targe anounts of work was inconstary to assembly and particular and to the
INJURY:	There were three miner socidents for which compensation was reid during
	1928 and regulted in a total loss of 94 days. The following table shows
	the nature of accident and loss of time.
15. POWER:	No. of Accidents Nature Time Lost
	1 Fracture of four ribs. 37 days
	Company 1 a subsidiary Infection of finger. 1 Iron Company 4 " re were no
	Severe laceration of thigh. 53 "
	cause ar3 listed under 2 - h. 94 days.
10	The rate charged for current was 122 per Kilowatt hour, the same as has
CONSUDICATO	Dear in direct for a number of years.
AND	<u>N</u>
PROPOSED NET	W
CONSTRUCTIO	N:
	E. & A. #537 - Opening Fifth Level, Mackinaw Mine.
	This E. & A. was approved in November and the work of preparing the
	Mackinaw shaft for hoisting and other work incidental thereto was started.
	The Mackinaw shaft is down 97' below the fourth level, and by sinking 40'
	it will be deep enough to open the fifth level. The E. & A. covers work
	of sinking, cutting plat and pocket, and drifting 850' to the ore body.
	All other expense will be delayed due to the cale of the Cardner hoist and
	engine house as they have to be replaced. This work was under way at
	the end of the year. It is planned to handle the rock from sinking on the
18. NATIONALITY	third level. Mackinaw, and dump it into the old fourth level stopes.
OF	Sinking can be started just as soon as the Gardner hoist is in commission.
EMPLOYESIA	
13. EQUIPMENT	The nationality report for the Gardner-Madkinaw Mine based on time
AND	books for the December 31st, 1923, period, is as follows:
PROPOSED	We of the Device have
EQUIPMENT:	Etricites tes bes 250 for the test of the test of the test
	A Mcclure top tram plant, for the Mackinaw top tram, was obtained from
	The care boist from the Stephenson Mine was taken to the Cardner and is
	now being set on foundations.
	Two underground haulage motors will be needed for development of the
	fifth level. They will be obtained from surplus motors at the Stephenson
	Mine otch,1.0
	Total, 98 100%
C.	Scraper Hoists:
19. RH-REENING	The following scraper hoists are used in the stopes and on the levels
TEA DUS 1	to pull down the ore on the foot, where the slope is too flat for the
	ore to run. to re-open the mine what received on adventer out, isze,
	1/1/1028
	Ingersoll-Rand air 0 2 2
	10 H.P. Sullivan electric. 0.000 The sala 3
	Sullivan air, 0 2 2
	Total 0 7 7
	One 10 H.P. Sullivan electric hoist was received too late in December to
	be charged out. The two Sullivan air hoists were second-hand machines from
	the Republic Mine.

GARDNER-MACKINAW MINE ANNUAL REPORT YEAR 1928

14. MAINTENANCE

AND REPAIRS:

There were no extraordinary repairs made after the mine started to operate. A large amount of work was necessary to assemble and put the equipment into proper operating condition, owing to the long shut-down and to the fact that some of the equipment had been sold and some borrowed by other mines.

15. POWER:

Electric power was supplied during the year by the Cliffs Power and Light Company, a subsidiary of the Cleveland-Cliffs Iron Company. There were no serious delays due to lack of power during the year. The delays from this cause are listed under 2 - h.

hauling equipment. Expense for regaining treatles at the Gardner was higher than expected. It is probable that costs were at least 15% to

The rate charged for current was l_{22}^{1} per kilowatt hour, the same as has been in effect for a number of years.

17. <u>CONDITION</u> <u>OF</u> PREMISES:

No landscaping was ever done at this mine. An unusual feature at this property was the eight large Norway and white pine trees near the mine buildings. During the idle period two of these trees blew down and two were struck by lightning. The surface around the mine buildings was kept in good condition at all times. The short life of the mine and small margin of profit does not warrant any expenditures for shrubbery or lawn. The water level is less than two feet below surface, and filling around the buildings and on roads is necessary in wet weather to keep them out of the water.

18. <u>NATIONALITY</u> OF

EMPLOYEES:

The nationality report for the Gardner-Mackinaw Mine based on time books for the December 31st, 1928, period, is as follows:

	No. of Men	Percentage
Italian,	24	24.5%
Finnish,	31	31.6
Swedish,	13	13.3
Norwegian,	1	1.0
French,	14	14.3
English,	14	14.3
Scotch,	_1	1.0
Total,	98	100%

19. <u>RE-OPENING</u> MINE:

Authority to re-open the mine was received on November 30th, 1928, and the work was started December 1st. The mine started operating April 7th, 1928, although some re-opening expense was incurred in April and May. The original estimated cost of re-opening was \$20,000, while the actual cost was in excess of \$33,000. The main reason for the

GARDNER-MACKINAW MINE ANNUAL REPORT YEAR 1928

Stockpile

23,605

19. <u>RE-OPENING</u> MINE:

2. PRODUCTION.

increase was delay in bailing after the mine was nearly unwatered due to various causes, replacement of air, water, and trolley lines throughout the mine due to action of acid mine water on the pipes and hangers, more repairs to timber and tracks, and more expense for assembling and overhauling equipment. Expense for repairing trestles at the Gardner was higher than expected. It is probable that costs were at least 15% to 20% higher on account of re-opening in the winter, with the severe cold weather and short days.

1,917

Last Year

21,686

			2					A	
2.4			1.63		C 77		COTT		
e 18 - 1	100					10.00	× ~ m		
	 1000							_	
				-					

Franport

Increase in 1928 -

Grade of Ore

Grade of Cre	1928	1927	Pacrease
Franport	357,746	381,349	23,603

f. Ore Statement:

	feranger v	20 55.1	Last Tear
On Hand Jan. 1, 1948	381,349	381,349	4.03,035
Catput for Year	0	0	0
Total	381,349	361,349	403,035
Shipments	23,603	23,603	21,686
Balance on Hand	357,746	357,746	381,549
Decrease in Gre on Hand		23,605	21,885

1928 - Mine abandoned. 1927 - " "

3. ANALYSIS:

b. Average Analysis on Straight Cargoes:

The analysis of the ore shipped from stockpile was below the average analysis of the piles. The steam showel out on the north side was uearly completed, and a cut started on the south side of the pile. The lump ore contains the bands of slate that reduce the iron content, and the first out gets the greater part of this lower grade ore. The analysis of ore loaded next year can be improved by loading out the second cut on the north side of the stockpile.

8. COST OF

CPERATING.

a. Comparison Mining Costs:

The and the state of the state	1928	1927	LECREASE	DECREASE
Surface Costs,	1.90	0	1.90	
General Mine Accounts,	3,066.70	1.066.93	1,999,77	
Potel.	3,068.60	1,086.93	2,001,67	
Abandomaant Nipense	0	-140.74		140.74
Loading and Shipping	1,054,87	1,676.16		631.239
Total as par Cost Sheet	4,123,47	2,883,85	1,239.64	
Taxes	10,856,39	11,550,23		893.84
Central Office	106.33	0	106.33	
Welfare, Safety, Hosp.	11.22	. 0	11,22	
Cost Adjustment	-	5,897.51		3,897,51
Grand Total	15,097.41	18,331,57		3,234.16

FRANCIS	MINE
ANNUAL	REPORT
YEAR	1928

Comparative Mining Costs: (Cont.)

when the mine operated.

FRANCING MUNE

S. COST OF

1. GENERAL:

There was no change in the condition of this abandoned mine during 1928. A small shipment was made from the stockpile. The steel shaft house and steel pulley stands are the only structures left on the property. strug semensation for injuries incurred provees still a

dest Adjustment charges were ale in 1927 due to closing up accounts

cornected with dismontling and storing analymout.

2. PRODUCTION. SHIPMENTS & INVENTORIES:

SW2 a

Person

Tota

10. TAXES:

b. Shipments:

Grade of Ore	Stockpile	Tot	al L	ast Year	1927
Franport	23,603	23,6	03	21,686	ON TAXES
Increase in 1928 -	aores,	- 1,9	17	55 79 50	10 10.65
c. Stockoile Inventories:		340,000	10,730,4	396,00	10 12,421,44
Grade of Ore Franport	1928	<u>1927</u> 381,349	Incre	ase Decre	ase 03
f. Ore Statement:			10,856.2	59 51	11,550433

Texes decreased in 1928 due to lo	Franport Tons	Total Tons	Total Last Year	0
On Hand Jan. 1, 1928	381,349	381,349	403,035	
Output for Year	0	0	0	
Total	381,349	381,349	403,035	
Shipments	23,603	23,603	21,686	
Balance on Hand	357,746	357,746	381,349	
Decrease in Ore on Hand	11. 12. 1. 1. 1.	23,603	21,686	
		-	-	

1928 - Mine abandoned. 1927 -= 18

3. ANALYSIS:

b. Average Analysis on Straight Cargoes:

The analysis of the ore shipped from stockpile was below the average analysis of the piles. The steam shovel cut on the north side was nearly completed, and a cut started on the south side of the pile. The lump ore contains the bands of slate that reduce the iron content, and the first cut gets the greater part of this lower grade ore. The analysis of ore loaded next year can be improved by loading out the second cut on the north side of the stockpile.

8. COST OF

OPERATING:

a. Comparative Mining Costs:

-
0
7
7
140.74
621.29
4
693.84
3
2
3,897.51
3,234.16
976 32

8. COST OF

OPERATING:

Comparative Mining Costs: (Cont.) nos 1923. The Architela Mine continued

The large increase in General Mine Accounts is due to setting up a reserve to take care of compensation payments for personal injuries. It is 2% of the payroll for 1928, plus a calculated amount to cover payments to employees still receiving compensation for injuries incurred when the mine operated. Cost Adjustment charges were high in 1927 due to closing up accounts connected with dismantling and storing equipment.

FRANCIS MINE ANNUAL REPORT YEAR 1928

surrounding villages to continue in existence.

10. TAXES:

a. STATEMENT SHOWING TOTAL ORE H	RODUCED FLO	28 10 1928	INGLASSIN1 9	27
DESCRIPTION	VALUATI ON	TAXES	VALUATION	TAXES
SW1 of NW1 Sec. 27-45-25, 40 acres,	-	2.33	QA CONT	8
SW4 (Ex. R. of W.) " 153.56 acres,	500	15.79	500	14.43
Personal Property,	340,000	10,730.80	396,000	11,421.44
Total, to	340,500	10,748.92	396,500	11,435.87
Collection Feese 1, 582,616 1, 584, 333	5.792.499	107.47	602 201.1	114.36
Total Taxes,	.0	10,856.39	0 90,8	11,550.23
Total Tax Rate per \$100 16 1,584,338	3, 793, 629	3.1561	602 292,0	2.885

3.277.057

Taxes decreased in 1928 due to lower valuation set by the Tax Commission on the ore in stock.

	These The		20.125	3,485,703	300,325	164,855		1,451,565	
.0.			1 18 19700	K AT CLOSE	1927 43	TD 1928 :			
	TENE	AUSTIN	PRINCETO	e Stapanso	a GULINA	FRANCIS	GARDING-		
	Jan.1, 1928	80.507	153.034	508.738	a <u>Guina</u>	381.349	TAVAL D		

988.325

141,253

0 357,746, 20,191

5. LABOR AND WAGES:

20

Jan.1, 1929 71,024 149,170 503.003

The population of Gwinn fownsite is greater than at any time cince 1933, but there are fewer people living in the Austin and Princeton locations. There are very few idle men in the district. Any vacancies at the Company operations are quickly filled by former employees who have been working at the Archibald Mine.

10. TAXES:

The following statement shows taxes in detail for the two years for all property in the district except mines, where the totals only are shown in the summary, as the detail of taxes for each also is shown in the report on the mine. The total tax, Cliff Power and Light Company, is also included to the summary in order to show total tax paid to the Cloveland-Cliffe Ires Groups; in Forsyth Township:

GWINN DISTRICT MINES ANNUAL REPORT YEAR 1928

1. GENERAL:

Lots 1, 2

11.

SEP of SE

NW- Of

No of NES

SEL of MRG

NEA OF MUS

88 of 983

St of NBL St 07 Th The of HW NB2 Of NB- Of BE

Lot, 17, 310 MB: 01 MP: That part of Included in By of SEA, S

That part of W

H 7, B &

07 283

å

Conditions in the Gwinn District were good during 1928, in fact, it ranks as one of the best years since 1923. The Archibald Mine continued to operate on double shift, a construction crew worked at the new Water Power Plant on the Escanaba River, the Gardner-Mackinaw Mine operated all the year, and there was also other Company activities in the district during the shipping season, and extensive woods operations around Gwinn. A general feeling of optimism prevails, in marked contrast with the depression of the previous year.

It is hoped that some solution will develop which will permit Gwinn and surrounding villages to continue in existence. 4.61

2.30

2.30

271,835 7,857,563

164.856

STATEMENT SHOWING TOTAL ORE PRODUCED FROM 1903 to 1928 INCLUSIVE:

	19 12	7 14 8	10 11	160	5.0	6	CA BONER-	4.63
	YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	MACK INAW	TOTAL
	Total	2 ** 36	i0 "	500	25,0	0	500	14.43
	1/1/28	1,582,616	1,584,333	3,792,429	988,665	522,602	201,160	8,671,805
	1928	0	0	0	0 1	0	90,866	90,866
	Total	1,582,616	1,584,333	3,792,429	988,665	522,602	292,026	8,762,671
h	STATEME	ENT SHOWT NO	TOTAL ORE	SHIPMENUS PR	ON 1905 to	1928 TNC	LUSTVR.	
••	O THE TENEL	ALL DITOWALIO	Total dia	MALL DECITE AT		1000 110	100111.	85.08
w.	POUNSITE	E - SURPACE	GHLY:	1. 199.00			GARDNER-	
alc	YEAR	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	MACKINAW	TOTAL
38	Total to	5-25, 27.40	Acres,	150	4.7		155	4.33
pl	1/1/28	1,502,109	1,431,299	3,277,057	988,325	141,253	201,160	7,541,203
inc	1928	9.483	3.864	208.735	0	23,603	70.675	316.360

C. STATEMENT SHOWING ORE IN STOCK AT CLOSE OF 1927 AND 1928:

Total 1,511,592 1,435,163

Collection Nees

Part of The of	: SBA Sec	. 21-4	5-25, Su	per-				CA DIDITID	
intendent's j	YEAR	25 83	AUSTIN	PRINCETON	STEPHENSON	GWINN	FRANCIS	MACKINAW	TOTAL
S sores in or	Jan.1,	1928	80,507	153,034	508,738	0	381,349	0	1,123,628
Part of 81 of	Jan.1,	1929	71,024	149,170	300,003	02.0	357,746	20,191	898,134

3,377,55

3.485.792 988.325

5. LABOR AND WAGES:

The number of men employed in the district by the Cleveland-Cliffs Iron Company on December 31st, 1928, was 84; on December 30, 1927, there were 36 men; the increase for the year was 48. The Archibald Mine employees averaged 180, the Cliffs Power and Light Company, 39, and probably 50 others No of NEX OF 5 who live at Gwinn work in the woods and at the lumber mill at Little Lake. The population of Gwinn Townsite is greater than at any time since 1923. but there are fewer people living in the Austin and Princeton Locations. There are very few idle men in the district. Any vacancies at the Company operations are quickly filled by former employees who have been working at the Archibald Mine. Me of MP: Sec.

10. TAXES:

Derzonal,

The following statement shows taxes in detail for the two years for all property in the district except mines, where the totals only are shown in the summary, as the detail of taxes for each mine is shown in the report on the mine. The total tax, Cliff Power and Light Company, is also included in the summary in order to show total tax paid by the Cleveland-Cliffs Iron Company in Forsyth Township:

1,690

GWINN DISTRICT MINES ANNUAL REPORT YEAR 1928

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10. TAXES:

10. TAXES: (Cont.)	19	28	19	27
DESCRIPTION	VALUATION	TAXES	VALUATION	TAXES
MINERAL LANDS GWINN FEE:	29	3 8	19	8 7
Lots 1, 2 & 3, Sec. 36-45-25, 52 Acres,	100	3.18	VALUAT100	2.92
" 7, 8 & 9, " 36 " 98.92 Acres,	200	6.33	200	5.77
P." 11, Lot 5 " 36 " 13.2 "	5,020	157.64	20	.58
SW1 of SW1 " 26-45-25, 40 "	10.080	3 2.53	80	2.30
NW of SE1 " 27 " 40 "	80	2.53	80	2.30
NW1 of " 35 " 160 "	320	10.07	320	9.23
N= of NE1 " 34 " 80 "	16.160	5.04	20 160	4.61
SE1 of NE1 " 34 " 40 "	80	2.53	80	2.30
NEL OF NWI " 34 " 40 "	80	2.53	80	2.30
Stof SE1 " 27 " 80 "	160	5.04	160	4.61
NET of SET " 28 " 40 "	600	18.94	600	17.31
St of NR1 " 28 " 80 "	130	4.11	130	3.75
St of Nt " 22 " 160 "	500	15.80	500	14.43
N= of NW1 " 2-45-26 87.08 "	90	2.86	90	2.60
NR1 of " 2 " 165.61 "	190	5.02	190	5.48
NEL OF SEL II 34 II 40 II	130	4 11	130	3.75
Total	2 920	92 26	2 920	0.10
Collection Fees	6, 560	92.20	2,920	04.24
Total Paras		07 19		04
Anatin Nine	000 000	53.10	119-000	00.00
Standard AWTINT MOUNTOINE SUDDACT ONT V.	550,000	12 809-08	112 000	-10 000 00
GWINN TOWNSITE - SURFACE ONDI:	001,000	0 070 00	202,000	0 014 04
Wal of Wal goo 21 45 25 27 40 Acros	540 150	0,070-00	150	14.94
Mb4 01 NW4, Sec. 21-13-25, 27.40 ACTes,	150	4.74	150	4.33
included in plot of Grime 25 01 comes	97,200	1,409.70		1,000102
Therefore and the plat of Gwinn, 25.01 acres,	200	16.0	200	5.77
N2 01 554, 56C. 21-45-25, 65.64 acres,	400,400	12.03	100,400	11.53
That part of Wg of SE4, Sec. 21-45-25 not	16,100	000.10	20,000	-010:04
included in plat of Gwinn, 38.80 acres,	300	9.46	300	8.66
Gwinn Townsite Plat,	101,905	3,218.15	101,935	2,942.85
Part of W2 of SE4 Sec. 21-45-25, Super-	1,914,185	99;000+79	7,005,844	\$7,958.54
intendent's Hesidence, 1.2 acres,	3,500	110.48	3,500	100.95
NW4 OI NE4 Sec. 21-45-25 except		45,062.08		40,432,01
b acres in cemetery, 35 acres,	100	3.15	100	2.91
Part of Sg of NE4 Sec. 21-45-25, 59.69 acres.	400	12.63	400	11.53
cliffs Alectric CompanyTotal,	106,955	3,377.55	106,985	3,103.47
Collection Fees,	- <u>GD_150</u>	33.78	35,420	30.89
Collection rees, Total Taxes,	Vicinia	3,411.33		3,134.36
Total Taxes,		1,971,023		1,063,28
GARDNER-MACKINAW DWELLINGS:				
Ng of NE4 of Sec. 35-45-25,	7,500	236.72	5,000	144.22
Collection Fees,		2.37		1.44
Total Taxes,	1928	239.09	12.02	145.66
State,	6,770127	8,670.96	7,002,08	7,759,35
GWINN DISTRICT OFFICE AND CRUSHER:	18,341.05	13,232,64	15,385,44	11,989,68
Personal, and	690	21.80	1,832	55.71
No of NW4 Sec. 27-45-25, Dist. Crusher,	1,000	31.58	1,000	25.85
Highway Inprovement, Total,	1,690	53.38	2,832	84.56
Highway Legalr, Collection Fees,	4,000,00	•54	0,000,00	.84
Library, Total Taxes,	100.00	53.92		85.40
School and One Mill,	40,350+80	34,469.00	40,948,00	02, 192.65
Comstery,	500.00	500.00		
Bridgs,			- ; · · · · ·	1,000.00
Rejected,	29+84	18+07	5.78	351-76
Total	27.333.47	74,986,94	81,500,87	82,745,80

GWINN DISTRICT MINES

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GWINN DISTRICT MINES ANNUAL REPORT YEAR 1928

10. TAXES: (Cont.)

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10. TAXES: (Cont.)	1928	1927	1926	1925
Percent paid by C. C. I. Company,	89.601 9	2 866.14	73.84 1 9	2 7
A. WATER SUPPLATIONTY TOO ANTON	VALUATION	TAXES	VALUATION	TAXES
Part of Lot 5 Sec. 20_45_25	5 000	157.82	(Trolu	ni hof
NUL of SEL of Sec 20-45-25	10,000	315 61	Minor	lou In
NEL of SW1 of Sec. 20.45-25	10,000	25 26	miller and	tion
Part of SH1 of SE1 of Sec. 20-45-25	300	9.46	Valua	cion.,
Tart of 504 of 550. 20-10-20,	16 100	508 15	20 000	576 94
Collection Fees	10,100	5 08	20,000	5 77
Total Taxes,	t did show th	513.23	was unsafe fo.	582.61
Note: Provide to 1929 ment of Austin loss	ded to instal	l a chlorinat	ing apparatus	10 .
was included in Austin Mine valuation Ab	ove Chicago	and installed	by one of the	a las
1028 valuetions include 2 hoarding houses	andes stable	rine one was	need during S	antomhar
Austin location dwellings.	v rainfall av	s also te des	trov bactaria	that
were in the wooden pipe mai	ns. The char	on was than a	aduced, so the	5t #
Total C. C. I. Co. Forsyth except mines	ats three weel	ta. Samolas	of water show	00
and power commanies	135,165	4.310.75	137.737	4 033.11
epidamic or other intestina	1 infection.	It places Ou	inn smone the	1,000.11
progr SUMMARY: 110 des of the	state that h	babivorn ers	cartain prote	stion
Austin Mine, for their water supply.	80,000	2. 524.87	112 280	3 238.13
Stephenson Mine. The following table sives	530,000	16, 727, 27	662,000	19 090.88
Princeton Mine 1929 and 1927	281 260	8 876 89	301 260	8 688.91
Francis Mine	340,500	10 748.92	396 500	11 435 87
Cardner-Mackinsw Mine	17 200	1 489 73	50,000	1 505 52
Mineral Lande	2 020	1,403.70	2 020	1,000.02
Cwinn Councite Maintenende Supplies	106 955	2 277 55	106 005	7 107 47
Austin Dwallings and Lands	16 100	500 75	100,900	5,103.47
Cardner Maltings and Idnus,	10,100	500.15	20,000	510.04
Gardner-Mackinaw Dweilings,	7,500	200.12	5,000	144.22
Gwinn District Office and Crusher,	1,690	53.38	2,832	84.56
Total C. C. I. Company,	1,414,125	44,635.74	1,659,977	47,952.64
Collection Fees,	UR COBEC INTE	446.34	as Yorrossi	479.37
Total Taxes, C. C. I. Company,	405:00 7,	45,082.08	hannag 11	48,432.01
Cliffs Power and Light Company.	36,150	1.141.04	36,490	1.052.75
Cliffs Electric Company.	10,000	315.62	475-50 (not :	included)
Total. Nator Bervice Accounts	46,150	1.456.66	36,490	1.052.75
Collection Fees	352-52 2.	14.57	00,100	10.53
Total Taxes.	781,45 11.	1.471.23		1.063.28
		-,		-,000120
Grand Total,	1,460,275	46,553.31	1,696,467	49,495.29
TAXES LEVIED - FORSYTH TOWNSHIP	1928	1927	1926	1925
State. Ine streets and alleys is	6 770.27	8 670.96	7 382.08	7 739.33
County, kept in good condition. Set	13.341.05	13, 232, 64	15 365.44	11 989.62
County Road, percoving deal trees in the	6 742.11	6 101 . 27	7 459 . 59	7 272.94
Contingent . parkny on Pine Street made	3 500.00	4 000.00	4 500.00	4 500 00
Highway Improvement	2 000.00	3,000.00	4,000.00	3,000,00
Highway Renair	4 000.00	4,000,00	2,000.00	7 000-00
Library The alleys in this least	100.00	100.00	2,000.00	1,000,00
School and One Mill's Company. Less arrest	40 350 80	34 469 00	10 040 00	19 909 65
Cemetery houses	500.00	500.00	40, 540.00	42,092.00
Bridge	500.00	500.00	Rendering	1 000 00
De jactod	00.04	10 00	hig willie .	1,000.00
nojecteu,	29.24	13.07	5.76	351.76
TOtal,	11,000.47	14,000.94	81,600.87	82,745.30

GWINN DISTRICT MINES ANNUAL REPORT YEAR 1928

10. TAXES: (Cont.)

TAXES LEVIED - FORSYTH TOWNSHIP	1928	1927	1926	1925
Amount paid by C. C. I. Company,	46,092.40	49,005.39	60,254.84	61,940.86
Percent paid by C. C. I. Company,	59.60	66.14	73.84	74.84
This location was cleans	i by the fow	mehip: Gvez	balf of the	Company

16. WATER SUPPLY: houses in this location are vacants

19. GWIMU

The new system of operating the pumping plant on the Escanaba River. inaugurated in December, 1927, was in force during 1928 and proved successful. Only one pumpman is required and there have been no delays. A sample of water taken by a state employee of the Department of Health showed contamination of the water with some colon bacilli. A larger number of samples taken by the health officer from Negaunee failed to disclose the source of contamination, but did show that the water was unsafe for drinking. It was then decided to install a chlorinating apparatus to treat all the water pumped through the mains. This was purchased from the Wallace-Tiernan Company of Chicago, and installed by one of their representatives. A heavy charge of chlorine gas was used during September and October due to the heavy rainfall and also to destroy bacteria that were in the wooden pipe mains. The charge was then reduced, so that a tank of chlorine gas now lasts three weeks. Samples of water show no dangerous bacteria. This installation forestalled a possible typhoid epidemic or other intestinal infection. It places Gwinn among the progressive villages of the state that have provided certain protection for their water supply. thes of the association is included in that in the

The following table gives the cost of operating the pump station in 1928 and 1927:

social, musical, athlet	10, a 1928 or	eations 1927	INCREASE DECREASE
General Expense	55.17	n for 72.57	of this nature, 17.40
Maintenance Labor	713.97	ty cen741.27 the	whole United 3 27.30
Maintenance Supplies	the 6.25 ex	tent. 834.22	827.97
Operating Labor	1,653.83	3,974.70	2,320.87
Operating Supplies	4,107.70	5,424.60	1,316.90
Total	6,536.92	11,047.36	4,010.44

0. Gwinn Hotel: The 1928 and 1927 operating costs were charged off as follows: a fairly successful years I 1928 ager has 1927 as INCREASE C. C. I. Co. Mines 405.00 7,092.19 hotel 6,687.19 Gwinn Townsite Expense, 2,823.38 866.81 1,956.57 C. K. Quinn & Co. 1,200.50 725.00 475.50 Water Service Accounts a good meals, and is gaining in favor with the traveling Receivable, 2,352.57 2,363.47 10.90 Total 1,047.47 g the lase 6,781.45 11,047.47 g the hotel 4,266.02

17. CONDITION OF PREMISES:

Owing to the cold, wet summer, the swimming pool at this park was not

GwinnaTownsite: Marquette County people as in previous years. Many tourists. The streets and alleys in Gwinn Townsite were cleaned by the Township and kept in good condition. Some expense was incurred by the Company in removing dead trees in the parks, and vacant lots. The Norway pines in the parkway on Pine Street made a good growth during 1928 and are now well established. A few were destroyed by automobiles. Austin Location: bove the present park are being out for wood, and unless

The alleys in this location were cleaned several times during the year by the Company. Less expense was incurred in this work due to more vacant houses.