The product of the mine as prepared for shipment was 6,743,510 pounds, or 3,371 1810-200 tons of mineral, yielding about 83 18-100 per cent., or 5,609,762 pounds of refined copper, for which has been realized the gross sum of		$658,382 94
Realized from the sale of silver		3,772 12
		$662,155 06
The expenses of the year are as follows:		
Running expenses at mine	$315,246 34	
Building, construction, and real estate account	75,586 73	
Smelting, transportation and all other expenses	93,631 12	
		486,464 19
Leaving as mining profit		$177,690 87
There has also been realized during the year from interests on loans		10,037 42
Making the income of the year		$187,728 29

The statement of assets and liabilities in our last report showed a balance on hand, as of date,

January 1, 1887	$548,781 46
Add earnings of 1887	187,728 29
	$736,509 75

Deduct dividend of Feb. 15, 1887	$160,000	
Deduct dividend of Aug. 25, 1887	40,000	
Leaving balance of assets, Jan. 1, 1888		[illegible]

A dividend of $4.00 per share, or $160,000 payable February 15, has been declared, which, with dividend of $1.00 per share, paid August 25 last, makes total for the year $200,000.

The usual financial statements are submitted, and also the report of the agent, which states clearly the present condition of our property.

THOMAS F. MASON, *President*.

New York, February 20, 1888.

GENERAL SUMMARY OF RECEIPTS AND EXPENDITURES OF THE QUINCY MINING COMPANY, [illegible] ITS ORGANIZATION TO DECEMBER 31, 1887.

Receipts.

From capital stock paid in	$200,[illegible]
From proceeds copper and silver (93,853,639 lbs. copper)	18,184,[illegible]
From interest	120,[illegible]
From profit on sale P. L. & R. Improvement Company stock, and other investments	79,[illegible]
From sale of real estate, Hancock	57,[illegible]
	$18,648,[illegible]
By balance brought down, being receipts over expenditures	$5,148,[illegible]
Deduct dividends declared, Nos. 1 to 38 inclusive	4,610,[illegible]
Leaving balance as per statement in detail below	$538,[illegible]

Expenditures.

For expenditure on location previous to 1856	$42,[illegible]
For expenditure on Quincy vein, 1851, not now worked	55,[illegible]
For openings and explorations on 3,800 feet "east," or Pewabic vein, extending to Portage Lake, preparatory to future work	11,[illegible]
For real estate and permanent improvements on same, including dwelling houses, stamp mill, machinery, steam engines, tram roads, dock, warehouses, and other buildings and roads	1,018,[illegible]
For mining and surface labor, expenses of smelting and marketing copper, and all incidental expenses	12,374,[illegible]
Balance carried down	5,146,[illegible]
	$18,648,[illegible]

STATEMENT OF ASSETS AND LIABILITIES, EXCLUSIVE OF REAL ESTATE, MINE PLAT AND SUPP[illegible] IN USE, JANUARY 1, 1888.

Assets.

Loans on call	$275,[illegible]
Cash in bank	11,[illegible]
Cash on hand at mine	8,[illegible]
Copper on hand, sold	232,[illegible]
Accounts receivable	11,[illegible]
	$538,[illegible]

Liabilities.

Drafts unpaid	$40,477 24	
Dividends unpaid	799 50	
Accounts payable in New York	11,875 00	
" " at mine	20,842 34	
		$73,[illegible]
		$464,[illegible]

Add at mine, viz:		
Supplies per inventory on file	$63,088 50	
Farm account (horses, wagons, etc.)	8,574 49	
Accounts receivable	28 60	
		$71,691 59
		$536,509 75
Less dividend payable February 15, 1888, $4.00 per share, $160,000.		

Summary for the Year.

Average force employed		447 men
" number of miners		142 "
" wages of miners on contract per month		$48.40
Yield of mineral per fm. of ground broken		976 lbs.
" of refined copper per fathom of ground broken		781 "
Total rock mined		124,289 tons
" " hoisted		96,370 "
" stamp rock treated		94,250 "
Yield of rock stamped, mineral		3.23 per cent.
Product stamp mineral	6,092,475 lbs	
" masses	651,035 "	6,743,510 lbs
" refined copper		5,609,762 lbs

AGENT'S REPORT.

QUINCY MINE, HANCOCK, MICH., January 31, 1888.

The following report of our operations at the mine for the past year is respectfully submitted.

The general appearance and productiveness of the vein, in both the north and south portions of the mine, continued favorably throughout the year.

No. 2 shaft was sunk from the thirty-fifth to the thirty-seventh level. This shaft is still several feet west of the main copper-bearing part of the vein belt, but during the last one hundred feet in sinking it passed through several bunches of vein matter carrying good stamp rock.

The drifting done from this shaft was at the thirty-seventh, thirty-sixth and thirty-fifth levels north. The thirty-seventh level was drifted a few feet south of shaft, and the thirty-sixth level was connected south with the drift from No. 4 shaft. Those openings showed a good average of productive vein, characterized by stretches of lean ground, low-quality vein, and blocks more or less rich in the different grades of copper.

The principal stoping done in this part of the mine was at different points at and between the thirtieth, thirty-first, thirty-second, thirty-fourth and thirty-fifth levels north, and in a rich block of ground at the thirty-third level south of shaft. Considerable good stoping ground is still available here and there between the twenty-eighth and thirty-fifth levels north and south of both shafts; while at and below the thirty-sixth level but little stoping at all has been done either at No. 2 or No. 4 shaft.

No. 4 shaft was sunk from fifty feet below the thirty-fifth level to the thirty-seventh level. This shaft is also a little west of the main copper-bearing part of the lode, but showed, in sinking, occasional patches of good stamp rock.

The drifting done from this shaft was at the thirty seventh level north, and thirty-sixth level north and south, and at the thirty-fifth, thirty-fourth, thirty-third and thirtieth levels south. Most of the vein exposed in the thirty-sixth and thirty-fifth levels is very promising. The vein shown in the thirty-fourth and thirty-third levels is more of the mine was at and between the thirty-second, thirty-third, thirty-fourth and thirty-fifth levels north and south of shaft.

The man-engine shaft was extended and put in working order from the twenty-ninth to the thirty-first level, and is now being sunk towards the thirty-third level.

The diamond drill was not used much in bunchy, having stretches of alternating good and poor ground.

The vein in the thirty-second and thirtieth levels, while showing occasional bunches of playing ground, is narrow and of much poorer quality than it is in the lower levels.

The principal stoping done in this part during the year. A few holes were bored a the twenty-fifth level north of No. 2 shaft, but nothing of value was discovered.

The accompanying maps, filled up as usual to the end of the year, show as near as may be the position and extent of work done in the various openings.

Several unavoidable accidents during the year caused more or less serious delay both at the mine and the mill. These mishaps, however, were mostly overcome in good time, and eventually we shall profit by the improvements made by way of reconstruction.

On the night of June 7 the rock house and adjuncts, with nearly all machinery enclosed, were totally destroyed. The fire undoubtedly was caused by lightning, which struck the drum house at head of main “incline,” and the whole range of buildings was soon a mass of flames, which it was impossible to extinguish.

Means were at once improvised, by erecting a temporary rock house, for handling the rock and sending it to mill, and regular ruuning operations were resumed as soon as possible.

On the 24th of August, the stamp mill was closed down for some time, on account of the breaking of both main engine shafts. This caused the stoppage of the mill for about four weeks; and the burning of the rock house, drum house, etc., necessitated a delay of about the same time, the total suspension of the stamp mill covered a period of nearly two months.

During the summer the water pipes which supplied the mine boilers from the lake out, but, fortunately, no serious breakage occurred, and a new line of six-inch cast-iron pipes, some forty-four hundred feet in length, was laid and put in use. As the old pump at the mill was becoming inadequate to this service, it was replaced by a new compound one—size 14-20x7x12—which makes this plant complete, and independent of the rest of the works, and sufficient for all probable contingencies.

The new rock house was ready for use about the middle of November. It stands several hundred feet north of the old one, being just opposite to No. 7 shaft. It is designed and equipped for doing the best possible service. Steam for operating it is taken from the main boilers at the mine.

For the transportation of rock a substantial trestle work was built for car tracks, over which the rock is sent from the shaft house to the rock house.

From the rock house to head of “incline" a second gravity road was built, and the old tram road was made new throughout, thus completing an entirely new outfit all the way from the stamp mill to No. 4 shaft.

Ths fire plant for the mine was finished early in the season, and proved to be of great value, for by its use the other mine buildings were saved at the time of the fork house fire.

At the mine boiler house an additional railroad trestle for side track was built, and the coal yards, both at the mine and the mill, were considerably enlarged so as to hold the needed supply of fuel.

A new dump scow for the removal of stamp sand has been built, and will be ready for use next season.

S. B. HARRIS, Agent.

Table showing yearly product of Quincy mine:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1856	6	1,462	1872	1,334	1,134
1857	61	762	1873	1,400	.....
1858	153	772	1874	1,525	654
1859	178	1,114	1875	1,334	281
1860	970	414	1876	1,536	1,171
1861	1,218	852	1877	1,427	336
1862	1,153	218	1878	1,480	449
1863	1,115	1,737	1879	1,323	1,458
1864	1,251	586	1880	1,848	263
1865	923	1,500	1881	2,753	884
1866	1,172	1,000	1882	2,832	1,796
1867	1,013	1,000	1883	3,006	239
1868	727	1,000	1884	2,825	436
1869	1,208	1,365	1885	2,924	497
1870	1,218	1,777	1886	2,961	1,529
1871	1,204	1,501	1887	2,804	1,762
Total				46,863	1,813

THE FRANKLIN MINING CO.

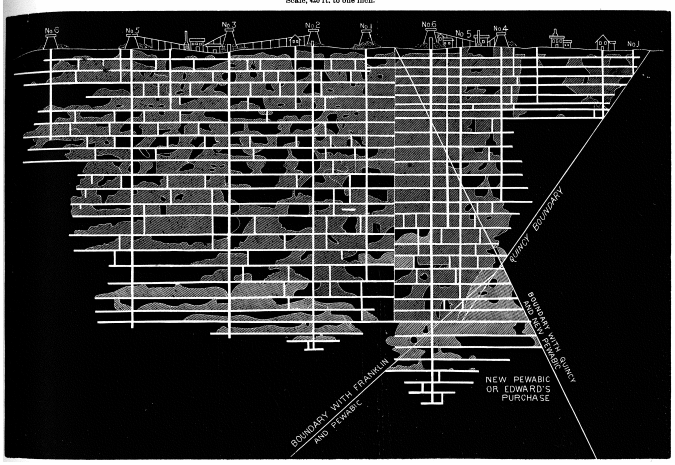
The Franklin mine was once, as now, in a prosperous condition, but this earlier period of good fortune was succeeded by many years of adversity. By being leased on tribute the affairs of the company and the condition of the mine reached a pretty low ebb. It has been brought up again by good management, vigorous, intelligent, economical management. It is the Pewabic lode, but is not in rich ground like the Quincy, but just about rich enough to work at a profit when operated as it is now.

The map herewith given does not show the underground extensions of work for several years past; but it is valuable as showing the situation of the Franklin, Pewabic and Quincy mines with one another, and also the location of the shafts, etc.

No. 2 shaft is now to the 29th level and can not be further sunk; it is still used, however, as there is stoping ground reached from the shaft in nearly all the levels below the 16th. No. 3 shaft is to the 30th level and the stoping is mainly below the 24th. No. 5 shaft is sunk to the 29th level. Not much timber is required in the mine; the hanging wall stands well. The vein is “bunchy,” but unlike the Quincy, has not afforded the side branches that have been so important in that mine; recently some discovery of this sort has been made with the diamond drill, an amygdaloid pocket east of the main lode has been found, which it is reported, is rich in copper.

LONGITUDINAL SECTION OF THE FRANKLIN AND PEWABIC MINES, JAN. 1888.

Scale, 420 ft. to one inch.



I have copied from the company's books fuller details of the work than are given in the printed report:

Company Account—Labor, and Cost of Same.

Number men	[illegible]
Mining captains, timbermen	$12,[illegible]
Miners' account, day account	1,[illegible]
Engineers, firemen, machinists	12,[illegible]
Trammers, laborers	34,[illegible]
Total	$64,[illegible]
Number men	[illegible]
Shafts	[illegible]
Winzes	[illegible]
Average cost per foot	10 [illegible]
Total cost sinking shafts	7,[illegible]

Mining Expense—Drifting, Cross-Cutting.

Number men	[illegible]
Number feet drifted	2,[illegible]
Average price per foot	$[illegible]
Total cost	$25,[illegible]

Statement of Stoping.

Number men	[illegible]
By air drill, number fathoms	9,[illegible]
Average price per fathom	$10 [illegible]
Total	$97,[illegible]
Mining expense, sundry labor	9,[illegible]

Cost of Supplies and Fuel.

Supplies	$12,[illegible]
Wood, coal and teaming	28,[illegible]
Total	$41,[illegible]
Less profit on miners' supplies	17,[illegible]
Total	$23,[illegible]

Recapitulation of Mining Expenses.

Company account, labor	$64,[illegible]
Sinking shafts and winzes	7,[illegible]
Drifting and cross-cutting	25,[illegible]
Stoping	87,[illegible]
Sundry labor	9,[illegible]
Supplies, fuel	23,[illegible]
Total	$217,[illegible]
Number of men on company account	[illegible]
Number of men on contract	[illegible]
Total number men	[illegible]
Tons of rock hoisted	173,[illegible]
Total rock rejected	[illegible]

Tons to mill	137,137
Per cent. rejected	21

Sunk No. 2 shaft 9 feet; No. 3 sunk 233 feet; No. 4 sunk 440 feet.

Total number feet drifted 2,634.7; number fathoms stoped 9,496.927.

Surface Expenses.

Number men	34½
Wages	$16,069 81
Teaming	4,195 67
Wagons and sleighs and other repairs	572 78
Total	$20,838 26
Less house rent and charges	9,006 07
Net total	$11,832 19

Stamp Mill Expenses.

Number men	56
Number cords wood	10,495
Cost of wood	$28,128 51
Cost foundry bills	3,225 46
Cost, other supplies	4,104 69
Cost of labor	22,006 32
Total	$57,569 98

Results of Stamping.

Number days average per man running	22
Tons stamped	137,137
Per cent. per ton	1.21
Pounds of copper	3,321,985
Tons stamped per cord of wood, average	13.06
Cost per ton of rock stoping	$41 98

Tram Road Expenses.

Number men	14
Cost of labor	$6,713 26
Cost of supplies	1,708 91
Total cost	$8,422 17
Number tons of rock run over to mill	137,137
Cost per ton	$6 14

Rock House Expenses.

Number men	37
Cost of labor	$14,756 25
Cost of supplies	529 89
Total cost	$15,286 14
Tons of rock	137,137
Cost per ton	$11 14
Cost hauling per ton rock hoisted	8 78
General expenses—Insurance, taxes, agents, etc.	10,363 32
Office expenses—Showing cost of office clerks and sundry items, total	2,519 41
Construction	1,791 23

Summary of Expenses.

Number of men	399
Mining expenses	$217,328 27
Surface expenses	11,832 91
Stamp mill expenses	57,564 98
Tram road expenses	8,422 17
Rock house expenses	15,286 14
General expenses	10,363 32
Office expenses	2,519 41
Construction, general repairs expenses	1,791 25
Total expenses	$325,107 71

Rock Account.

Rock on hand January 1, 1887	27,[illegible]
Mined during year	165,[illegible]
Total rock	192,[illegible]
Hoisted during 1887	173,[illegible]
Rock on hand January 1, 1888	18,[illegible]
Pounds of mineral per fathom of rock hoisted	[illegible]
" " ingot " " " " "	[illegible]
" " mineral " ton " " "	[illegible]
" " ingot " " " " "	[illegible]
" " mineral " " " " stamped	[illegible]
" " ingot " " " " "	[illegible]
Per cent. of mineral in rock stamped	[illegible]
" " " ingot " " "	[illegible]
" " " mineral " " hoisted	[illegible]
" " " ingot " " "	[illegible]
Cost of mineral per pound at smelting works	[illegible]
" " ingot " " " " "	[illegible]

Lands owned by Franklin Mining Co. N. ½ Sec. 14, S. W. ¼, Sec. 15, S. E. ¼, Sec. 15, all in T. 55. N., R. 33 W; and N. E. ¼ and W. ½, Sec 11, T. 55. N., R. 34 W., and W. ½, S. 24, T. 55, R. 34; S. W. ¼, S. 36, T. 56, R. 34, W. ½, S. E. ¼, S. 25, T. 5, 6 N., R. 34 W.

The present company has produced from July 1, 1874, to Jan'y 1, 1888, 13½ years, 39,148,464 lbs. of copper; and from 1857 to 1870, 12½ years, the old company produced 14,565,723 lbs. By tribute work, 1870 to 1874, 4 years, 2,206,774, making a total of 55,920,959.

FRANKLIN MINE REPORT.

BOSTON, March, 1888.

To the Stockholders of the Franklin Mining Co.:

Annexed you will find the usual statement of the doings and affairs of your company for the year ending December 31, 1887. The statements of assets and liabilities, showing a balance of assets at that time of $259,988.00, from which a dividend of one dollar per share (forty thousand dollars) was paid January 2, 1888, leaving us, after paying that sum, a larger surplus than we had at close of business December 31, 1886. We also hand you the report of our agent of the doings at the mine for the year, its present condition and future prospects, which, with copper at present price, certainly promises well for a successful business the coming season.

Our buildings, machinery, etc., are in good condition, and we have added during the year a hoisting engine, which will materially facilitate our business, the cost of which has gone into general expenses.

We have a large amount of rock in the mine, say 18,890 tons, broken and ready hoisting, which we have not valued in our assets, the cost of breaking which has gone into our regular expense account.

As will be seen by our agent's report, the cost of producing rock per ton was $1 87-100, a saving of three cents per ton on 1886 workings.

The total amount of rock hoisted during the year was 173,874 tons, or 1,256 tons less than in 1886.

The percentage of mineral in ton of rock hoisted was 1.37-100 per cent.

Further particulars are given by Captain J. Vivian, our agent, who has attended to the affairs of the company the past year with his usual energy and skill.

Respectfully submitted,
For the Directors.
D. L. DEMMON, Treasurer

OFFICE OF THE FRANKLIN MINING CO.,
HOUGHTON COUNTY,
Hancock, Mich., January 5, 1888.

D. L. Demmon, Esq., Treasurer:

DEAR SIR,—The following report of our doings for the year ending December 31, 1887, with the map of the mine showing the extent of the openings, stopes, etc., with inventory of supplies, tools, real estate and machinery; also tabular statements giving in detail the cost of each department of our works, together with a general description of our operations, is respectfully submitted.

SURFACE.

All in this department remains about the same as it was a year ago, except the laying down for fire purposes, of 2,450 feet three-inch gas pipe, connecting with seven hydrants, and extending from the engine to different parts of the location. With this arrangement the most important and valuable property on the mine can be reached with about two hundred feet of hose.

MACHINERY.

At the date of my last annual report, I did not suppose that any addition to our hoisting machinery would be necessary for 1887, but after increasing the depth of the mine about two hundred feet, we found that we had reached the point from where it would be impossible for our present hoisting engine to do the work required without carrying a higher pressure of steam on the boilers than was considered safe. Therefore we purchased from the Portage Lake foundry the heavy pieces for a 24"x48" Corliss engine, which is the same size as the one now in use. All the small parts we are making in our shops, thereby saving in the cost of it about one thousand dollars. It will be connected to the same shaft that the old engine is now operating, and will be ready for use about the 15th of January. On the 22d of May we had an accident to the hoisting engine, the key seat of the pinion giving out and bending the fly-wheel shaft, which disabled one hoisting drum for about four weeks, and necessitated putting in a new shaft, which was done in June. Since then, all in that department has worked very satisfactorily. The fire-box of the pumping engine boiler becoming too poor for further use has been replaced by a new one. All the machinery is in good repair.

STAMP MILL.

We have treated 137,137 tons of rock, which is 1,248 tons less than was stamped in 1886. The falling off was owing to the accident to the hoisting engine as stated above. The mill, except the foundation of two of the heads, which will be repaired in a few days, is in very fair condition. For the want of sufficient sand room in front of the mill, we have put up a sand wheel sixteen feet diameter, to elevate the sand to a point where it is carried by means of about one thousand feet of launders in another direction. With this arrangement we have sand room for about two years; after that we can elevate it twenty feet higher and deposit it on the old sand pile, where there is ample territory for all the sand the present mill can produce for at least twenty years.

MINING.

The openings made are as follows:

Sunk in shafts	440 feet.
Drifting	2,634 1-10 feet.

The amount of rock hoisted was 173,874 tons. The amount rejected was 36,737 tons, or 21 per cent. of the amount taken out of the mine. The cost of manipulating a ton of rock hoisted was 1 87-100 dollars, which is a saving of three cents per ton over 1886, or a total of 5,216 22-100 dollars for the year. The percentage of ingot copper in the rock hoisted was 1 12-100, which is a decrease of 9-100 per cent. from 1886.

No. 3 shaft has been sunk from the twenty-seventh to a point of thirty feet below the twenty-ninth level. On account of the lode bending off to the west, the shaft has been sunk in the foot wall, consequently we cannot say much in relation to the value of the lode until we have seen more of it, except at the twenty-ninth level, where it has been opened for thirty feet north of the shaft, without showing anything of much value.

No. 5 shaft has been sunk from a point thirty feet below the twenty-sixth level to the twenty-eighth. The lode in this opening is large, and full as rich as is usually found in this part of the mine. The openings by drifts have been regularly made from the twenty-fourth to the twenty-eighth level, both north and south of No. 5 shaft, which on the whole have exposed a very fair sized lode that will produce a large amount of all grades of copper, and pay well to remove by stopes. The drifting done at No. 3 shaft is from the twenty-sixth to the twenty-ninth level. The lode in these openings is about the same in size and productiveness as this part of the mine has afforded for many years. The lode in the twenty-ninth level north of No. 2 shaft is rather lean on the whole, but with anything like the present price for copper, some of it exposed in this opening will pay to take out. The depth of the shafts are

as follows: No. 2, 2,350 feet; No. 3, 2,320 feet; and No. 5, 2,200 feet.

PROSPECTS FOR 1888.

On account of some portions of the lode in the bottom levels at No. 2 shaft not showing as well as was met with in the levels above, I doubt if the product for the ensuing year will be as large as it was for 1887, but with the present price for our product the profits for 1888 will doubtless be materially augmented.

Capt. Thomas Dennis, Mr. Arno Jaehnig, the clerk, and Mr. James Moore are still with us, and I take pleasure in saying that they have as in former years faithfully worked for the best interests of the company.

I am, yours respectfully,

J. VIVIAN, Superintendent.

FRANKLIN MINING COMPANY, CASH ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1887.

Cash on hand January 1, 1887	[illegible]
Cash received from sales of copper, 4,797,289 lbs., at 11.4305c	[illegible]
Cash received from sales silver	[illegible]
Cash received from interest	[illegible]
Cash received from loans	[illegible]
	[illegible]

Contra.

Cash paid dividend January 1, 1887	$40,000 00
Cash paid mine agent's drafts	328,895 36
Cash paid loans	341,000 00
Cash paid interest	4,498 04
Cash paid insurance	919 51
Cash paid storage	882 75
Cash paid smelting	41,710 28
Cash paid freight	12,589 22
Cash paid expense, brokerage, taxes	12,308 69
Cash on hand December 31, 1887	133,506 47
	$916,310 32

E. & O. E., Boston, January 2, 1888. FRANKLIN MINING CO., by D. L. DEMMON, Treasurer.

FRANKLIN MINING COMPANY, PROFIT AND LOSS ACCOUNT FOR THE YEAR 1887.

Receipts.

3,475,664 lbs. copper sold at 11.942c	$411,602 57
440,174 lbs. copper on hand (sold)	74,521 46
Silver sold	2,045 39
Received for interest	698 77
	$488,868 19

Expenditures.

At mine, as per yearly cost sheet	$325,107 71
All other expenses, including smelting, freight, insurance, interest, etc.,	72,908 49
Profit and loss—Profit for 1887	90,851 99
	$488,868 19

E. & O. E. D. L. DEMMON, Treasurer.

FRANKLIN MINING COMPANY, ASSETS AND LIABILITIES, DECEMBER 31, 1887.

Assets.

Cash on hand		$133,506 47
Copper (sold)		74,521 46
Supplies at mine		73,395 67
Notes receivable		30,000 00
		$311,423 60

Liabilities.

Drafts accepted and in transit	$18,597 01	
Liabilities at mine	24,722 71	
Due for smelting and freight	8,115 88	
		51,435 60
Surplus December 31, 1887		$259,988 00

From which a dividend of one dollar per share, on $40,000, was paid January 2, 1888.

E. & O. E. D. L. DEMMON, Treasurer.

Yield in 1881	2,667,952 lbs. refined copper.
Yield in 1882	3,264,120 lbs. refined copper.
Yield in 1883	3,489,308 lbs. refined copper.
Yield in 1884	3,748,652 lbs. refined copper.
Yield in 1885	3,999,172 lbs. refined copper.
Yield in 1886	4,264,297 lbs. refined copper.
Yield in 1887	3,915,838 lbs. refined copper.

The Franklin mine has produced as follows:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1857	3	699	1873	183	[illegible]
1858	56	1,104	1874	2 3	[illegible]
1859	116	1,211	1875	583	[illegible]
1860	157	1,860	1876	963	[illegible]
1861	783	43	1877	1,169	[illegible]
1862	733	645	1878	1,299	[illegible]
1863	639	684	1879	1,414	[illegible]
1864	605	1,335	1880	1,168	[illegible]
1865	779	1,481	1881	1,338	[illegible]
1866	819	994	1882	1,622	[illegible]
1867	701	455	1883	1,744	[illegible]
1868	737	1,326	1884	1,882	[illegible]
1869	779	970	1885	1,999	[illegible]
1870	589	.....	1886	2,132	[illegible]
1871	300	1,000	1887	1,975	[illegible]
1872	186	.....			
Total				27,740	[illegible]

D. L. Demmon, Secretary and Treasurer, Boston, Mass.

THE PEWABIC MINING CO.

The Pewabic mine lies between the Franklin and the Quincy and was formerly a very rich amygdaloid mine, but becoming exhausted additional land was purchased nine years ago and the shaft extended down into it and levels opened. Unfortunately this ground did not prove productive, while the expense of the purchase and of the new openings was considerable. The company became financially embarrassed.

The affairs of the company have been in the courts for some years past and are yet far from settled. Its man-engine shaft and air compressor are used by the Franklin company.

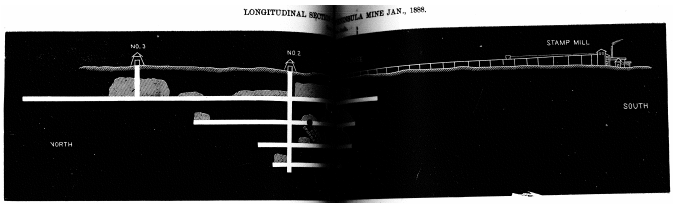
The Quincy mine is several hundred feet deeper than the Pewabic and is rich in the bottom which suggests that, possibly, the Pewabic will also be found productive at greater depth. The east branch which is so rich in the Quincy is also found productive at greater depth. The east branch which is so rich in the Quincy is also found in the Pewabic. It would seem to be advisable, that whoever works the Pewabic in future should test this east branch pretty thoroughly at every level. The machinery, Capt. Vivian says, is in good repair, and the mine could be started up without much expense; but paying ground would have to be found before a profit could accrue. The mine has been shut down since July 12, 1884.

The mine has produced in all, 13,894 tons, 620 lbs of copper.

D. L. Demmon, Secretary and Treasurer; Johnson Vivian, Agent.

THE HANCOCK MINE

has not been worked for several years, and I know of nothing of interest to be related of it beyond what is found in previous reports.



THE PENINSULA MINE,

which was shut down in 1884, is again to be worked. The water has been pumped out and things are otherwise getting into readiness to work the mine.

The mine lies south of the Osceola and is in the Allouez conglomerate. The openings are not very extensive, the lowest being only the 6th level, which latter was drifted in to but a slight extent.

I have been into the mine several times and have seen such good stopes, reasonably rich conglomerate. Certainly if enough of such kind of ground could be opened up, the Peninsula would be a paying mine. A history and description of the mine will be found in former reports. The stamp mill is first-class. The other machinery, rather out of date. The mine has produced 1,543 tons, 1,071 lbs of copper.

W. A. Dunn, Agent; S. D. North, President, Hancock, Mich.

THE OSCEOLA MINE

from the outset to the present time has been, and remains, one of the leading copper mines of the state. Intelligence, vigor, push, have characterized the management, and there have been no reverses. I have described the mine very fully in former reports. It is a good place to study mining, progressive work. The company's report is so complete for the year's work that little is left to be said.

OSCEOLA MINE REPORT.

The directors present the following report of the operations for the past year, and statement of the financial condition of the company:

The product of material was 4,184,432 pounds, which at 85.65 per cent. gave 3,583,723 pounds refined copper, for which has been realized the gross sum of		$424,936 85
From sale of building lots at Hancock		199 50
		$425,136 35

The costs have been:

Running expenses at mine	$297,684 31	
Smelting, transportation, and all other exdenses of selling copper	56,462 63	
		354,146 94
Showing a mining profit of		$70,989 41

The balance of assets January 1, 1887 was		$225,741 99
There has been expended in exploratory work	$6,513 03	
There has been expended in mine plant during the year	4,702 22	
Deduct dividend of February 15, 1887	50,000 00	61,215 25
		164,526 74
Making the balance of assets January 1, 1888		$235,516 15

A dividend of $1 per share, or $50,000, payable January 16, has been declared from the earnings of the past year.

There are no matters of interest or importance to record during the past year. The failure to find a paying lode in the cross-cut from 16th level was a great disappointment to many of our share-holders, but, after all, it was known by every one to be only an exploration, and does not preclude the possibility or even the probability of reaching important results in the future. As has been said in former reports, the great Calumet and Hecla conglomerate lode crosses and out-crops on the entire length of our property. With a belt of the formation so unique and wonderful, further explorations must surely be made in the future at greater depth, and one would be bold indeed who should decide that great results are not yet in store for the Osceola from this world-wide famous conglomerate lode.

The enormous advance in the price of ingot copper makes it certain that Captain Daniell acted wisely in placing his power and machinery at work “where it would do the most good” in the output of fine copper, with the certainty of ample remuneration. While we should remember that our mine is lean and bunchy in its characteristics, yet we should not forget that the lode going south and in depth shows gradual improvement, and the greatest portion of our estate is in this direction. We are justified in indulging hopeful anticipations for the future. We shall, no doubt, the coming season, open another shaft (No. 5) south, on the Opechee property, with reasonable ground of hope for improved conditions. Meantime, with present output and price of ingot copper, we can hardly fail to realize reasonable returns in dividends. The report of Captain Daniell and the treasurer will show our affairs to be in a healthy and conservative condition.

Assets and Liabilities.

Assets.		
Dash in bank at Boston	$15,608 36	
Cash on hand at mine	339 49	
Supplies on hand at mine	22,056 63	
Fuel on hand at mine and stamp mill	20,205 96	
Accounts receivable at mine	9,007 10	
Bills receivable at Boston	90,916 28	
3,000 shares stock in Tamarack-Osceola Copper Mfg. Co	7,500 00	
250 shares Hancock and Calumet R. R. stock	25,000 00	
Copper on hand, 724,002 pounds, since sold	109,958 52	
Total assets		$300,592 34
Liabilities.		
Drafts outstanding	$12,892 39	
Accounts payable at mine	31,880 30	
Bills payable at Boston	20,000 00	
Dividends uncalled for	303 00	
Total liabilities		65,076 19
Balance of assets January 1, 1888		$235,516 15

STATEMENT OF RECEIPTS AND EXPENSES OF ALL KINDS FROM SEPTEMBER 25, 1873, TO JANUARY 1, 1888.

Receipts.

[illegible] capital stock, $50,000 shares, $25 a share full paid			$1,250,000 00
958,002 pounds copper, 1874, at 23.37c	$218,736 92		
1,330,313 " " 1875, " 22.77c	302,862 96		
1,693,737 " " 1876, " 20.57c	348,333 25		
2,774,777 " " 1877, " 18.19c	504,636 93		
2,705,998 " " 1878, " 15.53c	420,340 14		
3,197,387 " " 1879, " 17.79c	568,689 89		
3,381,061 " " 1880, " 19.15c	647,487 19		
4,176,976 " " 1881, " 17.77c	742,585 84		
4,179,782 " " 1882, " 17.70c	739,458 26		
4,256,409 " " 1883, " 14.96c	636,846 83		
4,247,630 " " 1884, " 12.82c	544,651 02		
2,939,169 " " 1885, " 10.75c	208,558 65		
3,560,786 " " 1886, " 10.51c	374,144 13		
3,583,723 " " 1887, " 11.86c	424,936 85		
41,963,750 " " total " 15.92c			6,682,268 86
[illegible] sales of silver to date			32,439 04
[illegible] interest receipts to date			36,220 87
[illegible] 360 shares Hancock & Calumet R. R. stock			36,000 00
Total receipts			$8,036,928 77

Expenses.

[illegible]nning expenses prior to 1887	$5,130,925 73		
[illegible]nning expenses during 1887	354,146 94	$5,485,072 67	
[illegible]nstruction expense prior to 1887	$709,834 22		
[illegible]nstruction expense during 1887	4,702 22	$714,536 44	
[illegible]al estate		588,836 70	
[illegible]vidends prior to 1887	$972,500 00		
[illegible]vidends during 1887	50,000 00	1,022,500 00	
[illegible]xploratory work		15,466 81	
Total expenses			$7,826,412 62
[illegible]alance of receipts January 1, 1888			$210,516 15
[illegible]d 250 shares Hancock & Calumet R. R. stock			25,000 00
[illegible]alance of assets January 1, 1888			$235,516 15

DETAILS OF MINING EXPENSE.

[illegible]haft sinking, 462.3 feet at $12 26	$5,668 90	
[illegible]inze sinking, 217.5 " " 9 95	2,165 10	
[illegible]rifts, 3,820.1 " " 6 58	25,141 06	
[illegible]oping, 9,502 fath'ms at 9 91	94,188 90	
[illegible]amming	27,147 41	
[illegible]imbering, labor, materials, and supplies	6,940 41	
[illegible]xtra work	1,391 56	
[illegible]upplies, labor, fuel, etc., for air drills	26,852 29	
[illegible]upplies, fuel and labor for engines	27,383 81	
[illegible]ining superintendence and company account labor	19,960 35	
[illegible]acksmith, machinist, and carpenter labor	2,558 82	
	$239,398 61	
[illegible]ess profit on supplies	29,284 50	$210,114 11

Other Expenses.

Rock house	$18,136 80	
Surface labor, supplies, etc.	1,092 60	
Incidental expense, including taxes	6,378 19	
Office labor, supplies, etc.	5,802 52	
Transportation	22,641 29	
Stamping	33,518 80	
		[illegible]
Total running expenses		$297,[illegible]

Construction Costs.

Dwelling houses at stamp mill	$2,607 07	
Compressor, boiler-house, etc.	32 98	
Dwelling houses at mine	2,516 83	
School-house at mine	340 89	
Transfer of engine from No. 3 to No. 4 shaft	289 45	
Stamp mill construction	1,695 00	
Total construction costs	$7,452 22	

Credit.

By boiler, engine and dwelling houses sold	$2,750 00	
		$4,702 22
Expenses of drifting cross-cut to Calumet conglomerate		6,513 [illegible]
Total expended at mine		$308,[illegible]

SUMMARY.

Rock stamped	145,200 tons.
Product of mineral	4,184,432 lbs.
Product of refined copper	3,583,723 lbs.
Yield of refined copper per ton of stamp rock	24.68 lbs.
Yield of refined copper per cubic fathom of ground broken	377.15 lbs.
Yield of mineral per cubic fathom of ground broken	440 lbs.
Percentage of mineral in stamp rock	1.44 per ct.
Percentage of refined copper in stamp rock	1.23 per ct.
Cost per ton of rock hoisted	$1 74
Cost per ton of rock stamped	2 05
Refined copper, cost per pound at mine	8.31c
Cost of smelting, freight, and all other expenses	1.57c
Total cost per pound of refined copper laid down in New York	9.88c

SUPERINTENDENT'S REPORT.

OPECHEE, February 2, 1888.

To the President and Directors Osceola Consolidated Mining Company:

GENTLEMEN—In compliance with the usual custom I would submit the annual report of the mine for 1887.

After the end of May the stamping for the Tamarack mine at our mill was practically ended. The absence of revenue from this source after the time specified increased our cost of stamping over the preceding year about eight cents per ton. The cost of cross-cutting to and working on the conglomerate, not less than $8,000, charged to general mining expense, added five cents per ton to the cost of our rock stamped. A somewhat higher rate of underground wages, and increased cost of fuel, with the foregoing, will fully account for the difference of 19 cents per ton on cost of stamp rock which appears.

We got a pound of copper less per ton from the rock handled, then in the preceding year. This in itself is apparently a small matter, yet the difference is very appreciable on the cost of ingot produced.

The rock hoisted for the year was 171,038 tons, or the equivalent of 9,502 fathoms of ground. The mill product was 3,889,171 pounds mineral. Barrel work obtained 295,261 pounds, or a total of 4,184,432 pounds. This at 85.65, per cent. ingot gave a yield of 3,583,723 pounds. A fathom of ground afforded 377.15 pounds, and a ton of rock nearly 21 pounds of ingot.

The underground work foots up as follows, for the year:

The [illegible]	462.3 feet.
Shafts	217.5 feet.
Winzes and rises	3,820.1 feet.
Levels	720.5 feet.
Cross-cuts	82.0 feet.
Level conglomerate	5,302.4 feet.
Total	

Present depth of shafts and sinking for the year is shown in the following:

Shaft.	Sunk.	Depth from Surface.
Number 1		1,387.1 feet, 18 feet below 15th level.
Number 2	161.3 feet.	1,875.8 " 10 " " 21st "
Number 3	100.1 "	1,898.3 " 12 " " 21st "
Number 4	161.3 "	1,696.7 " 70 " " 19th "

The extension of the several levels for the year is shown in the following form; the preponderance of the work being between Nos. 3 and 4 shafts, and south of No. 4 shaft:

11th level	130.2 feet.	16th conglomerate	82.0 feet.
12th "	188.8 "	17th level	209.2 "
13th "	120.9 "	18th "	398.0 "
14th "	609.4 "	19th "	559.5 "
15th "	309.6 "	20th "	1,100.2 "
16th cross-cut	720.5 "	21st "	194.3 "

No. 2 shaft has been sunk from 19th to 21st level. The line of the shaft seems to be about parallel with the lode, but far enough tinder the productive part of it to show in the sinking copper only now and then. At this time the bottom of the shaft is quite productive. Cutting through the lode at 21st level we find from 8 to 10 feet of copper rock of full average quality. The drivage north of the shaft shows a continuous run of stoping ground at 20th level for nearly 200 feet. This is of about average quality. The 20th level between Nos. 2 and 3 shafts opened stoping ground for the most of its length, more

in quantity than usual, but we do not rate it as above the average in quality.

No. 3 shaft now down, and in working order to 21st level, was sunk wholly in the hanging-wall trap. The lode opened at 21st level for about 200 feet in length, is of better than average quality, and quite promising. Stoping ground here also seems to be continuous.

The levels drifted between Nos. 3 and 4 shafts, 18th, 19th and 20th, may be rated as average in productiveness. Lode irregular in width, the runs of copper ground not being longer than we ordinarily found them.

No. 4 shaft is now nearly down to 20th level. From the 16th level to within 20 feet of the present bottom, this shaft was sunk in the hanging-wall trap. At present the lode is in line of the shaft, and is fairly good for copper. Each level, except 16th, has from 12th down been drifted more or less south of No. 4 shaft. Best results have been noted in 17th, 18th and 19th levels. At 16th level we have had an exceedingly good stope, and we still feel that we may look to the ground south of No. 4 shaft for its fair proportion of our future product.

In the past year we were disappointed in stoping 17th and 18th levels between Nos. 3 and 4 shafts. These were unusually promising, and in places quite rich in the openings. The stopes will no doubt, afford rock of average quality, and in normal quantity, but we had been looking for something better.

The cross-cut at 16th level towards the conglomerate was drifted 720.5 feet, or in all, 740.8 feet, west from hanging-wall of amygdaloid to foot wall of the conglomerate. In October last we cut into the lode and found it from 5 to 6 feet wide, carrying a little copper, but not in quantity to be of any value. Drifting south to the extent of 82 feet has been done, making an exposure, including the cross-cut, of 90 feet. We found in driving south that the lode grew wider and carried a little more copper, but the last 40 feet drifted was the reverse of this. In the extreme end of the opening the conglomerate is less than five feet wide, and can only be characterized as poor. For a month past no work has been done here.

I am sensible of the importance that has been attached to the opening up of this lode, and I regret very much that I cannot speak of the prospect in more encouraging terms. I would not say that we are to expect nothing from the Calumet lode in our property, eventually. I have a distinct remembrance of the characteristics of the showing in and about No. 3 shaft of the old mine, and feel satisfied that we must still go deeper to find a paying lode, if it exists for us. Later we shall be in a better position to afford compressed air for the prosecution of work in this connection, if deemed best. Time will throw more light on what steps we had better take.

Returns from the west amygdaloid have gradually fallen off. Have not discontinued work on it, but scarcely expect to make an important discovery here.

Our prospects for the future are as good as the average of last year. While we have no unusually rich ground to fall back on, we feel that of late we have opened more ground that will pay for stoping in proportion to the whole than for a long time. The openings about and between Nos. 2 and 3 shafts are especially promising in this respect. We are also satisfied that our stoping ground continues to extend south, and it will be in order this year to take steps for the sinking of another working shaft.

Through the rock houses we passed 171,038 tons of rock, discarded 25,838 tons, remainder was sent to mill. The cost of manipulation was 10.6 cents per ton, a little under the preceding year.

Stamping amounted to 145,200 tons, and 38,700 tons for Tamarack mine. Total, 183,900 tons, at a cost for the whole of 35.05 cents per ton. For several months the full capacity of the mill was not utilized. We are now again running the four heads, partly on Tamarack rock.

Our construction account has not been important; a new boiler added to the mill, five dwellings for employés at the mine and same number at the mill.

With this you should receive plans of the mine by our engineer, and a detailed statement of the year's accounts.

Our work has run smoothly for the year. My assistants deserve praise for their untiring devotion to the interests of the company.

Yours very truly,

JOHN DANIELL, Superintendent.

The percentage of cost in the several departments of work are as follows:

1887.	West Amygdaloid.	Osceola Amygdaloid.	Rock House.	Transportation.	Stamping.	Incidentals.	Surface.	Office.	Whole No. Men.
Totals	.03364	.67849	.05962	.07443	.011019	.02097	.00359	.01907	374½

Total expenditures in 1887, $308,899.56.

ROCK HOUSE COST

Average cost per ton of rock, 10.6 cents; cost of air drill work, total $26,805.29; transportation expense of rock, paid 15 cents per car for hauling, balance is for loading cars; 145,200 tons of rock, cost of loading, $861.37; total cost, $22,641.29, 15.65 cents per ton.

Total cost stamping, labor	$26,111 85
Cords of wood used	51,341
Tons of coal	4,520
Cost of fuel	$30,488 00
Oil for lights	10 60
Oil for laboratory	1,265 27
Stamp shoes	1,244 60
Hardware	243 00
Iron and steel	2,300 96
Waste	278 57
Packing and belting	280 41
All other supplies	2,372 62
Total supplies	7,880 95
Amount of labor brought forward	26,111 85
Total (includes labor and Tamarack rock)	$64,478 80
Credit stamping tamarack rock	30,960 00
Total expenses	$33,518 80
Tons of Osceola rock stamped	145,200
Tons Tamarack rock stamped	387,000
Total tons stamped	183,900
Total incidental expenses	$6,378 19
" office "	5,802 52
" surface "	7,944 18
" construction account at mine	3,180 15
" " " on mill	1,665 00
" " " " dock	275 00
" " of houses at mill	2,607 07

Annual products of the Osceola mine are given in the following table:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1874	468		1881	2,089	1,876
1875	665	303	1882	2,088	782
1876	846	1,737	1883	782	2,128
1877	1,382	777	1884	2,123	1,630
1878	1,352	1,998	1885	969	1,169
1879	1,589	1,387	1886	1,780	786
1880	1,691	1,387	1887	1,791	1,723
Total				20,978	214

TAMARACK MINING CO.

The Tamarack mine has been the subject of more interest for the past few years than any other mining enterprise in the state.

Its success has given general gratification, and the original boldness of the scheme, the vigor and skill with which the work of sinking the shaft was executed, excited universal admiration and has brought great and deserved profit as well, no doubt, to the promoters of the undertaking. The Tamarack mine has been a good educator in several ways. It was a radically bold project thoroughly reasoned out from the inception, and rapidly, economically, and successfully brought to a conclusion.

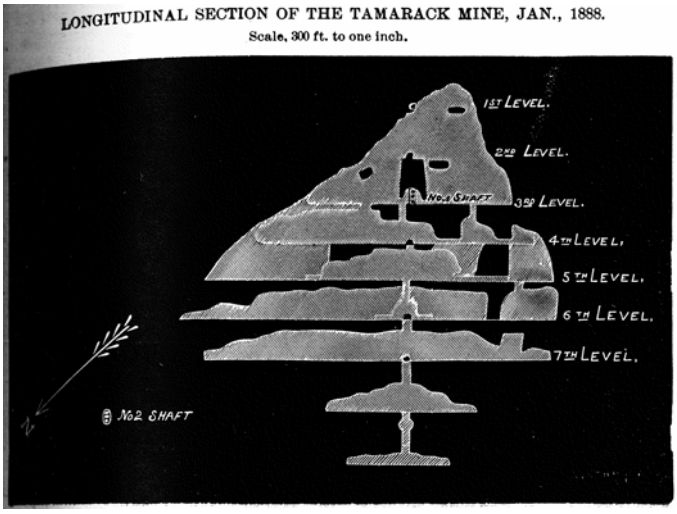
It was the first instance of extraordinary deep sinking, and has thus been an important lesson in this branch of mining. It has demonstrated the fact of the continuance of the copper charged conglomerate to great depth and persistence of these mineral "shoots" in their assumed course through the conglomerate belt down into the earth. The Tamarack company, with commendable openness and liberal intelligence, has been free to give to the public the entire results of the work, including the details of cost both of the primary sinking and preparation, and subsequently of the production of copper as well. With the exception of the Calumet and Hecla, all the copper mining companies have uniformly done this; but the Calumet and Hecla, working in this rich conglomerate, has persistently withheld from the public all statements and figures which could be used as certain data from which to determine the cost of the copper.

The Tamarack is in the same conglomerate, adjacent to the Calumet and Hecla, and the public is fully informed of the cost of the copper and of all the details pertaining to its production, of the extent of the mine, and of the percentage of yield of the rock. To all persons interested in the geology of the country, in the problems of mining, in the value of stocks, in investments, etc., this work by the Tamarack company, and the information which it disseminates, is invaluable.

With the exception of the Tamarack, the Calumet and Hecla is the only mine in this conglomerate, which is far richer than any other deposit. The mine produces more copper than all the others combined, so that all facts pertaining to it, and to its working, are of great scientific and financial interest, and for years it has remained a matter of general regret that the company should withhold from the public all information possible regarding it. Fortunately the Tamarack company is governed by a different policy.

It may be well to briefly describe the situation of the mine and to reiterate a few words giving its history.

The so-called Calumet and Hecla conglomerate is, as its name implies, a belt of conglomerate rock which in this portion, is richly impregnated with copper and which conforms in strike and dip with the other formations with which it is associated, bearing north about 33° east and dipping northwesterly at an angle of about 37° with the horizon. Along the line of the outcrop of this remarkable deposit the Calumet and Hecla Co. owns a length of upwards of two miles, across the whole of Section 23 and the corners of Section 14 and 15 in T. 56 N., R. 33 W.



To the north and south of these limits the conglomerate, as far as tested, has not proved productive in copper, but portions of the belt possessed by the Calumet and Hecla company are very rich, and nearly all of it holds copper. The so-called "copper shoots" are in the portions of the belt which contain the mineral in the greatest quantity, and these mineralized portions usually have a certain direction in the main body of the rock; that is, the portions of the deposit charged with the copper do not extend down usually at right angles to the strike of the formation but at an inclination to the north or to the south. In the Calumet and Hecla the copper shoots incline down to the north, and one of the points to favor the project of the Tamarack shaft was the supposition that the "copper shoot" at the south side of Section 23, known as the "Black Hills," or South Hecla mine, would hold its course, and hold its richness, and could be reached by a deep shaft from the surface.

The nearest point at which the Tamarack company could reach the lode was in the S. E. corner of the west half of the S. W. ¼ of Section 14, and it is here the shaft was located and sunk. It penetrated to a vertical depth of 2,270 feet before the conglomerate was struck, June 20, 1885, three and a half years from the date of commencement of the work.

The shaft is 19 feet x 7 feet inside the timbers, divided into three compartments, all of which are furnished with a cage descending to the bottom of the mine and one of them being operated by a separate plant of machinery.

A detailed description of this shaft and the work of sinking it is given in my report for 1885.

The shaft intersects the conglomerate in the corner of the property from which the company's boundaries run north and west, while the copper lode dips away to the northwest. Thus the successive levels, or horizontal

drifts in the lode, which run diagonally across the corner of the property from the south line to the east line, increase in length with the increase in depth of the mine. The shaft descends vertically in the foot wall, and the lode is reached from it by "cross-cut" drifts which of course are longer, successively, as they go down.

The mine has proved all that was anticipated, the most favorable, regarding it. The lode is as wide, as uniform, and as rich in copper, as any estimates had placed it. Altogether the Tamarack was a notable scheme, of much value to the country, very creditable to the owners, and a triumph of the energy and skill of Capt. Daniell, who directed the execution of the work.

The accompanying plan of the mine gives a clear idea of the underground work. It represents the mine laid on the foot wall and shows the position of the shafts and the intersections of the cross-cuts with the levels. The plan is to take out all the rock that is of any value, thus leaving only the bunches of sandstone, which occur in the conglomerate.

I went through the mine in March last, and found it looking extremely well; certainly as good in the bottom, at the 9th level, as any where. In February the average of mineral obtained from the rock was 5%, 3.77% ingot copper. The 9th level gives a length of ground of 1,500 feet between the boundaries. From this time on the company will be able to work to better advantage. The mine is becoming larger, giving more room, more stoping ground, so that they can mine far more rock hereafter. For instance the 9th level gives a working length of 1,400 feet, and the height, converging somewhat, to the 8th level, is 106 feet.

No. 2 shaft is down 1,200 feet; it will intersect the lode at a point below the 8th level, where the drift connecting the shafts will be 600 feet long. The shaft is slightly smaller than No. 1, inasmuch as there is no room for pipes reserved, but it will be in three compartments.

In No. 1 there is a down draught of air in two compartments and an up draught in one; the temperature in the mine is 62° to 65° Fahrenheit.

In No. 3 stamp head, recently added in the mill, the company has admitted a departure in the foundation,

E. P. Allis & Co., of Milwaukee, the makers, have placed a solid foundation to receive the blow. The difficulty with timbers is, that the stamp does constantly less work. The spring becomes too much, and the blow is less and less effective as the stamp is used. Allis & Co. have persuaded Capt. Daniell to consent to the trial of the stamp head with a foundation as immovable as possible. The spring timbers are done away with. The matter had been decided upon when I was at the mine last, in April. Since then the work has been completed, and the work of the new head is said to be all that was claimed for it. It is the first instance of the kind of a heavy stamp head being used without a mortar or anvil of spring timbers to receive the blow.

It is believed that with this foundation more rock will be passed in a given time than with the ordinary one.

The Tamarack has a remarkable record in the matter of profit and loss. The conglomerate was reached in June, 1885, and already the mine is in the dividend paying list. The money received from the sales of the copper produced has amounted to enough to cover all the outlay from the beginning, inclusive of the entire cost of sinking the shaft, the machinery, buildings, &c., besides leaving in the company's treasury a considerable surplus from which to pay dividends and defray contingent expenses.

The following is taken from the company's report of operations from Jan. 1 to July 1, 1887:

Mineral produced	6,232,119 lbs.	
Ingot copper, 74 per cent. of mineral	4,636,521 lbs.	
Which sold for the sum of	$474,614 68	
Running expenses of the mine	300,898 03	
Smelting, transportation, and all other expenses	79,684 18	
Mining profit	94,032 47	
Add balance of assets, July 1, 1886	100,599 54	
Add 250 shares of Hancock and Calumet R. R. stock	25,000 00	$125,539 54
Total	$219,632 01	
Deduct amount expended in mine plant during the year		$194,186 75
Leaving a balance of assetts of		$25,445 26

The stamp mill has been in operation since May 15, 1887, and we deem that our plant is the most effective and inexpensive of any on the lake, or in the country.

We say this in full consideration of the fact that enormous amounts of money have been expended by our competitors, in pursuit of a common object, which has been, and is, and will be, the production of fine copper at the lowest cost per pound. This is the test and standard by which all the producing companies must be judged in the long run. Our neighbor, the Calumet and Hecla, is really the only mine with which any sort of comparison can be made. It is, by far, the most extensively developed mine in the country, and nearly so in the word. Its product of fine copper the past year has been over 2,000 tons per month. It has absolutely unlimited resources in capital, and has been worked over twenty years with unfailing success. The conditions of the two mines are marvelously similar, excepting where the advantage is altogether against us.

In the first place our vein or lode is identical in character and location, but we had what a few years back was considered an absolutely insurmountable disadvantage,—that of being over 3,500 feet below them, on the dip of the lode. On their location the vein outcrops on the surface, giving access to the copper from the start, and so following it down on the incline, while our surface is in reality some 2,500 feet underground (vertical), and is reached only by a single shaft through solid and unproductive rock, through which every ton must be brought to the surface, to be treated at the stamp mills and smelting works. The Calumet and Hecla has access to its mine by twelve shafts, while we have but one, and yet, such is the superiority of vertical shafts, and of our system of working, that our two shafts (we have a second already more than 700 feet deep, which will be available within two years) in our opinion will be equally as effective in hauling rock to the surface, as the whole twelve shafts now working at the Calumet and Hecla. Treatment at the surface, as crushing rock and smelting mineral, is the same at both mines. Now if Tamarack can, in its first year, as a producing mine, with a single shaft, be made to yield 500 tons per month, as cheaply per pound as its old and rich neighbor can produce four times that quantity, does it not prove that Tamarack, young and insignificant as it is, by

comparison, has achieved marked success? It should not be forgotten that Tamarack has but 40,000 shares, while Calumet and Hecla has 100,000 on which to make its dividends. It will be remembered that two years ago it was voted to increase the capital by issuing 10,000 additional shares for the purpose of improving our facilities for smelting and handling our output of fine copper. It is now believed that this object will be attained without resorting to this expedient, and the 10,000 shares will remain, as voted by the stockholders, subject to the disposal of the directors, and will not be issued.

Calumet and Hecla has a most memorable reccord. Indeed, it is to-day one of the most so in history. It is a very old mine, as such matters are now considered in this country, and yet it is really a young mine. It was first opened before the consolidation in 1866, by comparatively feeble and inexperienced hands, in a remote wilderness, winter region, shut out from the commerce of the world absolutely for one-half of the year. Scientific knowledge in the peculiar work of mining for pure metal, and not for ores or mineral, was necessarily in its babyhood. A million or so of money was paid in by reluctant shareholders before the real history began to attract the world's notice. Capital and science had their legitimate results in marvellous success. In the course of its history it has returned to stockholders in cash over twenty-nine millions, and stands to-day by the price of stock as the representative of more than twenty millions more. It has spent vast sums with a more than liberal hand in opening and developing. To-day it is one of the richest mines in the world, both in its present development and production, and future promise.

Now it may be asked with great propriety, What has this wonderful history of the development and success to do with the Tamarack? We think the question will be answered, when the significance of the fact is considered, that their twelve shafts all dip, on the incline, ultimately into Tamarack property, and it will be reached in the future just as our shaft proved it at 2,000 feet in depth, after some years' work in barren solid rock at the precise spot anticipated. At the very outset, before machinery has been fairly started, having overcome the great obstacle of depth, we have demonstrated that we can produce copper certainly at as low cost per pound as any competitor. We feel that this matter, so imperfectly understood and appreciated generally, should not be lost sight of. It is true that it will take long years for us to develop and realize their remunerating results, but it is not less true that we have passed the crucial point of our history, and are to-day earning far beyond our current and construction expenses for dividends in coming years.

The new stamp mill has but two heads, which have been in operation for less than three months. The cost of the mill was about $110,000, and is designed for four heads, or may be arranged for six or more heads, but at present the mine does not supply sufficient rock for the two heads. In July, 1887, we crushed 9,375 tons of rock, yielding 668,000 pounds of copper, worth 10½ cents per pound—$70,000, and which cost $40,000 to produce, including mining, stamping, smelting, freight and commission, and $13,000 for construction. This gives the cost per pound for the copper 6 cents.

ASSETS AND LIABILITIES.

Cash in bank at Boston	$4,036 27
Hancock & Calumet R. R. Co. 6 per cent. bonds	55,000 00
Assessment No. 1	93 00
Supplies on hand at mine	31,823 78
Cash on hand at mine	811 74
Accounts receivable at mine	7,105 32
Wood and timber land	15,731 96

220 shares H. & C. R. R. stock		$25,000 00	
Bills receivable		46,361 92	
Copper on hand		195,748 60	
Total cash assets			$381,712 59
Liabilities.			
Drafts outstanding		$18,126 55	
Accounts payable at mine		42,094 07	
Bills payable		163,700 00	
Loan account		132,346 71	
Total liabilities			356,267 33
Balance of assets July 1, 1887			$25,445 26

STATEMENT OF RECEIPTS AND EXPENSES OF ALL KINDS, 1882 TO JULY 1, 1887.

Receipts.			
From capital stock, 50,600 shares, $13.00 a share paid in			$650,000 00
" 363 pounds copper, 1882, at 18.00		$65 34	
" 7,435 " " 1883, at 14.71		1,093 37	
" 1,979,400 " " 1885-6, at 10.05		198,944 56	
" 4,636,521 " " 1886-7, at 10.24		474,614 68	
" 6,623,719 " " total, at 10.19			674,717 95
From interest receipts, 1882		$832 83	
" " " 1883		592 44	
" " " 1884		1,656 19	
" " " 1885 (6 months)		506 92	
" " " 1885-6		2,581 12	
			6,169 50
From 350 shares Hancock & Calumet R. R. Co.'s stock sold and paid for			35,000 00
250 shares Hancock & Calumet R. R. Co.'s stock on hand			25,000 00
Total receipts			$1,390,887 45
Expenses.			
Running expenses prior to July 1, 1886	$308,039 56		
Running expenses during 1886-7	380,582 21	$688,621 77	
Construction expenses prior to July 1, 1886	$152,633 67		
Construction expenses during 1886-7	171,468 53		
No. 2 shaft	22,718 22	346,820 42	
Real estate		330,000 00	
Total expenses			1,365,442 19
Balance of receipts July 1, 1887			$25,445 26

DETAILS OF MINING EXPENSE.

Underground Expenses.		
Shaft sinking, 175.2 feet, at $24.86	$4,355 60	
Winze sinking, 674.6 feet, at $12.73	8,591 15	
Drifts, 2,260 feet, at $10.65	24,081 45	
Stoping, 4,289.37 fathoms, at $13.01	55,823 69	
Tramming	16,699 81	
Timbering, labor, materials and supplies	26,340 14	
Extra work	4,778 47	
Supplies, fuel and labor for engines	23,653 59	
Mining superintendence, and company account, labor	17,474 00	
Blacksmith, machinist and carpenter labor	2,829 59	
	$209,959 48	
Less profit on supplies	19,810 55	$190,148 93

Other Expenses.

Rock house	$10,280 66	
Surface labor, supplies, etc.	555 38	
Office labor, supplies, etc.	7,346 13	
Transportation	16,952 04	
Stamping	69,572 87	
Incidental expenses	791 16	
Taxes	5,250 86	
		110,749 [illegible]
Total running expenses		$300,[illegible]

Construction Costs.

No. 1 auxiliary engine	$19,955 91	
No. 2 shaft and equipment	1,916 06	
Electric light plant	158 36	
Rock house	1,280 34	
Change house	297 33	
Dwellings	17,178 21	
Compressor	1,458 84	
Machine shop	993 82	
Carpenter shop	1,723 79	
Blacksmith shop	1,964 56	
Office	412 86	
Number 1 engine and shaft equipment	6,053 14	
Third compartment, Number 1 shaft	1,487 54	
Stamp mill, dwellings, etc.	100,503 32	
Private dwellings	3,815 96	
New boilers	11,820 27	
Number 2 auxiliary engine	448 22	
Total construction costs	$171,468 53	
Number 2 shaft	22,718 22	
		194,186 [illegible]
Total expended at mine		$495,084 [illegible]

Summary.

Rock stamped	90,587 tons.
Product of mineral	6,232,119 lbs.
Product of refined copper	4,636,821 lbs.
Yield of refined copper per cubic fathom of ground broken	831 lbs.
Yield of refined copper per ton of stamp rock	51.18 lbs.
Yield of mineral per cubic fathom of ground broken	1,116 lbs.
Percentage of mineral in stamp rock	3.44 per cent.
Percentage of refined copper in stamp rock	2.56 per cent.
Refined copper, cost per pound at mine	6.49 cents.
Cost of smelting, freight, commission, and Boston expense	1.72 cents.
Total cost per pound of refined copper laid down in New York and sold	8.21 cents.

The cost of producing and treating rock has steadily decreased as the output has become greater; $3.32 per ton as against $4.00 per ton the previous year. From present outlook $3.00 per ton will be the maximum cost for handling rock.

The amount of rock handled during the year ending June 30, 1887, was 106,802 tons, 6,350 tons of which came from the walls of the enclosing rock, much of it being left underground; 100,452 tons went to the rock house, and after assorting 90,587 tons were sent to the mill. The number of fathoms broken in the conglomerate was 5,580⅔, which yielded 831 lbs. of ingot to the fathom. Number of copper boulders selected during the year, 187,164.

No. 1 shaft is, August 31, 2,490.7 feet deep, and No. 2 725 feet deep, the latter having been sunk 517 during the year, using one drill.

There is nothing special to be noted about the beds of rock passed through in sinking No. 2. No copper belts of apparent value have been cut. We have rather more water than in No. 1 shaft and the rock seems firmer, requiring less timber.

To the rock house, in the last year, we have added one 10" x 15" breaker, and now have nearly ready a hammer for breaking the largest-sized rocks. This plant may be regarded as complete, and is assuredly quite efficient. It cost 9.62 cents per ton to pass rock through the house.

Transportation expense is but little in excess of 18 cents per ton. For the current year this will be less, the larger output insuring a reduction of the rate.

We continued stamping at the Osceola Mill until 18th May last, so that we have but little to report respecting our own operations. The cost at Osceola was 80 cents per ton. The charge for the year was 76.8 cents per ton.

We are counting on stamping for 50 cents per ton when the two heads are fully supplied with rock. This of itself will be an important reduction of expense. The new stamps will crush each head, in excess of 200 tons of conglomerate daily, probably more than 225 tons. Up to the present we have not tested its full capacity. Results attained in first two months' running are misleading. Expenses have been comparatively higher than what would be rated as regular.

Construction account, as you know, has been heavy. Nor is it possible to equip a mine of this magnitude without spending large sums of money.

The stamp mill is the most important of our improvements. The building is large enough for three heads of stamps and the accompanying dressing machinery. Bin capacity for five heads has been provided. Boiler-house contains three large boilers, uniform in size and style with those at the mine. Room for another exists. Stamps, two heads, are wholly of iron, 20" cylinders. Fifty-six washers (jigging machines) have been put in, and six Evans' Slime tables for treating the finer material. Pump is large enough to supply three heads of stamps, and is in a separate building. Electric light plant has just been put in. Everything is of the best quality, and should do good service.

At the mine the improvements outlined in last year's report have been completed. We have in addition put in a boiler at No. 1 boiler house, increasing the number there to four. Have extended railroad to the boiler houses, so that fuel can be delivered from cars with extra handling. We have eight frame dwellings, one a boarding-house, complete and under way, also a school-house. Shall before winter have forty-five log houses ready for occupation.

We are busy about the plant for No. 2 shaft. This is a duplicate of No. 1 Auxiliary engine, and slight modification of drum. Some further dwelling houses and possibly a third head of stamps will be necessary next year.

The following are the results of the mine operations for the closing six months of the year 1887, July 1 to Dec. 31:

Product of mineral was 6,070,600 lbs, which yielded 76.7 per cent.=4,617,87.1 lbs of ingot, and sold at an average of 12.88 cents per pound, giving	$594,805 33
Running expenses of mine	183,905 45
Smelting, transportation, and all expenses of making copper	64,823 43
	$248,728 88
Showing a net profit of	346,076 45
Add balance of assets, July 1, 1887	25,445 26
	$371,521 71

Deduct amount expended in mine plant during 6 months and it leaves a balance of assets Jan. 1, 1888		$279,[illegible]
Refined copper cost at the mine	3.43	cents per lb.
Cost for smelting, freight, and all other expenses	1.41	"
Total cost of refined copper per lb. in N. Y. and sold	5.39	"
Add cost of sinking No. 2 shaft and it makes the copper cost	7.37	"

Assets and Liabilities January 1, 1888.

Assets, omitting details	$546,[illegible]
Total liabilities, omitting details	266,[illegible]
Balance of assets, Jan. 1, 1888	$279,[illegible]

The officers are, J. W. Clark, President; A. S. Bigelow, Secretary and Treasurer, 245 Washington St. Boston; John Daniell, Agent, Opechee, Mich. Capital stock, $1,250,000, divided into 50,000 shares of $25 each. Annual meeting occurs first Tuesday of October of each year.

THE TAMARACK JR. MINING CO.

is a company recently organized by the owners of the Tamarack to sink two shafts in the east half of the S. E. ¼, Sec. 11, 56, 36. The shafts are located, one in the

center of each 40. This land joins the Centennial mine on the west and the expectation is, that the shafts at the proper depth will intercept the "copper shoot" now reached in No. 5 Calumet mine shaft.

At any rate enough confidence is felt in the existence of productive copper ground in this land to induce the undertaking of sinking at great depth to find it. Both shafts are under way; No. 1, a three compartment shaft, is down 150 feet, and No. 2, four compartment, is 80 feet. They use a Rand compressor, four power drills and are perfecting arrangements to push the work vigorously under the direct oversight of Capt. John Cruse.

Besides the land above mentioned there has been set off to this company the S. E. ¼, N. E. ¼ of the same section; in all 120 acres, being ½ mile wide and ¾ of a mile long north and south.

No. 1 is in the south 40, and No. 2 in the middle 40. I have not estimated the depth which they will have to go to reach the conglomerate, but judge it will be about 2,400 feet.

The number of shares is placed at 50,000, par value being $25 each. At a meeting of the directors of the Tamarack Mining Co. held February 25, 1888, it was ordered that the stockholders of this company be offered the right until May 15, 1888, to subscribe to 40,000 shares of said Tamarack Junior Mining company pro rata, that is, one share for every share held in this company April 9, 1888, payment to be made to the treasurer of the Tamarack Junior Mining Company as follows:

June 1, 1888	$3.00	a share
May 1, 1889	3.00	a share
May 1, 1890	2.00	a share
May 1, 1891	2.00	a share

That upon payment into the treasury of the Tamarack Junior Mining company of the first instalment of three dollars a share, this company is to execute a a deed to the Tamarack Junior Mining company of the land set off for the mine.

THE CALUMET AND HECLA CO.

had great fortune, both ill and good in the past year. The former has consisted in the fire that has raged in the mine so many months, and the latter in the remarkably favorable results obtained at the South Hecla; a part of the mine of which, comparatively, very little reckoning was made a few years ago, but which under the spur of necessity has been rapidly opened and developed, and found to be unexpectedly rich and productive, furnishing an output nearly equal to that of the entire mine previous to the fire.

The Calumet and Hecla mine has a working length of 4,000 feet. The central or main portion is entered by 7 shafts, which are sunk to the 28th and 39th levels, a vertical depth of 2,300 feet, and a depth in the plane of the lode of 3,800 feet, and a width of from 8 to 27 feet. The hanging wall, a trap belt, is a bad one, broken and fragmentary, or tending to speedily become so if left to itself. To hold it in its place requires much artificial support. The mine is a network of fine timber; millions of feet of dry pine; the best fuel for a great conflagration, and to such a calamity there is, inevitably, constant danger.

Such an occurrence happened on the 4th of August last; a fire broke out in the 16th level, near No. 2 Hecla shaft, which caused the closing of the mine and the vigorous application of water, steam and gas to extinguish it. Probably it never was completely put out, but work resumed after a few weeks' delay and proceeded without further interruption until November 20, when the fire again broke out and all the shafts were immediately sealed at the surface as tightly as possible, and the work of manufacturing and injecting carbonic acid gas into the mine was begun. The fire at first raged with much apparent fury; the smoke emanated from the shafts with a good deal of force, and while the fire was abated somewhat, and got under partial control, it has been a very slow, expensive, difficult matter to extinguish it wholly. However, after more than six months of constant effort, the mine is again opened, and they are now removing the water, with which the mine is more than half filled. Probably by the middle of July the company will be again hoisting copper from this, the main body of the mine. As the Black Hills or South Hecla is more than a half a mile south of and wholly unconnected with the main mine, it was not of course affected by the fire. And thus it transpires that the South Hecla, by force of circumstances, has become during all these months the sole producer, and being worked to the fullest extent it has been made to yield nearly as much copper as was previously obtained from the whole mine. It so happened, fortunately, that the South Hecla was well opened and little stoped, so that the shafts could all be used exclusively for hoisting stamp rock. Still sinking has been carried on, as the shafts which were at the 10th level when the fire occurred are now to the 11th, 12th and 13th levels. The mine is about 1,000 feet long and 1,200 feet deep. It is not all good ground. The conglomerate is found to be very wide, thirty feet maximum width. There are four working shafts, which are numbered from the north to the south, 9, 10, 11, 12. North of these two others are sinking, 7 and 8, which will have to penetrate to a considerable depth before they reach to the "copper shoot" found in the other shafts.

Nine and ten constitute a double shaft, though operated separately, the machinery for No. 9 being placed in an engine house north of the shaft, while the machinery for No. 10 is contained with that for 11 and 12 also, in a building to the south. Each shaft has a rock breaker; these receive all the rock of suitable size and thence pass it into the rock bin below, from where it is drawn out into cars and sent on to the stamp mill. If too large for the breakers, the rock is sent under the stone hammer and thence through a breaker.

The compressors at the mine are not used. The air is now brought from the main compressor plant nearly a mile away.

The deepest of the shafts is No. 12, next to the Osceola line, which is to the 13th level. No. 11 is to the 12th, and 9 and 10 to the 11th. The lower levels at No. 12 have been extended towards the south until they ceased to show any copper. The belt in that part is narrow and lean. The best ground is at Nos. 9 and 10 shafts. They leave heavy pillars, 85 feet wide, on each side of the shafts; 170 feet of solid ground left standing at each shaft in every level.

The ground is untouched from the 2d level up to the surface, left for support. A notable fact exists: they are having a mass of copper in the mine; have already cut 9 tons from it. It is a slab of copper resting horizontally in the conglomerate. Mass copper is heretofore a rare or unheard of occurrence in this conglomerate.

The company has built a new engine house for the Hecla mine, situated north of the South Hecla. It is a fine stone structure with a brick smokestack 213 feet high.

The old one will be used for compressor plant.

The stamp mills at Like Linden have been enlarged and now contain 15 head of stamps, 7 in the Hecla mill and 8 in the Calumet, of which 11 are now, March, worked.

The company is adding three more to the Calumet mill which will then make the number 11. A few years ago the arrangements of these mills might justly be criticized, it is not so now, they work admirably, and apparently with as much economy as any mills in the country.

The mineral is run automatically into cars standing on the track in the mills, and thence the cars are drawn by locomotive to the store hose at the smelting works about a mile away. The company now smelts all its own copper at Lake Linden.

No. 5 shaft, the most northern one of the mine, is down to the 34th level, and is watched with interest by outside parties as well as by the company, from the fact that it is showing well in copper, and that the copper makes to the north as it goes down.

The company returned to the shareholders in 1887, $15 per share, making a total to July, 1888, of $30,350,000.

Table of product of Calumet and Hecla mine:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1867	657	1,173	1878	12,626	1,128
1868	2,549	375	1879	13,135	943
1869	6,157	1,771	1880	15,837	1,239
1870	7,030	1,584	1881	15,680	781
1871	8,111	590	1882	16,026	1,528
1872	8,081	183	1883	16,562	1,045
1873	9,424	265	1884	20,236	1,585
1874	10,062	1,225	1885	23,623	1,990
1875	10,736	1,454	1886	25,259	220
1876	10,845	732	1887	23,008	123
1877	11,284	468			
Total				273,956	1,560

Mr. J. N. Wright, General Superintendent, Calumet, Mich.; Alex. Agassiz, President, Boston, Mass.

The following official statement of assets and liabilities, April 30, 1888, has been issued by the Calumet & Hecla Mining Company:

Assets.

Cash at mine	[illegible]
Cash at New York office	[illegible]
Cash at Boston office, and copper at 9c	2,407,[illegible]
Bills receivable at mine	[illegible]
Total	$2,513,[illegible]

Liabilities.

Drafts in transitu	$71,539 21	
Employés' Aid Fund	2,388 00	
Bills payable at mine	146,285 14	
Bills payable at Boston	100,000 00	
Machinery contracts, "estimate,"	200,000 00	
New smelting works	50,000 00	
		569,[illegible]
Balance		$1,953,[illegible]

THE CENTENNIAL MINING CO.

now holds the whole of Sec. 12, 640 acres, T. 56, 33, adjoining the Calumet and Hecla on the north. The section is crossed by the Calumet and Hecla conglomerate and the Osceola amygdaloid. The former enters at about the south quarter post and runs N. 35° E. to the ⅛th post in the east line of the north half of the section, thus giving a surface length of the conglomerate on the property of about 4,800 feet. Thus the greater portion of the section is underlaid by the conglomerate, enough for a mine of the largest dimensions if it is sufficiently charged with copper. The work done by the old Schoolcraft company at this mine did not prove to be favorable. The conglomerate, as far as it was tested, did not prove to be favorable. The conglomerate, as far as it was tested, did not contain enough copper to be of any value. Work subsequently done in the amygdaloid gave better results. In former reports I have described the work done in both these copper belts.

It seems, in the light of all that is now known of this great copper belt, to be the wise thing for the company to sink a deep shaft, to go down in the lode, and it is quite possible that paying ground will be found. The copper "shoot" in No. 5 Calumet shaft affords evidence that it may reach this property. Still greater is the probability that in the long stretch of ground between this No. 5 shaft and the Centennial line other good copper "shoots" may occur, in which case they certainly will be in the Centennial land also. It is a matter worth the trial. The

company has all the requisite machinery for sinking such a shaft.

S. L. Smith, President; Josiah Hall, resident Agent.

THE KEARSARGE MINING CO.

has kept at work in a moderate way in its property, the S ½, S. 6, 56, 32. The work is all in the way of exploring and is sufficiently favorable, that with the general confidence placed in the management, cause the stock of the company to rate well in the market. It is not necessary to say more of the mine than is embraced in the company's report.

KEARSARGE MINE REPORT.

The directors present the following report of the operations for the past year, and statement of the financial condition of the company:

The product of mineral was 27,874 pounds, which, at 76.19 per cent. gave 21,237 pounds of refined copper, for which has been realized the gross sum of		$3,408 92
From interest receipts		2,551 13
From assessment No. 3		40,000 00
Add balance of assets, Jan. 1, 1887		73,627 45
		$119,587 50
The costs have been:		
Running expenses at mine	$46,991 02	
Smelting, transportation, and sundry other expenses	1,515 63	
	$48,506 65	
There has been expended in mine plant during the year	14,601 29	
		63,107 94
Making the balance of assets January 1, 1888		$56,479 56

Our operations thus far have been confined wholly to opening the mine preparatory to stoping and producing copper.

We are now in a position to test our mine, and have good reason to believe that the developments in the near future will show gratifying results, and that we shall be classed among the regular producing mines.

We can arrange with the Osceola mine to stamp for us what rock may be available for the present, and until we can feel warranted in erecting a mill of our own.

The reports of our treasurer and superintendent are herewith submitted, giving detailed accounts of the present condition of the company.

CHARLES VAN BRUNT, President.

ASSETS AND LIABILITIES.

Assets.		
Cash in bank at Boston	$16,634 61	
Cash on hand at mine	139 89	
Supplies on hand at mine	561 39	
Fuel on hand at mine and stamp mill	2,151 16	
Accounts receivable at mine	1,552 42	
Bills receivable at Boston	3,910 00	
Assessment No. 3	15,576 00	
250 shares Hancock & Calumet R. R. stock	25,000 00	
Copper on hand, 21,287 pounds	3,408 92	
Total assets		$68,934 39
Liabilities.		
Drafts outstanding	$5,283 05	
Accounts payable at mine	7,171 78	
Total liabilities		$12 454 83
Balance of assets January 1, 1888		$56,479 56

STATEMENT OF RECEIPTS AND EXPENSES OF ALL KINDS.

Receipts.	
From capital stock, 50,000 shares, $13 a share paid in	$650,000 00
From 21,237 lbs. copper 1887, at 16	3,408 92
" interest receipts to date	3,648 95
Total receipts	$657,057 87

Expenses.		
Running expenses prior to 1887	$20,361 72	
Running expenses during 1887	48,506 65	
		$68,868 37
Construction expense prior to 1887	$13,962 21	
Construction expense during 1887	14,601 29	
		$28,563 50
Real estate		474,000 00
Total expenses		[illegible]
Balance of receipts January 1, 1888		[illegible]

SUPERINTENDENT'S REPORT.

OPECHEE, February 8, 1888.

To the President and Directors, Kearsarge Mining Co.:

GENTLEMEN:—I beg to submit the following report of the past year's operations.

Our work has been confined wholly to development; the copper taken from the mine coming from the openings and in the shape of mass and barrel copper. We sent to smelting works 27,874 pounds of mineral. This afforded 21,237 ingot, or in excess of 76 per cent.

Development has shown that overlying the lode on which we commenced operations and usually distant 30 to 40 feet from it, there is another bed of amygdaloid from 3 to 4 feet wide, occasionally wider. This last runs in nearly a straight course, while the main lode, very irregular in size, takes a very circuitous course, sometimes approaching the west lode very closely, and again leaving a well-defined trap between. At more than one point we have found in cross-cutting from one bed to the other, that the intervening material is wholly amygdaloid, leading to the inference that both should be taken as one lode. At 5th level, No. 1 shaft, this is especially the case, but I cannot say that I am settled in opinion as to its correctness. Should this prove to be so, our chances of finding heavy deposits of copper in depth would be good. We look to early developments at 6th level to throw light on the question.

During the year No. 1 shaft has been sunk 344.7 feet. At this time it is down to 6th level. This shaft has been in line of, and near to the west lode I have referred to. It has shown a little copper, but the width of the copper course is too narrow to rate it as ordinarily profitable. About half way between 4th and at 5th level, in cross-cutting east, we encountered another of nearly three tons. This last lay in the ground between the two lodes.

No. 2 shaft has been sunk 347 feet, and is now down to 6th level.

Cross-cutting east is going on from both shafts, and I am hopeful that we will find profitable ground when the lode is encountered.

Including cross-cut, 80 feet, there has been drifted at 50th level 634.9 feet. The level has been holed from shaft to shaft. In the vicinity of No. 2 shaft we drifted through 165 feet of copper-bearing ground that in places is quite rich. We rate it as being all good stoping ground. Later, in drifting north of No. 2, for 100 feet we have had a promising lode carrying only a little copper. The ground in vicinity of No. 1 shaft, at 5th level, has not been good for copper, quite promising at times, but not profitably productive. It must be remembered that the lode in places is very wide, and we cannot claim that the drivage shows fairly what it contains. At this time we are cross-cutting in 5th level to determine the full width and value of the lode. Though we have drifted 20 feet, we have not yet seen the foot-wall.

The 4th level has also been communicated between shafts. In this level we found the most productive ground near No. 2

shaft, and laid open in one stretch 110 feet of very good ground. At three other points we found ground we can count on stoping. Going north of No. 2 shaft we have carried a very promising lode.

The 3d level was driven north of No. 1 shaft on the west lode about 250 feet. This opening showed 100 feet in length of stoping ground, but rather narrow so far as seen. From No. 2, south, the opening is on the east of main lode. It looks as if fully half the ground, 320 feet on the east lode, about and attainable from No. 2 shaft, would be good.

The 60 feet drifted at 2d level, to make connection between shafts, afforded considerable heavy copper, and here we count on good stoping ground. Neither north of No. 2 shaft, nor south of No 1 shaft, have we found anything valuable at this level.

At first level, north of No 1 shaft, we have drifted 89.1 feet. The lode here is quite good for copper, and though, as elsewhere, it is bunchy, it will all afford good stoping ground.

In summing up I would try to embrace the more salient points in the following. Our mine, as those on amygdaloid lodes generally are, must be termed bunchy. The lode in places is very wide, and as yet we do not know enough of it to say that those places in the openings, which do not show a fair quantity of copper, must necessarily be poor. Stoping must determine this. It would have been more satisfying if the copper ground exposed was more in proportion to the whole length opened; but if that of which we are necessarily doubtful, until further proved, turns out fairly, then we have every reason to expect a good and lasting mine. The course we have pursued in opening the lode quite extensively, before making any effort to produce copper, I regard as very judicious, for we have now attained a sufficient depth to admit of fully proving it, without spending largely for its equipment in advance of really knowing what we have.

The drifting for the year foots up as follows:

1st level	89.1	feet.
2d "	410.4	"
3d "	692.5	"
4th "	705.3	"
5th "	641.9	"
Total	2,539.2	feet.

Of this drivage 280 feet would properly come under the head of cross-cuts.

Our construction account gives in detail the expenses in that direction; the principal expenditure being on account of a 22x42 air compressor, boiler, heater, house, etc., for same. The machine is doing good duty, and we think is equal to running 18 drills. At this time we are framing a rock house. This is to be ready for erection as soon as the weather permits. Much of the grading necessary for railroad approaches to rock house has been done. Early in summer we should be producing copper regularly.

With this you should receive the mine plans and detailed statement of the year's expenditures.

Yours very respectfully,

JOHN DANIELL, Superintendent.

THE WOLVERINE MINE,

Situated just south of the Kearsarge, remains idle. The legal controversy regarding the title is not terminated.

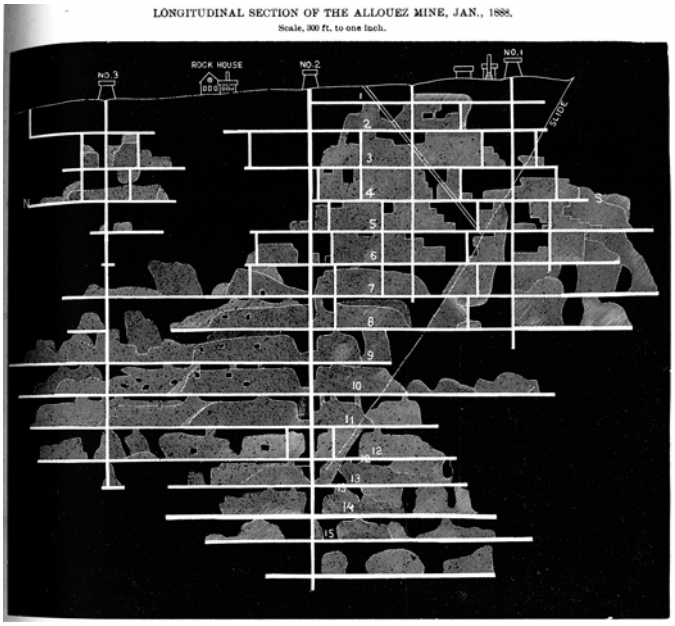
ALLOUEZ MINING CO,

has resumed possession of its mine. The lessees, Messrs. Watson & Walls, having failed financially, the company was obliged to again take hold of its mine. As matters have turned out, and considering the great change for the better in the copper market, it would have been to the advantage of the company not to have leased the mine at all; but to have pushed the openings and had the mine in readiness for producing copper largely when the rise came. Now it happens that the price of copper has advanced to a highly advantageous figure, and the Allouez people are engaged in getting ready to mine it. The machinery, also, requires thorough overhauling, all of it, hoisting, rock house, stamp mill and railroad.

In the mine the company is sinking and drifting at this date, June 1, in Nos. 1 and 2 shafts. The latter is on its way down from the 17th level, going to the 18th. They are drifting south in the 17th level and in the 12th. Also in No. 1 they are drifting in the 7th level.

Besides repairing that now on hand, some new machinery is required. A new hoisting plant will be supplied at No. 1 shaft, and two new boilers will soon be added to the steam generating apparatus. The company will thus not be in readiness to produce much metal until, perhaps, October.

Mr. Fred Smith continues as Agent, and Ned Roscorla, Mining Captain.



ALLOUEZ MINE REPORT.

NO. 76 WALL STREET, NEW YORK.

The directors present herewith a summary of the receipts and expenditures during the year 1887, and statement of the assets and liabilities of the company at the close of the year, showing a balance of strictly available assets of $48,497.97.

The parties to whom the mine was leased for a term of three years from June 1, 1885, became unable, on account of pecuniary difficulties, to continue working the mine as agreed,

and, after struggling along and making a limited production during the early part of 1887, they finally succumbed to the pressure of the ten per cent. copper market, and in July their property was attached by creditors, and work was stopped. Our revenue from royalty on the copper produced was therefore small.

Possession of the mine was resumed by the company in September. The low price of copper then ruling did not warrant your directors in taking any action looking toward working the mine, neither was such a course practicable under the dilapidated condition in which the surface plant was left by the lessees; but steps were at once taken to protect the buildings and machinery, and to keep the mine free from water and guarded from injury. As the copper market improved, and it became more and more evident that the era of extremely low prices was passing away, the directors determined to commence opening new ground to some extent, and we are now sinking and drifting at some of the most promising points, and preparing for active production as soon as the machinery and buildings can be repaired and put in proper condition for economical operation. This work cannot be undertaken to any considerable extent until the snow has gone, and by the time it can be completed, the mine will be put into condition to fully supply the stamp mill, provided that the stockholders shall at the annual meeting decide upon such a course.

The directors are of the opinion that the present condition of the copper market, and the prospect of a continuance of fair prices, warrant the resumption of work and the outlay necessary to put the mine and surface plant in good working condition.

STATEMENT OF RECEIPTS AND EXPENDITURES FOR THE YEAR 1887.

Receipts.

Copper sold, 85,640 lbs., av. 10.38 cents			$8,896 93
Balance of interest account			709 51
			$9,606 44

Expenditure.

Freight and other charges on copper		$368 42	
Office and other expenses		1,230 34	
At Mine—			
Taxes on property not leased	$77 78		
Insurance on buildings, etc.	1,322 83		
Fire hose and water pipes	552 45		
Surveying	39 00		
Repairing agent's house	769 59		
Canal tolls on copper	8 16		
Legal expenses	150 00		
Pay of employees (Oct., Nov. and Dec.)	876 73		
Fuel and supplies (used in same months)	699 86		
Agent's salary and other expenses	1,627 23		
	$6,123 62		
Less rents received	415 50		
		$5,708 13	
Add amount due by lessees not collectible		4,028 08	
			$11,334 97
Excess of expenditure over receipts			$1,728 53
The balance of assets reported Dec. 31, 1886, was		$59,870 00	

Deduct.

Accounts receivable—old debts not now collectible	$451 58		
Amount transferred from "mining supplies," to "mining plant," being tools and implements on hand at time of closing work May, 1885	9,192 81	9,644 39	
			50,226 50
			$48,497 97

ASSETS AND LIABILITIES, ALLOUEZ MINING CO., DECEMBER 31, 1887.

Assets.

Cash in bank and Trust Company		$42,984 00
Accrued interest on deposit in Trust Co		538 88
At Mine—		
Cash in bank	$639 62	
Fuel and supplies	1,940 06	
Standing timber on 335 acres of land, purchased for mine use, cost	4,833 94	
Accounts receivable	28 51	
		7,442 13
		$50,965 01

Liabilities.

Due employees and others at mine	$1,765 19
Agent's drafts outstanding	609 26
Sundry accounts payable	92 59
Net balance quick assets, Dec. 31, 1887	[illegible]

By order of Directors.

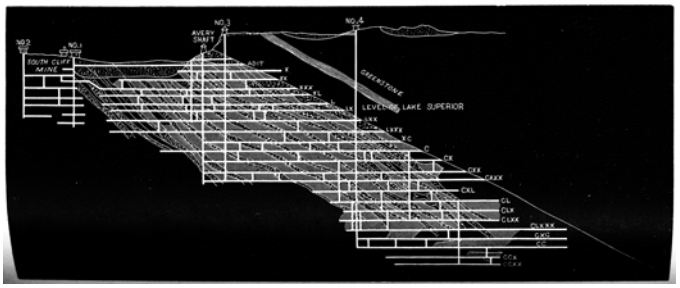
JOHN STANTON, Treasurer.

New York, March 1, 1888.

Table of Products.

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1869	1	1,575	1880	658	[illegible]
1873	10	1,163	1881	736	[illegible]
1874	504	130	1882	841	[illegible]
1875	692	1,574	1883	875	[illegible]
1876	780	1,785	1884	964	[illegible]
1877	650	479	1885	1,085	[illegible]
1878	565	1,146	1886	862	[illegible]
1879	715	1,452	1887	442	[illegible]
Total				10,389	[illegible]

LONGITUDINAL SECTION OF THE CLIFF MINE, 1888.
Scale, 600 ft. to one inch.



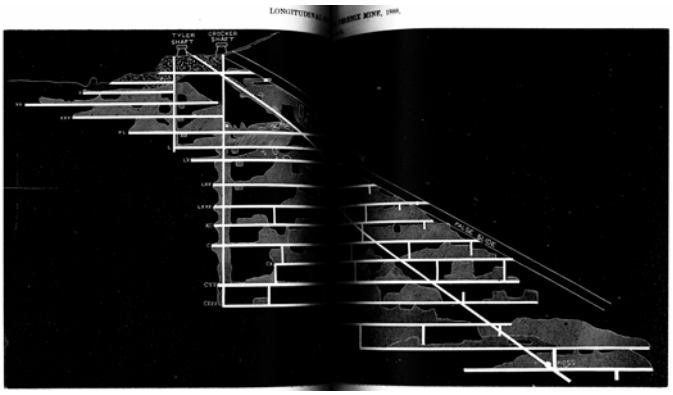
THE CLIFF COPPER MINE,

once the great bonanza of Lake Superior, is the first fissure vein mine met with north of Portage Lake. A detailed description of this celebrated mine is given in the Com. Report for 1880, and subsequent reports have brought the matter up to date. No work has been done in the past year. What the old mine may contain still hidden from sight away down in its depths, or what may lie elsewhere undiscovered beneath the surface of the of the property to reward future exploration, is only a matter of conjecture.

The Cliff has produced as follows:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
Prior to 1855	3,400	.....	1871	71	238
1855	937	197	1872	59	386
1856	1,110	934	1873	357	1,203
1857	1,118	850	1874	527	901
1858	1,130	433	1875	581	873
1859	707	1,007	1876	450	146
1860	921	1,303	1877	80	1,319
1861	964	11	1878	207	415
1862	1,002	960	1879	67	336
1863	1,050	354	1880	30	962
1864	675	1,334	1881	39	1,382
1865	747	626	1882	33	53
1866	821	428	1883	5	374
1867	560	1,725	1884	14	255
1868	613	746	1885	4	332
1869	362	1,247	1886	11	342
1870	222	381	1887	.....	.....
Total				19,064	1,643

D. D. Brockway, Agent, Phœnix, Mich.



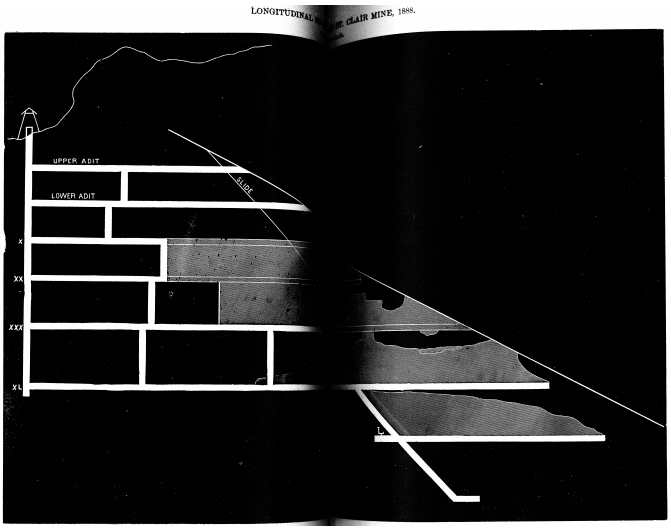
THE PHOENIX MINE

yielded some copper in 1887. The property is held, I believe, by J. H. Chandler, Esq., of Chicago. The mine is one of the oldest and larges of the copper mines of the state and has a checkered career. Its full history has been heretofore given.

Capt. Jas. Bath is resident Agent.

The following table shows the product:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
Previous to 1855	19		1871	609	
1855	3		1872	364	
1856	8		1873	260	
1857	17		1874	699	
1858			1875	702	
1859	28	590	1876	698	
1860	20	62	1877	511	
1861	34	790	1878	150	
1862	31	1,590	1879	272	
1863	72	118	1880	218	
1864	142	187	1881	204	
1865	202	1,000	1882	268	
1866	206		1883	256	
1867	155	115	1884	310	
1868	130		1885	180	
1869	398	930	1886	50	
1870	499	1,040	1887	6	
Total				7,731	



THE ST. CLAIR MINE

has become also, temporarily, a non-producer. The mine is opened in a fissure vein, which has yielded in the aggregate 505 tons 1,071 lbs. of copper.

Capt. Jas. Bath is resident Agent.

THE CENTRAL MINE

is one of the most interesting as well as one of the best copper mines in the peninsula. It is in a fissure vein, and retains its productiveness unimpaired. There is nothing new to be said of it.

The new hoisting machinery works satisfactorily, and the mine is in excellent shape. It is 2,300 feet in depth, vertical.

The company now owns the old Northwestern Mining property, and is doing some exploring work in the old mine. It joins the Central on the east.

CENTRAL MINE REPORT FOR THE YEAR 1887.

The directors present the following statement of the operations during the year 1887:

The production of mineral was 1,219.1390 tons, which yielded about 78.84 per cent., or 1,923,279 pounds of refined copper. The shipments amounted to 2,199,133 pounds of refined copper, including 275,854 pounds of the product of the previous year, all of which has been sold.

The following is a summary of the year's business:

Production.

1,923,279 lbs. copper, at 12.12 cents		$233,045 41
Silver		437 77
		$233,483 18
Add interest received		3,903 74
		$237,486 92

Costs.

Working expenses at mine	$150,285 19	
Construction account at mine	12,552 12	
Smelting, freight and all other expenses	32,453 75	
Making the total expenses		195,291 06
And showing a net profit in 1887 of		$42,095 86
There has also been credited real estate for "stumpage"		3,286 02
Making the net increase in assets		$45,381 88
The surplus from 1886, after payment of dividend, was		216,104 31
Making the net surplus, Dec. 31, 1887		261,486 19

as shown in detail in the annexed statement of assets and liabilities, and out of which a dividend of two dollars per share ($40,000) was paid February 1, 1888.

The expenditure for construction completed the new hoisting plant named in previous report. This machinery works satisfactorily, and provides ample power for many years to come.

The product for the year, although a fair average, is not as large as was expected at the beginning of the year, and shows a decrease of about twenty-four per cent. from that of the previous year. In the early part of the summer the vein in several of the stopes became small and poor, and the yield was very light until towards the close of the year, when some rich ground was developed in driving the 27th level south, which added materially to the product. This decrease in the production accounts for the diminution of profit, notwithstanding a material increase in the average price obtained for the copper, which was caused by the rise in the market value during the last two months of the year.

The improved appearance of the mine continues to this date, and this circumstance, taken together with the better prices

obtainable for copper, warrants the expectation that the results of the business of the current year will be more satisfactory.

WILLAM C. STURGES,
JOSEPH E. GAY,
JOHN STANTON,
ROBERT PORTERFIELD,
ALBERT J. HATCH,
EDWIN H. MEAD,

New York, March 27, 1888. *Directors*.

ASSETS AND LIABILITIES DECEMBER 31, 1887, EXCLUSIVE OF REAL ESTATE AND MINE PLANT.

Assets.

Cash	$67,180 59
Loans	52,040 00
Silver on hand	437 77
Copper on hand, sold	101,168 76
Accounts receivable	14,237 75
	$235,064 87

At Mine.—

Cash	$3,724 76	
Merchandise in store	20,881 49	
Supplies	33,556 20	
		[illegible]
		[illegible]

Liabilities.

Agent's drafts	$7,901 55	
Indebtedness at mine	18,685 58	
Accounts payable	5,154 00	
		[illegible]
Balance of assets		[illegible]
(Less dividend, February 1, 1888, of $40,000.)		

SUMMARY OF RECEIPTS AND EXPENDITURES OF CENTRAL MINING COMPANY, FROM ITS ORGANIZATION TO DECEMBER 31, 1887.

Receipts.

Capital stock paid in		[illegible]
Copper sold, including silver		8,404,273 [illegible]
Profit on timber sold		79,011 [illegible]
Total receipts		[illegible]

Expenditures.

Net expenditure for mining operations, buildings and machinery, smelting a..d marketing copper, and incidental expenses	$6,481,068 00	
Net cost of "Madison" and Northwestern lands	20,730 99	
Total expenditures		6,501,799 [illegible]
Balance of receipts		[illegible]
Deduct dividends paid		1,820,000 [illegible]
Net surplus, December 31, 1887		[illegible]
(As shown in statement of assets and liabilities.)		

AGENT'S REPORT.

CENTRAL MINE, KEWEENAW COUNTY, MICH., February 14, 1888.

John Stanton, Esq., Secretary and Treasurer, New York:

DEAR SIR:—The following report of operations at our mine during the year 1887, is respectfully submitted:

Ground Broken.

Sinking in shafts and winzes 229 feet, average cost		[illegible]
Drifting in vein and cross-cuts, 1,363 10-12 feet, average cost		[illegible]
Stoping on vein	2,547 31-36	
sup. fathoms cost		[illegible]
Stoping on plats, etc	300	
Cubic fathoms		

The total amount of ground broken in openings and stopes is 3,214 cubic fathoms.

Production.

981 bbls. stamp copper, weighing	1,430,865 lbs
134 hhds. barrel copper, weighing	463,265 "
204 masses copper, weighing	545,100 "
Total	2,439,230 "

Or 1,219 1390-2000 tons.

Average yield of mineral per fathom of ground broken, 759 lbs. Average yield of ingot per fathom of ground broken, 598 lbs.

Expenditure At Mine.

The total expenditure for the year is as follows:

Mining and surface expenses	$134,805 09
Stamp mill expenses	16,068 47
Taxes	3,891 67
Construction account	12,552 12
	$ 67,317 35
Less rents received	4,480 04
Total expenses	$162,837 31

SINKING.

No. 2 shaft has been sunk to the 28th level. A winze has also been sunk from the 27th to the 28th level. We cannot say anything about the vein in this winze, as we did not break into it while sinking, but at the bottom it was poor.

DRIFTING.

The 23d level has been extended south of No. 2 shaft 25 6-12 feet. The vein is small poor.

The 24th level has been extended south of No. 2 shaft 213-12 feet through poor ground.

The 25th level has been extended 61½ feet south, and 102½ feet north. This level has opened up some very good stoping ground, the vein varying from a few inches to 4 feet in thickness, and has yielded considerable stamp and barrel copper.

The 26th level has been driven 189 8-12 feet south of No. 2 shaft. The vein has been variable as in the level above. Sometimes it would be 10 feet thick and quite rich, and again only a few inches thick and very poor, but it has yielded some good masses, with barrel and stamp copper.

The 27th level has been driven south 311 feet, and north 306 feet. These drifts have opened up about 250 feet of very good ground, showing mass and barrel copper. Going south, the vein split and the drift was continued on the east branch, which was supposed to be the main part of the vein and which proved to be very poor, but in coming on with our stopes we found we were on the wrong branch. We then cross-cut west and found a good vein, which has yielded a large part of the copper produced in the latter part of the year.

The 28th level has been driven south 45½ feet, and north 13½ feet. The vein has bee about two feet thick, but very poor until within the last few days, when the south drift has exposed a better vein yielding good stamp rock, with a small mass protruding from the bottom of the drift. The north drift continues poor.

We have done considerable cross-cutting at different levels, to make sure that we had not left a part of the vein, and in some cases have been well paid for the work done.

STOPING.

We have four good stopes of 50 feet each in back of the 27th level. Two of them are idle, while we are cutting mass copper in two of them. In one just south of the winze we have 18 men cutting on a mass which I think will yield over 200 tons of copper; it is very pure and free from rock, two of the cuts being over four feet through; this makes it very slow work in getting the copper away, but it will yield more copper than if it were mixed with rock. Two other stopes in this level are looking well, and will produce considerable copper the coming year.

These stopes in the back of the 26th level are almost exhausted, only a little ground remaining in the bottom of the level above.

The stopes over 25th level south of No. 2 shaft have produced considerable copper the past season, although the vein has been rather small for profitable mining.

The back of the 24th level, in the south part of the mine, has been much richer than we expected to find it. As these stopes approached the bottom of the 23d level the vein became larger and better, and produced several small masses, besides barrel and stamp copper.

We have considerable good stoping ground, and if the 28th level proves reasonably good, which seems likely from its present appearance, our prospects for this year are very encouraging.

In conclusion, I would recommend to your favorable notice, the faithful discharge of their duties by my assistants in conducting the business of the company during the past year.

Respectfully yours,

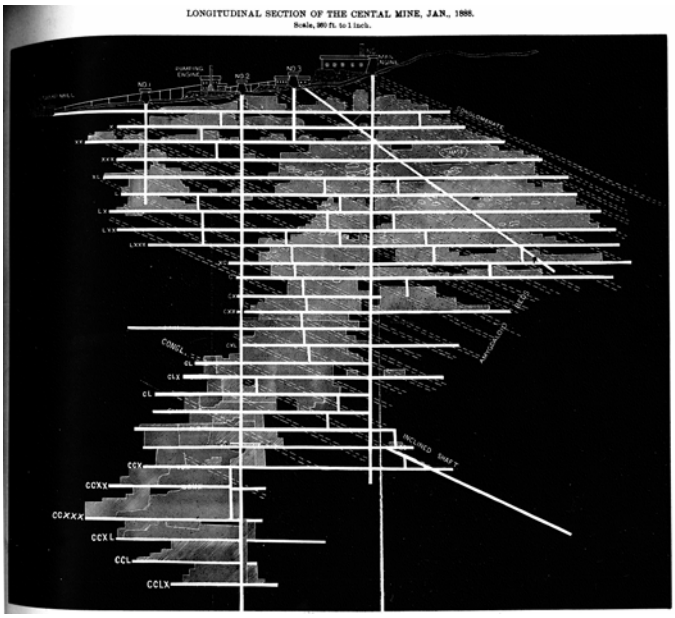
JAMES DUNSTAN, Agent.

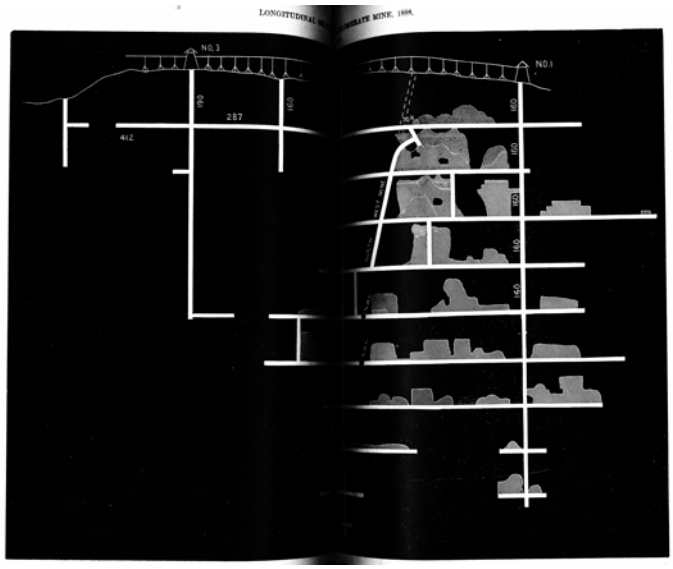
Table showing product of Central Mine—refined copper:

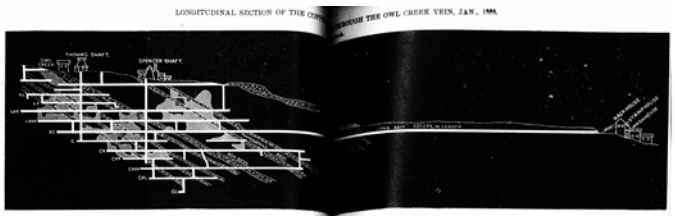
Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
1856	32	403	1872	623	[illegible]
1857			1873	751	[illegible]
1858	71	1,011	1874	870	[illegible]
1859	84	312	1875	733	[illegible]
1860	125	1,370	1876	1,080	[illegible]
1861	70	139	1877	997	[illegible]
1862	133	1,972	1878	945	[illegible]
1863	278	1,548	1879	899	[illegible]
1864	381	1,855	1880	1,013	[illegible]
1865	346	1,200	1881	709	[illegible]
1866	574	1,842	1882	676	[illegible]
1867	687	745	1883	634	[illegible]
1868	1,353	1,827	1884	723	[illegible]
1869	903	1,801	1885	1,078	[illegible]
1870	663	1,156	1886	1,256	[illegible]
1871	716	662	1887	1,099	[illegible]
Total				19,447	[illegible]

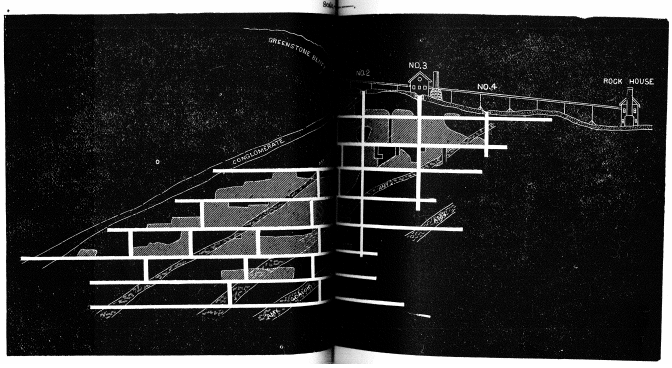
John Dunstan, Agent; Samuel Bennett, Mining Captain; J. F. Robert, Clerk.

On August 1, next, the company pays its 27th dividend of $1.50 per share, $30,000, which makes the total declared to date $1,860,000.









THE CONGLOMERATE MINING CO.

is doing nothing in the way of mining; everything is as it has been for several years past, and it does not appear to be the present intention of the company to resume work in the mine. It is an old location but was never a prosperous one; far more money has been expended there than the copper has brought. But I know of nothing to state regarding the property beyond what I have incorporated in previous reports, beginning with that of 1880.

Mr. Chas. H. Palmer continues in charge of the mine as resident Agent.

The following table shows the copper production at this mine:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
Years previous and 1855	654	80	1875	12	1,260
1856	1	1,348	1876	88	1,701
1857	29	543	1877	16	1,417
1858	83	100	1878	140	345
1859	74	144	1879	70	12
1860	121	97	1880	116	1,814
1861	54	1,920	1881	193	91
1864	111	660	1882	335	1,681
1865	241	861	1883	111	117
1866	64	90	1884	599	691
1867	163	600	1885	20	1,155
1872	81	1,161	1886	22	505
1873	170	743	1887	4	913
1874	40	1,271			
Total				2,622	1,380

THE COPPER FALLS MINE

is again worked vigorously. The stamp mill was not run until near the close of the year, but opening work was continued in the mine, in the ash bed, and in the Owl Creek vein; working south in the latter from the ash bed mainly in the adit level.

It will be remembered that the Copper Falls, which is one of the oldest copper mines in the State, was opened and worked in a fissure vein that crosses the formation at about right angles, i. e., north and south. The mine in this vein,—Owl Creek, so-called—is the one shown in the accompanying map. In crossing the formation the vein, of course, cuts the successive beds of which it is composed, among which is widely known amygdaloid belt called the ash-bed; a name given to it in an early day, and which it still retains. The mine is on the north side of the range, where the formation dips and slopes to the north, to the lake. This so-called ash-bed holds an average small percentage of copper, about .80%. In point of fact it is identical with the Atlantic bed, except that the Atlantic mine stands more erect and is wider.

The mine is entered by shafts from the surface, which were formerly only used, but more recently by a long adit shown in the map, which enters the mine from the north; starting from near the level of the low ground that stretches away from the lake. East and west of this adit the ash-bed has been worked in extensively, as I have described very fully in former reports.

The mine is looking as well as usual, rather better, I think, than it has for a few years back. The new openings in the ash-bed are apparently a little improved, and in the vein has been found quite lately considerable copper. There is the feeling of elation about it among the people at the Falls. They hope for prosperity from the new discovery of mass copper south in the vein.

Two heads are now running in the mill.

The Copper Falls is a very interesting mine.

Table of product of Copper Falls mine:

Year.	Tons.	Pounds.	Year.	Tons.	Pounds.
Previous to 1855	158		1871	239	[illegible]
1855	160		1872	260	[illegible]
1856	104	10	1873	643	[illegible]
1857	153	1,305	1874	535	[illegible]
1858	151	1,852	1875	203	[illegible]
1859	173	174	1876	8	[illegible]
1860	255	818	1877	5	[illegible]
1861	280	11	1878	5	[illegible]
1862	299	299	1879		
1863	159	1,348	1880	3	[illegible]
1864	179	808	1881	334	[illegible]
1865	235		1882	293	[illegible]
1866	568	1,169	1883	402	
1867	1,128	1,485	1884	445	[illegible]
1868	239	1,384	1885	575	[illegible]
1869	345	1,400	1886	689	[illegible]
1870	386	990	1887	270	
Total				9,765	[illegible]

David Nevins, President, Boston, Mass.; J. H. Moyle, Superintendent, Copper Falls, Mich.

The following tables give the amounts of iron ore, copper and coal, produced by the different companies and individuals in the State in 1887, and the specific tax due the State thereon, as reported by the Commissioner of Mineral Statistics to the Auditor General, prior to May 1, 1888:

Name of Company or Producer.	Tons of Ore.	Specific Tax.
American Iron Company, Marquette county	370	$3 70
Aurora Iron Mining Company, Gogebic county	154,195	1,541 95
Ashland Iron Mining Company, Gogebic county	175,561	1,755 61
Anvil Iron Mining Company, Gogebic county	10,075	100 75
Beaufort Iron Mining Company, Marquette county	12,830	128 30
Buffalo Mining Company, Marquette county	24,686	246 86
Blue Jacket Iron Mining Company, Gogebic county	2,070	20 70
Beta Iron Mining Company, Menominee county	2,811	28 11
Bessie Iron Mining Company, Gogebic county	1,003	10 03
Brotherton Iron Mining Company, Gogebic county	21,721	217 21
Delaware and Lackawanna Coal Company, Gogebic county	8,411	84 11
Chapin Mining Company, Menominee county	334,026	3,340 26
Cleveland Iron Mining Company, Marquette county	204,828	2,048 28
Cambria Mining Company, Marquette county	41,136	411 36
Champion Iron Company, Marquette county	146,330	1,463 30
Cornell Iron Mining Company, Menominee county	2,064	20 64
Colby Mine, Gogebic county	258,518	2,585 18
Detroit Mining Company, Marquette county	22,656	226 56
First National Iron Mining Company, Gogebic county	1,997	19 97
Delphic Iron Company, Menominee county	1,801	18 01
Gibson Mine, Marquette county	2,700	27 00
Grand Rapids Iron Company, Marquette county	1,200	12 00
Humbolt Iron Mining Company, Marquette county	17,844	178 44
Hamilton Ore Company, Menominee county	514	5 14
Ironton Iron Mining Company, Gogebic county	27,887	278 87
Iron River Company, Menominee county	82,464	824 64
Iron King Mining Company, Gogebic county	74,609	746 09
Iron Cliff Company, Marquette county	164,234	1,642 34
Iron Chief Mining Company, Gogebic county	2,250	22 50
Iron Star Company, Iron county	23,240	232 40
Jackson Iron Company, Marquette county	109,941	1,099 41
Lillie Mining Company, Marquette county	23,041	230 41
Lucy Mining Company, Marquette county	11,584	115 84
Lumbermen's Mining Company, Menominee county	109,119	1,091 19
Lake Superior Iron Company, Marquette county	302,909	3,029 09
Mastodon Iron Mining Company, Iron county	49,115	491 15

TABLE—CONTINUED.

Name of Company or Producer.	Tons of Ore.	Specific Tax.
Metropolitan Iron and Land Company, Goegebic county	217,384	[illegible]
Metropolitan Iron and Land Company, Iron county	9,069	[illegible]
Millie Mining Company, Menominee county	1,163	[illegible]
Michigamme Company, Marquette county	51,975	[illegible]
Milwaukee Iron Mining Company, Marquette county	50,471	[illegible]
North Champion Iron Company, Marquette county	883	[illegible]
Norwood Mine, Marquette county	2,200	[illegible]
Nanaimo Mining Company, Menominee county	30,460	[illegible]
Negaunee Mining Company, Marquette county	5,259	[illegible]
Nonpariel Iron Mining Company, Marquette county	1,578	[illegible]
Paint River Iron Company, Iron county	10,240	[illegible]
Pabst Mining Company, Gogebic county	19,906	[illegible]
Pittsburgh and Lake Angeline Mining Company, Marquette county	191,121	[illegible]
Phœnix Iron Mining Company, Marquette county	1,605	[illegible]
Puritan Mining Company, Gogebic county	42,006	[illegible]
Penn Iron Mining Company, Menominee county	321,574	[illegible]
Perkins Mine, Menominee county	16,834	[illegible]
Pittsburgh and Lake Superior Iron Company, Marquette county	47,454	[illegible]
Palms Iron Mining Company	1,600	[illegible]
Richards Iron Company, Marquette county	1,374	[illegible]
Rolling Mill Mining Company, Marquette county	1,0[illegible]8	[illegible]
Republic Iron Company, Marquette county	220,142	[illegible]
Republic Reduction Company, Marquette county	87	[illegible]
Swanzy Iron Mining Company, Marquette county	2,842	[illegible]
Sunday Lake Mining Company, Gogebic county	18,938	[illegible]
Sheldon & Shafer Mine, Iron county	2,379	[illegible]
Stephenson Mining Company, Menominee county	3,589	[illegible]
Selden Iron Company, Iron county	1,302	[illegible]
South Buffalo Mining Company, Marquette county	4,914	[illegible]
Titan Iron Mining Company, Marquette county	16,003	[illegible]
Valley Iron Mining Company, Goegebic county	322	[illegible]
Wetmore Mine, Marquette county	3,355	[illegible]
Webster Mining Company, Marquette county	2,054	[illegible]
Winthrop Hematite Company, Marquette county	98,078	[illegible]
West Republic Mining Company, Marquette county	12,777	[illegible]
Wheat Iron Mining Company, Marquette county	17,538	[illegible]
Walpole Mine, Menominee county	1,740	[illegible]
Youngstown Iron Mining Company, Iron county	34,418	[illegible]
York Mining Company, Marquette county	5,556	[illegible]
York Iron Mining Company, Iron county	35,435	[illegible]

Coal Production in Michigan in 1887, and Specific Tax Thereon.

Name of Producer.	No Tons.	Specific Tax.
R. H. Emerson & Company, Jackson county	13,230	$66 15
Spring Arbor Coal Company, Jackson county	500	2 50
Star Coal Mining Company, Jackson county	7,333	36 67
Bennett Sewer Pipe Company, Jackson county	2,317	11 58
Grand Ledge Mining Company, Ingham county	64	32
Corunna Coal Company, Shiawassee county	10,000	50 00
Standard Mining Company, Jackson county	5,000	25 00

Copper Production in Michigan in 1887, and Specific Tax thereon, as reported to the Auditor General by the Commissioner of Mineral Statistics.

Name of Company or Producer.	No. Tons.	No. Lbs.	Specific Tax.
Atlantic Mining Company, Houghton county	1,820	1,865	$1,365 70
Allouez Mining Company, Keweenaw county	442	1,010	331 88
Calumet and Hecla Mining Company, Houghton county	23,008	123	17,256 05
Cliff Copper Company, Keweenaw county	.....	145	05
Central Mining Company, Keweenaw county	1,099	1,133	824 67
Conglomerate Mining Company, Keweenaw county	4	913	3 34
Copper Falls Mining Company, Keweenaw county	368	477	273 68
Evergreen Bluff Mining Company, Ontonagon county	.....	1,077	40
Franklin Mining Company, Houghton county	1,957	1,838	1,468 44
Huron Copper Company, Houghton county	742	103	506 53
Hilton Mining Company, Ontonagon county	8	1,155	6 43
Knowlton Mining Company, Ontonagon county	19	870	14 58
Kearsarge Mining Company, Houghton county	10	1,237	7 96
Mass Mining Company, Ontonagon county	8	.....	6 00
National Mining Company, Ontonagon county	12	1,187	9 45
Nonesuch Mining Company, Ontonagon county	1	5	75
Ogima Mining Company, Ontonagon county	.....	952	36
Osceola Mining Company, Houghton county	1,791	1,723	1,343 90
Phœnix Copper Mining Company, Keweenaw county	6	1,197	5 06
Quincy Copper Mining Company, Houghton county	2,804	1,762	2,103 66
Ridge Copper Company, Ontonagon county	42	962	31 86
Rolling Mill Scrap, Houghton county	215	330	.....
Sundry tributers	34	17	25 05
Tamarack Mining Company, Houghton county	3,702	1,606	2,777 10
Total product and tax	38,112	927	$28,584 34