STATE OF MICHIGAN

MINES AND MINERAL STATISTICS

BY

TOM A HANNA

COMMISSIONER OF MINERAL STATISTICS.

IRON MOUNTAIN, MICH.

BY AUTHORITY

MARQUETTE
PRESSES OF THE MINING JOURNAL CO., LIMITED

WHERE IRON ORE WAS FIRST DISCOVERED IN 1844—ON LOCATION OF THE JACKSON MINE, BETWEEN NEGAUNEE AND ISHPEMING, MICH. BY THE COURTESY OF THE CHICAGO & NORTHWESTERN RAILWAY.

LETTER OF TRANSMITTAL.

STATE OF MICHIGAN
OFFICE OF THE
COMMISSIONER OF MINERAL STATISTICS,
Iron Mountain, Mich., Dec. 1, 1902.

HON. AARON T. BLISS,
Governor of the State of Michigan:

SIR:—In fulfillment of the duties of my office I have the honor to submit herewith the following report upon the mines and mineral interests of the State for the last half of 1901 and the first half of 1902. It will be followed in July next by report for the last half of 1902 and the first half of 1903. The various dates at which the mining companies end their fiscal year makes it impossible to issue reports at an earlier date.

Respectfully, your obedient servant,

TOM A. HANNA,
Commissioner of Mineral Statistics.

COMMISSIONERS OF MINERAL STATISTICS.

NAME.	Date of Appointment.	Term Expired.
CHAS. E. WRIGHT	Feb. 15, 1877	Jan. 12, 1883.
A. P. SWINEFORD	Jan. 12, 1883	April 29, 1885.
CHAS. D. LAWTON	April 29, 1885	March 19, 1891.
JAMES P. EDWARDS	March 19, 1891	Jan. 10, 1893.
JAMES B. KNIGHT	Jan. 10, 1893	March 28, 1895.
GEORGE A. NEWETT	March 28, 1895	April 1, 1899.
JAS. RUSSELL	June 18, 1899	March 31, 1901.
TOM A. HANNA	April 1, 1901.	

INTRODUCTORY.

The year covered by this report—the last half of 1901 and the first half of 1902—has been one of great prosperity in the Michigan iron and copper districts, not only for those directly connected with these vast industries, but with all classes. The output of iron ore has been a phenomenal one. Many new mines have been opened and the old ones have enlarged their working forces. As a result wages have ruled high and the supply of labor was never at any time equal to the demand.

Not in many years has so much exploratory work been done, nor in such a systematic and thorough manner. The old methods of exploring were not unlike "scramming" in comparison with modern methods. At present mining companies think nothing of expending many thousands of dollars proving up and developing an ore body, whereas in olden days a property would be pronounced barren if a merchantable body of ore was not found in a crude shaft of fifty or more feet in depth. Now days, shafts are sunk to the depth of a thousand feet or more into the ore body. This is best evidenced at the new Hartford mine, of the Oliver Iron Mining company, and the Maas shaft of the Cleveland-Cliffs Iron company, at Negaunee.

This great activity in exploratory work has resulted in the finding of a number of new mines, and more will be added to the list in 1903. While there has been a great deal of exploring on the Marquette and Gogebic ranges, probably more has been done on the Menominee range in this direction than both the others combined. It is certain that this work will result in the finding of new ore lenses, though it is probable at a much greater depth than formerly.

It is interesting to note that fully 95 per cent of the producing iron mines are now owned by large

corporations, with furnace connections. The only notable exception to this general rule is the firm of Corrigan, McKinney & Co., operating a chain of a dozen or more mines extending from the Menominee to the Mesaba. The Oliver Iron Mining company, controlled by the United States Steel Corporation, mines about 50 per cent of the Michigan ore, and the Cleveland-Cliffs Iron Company about 30 per cent. The remaining 20 per cent is mined by the so-called independent producers.

Diagram maps have been prepared of the three iron ranges, showing the old mines and many explorations, also list of the mines with their locations. The map of the copper district shows only the properties in any way active during the year, while the appendant list of idle properties gives their locations.

In preparing the tables of the products for the iron mines, from the old reports, it was found that the products had sometimes been given, and sometimes the shipments, and for the year 1894 there seems to be no record. In preparing the table of products for the copper mines it appears that sometimes long tons, and sometimes short tons have been uses. While these irregularities impair the value of the tables, nevertheless they will serve to give, at a glance, some idea of the activity and importance of the various properties. The gypsum quarries and manufacturers have been forming a new “trust,” so we have been unable to get statistics from them. Included in this report is a table showing iron shipments from all ranges during the past forty-six years, together with a complete table of analysis of all Lake ores now mined.

Wags were never higher than now and labor is contented. As evidence of this we invite attention to the fact that, while there are fully 40,000 men employed in the mines, there has not been a single strike during the period covered by this report. It has been said, and it is true, that the miners of Michigan are the best paid laborers in the world. It this connection it may be well to call attention to the miners’ clubs, which the mining companies have been instrumental in forming for thee protection of their men. As an illustration, we will cite the club at the Chapin mine: Under the rules of this club, which is governed by a committee of miners, the rules provide for monthly dues of $1.50. By the payment of this sum the member is entitled to medical service and medicine for himself and family, and for every day he is confined to his home by illness or accident $2.00, and ten cents per day for each child under sixteen years of age. In case a miner, the father of six children, should be killed in the performance of his duty, his family would receive the sum of $500 from the club and mining company, $500 from the Carnegie Aid Fund and $100 from the Aid Fund for every child under sixteen years of age, making the tidy sum, in this instance, of $1,600. A pension fund is also provided for. Every precaution is taken by the companies to ensure the safety of their men, and that their efforts are highly successful is evidenced by the low rate of fatalities.

Attention is called to the department devoted to "Old Mines and Explorations". It has been the endeavor of the commissioner to make this as complete as possible, as the department is considered an important one. Much time and labor was expended in compiling the material. It is not claimed that the "history" is a complete one, but it is as nearly so as the commissioner can make it without the cooperation of his readers. Data for this section is always acceptable. Will you not aid me in making the next issue more complete?

TOM A. HANNA,
Commissioner.

AN ACT TO AUTHORIZE THE APPOINTMENT OF A COMMISSIONER OF MINERAL STATISTICS, AND DEFINING THE DUTIES AND COMPENSATION OF THE SAME.

(4630) Section 1. The People of the State of Michigan enact, That it shall be the duty of the governor of the State of Michigan to appoint, by and with the consent of the senate, a commissioner of mineral statistics for the state. The term of the office of the present commissioner shall expire on the thirty-first day of March, in the year eighteen hundred and ninety-five, and the term of office of his successor shall commence on the first day of April thereafter, and shall continue for two years, or until his successor shall be named. It shall be the duty of the said commissioner to make an annual report to the governor, setting forth in detail the mineral statistics for the year; with the progress and development of its mining and smelting industries. (App. Mar. 21; Act 29).

(4631) Sec. 2. It shall further be the duty of such commissioner to make such geological and other surveys as are needed for fully carrying out the purposes of this act; to observe, and to record by maps and plans, when necessary, especial facts which may be developed in the progress of mining and exploration.

(4632) Sec. 3. And it shall also be his duty to collect each year typical suites of specimens of copper, iron, and other ores, and rocks from the archaen formations, not less than ten in number, of the state; and examine them microscopically; to name and classify them; showing by geological sections their stratigraphical positions. Such collections to be at the disposal of the state board of education, to be distributed among the educational institutions of the state.

(4633) Sec. 4. That an annual appropriation of two thousand five hundred dollars, to be paid to such commissioner in quarterly installments, be made, which sum shall cover the compensation and expenses of said commissioner, and for all surveys and explorations made by him or under his directions; and also include

the cost of publication, under his direction and control, of one thousand copies of his report. Such commissioner shall have the right to publish and sell as many copies of his report in excess of such one thousand copies as he may elect, but without cost to the state: Provided, That nothing herein contained shall interfere with the publishing by the state of the report of such commissioner for the year eighteen hundred and eighty-two. (Apr. 29; Eff. Aug. 30; App. May 3).

(4634) Sec. 5. Said commissioner is hereby authorized to demand, and it shall be the duty of all corporations or individuals engaged in mining to make such reports under oath, as to product and other matters as shall be required by him, on blanks to be furnished by said commissioner for that purpose. (App. Apr. 29; Eff. Aug. 30).

(4635) Sec. 6. It shall also be the duty of said commissioner to report to the auditor general on or before the first day of May in each year, the amount of copper, iron, coal, or other mineral produced by each and every corporation or individual engaged in mining in this state during the preceding calendar year, which reports shall be the basis for computing the specific taxes chargeable against such corporations or individuals, on the amount of mineral produced by them, and in case any corporation or individual engaged in mining in this state shall neglect or refuse to make the reports required by section five of this act, at the time and in the manner therein specified, then it shall be the duty of said commissioner of mineral statistics, to report the amount of specific tax chargeable against such delinquent corporations or individuals.

IRON.

The condition of the iron trade during the year was one of sustained prosperity. This was reflected in the Lake Superior region by the continued activity of the producing mines, the energy of the explorers, and the eagerness with which large companies bought mining properties. Though the shipping season was shorter than usual, the largest annual tonnage of ore on record, more than 20,500,000 tons, left the upper lake ports. And yet, large stockpiles were left at a number of mines. Inability of the railroads at lower lake ports to handle the tonnage offered, near the close of the season, limited the shipments.

The organization and operation of the United States Steel Corporation has caused more comment than any other incident affecting the iron industry. It is not too soon to make statements concerning the benefit of this and similar large corporations. Its effect on the iron ranges has been otherwise than depressing; rather it has had the effect of sustaining ore prices, the activity of the two years previous being fully maintained and even increased. That the corporation owns or controls a very large pro-life; portion of the product of the Michigan ranges is true, but nothing like 90 per cent, as has been frequently stated. A study of the Michigan shipments for last year shows less than 55 per cent can be credited to it. Prospectors have found no difficulty in getting capital interested, and the "independent operators" have not hesitated to bid up the price and buy a property or lease wherever they thought the "showing" was good. Manufacturers of iron and steel products are, in many instances, building their own blast furnaces and buying their own mines, near an independent railroad, thus securing themselves in the matter of obtaining supplies. The corporation has done much toward keeping the price of iron products from soaring, and can, it is believed, keep the price from falling. Certain it is, the advent of the corporation has proven beneficial in this state, inasmuch as wages are higher and the supply of miners is not equal to the demand. It has given that stability to the mining business it has never enjoyed before, and none of the evils that were so freely predicted at its advent have occurred. What is said in favor of the Oliver company also applies with equal force to the Cleveland-Cliffs Iron company, the largest of the so-called independent producers—a concern which is far-famed for the great generosity with which it treats its employes—and other large corporations, which now control 90 per cent or more of the active mines.

The United States Geological Survey has published detailed descriptions of the Michigan "old iron ranges" and maps showing their location, which are of great value to explorers. There are without doubt other ore bodies to be discovered on these ranges, and there are other districts as yet little known, that are worthy of, and will receive, thorough exploration as the demand for ore increases. The prospects for continued activity and prosperity in the Michigan iron ranges during the coming year were never so good.

In presenting a statement of the operations at the active mines during the year, we have grouped them by management rather than by ranges, but have also given in each case the location by section, town, and range. We have also compiled from former reports and private maps the names and locations of many old mines or explorations. These locations are given without other comment than the amount of product, where that could be obtained. The maps of the iron ranges and copper regions are presented, to aid in comprehending the extent of the mineral interests in the Upper Peninsula.

OLIVER IRON MINING COMPANY.

GENERAL ORGANIZATION.

President—Thomas F. Cole.

Vice-President—Dr. Nelson P. Hulst.

Secretary—C. D. Fraiser.

Treasurer—Charles E. Scheids.

Assistant Secretary and Treasurer—Geo. D. Swift.

Auditor—W. E. Jeffery.

General Manager—William J. Olcott.

Main Business Office—Duluth, Minn.

General Superintendents—John H. McLean, Gogebic range, Ironwood, Mich.; William H. Johnston, Marquette range, Ishpeming, Mich.; Otto C. Davidson, Menominee range, Iron Mountain, Mich.

This company is the mining branch of the United States Steel Corporation, and is by far the largest producer of iron ore and owner of mining properties in the state. In many cases its operations are carried on through subsidiary companies.

GOGEBIC RANGE.

During the year the company operated the following mines on the Gogebic range: the Norries, Pabst, Aurora, and Tilden. John H. McLean, district superintendent; D. E. Sutherland, assistant to the superintendent; Laurence T. Stephens, chief clerk; Williard Bayliss, mining engineer.

North Norrie and East Norrie mines are located on the SE ¼ of Sec. 22, and W ½ of SW ¼, Sec. 23, T. 47, R. 47. Post-office address is Ironwood, Michigan. Mine captains, John Luxmore and Andrew Nedin. During the year 625,391 tons of ore were produced, of the following grades: Norrie, 63 per cent iron, .041 per cent phos.; Norden, 63 per cent iron., .080 per cent phos. A large shaft, steel lined, is being sunk at this property.

The Pabst mine is located on the S ½ of NE ¼, Sec. 23, T. 47, R. 47. Post-office address, Ironwood, Michigan. Mine engineer, Williard Bayliss; mine captain, Thomas J. Stevens. During the year 1901, 177,561 tons of ore were produced, all of the Norrie and Norden grades.

The Aurora mine is located on the E ½ of the SW ¼ and the S ½ of the NW ¼ of Sec. 23, T. 47, R. 47. Mine engineer, Williard Bayliss; mine captain, William Thomas. Two hundred and thirty-four thousand two hundred and forty-nine tons of ore were produced during the year of the following grades: Aurora, 62 per cent iron, .035 per cent phos.; the Ardale, 55 per cent iron, .058 per cent phos.

The Tilden mine is located on the N ½ of Sec. 15, T. 47, R. 46. Post-office address, Bessemer, Michigan. Mine engineer, Arthur A. Wakefield; mine captain, William H. Knight. Four hundred and twenty-one thousand three hundred and sixteen tons of ore were produced of the following grades: Tilden, 63.40 per cent iron, .050 per cent phos.; Rand, 62 per cent iron, .042 phos.; Norden, 63.25 per cent iron, .075 per cent phos.

The Chicago mine, located on the E ½ of the NE ¼ of Sec. 8, and W ½ of NW ¼ of Sec. 9, T. 47, R. 45, formerly known as the Kingsford and Sparta, is being equipped for shipping during the season of 1903. The grade of ore runs 55 per cent iron and .075 phos.

The Royal mine in the SE ¼ of Sec. 18, and the Genevia mine in the SW ¼ of Sec. 18, T. 47, R. 46, with Jas. Stanlake as captain, are being explored by underground openings.

MENOMINEE RANGE.

On the Menominee range the following mines were operated: The Chapin, the Cundy, and the Aragon. The general superintendent being O. C. Davidson; chief clerk, Geo. J. Eisele, all of Iron Mountain, Michigan.

The Chapin mine workings are located on the S ½ of SW ¼, Sec. 30, T. 40, R. 30, and the E ½, of SE ¼, Sec. 25, T. 40, R. 31, and includes the two mines formerly known as the Hamilton and Ludington. Stephen James, mine engineer; Martin Goldsworthy, mine captain. The product for the year was 927,747 tons of two grades, Chapin, 59.30 per cent iron, .061 per cent phos.; Ajax, 52.10 per cent iron, .058 per cent phos. Work will soon commence on a new shaft at this property that will be the largest in the state and practically fire proof.

The Cundy mine, located on the NW ¼ of NE ¼, Sec. 3, T. 39, R. 30. Post-office address, Quinnesec, Michigan. Superintendent, Jas. H. Cundy; mine engineer, G. A. Hellberg; mine captain, William Wilcox. The mine produced 178,855 tons during the year, known as Gray Iron, 43.91 per cent iron, .038 per cent phos.

The Aragon mine workings are located on the NW ¼ of NW ¼, Sec. 9, and NE ¼ of NE ¼, Sec. 8, T. 39, R. 29. Post-office address, Norway, Michigan. Mine engineer, G. A. Hellberg; mine captain, G. A. Alvar. The product for the year was 466,086 tons, of two grades, Granada, 60.75 per cent iron, .061 per cent phos.; Leria, 61.65 per cent iron, .085 per cent phos. The company has finished sinking a new shaft to be known as the No. 5, for the purpose of tapping a large ore body in the west end of the mine.

The company is also exploring the Forest mine, located on the NE ¼ of SW ¼, Sec. 25, T. 40, R. 30. Superintendent, J. C. Kruse; mine captain William Hick. Post-office address, Iron Mountain, Michigan; the West Ludington, located on the N ½ of SW ¼ and S ½ of NW ¼, Sec. 25, T. 40, R. 31, where they have a shaft over 500 feet deep. During the year little exploring was done at the Breen mine in the NW ¼ of NE ¼, Sec. 22, T. 39, R. 28, but gave the option up. The company is also doing some work at the old Garfield, near Vulcan, and the Hancock, in the Felch Mountain district, the latter with encouraging results. At the Forest a small vein of excellent ore has been struck, but the extent is yet to be proven.

In the Crystal Falls-Iron River district the following mines were operated during the year: Mansfield, Columbia, Dober, and Riverton. Jas. S. Wall, district superintendent; William Toppan, clerk; W. H. Crago, engineer, Iron River, Michigan.

The Mansfield mine is located on the fractional SW ¼ of SW ¼, S. 17, and the fractional NW ¼ of NW ¼ of Sec. 20, T. 43, R. 31. Post-office address, Mansfield, Iron county, Michigan. Assistant to superintendent, William Trebilcock; mine captain, F. C. Meneehette. During the

year 74,113 tons were produced, of the following grades: Iron, 60.00 per cent; phos., .055 per cent, and iron, 57.00 per cent; phos., .076 per cent. The underground openings are showing up a good body of ore and a new shaft is being sunk.

The Columbia mine is located on the NW ¼ of Sec. 31, T. 43, R. 32. Assistant superintendent, William Trebilcock; mine captain, John Gribble. Post-office address, Crystal Falls, Michigan. Product for the year 1901 was 19,880 tons of 59.00 per cent iron, .425 per cent phos. Usual underground development was carried on.

The Dober mine is located on the NW ¼ of Sec. 1, T. 42, R. 35. Post-office address, Iron River, Michigan. Mine captain, William Wall. Fifty-nine thousand nine hundred and seventy-two tons were produced during the year, showing 59.00 per cent iron, and .495 per cent phos. A large stripping contract has been let at this property, which means increased shipments in 1903. About 35,000 yards of surface will be removed. Hoose & King have the contract.

The Riverton mine is located in the NW ¼ of NW ¼, Sec. 36, T. 43, R. 45. Mining captain, H. Duff. Post-office address, Iron River, Michigan. The product was 59,888 tons for the year. The mine was closed in July, but is again active. The ore runs 57.00 per cent iron, .495 per cent phos. 1

The company has been exploring with underground openings the following mines: T he Michigan, in NW ¼ of Sec. 9, T. 44, R. 33, with James Edwards as mine captain. Post-office address, Amasa, Michigan.

The Hope on the E ½ of SE ¼, Sec. 27, T. 43, R. 32. Mine captain, John Buddle. Post-office address, Crystal Falls, Michigan.

The Gibson on the NW ¼ of NW ¼, Sec. 15, T. 44, R. 33. Mine captain, John Cowling. Post-office address, Amasa, Michigan. The showing at this property is excellent.

MARQUETTE RANGE.

The following mines are operated by the Oliver Iron Mining company on this range: Lake Superior group, comprising the Hard Ore, Hematite, Section 16 and Section 21; the Winthrop; the Regent group, comprising the Queen, Prince of Wales, Buffalo, South Buffalo and Blue; the Negaunee; Stegmiller; Hartford, and Bessie.

The workings of the Lake Superior group are located on Secs. 9, 10, 16, and Sec. 21, T. 46, R. 27. General superintendent, William H. Johnston; assistants to the superintendent, John C. Greenway and C. E. Hendricks; chief clerk, J. C. W. Chapman; mine engineer, C. E. Hendricks; mine captain, Hard Ore, John McEncroe; Hematite, Jos. Hodgson; Sec. 16, Jos. Hodgson; Sec. 21, John Trebilcock. Production for 1901, 680,822 tons; annual production provided for, 700,000 tons. Grades of ore: Alford, 63.70 iron, .048 phos.; Bedford, 60.16 iron, .140 phos.; Chatford, 50,96 iron, .114 phos.; Abbotsford, 62.88 iron, .030 phos.; Beresford, 63.47 iron, .106 phos.; Castleford, 56.90 iron, .087 phos.

The Winthrop mine is located on Sec. 21, T. 47, R. 27. Mine engineer, Andre Formis; mine captain, John Trebilcock. Annual production at present proved for, 112,000 tons. Inactive in 1901 and 1902. Grades of ore, (1) Bell, 40.00 iron, .034 phos.

Regent group of mines is located in Sec. 5, T. 47, R. 26. Chief clerk, George McDonald; mine engineer, Andre Formis; mine captain, Richard Roberts. Annual production provided for, 400,000 tons; production in 1901, 337,629 tons. Grades of ore: Buffalo, 61.65 iron, .099 phos.; Cameo, 58.08 iron, .109 phos.

The Negaunee mine is also in Sec. 5, T. 47, R. 26. C. G. Mason is the mining engineer, and James Piper, captain. Annual production at present for, 200,000 tons; output in 1901, 269,838 tons. Grades of ore: (1) Bessemer, 59.60 iron, .062 phos.

The Hartford mine is located in Sec. 36, T. 48, R. 27. Andre Formis is mining engineer, and Elijah Toms, mine captain. Production for 1901, 3,220. Grades of ore: Averhart, 61.47 iron, .020 phos.; Bernhart, 58.02 iron, .075 phos. Much development work has been done at this property and many improvements made, which will be noted later. The Hartford will be a large shipper another year.

The Bessie is located in Sec. 35, T. 48, R. 29. Andre Formis, mining engineer; W. J. Allen, mine captain. Annual production provided for, 20,000 tons; 1901 output, 805 tons. Grades of ore: (1) Bessie, 53.47 iron, .032 phos.

The Oliver company also owns the Stegmiller mine, not now in operation, and has acquired large tracts of land in Negaunee during the year; also an immense body of low grade ore in the Cascade district, including the Moore mine. It is understood that this property will be stripped.

THE CLEVELAND-CLIFFS IRON COMPANY.

President—W. G. Mather.

Vice-President—J. H. Wade.

Auditor—R. C. Mann.

Secretary—J. H. Sheadle.

Treasurer—W. G. Mather.

Main Business Office—Cleveland, Ohio.

This company owns a large estate and during the year operated the following mines: Ashland, Cleveland Hard Ore, Cleveland Lake, Cliffs Shaft, Michigamme, Salisbury and Tilden.

Mine agent, M. M. Duncan; mine auditor, A. J. Yungbluth; mine engineer, J. E. Jopling; general offices at Ishpeming, Mich.; land agent, Samuel Redfern, office at Negaunee, Michigan.

The Ashland mine is located on the fractional S ½ of SW ¼, Sec. 22, and fractional N ½ of NW ¼, Sec. 27, T. 47, R. 47. Post-office address, Ironwood, Michigan. Superintendent, H. F. Ellard; Clerk, W. W. Smith; engineer, S. R. Elliott; mine captain, G. A. Anderson. The production for the year 1901 was 299,083 tons. A large shaft is being sunk.

The Cleveland Hard Ore mine is located in the NE ¼, Sec. 10, T. 47, R. 27. Post-office address, Ishpeming, Michigan. Mine captain, Duncan Campbell. Production for the year 1901 was 76,815 tons.

The Cleveland Lake mine is located in the SE ¼, Sec. 10, T. 47, R. 27. Post-office address, Ishpeming, Michigan. Mine captain, Alfred Collick. Production for the year 1901 was 468,333 tons.

The Cliffs Shaft mine is located in the NE ¼ of NE ¼, Sec. 9, and NW ¼ of NW ¼ of Sec. 10, T. 47, R. 27. Post-office address, Ishpeming, Michigan. Mine captain, James Stephens. Production for the year 1901 was 274,259 tons.

The Salisbury mine is located in the S ½ of NW ¼, Sec. 15, T. 27. Post-office address, Ishpeming, Michigan. Mine captain, James Matthews. Production for the year 1901 was 181,019 tons.

The Tilden mine is located in the S ½ of SE ¼, Sec. 23, T. 47, R. 27. Post-office address, Ishpeming, Michigan. Mine captain, John Skews. Production for the year 1901 was 10,643 tons. Open pit workings, and operated during shipping season only.

The Michigamme mine is located in the SE ¼, Sec. 19, and SW ¼, Sec. 20, T. 48, R. 30. Post-office address, Michigamme, Michigan. Mine captain, Joseph Rosskelly. Production for the year 1901 was 30,996 tons. The mine was closed in October, 1901.

The Maas exploration. During the summer the company bought George Maas' option on lands in the NE ¼, Sec. 6, T. 47, R. 26. and in S ½ of S ½, Sec. 31, T. 48, R. 26 and, after exploration, bought these lands. The sand shaft is being sunk in the SE ¼ of SE ¼, Sec. 31. Many difficulties are being, and have been, encountered, but the ledge is now nearing and soon one of the most difficult engineering feats ever undertaken in the Lake Superior country will have been successfully accomplished. Capt. James H. Rough is in immediate charge of the work.

PENN IRON MINING COMPANY.

President—Powell Stackhouse.

Secretary and Treasurer—A. P. Robinson.

Main Business Office—Philadelphia, Pa.

This company operates the East and West Vulcan mines, the Curry mine, the Norway mine, and the Cyclops mine. Wm. Kelly, general manager, Vulcan, Mich.; assistant, Franklin E. Copeland; mines clerk, Anton Johnson; mines engineer, F. A. Janson.

The East Vulcan mine is located on the S ½ of Sec. 11, T. 39, R. 29. Post-office address, Vulcan, Michigan. Mine captain, Wm. Harris.

The West Vulcan mine is located on the SE ¼ of NE ¼ and the fractional E ½ of SE ¼ and the NW ¼ of SE ¼, Sec. 9, T. 39, R. 29. Post-office address, Vulcan, Michigan. Mine captain, Wm. Bond.

The Curry mine is located on W ½ of NE ¼, Sec. 9, T. 39, R. 29. Post-office address, Vulcan, Michigan. Mine captain, Wm. Bond.

The Norway mine is located on SE ¼ of Sec, 5, T. 39, R. 29. Post-office address, Vulcan, Michigan. Mine captain, Wm. Williams.

The Cyclops mine is located on the NW ¼., Sec. 5, T. 39, R. 29. Post-office address, Vulcan, Michigan. Mine captain, Wm. Williams.

HEMLOCK RIVER MINING COMPANY.

President—Samuel Mather.

Vice-President and Treasurer—H. G. Dalton.

Secretary—H. S. Haselton.

Main Business Office—Western Reserve Building, Cleveland, Ohio.

This company operates the Hemlock mine, located on the W ½ of SW ¼ and E ½ of W ½ and W ½ of E ½, Sec. 4, T. 44, R. 33. Mine post-office address, Amasa, Mich.

District superintendent, Chas. E. Lawrence; clerk, C. W. Extrum; mine engineer, W. J. Rashleigh; mine captain, C. W. Hughes.

The production for the year 1901 was 147,271 tons. This is about the annual capacity of the mine. The ore is non-Bessemer, runs about 56 per cent iron.

VERONA MINING COMPANY.

President—Samuel Mather.

Vice-President—Walter Scranton.

Secretary—H. S. Haselton.

Treasurer—H. G. Dalton.

Main Business Office—Western Reserve Building, Cleveland, Ohio.

The company operates the following mines on the Menominee range: The Verona, the Vivian, the Caspian, the Baltic, and the Young exploration; and on the Gogebic range the Mikado mine, with a number of explorations.

For the Menominee range mines the general superintendent is Chas. E. Lawrence; clerk, C. W. Extrum; mines engineer, W. J. Rashleigh. Post-office address, Amasa, Michigan.

The Verona mine is located on the NE ¼ of the NE ¼, Sec. 15, and N ½ of N ½, Sec. 14, T. 39, R. 28. Post-office address, Vulcan, Michigan. Mine captain, James Brew. During the year the mine produced 14,115 tons of two grades: Athens, 60 per cent iron, non-Bessemer; Madrid, 63 per cent iron, .025 per cent phos. The mine can produce 20,000 tons annually.

The Vivian mine is located on the S ½ of the SW ¼ of Sec. 34, T. 40, R. 30. The lease includes the entire west half of the section. Post-office address, Quinnesec, Michigan. Mine captain, E. R. Hughes. During the year this property was explored and became a shipper of ore of 42 per cent iron and .020 phos., or better.

The Caspian mine is located on the NE ¼ of Sec. 1, T. 42, R. 35. Post-office address, Iron River, Michigan. The company is sinking a shaft to reach the ore body, which has been located by diamond drills.

The Baltic mine is located in the W ½ of NW ¼, Sec. 7, T. 42, R. 44. Post-office address, Stambaugh, Michigan. Assistant superintendent, W. H. Jobe. The product for 1901 was 27,871 tons, 59 per cent iron, non-Bessemer. The mine is equipped to produce 140,000 tons, and has a large body of ore.

The Mikado mine is located on the NW ¼ and NW ¼ of NE ¼, Sec. 18, T. 47, R. 45, on the Gogebic range. Post-office address, Bessemer, Michigan. Superintendent, G. S. Barber. The mine produced in 1901 76,116 tons of 58 per cent iron, non-Bessemer; this mine is prepared to produce 110,000 annually.

The Verona Mining company is conducting explorations on the S ½ of SW ¼, Sec. 6, T. 42, R, 34, Iron county. This is known as the Young exploration.

CORRIGAN, McKINNEY & COMPANY

Main Business Office—Cleveland, Ohio.

This is a co-partnership, operating mines as follows: On the Gogebic range, the Puritan, Ironton and Winona mines, located on the S ½, Sec. 17, T. 47, R. 46, and the Meteor mine on the SW ¼, Sec. 11, T. 47, R. 45, with Henry Whitburn as superintendent at Bessemer, Michigan. The product for the Meteor mine was 35,563 tons, and of the other mines 19,229 tons. The Puritan has since been transferred to the Oliver company.

the Crystal Falls district the firm operates the Tobin and the Armenia. Post-office address, Crystal Falls, Michigan. On the Felch Mountain range is the Groveland mine. Post-office address, Randville, Michigan. The following officials are located at Crystal Falls: W. J. Richards, general superintendent; chief clerk, James D. Vivian; mine engineer, John A. Knight.

The Tobin mine is located on the SW ¼, Sec. 30, T. 43, R. 32. Mine captain, John Barker. Product for the year, 21,957 tons.

Armenia mine is located on the E. ½ of SE ¼, Sec. 23, T. 43, R. 32. Mine captain, Ed. Pengilly. Product for the year, 23,983 tons.

The Groveland mine is located on the NW ¼ of SE ¼, Sec. 31, T. 42, R. 29. Clerk, F. W. Williams; mine captain, Harry Lowry. The product for the year was 13,649 tons.

At the following mines the company has done more or less exploring during the year: Paint River mine, located on Lots 4 and 5 and NE ¼ of SE ¼, Sec. 20, T. 43, R, 32; William Carlson, captain; the Dunn mine on the NE ¼, Sec. 1. T. 42, R. 43; mine captain, Thomas Carlyon; the Lamont mine, located on Lot 6, Sec. 20, T. 43, R. 32; mine captain, William Carlson. Post-office address, Crystal Falls, Michigan. A new shaft is being sunk at the Dunn.

LINCOLN IRON MINING COMPANY.

President—James Corrigan.

Vice-President—Stevenson Burke.

Secretary and Treasurer—J. E. Ferris.

Main Business Office—Cleveland., Ohio.

The company operates the Lincoln mine, located on the W ½ of SW ¼, Sec. 21, T. 43, R. 32. Post-office address, Crystal Falls, Michigan. Superintendent, W. J. Richards; chief clerk, James D. Vivian; mine engineer, John A. Knight; mine captain, Edwin Jacka. The mine produced 14,976 tons during the year, and is one of the "Corrigan-McKinney" group of mines.

CRYSTAL FALLS IRON MINING COMPANY.

President—James Corrigan.

Vice-President—Stevenson Burke.

Secretary and Treasurer—J. E. Ferris.

Main Business Office—Cleveland, Ohio.

The company operates the Crystal Falls mine, located on the E ½ of NE ¼, Sec. 21, T. 43, R. 32. Post-office address, Crystal Falls, Michigan. Superintendent, W. J. Richards; chief clerk, James Vivian; mine engineer, John A. Knight; mine captain, James Langdon. This mine is also one of the Corrigan, McKinney group, and during the year produced 232,294 tons.

QUINNESEC IRON MINING COMPANY.

President—James Corrigan.

Vice-President—Stevenson Burke.

Secretary and Treasurer—J. E. Ferris.

Main Business Office—Cleveland, Ohio.

This company operates the old Quinnesec mine, located on the SE ¼, Sec. 34, T. 40, R. 30. It is now one of the Corrigan-McKinney mines. Mine post-office, Quinnesec, Michigan. Clerk, Howard E. MacNeil; mine captain, W. J. Trevarthen. The production for the year was 64,900 tons. The following officials are located at Crystal Falls: Superintendent, W. J. Richards; Mine Engineer, John A. Knight. An important lense of ore was cut during the year and this property, which was abandoned as "worked out" at least half a dozen tines, now gives promise of a long life. The ore is a higher grade than that produced heretofore.

GREAT WESTERN IRON MINING COMPANY.

President—James Corrigan.

Vice-President—Stevenson Burke.

Secretary and Treasurer—J. E. Ferris.

Main Business Office—Cleveland, Ohio.

This company operates the Great Western mine, located on the E ½ of SW ¼, Sec. 21, T. 43, R. 32. It is known as one of the "Corrigan & McKinney" group of mines. Post-office address, Crystal Falls, Michigan. Superintendent, W. J. Richards; clerk, James D. Vivian; mine engineer, John A. Knight; mine captain, Edwin Jacka. Product for the year was 108,442 tons.

DONORA MINING COMPANY.

President—W. H. Donner.

Vice-President and Treasurer—A. W. Mellon.

Secretary—Oscar Rohn.

Main Business Office—Duluth, Minn.

This company operates the Volunteer mine, located on the S ½ of S ½, Sec. 30. and N ½ of N ½, Sec. 31, T. 47, R. 26. Post-office address of mine, Palmer, Marquette county, Michigan. Superintendent, O. B. Warren; assistant superintendent, Frank Keese; clerk, A. E. Hodgkins; mine captain, Alfred Edwards. During the fall of 1901 the mine was unwatered and preparations made for mining. The company will explore the property thoroughly with underground openings and diamond drilling. The Comrade ore, 56 per cent iron, .112 per cent phos., was what the mine formerly produced. The Donora Mining company is also exploring the old Platt mine, located on the NE ¼ of Sec. 32, T. 47, R. 26. Gilbert Archambeault is mine captain. In addition to underground work the diamond drill will be used.

CHAMPION IRON COMPANY.

President—H. H. Fay.

Treasurer—W. E. Stone.

Main Business Office—28 State street, Boston, Mass.

The company operates the Champion mine, located on the S ½, Sec. 31, T. 48, R. 29. Post-office address, Beacon, Marquette county, Michigan. General Manager, Walter Fitch; clerk, Thos. Carmichael; mine engineer, C. D. Peacock; mine captain, Chas. Champion. During the year 1901 the product was 99,026 tons. The company was also developing a hematite mine on the NE ¼, Sec. 28, T. 48, R. 29.

LORETTO IRON COMPANY.

President—D. F. Bremner.

Secretary—H. V. Hayes.

Treasurer—W. A. Amberg.

Main Business Office—1040 Marquette building, Chicago, Ill.

This company operates the Loretto mine, located on the NW ¼ of SW ¼, Sec. 7, T. 39, R. 28, and controls adjoining lands in Sec. 12, T. 39, R. 29. Post-office address, Loretto, Michigan. Superintendent, H. Truscott; clerk, Enoch Henderson; mine engineer, E. T. Numsin; mine captain, Tim Donovan. The production for the year 1901 was 80,000 tons. Three grades of ore are produced, as follows: San Jose, 64.34 per cent iron; .014 per cent phos.; Loretto, 57.97 per cent iron, .019 per cent phos.; Russell, 51.25 per cent iron; .055 per cent phos. The mine is equipped to produce 100,000 tons annually. Underground developments show a good body of ore.

ISHPEMING MINING COMPANY.

President—F. B. Baird.

The company operates the East New York mine, located on the SW ¼ of SW ¼ of Sec. 2, T. 47, R. 27. Main office at the mine, Ishpeming, Michigan. Mine captain, Frank Platto. During the year the mine produced 31,626 tons. The company has secured control of the old Martel furnace at St. Ignace and is preparing it for operation.

REPUBLIC IRON & STEEL COMPANY.

President—A, W. Thompson.

Secretary and General Auditor—W. B. Haagsma.

Treasurer—John F. Taylor.

Main Business Office—Stock Exchange building, Chicago, Ill.

The company operates the Cambria and Lillie mines. The Cambria mine is located on the SE ¼ of SE ¼, Sec. 35, and W. ½ of SW ¼ of SW ¼, Sec. 36, T. 48, R. 27; the Lillie being on the SW ¼ of SE ¼, Sec. 35, T. 48, R. 27. Alexander Maitland is general manager; A. W. Maitland, assistant; the clerk is F. E. Nightingale; mining engineer, B. E. LaLonde; mine captain, John Deacon. Office at Negaunee, Michigan. During the year 1901 the Cambria produced 68,907 tons and the Lillie 98,788 tons. This company also has extensive ore deposits on the Mesaba range and is negotiating for Menominee range properties.

JACKSON IRON COMPANY.

President and General Manager—Capt. Sam Mitchell.

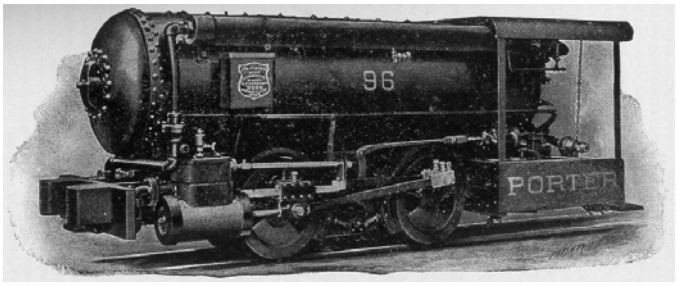
Vice-President—J. H. Wade.

Secretary—Thos. Pellow.

Mine Captain—William Penglase.

Main Business Office—At the Mine, Negaunee, Michigan.

The Jackson mine is located on Sec. 1, T. 47, R. 27. Though closed during the year the mine shipped 38,721 tons, 46 per cent iron, non-Bessemer. This was taken from old rock piles. The mine still contains large bodies of medium grade ore, but the management does not think the present prices warrant the mining of it.



PNEUMATIC LOCOMOTIVE AT ARAGON MINE.

JONES & LAUGHLINS, LIMITED.

Chairman—B. F. Jones, Jr.

Main Business Office—Pittsburg, Pa.

This company is developing the Jackpot mine on the Gogebic range and the Monongahela in the Crystal Falls district. The mines office is at Ishpeming, Michigan. Capt. Thomas Walters, agent; clerk, Chas. T. Kruse; mine engineer, Rudolph Ericson.

The Jackpot mine is located on the N ½ of the SW ¼ of Sec. 16, T. 47, R. 46. Mine post-office address, Bessemer, Michigan. Superintendent. W. J. Sincock; clerk, Jos. Hendy. In 1901 the mine produced 22,000 tons, averaging 53 per cent iron, .042 per cent phos.

The Monongahela mine is located on tile NE ¼ of NE ¼, Sec. 36, T. 43, R. 33. Mine post-office address, Crystal Falls, Michigan. Superintendent, Mark Elliott. During the year underground development was pushed, but without finding a large body of ore; 2.397 tons, however, were shipped, averaging 55 per cent iron and .150 per cent phos. The mine is now closed.

PITTSBURG & LAKE ANGELINE IRON COMPANY.

President—James Laughlins, Jr.

Secretary and Treasurer—William G. Pollock.

Main Business Office—Western Reserve building, Cleveland, Ohio.

This company operates the Lake Angeline mine, located on the N ½ of N ½, Sec. 15, T. 47, R. 27, and controls other lands in the neighborhood. Mine post-office address, Ishpeming, Michigan. The agent is Capt. Thomas Walters, succeeding Alfred Kidder; cashier, Geo. P. Persons; mine engineer, Rudolph Ericson mine captain, William Tregambo. This property includes the Lake Angeline proper and the East End mine. The production in 1901 was 486,617 tons. Though there are many thousand tons of silicious ore in the mine, the end of the high grade ore is in sight, as shown by underground development.

This company has also acquired extensive interests on the Mesaba (Minnesota) range and has organized the Inter-State Mining company for the purpose of operating. Chas. T. Fairbairn is the superintendent on the Mesaba.

NEWPORT MINING COMPANY.

President—Ferdinand Schlesinger.

Vice-President and General Manager—F. E. Woodbury.

Secretary—Wilmot Saeger.

Treasurer—Charles Ray.

Main Business Office—22 University building, Milwaukee, Wis.

This company operates the Newport and Anvil mines. The Newport mine is located on the N ½ of Sec. 24, T. 47, R. 47. Post-office address, Ironwood, Michigan. Superintendent, James R. Thompson; clerk, L. C. Brewer; mine engineer, C. W. Williams; captain, Thos. Oliver. Production for the year 1901 was 213,588 tons.

Four grades of ore were produced: Melrose, 60.33 per cent iron, .041 per cent phos.; New Era, 58.01 per cent iron, .039 per cent phos.; Newport, 53.24 per cent iron, .041 per cent phos.; Bonnie, 50.55 per cent iron, .038 per cent phos. The skill shown in selecting these grades of ore is to be commended.

The Anvil mine is located on the NE ¼, Sec. 14, T. 47, R. 46. Post-office address, Ironwood, Michigan. Superintendent, James R. Thompson; clerk, W. W. Boyce; mine captain, W. C. Rowe. The production for the year 1901 was 1,100 tons.

DUNN IRON MINING COMPANY.

President—Ferdinand Schlesinger.

Vice-President—F. E. Woodbury.

Treasurer—Charles Ray.

Main Business Office—22 University building, Milwaukee, Wis.

This company owns the Palms mine, located on the NW ¼, Sec. 14, T. 47, R. 46. Post-office address, Ironwood, Michigan. Superintendent, James R. Thompson. This mine was idle during the year 1901, but made a shipment of 7,603 tons. It is said that a new lense of ore has been discovered, but I have not yet inspected same.

RICHMOND IRON COMPANY.

President—A. Maitland.

Secretary and Treasurer—A. F. Maitland.

Main Business Office—Negaunee, Mich.

This company operates the Richmond mine, located on the SW ¼ of SW ¼, Sec. 28, T. 47, R. 26. Post-office address, Palmer, Michigan. Mine captain, John Huhtala. Production for the year 1901 was 54,181 tons. This is a lean ore, the analysis of which is not reported. The annual production at present provided for is 100,000 tons.

COMMONWEALTH IRON COMPANY.

President—E. W. Oglebay.

Secretary—C. W. Merrill.

Treasurer—John F. Whitelaw.

Main Business Office—76 Wade building, Cleveland, Ohio.

This company operates the Commonwealth mine, located on Sec. 34, T. 48, R. 18 E., Wisconsin. Post-office address, Commonwealth, Wisconsin. Superintendent, E. W. Hopkins; clerk, N. C. Jensen; mine captains, L. W. Ericson and Edward Larson. The production for the year 1901 was 78,000 tons, known as Davidson ore, 56.00 per cent iron, .130 per cent phos. What is known as the Badger mine, or pit, is part of the Commonwealth mine. This company also owns some, 2,000 acres of mineral land in the same township on which considerable exploring is being done.

BRISTOL MINING COMPANY.

President—E. W. Oglebay.

Vice-President—L. B. Miller.

Secretary—C. W. Merrill.

Treasurer—D. Z. Norton.

Main Business Office—Wade building, Cleveland, Ohio.

The company operates the Bristol mine and the Beaufort mine.

The Bristol mine is located on the E ½ of SE ¼, Sec. 19, formerly known as the Clare, also the W ½ of SE ¼, Sec. 19, formerly known as the Quincy. The company also controls the SW ¼ of NW ¼, Sec. 19, all in T. 43, R. 32. Post-office address, Crystal Falls, Michigan. Superintendent, E. W. Hopkins; assistant superintendent, Arvid Bjork; clerk, F. H. Miller; mine captain, August Frangquist. The post-office address of E. W. Hopkins is Commonwealth, Wisconsin. The production for the year 1901 was 41,600 tons. Two grades of ore are produced: Bristol, 56.70 per cent iron, .496 per cent phos.; Manganate, 51.55 per cent iron, .550 per cent phos.

Beaufort mine is located on the S ½ of NW ¼ and N ½ of SW ¼, Sec. 22, T. 48, R. 31. Post-office address, Michigamme, Michigan. Superintendent, E. W. Hopkins; assistant superintendent, Geo. L. Woodworth; clerk, Jos. Thoney; mine captain, August Johnson. Post-office address of E. W. Hopkins, Commonwealth, Wisconsin. The production for the year 1901 was 11,682 tons, 52.00 per cent iron, .257 per cent phos. This property was recently sold to Roger, Brown & Co., the steel makers, but is still being operated by the Bristol Mining company.

REPUBLIC IRON COMPANY.

President—W. D. Rees.

Vice-President—Samuel Mather.

Secretary—W. B. Castle.

Treasurer—W. D. Rees, all of Cleveland, Ohio.

Business Office and Mine Office—Republic, Mich.

Superintendent, D. T. Morgan; clerk, H. R. Gambee; mine captain, Peter W. Pascoe.

This company operates the Republic mine, located on Lots 2, 3, 5 and 8, Sec. 7, T, 46, R. 29. The production

for the year 1901 was 153,183 tons. The only grade of ore reported was Specular, 67 per cent iron, .038 per cent phos.

This mine was recently purchased by the Cambria Steel company and William Kelly, of the Penn Iron Mining company, Vulcan, Mich., is now in charge as general manager, with Mr. Morgan as resident assistant.

SUNDAY LAKE IRON COMPANY.

President—Joseph Sellwood.

Vice-President—M. M. Drake.

Secretary and Treasurer—R. M. Sellwood.

Main Business Office—Duluth, Minn.

This company operates the Sunday Lake mine, located on the W ½ of SW ¼, Sec. 10, T. 47, R. 45. Post-office address, Wakefield, Michigan. Superintendent, N. B. Roscorla; clerk, James Cary; mine engineer, L. W. Treetner; mine captain, Wm. Downey. The 1901 production was 89,997 tons. The analysis gives 63 per cent iron, .030 phos. Underground developments prove a good body of ore in sight. A new equipment of boilers, pumps and hoists were added during the year. The annual production at present provided for is 125,000 tons.

BROTHERTON IRON MINING COMPANY.

President—Joseph Sellwood.

Vice-President—J. H. Bartow.

Secretary and Treasurer—R. M. Sellwood.

Main Business Office—Duluth, Minn.

This company operates the Brotherton mine, located on the N ½ of SE ¼, Sec. 9, T. 47, R. 45. Post-office address, Wakefield, Michigan. Superintendent, N. B. Roscorla; clerk, James Cary; mine engineer, L. W. Treetner; mine captain, Wm Downey. Production for the year 1901 was 105,000 tons. The analysis give 63 per cent iron, .030 per cent phos. The underground developments prove a good body of ore in sight. A new equipment of boilers, pumps, engine and hoists has been added.

CHESTER MINING COMPANY.

President—Joseph Sellwood.

Secretary and Treasurer—R. M. Sellwood.

Main Business Office—Duluth, Minn.

This company operates the Chester mine, located on the S /12 of NE ¼, Sec. 7, T. 47, R. 26. This property was for many years known as the Rolling Mill mine. Post-office address, Negaunee, Michigan. Superintendent, Alfred Newcombe; clerk, N. L. Leach. The production for the year 1901 was 22,815 tons. The mine produces two grades of ore, a Bessemer of 40 per cent iron, .040 per cent phos., and a non-Bessemer of 50 per cent iron, .070 per cent phos. From open pit developments it is estimated there are a million tons of ore in sight. The new equipment added during the year consists of a boiler and 24-foot drum.

THE DESSAU COMPANY.

Secretary and Treasurer—S. Dessau.

Main Business Office—No. 9 Maiden Lane, New York City.

The company operates the Millie mine, located on the NW ¼ of NE ¼ and NE ¼ of NW ¼ of Sec. 31, T. 40, R. 30. Mine post-office address, Iron Mountain, Michigan. Superintendent, Charles McGregor; clerk, S. J. McGregor. During the year the mine shipped 12,133 tons. Underground exploring was carried on by diamond drill work, but a new lense of ore has not been discovered. The lean ore pit was idle a portion of the year, but preparations are being made for a large shipment.

SECTION SIX.

W. S. Shaw, of Boyne City, Mich., with C. H. Heys in charge, is sinking a shaft to explore the formation on the NE ¼ of SW ¼ and NW ¼ of SE ¼, Sec. 6, T. 39, R. 29. Post-office address, Iron Mountain, Michigan. At a depth of 100 feet they state the formation will analyze above 45 per cent iron and about .015 per cent phos. They are well equipped for exploring, having installed boiler, air compressor and drills, pumps and power hoist. Their option covers several hundred acres either side of their present work. The property was formerly known as the Beaver Iron mine or High Exploration. Work was suspended some weeks ago. Thousands of dollars have been expended upon this property without encouraging results thus far. There are numerous outcroppings of lean ore—some marketable—and it seems to be the opinion of experts that good ore will yet be found with depth.

THE ALGOMAH COMMERCIAL COMPANY, LIMITED.

F. H. Clergue, president, has been conducting extensive explorations in the district west of Republic, Michigan. The mines under option are in Secs. 6, 18, 19, 29 and 30, in T. 46, R. 30. On Section 19 a vertical diamond drill hole was put down to a depth of nearly 2,500 feet, and nothing of importance found. These parties are also exploring on the E ½ of NE ¼ of NE ¼ of Sec. 3 and W ½ of NW ¼ of Sec. 2, T. 47, R. 28, just east of the

Dexter mine. Here it is said a small body of ore has been found.

VICTOR SCHLITZ MINING COMPANY.

President—Victor Schlitz.

Vice-President—G. W. Youngs.

Secretary—Fred Reuter.

Treasurer—Victor Schlitz.

Main Business Office—Milwaukee., Wis.

This company operates the Hiawatha mine, located on the SW ¼ of SE ¼ of Sec. 35, T. 43, R. 35. Mine post-office address, Iron River, Michigan. Superintendent, G. W. Youngs; mine captain, Josh Brooks. During the year the mine produced 20,000 tons of non-Bessemer ore, running about .053 per cent iron. Plans are being made for increased shipments.

THE BIRD IRON COMPANY.

President—Geo. V. Penwell.

Vice-President—John Crerar.

Secretary—M. S. Sanders.

Treasurer—A. Floyd Clinch.

Main Business Office—Crystal Falls, Mich.

The company is operating the Foxdale mine, located on E ½ of NE ¼, Sec. 10, T. 47, R. 29, on the Marquette range. The mine post-office address is Humboldt, Michigan. Mine captain, Jos. Shimmin. The product for the year was 4,526 tons, running 53.50 per cent iron, .068 per cent phos. Present efforts seem to be directed to opening a mine rather than to shipping. The company also operates two explorations in the Crystal Falls-Iron River district, the Bird mine, located on the W ½ of SE ¼, Sec. 13, T. 43, R. 32. Operations were suspended during the greater part of the year. The James mine, located on the N ½ of NE ¼, Sec. 23, T. 43, R. 35. Post-office address, Iron River, Michigan. Mine captain, John Looney.

THE ANTOINE ORE COMPANY.

Secretary and Treasurer—R. Williamson, Sharon, Penn.

Oglebay, Norton & Co., of Cleveland, Ohio, seemed to be the operators under some arrangement with the Antoine Ore company, of the Traders mine, located on the SE ¼ of SW ¼ and SW ¼ of SE ¼, Sec. 17, T. 40, R. 30. Mine post-office address, Iron Mountain, Michigan. Superintendent, F. L. Coventry; mine captain, Frank Carbis. Product for the year 1901 was 63,155 tons, known as Clifford ore, running 41.00 per cent iron, .013 per cent phos.

Since the above was prepared for the printer the mines of the above company, including the Traders, Clifford, Keel Ridge and Vulcan Silica, have passed to the control of the Republic Iron & Steel company, with Hon. Alexander Maitland as general manager. It is the expectation of the new management to double the shipment from the Antoine mine and also open up the Vulcan Silica.

THE PEWABIC COMPANY.

President—George D. Van Dyke.

Vice-President—J. H. Van Dyke.

Secretary and Treasurer—William D. Van Dyke.

Main Business Office—Wells building, Milwaukee, Wis.

This company operates the Pewabic mine, located on the S ½ of NW ¼, Sec. 32, and the Walpole, now included in the Pewabic, and located on the NE ¼ of NE ¼, Sec. 31, T. 40, R. 30. The company also owns a good many thousand acres in Northern Wisconsin and Michigan of prospective mineral value. Post-office address of the mine is Iron Mountain, Michigan. General manager, E. F. Brown; cashier, W. G. Monroe; mine engineer, John M. Goldsworthy; mine captains. Edward Lord and Benjamin Martin. The shipment for the year was 507,786 tons, of five grades, as follows: Pewabic, 64.37 per cent iron, .012 per cent phos.; Walpole, 57.61 per cent iron, .118 per cent phos.; Tyrone, 59.87 per cent iron, .073 per cent phos.; Toledo, 55.00 per cent iron, .012 per cent phos.; Pewabic Genoa, 43.21 per cent iron, .010 per cent phos.

The developments at the Walpole during the year, the company feels, warrants the installation of the new hoisting plant, for depth of 1,200 feet.

The company has several exploring parties in the field and is giving its lands in Iron county a thorough proving up. Thus far the work is barren of results.

BLAST FURNACE DIVISION.

MANISTIQUE IRON COMPANY.

President—Joseph H. Berry.

Vice-President—W. G. Smith.

Secretary and Treasurer—E. H. Flinn.

Maine Business Office—Detroit, Mich.

The furnace is located at Manistique, William H. Nelson being manager. Product for the year was 29,671 tons.

ELK RAPIDS IRON COMPANY.

President—N. K. Fairbank.

Vice-President and Superintendent—H. B. Louis.

Secretary—Dexter Fairbank.

Treasurer—Charles Durkee.

Main business office and furnace at Elk Rapids, Michigan. Product for the year was 26,662 tons.

NEWBERRY FURNACE.

Was recently purchased by the Manistique Iron company and is being prepared for blast, after many years of idleness.

THE ANTRIM IRON COMPANY.

President—T. J. O'Brien.

Vice-President—J. M. Barnett.

Secretary and Treasurer—J. C. Holt.

The main business office is at Grand Rapids, Michigan, in the Michigan Trust building. The furnace is located at Antrim; post-office address, Mancelona, Michigan. Superintendent, N. M. Langdon. Product for the year was 36,208 tons.

MARTEL FURNACE.

The Martel furnace, at St. Ignace, which has been idle for nearly twenty years, has been acquired by the same capitalists operating the East New York mine, has been repaired and will soon be in operation.

PENINSULA IRON COMPANY.

President—Theo. H. Eaton.

Vice-President—Robert Leite.

Secretary and Treasurer—Solon Burt.

Main office and furnace is located at Detroit, Michigan. Product for the year was 2,988 tons. This furnace went out of blast early in the year, and, is believed, marks the end of the charcoal pig iron smelting in Detroit. A corporation has been formed to build a large furnace plant at Zug Island, a short distance below that city, however.

GAYLORD IRON COMPANY.

President—Chas. A. Kent.

Vice-President and Secretary—Frank B. Gaylord.

Treasurer—Nicholas Woods.

Main office and furnace at Detroit, Michigan. Product for the year was 3,628 tons. Furnace has been out of blast since May 1st, 1901.

SPRING LAKE IRON COMPANY.

President—I. M. Been.

Vice-President—J. C. Spencer.

Secretary and Treasurer—J. C. Ford.

Post-office address, main business office, and furnace, at Fruitport, Michigan. Product for the year, 24,085 tons.

CLEVELAND-CLIFFS IRON COMPANY.

President and Treasurer—Wm. G. Mather.

Vice-President—J. H. Wade.

Secretary—J. H. Sheatle.

Main Business Office—Cleveland, Ohio.

The furnace is located at Gladstone, Michigan. Manager, Austin Farrell. Product for the year was 38,739 tons. This company has a new furnace rapidly nearing completion at Marquette.

BLAST FURNACES—PIG IRON.

From 1891 to 1901 inclusive.

	1891. Tons.	1892. Tons.	1893. Tons.	1894. Tons.	1895. Tons.	1896. Tons.	1897. Tons.	1898. Tons.	1899. Tons.	1900. Tons.	1901. Tons.
*Pioneer, Gladstone	.....	.....	.....	.....	.....	23,849	36,700	38,800	31,546	38,211	38,739
Carp River Furnace Co., Marquette	.....	.....	.....	.....	.....	.....	.....	.....	2,326	14,243	.....
Excelsior Furnace Co., Ishpeming	.....	.....	.....	.....	11,405	17,906	10,024	22,608	.....	.....	.....
Peninsula Iron Co., Detroit	10,453	10,676	9,645	.....	11,086	6,542	11,129	11,144	9,869	10,235	2,988
Spring Lake Iron Co., Fruitport	.....	.....	.....	.....	25,015	25,610	7,275	22,054	20,376	22,291	24,085
Elk Rapids Iron Co., Elk Rapids	14,100	17,867	21,273	.....	10,097	16,885	25,238	18,362	25,134	22,060	26,662
Union Iron Co., Detroit	.....	.....	.....	.....	6,683	13,380	5,203	.....	11,825	.....	.....
Gaylord Iron Co., Detroit	.....	.....	.....	.....	2,783	10,363	9,731	10,541	5,473	11,374	3,628
Jackson Iron Co., Fayette	.....	.....	.....	.....	.....	.....	.....	9,871	9,320	.....	.....
Antrim Iron Co., Mancelona	20,121	24,138	25,945	.....	21,627	32,134	10,218	27,398	36,073	25,506	36,208
Manistique Iron Co., Manistique	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,486	29,671
Weston Furnace Co.,	22,092	28,409	10,865	.....	.....	.....	.....	.....	.....	.....	.....
Western Furnace Co.	.....	.....	.....	.....	.....	.....	1,059	.....	.....	.....	.....
Detroit Iron Furnace Co.	18,757	7,185	.....	.....	.....	.....	.....	.....	.....	.....	.....
Martel Furnace	6,117	9,968	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Iron & Steel Works	8,001	8,721	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(*) Includes Iron Cliffs Company.

ORE SHIPMENTS FOR 1901.

Marquette Range.

Name of Mine.	
Beaufort	4,338
Cambria	68,907
Champion	99,026
Chester	22,815
Cleveland-Cliffs Iron Co	874,465
East New York	31,696
Jackson	38,271
Lake Superior	635,642
Lillie	98,788
Moore	37,655
Negaunee	234,713
Pittsburg & Lake Angeline	481,574
Princeton (Swanzey)	67,051
Queen Group	400,845
Republic	104,604
Richmond	54,181
Winthrop	109
Total	3,254,680

Menominee Range.

Antoine	63,429
Aragon	477,212
Aremnia	18,750
Baltic	17,326
Bristol (G)	36,593
Chapin	929,701
Columbia	19,963
Commonwealth	77,799
Crystal Falls	230,614
Cundy	160,519
Florence	15,395
Foxdale	4,647
Great Western	123,261
Groveland	11,444
Hemlock	149,966
Hiawatha	20,355
Hilltop	2,503
Lincoln	19,727
Loretto	54,985
Mansfield	74,113
Millie (Hewitt)	12,133
Monongahela	2,397
Penn Iron Mining Co	358,126
Pewabic	507,786
Quinnesec	66,383
Riverton	119,860
Tobin	18,957
Verona	11,475
Total	3,605,449

Gogebic Range.

Name of Mine.	
Anvil	1,101
Ashland	286,399
Atlantic	190,135
Aurora	223,747
Brotherton	103,109
Cary (and Superior)	179,374
Colby (E)	23,475
Harmony (Germania)	10,358
Hennepin	21,475
Iron Belt	43,883
Jack Pot	19,988
Meteor (Comet)	34,140
Mikado	91,846
Montreal	72,945
Newport	190,448
Norrie	660,965
Pabst	198,686
Palms	7,603
Pike	6,346
Puritan (Ruby)	21,788
Sunday Lake	89,997
Tilden	446,670
West Colby	12,836
Windsor	841
Total	2,938,155

Total Ore Output from 1885 to 1901.

Marquette range	62,847,473
Menominee range	37,621,428
Gogebic range	34,154,790
Vermilion (Minn.) range	16,977,243
Mesaba (Minn.) range	40,404,967

FREIGHT RATES.

Average Freight Rates on Iron Ore Per Gross Ton, from Ports Named to Ohio Ports—Table Covering Wild and Contract Rates for Twenty Years Past.

	Escanaba.		Marquette.		Ashland and other ports at the head of Lake Superior.	
Year.	Wild or daily rate.	Contract rate.	Wild or daily rate.	Contract rate.	Wild or daily rate.	Contract rate.
1882	$1.04	$1.40	$1.26	$1.75	....	....
1883	1.22	1.00	1.40	1.20	....	....
1884	.87	1.10	1.08	1.35	....	....
1885	.78	.90	.98	1.05	1.25	1.15
1886	1.28	1.05	1.51	1.20	1.78	1.20
1887	1.59	1.40	1.87	1.63	2.23	2.00
1888	1.05	.90	1.30	1.15	1.43	1.25
1889	1.01	1.00	1.19	1.10	1.34	1.25
1890	.89	1.10	1.07	1.25	1.17	1.35
1891	.84	.65	1.02	.90	1.11	1.00
1892	.74	1.00	.98	1.15	1.15	1.25
1893	.56	.85	.71	1.00	.77	1.00
1894	.47	.60	.60	.80	.78	.80
1895	.73	.55	.92	.75	1.13	.80
1896	.52	.70	.66	.95	.77	1.05
1897	.45	.45	.55	.65	.57	.70
1898	.51	.45	.60	.60	.62	.60
1899	.95	.50	1.08½	.60	1.29½	.60
1900	.69½	1.00	.78	1.10	.84½	1.25
1901	.64	.60	.79	.70	.89	.80

Charge to vessel in 1901 for trimming and unloading 22 cents a ton.

Average ore rates for the entire period of twenty years: Escanaba, contract 80½ cents, wild 84 cents; Marquette, contract $1.04, wild $1.01. Average for past ten years: Escanaba, contract 67 cents, wild 62½; Marquette, contract 83 cents, wild 76½ cents; Ashland and other ports at the head of Lake Superior, contract 88½ cents, wild 88 cents.

ORE PRICES.

In addition to the market demand, the price of iron ore is governed by other considerations, these being its chemical and physical nature. At the present time, individual ideas of the purchaser regarding furnace practice governs the price so far as the physical nature of the ore is concerned. To a limited extent this may also be true of the chemical contents. However, all contracts for ore delivery are now made conditioned on the actual contents as shown by cargo analysis. The furnaceman is required to produce an iron of specified chemical contents, and hence uses the ore or combination of ores that will exactly meet his requirements. The miner is required to guarantee his product to the purchaser.

To bring about some uniformity and fairness in the matter, the selling agents since 1897 have used the accompanying table showing the varying price of an ore as per phos. contents. The price of the "base ore" is fixed by the market demand, for instance, during this year that price has averaged $4.25 per ton, the base being an ideal ore of 63 per cent iron and .045 per cent phos. Column 1 shows the percentage of phos. by variation of .001 of a per cent. Column 2 shows the rate of change in price per ton at any particular per cent of phos. content. Column 3 is obtained by adding all the items in Column 2 between the "base" and any particular per cent of phos., and is the amount of price per ton to be added to or subtracted from the price of the "base ore" price.

Thus an ore of 63 per cent and .060 per cent phos. was worth $4.0775 per ton, while an ore of 63 per cent and .020 phos. was worth $4.60 per ton.

In addition to the above, the price obtained for an ore, however, depends also on the per cent of iron, the per cent of silica, the per cent of moisture etc.

Phosphorus Table Showing Value of Ore Carrying 63 Per Cent Iron and 10 Per Cent Moisture.

Percentage of Phosphorus.	Rate of Progression.	Phos. Values.	Price.	Percentage of Phosphorus.	Rate of Progression.	Phos. Values.	Price.
.070	.0200	.3500	3.9000	.037	.0115	.0780	4.3280
.069	.0195	.3300	3.9200	.036	.0120	.0900	4.3400
.068	.0190	.3105	3.9395	.035	.0125	.1025	4.3525
.067	.0185	.2915	3.9585	.034	.0130	.1155	4.3655
.066	.0180	.2730	3.9770	.033	.0135	.1290	4.3790
.065	.0175	.2550	3.9950	.032	.0140	.1430	4.3930
.064	.0170	.2375	4.0125	.031	.0145	.1575	4.4075
.063	.0165	.2205	4.0295	.030	.0150	.1725	4.4225
.062	.0160	.2040	4.0460	.029	.0155	.1880	4.4380
.061	.0155	.1880	4.0620	.028	.0160	.2040	4.4540
.060	.0150	.1725	4.0775	.027	.0165	.2205	4.4705
.059	.0145	.1575	4.0925	.026	.$170	.2375	4.4875

Percentage of Phosphorus.	Rate of Progression.	Phos. Values.	Price.	Percentage of Phos. phorus.	Rate of Progression.	Phos. Values.	Price.
.058	.0140	.1430	4.1070	.025	.0175	.2550	4.5050
.057	.0135	.1290	4.1210	.024	.0180	.2730	4.5230
.056	.0130	.1155	4.1345	.023	.0185	.2915	4.5415
.055	.0125	.1025	4.1475	.022	.0190	.3105	4.5605
.054	.0120	.0900	4.1600	.021	.0195	.3300	4.5800
.053	.0115	.0780	4.1720	.020	.0200	.3500	4.6000
.052	.0110	.0665	4.1835	.019	.0205	.3705	4.6205
.051	.0105	.0555	4.1945	.018	.0210	.3915	4.6415
.050	.0100	.0450	4.2050	.017	.0215	.4130	4.6630
.049	.0095	.0350	4.2150	.016	.0220	.4350	4.6850
.048	.0090	.0255	4.2245	.015	.0225	.4575	4.7075
.047	.0085	.0165	4.2335	.014	.0230	.4805	4.7305
.046	.0080	.0080	4.2420	.013	.0235	.5040	4.7540
.045	.0000	.0000	4.2500	.012	.0240	.5280	4.7780
.044	.0080	.0080	4.2580	.011	.0245	.5525	4.8025
.043	.0085	.0165	4.2665	.010	.0250	.5775	4.8275
.042	.0090	.0255	4.2755	.009	.0255	.6030	4.8530
.041	.0095	.0350	4.2850	.008	.0260	.6290	4.8790
.040	.0100	.0450	4.2950	.007	.0265	.6555	4.9055
.039	.0105	.0555	4.3055	.006	.0270	.6825	4.9325
.038	.0110	.0665	4.3165	.005	.0275	.7100	4.9600

Base Ore.—Iron, 63.00. Phos., .045. Moisture, 10.00.

Statement Showing Analysis and Price of Base Ore 1895 to 1902 Inclusive.

Year.	Iron.	Phos.	Mstr.	Natural.	Price at L. Erie.
1895	63.25	.045	9.00	57.56	$2.90
1896	63.00	.045	9.75	56.86	4.00
1897	63.00	.045	10.00	56.70	2.60
1898	63.00	.045	10.00	56.70	2.75
1899	63.00	.045	10.00	56.70	2.95
1900	63.00	.045	10.00	56.70	5.50
1901	63.00	.045	10.00	56.70	4.25
1902	63.00	.045	10.00	56.70	4.25

LOCATIONS OF OLD MINES ON THE MARQUETTE RANGE.

ADA.

E ½ of NW ¼ of S. 8, T. 47, R. 26, also known as the Allen. Old exploration

ALBION.

NE ¼ of NW ¼ of S. 19, T. 47, R. 27, formerly known as Gilmore, explored intermittently. Total product, 4,592 tons.

ALLEN.

E ½ of NW ¼ of S. 8, T. 47, R. 26. Also known as the Ada. Old exploration.

AMERICAN.

W ½ of SW ¼ of S. 32, T. 48, R. 28, formerly the Sterling; at one time the Boston. Idle since 1892. Total product, 106,000 tons.

AMES.

SE ¼ of SW ¼ of S. 2, T. 47, R. 27; idle since 1894. Total product, 6,298 tons.

ANDERSON.

A part of S. 1, T. 46, R. 30, explorations. The South Buffalo was at one time referred to as the Anderson.

ARGYLE.

SW ¼ of SE ¼ of S. 2, T. 47, R. 29, known as Lincoln, Edwards and Sampson (Samson). Idle since 1892. Total product, 264,083 tons.

BARAGA.

SE ¼ of SE ¼ of S. 6, T. 47, R. 26. Old exploration.

BARASA.

SW ¼ of SE ¼ of S. 32, T. 48, R. 26. Closed in 1900. Made no shipment.

BARINGER.

SW ¼ of SE ¼ of S. 16, T. 47, R. 27. Old exploration.

BARON.

SE ¼ of NW ¼ of S. 11, T. 47, R. 29, part of the Washington estate. The product is included in the Humboldt and Washington.

BARNUM.

SE ¼ of NE ¼ of S. 9, T. 47, R. 27. Closed in 1893. Since then the name Barnum has been erroneously applied to the Cliffs Shaft of the Cleveland-Cliffs Iron company.

BAY STATE.

W ½ of NW ¼ of S. 8, T. 47, R. 26; also known as the Green Bay and the Indiana. Idle since 1883. Total product, 17,399 tons.

BLACKHAWK.

NE ¼ of NE ¼ of Sec. 5, T. 47, R. 26, supposed to be the Hawkeye. Old exploration.

BEAUFORT.

NW ¼ of SW ¼ of S. 22, T. 48, R. 31, once a part of the Northrup. In 1889 the total product was 114,519 tons.

BEN NEELY.

E ½ of Lot 5 and Lots 6 and 7 of S. 36, T. 48, R. 27, now the Hartford. Operated by the Oliver Iron Mining company in 1901.

BRAASTAD.

Now known as the Winthrop and the Mitchell mines; once operated by Fred Braastad. Idle in 1901.

BERIA.

NE ¼ of S. 30, T. 47, R. 30, also known as Norman. Old exploration, and sometimes referred to as the Shouldice.

BESSEMER.

SW ¼ of SE ¼ of S. 35, T. 48, R. 27, now the Lillie. Operated by Republic Iron & Steel company.

BESSIE.

E ½ of SW ¼ of S. 35, T. 48, R. 29; explored by Oliver Iron Mining company during 1901.

BLUE.

SW ¼ of SW ¼ of S. 5, T. 47, R. 26, formerly known as Kaufman, now in the “Queen Group.” Operated by Oliver Iron Mining company in 1901.

BOSTON.

SE ¼ of SW ¼ and SW ¼ of SE ¼, S. 32, T. 48, R. 28, at one time operated with the American. Idle since 1884, but shipped 587 tons in 1897 from stockpile. Total product, 61,715 tons.

BROTHERTON.

SW ¼ of S. 17, T. 45, R. 25, also known as Stegmiller. Explored in 1900 by the American Steel & Wire company.

BUCKEYE.

S ½ of S. 36, T. 48, R. 30. Old exploration.

BUFFALO.

NW ¼ of SE ¼ of S. 5, T. 47, R. 26, now in the "Queen Group."

BUNKER HILL.

NW ¼ of SE ¼ of S. 6, T. 47, R. 26. Old exploration.

BURT.

SW ¼ of SW ¼ of S. 10, T. 47, R. 27, also known as the old Lake Superior Iron company Hard Ore mine; now in the Oliver Iron Mining company. The name Burt was at one time applied to all the Lake Superior Iron company's property.

CAMBRIA.

SE ¼ of SE ¼ of S. 35, and W ½ of SW ¼ of SW ¼ of S. 36, T. 48, R. 2, operated by Republic Iron & Steel company.

CANNON.

S ½ of NE ¼ of S. 28, T. 47, R. 30. Old exploration.

CARR.

NW ¼ of S. 33, T. 47, R. 26. Old exploration, a part of which became the Mexican (New Mexican). Shipped in 1873, 2,380 tons.

CASCADE.

SE ¼ of S, 30, T. 46, R. 26, also known as Howe and Palmer; now the Volunteer. (Operated by the Donora Iron company.)

CASE.

N ½ of SW ¼ of Sec. 33, T. 48, R. 28. Old exploration.

CHAMPION.

S ½ of S. 31, T. 48, R. 29. Operated by Champion Iron

CHESHIRE.

SE ¼ of S. 18, T. 45, R. 25, also known as the Smith, and now as the Princeton, frequently referred to as the Swanzey. The products of these mines have not been reported separately.

CHESTER.

S ½, of NE ¼ of S. 7, T. 47, R. 26, formerly known as the Mill; closed in 1888; made a shipment in 1897. Operated in Chester Mining company.

CHICAGO.

SE ¼, of SE ¼ of S. 7, T. 47, R. 26, closed in 1882. Total product 8,895 tons.

CHIPPEWA.

W ½ of SW ¼ of S. 22, T. 47, R. 30. Old exploration.

CLANCY.

N ½ of SW ¼ of S. 28, T. 47, R. 26. Old exploration.

CLEVELAND.

Refers to several Hard Ore mines operated by Cleveland-Cliffs Iron company.

CLEVELAND HARD ORE.

NE ¼ of S. 10, T. 47, R. 27. The pit now operated is known as the Moro, operated in 1901 by the Cleveland-Cliffs Iron company.

CLEVELAND HEMATITE.

NW ¼ of S. 2, T. 47, R. 27, closed in 1895.

CLEVELAND LAKE.

SE ¼ of s. 10, T. 47, R. 27, operated in 1901 by Cleveland-Cliffs Iron company.

CLIFFS SHAFT.

NE ¼ of NE ¼ of S. 9, T. 47, R. 27, sometimes erroneously referred to as the Barnum. Operated in 1901 by the Cleveland-Cliffs Iron company.

COLUMBIA.

Fractional SW ¼ of S. 6, T. 46, R. 29, known as Kloman, closed in 1882. Total product, 94,813 tons.

COLWELL.

S ½ of NE ¼ and N ½ of SE ¼ of S. 12, T. 47, R. 31, also known as Virginia.

CONSOLIDATED.

S ½ of SE ¼ of S. 28, T. 47, R. 26, also known as the Royal, Gribbon, and Mesabi Friend, and now the Moore.

CONRAD.

S ½ of SW ¼ of S. 7, T. 47, R. 28, and NW ¼ of NW ¼ of S. 18, T. 47, R. 28. Was known as Michigan. Old exploration.

CROWN.

NW ¼ of NW ¼ of S. 4, T. 47, R. 26. Old exploration.

DALLIBA.

N ½ of SW ¼ and S ½ of NW ¼ of S. 29, T. 48, R. 29, now the Phoenix. Last shipment in 1887. Total product, 59,114 tons.

DAVID.

NE ¼ of NW ¼ of S. 18.T. 47, R. 28. Old exploration.

DAVIS.

SW ¼ of NW ¼. of S. 7, T. 47, R. 26, also known as Wheeling, now the Grand Rapids, closed in 1896. Total product, 121,291 tons.

DETROIT.

NE ¼ of NE ¼ of S. 3, T. 47, R. 27, formerly Norwich, closed in 1890. Total product, 128,299 tons.

DEXTER.

E ½ of NW ¼ and W ½ of NE ¼ of S. 3, T. 47, R. 28, includes the old Dey, operated intermittently, last shipment in 1897. Total product, 118,512 tons. Explored in 1898 and 1899.

DEY.

W ½ of NE ¼ of S. 3, T. 47, R. 28, became part of Dexter Consolidated, now known as Dexter. Old exploration.

DONORA.

Donora Iron company explored Volunteer and Platt mines in 1901.

DUNBAR.

SW ¼ of NW ¼ of S. 4, T. 47, R. 26. Old exploration.

EAST BUFFALO.

NE ¼ of SE ¼ of S. 5, T. 47, R. 26, also known as Lackawanna.

EAST CHAMPION.

SE ¼ of SW ¼ of S. 32, T. 48, R. 29, also known as Keystone, and also as Iron Duke, closed in 1882, but shipped in 1889. Total product, 77,648 tons.

EAST END.

NE ¼ and NE ¼ of S. 15, T. 47, R. 27, operated by the Pittsburg & Lake Angeline Iron company. This was the original "East End" mine and abandoned. At present the mine is in N ½ of NE ¼ of S. 15. This was originally known as Pittsburg and Lake Angeline companies' Lake Shaft, now known as the East End.

EAST JACKSON.

NW ¼ of SW ¼ of S. 6, T. 47, R. 26, formerly Pendill, closed in 1884. Total product, 26,910 tons.

EAST NEW YORK.

SW ¼ of SW ¼ of S. 2, T. 47, R. 27, operated in 1901 by Ishpeming Mining company.

EDWARDS.

SW ¼ of SE ¼ of S. 2, T. 47, R. 29, also known as the Lincoln and Argyle, now as Sampson (Samson). Closed in 1892. Total product, 264,083 tons.

ELBA.

SW ¼ of NE ¼ and SE ¼ of NW ¼ of S. 6, T. 47, R. 26. Old exploration.

ELLSWORTH.

S ½ of SE ¼ of S. 19, T. 47, R. 30. Old exploration.

EMMA.

E ½ of NE ¼ of S. 31, T. 47, R. 26. Old exploration. Now in the Volunteer mine property.

ERIE.

NE ¼ of NW ¼ of S. 28, T. 47, R. 30, at one time known as the Fremont, and at one time seems to have been referred to as the Magnetic. Closed in 1885. Explored during 1901 by Mr. E. F. Bradt. Total product, 8,135 tons.

EUREKA.

NW ¼ of SW ¼ of S. 11, T. 47, R. 29, also known as Peck, Harlow and Hungerford & Harlow. Old exploration.

ETNA.

NE ¼ of NW ¼ of S. 7, T. 47, R. 26, a part of the old "Manganese" property. Idle since 1887. Total product, 1,091 tons. (May have been known as Schadt shipment.)

EXCELSIOR.

SE ¼ of SE ¼ of S. 6, T. 47, R. 27. Old exploration.

FARM.

NW ¼ of S. 25, T. 8, R. 31, now known as the Imperial, once the Wetmore. Idle in 1901. The correct total product cannot be given, according to the Iron Trade Review, the total shipments are 200,587 tons.

FITCH.

SE ¼ of NE ¼ of S. 24, T. 47, R. 28, closed in 1893, but in 1895 shipped 174 tons. Total product, 31,817 tons.

FOREST CITY.

E ½ of SW ¼ of S. 35, T. 48, R. 27, is said to have made a small shipment of high grade ore after which the property was explored.

FOSTER.

W ½ of SW ¼ of S. 23 and E ½ of SE ¼ of S. 22, T. 47, R. 27, closed in 1898 by Cleveland-Cliffs company. Total product, 188,454 tons.

FOXDALE.

E ½ of NE ¼ of S. 10, T. 447, R. 29, operated in 1901 by Bird Iron company.

FREMONT.

NE ¼ of NW ¼ of S. 28, T. 47, R. 30, known as the Erie, closed in 1885, explored in 1901 by Mr. E. F. Bradt. Total product, 8,135 tons.

GEORGE MITCHELL.

NE ¼ of SW ¼ of S. 5, T. 47, R. 26, known as Prince of Wales, now in the "Queen Group."

GERTRUDE (GERTIE).

W ½ of SW ¼ of S. 35, T. 48, R. 29. Old exploration. Now in the Bessie.

GIBSON (MATT GIBSON).

SE ¼ of SE ¼ of S. 29, T. 48, R. 29, closed in 1888. Also known as Gibson Mitchell. Total product, 16,357 tons.

GILMORE.

NE ¼ of NW ¼ of S. 19, T. 47, R. 27, known as Albion, explored intermittently. Total product, 4,592 tons.

GOODRICH.

W ½ of NW ¼ of S. 19, T. 47, R. 27, closed in 1882. Total product, 51,479 tons.

GRAND CENTRAL.

SW ¼ of SW ¼ of S. 6, T. 47, R. 26, formerly known as Iron Valley now in New York Hematite. Closed in 1882. Total product, 37,241 tons.

GRAND RAPIDS.

SW ¼ of NW ¼ of S. 7, T. 47, R. 26, formerly known as the Wheeling or Davis, closed in 1896. Total product, 121,291 tons. This name, Grand Rapids, was once applied to the property now known as the Moore.

GREEN BAY.

W ½ of NW ¼ of S. 8, T. 47, R. 26, also known as Indiana, as Bay State. Idle since 1883. Total product, 17,399 tons.

GRIBBEN.

S ½ of SE ¼ of S. 28, T. 47, R. 26, formerly known as the Consolidated, Mesabi's Friend, and now known as the Moore, and at one time referred to as the Grand Rapids. Total product, 22,929 tons.

HARD ORE.

Mines of the Cleveland-Cliffs Iron company and Oliver Iron Mining company.

HARLOW.

N ½ of SW ¼ of S. 11, T. 47, R. 29, also known as Peek, Hungerford & Harlow, and Eureka. Old exploration.

HARTFORD.

E ½ of Lot 5 and Lots 6 and 7 of S. 36, T. 48, R. 27, formerly known as the Ben Neely, operated in 1901 by the Oliver Iron Mining company. No shipments.

HAWKEYE.

E ½ of NE ¼ of Sec. 5, T. 47, R. 26, at once time referred to as Blackhawk. Old exploration.

HEMATITE.

N/W ¼ of NW ¼ of S. 2, T. 47, R. 27, formerly the Nelson, closed in 1895 by the Cleveland-Cliffs Iron company. NW ¼ of SW ¼ of S. 10, T. 47, R. 27, closed in 1892 by Lake Superior Iron Company.

HIMROD.

N ½ of SE ¼ of S. 7, T. 47, R. 26, also known as Orion. Old exploration. Total product, 2,566.

HOME.

SE ¼ of SE ¼ of S. 29, T. 47, R. 26, formerly known as the Prout and Wheat, now Star West, closed in 1900. Total product, 204,649

HORTENSE.

E ½ of NE ¼ of S. 29, T. 48, R. 29, once known as the Kidder, and once North Champion, closed in 1890. Total product, 30,571 tons.

HOWE.

SE ¼ of S. 30, T. 47, R. 26, also known as Cascade and Palmer, now the Volunteer, and operated by the Donora Iron company.

HOWELL HOPPOCK (HOPPICK).

NW ¼ of NE ¼ of S. 28, T. 47, R. 27. Old exploration. Total product, 2,206 tons.

HUMBOLDT.

E ½ of NW ¼ of S. 11, T 47, R. 29, part of the Washington estate. Total product includes that of the Baron and Washington mines. Total product, 723,961 tons.

HUNGERFORD & HARLOW.

NW ¼ of SW ¼ of S. 11, T. 47, R. 29, also known as Eureka, and Harlow, Peck. Old exploration.

IMPERIAL.

NW ¼ of S. 25, T. 48, R. 31, formerly known as the Farm or Wetmore. Idle in 1901. The correct total product cannot be given, according to the Iron Trade Review, the total shipments are 200,587 tons.

INDIANA.

W ½ of NW ¼ of S. 8, T. 47, R. 26, also known as the Green Bay, and now the Bay State. Old exploration. Closed in 1883. Total product, 17,399 tons.

IRON CENTRE.

SW ¼ of SE ¼ of S. 2, T. 47, R. 27. Old exploration.

IRON CLIFFS.

Now the Cleveland-Cliffs company.

IRON DUKE.

SE ¼ of SW ¼ of S. 32, T. 48, R. 29, also known as Keystone, and East Champion, closed in 1882, but in 1887 shipped 2,697 tons. Total product, 77,648 tons.

IRON KING (KING).

W ½ of SE ¼ of S. 24, T. 48, R, 31, also referred to as the Stewart and King. Old exploration.

IRON MOUNTAIN.

S ½ of S. 14, T. 47, R. 27. Extensive explorations. Total product, 393 tons.

IRON VALLEY.

SE ¼ of SW ¼ of S. 6, T. 47, R. 26, also known as the Grand Central, now the New York Hematite. Closed in 1882. Total product, 37,241 tons.

JACKSON.

Sec. 1, T. 47, R. 27. Operated in 1901 by Jackson Iron company.

JIM PASCOE (PASCOE).

W ½ of NE ¼ of S. 29, T. 48, R. 29, formerly all of the NE ¼ last shipment in 1886. Total product, 58,666 tons.

JOYCE.

SE ¼ of SW ¼ of S. 28, T. 47, R. 26, also known as the Primrose. Old exploration.

KAUFMAN.

SW ¼ of SW ¼ of S. 5, T. 47, R. 26, also known as Blue; now in the "Queen Group."

KERR.

W ½ of NE ¼ and W ½ of E ½ of NE ¼ of S. 4, T. 47, R. 28. Old exploration.

KEYSTONE.

SE ¼ of SW ¼ of S. 32, T. 48, R. 29, known as Iron Duke and East Champion. Closed in 1882, but in 1889 shipped 2,697 tons. Total product, 77,648 tons.

KIDDER.

E ½ of NE ¼ of S. 29, T. 48, R. 29, also known as North Champion, now as the Hortense; closed in 1890. Total product, 30,571 tons.

KILWORTH.

SW ¼ of SW ¼ of S. 22, T. 47, R. 27, and NW ¼ of NW ¼ of S. 27, T. 47, R. 27. Old exploration.

KLOMAN.

Fractional SW ¼ of S. 6, T. 46, R. 29, also known as Columbia, in 1882. Total product, 94,813 tons.

LACKAWANNA (DELAWARE & LACKAWANNA).

NE ¼ of SE ¼ of S. 5, T. 47, R. 26, also known as East Buffalo Old exploration.

LAKE ANGELINE.

N ½ of NW ¼ of S. 15, T. 47, R. 27, operated by Pittsburg & Lake Angeline Iron company.

LAKESIDE.

Lot 7, T. 48, R. 27, now in the Hartford.

LAKE SUPERIOR.

Originally referred to what is now known as the Hard Ore of the Lake Superior Iron company, now operated by the Oliver Iron Mining company.

LAXEY.

SE ¼ of SE ¼ of S. 28, T. 47, R. 26. Old exploration, now in the Moore.

LILLIE.

SW ¼ of SE ¼ of S. 35, T. 48, R. 27, formerly the Bessemer, now operated by the Republic Iron & Steel company.

LINCOLN.

SW ¼ of SE ¼ of S. 2, T. 47, R. 29, also known as the Edwards, Argyle and Sampson (Samson), closed in 1892. Total product, 264,083 tons.

LOWTHIAN.

SE ¼ of NE ¼ of S. 20, T. 47, R. 27. Output included in L. S. & I. company. Idle since 1882.

LUCKY STAR.

NW ¼ of SW ¼ of S. 5, T. 47, R. 26. Old exploration.

LUCY.

SW ¼ of SW ¼ of S. 6, and NW ¼ of NW ¼ of S. 7, T. 47, R. 26, formerly the McComber. Total product, 516,307 tons.

MAGNETIC.

SW ¼ of NW ¼ of S. 20, T. 47, R. 30. Old exploration. Total product, 1,136 tons.

MANGANESE.

N ½ of NE ¼ and NE ¼ of NW ¼ of S. 7, T. 47, R. 26. The west forty became the Etna. Total product, 6,359 tons.

MARINE.

NW ¼ of SE ¼ of S. 30, T. 48, R. 29. Old exploration.

MARQUETTE ORE CO.

Shipped some rockpiles from the Winthrop mine.

MARQUETTE.

N ½ of N ½ of S. 14, T. 47, R. 27. Old exploration.

MATT GLEASON.

N ½ of SE ¼ of S. 19, T. 47, R. 30, also known as the Northwest Republic. Old exploration.

M'COMBER.

SW ¼ of SW ¼ of S. 6, and NW ¼ of NW ¼ of S. 7, T. 47, R. 26, now known as the Lucy. Total output, 516,307 tons.

MERRYWEATHER.

SE ¼ of NE ¼ of S. 24, T. 47, R. 28, closed in 1893, but in 1895 shipped 174 tons. Also known as the Fitch. Total product, 31,817 tons.

MESABI FRIEND.

S ½ of SE ¼ of S. 28, T. 47, R. 26, also known as the Gibbon, Royal, Consolidated and now the Moore. Operated in 1901.

MESNARD.

NW ¼ of NW ¼ of S. 28, T. 48, R. 29. Old exploration.

METROPOLIS.

SE ¼ of NE ¼ and NE ¼ of SE ¼ of S. 2, T. 46, R. 30, also known as Metropolitan and Republic. Old exploration, closed about 1889. Total product, 289 tons.

MEXICAN (NEW MEXICAN).

NE ¼ of NW ¼ of S. 33, T. 47, R. 26, part of what was formerly known as the Carr.

MICHIGAMME.

S ½ of S. 19, and SW ¼ of S. 20, T. 48, R. 30, now operated by Cleveland-Cliff's company. Total product, 880,362 tons. Closed October, 1901.

MICHIGAN.

S ½ of SW ¼ of S. 7, and NW ¼ of NW ¼ of S. 18, T. 47, R. 28, also known as the Conrad. Old exploration.

MILLER.

NE ¼ of NW ¼ of S. 21, T. 47, R. 27. Old exploration. Total product, 4,756 tons. NW ¼ of NE ¼ of S. 7, T. 47, R. 26, a part of the Old Manganese property, was at one time referred to as the Miller.

MILWAUKEE.

SE ¼ of NW ¼ of S. 7, T. 47, R. 26, closed in 1890. Total product, 374,371 tons.

MINOWAN.

N ½ of SE ¼ of S. 28, T. 47, R. 26, also known as the Joyce. Old exploration.

MITCHELL.

SE ¼ of S. 21, T. 47, R. 27, formerly Shenango, at one time known as one of the "Braastad mines," explored in 1901 by the Pittsburg & Lake Angeline Iron company. Total product, 136,636 tons.

NATIONAL.

SE ¼ of S. 16, T. 47, R. 27, closed in 1884. Total product, 150,213 tons.

NEGAUNEE.

NW ¼ of S. 5, T. 47, R. 26, operated in 1901 by American Steel & Wire company, now in the Oliver Iron Mining company.

NELSON.

NW ¼ of NW ¼ of S. 2, T. 47, R. 27, now known as the Cleveland-Cliffs Iron company Hematite mine, closed in 1895.

NEW BARNUM.

Wrongly applied to the Cliffs Shaft, operated by the Cleveland-Cliffs Iron company.

NEW BURT.

SE ¼ of NE ¼ of S. 19, T. 47, R. 27. One of the Lake Superior Iron company's mines, closed in 1879.

NEW ENGLAND.

W ½ of NE ¼ of S. 20, T. 47, R. 27, closed in 1873. Explored in 1901 by Lake Superior Iron company. Total product, 110,506 tons.

NEW YORK HEMATITE.

SE ¼ of SW ¼ and SW ¼ of SE ¼ of S. 6, T. 47, R. 26. The west forty was once known as the Iron Valley and Grand Central. Closed in 1882. Total product, 37,241 tons.

NEW YORK.

SE ¼ of SE ¼ of S. 3, T. 47, R. 27, formerly known as the York, last shipment in 1900. Total product, 1,123,071 tons,

NONPAREIL.

NW ¼ of S. 5, T. 47, R. 27, also known as St. Lawrence, closed in 1887. Total product, 23,531 tons.

NORMAN.

NE ¼ of S. 30, T. 47, R. 30, known as Beria. Old exploration.

NORTHAMPTON.

SE ¼ of S. 30, T. 48, R. 29. Old exploration.

NORTH CHAMPION.

E ½ of NE ¼ of S. 29, T. 48, R. 29, known as the Kidder and now the Hortense, closed in 1890. Total product, 30,574 tons. The North Champion now refers to the Hematite mine of the Champion Iron company, and is in the NE ¼ of S. 28, T. 48, R. 29.

NORTH DALLIBA.

S ½ of NW ¼ of S. 29, T. 48, R. 29, now part of Phoenix.

NORTH PHOENIX.

S ½ of NW ¼ of S. 29, T. 48, R. 29, a part of the Phoenix. Old exploration.

NORTH REPUBLIC.

SE ¼ of NE ¼ and NE ¼ of SE ¼ of S. 2, T. 46, R. 30, also known as Metropolis. Old exploration, closed about 1889. Total product 289 tons.

NORTH RANGE.

W ½ of NW ¼ of S. 3, and E ½ of E ½ of NE ¼ of S. 4, T. 47, R. 28. Old exploration by the Union Iron & Steel company.

NORTHRUP.

SW ¼ of S. 22, T. 48, R. 31, part of this property became the Beaufort and part the Norwood.

NORTHWEST REPUBLIC.

N ½ of SE ¼ of S. 19, T. 47, R. 30, formerly known as the Matt Gleason. Old exploration.

NORWICH.

NE ¼ of NE ¼ of S. 3, T. 47, R. 27, now the Detroit, closed in 1890. Total product, 128,299 tons.

NORWOOD.

S ½ of SW ¼ of S. 22, T. 48, R. 31, once a part of the Northrup, closed in 1888. Total product, 5,753 tons.

OGDEN.

W ½ of SW ¼ of S. 13, T. 47, R. 27. Old exploration. Total product, 986 tons.

OHIO.

S ½ of SE ¼ of S. 22, T. 48, R. 31. Old exploration.

ORION.

N ½ of SE ¼ of S. 7, T. 47, R. 26. Also known as Himrod. Old exploration. Total product, 2,566 tons.

ORLEANS.

E ½ of S. 23, T. 48, R. 31, also known as Steward. Old exploration. Total product, 2,987 tons.

PACIFIC.

NE ¼ of S. 34, T. 47, R. 30, also known as the Standard. Old exploration.

PALMER.

SE ¼ of S. 30, T. 47, R. 26, formerly known as the Howe and Cascade, now the Volunteer, and operated by the Donora Iron company.

PARSONS (OLD PARSONS).

NE ¼ of NW ¼ of S. 21, T. 47, R. 27. Old exploration.

PECK.

NW ¼ of SW ¼ of S. 11, T. 47, R. 29, also known as the Eureka, Harlow. Old exploration.

PENDILL.

NW ¼ of SW ¼ of S. 6, T. 47, R. 26, now the East Jackson, closed in 1884. Total product, 26,910 tons.

PHOENIX.

N ½ of SW ¼ and S ½ of NW ¼ of S. 29, T. 48, R. 29, formerly the Dalliba. Last shipment in 1887. Total product, 59,114 tons.

PIONEER.

NW ¼ of SW ¼ of S. 4, T. 47, R. 26. Last shipped in 1888. Total product, 15,055 tons. Some ore was shipped to local furnaces from the Jackson property under the name of Pioneer.

PITTSBURGH & LAKE ANGELINE.

N ½ of N ½ of S. 15, T. 47, R. 27, includes the “East End” and Lake Angeline mines, operated by the Pittsburg & Lake Angeline Iron Mining company in 1901.

PITTSBURG & LAKE SUPERIOR.

This name formerly referred to the Volunteer mine and other mineral lands.

PLATT.

NW ¼ of NE ¼ of S. 32, T. 47, R, 26, now operated by the Donora Iron company. Total product, 73,844 tons.

PONTIAC.

NW ¼ of NE ¼ of S. 12, T. 47, R. 27. Old exploration. Total product, 1,500 tons.

PORTLAND.

N ½ of NW ¼ of S. 26, T. 48, R. 31. Old exploration. The name has also been applied to the SE ¼ of the SE ¼ of S. 22, T. 48, R. 31.

PRIMROSE (PRIMROSE VALLEY).

SE ¼ of SW ¼ of S. 28, T. 47, R. 26, also known as the Joyce. Total product, 6,040 tons.

PRINCE OF WALES.

NE ¼ of SW ¼ of S. 5, T. 47, R. 26, formerly the George Mitchell, now in the “Queen Group.”

PRINCETON.

SE ¼ of S. 18, T. 45, R. 25. The names Cheshire, Smith and Swanzey have been indifferently applied to as many different locations in this section, as well as to the Princeton property.

PROUT.

SE ¼ of SE ¼ of S. 29, T. 47, R. 26, also known as the Wheat, and Home, now the Star West, closed in 1900. Total product, 204,649 tons.

QUEEN.

SE ¼ of SW ¼ of S. 5, T. 47, R. 26, formerly known as the Swan, now in the “Queen Group.”

REPUBLIC.

Lots 2, 3, 5 and 8, S. 7, T. 46, R. 29. Operated in 1899 by the Republic Iron Mining company.

RICHARDS.

NW ¼ of NE ¼ of S. 33, T. 47, R. 26, in 1897 made last shipment. Total product, 1,374 tons.

RICHMOND.

SW ¼ of SW ¼ of S. 28, T. 47, R. 26. Operated in 1901 by the Richmond Iron company.

RIVERSIDE.

Lots 1 and 2 of S. 35, T. 47, R. 30, closed in 1891. Total product, 16,117 tons. Explored in 1900 by Oliver Mining company.

ROLLING MILL.

S ½ of NE ¼ of S. 7, T. 47, R. 26, known as the Chester, last shipment in 1897. Operated in 1901 by the Chester Mining company.

ROWLAND.

NW ¼ of SW ¼ of S. 7, T. 47, R. 26. Old exploration. Sometimes referred to as the Iron Cliffs. Total product, 2,988 tons.

ROYAL.

S ½ of SE ¼ of S. 28, T. 47, R. 26, also known as the Gribben, Consolidated, Mesabi's Friend, and now as the Moore, and at one time referred to as the Grand Rapids. Total product, 58,346 tons.

SAGINAW.

NW ¼ of NE ¼ of S. 19, T. 47, R. 27, last shipment in 1891. Total product, 441,648 tons.

SALISBURY.

S ½ of NW ¼ and SW ¼ of NE ¼ of S. 15, T. 47, R. 27, operated by the Cleveland-Cliffs Iron company.

SAM MITCHELL, SECTION 5. (SAM MITCHELL).

NE ¼ of SE ¼ of S. 5 T. 47, R. 26, now known as the Lackawanna. Total product, 8,262 tons. Old exploration.

SAMPSON (SAMSON).

SW ¼ of SE ¼ of S. 2, T. 47, R. 29, formerly known as the Lincoln, Edwards and Argyle. Idle since 1894. Total product, 267,805 tons.

SECTION 21.

SW ¼ of NE ¼ and SE ¼ of NW ¼, S. 21, T. 47, R. 27, operated by the Oliver Iron Mining company.

SECTION 19.

NE ¼ of NE ¼ of S. 19, T. 47, R. 27. Old exploration. Same as New Burt. Now in Oliver Iron Mining company.

SECTION 16.

NE ¼ of NE ¼ of S. 16, T. 47, R. 27, operated by Oliver Iron Mining company.

SECTION 12.

NE ¼ of NE ¼ of S. 12, T. 47, R. 27. Last shipment in 1885. Total product, 24,191 tons.

SHENANGO.

SE ¼ of S. 21, T. 47, R. 27, now known as Mitchell, at one time known as one of the "Braastad Mines." Explored in 1901 by the Pittsburg & Lake Angeline company. Total product, 136,636 tons.

SHOULDICE.

NE ¼ of S. 30, T. 47, R. 30, known as Beria.

SMITH.

SE ¼ of S. 18, T. 45, R. 25, also known as the Cheshire. The names Cheshire and Swanzey have been indifferently applied to this property, now the Princeton. The products of these mines have not been reported separately.

SOUTH BUFFALO.

SW ¼ of SE ¼ of S. 5, T. 47, R. 26, now in the "Queen Group." At one time seems to have been referred to as the Anderson. Closed.

SOUTH JACKSON.

SE ¼ of SE ¼ of S. 1, T. 47, R. 27, a part of the Jackson.

SPURR.

S ½ of NW ¼ and N ½ of SW ¼ of S. 24, T. 48, R. 31, last shipment in 1883. Total product, 164,189 tons.

STANDARD.

NE ¼ of S. 34, T. 47, R. 30, also known as Pacific. Old exploration.

STAR.

W ½ of SW ¼ of S. 8, T. 47, R. 26. Old exploration.

STAR WEST.

SE ¼ of SE ¼ of S. 29, T. 47, R. 26, formerly known as the Home, Wheat and Prout.

ST. CHARLES.

SE ¼ of SE ¼ of S. 5, T. 47, R. 26. Old exploration.

STEGMILLER.

SW ¼ of S. 17, T. 45, R. 25, formerly the Brotherton. Explored in 1900 by the American Steel & Wire company.

STERING.

W ½ of SW ¼ of S. 32, T. 48, R. 28, now the American. Idle since 1892. Total product, 106,000 tons.

STEWARD.

E ½ and S ½ of SW ¼ of S. 23, T. 48, R. 31, also known as Orleans. Old exploration. Total product, 2,987 tons.

STEWART.

W ½ of SE ¼ of S. 24, T. 48, R. 31, also known as Iron King (King). Old exploration.

ST. LAWRENCE.

NW ¼ of S. 5, T. 47, R. 27, formerly the Nonpareil. Total product, 23,531 tons.

SWAN.

SE ¼ of SW ¼ of S. 5, T. 47, R. 26, now the Queen. In the "Queen Group."

SWANZEY.

SE ¼ of NW ¼ of S. 18, T. 45, R. 25. The names Cheshire and Swanzey have been indifferently applied to different properties in this section. The present Princeton being frequently referred to as the Swanzey. The products of these different mines have not been reported separately.

TAYLOR.

NE ¼ of NW ¼ of S. 9, T. 49, R. 33. Closed in 1883. Total product, 31,784 tons.

TITAN.

NE ¼ of SE ¼ of S. 21, T. 48, R. 31. Closed in 1888. Total product, 89,513 tons. Explored in 1900 by Cleveland-Cliffs company.

TOLEDO.

Lots 4 and 6 of S. 7, and lots 2 and 8 of S. 18, T. 46, R. 29, now known as West Republic. Total product to 1890 was 133,086 tons.

TILDEN.

SW ¼ of SE ¼ of S. 23, T. 47, R. 27. Operated by Cleveland-Cliffs Iron company.'

UNION IRON & STEEL.

W ½ of NW ¼ of S. 3, and E ½ of E ½ of NE ¼ of S. 4, T. 47, R. 28, also known as North Range.

U. S. GRANT.

NW ¼ of NE ¼ of S. 5, T. 47, R. 26. Old exploration.

VIRGINIA.

S ½ of NE ¼ and N ½ of SE ¼ of S. 12, T. 47, R. 31. Exploration in 1892. Known as Colwell.

VOLUNTEER.

S ½ of S ½ of S. 30, and N ½ of N ½ of S. 31, T. 47, R. 26, formerly known as the Cascade and the Palmer. Now operated by the Donora Iron company.

WASHINGTON.

N ½ of S. 11, T. 47, R. 29, and other lands. Subsequently portions of these lands became known as the Humboldt and Baron. The products of these mines have not been reported separately.

WATSON.

NW ¼ of S. 32, T. 47, R. 26. Old exploration.

WEBSTER.

N ½ of NE ¼ and SE ¼ of NE ¼ of S. 26, T. 48, R. 31. Total product, 35,906 tons.

WEST END.

N ½ of NW ¼ of S. 31, T. 47, R. 26. Part of the Palmer or Volunteer.

WEST REPUBLIC.

Lots 4 and 6 of S. 7, and Lots 2 and 8 of S. 18, T. 46, R. 29, formerly known as the Toledo. Total product to 1890 was 133,086 tons.

WHEAT.

SE ¼ of SE ¼ of S. 29, T. 47, R. 26, also known as the Prout and Home, now the Star West. Total product, 206,649 tons.

WHEELING.

SW ¼ of NW ¼ of S. 7, T. 47, R. 26, also known as the Davis, now the Grand Rapids. Closed 1896. Total product, 121,291 tons.

WETMORE.

NW ¼ of S. 25, T. 48, R. 31, formerly the Farm, now the Imperial. Idle in 1901. The correct total product cannot be given, according to the Iron Trade Review the total shipments are 200,587 tons.

WICKER.

NE ¼ of SE ¼ and SW ¼ of SE ¼ of S. 29, T. 48, R. 29. Old exploration.

WICKS (WICK).

NE ¼ of NE ¼ of S, 32, T. 47, R. 26. Part of present Platt. Produced in 1882, 196 tons.

WINDSOR.

N ½ of NE ¼ of S. 2, T. 46, R. 30. Old exploration.

WINTHOP.

SW ¼ of S. 21, T. 47, R. 27, once included in the "Braastad mines." Now operated by the Oliver Iron Mining company. Idle in 1901.

YORK.

SE ¼ of SE ¼ of S. 3, T. 47, R. 27, now the New York. Last shipment in 1900. Total product, 1,123,071 tons.

LOCATIONS OF OLD MINES ON THE MENOMINEE RANGE.

ACME.

SE ¼ of NE ¼ of S. 20, T. 43, R. 32. Old exploration.

ALPHA.

SW ¼ of SW ¼ of S. 12, T. 42, R. 33. Explored intermittently.

ANGUS SMITH (SMITH).

E ½ of SE ¼ of S. 23, T. 43, R. 32, now the Armenia.

APPLETON.

NE ¼ of SW ¼ of S. 7, T. 39, R. 28, formerly known as the Sturgeon River and Chicago. Worked and explored intermittently. Total product, 12,102 tons.

ARAGON.

N ½ of NE ¼ of S. 8, and N ½ of NW ¼ of S. 9, T. 39, R. 29. Now operated by the Oliver Iron Mining company.

ARMENIA.

E ½ of SE ¼ of S. 23, T. 43, R. 32, formerly known as Angus Smith (Smith). Now operated by Corrigan, McKinney & Co.

ATLAS.

SW ¼ of SE ¼ of S. 12, T. 42, R. 33. Old exploration.

BALTIC.

W ½ of W ½ of S. 7, T. 42, R. 34, formerly the Murphy.

BETA.

NE ¼ of SW ¼ of S. 26, T. 43, R. 35. Closed in 1887, but shipped in 1891. Total product, 4,211 tons.

BIRD.

W ½ of SE ¼ of S. 13, T. 43, R. 32, also known as Voos. Operated by Bird Iron company.

BLANEY.

SE ¼ of SE ¼ of S. 27, T. 43, R. 32, formerly known as Wauneta, now the Hope. Closed in 1893, but explored since. Operated by Oliver Iron Mining company. Total product, 17,818 tons.

BOHEMIA.

Lot 1 of S. 20, T. 43, R. 31, also known as Canadian. Old exploration.

BOYINGTON.

W ½ of SE ¼ of S. 13, T. 43, R. 35. Exploration.

BREEN.

NW ¼ of NE ¼ of S. 22, T. 39, R. 28. Closed in 1880. Explored intermittently since. Total product, 17,440 tons.

BRIER HILL.

S ½ of NW ¼ of S. 9, T. 39, R. 29. Now in the Pen company group. Closed 1883. Total product, 14,982 tons.

BRISTOL.

E ½ of SE ¼ of S. 19, T. 43, R. 32, formerly the Clare or Claire. Operated by Bristol Mining company.

CALEDONIA.

W ½ of SW ¼ of S. 17, T. 43, R. 31. Old exploration.

CALUMET.

SE ¼ of NW ¼ of S. 8, T. 41, R. 28. Closed in 1884. Total product, 38,713 tons.

CANADIAN.

Lot 1 of S. 20, T. 43, R. 31, also known as Bohemia. Old exploration.

CASPIAN.

NE ¼ of S. 1, T. 42, R. 35, formerly the Grenegar.

CHICAGON (CHICAGON LAKE).

NE ¼ of S. 26, T. 43, R. 34. Intermittently explored.

CLARE (CLAIRE).

E ½ of SE ¼ of S. 19, T. 43, R. 32, now the Bristol. (Some time previously to 1890 the Clare and Youngstown seem to have been used indifferently referring to what are now the Bristol and Youngstown.) Operated by the Bristol Mining company.

COLUMBIA.

N ½ of NW ¼ of S. 31, T. 43, R. 32, also known as Sheldon & Shafer and Shafter and Union.

COMMONWEATH (Wisconsin).

SE ¼ of S. 34, T. 40, R. 18.

CORNELL.

NE ¼ of S. 20, T. 40, R. 30, now in the Antoine Ore company.

CUFF.

S ½ of SW ¼ of S. 22, T. 40, R. 30, also known as Protection. Closed in 1900. Total product, 58,419 tons.

CUNDY.

N ½ of NE ¼ and NE ¼ of NW ¼ of S. 3, T. 39, R. 30, formerly known as Ruth & Rachel and J. R. Wood. Now operated by Oliver Iron Mining company.

CURRY.

W ½ of NE ¼ of S. 9, T. 39, R. 29, now in the Penn company group.

CYCLOPS.

SW ¼ of SE ¼ of S. 5, T. 39, R. 29, now in Penn company group.

CRYSTAL FALLS.

E ½ of NE ¼ of S. 21, T. 43, R. 32, now operated by Corrigan, McKinney & Co.

DEERHUNT.

SW ¼ of NW ¼ of S. 35, T. 43, R. 29. Recent exploration.

DELPHIC.

NE ¼ of SW ¼ of S. 24, T. 42, R. 33. Idle since 1886, but explored since. Total product, 33,445 tons.

DESSAU.

NE ¼ of NW ¼ and NW ¼ of NE ¼ of S. 31, T. 40, R. 30, also known as Hewitt. Now the Millie.

DOBER.

NW ¼ of S. 1, T. 42, R. 35, now operated by Oliver Iron Mining company.

DUNN (YORK).

W ½ of NE ¼ of S. 1, T. 42, R. 33. Idle since 1899. Total product, 1,056,946 tons.

EAST VULCAN.

S ½ of SE ¼ of S. 11, T. 39, R. 29, now in Penn company group.

EMMETT.

NE ¼ of NE ¼ of S. 22, T. 39, R. 28. Idle since 1881, but explored since. Total product, 66,655 tons.

FAIRBANKS.

W ½ of SW ¼ of S. 21, T. 43, R. 32, now the Lincoln. Operated by Corrigan, McKinney & Co.

FOGARTY.

SE ¼ of SE ¼ of S. 1, T. 42, R. 35. Recent exploration.

FLORENCE (Wisconsin).

W ½ of SW ¼ of S. 21, T. 40, R. 18. Originally known as Eagle.

FOREST.

NE ¼ of SW ¼ of S. 25, T. 40, R. 30. Being explored by Oliver Iron Mining company.

GARFIELD.

NW ¼ of NW ¼ of S. 13, T. 39, R. 29. Old exploration.

GIBSON.

NW ¼ of NW ¼ of S. 15, T. 44, R. 33. Operated by Oliver Iron Mining company.

GREAT EASTERN.

NW ¼ of NW ¼ of S. 18, T. 42, R. 32, also known as Nighthawk. Old exploration.

GREAT WESTERN.

E ½ of SW ¼ of S. 21, T. 43, R. 32, formerly known as the Iron Star. Operated by Corrigan, McKinney & Co.

GRENIGAR.

NE ¼ of S. 1, T. 42, R. 35, now the Caspian. Operated by the Verona Mining company.

GROVELAND.

N ½ of SE ¼ of S. 31, T. 42, R. 29. Operated by Corrigan, McKinney & Co.

HAGEY & PORTER.

SE ¼ of NE ¼ of S. 8, T. 39, R. 29, also known as the Harrison. Now in the Aragon. Operated by Oliver Iron Mining company.

HAMILTON.

NW ¼ of SW ¼ of S. 30, T. 40, R. 30, now in the Chapin. Operated by the Oliver Iron Mining company.

HANCOCK.

S ½ of SE ¼ of S. 30, T. 41, R. 27. Old exploration.

HARRISON.

S ½ of NE ¼ of S. 8, T. 39, R. 29, also known as the Hagey & Porter. Now in the Aragon. Operated by the Oliver Iron Mining company.

HECLA.

N ½ of NE ¼ of S. 8, T. 41, R. 28. Old exploration.

HEMLOCK.

W ½ of SE ¼ and E ½ of SW ¼ of S. 4, T. 44, R. 33. Operated by Hemlock River Mining company.

HEWITT.

NE ¼ of NW ¼ and NW ¼ of NE ¼ of S. 31, T. 40, R. 30, also known as Dessau, now the Millie.

HIAWATHA.

SW ¼ of SE ¼ of S. 35, T. 43, R. 35. Small mine or exploration.

HILLTOP.

SW ¼ of NW ¼ of S. 22, T. 43, R. 32. Operated by Oliver Iron Mining company.

HOLLISTER.

W ½ of SW ¼ of S. 13, T. 43, R. 32. Explored intermittently. Total product, 4,098 tons. Now operated by Oliver Iron Mining company.

HOPE.

E ½ of SE ¼ of S. 27, T. 43, R. 32, formerly Wauneta and Blaney. Closed in 1893, but explored since, now operated by Oliver Iron Mining company. Total product, 17,818 tons.

ILLINOIS.

NW ¼ of S. 26, T. 40, R. 30, also known as Inter-State. Old exploration. Inter-State Mining company explored the Indiana and Forest.

INDIANA.

W ½ of NE ¼ of S. 27, T. 40, R. 30. Closed in 1886. Total product, 18,579 tons.

INTER-RANGE.

SW ¼ of NE ¼ of S. 4, T. 43, R. 31. Old exploration.

INTER-STATE.

NW ¼ of S. 26, T. 40, R. 30, also known as the Illinois. Old exploration.

IRON HILL.

SE ¼ of NE ¼ of S. 32, T. 40, R. 29. Old exploration.

IRON RANGE.

NE ¼ of NE ¼ of S. 14, T. 39, R. 29. Now in the Verona.

IRON RIVER.

NW ¼ of NW ¼ of S. 36, T. 43, R. 35. Now in the Riverton. Operated by Oliver Iron Mining company.

IRON STAR.

E ½ of SW ¼ of S. 21, T. 43, R. 32. Now the Great Western.

ISABELLA.

SW ¼ of SW ¼ of S. 36, T. 43, R. 35. Now in Oliver Iron Mining company.

JAMES.

W ½ of NE ¼ of S. 23, T. 43, R. 35. Exploration by Bird Iron company.

J. R. WOOD.

N ½ of NE ¼ and NE ¼ of NW ¼ of S. 3, T. 39, R. 30, also known as Ruth & Rachel, now the Cundy. Operated by Oliver Iron Mining company.

JUNIATA (JUNIETTE).

W ½ of SW ¼ of S. 24, T. 43, R. 32.

KEEL RIDGE.

SE ¼ of SW ¼ of S. 32, location of old mine.

S ½ of SE ¼ of S. 32, operated by Antoine Ore company. Idle since 1900.

KIMBALL.

E ½ of SE ¼ of S. 29, T. 43, R. 32. Old exploration.

LAMONT.

Lot 6 in SE ¼ of S. 20, T. 43, R. 32, also known as Monitor. Operated by Corrigan, McKinney & Co.

LEE PECK.

SW ¼ of NE ¼ of S. 26, T. 43, R. 32. Worked intermittently. Total product, 2,844 tons.

LINCOLN.

W ½ of SW ¼ of S. 21, T. 43, R. 32, formerly the Fairbanks. Now operated by Corrigan, McKinney & Co.

LORETTO.

W ½ of SW ¼ of S. 7, T. 39, R. 28. Operated by Loretto Iron company.

LOTTA.

N ½ of NW ¼ of S. 33, T. 44, R. 31. Old exploration.

LOWELL.

S ½ of SW ¼ of S. 11, T. 39, R. 29. Old exploration. Part of East Vulcan.

LUDINGTON.

S ½ of SE ¼ of S. 25, T. 40, R. 31, now in the Chapin. Operated by Oliver Iron Mining company.

LUMBERMAN'S MINING CO.

Explored at a number of different places and operated the Ludington mine and the Stevenson at Norway.

MAGGIE.

SE ¼ of NE ¼ of S. 23, T. 43, R. 32. Old exploration.

MAMMOTH.

NE ¼ of SW ¼ of S. 17, T. 43, R. 31. Old exploration.

MANGANATE.

A grade of Bristol mine ore.

MANHATTAN.

NW ¼ of SE ¼ of S. 13, T. 42, R. 33, also known as South Mastodon. Old exploration.

MANSFIELD.

Lot 8 of S. 20, and Lot 5 of S. 17, T. 43, R. 31. Operated by Oliver Iron Mining company.

MARYLAND.

NW ¼ of NE ¼ of S. 23, T. 39, R. 28. Old exploration.

MASTODON.

S ½ of NE ¼ of S. 13, T. 42, R. 33. Closed in 1895, but made shipment in 1896. Total product, 425,708 tons.

MAY.

SE ¼ of SW ¼ of S. 28, T. 43, R. 32. Old exploration.

MENOMINEE MINING CO.

Conducted explorations and operated the Chapin at one time, and the Vulcan, Cyclops, Norway, Quinnesec and Florence.

METROPOLITAN.

N ½ of NE ¼ of S. 32, T. 42, R. 28. Closed in 1886. Total product, 107,026 tons.

MICHIGAN.

NE ¼ of NW ¼ of S. 9, T. 44, R. 33. Operated by Oliver Iron Mining company. At first it was called the Gibson.

MILLER.

W ½ of SW ¼ of S. 25, T. 43, R. 35. Operated by Oliver Iron Mining company.

MILLIE.

NE ¼ of NW ¼ and NW ¼ of NE ¼ of S. 31, T. 40, R. 30, also known as Hewitt and Dessau.

MISSOURI.

W ½ of SE ¼ of S. 5, T. 41, R. 30. Old exploration.

MONITOR.

Lot 6 in SE ¼ of S. 20, T. 43, R. 32, also known as Lamont.

MONONGAHELA.

NE ¼ of NE ¼ of S. 36, T. 43, R. 33. Operated by Jones & Laughlin, Ltd.

MURPHY.

W ½ of W ½ of S. 7, T. 42, R. 34, now the Baltic. Operated by Verona Mining company.

MUTUAL.

E ½ of SE ¼ of S. 1, T. 39, R. 30. Old exploration.

NANAIMO.

NW ¼ of SW ¼ of S. 26, T. 43, R. 35. Last shipment in 1891. Total product, 127,566 tons.

NIGHTHAWK.

NW ¼ of NW ¼ of S. 18, T. 42, R. 32, also known as Great Eastern. Old exploration.

NORTH HOPE.

SE ¼ of NE ¼ of S. 27, T. 43, R. 32. Exploration.

NORTHWESTERN.

N ½ of NW ¼ of S. 32, T. 42, R. 28. Total product, 17,206 tons.

NORWAY.

N ½ of SE ¼ of S. 5, T. 39, R. 29, now in Penn Company group.

PAINT RIVER.

E ½ of SE ¼ of S. 20, T. 43, R. 32. Operated by Corrigan, McKinney & Co.

PERKINS.

SW ¼ of SW ¼ of S. 4, T. 39, R. 29, sometimes referred to as the Saginaw. Closed in 1890, but made shipment in 1895. Total product, 397,225 tons.

PEWABIC.

NW ¼ of S. 32, T. 40, R. 30. Operated by Pewabic Company.

PROTECTION.

S ½ of SW ¼ of S. 22, . 40, R. 30, also known as Cuff. Closed in 1900. Total product, 58,419 tons.

QUINCY.

W ½ of SE ¼ of S. 19, T. 43, R. 32. Old exploration.

QUINNESEC.

S ½ of SE ¼ of S. 34, T. 40, R. 30. Operated by Corrigan, McKinney & Co.

RUTH & RACHEL.

N ½ of NE ¼ and NE ¼ of NW ¼ of S. 3, T. 39, R. 30, now the Cundy. Formerly the J. R. Wood.

SCOTT.

S ½ of NE ¼ of S. 22, T. 40, R. 17, Wis. Old exploration.

SELDEN.

N ½ of SE ¼ of S. 35, T. 43, R. 35. Explored intermittently. Total product, 2,092 tons.

SHAFER.

N ½ of NW ¼ of S. 31, T. 43, R. 32, also known as Shelden and Union. Now the Columbia.

SHELDEN & SHAFER.

N ½ of NW ¼ of S. 31, T. 43, R. 32, also known as Schafter and Union. Now the Columbia.

SHERIDAN.

SE ¼ of SE ¼ of S. 26, T. 43, R. 35, worked intermittently. Total product, 116,299 tons. Idle since 1900.

SMITH-WHITE (SMITH-BUTLER).

NE ¼ of NW ¼ of S. 8, T. 39, R. 29, now in Aragon.

SOUTH MASTODON.

NW ¼ of SE ¼ of S. 13, T. 42, R. 33, also known as Manhattan. Old exploration.

STACK.

SW ¼ of NW ¼ of S. 27, T. 40, R. 17, Wis. Old exploration.

STAMBAUGH.

SE ¼ of NE ¼ of S. 35, T. 43, R. 35, now in Riverton property.

STEPHENSON.

NW ¼ of SW ¼ of S. 4, T. 39, R. 29. Closed in 1887. Total product, 39,603 tons.

ST. LOUIS.

E ½ of SE ¼ of S. 5, T. 41, R. 30. Old exploration.

STURGEON RIVER.

NE ¼ of SW ¼ of S. 7, T. 39, R. 28, now known as the Appleton. Worked and explored intermittently. Total product, 12,102 tons.

TOBIN.

SE ¼ of SW ¼ of S. 30, T. 43, R. 32. Intermittently explored.

THE VULCANS.

In Sections 10 and 11, T. 39, R. 29, now in the Penn group.

TRADERS.

S ½ of SW ¼ of S. 17, T. 40, R. 30. Now operated by the Antoine Ore company.

UNION.

N ½ of NW ¼ of S. 31, T. 43, R. 32, also known as Shelden & Shafter, and Shafer; now the Columbia.

VICTORIA.

NW ¼ of NW ¼ of S. 22, T. 43, R. 32. Recent exploration.

WAGNER.

S ½ of SE ¼ of S. 30, T. 43, R. 32. Old exploration.

WALPOLE.

NE ¼ of NE ¼ of S. 31 and SE ¼ of SE ¼ of S. 30, T. 40, R. 30, now in the Pewabic.

WAUNETA.

E ½ of SE ¼ of S. 27, T. 43, R. 32, also known as Blaney, now the Hope. Closed in 1893, but explored since. Now by Oliver Iron Mining company. Total product, 17,818 tons.

WAVERLY.

Sec. 6, T. 39, R. 29. Lands of the Beaver Iron company.

WEST LUDINGTON.

S ½ of NW ¼ of S. 25, T. 40, R. 31, being explored by Oliver Iron Mining company.

WINDFALL.

N ½ of NE ¼ of S. 24, T. 43, R. 32. Old exploration.

YOUNGSTOWN.

W ½ of SW ¼ of S. 20, T. 43, R. 32. Idle since 1891, but made two small shipments since. Total product, 151,455 tons.

LOCATIONS OF OLD MINES ON THE GOGEBIC RANGE.

ADA.

SW ¼ of S. 17, T. 47, R. 46 (Puritan, Ruby); W ½ of SE ¼ of S. 17, T. 47, R. 46 (Ironton, Lowell); E ½ of SE ¼ of S. 17, T. 47, R. 46 (Tontine, Imperial, Federal); Ada—S ½ of S. 17, T. 47, R. 46.

ALBION.

S ½ of SW ¼ of S. 24, T. 47, R. 44. Old exploration.

ALPHA.

SW ¼ of NE ¼ of S. 9, T. 47, R. 45, and SE ¼ of NW ¼ of S. 9, T. 47, R. 45, now in the Pike.

ALWARD, OR ATWOOD

NW ¼ of NE ¼ of S. 18, T. 47, R. 45, now in the Mikado.

ANCHOR.

E ½ of NE ¼ of S. 19, T. 47, R. 43. Old exploration.

ANDREWS.

SE ¼ of S. 18, T. 47, R. 43. Old exploration.

ANVIL.

NE ¼ of S. 14, T. 47, R. 46.

ARTHUR.

SE ¼ of NW ¼ and NE ¼ of SW ¼ of S. 20, T. 47, R. 3. Old exploration.

ASCHERMAN.

E ½ of SW ¼ of S. 10, T. 47, R. 45, also known as Iron Chief. Worked and explored intermittently.

ASHLAND.

S ½ of SW ¼ of S. 22 and N ½ of NW ¼ of S. 27, T. 47, R. 47.

AURORA.

E ½ of SW ¼ of S. 23, T. 47, R. 47, and N ½ of SE ¼ of S. 23, formerly known as Vaughn.

AVERY.

S ½ of S. 16, T. 47, R. 43.

BARKER.

N ½ of NW ¼ of S. 6, T. 46, R. 43, and SW ¼ of S. 31, T. 47, R. 43.

BANGS.

E ½ of SW ¼ and W ½ of SE ¼ of S. 15, T. 47, R. 46, and SW ¼ of S. 13, T. 47, R. 46. Old exploration.

BAY CITY.

E ½ of NE ¼ of S. 20, T. 47, R. 43. Old exploration.

BELMONT.

S ½ of NW ¼ of S. 17, T. 47, R. 46. Old exploration.

BENJAMIN.

S ½ of NW ¼ of S. 16, T. 47, R. 46, formerly part of the Valley, now the West Colby.

BIG PRESQUE ISLE.

W ½ of SW ¼ and NE ¼ of SW ¼ and SE ¼ of SW ¼ and S ½ of NE ¼ of S. 21, T. 47, R. 43. Old exploration.

BLUE JACKET.

SE ¼ of S. 18, T. 47, R. 46, now the Royal.

BONNIE.

NE ¼ of S. 24, T. 47, R. 4, now part of Newport.

BOWEN.

NE ¼ of S. 30, T. 47, R. 43, same as Kingston Ore company.

BROTHERTON.

Fractional N ½ of SE ¼ of S. 9, T. 47, R. 45.

CANTON.

S ½ of SE ¼ of S. 24, T. 47, R. 44. Old exploration.

CARLETON.

W ½ of NE ¼ of S. 25, T. 47, R. 44. Old exploration.

CASE.

NE ¼ of S. 13, T. 47, R. 45; N ½ of S. 21, T. 47, R. 44; SW ¼ of S. 14, T. 47, R. 44; NW ¼ of S. 23, T. 47, R. 44; NE ¼ of NE ¼ and W ½ of NE ¼ and NW ¼ of S. 13, T. 47, R. 43. Old explorations. N ½ of NE ¼ of S. 14, T. 47, R. 45; S ½ of NE ¼ of S. 17, T. 47, R. 46; S ½ of NE ¼ of S. 7, T. 47, R. 45; SE ¼ of S. 26, T. 47, R. 44. Old explorations.

CENTRAL GOGEBIC.

NE ¼ of NW ¼ and W ½ of NE ¼ of S. 18, T. 47, R. 42. Old exploration.

CHANNING EXPLORATIONS.

S ½ of NW ¼ of S. 7, T. 47, R. 45; E ½ of NW ¼ of S. 8, T. 47, R. 45; NE ¼ of S. 23, T. 47, R. 43.

CHICAGO.

W ½ of NW ¼ of S. 9, T. 47, R. 45, also known as Sparta; also E ½ of NE ¼ of S. 8, T. 47, R. 45, also known as the Smith. Explored by Oliver Iron Mining company, 1901. Also W ½ of E ½ of S. 23, T. 4, R. 43. Old exploration.

CHISHOLM.

NE ¼ of S. 14, T. 47, R. 44.

CHYNOWETH.

S ½ of NE ¼ of S. 24, T. 47, R. 43. Old exploration.

CLINTON IRON MINING SYNDICATE.

NE ¼ and SE ¼ of NW ¼ of S. 18; S ½ of NW ¼ and SE ¼ of S. 17; SW ¼ and S ½ of SE ¼ and S ½ of NE ¼ of S. 16; SW ¼ and S ½ of NW ¼ and W ½ of SE ¼ of S. 15; N ½ of S. 22, T. 47, R. 44. Old explorations.

COLBY.

NE ¼ of S. 16 and N ½ of S. 15, T. 47, R. 46; N ½ of S. 15, now Tilden.

COMET.

S ½ of SW ¼ of S. 11, T. 47, R. 45, formerly the Eclipse, now the Meteor.

COMMERCIAL.

W ½ of SE ¼ of S. 11, T. 47, R. 45. Old exploration.

COURTLAND.

E ½ of NE ¼ of S. 17, T. 47, R. 45. Old exploration.

CRESCENT.

SE ¼ of SE ¼ of S. 12, T. 47, R. 46. Old exploration.

CROWN POINT.

Fractional N ½ of SW ¼ of S. 9, T. 47, R. 45. Old exploration.

CURTON.

W ½ of SW ¼ of S. 23, T. 47, R. 43. Old exploration.

DANGLER.

W ½ of NW ¼ of S. 13, T. 47, R. 46, also known as East Anvil, now the Eureka.

DAVIS (NEW DAVIS).

NW ¼ of S. 19, T. 47, R. 46, formerly part of First National.

DELANO.

NW ¼ of NE ¼ of S. 22, T. 47, R. 43, part of Joliet.

DOE.

SW ¼ of SE ¼ of S. 8, T. 47, R. 44. Old exploration.

DIAMOND.

NW ¼ of SW ¼ of S. 30, T. 47, R. 43; SW ¼ of NW ¼ of S. 30, T. 47, R. 43; NE ¼ of SE ¼ of S. 30, T. 47, R. 43; SW ¼ of SW ¼ of S. 29, T. 47, R. 43.

DUNCAN.

S ½ of SW ¼ of S. 7, T. 47, R. 45. Old exploration.

EAST ANVIL.

W ½ of NW ¼ of S. 13, T. 47, R. 46, also known as the Eureka and Dangler. Idle since 1896.

EAST DANGLER.

W ½ of NE ¼ of S. 13, T. 47, R. 46, formerly part of Miner & Wells. Old exploration.

EAST NORRIE.

W ½ of SW ¼ of S. 23, T. 47, R. 27.

ECLIPSE.

S ½ of SW ¼ of S. 11, T. 47, R. 45, later the Comet, now the Meteor.

EMPEROR.

S ½ of NE ¼ of S. 17, T. 47, R. 44. Old exploration.

ESPARENZA.

N ½ of SW ¼ of S. 7, T. 47, R. 45. Old exploration.

EUREKA.

W ½ of NW ¼ of S. 13, T. 47, R. 46, formerly known as East Anvil and Dangler. Idle since 1896.

FEDERAL.

E. ½ of SE ¼ of S. 17, T. 47, R. 46, also known as Tontine and Imperial. Now in the Ada.

FIRST NATIONAL.

NW ¼ of S. 19, T. 47, R. 46; SW ¼ of S. 18, T. 47, R. 46; Sec. 18 became known as the Lisbon and Geneva. The First National mine was located in Sec. 19, and later was known as the Davis, and now known as New Davis.

FITZSIMMONS.

E ½ of SW ¼ and W ½ of SE ¼ of S. 12, T. 47, R. 45. Parts of Phoenix.

FITZSIMMONS.

SE ¼ of SE ¼ of S. 7, and S ½ of SW ¼ of S. 8, and N ½ of NW ¼ of S. 17, also NW ¼ of S. 16, T. 47, R. 44. Old explorations. W ½ of NW ¼ and W ½ of NE ¼ of S. 19, T. 47, R. 43.

FLORENCE.

W ½ of NE ¼ of S. 17, T. 47, R. 45. Old exploration.

FOLEY.

NW ¼ of NE ¼ of S. 15, T. 47, R. 45. Old exploration.

FOX RIVER.

E ½ of SE ¼ of S. 35, T. 47, R. 44.

FRANKFORT.

E ½ of NW ¼ of S. 24, T. 47, R. 44. Old exploration.

GALENA.

S ½ of SE ¼ of S. 14, T. 47, R. 43. Old exploration.

GENEVA.

SW ¼ of S. 18, T. 47, R. 46, formerly part of First National, also known as Lisbon. Intermittently explored.

GEORGE WASHINGTON.

W ½ of NW ¼ and NE ¼ of NW ¼ of S. 18, T. 47, R. 44. Old exploration.

GOGEBIC.

E ½ of NW ¼ of S. 13, T. 47, R. 46. Old exploration.

GOODIE.

W ½ of S. 7, T. 47, R. 45. Old exploration.

HARING.

N ½ of NW ¼ of S. 18, T. 47, R. 44. Part of Geo. Washington.

HARRINGTON.

S ½ of NE ¼ of S. 14, T. 47, R. 45, and S ½ of NW ¼ of S. 14, T. 47, R. 45.

HART & SHORES.

NE ¼ of S. 14, T. 47, R. 45, also known as the Orient.

HAYWOOD & WESCOTT.

SW ¼ of S. 7, T. 47, R. 44. Old exploration.

HAZARD.

E ½ of NE ¼ of S. 8, T. 47, R. 45, also known as Kingsman. Old exploration.

HECLA.

W ½ of SE ¼ of S. 20, T. 47, R. 42. Old exploration.

HIGBY.

S ½ of NW ¼ of S. 16, T. 47, R. 44. Part of Fitzimmons.

HINKLE.

NW ¼ of NE ¼ of S. 19, T. 47, R. 43, and NE ¼ of NE ¼ of S. 19, T. 47, R. 43. Parts of Anchor and Fitzsimmons.

HOLLAND.

N ½ of SE ¼ of S. 20, T. 47, R. 43. Old exploration.

HOLSTON.

SE ¼ of NE ¼ of S. 9, T. 47, R. 45. Old exploration.

HOLYOKE.

S ½ of SW ¼ of S. 18, T. 47, R. 42. Old exploration.

HOMESTAKE.

S ½ of S. 17, T. 47, R. 45, and W ½ of SW ¼ of S. 16, T. 47, R. 45. Old exploration.

HOUGHTON.

W ½ of NW ¼ of S. 8, T. 47, R. 45; W ½ of NE ¼ of S. 8, T. 47, R. 45, and W ½ of SE ¼ of S. 8, T. 47, R. 45, now Jumbo. Old exploration.

HOWELL.

E ½ of NW ¼ of S. 13, T. 47, R. 45. Old exploration.

HUBBELL.

W ½ of SE ¼ of S. 7, T. 47, R. 45. Old exploration.

HURON.

E ½ of SW ¼ and SE ¼ of NW ¼ of S. 23, T. 47, R. 43. Old exploration.

IMPERIAL.

E ½ of SE ¼ of S. 17, T. 47, R. 46, also known as Tontine and Federal. Now in Ada.

IRON AGE.

N ½ of SE ¼ of S. 24, T. 47, R. 44. Old exploration. Also N ½ of NE ¼ of S. 24, T. 47, R. 43. Old exploration.

IRON CHIEF.

E ½ of SW ¼ of S. 10, T. 47, R. 45, also known as Ascherman. Worked and explored intermittently.

IRONDALE.

NE ¼ of SW ¼ and NW ¼ of SE ¼ of S. 19, T. 47, R. 43. Old exploration.

IRON DUKE.

E ½ of SE ¼ of S. 25, T. 47, R. 44. Old exploration.

IRON KING.

NW ¼ of S. 24, T. 47, R. 47, also known as the Mount Hope. Now part of Newport.

IRON PRINCE.

E ½ of SE ¼ of S. 7, T. 47, R. 45. Old exploration.

IRON QUEEN.

NE ¼ of S. 26, T. 47, R. 44. Old exploration.

IRONSIDES.

E ½ of SW ¼ of S. 8, T. 47, R. 45. Old exploration.

IRONTON.

W ½ of SE ¼ of S. 17, T. 47, R. 46, also known as the Lowell. Now in the Ada.

JACKPOT.

N ½ of SW ¼ of S. 16, T. 47, R. 46, formerly part of the Valley.

JESSIEVILLE.

N ½ of SW ¼ of S. 24, T. 47, R. 47. Exploration.

JOHNSON.

NE ¼ of SW ¼ and NW ¼ of SE ¼ of S. 18, T. 47, R. 44.

JOLIET STEEL.

SE ¼ of S. 10, T. 47, R. 45, and NE ¼ of S. 22, T. 47, R. 43. Old explorations.

JUMBO.

W ½ of SE ¼ of S. 8, T. 47, R. 45, formerly part of the Houghton.

KENNEDY.

NE ¼ of S. 13, T. 47, R. 45. Part of Case.

KINGSMAN.

E ½ of NE ¼ of S. 8, T. 47 R. 45, also known as the Hazard. Old exploration.

KINGSTON.

N ½ of NE ¼ of S. 17, T. 47, R. 44; also E ½ of SE ¼ of S. 23, T. 47, R. 44. Old explorations. N ½ of SW ¼ and W ½ of NW ¼, S. 25, T. 47, R. 44; NE ¼ of S. 30, T. 47, R. 43; SE ¼ of SE ¼ of S. 21, T. 47, R. 43.

KINNIKINNIC.

NE ¼ of NE ¼ of S. 31, T. 47, R. 43, and NW ¼ of NW ¼, S. 32, T. 47, R. 43. Old explorations.

KINNIKINNIC.

E ½ of NE ¼ of S. 25, T. 47, R. 44, and W ½ of NW ¼ of S. 30, T. 47, R. 43. Old explorations.

LA BELLE.

W ½ of SE ¼ of S. 25, T. 47, R. 44. Old exploration.

LANGFORD & HART.

SE ¼ of S. 19, T. 47, R. 42, and SW ¼ of S. 19, T. 47, R. 42.

LA RUE.

W ½ of NW ¼ and NE ¼ of NW ¼ of S. 22, T. 47, R. 43. Old exploration. Also known as Yondata.

LINCOLN.

W ½ of SE ¼ of SW ¼ and SW ¼ of SW ¼ of S. 20, T. 47, R. 43. Old exploration.

LISBON.

SW ¼ of S. 18, T. 47, R. 46, formerly part of First National, now the Geneva. Intermittently explored.

LITTLE GIANT.

N ½ of NE ¼ of S. 19, T. 47, R. 46. Old exploration.

LOGAN.

SW ¼ of NW ¼ and NW ¼ of SW ¼ of S. 20, T. 47, R. 43. Old exploration.

LOWELL.

W ½ of SE ¼ of S. 17, T. 47, R. 46, also known as the Ironton. Now in the Ada.

LUTHER.

SE ¼ of S. 14, T. 47, R. 43, also the Galena.

MARINESCO.

W ½ of SW ¼ and E ½ of NW ¼, S. 19, T. 47, R. 43. Old exploration. Explored by Oliver Iron Mining company in 1901.

MASCOTT.

S ½ of NE ¼ of S. 7, T. 47, R. 45. Old exploration.

M'GRATH.

S ½ of SW ¼ of S. 24, T. 47, R. 43.

M'GRATH & LANGFORD.

SE ¼ of S. 19, T. 47, R. 42.

M'KENNA.

NE ¼ of NE ¼ of S. 26, T. 47, R. 43; NW ¼ of NW ¼ of S. 23, T. 47, R. 43; NW ¼ of NW ¼ of S. 24, T. 47, R. 43. Part of Troy. NE ¼ of NE ¼ of S. 23, T. 47, R. 43. Parts of these McKennas are known as Oshkosh.

M'KINNON.

E ½ of NW ¼ of S. 25, T. 47, R. 44. Old exploration.

M'LENNON.

S ½ of NE ¼ of S. 15, T. 47, R. 44; E ½ of SE ¼ of S. 15, T. 47, R. 44; S ½ of NW ¼ of S. 14, T. 47, R. 44. Old explorations.

MERRILL.

SW ¼ of S. 23, T. 47, R. 44. Old exploration.

MERRITT.

N ½ of NE ¼ of S. 24, T. 47, R. 43. Same as Iron Age.

METEOR.

S ½ of SW ¼ of S. 11, T. 47, R. 45, formerly the Eclipse and Comet.

MIKADO.

E ½ of NW ¼ of S. 18, T. 47, R. 45, and NW ¼ of NE ¼ of S. 18, T. 47, R. 45, formerly Alward or Atwood.

MINER.

SW ¼ of S. 14, T. 47, R. 43. Old exploration.

MINER & WELLS (WELLS & MINER).

NE ¼ of S. 13, T. 47, R. 46. Old exploration. Part became the East Dangler, and part became the United.

MONTICELLO.

N ½ of NE ¼ of S. 23, T. 47, R. 47, also known as the North Pabst. Old exploration.

NEWBERRY.

SE ¼ of S. 13, T. 47, R. 47, also known as the Powers. Old exploration.

NEWPORT.

N ½ of S. 24, T. 47, R. 47, formerly known as the Iron King or Mount Hope and the Bonnie.

NIAGARA.

E ½ of SW ¼ and SE ¼ of NW ¼ of S. 22, T. 47, R. 43. Old exploration.

NORRIE GROUP.

Norrie, S. ½ of SE ¼ of S. 22. East Norrie, W ½ of SW ¼ of S. 23, T. 47, R. 47. Aurora, E ½ of SW ¼ of S. 23 and N ½ of SE ¼ of S. 23. Pabst, S ½ of NE ¼ of S. 23.

NORTH ANVIL.

W ½ of SE ¼ of S. 11, T. 47, R. 46. Old exploration.

NORTH AURORA.

S ½ of NE ¼ of S. 23, T. 47, R. 47. Old exploration.

NORTH IRON KING.

SW ¼ of S. 13, T. 47, R. 47. Old exploration.

NORTH PABST.

N ½ of NE ¼ of S. 23, T. 47, R. 47, also known as Montecello. Old exploration.

NORWAY.

W ½ of SW ¼ of S. 8, T. 47, R. 45. Old exploration.

NUNNEMACHER.

N ½ of SW ¼ of S. 11, T. 47, R. 45.

ONTANA.

W ½ of NW ¼ of S. 27, T. 47, R. 44. Old exploration.

ONTARIO.

W ½ of NW ¼ of S. 24, T. 47, R. 44. Old exploration. W ½ of NW ¼ of S. 23, T. 47, R. 43. Old exploration.

ONTONAGON.

W third and E third of NE ¼ of S. 24, T. 47, R. 44. Old exploration.

ORIENT.

N ½ of NE ¼ of S. 14, T. 47, R. 45, also known as the Hart & Shores.

OSHKOSH.

NE ¼ of SE ¼ and SE ¼ of NE ¼ of S. 23, T. 47, R. 43. Old exploration.

OWEN.

W ½ of SE ¼ of S. 23, T. 47, R. 44. Old exploration.

PABST.

S ½ of NE ¼ and N ½ of SE ¼ of S. 23, T. 47, R. 47.

PALMER.

W ½ of NW ¼ of S. 13, T. 47, R. 45. Old exploration.

PALMS.

NW ¼ of S. 14, T. 47, R. 46.

PAULSON.

S ½ of NW ¼ of S. 23, T. 47, R. 27. Old exploration.

PHOENIX.

S ½ of SW ¼ and SW ¼ of SE ¼ of S. 12, T. 47, R. 45. Old exploration.

PIKE.

E ½ of NW ¼ of S. 9, T. 47, R. 45, formerly part of the Alpha.

PILGRIM.

E ½ of NE ¼ and SW ¼ of NE ¼ of S. 18, T. 47, R. 45. Old exploration.

PITTSBURG.

N ½ of SW ¼ of S. 11, T. 47, R. 45. Old exploration.

PRESQUE ISLE.

NE ¼ of S. 23, T. 47, R. 44. Old exploration.

POWERS.

NW ¼ of S. 22, T. 47, R. 43, also known as Yondota and LaRue.

PURITAN.

SW ¼ of S. 17, T. 47, R. 46, also known as Ruby. Now part of Ada.

RACINE.

S ½ of NE ¼ of S. 10, T. 47, R. 45. Old exploration.

RELIANCE.

N ½ of SW ¼ of S. 24, T. 47, R. 44. Old exploration.

RHINELANDER.

W ½ of NW ¼ of S. 18, T. 47, R. 45, now part of United. Old exploration.

ROBERTS.

NE ¼ of NE ¼ of S. 15, T. 47, R. 45. Old exploration.

ROYAL.

SE ¼ of S. 18, T. 47, R. 46, formerly the Blue Jacket.

RUBY.

SW ¼ of S. 17, T. 47, R. 46, also known as Puritan. Now the Ada.

SEWALL.

W ½ of SE ¼ of S. 7, T. 47, R. 44. Old exploration.

SHARP.

NE ¼ of S. 23, T. 47, R. 44, also known as Presque Isle.

SMITH.

W ½ of SW ¼ of S. 10, T. 47, R. 45, now the Sunday Lake. Fractional E ½ of SE ¼ of S. 8, T. 47, R. 45, also known as Chicago, and Smith & Picards. N ½ of NW ¼ of S. 14, T. 47, R. 45.

SPARTA.

W ½ of NW ¼ of S. 9, T. 47, R. 45, also known as Chicago. Explored by Oliver Iron Mining company in 1901.

SPEEDWALL.

W ½ of NW ¼ of S. 17, T. 47, R. 45. Old exploration.

STAFFORD.

SE ¼ of S. 17, T. 47, R. 43.

STANDARD.

E ½ of SW ¼ and W ½ of SE ¼ of S. 12, T. 47, R. 46. Old exploration.

STAR.

E ½ of NW ¼ of S. 17, T. 47, R. 45. Old exploration.

STERLING.

SE ¼ of S. 10, T. 47, R. 45. Old exploration.

SUMMIT.

N ½ of SE ¼ of S. 21, T. 47, R. 43. Old exploration.

SUNDAY LAKE.

W ½ of SW ¼ of S. 10, T. 47, R. 45.

TAYLOR.

SE ¼ of SW ¼ and fractional S ½ of SE ¼ of S. 17, T. 47, R. 42. Old exploration.

TILDEN.

N ½, of S. 15, T. 47, R. 46, formerly part of the Colby.

TOBIN.

E ½ of NW ¼ of S. 30, T. 47, R. 43. Old exploration.

TONTINE.

E ½ of SE ¼ of S. 17, T. 47, R. 46, also known as Federal and Imperial. Now in the Ada.

TROY.

N ½ of NW ¼ of S. 24, T. 47, R. 43. Old exploration.

UNITED.

E ½ of NE ¼ of S. 13, T. 47, R. 46, formerly part of Miner & Wells. W ½ of NW ¼ of S. 18, T. 47, R. 45, formerly the Rhinelander. Old exploration.

U. S. GRANT.

N ½ of SE ¼ of S. 1, T. 47, R. 44. Old exploration.

VALLEY.

S ½ of NW ¼ of S. 16, T. 47, R. 46, Benjamin, now West Colby; N ½ of SW ¼ of S. 16, T. 47, R. 46, now Jackpot; N ½ of SE ¼ of S. 16, T. 47, R. 46. Old exploration.

VAUGHN.

N ½ of SE ¼ of S. 23, T. 47, R. 47, became part of the Aurora. Now in the Norrie Group.

VERNON.

Middle third of NE ¼ of S. 24, T. 47, R. 44. Old exploration.

WAKEFIELD.

E ½ of NW ¼ of S. 30, T. 47, R. 43. Same as Tobin.

WAKEFIELD.

NE ¼ of S. 24, T. 47, R. 44, and N ½ of S. 20, T. 47, R. 44.

WEED.

SW ¼ of S. 17, T. 47, R. 45, and S ½ of S. 16, T. 47, R. 45. Old explorations.

WEST COLBY.

S ½ of NW ¼ of S. 16, T. 47, R. 46, formerly the Benjamin, part of the Valley.

WESTERN UNION.

N ½ of N ½ of S. 21 and SW ¼ of NW ¼ of S. 21, T. 47, R. 43. Old exploration.

WRIGHT.

NE ¼ and E ½ of NW ¼ and SW ¼ of NW ¼ and W ½ of SW ¼ and E ½ of SE ¼ of S. 20, T. 47, R. 42. Old exploration.

WOLFF.

SE ¼ of SW ¼ and SW ¼ of SE ¼ and E ½ of SE ¼ of S. 19, T. 47, R. 43. Old exploration.

WOODLEIGH.

N ½ of NW ¼ of S. 14, T. 47, R. 45.

YONDOTA.

W ½ of NW ¼ and NE ¼ of NW ¼ of S. 22, T. 47, R. 43, also known as LaRue. Old exploration.

COMPLETE AVERAGE CARGO ANALYSIS OF LAKE SUPERIOR IRON ORES. SEASON 1901.

GOGEBIC RANGE.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Ashland*	61.00	.045	6.85	.240	3.23	.360	.280	.012	2.30	.....
	54.29	.040	6.09	.213	2.87	.320	.249	.010	2.047	11.00
Anvil*	63.00	.048	5.80	.90	.97	.25	.17	.005	3.02	.....
	55.03	.0419	5.066	.786	.847	.218	.148	.004	2.637	12.65
Anvil Special*	52.00	.050	5.80	10.00	.97	.25	.17	.005	3.02	.....
	45.76	.044	5.10	8.80	.85	.22	.149	.004	2.657	12.00
Ardale	56.994	.0554	10.459	.200	4.60	.220	.100	.....	2.82	.....
	51.0272	.04960	9.3640	.2685	4.118	.1969	.0895	.....	2.524	10.469
Atlantic	61.88	.048	.....	.....	.....	.....	.....	.....	.....	.....
	55.289	.0428	.....	.....	.....	.....	.....	.....	.....	10.65
Aurora	62.734	.0339	4.764	.370	1.88	.289	.139	.....	2.90	.....
	55.2369	.02984	4.1946	.3257	1.655	.2465	.1144	.....	2.553	11.952
Best	56.29	.059	12.22	.93	.98	.68	.90	.007	2.90	.....
	49.23	.0516	10.687	.81	.857	.59	.787	.006	2.53	12.54
Bonnie	50.23	.038	12.57	6.01	1.69	.17	.70	.019	4.58	.....
	45.207	.034	11.31	5.409	1.52	.15	.63	.017	4.12	10.00
Brotherton*	62.50	.028	7.35	.35	1.00	.20	.04	.010	1.15	.....
	56.25	.0252	6.615	.315	.90	.180	.036	.009	1.035	10.00
Buckeye*	58.14	.084	10.50	.43	2.02	.14	.46	.025	.....	.....
	51.17	.074	9.24	.38	1.88	.12	.41	.022	.....	12.00
Cary Empire	58.46	.059	4.75	3.02	.97	.12	.14	.012	5.64	.....
	52.5555	.0530	4.2703	2.7150	.8720	.1078	.1259	.0108	5.0704	10.10
Colby Bessemer*	64.300	.029	2.720	.260	1.020	.160	.210	.006	1.900	.....
	57.857	.025	2.447	.233	.917	.143	.188	.005	1.709	10.020
Colby No. 1	56.700	.066	3.200	6.320	.880	.160	.400	.006	2.200	.....
	51.585	.060	2.911	6.204	.800	.145	.363	.005	2.001	9.020
Colby No. 2	60.600	.080	4.000	2.250	1.100	.170	.470	.008	2.150	.....
	54.661	.072	3.608	2.029	.992	.153	.423	.007	1.939	9.800
Hennepin	59.39	.049	10.10	.36	1.23	.25	.09	.015	2.79	.....
	53.42	.044	9.099	.32	1.108	.225	.081	.0136	2.47	9.91
Iron Belt*	60.50	.045	8.75	.36	1.50	.35	.39	.030	3.90	.....
	53.32	.040	7.71	.32	1.32	.31	.34	.027	3.40	11.86
Ironton	61.120	.051	6.700	.920	1.400	.360	.120	.004	2.900	.....
	54.641	.045	5.989	.822	1.251	.321	.107	.003	2.592	10.600
Jack Pot	52.90	.035	.....	.....	.....	.....	.....	.....	.....	.....
	46.05	.030	.....	.....	.....	.....	.....	.....	.....	12.95
Lawrence	62.21	.055	4.62	.30	1.34	.19	.11	.018	3.98	.....
	55.44	.049	4.12	.27	1.20	.17	.10	.016	3.55	10.87
Lyon	58.44	.048	.....	.....	.....	.....	.....	.....	.....	.....
	53.31	.0447	.....	.....	.....	.....	.....	.....	.....	8.77
Melrose*	62.00	.040	5.35	.95	1.08	.17	.13	.011	3.31	.....
	55.40	.0357	4.78	.848	.964	.15	.116	.0098	2.957	10.65
Melrose No. 2*	62.00	.070	5.15	.....	1.08	.17	.13	.011	3.31	.....
	55.40	.062	4.60	.....	.964	.15	.116	.0098	2.957	10.65
Meteor	60.100	.039	8.700	.560	.900	.620	.090	.004	2.260	.....
	53.639	.034	7.764	.499	.803	.553	.080	.003	2.017	10.750
Mikado	57.29	.151	13.80	.32	1.01	.42	.18	.011	1.55	.....
	50.3121	.1326	12.2070	.2810	.8870	.3688	.1581	.0097	1.3612	12.18
Montreal*	62.86	.045	4.47	.43	1.18	.20	.13	.012	.....	.....
	56.15	.040	3.99	.38	1.05	.18	.12	.011	.....	10.68
New Davis*	48.00	.055	11.02	10.00	.....	.....	.....	.....	.....	.....
	44.16	.051	10.14	9.20	.....	.....	.....	.....	.....	8.00
New Era*	58.00	.035	10.05	.90	1.23	.26	.14	.011	4.41	.....
	51.27	.0309	8.883	.795	1.087	.229	.12	.0097	3.897	11.61
New Era No. 2*	58.00	.075	10.05	.90	1.23	.26	.14	.011	4.41	.....
	51.27	.066	8.88	.795	1.087	.229	.12	.0097	3.897	11.61
Newport	63.23	.041	6.24	8.12	.81	.....	22	.18	.008	5.15
	47.60	.0366	5.58	7.26	.72	.....	196	.16	.007	4.60
Norrie	63.425	.0405	3.994	.400	1.90	.320	.120	.....	2.60	.....
	56.5662	.03612	3.5620	.3567	1.694	.2853	.1070	.....	2.318	10.814
Norrie Norden	63.995	.0804	2.992	.350	1.48	.240	.090	.....	3.30	.....
	57.8124	.07263	2.7029	.3161	1.337	.2168	.0813	.....	2.981	9.661
Nordale	58.268	.0362	10.052	.310	3.43	.220	.100	.....	2.66	.....
	52.2553	.03246	9.0147	.2780	3.076	.1972	.0896	.....	2.385	10.319
Ottawa*	58.10	.067	6.14	2.72	1.58	.05	.16	.005	4.74	.....
	52.00	.060	5.50	2.43	1.41	.04	.14	.004	4.24	10.50
Ottawa Mang*	54.95	.074	4.25	6.29	1.01	.15	.21	.031	6.50	.....
	49.18	.066	3.80	5.63	.91	.13	.18	.028	5.81	10.50
Puritan	57.200	.038	6.200	4.020	1.400	.420	.120	.006	2.900	.....
	50.679	.033	5.493	3.561	1.240	.372	.106	.005	2.569	11.400

*Expected analysis for the season of 1902.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Rand	63.43	.0397	2.58	1.99	1.22	.47	.35	.....	2.83	.....
	55.361	.03466	2.251	1.736	1.064	.410	.305	.....	2.470	12.72
Rowe*	57.00	.040	11.25	.90	.70	.23	.19	.02	2.75	.....
	49.59	.0348	9.787	.78	.609	.20	.165	.017	2.39	13.00
Sunday Lake*	62.50	.028	7.10	.30	.95	.25	.05	.010	1.04	.....
	56.25	.0252	6.390	.270	.856	.225	.045	.009	.936	10.00
Taylor*	58.00	.052	8.40	.220	2.52	.260	.150	.014	3.20	.....
	52.20	.0468	7.56	.207	3.168	.234	.135	.0126	2.88	10.00
Tilden	63.88	.0497	2.99	.77	1.29	.53	.37	.....	2.68	.....
	55.505	.04318	2.598	.669	1.120	.460	.321	.....	2.328	13.11
Tilden Norden	63.82	.0756	3.00	.76	1.30	.56	.44	.....	2.59	.....
	55.202	.06549	2.599	.658	1.126	.485	.381	.....	2.243	13.36
Winona	57.200	.046	8.000	2.180	.900	.210	.090	.006	2.180	.....
	51.026	.041	7.152	1.948	.804	.187	.080	.005	1.948	10.600

MARQUETTE RANGE.

Abbotsford	62.88	.030	7.41	.13	1.59	.112	.151	.....	.33	.....
	62.053	.0296	7.312	.128	1.569	.1105	.1490	.....	.325	1.315
Alford	63.70	.048	5.86	.26	1.64	.149	.169	.....	1.05	.....
	56.851	.0428	5.229	.232	1.463	.1329	.1508	.....	.937	10.751
Angeline, Hard	67.41	.011	.....	.....	.....	.....	.....	.....	.....	.....
	63.65	.010	.....	.....	.....	.....	.....	.....	.....	5.57
Angeline, Hard No. 1 B	67.18	.014	.....	.....	.....	.....	.....	.....	.....	.....
	64.49	.013	.....	.....	.....	.....	.....	.....	.....	4.00
Angeline, Hematite	65.13	.041	.....	.....	.....	.....	.....	.....	.....	.....
	57.85	.036	.....	.....	.....	.....	.....	.....	.....	11.17
Angeline, South	61.70	.079	6.85	.32	1.52	.25	.13	.022	3.07	.....
	54.94	.070	6.10	.28	1.35	.22	.12	.020	3.27	10.96
Averhart*	61.47	.020	9.97	.....	.....	.....	.....	.....	.....	.....
	59.472	.0193	9.645	.....	.....	.....	.....	.....	.....	3.25
Barrow	42.42	.040	32.46	.....	.....	.....	.....	.....	.....	.....
	38.90	.037	30.68	.....	.....	.....	.....	.....	.....	8.31
Beaufort	52.00	.257	5.07	.24	.98	3.42	2.62	.086	11.68	.....
	47.94	.237	4.68	.22	.90	3.15	2.42	.079	10.77	7.79
Bessie*	53.47	.432	12.07	.....	.....	.....	.....	.....	.....	.....
	51.732	.4179	11.677	.....	.....	.....	.....	.....	.....	2.26
Bell	40.00	.034	38.25	.21	1.28	.13	.16	.028	2.23	.....
	39.09	.033	37.38	.20	1.25	.127	.156	.027	2.238	2.25
Bedford	60.16	.140	7.80	.61	1.26	.335	.519	.....	3.28	.....
	53.301	.1240	6.910	.540	1.116	.2968	.4598	.....	2.906	11.40
Beresford	63.47	.106	4.97	.33	2.48	.298	.432	.....	.43	.....
	63.081	.1053	4.939	.129	2.464	.2961	.4293	.....	.427	.612
Beresford Lump	64.60	.107	3.51	.13	2.22	.335	.378	.....	.40	.....
	64.240	.1064	3.490	.129	2.207	.3331	.3758	.....	.397	.556
Bernhart*	58.02	.075	9.04	.....	.....	.....	.....	.....	.....	.....
	53.993	.0697	8.412	.....	.....	.....	.....	.....	.....	6.94
Bigelow	51.00	.050	22.04	.12	2.10	.26	.12	.016	2.53	.....
	46.41	.045	20.056	.109	1.91	.236	.109	.014	2.30	9.00
Buffalo	61.65	.099	5.05	.309	2.74	.94	.817	.091	1.979	.....
	54.202	.0870	4.439	.2716	2.409	.826	.7183	.0800	1.7399	12.080
Cambria*	60.41	.053	6.64	.58	2.63	.90	.32	.010	2.71	.....
	53.698	.047	5.90	.87	2.337	.80	.28	.0088	2.408	11.11
Cambridge	59.50	.668	6.03	.718	1.513	1.80	.461	.010	1.97	.....
	50.66	.568	5.13	.611	1.288	1.53	.392	.008	1.66	14.85
Cameo	58.08	.1000	7.03	.213	4.84	1.17	1.06	.109	2.511	.....
	51.316	.08915	6.211	.2765	4.276	1.033	.936	.0963	2.2185	11.645
Castleford	56.90	.087	13.80	.13	2.75	.279	.447	.....	.52	.....
	56.234	.0859	13.638	.128	2.717	.2757	.4417	.....	.513	1.170
Champion No. 1 Crushed*	64.00	.060	4.55	.20	2.38	.32	.29	.013	.....	.....
	63.49	.0595	4.51	.198	2.36	.317	.288	.0129	.....	.80
Champion B Crushed*	60.30	.058	8.96	.23	2.78	.38	.26	.018	.....	.....
	59.73	.0574	8.87	.228	2.75	.376	.258	.0178	.....	.95
Champion, Hematite	52.25	.397	9.84	.28	1.67	3.18	1.81	.053	6.35	.....
	47.76	.363	8.99	.256	1.53	2.89	1.65	.048	5.80	8.60
Chatford	46.750	.114	21.10	.31	1.35	.186	.169	.....	3.39	.....
	46.750	.1045	19.357	.284	1.238	.1706	.1550	.....	3.109	8.260
Chester No. 1	45.35	.061	28.54	.33	1.75	.89	.65	.009	1.78	.....
	41.85	.0567	26.5422	.3069	1.6275	.8277	.6045	.0083	1.6554	6.95
Chester No. 2	40.80	.020	36.16	.478	1.422	.22	.25	.006	2.12	.....
	38.72	.02805	33.809	.4469	1.3296	.2057	.2338	.0056	1.982	6.50
Cliffs Shaft, Crushed	61.90	.098	4.48	.24	2.19	1.28	.97	.021	.63	.....
	61.24	.0969	4.43	.237	2.166	1.266	.959	.0207	.623	1.06
Cliffs Shaft, Lump	63.49	.087	3.30	.25	1.88	1.23	.84	.019	.56	.....
	63.22	.0866	3.286	.248	1.872	1.224	.836	.0189	.557	.42
Comrade*	56.10	.112	12.36	.106	4.15	.561	1.98	.025	1.29	.....
	54.50	.1107	12.23	.1048	4.10	.555	1.96	.0247	1.275	1.09

*Expected analysis for the season of 1902.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Derhart*	47.01	.020	29.91	.....	.....	.....	.....	.....	.....	.....
	45.590	.0193	29.006	.....	.....	.....	.....	.....	.....	3.02
East New York	59.38	.046	9.17	.14	2.48	.39	.41	.017	1.77	.....
	52.759	.0408	8.147	.12	2.20	.346	.36	.015	1.57	11.15
Imperial*	52.44	.256	13.49	.198	1.20	1.37	1.39	.011	7.38	.....
	47.03	.229	12.10	.177	1.076	1.228	1.246	.009	6.62	10.32
Jackson, South	42.50	.082	29.60	2.82	1.65	.14	.07	.018	3.50	.....
	38.9405	.0751	27.1225	2.5840	1.5119	.1283	.0641	.0165	3.2071	8.37
Lake	51.90	.125	5.73	.490	2.82	.50	.54	.013	3.71	.....
	51.90	.1086	4.981	.425	2.451	.434	.469	.0113	3.225	13.07
Lake Bessemer	64.03	.040	5.26	.220	1.25	.260	.130	.011	1.50	.....
	56.48	.035	4.64	.203	1.10	.229	.114	.009	1.32	11.79
Lillie	60.85	.085	6.10	.24	2.10	.41	.69	.013	2.24	.....
	52.35	.074	5.288	.207	1.837	.358	.978	.0110	2.92	12.52
Michigamme	59.20	.104	11.70	.19	2.23	.84	1.01	.025	.150	.....
	58.45	.102	11.54	.187	2.20	.829	.997	.024	.148	1.26
Mitchell	60.88	.156	.....	.....	.....	.....	.....	.....	.....	.....
	53.88	.138	.....	.....	.....	.....	.....	.....	.....	11.50
Moore*	41.60	.019	37.48	.29	1.21	.69	.48	.035	.42	.....
	40.457	.0184	36.450	.282	1.176	.671	.466	.0340	.408	2.747
Negaunee*	59.60	.062	7.4	.35	2.88	.99	.608	.067	1.98	.....
	52.815	.0549	6.55	.310	2.552	.877	.5387	.0593	1.754	11.383
Norfolk, Bess. Crushed	55.55	.055	15.26	.27	3.35	.38	.21	.034	.15	.....
	54.91	.0542	15.08	.267	3.31	.376	.208	.0336	.148	1.15
Norfolk, Non-Bess. Crushed	57.17	.126	13.91	.27	3.08	.38	.21	.034	.15	.....
	56.51	.1245	13.75	.267	3.04	.376	.208	.0336	.148	1.15
Princeton No. 1	64.40	.047	2.30	.43	1.37	1.05	.93	.021	1.00	.....
	53.34	.039	1.926	.36	1.147	.879	.778	.017	1.34	16.24
Princeton, No. 2	60.27	.124	7.70	.57	1.50	.65	.518	.016	1.98	.....
	49.95	.102	6.38	.46	1.23	.538	.429	.013	1.64	17.12
Republic, Crushed*	65.50	.046	4.00	.....	.....	.....	.....	.....	.....	.....
	64.84	.0455	3.960	.....	.....	.....	.....	.....	.....	1.00
Republic Kingston	62.62	.045	7.21	.12	1.42	.42	.30	.027	.31	.....
	61.94	.0445	7.132	.118	1.404	.415	.296	.0267	.306	1.08
Republic Magnetic (N. B.)*	69.00	.....	2.50	.147	.664	.20	.216	.021	.46	.....
	68.31	.....	2.47	.145	.657	.198	.212	.0207	.455	1.00

Republic Specular	67.41	.040	2.31	Trace.	.747	.22	.15	.025	.23	.....
	66.74	.0396	2.286	Trace.	.7395	.217	.148	.0247	.227	1.00
Richmond	43.600	.034	36.200	.040	.640	.490	.110	.004	2.740	.....
	43.046	.033	35.740	.039	.631	.483	.108	.003	2.705	1.270
Rose	60.50	.150	6.41	.33	2.45	.50	.18	.029	2.16	.....
	54.45	.135	5.769	.297	2.20	.45	.16	.026	1.94	10.00
Sallsbury	60.42	.112	7.00	.29	2.31	.56	.56	.012	2.22	.....
	52.56	.097	6.089	.252	2.009	.487	.487	.0104	1.931	13.01
Scotch*	58.50	.122	10.19	.105	3.92	.586	.874	.019	.730	.....
	57.92	.1207	10.08	.104	3.88	.580	.865	.0188	.722	1.00
Sheffield	59.72	.028	.....	.....	.....	.....	.....	.....	.....	.....
	57.45	.027	.....	.....	.....	.....	.....	.....	.....	3.80
Tilden Silica	42.10	.031	38.10	.06	.83	.25	.10	.010	.27	.....
	41.35	.030	37.42	.058	.815	.24	.098	.0098	.265	1.78

MENOMINEE RANGE.

Atfield	60.58	.055	6.18	.078	2.48	.84	.62	.22	2.42	.....
	54.402	.0493	5.549	.0700	2.227	.754	.556	.197	2.173	10.197
Armenia	58.700	.226	6.950	.200	1.180	2.190	1.020	.004	3.100	.....
	52.653	.202	6.234	.179	1.058	1.964	.914	.003	2.780	10.300
Ajax	52.10	.0575	14.60	.4272	1.76	1.55	3.24	.005	2.70	.....
	48.677	.0537	13.640	.3991	1.644	1.448	3.120	.0046	2.522	6.57
Bangor*	50.00	.46	6.50	.23	1.99	.61	.90	.050	4.15	.....
	51.92	.40	5.72	.20	1.75	.536	.79	.044	3.65	12.00
Baltic	59.35	.456	3.79	.28	3.13	.39	.43	.052	5.55	.....
	53.9195	.4143	3.4432	.2262	2.8436	.3543	.3907	.0472	5.0422	9.15
Barfield	58.57	.074	8.15	.129	2.68	.924	.67	.234	3.10	.....
	52.363	.0661	7.286	.1153	2.396	.8260	.599	.2092	2.771	10.597
Barton	59.09	.416	4.71	.640	2.32	.66	.533	.035	5.50	.....
	56.460	.3974	4.500	.6115	2.216	.630	.5092	.033	5.255	4.45
Basic	56.880	.360	4.140	4.900	1.650	2.200	1.180	.006	2.900	.....
	52.557	.322	3.825	4.527	1.524	2.032	1.090	.005	2.679	7.600
Bristol	56.70	.496	5.24	.94	1.83	1.54	.50	.022	6.72	.....
	52.45	.458	4.85	.87	1.69	1.42	.46	.020	6.21	7.50
Brunswick	57.81	.520	4.86	.250	3.10	1.37	.853	.016	4.44	.....
	50.820	.4571	4.272	.2197	2.725	1.204	.7498	.0140	3.903	12.09
Chapin	59.30	.0615	6.25	.4124	1.17	1.34	2.87	.004	2.55	.....
	55.368	.0574	5.835	.3850	1.092	1.251	2.679	.0037	2.380	6.63

*Expected analysis for the season of 1902.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Clearfield	59.18	.047	6.13	.067	2.37	1.48	.69	.495	3.43	.....
	52.377	.0415	5.425	.0592	2.097	1.309	.610	.4380	3.035	11.495
Clifford	41.00	.012	39.79	.12	.81	.20	.09	.010	.68	.....
	39.85	.012	38.67	.12	.79	.19	.09	.009	.66	2.82
Crystal Falls	58.650	.772	4.270	.380	1.820	2.600	1.060	.006	2.200	.....
	53.606	.705	3.902	.347	1.663	2.376	.968	.005	2.010	8.600
Davidson*	56.06	.120	7.29	.35	3.76	1.08	2.85	.120	.....	.....
	49.89	.116	6.49	.31	3.35	.96	2.50	.106	.....	11.00
Davy*	41.50	.021	38.08	.08	.33	.60	.85	.02	.66	.....
	41.08	.0207	37.699	.079	.326	.59	.84	.019	.65	1.00
Florence	55.00	.232	6.05	.50	3.95	2.30	3.24	.11	5.23	.....
	49.87	.264	5.486	.45	3.58	2.08	3.028	.099	4.74	9.32
Granada	60.75	.0605	5.35	.153	1.39	.98	3.17	.019	2.17	.....
	56.029	.0557	4.934	.1411	1.281	.903	2.923	.0175	2.001	7.77
Gray	43.91	.038	23.88	.53	1.91	.....	.....	.062	4.70	.....
	43.466	.0376	23.638	.524	1.890	.....	.....	.0613	4.652	1.01
Groveland No. 1	52.030	.046	10.870	1.370	2.700	6.200	4.720	.008	3.200	.....
	48.700	.043	10.174	1.282	2.527	5.803	4.417	.007	3.051	6.400
Groveland No. 2*	51.100	.058	19.070	1.530	3.090	2.850	4.680	.018	6.300	.....
	47.931	.054	17.887	1.435	2.898	2.673	4.389	.016	5.909	6.200
Great Western	59.040	.327	6.800	.900	1.760	2.180	.960	.007	2.970	.....
	53.903	.298	6.208	.821	1.606	1.990	.876	.006	2.711	8.700
Hemlock	55.97	.257	6.14	.32	2.88	2.36	1.89	.012	4.50	.....
	53.3450	.2449	5.8520	.3050	2.7449	2.2493	1.8014	.0114	4.2890	4.89
Hiawatha	57.34	.184	7.08	.46	1.60	.328	.28	.017	.....	.....
	53.326	.1711	6.584	.42	1.488	.3020	.2604	.0158	.....	7.00
Hope*	59.00	.325	8.00	.....	.....	.....	.....	.....	.....	.....
	51.320	.2880	7.040	.....	.....	.....	.....	.....	.....	12.00
Keel Ridge*	40.64	.046	37.42	.20	.90	1.35	1.00	.006	.....	.....
	39.46	.045	36.33	.19	.87	1.31	.97	.006	.....	2.90
Kimball*	57.200	.660	4.300	.210	1.600	2.600	1.800	.006	3.020	.....
	52.624	.607	3.966	.193	1.472	2.392	1.656	.005	2.778	8.000
Lamont	57.600	.720	4.150	.580	1.240	2.610	1.100	.006	2.100	.....
	53.704	.658	3.797	.530	1.134	2.388	1.006	.005	1.921	8.500
Lerida	61.65	.0853	5.22	.131	1.36	.92	2.25	.015	2.08	.....
	56.810	.0786	4.810	.1207	1.253	.847	2.073	.0138	1.916	7.85
Lincoln	58.800	.340	6.900	.660	1.800	1.600	1.130	.008	2.720	.....
	54.037	.312	6.341	.606	1.654	1.470	1.084	.007	2.499	8.100
Loretto	59.00	.022	11.16	.17	1.71	.43	.70	.023	.79	.....
	53.60	.0199	10.138	.15	1.55	.39	.636	.0208	.717	9.14
Manganate	51.55	.550	6.05	3.39	2.78	2.08	1.60	.042	7.10	.....
	47.73	.509	5.60	3.06	2.57	1.93	1.48	.038	6.80	7.41
Monongahela, Non-Bess	52.33	.109	15.59	.23	3.84	.29	.50	.020	3.50	.....
	47.25	.098	14.08	.21	3.47	.26	.45	.018	3.16	9.70
Michigan No. 1*	57.50	.225	4.50	.....	.....	.....	.....	.....	.....	.....
	53.762	.2103	4.207	.....	.....	.....	.....	.....	.....	6.50
Michigan No. 2*	53.50	.325	7.50	.....	.....	.....	.....	.....	.....	.....
	48.685	.2957	6.825	.....	.....	.....	.....	.....	.....	9.00
Paint River*	57.400	.660	6.100	.400	1.900	1.900	1.410	.008	3.600	.....
	51.088	.587	5.429	.356	1.691	1.744	1.254	.007	3.204	11.000
Pewabic	54.37	.012	4.75	.13	.99	.57	1.22	.001	1.03	.....
	50.3491	.0110	4.3795	.1199	.9128	.5255	1.1248	.0009	.9497	7.80
Pewabic Genoa	43.21	.010	30.69	.10	1.62	.72	1.37	.005	1.29	.....
	40.6520	.0094	28.8732	.0941	1.5241	.6774	1.2889	.0047	1.2136	5.92
Quinnesec No. 1*	62.100	.034	4.020	.220	.600	.200	.220	.006	2.200	.....
	56.884	.032	3.798	.207	.567	.189	.207	.005	2.079	5.500
Quinnesec Non-Bess	62.200	.112	4.100	.210	.700	.200	.260	.006	2.180	.....
	59.002	.106	3.889	.199	.664	.189	.246	.005	2.067	5.140
Quinnesec (Silicious-Bess.)	44.800	.032	30.100	.120	1.090	.290	.380	.004	2.720	.....
	43.823	.031	29.443	.117	1.066	.254	.371	.003	2.660	2.180
Russell	54.40	.061	9.06	.37	2.56	2.35	3.40	.019	3.20	.....
	50.12	.056	8.90	.34	2.358	2.16	3.13	.017	2.948	7.86
San Jose	65.40	.014	3.64	.16	1.18	.24	.38	.013	.52	.....
	59.327	.0128	3.329	.146	1.079	.219	.347	.0118	.47	8.52
Tobin*	60.180	.240	6.400	.220	1.410	1.220	.980	.004	2.220	.....
	55.004	.219	5.849	.201	1.288	1.206	.895	.003	2.668	8.600
Toledo	55.01	.012	16.44	.11	1.36	.81	1.36	.004	1.31	.....
	51.0548	.0111	15.2580	.1021	1.2622	.7518	1.2622	.0037	1.2158	7.19
Tyrone	59.87	.073	7.46	.16	1.37	1.66	2.45	.002	2.66	.....
	56.6492	.06785	6.9341	.1487	1.3724	1.5430	2.2773	.0019	2.4725	7.05
Vivian*	42.00	.008	36.42	.10	1.07	.60	.99	.002	.86	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Walpole	57.61	.118	9.82	.15	2.32	.22	1.23	.002	2.05	.....
	53.9287	.1105	9.1925	.1404	2.1718	.2059	1.1514	.0028	1.9190	6.39

*Expected analysis for the season of 1902.

MESABA RANGE.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Adams	62.75	.054	3.49	.706	1.98	.148	.080	.005	4.57	.....
	56.719	.0507	3.154	.6381	.916	.1337	.0723	.0587	4.130	9.61
Adams Special	63.61	.032	3.09	.574	1.30	.119	.079	.047	3.87	.....
	57.497	.0289	2.793	.5188	1.175	.1075	.0714	.0424	3.498	9.61
Adams No. 2	59.93	.069	4.09	.662	2.29	.130	.088	.072	6.79	.....
	50.940	.0586	3.476	.5627	1.946	.1105	.0748	.0620	5.771	15.00
Admiral	62.800	.027	4.900	.200	.620	.220	.180	.008	2.140	.....
	58.823	.024	4.517	.276	.571	.212	.165	.005	1.973	7.800
Atlas	60.53	.057	5.70	1.07	1.03	.20	.10	.013	4.73	.....
	54.2228	.0511	5.1061	.9585	.9227	.1792	.0896	.0116	4.2371	10.42
Audrey	61.62	.054	4.20	.54	2.20	.38	.20	.002	4.16	.....
	53.311	.0466	3.631	.466	1.988	.328	.172	.0017	3.596	13.54
Beaver	62.85	.078	2.35	.33	1.54	.18	.12	.011	3.95	.....
	57.24	.0699	2.106	.29	1.38	.16	.107	.0098	3.54	10.35
Biwabik	63.55	.038	3.10	.45	.95	.19	.11	.009	4.13	.....
	58.64	.035	2.86	.415	.876	.175	.10	.008	3.81	7.72
Butler	62.59	.053	2.52	.50	1.02	.41	.28	.015	5.08	.....
	56.88	.048	2.29	.454	.926	.372	.254	.013	4.61	9.12
Chisholm*	64.30	.032	2.36	1.15	1.02	.18	.20	.006	.....	.....
	57.471	.0348	3.003	1.027	.911	.160	.178	.0053	.....	10.62
Clark*	62.82	.034	4.68	1.04	.96	.23	.18	.005	.....	.....
	56.148	.0303	4.182	.929	.858	.205	.160	.0044	.....	10.62
Commodore	62.100	.029	4.150	.200	1.210	.240	.060	.004	3.400	.....
	57.231	.035	3.764	.181	1.097	.217	.054	.003	3.083	9.300
Columbia	57.52	.066	8.89	.56	3.94	.13	.13	.016	4.58	.....
	49.28	.056	7.62	.48	3.37	.11	.11	.014	3.92	14.32
Corsica*	61.00	.045	.....	.....	.....	.....	.....	.....	.....	.....
	54.21	.0400	.....	.....	.....	.....	.....	.....	.....	11.10
Croxton*	60.00	.060	.....	.....	.....	.....	.....	.....	.....	.....
	54.60	.0546	.....	.....	.....	.....	.....	.....	.....	9.00
Dailey*	61.02	.038	6.11	.71	.92	.21	.18	.043	5.17	.....
	51.51	.032	5.157	.599	.776	.177	.15	.036	4.36	15.59
Duluth	59.93	.053	5.23	.883	1.62	.118	.109	.010	6.33	.....
	52.492	.0464	4.589	.7734	1.418	.1033	.0954	.0087	5.544	12.41
Elba	56.70	.039	2.84	.93	.89	.10	.17	.010	5.20	.....
	55.7891	.03526	3.4721	.8409	.8047	.0904	.1537	.0090	4.7018	9.58
Fayal	63.80	.037	2.95	.65	.75	.40	.15	.004	3.69	.....
	57.860	.0335	2.675	.589	.680	.362	.136	.0036	3.346	9.31
Franklin	60.635	.0381	.....	.....	.....	.....	.....	.....	.....	.....
	55.550	.0352	.....	.....	.....	.....	.....	.....	.....	7.457
Genoa	62.88	.032	4.62	.46	.77	.44	.22	.007	2.44	.....
	56.453	.0287	4.147	.412	.691	.395	.197	.0062	2.188	10.22
Hartley	63.45	.042	3.65	.532	1.24	.150	.028	.008	3.50	.....
	57.660	.0381	3.313	.5011	1.125	.1361	.0254	.0072	3.177	9.21
Hibbing	64.62	.023	2.84	.507	1.32	.155	.083	.007	2.56	.....
	57.899	.0295	2.544	.4542	1.182	.1388	.0743	.0062	2.230	10.40
Island	61.40	.026	3.43	.56	.91	.43	.23	.013	5.96	.....
	54.179	.0582	3.026	.494	.802	.432	.202	.0114	5.259	11.76
Jordan*	62.990	.059	4.200	.260	1.050	.280	.190	.009	2.760	.....
	57.685	.053	3.809	.235	.952	.253	.163	.005	2.503	9.200
Juniata	61.45	.054	5.35	.280	2.45	.115	.075	.011	3.65	.....
	53.305	.0468	4.640	.2428	2.107	.0997	.0650	.0095	3.166	13.254
Kanawha and Hale	63.0718	.069	8.78	.45	1.19	.95	.14	.010	2.09	.....
		.0619	7.884	.4041	1.0686	.8531	.1257	.0088	1.8768	10.20
Longyear Bessemer*	61.00	.050	.....	.....	.....	.....	.....	.....	.....	.....
	55.51	.0455	.....	.....	.....	.....	.....	.....	.....	9.00
Longyear Non-Bessemer*	60.00	.070	6.50	.49	1.21	.25	.17	.010	.....	.....
	54.60	.0637	5.915	.4459	1.0931	.2275	.1547	.0091	.....	9.00
Mahoning	64.06	.047	2.45	.39	1.46	.14	.12	.008	2.97	.....
	57.63	.042	2.19	.349	1.308	.12	.107	.007	2.66	10.40
Malta	63.52	.030	4.70	.78	.63	.12	.12	.013	2.89	.....
	58.1526	.02747	4.3029	.7141	.5768	.1099	.1099	.0119	2.6634	8.45
Minorca*	61.73	.032	.....	.....	.....	.....	.....	.....	.....	.....
			.....	.....	.....	.....	.....	.....	.....	.....
Morrow*	60.00	.060	5.50	.47	1.32	.12	.08	.027	.....	.....
	54.90	.0549	5.0325	.43	1.2078	.1098	.0732	.0247	.....	8.50
Mountain	63.78	.0415	3.95	.219	1.15	.106	.070	.014	2.35	.....
	55.833	.03632	3.457	.1917	1.707	.0927	.0612	.0122	2.057	12.450
Oliver	62.64	.0498	4.63	.232	2.18	.696	.087	.015	3.04	.....
	54.702	.04348	4.043	.2026	1.903	.0838	.0759	.0130	2.654	12.671
Pearce*	62.00	.025	3.17	1.10	1.01	.18	.20	.007	.....	.....
	56.70	.0315	2.853	.990	.909	.162	.180	.0063	.....	10.00
Penobscot	59.82	.040	7.22	.88	1.92	.20	.14	.10	3.53	.....
	53.18	.035	6.419	.78	1.71	.177	.12	.088	3.138	11.09
Pillsbury No. 1	62.07	.030	4.28	.507	1.23	.090	.171	.008	4.84	.....
	57.624	.0274	3.910	.4631	1.123	.0822	.1562	.0073	4.421	8.64

*Expected analysis for the season of 1902.

ORE	Iron	Phos.	Silica	Mang.	Alumina	Lime	Magnesia	Sulph'r	Loss by Ignition	Moist.
Pillsbury No. 2	59.04	.055	4.92	.750	1.28	.118	.215	.010	8.23	.....
	52.191	.0486	4.349	.6630	1.131	.1043	.1900	.0088	7.275	11.60
Preble	60.67	.063	6.22	.325	2.63	.116	.065	.013	3.63	.....
	52.412	.0544	5.373	.2807	2.272	.1002	.0561	.0112	3.135	13.611
Roberts	60.85	.025	7.90	.45	1.12	.25	.08	.040	2.10	.....
	48.525	.0227	7.196	.4099	1.0294	.2277	.0728	.0364	1.9131	8.90
Sauntry No. 1*	61.68	.053	5.94	.50	1.88	.21	.11	.006	.....	.....
	56.221	.0483	5.414	.455	1.713	.191	.100	.0054	.....	8.85
Sauntry No. 2*	61.64	.079	6.03	.80	2.07	.29	.11	.005	.....	.....
	50.184	.0220	5.496	.729	1.886	.264	.102	.0045	.....	8.56
Shilling	62.17	.062	2.78	.53	1.06	.22	.07	.013	6.09	.....
	55.25	.055	2.47	.47	.942	.195	.06	.011	5.41	11.13
Sparta	61.63	.025	7.75	.40	.69	.15	.26	.019	2.35	.....
	56.3298	.02285	7.0835	.3656	.6307	.1371	.2376	.0174	2.1479	8.60
Stephens*	59.00	.070	3.75	.....	.....	.....	.....	.....	.....	.....
	54.000	.0630	3.375	.....	.....	.....	.....	.....	.....	10.00
Steese	62.64	.037	2.48	1.07	1.22	.12	.05	.007	4.87	.....
	57.86	.034	2.29	.988	1.127	.11	.046	.006	4.498	7.62
Stevenson	64.890	.036	3.020	.310	.720	.360	.180	.005	2.730	.....
	58.504	.033	2.789	.284	.669	.238	.165	.004	2.494	8.36o
Thompson	63.01	.036	3.34	.607	.82	.185	.113	.027	4.66	.....
	55.600	.0317	2.947	.5356	.723	.1592	.0997	.0238	4.111	11.76
Top Brown	60.99	.066	5.20	.88	.95	.15	.24	.018	4.43	.....
	54.8738	.05939	4.6833	.7918	.8548	.1350	.2160	.0162	3.9861	10.02
Tubal	61.19	.060	4.45	.938	2.57	.168	.062	.016	4.18	.....
	52.363	.0519	3.851	.8117	2.224	.1453	.0536	.0138	3.617	13.46
Union*	60.54	.041	.....	.....	.....	.....	.....	.....	.....	.....
	55.63	.0376	.....	.....	.....	.....	.....	.....	.....	8.11
Wallace	61.850	.055	2.100	.270	.900	.180	.210	.008	2.900	.....
	58.559	.049	1.896	.334	.812	.162	.189	.007	2.618	9.700
Welsh	61.45	.055	3.35	.61	1.07	.47	.24	.016	5.79	.....
	54.432	.0487	2.927	.540	.947	.416	.212	.0141	5.128	11.42

VERMILLION RANGE.

Chandler	64.42	.040	4.21	.10	1.99	.38	.20	Trace.	.98	.....
	61.234	.0380	4.001	.095	1.891	.361	.190	Trace.	.931	4.96
Jura	61.02	.078	4.31	.156	2.67	1.16	.....	.....	4.07	.....
	56.779	.0725	4.010	.1451	2.484	1.079	.....	.....	3.787	6.95
Long Lake	60.64	.043	7.68	.14	3.26	.40	.35	Trace.	1.43	.....
	56.722	.0402	7.133	.130	3.049	.374	.327	Trace.	1.337	6.46
Pioneer	63.11	.040	5.66	.139	2.55	.074	.017	.....	1.35	.....
	59.108	.0374	5.301	.1226	2.388	.0693	.0159	.....	1.264	6.34
Pilot	67.03	.032	2.23	.069	1.04	.051	.008	.....	.49	.....
	65.555	.0312	2.180	.0674	1.017	.0498	.0078	.....	.479	2.20
Red Lake	61.45	.122	6.73	.09	2.49	.61	.64	.019	.93	.....
	59.723	.1185	6.540	.087	2.420	.592	.622	.0184	.903	2.81
Savoy	63.76	.051	3.46	.080	2.38	.248	.....	.....	2.68	.....
	59.532	.0476	3.230	.0746	2.222	.2315	.....	.....	2.502	6.63
Sibley*	64.00	.048	4.00	.....	.....	.....	.....	.....	.....	.....
	60.160	.0451	3.760	.....	.....	.....	.....	.....	.....	6.00
Soudan	65.65	.084	4.05	.06	.85	.52	.29	.022	.36	.....
	64.803	.0829	3.997	.059	.839	.513	.286	.0217	.355	1.29
Vermillion	64.88	.136	4.24	.06	1.35	.65	.41	.015	.59	.....
	64.295	.1345	4.195	.059	1.335	.643	.405	.0148	.583	1.04
Vermillion Lump	66.05	.156	2.30	.09	1.06	.64	.42	Trace.	.51	.....
	65.600	.1549	2.284	.089	1.052	.635	.417	Trace.	.506	.68
Zenith	65.95	.036	3.30	.108	1.53	.075	.....	.....	.70	.....
	60.845	.0332	3.044	.0996	1.4115	.0691	.+.....	.....	.645	7.74

MICHIPICOTEN RANGE.

Helen	58.94	.112	5.37	.13	.91	.13	.09	.063	9.99	.....
	55.39	.106	5.10	.12	.86	.12	.08	.0598	9.49	5.00

*Expected analysis for the season of 1902.

COPPER.

During the year the relations of the copper market of the Michigan copper mines apparently have been very mystifying, especially when viewed in the light of the reports of some of the companies. This department was not created to give advice to speculators, or investors, regarding market conditions, or the management of probable future condition of any mine. We will call attention to certain facts, more as a matter of record than for information.

In the years 1897 and 1898, when the market price of copper was 12½ cents per pound, or less, most of the producing mines were paying dividends, or at least, making more than expenses, including the usual charges for development and equipment. During 1898, 1899 and 1900, when the market price was quoted around 17 cents per pound, the dividends increased enormously, and in addition large expenses in new equipment was installed. During the year 1901 the quoted price of copper remained about 17 cents per pound until well along into December, and in some instances the high dividends continued; however, the reports of the companies for 1901 showed that 14 cents or less was the average price per pound received, and that the cost of production was more than 12 cents per pound.

The reports do not show to what the increased cost of production is due. The total production of copper in the district was much smaller than has been predicted; in the case of the Calumet & Hecla mine being 20,000,000 pounds less. At the new properties development work has progressed steadily, and wherever the conditions have seemed to warrant, stamp mills are being installed and permanent equipment for greater depth of mining. The new equipment installed by the old mines is such that a larger per cent of the copper is saved, and at less cost than formally. That the copper mining industry of Michigan is on a permanent and profitable basis cannot be questioned.

To the active list of mines is appendant a list of idle mines and explorations, with their locations. Though the list is not complete, it gives some idea of the great extent of territory that has received more or less attention from the explorers. The accompanying map of the copper district shows only the active properties of the year.

ADVENTURE CONSOLIDATED COPPER COMPANY

President—Charles J. Devereaux.

Vice-President—T. Henry Mason.

Secretary and Treasurer—Wm. R. Todd.

Main Business Office—45 Broadway, New York City.

This company owns entire Sec. 36, the E ½ and NW ¼ of Sec. 35, T. 51, R. 38, and another tract in Secs. 1 and 2, T. 50, R. 39, and other lands, amounting in all to about 2,000 acres. Mine post-office address, Greenland, Mich. At the present, mining operations are confined to N ½ of NW ¼ Sec. 36. Local officials—Superintendent, P. R. Roberts; clerk, S. A. Prince; mine engineer, G. P. Tucker; mine captain, Thos. Trevarrow.

During the year the mine produced 13 tons 241 pounds refined copper. From the underground developments the company feels warranted in erecting a mill to treat 1,500 tons of rock daily. The mill will be located on the fractional SE ¼ of Sec. 19, T. 55, R. 35, bordering on Lake Superior. Henry F. Keyes, mill superintendent, Redridge, Houghton county, Mich.

ARNOLD MINING COMPANY.

President—C. L. Davenport.

Secretary and Treasurer—John Brooks.

Main Business Office—50 State St., Boston, Mass.

Except for the Lands of the Ashbed Mining company, the Arnold owns all of Secs. 1, 2, 10, 11, 12. 13, 14, 15, T. 58, R. 31. Mine post-office, Copper Falls Mine, Keweenaw county, Michigan. Superintendent, Wesley Clark. The Arnold mine was closed early in the year.

BELT COPPER MINE.

The Belt Copper mine, SW ¼ of Sec. 29, and E ½ of Sec. 31, and NW ¼ of Sec. 32, and SE ¼ of Sec. 30, T. 51, R. 37, owned by R. R. Goodell, of Houghton, Michigan, was under option to Capt. W. A. Dunn, also of Houghton. However, the option was allowed to lapse.

CALUMET & HECLA MINING COMPANY.

President—Alexander Agassiz.

Vice-President—Col. T. L. Livermore.

Secretary and Treasurer—Geo. A. Flagg.

Main Business Office—12 Ashburton Place, Boston, Mass.

The mine location consists of about 2J500 acres in a compact tract in Secs. 13, 14, 15, 22, 23, T. 56, R. 33; operations at present principally carried on in Secs. 14, 23, 22. In addition, the company owns many thousand acres of timber lands in the Upper Peninsula. Mine post-office address, Calumet, Michigan. Superintendent, James MacNaughton; assistant superintendent, John Duncan; clerk, J. H. Lathrop; mine engineer, E. S. Grierson; mine captain, James Milligan. The production for the year 1901 was 33,263 tons 1,437 pounds. The stamp mill is located on Torch Lake, Sec. 6, T. 55, R. 32. Post-office address. Lake Linden, Michigan. H. W. Cake, superintendent. The company owns two reduction works, one at Lake Linden, Michigan, James

Cooper, superintendent, the other at Buffalo, N. Y., M. B. Patch, superintendent.

CHAMPION COPPER COMPANY.

President—Wm. A. Paine.

Vice-President—Arthur G. Stanwood.

Secretary and Treasurer—Frederic Stanwood.

Main Business Office—27 State St., Boston, Mass.

This company owns S ½ of Sec. 30, and W ½ of Sec. 31, and N ½ of NE ¼ of Sec. 31, T. 54, R. 34, and SE ¼ of Sec. 25, and E ½ of Sec. 36, T. 54, R. 35. Mine post-office, Painesville, Houghton county, Michigan. Superintendent, Dr. L. L. Hubbard; mine engineer, Fred W. O'Neil; mine captain, John Bivan. Underground development warrants the erection of a modern stamp mill to treat the rock to produce 1,200 tons refined copper annually. The mill is located at Redridge, Michigan, F. G. Cogin, superintendent.

MASS CONSOLIDATED MINING COMPANY.

President—Charles A. Lamb.

Vice-President—Samson D. Whittemore.

Secretary—Charles H. Bennett.

Main Business Office—16 State St., Boston, Mass.

This company owns upward of 1,000 acres in a compact block in Secs. 33, 34, T. 51, R. 38, Sec. 6, T. 50, R. 38, and in Sec. 1, T. 50, R. 39. Mine post-office address, Mass City, Michigan. Superintendent, Charles H. Krause; clerk, Wm. A. Brown; mine captain, James M. Wilcox. During the year two shafts reached a depth of 1,100 feet, and a third 150 feet. The underground drifts show a large amount of stamp rock and mass copper. The mine is equipped with the most modern and approved machinery. The stamp mill is located on the south shore of Keweenaw Bay, James M. Wilcox, superintendent. The first stamp went into commission Aug. 1, 1901, and with a few stoppages has worked with good satisfaction since that date. The mine reports 873,297 pounds refined copper for the year 1901.

ST. MARY'S CANAL MINERAL LAND COMPANY.

President—Nathaniel Thayer.

Vice-President—Charles J. Paine.

Secretary and Treasurer—Arthur G. Stanwood.

Main Business Office—199 Washington St., Boston, Mass.

The company owns many thousand acres of mineral lands on the copper range and conducted diamond drill explorations on Sec. 22, T. 53, R. 35. Nothing of value found. The company's agent is R. R. Goodell, Houghton, Michigan.

QUINCY MINING COMPANY.

President—T. Henry Mason.

Vice-President—Chas. J. Devereaux.

Secretary and Treasurer—Wm. R, Todd.

Main Business Office—45 Broadway, New York City.

This company owns about 2,000 acres of irregular outline, in Secs. 25, 26, 23, 24, 13, T. 55, R. 34. Operations are at present principally in Secs. 2 and 23. The company also owns stamp mills and docks on Torch Lake, and reduction works and docks on Sec. 25, T. 55, R. 34, on Portage Lake. Mine post-office address, Hancock, Michigan. Superintendent, J. L. Harris; clerk, H. C. Fish; mine engineer, Cyril Brackenbury; mine captain, Thomas Whittle. Production for the year 1901 was 9,169 tons 2,160 pounds. An annual production of 10,000 tons is provided for. The usual amount of underground development has been carried on. This is the first copper company to introduce electric haulage underground. The post-office address of the Quincy stamp mill is South Lake Linden, Michigan, Cornelius Bedell, superintendent. Here the Wilfley concentrating tables were introduced. Post-office address of the reduction works is Hancock, Michigan. James R. Cooper, superintendent.

RHODE ISLAND COPPER COMPANY.

President—Charles J. Devereaux.

Vice-President—T. Henry Mason.

Secretary and Treasurer—W. R. Todd.

Main Business Office—45 Broadway, New York City.

This company owns entire Sec. 5, and SW ¼ of Sec. 4, T. 55, R. 33, the present operations being confined to the SE ¼ of Sec. 5, where underground exploring is carried on. Mine post-office address, Hancock, Michigan. Superintendent, Thos. Dennis; clerk, M. M. Dennis.

THE "STANTON" GROUP OF MINES.

ATLANTIC MINING COMPANY.

President—Joseph E. Gay.

Secretary and Treasurer—John Stanton.

Main Business Office—11-13 Williams St., New York City.

The mine location consists of about 640 acres in Sees. 4 and 9, T. 54, R. 34. Mine post-office address, Atlantic Mine, Houghton county, Michigan. Agent, F. McM. Stanton; superintendent, Fred E. Denton; clerk, A. D. Edwards; mine engineer, Theodore Dengler; mine captain, William Tretheway. The company also owns Sec. 16, T. 54, R. 34, on which a small amount of exploring has been done, old mill site and dock on Portage Lake in Secs. 33 and 34, and several thousand acres of timber land, and stamp mill site and water rights on Salmon Trout River and the shore of Lake Superior. Production for the year 1901 was 2,083 tons 969 pounds. Stamp rock averaged about 6 per cent copper. The usual underground development was carried on. The old surface equipment was entirely replaced by new and modern machinery and buildings. The new stamp mill is in commission and has been in constant operation since starting. Post-office address, Redridge, Michigan; superintendent, F. E. Coggin, Jr.

BALTIC MINING COMPANY.

President—John Stanton.

Secretary and Treasurer—J. R. Stanton.

Business Office—11-13 Williams St., New York City.

The Baltic location consists of the E ½ of Sec. 20, W ½. and NE ¼ Sec. 21, T. 54, R. 34, the present mining operations being confined to the NW ¼ of Sec. 21. Mine post-office address, Atlantic Mine, Houghton county, Michigan. Agent, Frank McM. Stanton; superintendent, Fred E. Denton; clerk, A. D. Edwards; mine engineer, Theo. Dengler; mine captain, Wm. Jolly. Production for the year 1901 was 1,139 tons 472 pounds copper, the company leasing one of the Atlantic stamp heads to accomplish this. The underground development is such that the company felt warranted in erecting a modern stamp mill of four heads and equipping the mine with modern machinery. The mill is located on the shore of Lake Superior and Salmon Trout River in Sec. 20, T. 55, R. 35. Post-office address, Redridge, Michigan; superintendent, F. G. Coggin, Jr. The per cent of copper in the amygdaloid stamp rock is about 1.15 per cent.

CENTRAL MINING COMPANY.

President—Joseph. E. Gay.

Vice-President—J. Wheeler Hardley.

Secretary and Treasurer—John Stanton.

Main Business Office—11-13 Williams St., New York City.

The company owns upwards of 20,000 acres in Townships 56, 57, 58, Ranges 30 and 31. Mine post-office address, Central Mine P. O., Keweenaw county, Michigan. Clerk, John F. Robert. The agent is Frank McM. Stanton of Atlantic, Houghton county, Michigan. The mine has been closed a number of years. During this year diamond drill exploring has been conducted on Secs. 26 and 35, T. 58, R. 31. Nothing of importance has yet been shown.

MICHIGAN COPPER MINING COMPANY.

President, John Stanton.

Secretary—J. Wheeler Hardley.

Treasurer—John R. Stanton.

Main Business Office—11-13 Williams St.., New York City.

The company owns 4,500 acres in a compact tract in Secs. 10, 11, 14, 15, 22, 23, 24, 25, 26 and 27, T. 50, R. 39. The present mining operations, however, are confined to the SW ¼ of S. 15. Mine post-office, Rockland, Ontonagon county, Michigan. Superintendent, Samuel L. Brady; clerk, H. R. Stubensky; mine engineer, T. E. Vanse; mine captain, J. C. Thomas. During the year the company has been engaged in unwatering the old Minnesota mine (now a part of the Michigan), as well as opening up new territory. The developments thus far have warranted the building of a stamp mill. The company reports no production of copper in 1901. There have been no contractions in the operations during the year.

MOHAWK MINING COMPANY.

President—John Stanton.

Secretary and Treasurer—John R. Stanton.

Main Business Office—11-13 Williams St., New York City.

The company owns 800 acres of land located in Secs. 33, 34, 27, 28, T. 57, R. 32. Operations at present are confined to the W ½ of Sec. 27. Mine post-office address, Kearsarge, Houghton county, Michigan. Superintendent, Fred Smith; clerk, F. H. Getchell; mine engineer, Willard J. Smith; mine captain, Wm. Trevarrow. The development in the four shafts and six levels is such that the company feels warranted in building six or seven miles of railroad and a four-head stamp mill, the latter located near the mill of the Wolverine, Sec. 30, T. 56, R. 30, fronting on Keweenaw Bay. A portion of the mill is now in commission and the results received are satisfactory. Barney Shearer, superintendent, Kearsarge, Michigan. In addition to the native copper this mine produces a small amount of arsenical copper ore called Mohawkite. During the year 71 tons 1,850 pounds of copper were produced, all from the Mohawkite.

PHOENIX CONSOLIDATED COPPER COMPANY.

President—John R. Stanton.

Vice-President—William C. Stewart.

Secretary and Treasurer—J. Wheeler Hardley.

Main Business Office—-11-13 Williams St., New York City.

The company owns ail of Sees. 19 and 30, and the W ½ of Secs. 20 and 29, the fractional W. ½ of Sec. 17, and the fractional Sec. 18, T. 58, R. 31. The property is bounded on the north by Lake Superior. The mining operations at present are confined to N ½ of NW ¼, Sec. 30, T. 58, R. 31. Mine post-office address, Phoenix, Michigan. Agent, F. McM. Stanton, Atlantic, Michigan. The local officials are: Superintendent, Dunbar D. Scott; clerk, W. D. Childs; mine engineer, Dunbar D. Scott; mine captain, Edward Hall. This mine is being put on a modern producing basis, the necessary equipment being installed and openings made. During the year 46 tons 1,643 pounds refined copper were produced. The underground developments are deemed sufficient to warrant the building of new shops and new railroad to the mill site. The ground is being prepared for the new mill, on the NE ¼ of Sec. 30, which will be built the coming year.

WINONA COPPER COMPANY.

President—John Stanton.

Secretary—J. Wheeler Hardley.

Treasurer—John R. Stanton.

Main Business Office—11-13 Williams St., New York City.

The company owns a compact tract of about 1,200 acres located in Secs. 19, 20, 29, 30, T. 52, R. 36, besides other lands in the same town. Mine post-office address, Winona, P. O., Houghton county, Michigan. Superintendent, F. E. Denton; clerk, Wm. Van Orden. The mining operations at present are confined to the N ½ of NW ¼ of Sec. 29. Underground development show barren rock in the northern or eastern extension of the lode. In the southern or western extension a moderate amount of copper bearing rock has been shown, and at present all underground operations are confined to that portion of the mine. During the year the company made a "cross section" of the property by means of diamond drills. Nothing of promise was found. On one of the amygdaloid beds, just located, a test pit was sunk and a small amount of cross-cutting done; the showing did not warrant further work. The company reports no product.

WOLVERINE COPPER MINING COMPANY.

President—John Stanton.

Secretary and Treasurer—John R. Stanton.

Main Business Office—11-13 Williams St., New York City.

The Wolverine mine is located on the NW ¼ of Sec. 7, and W ½ of NE ¼ and NE ¼ of NE ¼, Sec. 7, T. 56, R. 32. The mine post-office address is Kearsarge, Houghton county, Michigan. Superintendent, Fred Smith; clerk, C. L. Noetzel; mine engineer, Willard J. Smith; mine captain, Wm. Pollard. The product for the year 1901 was 2,208 tons 206 pounds. The annual production at present provided for is about 2,200 tons. The stamp rock yields about 1¼ per cent copper. The underground development shows satisfactory continuation of a productive lode. During the year the stamp mill was building on Sec. 30, T. 56, R. 30, bordering on Keweenaw Bay. Barney Shearer, mill superintendent, Kearsarge P. O. The stamp mill has a capacity of 1,000 tons of rock per day.

THE "BIGELOW" GROUP OF MINES.

OSCEOLA CONSOLIDATED MINING COMPANY.

President—A. S. Bigelow.

Secretary and Treasurer—Wm. J. Ladd.

Main Business Office—199 Washington St., Boston, Mass.

This company took the Kearsarge mine and Osceola lands included in Sec. 6 and W. ½ of Sec. 5, T. 56, R. 32, the Tamarack, Jr., mine, being the E. ½ of SE ¼ and SE ¼ of NE ¼ of Sec. 11, T. 56, R. 33, and the old Osceola mine in the NW ¼ of Sec. 26, and most of Sec. 27, T. 56, R. 33. Mine post-office address, Opechee, Houghton county, Michigan. Superintendent, Wm. E. Parnall; assistant superintendent, Wm. C. Watson; clerk, Wm. Veale; mine engineer, John B. Watson; mine captains, James P. Richards, Wm. Daniell, Wm. Skews, Frank Lander. Production for the year 1901 was 6,126 tons, 1,247 pounds. The stamp rock yielded 0.8651 per cent of copper. The usual underground development was carried on. The company has also built a new modern stamp mill, located on Torch Lake, Sec. 12, T. 55. R. 33. Post-office address. South Lake Linden, Michigan. Abraham L. Burgan, superintendent.

TAMARACK MINING COMPANY.

President—A. S. Bigelow.

Secretary and Treasurer—W. J. Ladd.

Main Business Office—199 Washington St., Boston, Mass.

The Tamarack mine property comprises about 1,000 acres of irregular outline, located in Secs. 10, 11, 14 and 15, T. 56, R. 33. Mine post-office address, Calumet, Michigan. Superintendent, Wm. E. Parnall; assistant superintendent, Wm. E. Parnall, Jr.; clerk, J. T. Reeder; mine engineer, John D. Watson; mine captain, Thomas Maslin. Product for the year 1901 was 8,036 tons 212 pounds copper. A somewhat greater annual production is provided for, however. The company works a conglomerate lode yielding 1.4357 per cent copper. The underground development shows an average lode. Vertical shafts are required to reach the copper-bearing ground of this location as the vein outcrops on Calumet & Hecla lands. The stamp mills and smelters of the company are located on Sec. 13, T. 55, R. 33, bordering on Torch Lake. Post-office address, South Lake Linden, Michigan. A. L. Burgan, superintendent. In addiction to the lands mentioned the company owns many thousand acres of timber lands in the Upper Peninsula.

THE ISLE ROYALE COPPER COMPANY.

President—A. S. Bigelow.

Vice-President—Edgar Buffum.

Secretary and Treasurer—W. J. Ladd.

Main Business Office—199 Washington St., Boston, Mass.

This company owns the entire Secx. 1, 2, 10, and parts of 11, 12, 9, 15, in T. 54, R. 34, and the SW ¼ of Sec. 36, T. 55, R. 34, and the NW ¼ of Sec. 6, T. 54, R. 33. Present operations are confined to the NW ¼ of Sec. 1, and the SW ¼ of Sec. 36. The mine post-office address is Houghton, Michigan. William E. Parnall, of Calumet, is superintendent; assistant superintendent, R. M. Edwards; clerk, H. L. Haddock; mine engineer, E. F. Remer; mine captain, Edward Warmington. The company's mill is located on Portage Lake, on NW ¼ of Sec. 5, T. 54, R. 33, with James G. Glanville as superintendent. Postoffice address is Houghton, Michigan. Product of copper during the year was 970 tons from an amygdaloid vein running about .59 of 1 per cent.

THE "FAY" GROUP OF MINES.

ALLOUEZ MINING COMPANY.

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. Endicott.

Main Business Office—60 State St., Boston, Mass.

The work of this company is confined to Sec. 31 and SW ¼ of Sec. 32, T. 57, R. 32, but in addition owns some 3,000 acres in T. 57, Ranges 32 and 33. Mine post-office address, Calumet, Michigan. Superintendent, James Chynoweth; clerk, John M. Wagner; mine captain, Capt. Polglaze. The company has done the usual amount of exploring for a paying lode.

CENTENNIAL COPPER MINING COMPANY

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. EndiCott.

Main Business Office—60 State St., Boston, Mass.

The company owns the NW ¼ of NW ¼ of Sec. 18, T. 56, R. 32, and entire Sec. 12, T. 56, R. 33. Mine post-office address, Calumet, Michigan. Superintendent, James Chynoweth; clerk, John M. Wagner; mine engineer, C. W. Botsford; mine captain, John Pentecost. During the year the company produced 360 tons of copper. It has not yet begun to build a new mill, nor extensive repairs to its old mill contemplated. The new shaft promises to reach rich territory. The local management is very conservative and is not disposed to "deal in futures."

ELM RIVER COPPER COMPANY.

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. Endicott.

Main Business Office—60 State St., Boston, Mass.

The company owns Sec. 6, except the NE ¼ and the SW ¼ of NW ¼, T. 52, R. 35, and Sec. 1, except the N ½ of NW ¼; S ½ of Sec. 2; Sec. 11; NW ¼ of Sec. 12, T. 52, R. 36; the SW ¼ and W ½ of NE ¼ of Sec. 36, T. 53, R. 36. Superintendent, James Chynoweth; clerk, John M. Wagner; mine captain, Samuel Chynoweth. Mine post-office address, Calumet, Michigan. The only work has been exploring with the diamond drill in Sec. 11.

MAYFLOWER MINING COMPANY.

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. Endicott.

Main Business Office—60 State St., Boston, Mass.

The company owns all of Sec. 8, and SE ¼ and SE ¼ of NE ¼ of Sec. 7, T. 56, R. 32. Exploring has been confined to Sec. 8, test-pitting and diamond drilling. Mine post-office address, Calumet, Michigan. Superintendent, James Chynoweth; clerk, John M. Wagner.

OLD COLONY COPPER COMPANY.

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. Endicott.

Business Office—60 State St., Boston, Mass.

The company owns entire Secs. 17 and 18, except S ½ of SE ¼ of Sec. 18, T. 56, R. 32. Explorations have been carried on by means of diamond drill and shaft sinking. Mine post-office address, Calumet, Michigan. Superintendent, James Chynoweth; clerk, John M. Wagner.

TRIMOUNTAIN MINING COMPANY.

President—H. F. Fay.

Secretary—W. B. Mosman.

Treasurer—George G. Endicott.

Business Office—60 State St., Boston, Mass.

The company owns the E ½ of Sec. 19, and W ½ of Sec. 20, and N ½ of Sec. 29 and NE ¼ of Sec. 30, T. 54, R. 34. The present work is confined to the NW ¼ of Sec. 29 and NE ¼ of Sec. 30. Mine post-office address, Trimountain, Michigan. Superintendent, James Chynoweth; clerk, John M. Wagner; mine engineer, John Knox; mine captain, Thomas Rapson. From the underground developments the company felt warranted in building a mill on the shore of Lake Superior in Sections 29 and 30, T. 55, R. 35, which is now in commission. W. J. Uren, mill superintendent. Postoffice address, Beacon Hill, Michigan.

VICTORIA COPPER MINING COMPANY.

President—Thomas B. Dunstan, Hancock, Mich.

Vice-President—Calvin Austin.

Secretary and Treasurer—James P. Graves.

Main Business Office—Room 539, 53 State St., Boston, Mass.

This company owns about 2,000 acres in a compact tract in Secs. 19, 20, 29, 30, 31, T. 50, R. 39, and in Secs. 25 and 36, T. 50, R. 40. The main shaft is located in the SW ¼ of Sec. 30, T. 50, R. 39. Mine post-office address, Rockland, Michigan. Superintendent, Thomas Hooper; clerk, C. R. Everett; mine captain, George Hooper. The underground work has been confined to deepening the shaft and extending the levels, in all of which work much good stamp rock is shown, estimated to run 1½ per cent copper. However, the company does not feel warranted in building a stamp mill yet. The equipment for continuing the underground development is good and the ground is cleared for the starting of a new shaft. During the year some two thousand feet of sinking and about thirteen thousand feet of drifting and cross-cutting was accomplished. The main shaft (No. 2) being below the thirteenth level, at an approximate depth of twelve hundred feet. The work of developing the water power has commenced.

WYANDOTTE COPPER COMPANY.

President—Henry Stackpole.

Vice-President—Irving J. Sturgis.

Secretary and Treasurer—W. O. Gay.

Main Business Office—4 Liberty Square, Boston, Mass.

This company owns entire Sec. 21, S. ½ of Sec. 16, E ½ of SE ¼ of Sec. 29, and has under option Sec. 28, T. 52, R. 36. Mine post-office address, Houghton, Michigan. Superintendent, F. L. Van Orden; clerk, John L. Hicok; mine engineer, F. L. Van Orden. All underground work was stopped in July. Present operations being confined to systematic exploring, with diamond drills, located on Sec. 28. Nothing of value has yet been found.

FRANKLIN MINING COMPANY.

President—Francis H. Raymond.

Secretary and Treasurer—Daniel L. Demmon.

Main Business Office—15 Congress St., Boston, Mass.

The company owns the SW ¼ of Sec. 24, T. 55, R. 34, and also the NW ¼ of Sec. 9, and Secs. 8 and 7, T. 55, R. 33, and known as the Franklin Junior property. Mine post-office address, Calumet, Michigan. Superintendent, Joshua D. Hosking; clerk, Arna Jaehnig. During the year 2, 442 tons 1,192 pounds were produced. The company's mill is located on Portage Lake, Sec. 10, T. 54, R. 33. The Conglomerate vein the company is now working is said to yield 1¼ per cent copper.

TECUMSEH COPPER COMPANY.

President—John C. Watson.

Secretary and Treasurer—Daniel L. Demmon.

Main Business Office—15 Congress St., Boston, Mass.

The company owns the S ½ of the NE ¼ of Sec. 32; S ½ of N ½ of Sec. 33; S ½ of NW ¼ and NE ¼ of NW ¼ of Sec. 34, T. 56, R. 33. Mine post-office address, Calumet, Michigan. Superintendent, James Chynoweth. During the year the company did the usual amount of exploring to find a paying lode.

MISCELLANEOUS.

Mr. Edwin Henwood of Hancock, Mich., held an option on the old Delaware, or Conglomerate, mining property, consisting of several thousand acres in T. 58, R. 30. The Oneida Copper company was formed to take these lands, but a transfer of the property has not been made.

The Essex Copper company, Marmaduke Richardson, president, 12 John street, New York City; A. Meads, agent, Marquette, Mich., holds the old Norwich mine. The property has been idle.

The Peak Copper company, H. T. Carleton, secretary, Cleveland, Ohio, reported organized to operate lands in Sec. 32, T. 49, R. 46, we are informed by Carleton was never organized.

MILL RESULTS.

The Boston News Bureau, a copper authority, has compiled in following table some very instructive figures, showing clearly the results now being obtained at the mills of the above mentioned producing mines. It is noteworthy that five out of the twelve mines are stamping rock which yields less than twenty pounds of fine copper to the ton, or less than 1 per cent.

	Tons of Rock stamped daily	Tons Copper daily	Per Ct. Copper in Rock	Lbs. Copper in ton of Rock
Calumet & Hecla	4,800	150	3.1	62
Trimountain	600	12	2.0	40
Champion	250	4	1.6	32
Tamarack	2,300	32	1.4	28
Quincy	3,100	37	1.2	24
Wolverine	670	8	1.2	24
Baltic	750	9	1.2	24
Osceola	3,600	34	.94	19
Mass	750	7	.93	18
Isle Royale	1,400	10	.71	14
Franklin	1,300	9	.69	14
Atlantic	1,500	9	.6	12

PRODUCTION OF COPPER IN POUNDS FOR THREE YEARS.

Mine.	1899.	1900.	1901.
Calumet & Hecla	89,610,963	77,761,382	74,510,557
Tamarack	18,565,602	19,182,502	18,000,852
Quincy	14,301,182	14,116,551	19,540,720
Osceola	11,358,049	12,566,471	13,522,240
Atlantic	4,675,882	4,930,149	4,665,920
Wolverine	4,500,373	4,789,829	4,946,126
Franklin	1,230,000	3,663,710	5,470,272
Baltic	621,336	1,735,060	2,551,832
Arcadian	500,000	1,350,000	.....
Centennial	730,240	892,500	806,400
Arnold	763,911	856,000	144,696
Mass	42,800	122,239	873,600
Phoenix	.....	88,206	104,297
Adventure	.....	23,572	29,361
Isle Royale	.....	.....	2,172,800
Mohawk	.....	.....	160,897

COPPER MINES.

TOTAL PRODUCTION PRIOR TO 1880.

	Tons.	Pounds.
Adventure	577	1,663
Aetna	70	881
Albany & Boston (Peninsular)	440	36
Allouez	3,921	1,198
Amygdaloid	770	1,180
Arcadian	17	1,069
Atlantic (South Pewabic)	7,914	534
Aztec	349	217
Bay State	199	1,115
Caledonia (Old Nebraska)	188	1,588
Calumet & Hecla	110,721	41
Carp Lake	15	1,135
Central	13,497	1,436
Clark	93	1,915
Cliff	18,916	1,943
Concord	327	1,544
Copper Falls	6,750	512
Delaware	671	1,062
Douglas	84	1,502
Eagle River	24	1,667
Evergreen Bluff	669	1,555
Flint Steel River	399	238
Franklin	13,884	86
Garden City	37	1,397
Grand Portage	814	1,632
Hancock (Sumner)	1,401	1,301
Hilton (Ohio)	21	1,819
Huron	3,812	146
International (Bohemian)	216	475
Isle Royale	4,498	1,709
Island	68	1,207
Knowlton	263	973
Lake Superior	7	821
Madison (Summit)	35	557
Mass	625	1,542
Mesnard	42	97
Minnesota	17,309	1,758
Minong	215	884
National	5,302	1,185
Nonesuch	58	110
North America	976	1,803
Northwestern	199	203
Norwich	496	1,360
Ogima	469	282
Ohio Trap Rock	20	1,185
Osceola	6,314	202
Pennsylvania (Northwest)	1,517	302
Petherick	343	424
Pewabic	11,033	1,811
Phoenix	6,035	766
Quincy	24,899	543
Ridge	2,064	422
Rockland	3,105	309
Schoolcraft (Centennial)	941	529
Seneca	8	1,222
Sheldon & Columbian	673	463
Saginaw	25	1,264
Star	8	1,180
St. Clair	220	939
Superior	283	1,331
Toltec	206	1,433
Victoria (Forest)	186	1,279
Windsor	34	....
Sundry companies and tributers	881	675
Total	275,193	1,657

COPPER MINES.

ANNUAL PRODUCTION FROM 1890 TO 1901 INCLUSIVE.

	1890		1891		1892		1893		1894		1895		1896		1897		1898		1899		1900		1901	
	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.	Tons	Lbs.
Adventure	7	1,485					Became part of Adventure Consolidated in 1898.														50		13	241
Allouez	703	1,828	620	1,423	273	530																		
Arnold		Incorporated in 1897															76	320	381	1,911	428			
Arcadian		Organized in 1898																	250		675			
Atlantic	1,809	1,972	1,826	1,676	1,851	1,875	2,110	1,933	2,318	1,609	2,447	1,985	2,416	897	2,554	1,663	2,198	1,399	2,337	1,882	2,465	149	2,083	969
Baltic		Organized in 1897															21	766	310	1,336	867	1,060	1,139	472
Calumet & Hecla	29,934	106	31,793	620	28,247	1,211	30,218	1,913	30,662	626	39,568	1,399	44,640	621	41,624	54	43,213	320	44,805	963	38,880	1,382	33,263	1,437
Centennial		Organized in 1896															336		365	240	446	500	360	
Central	706	1,391	618	1,500	812	1,982	590	40	292	590	189	1,020	234	1,243	307	891	145	1,339						
Copper Falls	237	1,380	713	1,000	675		375		Absorbed by Arnold in 1898.															
Franklin	2,819	112	2,159	1,840	1,884	1,605	1,752	244	1,778	487	1,543	933	1,373	76	1,454	384	1,311	1,702	615		1,831	1,710	2,442	1,192
Huron	868	777	628	1,059	230	1,499	281	776	Became part of the Isle Royale.															
Kearsarge	799	525	863	1,390	733	1,758	813	1,030	999	710	973	163	688	1,226	Became part of Osceola Consolidated in 1897									
Mass								Became Mass Consolidated.					18	884	31	250			21	800	86	926	390	
Mohawk		Organized in 1898																			35		71	1,857
Osceola	2,647	492	3,271	1,358	3,549	656	3,357	1,870	3,459	502	3,135	372	3,125	1,304			Became Osceola Consolidated.							
Osceola Consolidated		Organized in 1897													5,600	1,102	6,341	297	5,679	49	6,500	49	6,126	1,247
Peninsula	554	660	799	1,670	486	1,217		Bought by the Franklin in 1895.																
Phoenix Consolidated		Organized in 1899																			44	206	46	1,643
Quincy	4,032	255	5,271	519	5,551	1,926	7,199	477	7,742	14	8,152	721	8,431	1,477	8,462	618	8,177	61	7,150	1,182	7,058	550	9,170	160
Tamarack	5,053	1,482	8,080	1,312	8,213	633	7,542	1,113	7,687	1,281	7,450	280	8,022	860	10,111	529	9,830	480	9,282	1,602	9,590	1,605	8,036	212
Tamarack, Jr					398	769	805	259	1,174	1,328	1,302	1,000	1,067	1,000	Became part of Osceola Consolidated in 1897									
Victoria		Organized in 1899																			20			
Wolverine					250	74	512	1,062	832	1,255	907	1,391	1,110	933	1,158	296	2,294	114	2,250	373	2,399	1,829	2,208	206
Sundry Co.'s & Tributers	98	424																						
Totals	50,272	889	56,648	1,367	53,159	1,735	55,559	717	56,947	402	65,670	1,264	71,129	521	71,303	1,787	73,945	798	73,450	388	71,378	1,966	65,351	1,636

DIVIDENDS AND ASSESSMENTS FOR COPPER MINES.

Name of Company	1901 Dividends	Total Dividends	1901 Assessm'ts	Total Assessm'ts
Arnold		$ 100,000		$ 810,000
Atlantic	$ 80,000	940,000		980,000
Adventure			$ 600,000	900,000
Allouez				1,616,000
Arcadian				1,800,000
Baltic			300,000	800,000
Calumet & Hecla	1,000,000	78,350,000		1,200,000
Centennial (old)				1,365,000
Centennial (new)				520,000
Central		1,970,000		100,000
Cliff		2,518,620		111,000
Copper Falls		100,000		1,000,000
Copper Range				1,250,000
Champion			100,000	875,000
Elm River				800,000
Franklin		1,240,000		220,000
Humboldt			20,000	148,000
Huron				240,000
Isle Royale Consolidated				2,000,000
Mass Consolidated		100,000	200,000	900,000
Michigan		1,820,000	100,000	350,000
Miners				1,000,000
Minnesota				456,000
Mohawk			250,000	1,000,000
Mayflower				500,000
Meadow				36,750
National				320,000
Old Colony				800,000
Osceola Consolidated	288,450	4,247,300		1,700,000
Pewabic				585,200
Pacific			39,980	39,980
Phoenix		20,000		837,500
Quincy	600,000	12,870,000		1,450,000
Rhode Island				500,000
Tecumseh				200,000
Trimountain				1,200,000
Tamarack	600,000	8,490,000		320,000
Victoria				800,000
Winona				800,000
Wolverine	120,000	750,000		230,000
Wyandot				700,000

LOCATIONS OF OLD MINES ON THE COPPER RANGE.

AETNA.

W ½ and S ½ of SE ¼ of S. 6, W ½ and NE ¼ of S. 7, and NW ¼ of S. 18, T. 58, R. 28.

AGATE HARBOR.

Sec. 1, and N ½ of S. 12, T. 58, R. 30, S ½ of S. 6, N ½ of S. 7, W ¼ of S. 5, NW ¼ of S. 8, NE ¼ of S. 5, T. 58, R. 29.

AHMEEK.

S ½ of S ½ and SW ¼ of S. 28, S ½ of NE ¼ and SW ¼ of S. 29, and E ½ of S. 32, T. 57, R. 32.

ALBANY & BOSTON.

Sec. 8, except SW ¼ of SW ¼, N ½ and N ½ of SE ¼ and NE ¼ of SW ¼ of S. 7, NW ¼ of S. 9, N ½ of S. 11, E ½ of NE ¼ of S. 10, all in T. 53, R. 33.

ALGOMAH.

W ½ of S. 30, T. 51, R. 37.

ALGONQUIN.

Sec. 2, T. 51, R. 37, and W ½ of S. 36, and E ½ of S. 35, T. 52, R. 37, Now in the Belt.

AMYGDALOID.

NW ¼ of S. 22, and E ½ of Secs. 16, 21, 28, 33; T. 58, R. 30, and fractional S. 34, T. 59, R. 30, on Lake Superior.

ASHBED.

Parts of Secs. 2, 10, 11, 14, 15, 23; T. 58, R. 31. A strip 240 rods wide at right angle to the strike of the formation.

ATLANTIC (OLD).

SW ¼ of S. 34, T. 51, R. 38. Now in the Mass.

ARNOLD.

All of Secs. 1, 2, 10, 11, 12, 13, 14 and 15, in T. 58, R. 31, bordering on Lake Superior, except the strip belonging to the Ashbed.

AZTEC.

W ½ of S. 31, T. 51, R. 37.

BELT.

W ½ of S. 36, E ½ of S. 35, T. 52, R. 37; entire S. 2 and SE ¼ of S. 3, T. 51, R. 37; also SW ¼ of S. 29, SE ¼ of S. 30, E ½ of S. 31 and NW ¼ of S. 32, T. 51, R. 37.

BLUFF.

NW ¼ of S. 15, T. 58, R. 29.

BOHEMIAN.

E ½ of S. 31, T. 51, R. 37. Now in Belt.

BRITISH AMERICAN.

S ½ of S. 2, and N ½ of S. 11, T. 58, R. 30, also known as Chicago.

CALEDONIA.

N ½ of S. 12, T. 50, R. 39. Part of Flint Steel.

CAMBRIAN.

SW ¼ of S. 24, T. 48, R. 49.

CARP LAKE.

S ½ of S. 14, and SE ¼ of S. 15, and N ½ of N ½ of S. 23, T. 51, R. 43.

CASCADE.

SW ¼ of S. 9, T. 49, R. 41.

CENTRAL.

Secs. 19, 30, 31; T. 58, R. 30; S. 36 and W ½ of Secs. 24 and 25 and E ½ of Secs. 23, 26, 35, and S ½ of S. 34, and SW ¼ of S. 35, T. 58, R. 31.

CHICAGO.

N ½ of S. 11 and SW ¼ of S. 2, T. 58, R. 30.

CLARK.

N ½ of NE ¼ of S. 9, and about 2,500 acres in Secs. 3, 4, 5, 8, 9; T. 58, R. 28.

CLIFF (PITTSBURG & BOSTON COPPER CO.).

SW ¼ of S. 36, T. 58, R. 32, and some 8,000 acres in T. 58, R. 32; T. 57, R. 32, and T. 57, R. 31.

CLIFTON.

SW ¼ of S. 10, and NW ¼ of S. 15, T. 49, R. 41.

CLINTON.

SE ¼ of S. 8, T. 49, R. 41.

CONGLOMERATE.

Secs. 13, 14, 15; T. 58, R. 30 (Oneida).

CONNECTICUT.

W ½ of SE ¼ of S. 16, T. 58, R. 30.

COPPER HARBOR.

S ½ of S. 10, T. 58, R. 28.

COULTER.

NE ¼ of S. 10, and NW ¼ of S. 11, T. 51, R. 37.

DACOTAH.

Fractional SW ¼ of S. 35, T. 55, R. 34.

DANA.

E ½ of S. 24, and E ½ of S. 25, T. 58, R. 31.

DERBY.

SW ¼ of S. 19, T. 49, R. 41.

DEVON.

SW ¼ of S. 25, and NW ¼ of S. 36, T. 50, R. 40.

DOUGLAS.

NE ¼ of S. 30, and NW ¼ of S. 29, T. 55, R. 33. Now in Arcadian.

DOUGLAS HOUGHTON.

N ½ of SE ¼ of S. 15, T. 51, R. 37. Now in Henwood.

DOVER.

NE ¼ of S. 3, T. 55, R. 33.

EAGLE HARBOR.

Land tract only, 7,000 acres west side T. 58, R. 30.

EMPIRE.

2,100 acres in Secs. 1, 2, 3, 10, 11, 12, 14; T. 58, R. 29, east and south of Mosquito Lake, Keweenaw county.

EUREKA.

W ½ of S. 2, T. 49, R. 41, also Merryweather.

EVERGREEN BLUFF.

Sec. 8, NE ¼ of S. 7, E ½ of S. 6, SW ¼ and S ½ of NW ¼ of S. 5, all in T. 05, R. 38.

FARM.

S ½ of S. 25, T. 51, R. 38. Now in the Toltec.

FIRE STEEL.

NW ¼ of S. 22, T. 51, R. 37.

FLINT STEEL.

Entire S. 12 and SE ¼ and E ½ of NE ¼ of S. 11, T. 50, R. 39.

FOREST.

SE ¼ of S. 25, T. 51, R. 40; NE ¼ and SW ¼ of S. 30, T. 50, R. 39. Now in Victoria.

FULTON.

Parts of Secs. 26, 27, 33, 34, 35, 22 and 23; all in T. 57, R. 32.

GLENN.

Part of S. 31, T. 50, R. 39. Now in Victoria.

GLOBE.

Secs. 1, 2, 3, 4, 5; T. 53, R. 35.

GOGEBIC.

SW ¼ of S. 26, T. 49, R. 42.

GRAND PORTAGE.

SW ¼ of S. 36, T. 55, R. 34. Now in Isle Royale.

GREAT WESTERN.

SE ¼ of S. 30, and SW ¼ of S. 29, T. 51, R. 37. Now in Belt.

HALLIWELL.

S ½ of S. 27 and S ½ of S. 28, T. 51, R. 42.

HANCOCK.

SW ¼ of S. 26, T. 55, R. 34.

HANOVER.

W ½ of S. 8, T. 58, R. 28.

HARTFORD.

Secs. 32 and 33, T. 50, R. 40.

HENWOOD.

NW ¼ of S. 15, E ½ of S. 15, and W ½ of S. 14, T. 51, R. 37.

HIGHLAND.

N ½ of S. 31, and S ½ of S. 30, T. 55, R. 33. Now in Arcadian.

HILTON.

E ½ of S. 36, T. 51, R. 38. Now in Adventure.

HUDSON.

W ½ of S. 11, T. 49, R. 41.

HUMBOLDT.

Entire S. 21 and fractional S. 16, T. 58, R. 31, bordering on Lake Superior.

HURON.

S ½ of Secs. 1 and 2, T. 54, R. 34. Now in Isle Royale.

INDIANA.

Sec. 21, S. 28, NW ¼ and W ½ of NE ¼ of S. 27, T. 51, R. 37.

INTERNATIONAL.

E ½ of S. 31, T. 51, R. 37. Now in Belt.

IRON CITY.

Secs. 14 and 11, T. 58, R. 29. Now part of Empire.

IROQUOIS.

SW ¼ of S. 7, T. 56, R. 32. Now in Osceola.

KAUKAUNA.

Secs. 9 and 10, T. 52, R. 36. Never incorporated as a company.

KEARSARGE.

Sec. 6 and W ½ of S. 5, T. 56, R. 32, and E ½ of SE ¼ of S. 1, T. 56, R. 33. Now in Osceola.

KEWEENAW.

Entire S. 13 and E ½ of S. 24, T. 58, R. 28.

KNOWLTON.

S ½ and W ¾ of NW ¼ of S. 1, and E ½ of E ½ of S. 2, T. 50, R. 39. Now in Adventure.

LAKE SUPERIOR.

W ½ and W ½ of E ½ of S. 13, and E ½ and NW ¼ of S. 14, T. 50, R. 39.

LAURIUM.

Sec. 24, T. 56, R. 33.

MADISON.

Secs. 19 and 30, and S ½ of SW ¼ of S. 18, T. 58, R. 30. Mine in W ½ of S. 19. Now in Central.

MANDAN.

W ½ of S. 17, and N ½ of S. 20, and SW ¼ of S. 8, T. 58, R. 29.

MANHATTAN.

W ½ of S. 11, T. 57, R. 32.

MEADOW.

NE ¼ of S. 20, and E fractional ½ of S. 17, T. 58, R. 31.

MEDORA.

E ½ of S. 17, and NE ¼ of S. 20, and S ½ of SE ¼ of S. 8, T. 58, R. 29.

MENDOTA.

Entire and fractional Secs. 29, 32, 33, 34, and W ½ of S. 28, and S ½ of Secs. 20, 21 and 22, and other outlying areas in T. 58, R. 29.

MERRYWEATHER.

W ½ of S. 2, T. 49, R. 41. Now Eureka.

MESNARD.

NE ¼ of S. 24, T. 55, R. 33. Now in Quincy.

METTALINE.

S ½ of NE ¼ and N ½ of SE ¼ of S. 34, T. 56, R. 33.

MILTON, OR MOLDEN.

SE ¼ and E ½ of SW ¼ of S. 31, T. 50, R. 40, and E ½ of W ½ and E ½ of S. 6, and N ½ of NE ¼ of S. 7, T. 49, R. 40.

MINERS.

Now in Isle Royale.

MINNESOTA.

Sec. 15, T. 50, R. 39. Now in Michigan.

MINONG.

Secs. 22, 26, 27, 34, 35; T. 66, R. 35. On Isle Royale.

MONTEZUMA.

Fractional E ½ of S. 35, T. 55, R. 34.

MONTREAL.

Parts of Secs. 8, 9, 17; T. 58, R. 28. Now in the Clark.

MUSCOWAUBIC.

Sec. 27, T. 51, R. 43.

NATICK.

W ½ of S. 17, T. 58, R. 31.

NATIONAL.

Sec. 16, except SE ¼ of SE ¼, and SE ¼ and N ½ of NE ¼ of S. 17, and S. 8, except W ½ of SW ¼, and S. 5, except NE ¼, T. 50, R. 39.

NATIVE COPPER.

S ½ of S. 3 and NE ¼ of S. 10, T. 58, R. 30.

NAUMKEOG.

N ½ and N ½ of SE ¼ of S. 3, T. 54, R. 34.

NEW JERSEY.

Parts of Secs. 11, 12, 13, 14; T. 58, R. 30, consisting of about 700 acres.

NEW YORK.

Parts of Secs. 3, 10 and 15; T. 57, R. 32.

NONESUCH.

S ½ of S. 1, and N ½ of S. 12, T. 50, R. 43.

NORTH CLIFF.

N ½ of S. 35 and fractional S. 26, T. 58, R. 32.

NORTHWEST.

Secs. 13, 14, 15, 24; and Secs. 10, 11, 12, 23, 25; T. 58, R. 30. Now in Pawnee.

NORTHWESTERN.

Parts of Secs. 24, 25, 26, 35, 36; T. 58, R. 31. Now in Central.

NORWICH.

E ½ of SE ¼ and SE ¼ of NE ¼ of S. 11, and W. ½ of SW ¼ and SW ¼ of NW ¼ of S. 12, T. 49, R. 41.

ONECO.

S ½ of S. 3, and N ½ of S. 10, and W ½ of SW ¼ of S. 2, T. 55, R. 33.

PACIFIC.

Entire S. 5, and N ½ of S. 3, T. 54, R. 34.

PAWNEE

Some 5,400 acres in Secs. 10, 11, 12, 13, 14, 15, 23, 24, 25, 26; T. 58, R. 30, and Secs. 30 and 31 in T. 58, R. 29.

PETHERICK.

Now Ashbed.

PEWABIC.

Now in Quincy and Franklin.

PISCATAUQUA.

E ½ of S. 31, T. 51, R. 37. Now in Belt.

PITTSBURG.

E ½ of S. 10, T. 49 R. 41.

PITTSBURG & BOSTON.

Cliff mine in SW ¼ of S. 36, T. 58, R. 32, and 8,000 more acres in the vicinity.

PITTSBURG & ISLE ROYALE.

Worked S. 12, T. 65, R. 36, Isle Royale.

PONTIAC.

SE ¼ of S. 13, T. 55, R. 33. Now in Quincy.

PORCUPINE MOUNTAIN.

E ½ and SW ¼ of S. 28, T. 51, R. 43.

RESOLUTE.

S ½ of S. 7, and S. 18, and N ½ of N ½ of S. 19, T. 58, R. 29.

RIDGE.

SW ¼ of S. 35, T. 51, R. 38. Now in Mass.

ROCKLAND.

SE ¼ of S. 10, and SW ¼ of S. 14, and NE ¼ of S. 15, T. 50, R. 39. Now part of Michigan.

SAGINAW.

Sec. 35, T. 66, R. 34, Isle Royale.

SALEM.

NW ¼ and W ½ of SW ¼ of S. 33, T. 58, R. 31.

SCHOOLCRAFT.

SE ¼ of S. 12, T. 56, R. 33. Now in Centennial.

SENECA.

E ½ of S. 20, entire S. 21, N ½ and SW ¼ of S. 22, and NW ¼ of S. 23, N ½ of N ½ of S. 28, and N ½ of NE ¼ of S. 29, T. 57, R. 32.

SHARON.

SE ¼ of S. 9, T. 49, R. 41.

SHELDON & COLUMBIAN.

Fractional SE ¼ of S. 36, T. 55, R. 34.

SILVER CREEK.

Sec. 2 and NE ¼ of S. 3, T. 58, R. 28.

SISKOWIT.

Sec. 13, T. 66, R. 34, on Isle Royale, near Rock Harbor.

SOUTH RANGE.

4,000 acres scattered in Houghton and Ontonagon counties.

SOUTH SIDE.

200 acres in E ½ of S. 34, T. 55, R. 34.

SOUTH PEWABIC.

S ½ of S. 4, T. 54, R. 34. Now in Atlantic.

STANDARD.

1,080 acres on Secs. 9, 16, 17; T. 56, R. 33.

STAR.

720 acres on Secs. 9, 10, 16; T. 58, R. 28; Star mine, E ½ of S. 9, T. 58, R. 28.

ST. CLAIR.

133 acres on S. 29, T. 58, R. 31. Now in Phoenix.

ST. LOUIS.

Entire S. 19 and W ½ of W ½ of S. 20, T. 56, R. 32.

ST. MARY'S.

N ½ of S. 18, T. 55, R. 33. Now in Arcadian.

STONINGTON.

E ½ of S. 10, T. 52, R. 36.

SUMNER.

SW ¼ of S. 26, T. 55, R. 34. Now Hancock.

SUMMIT.

Secs. 19 and 30, T. 58, R. 30. Now in Central.

SUPERIOR.

W ½ and W ½ of E ½ of S. 2, and W ½ of NE ¼ and E ½ of NW ¼ and SW ¼ of S. 11, T. 50, R. 39.

TAMARACK JUNIOR.

E ½ of SE ¼ and SE ¼ of NE ¼ of S. 11, T. 56, R. 36. Now in Osceola.

TREMONT.

SE ¼ of S. 26, and NE ¼ of S. 35, T. 50, R. 40.

TOLTEC.

S ½ and NW ¼ of S. 25, and NE ¼ of S. 26, T. 51, R. 38.

TORCH LAKE.

All of Secs. 35 and 36; T. 56, R. 33.

VULCAN.

1,520 acres in Secs. 7, 8, 17, 18; T. 58, R. 27.

WATERBURY.

E ½ of S. 17, T. 58, R. 30. Part of lands owned by Eagle Harbor company.

WENDIGO.

Secs. 11, 12, 13; T. 65, R. 36, and S. 7, T. 65, R. 35, on Isle Royale.

WEST MINNESOTA.

SE ¼ and E ½ of SW ¼ and fractional W ½ of NE ¼ of S. 18, and NE ¼ and E ½ of NW ¼ of S. 19, T. 50, R. 39.

WHEAL KATE.

SE ¼ and S ½ of NE ¼ of S. 17, T. 54, R. 34.

WHITE PINE.

S ½ of SE ¼ of S. 5, T. 50 R. 42.

WINTHROP.

Parts of Secs. 22, 23, 26, 27; T. 58, R. 31.

SALT.

The following information regarding the salt industry of the state has been taken from the annual report of the state salt inspector, issued Dec. 14, 1901, and covering the period from Dec. 31, 1900, to Dec. 31, 1901. For further detailed information regarding the industry, the reader is referred to the inspector, John M. Porter, Saginaw, Mich.:

Salt Producing Districts.

The salt producing territory of the state is divided into eight districts.

District No. 1, Saginaw county, has seventeen salt companies, with seventeen steam blocks and one thousand solar salt covers, having a manufacturing capacity of nine hundred thousand barrels of salt.

District No. 2, Bay county, has thirteen salt companies, with twelve steam blocks and one vacuum pan block, a manufacturing capacity of eight hundred thousand barrels of salt.

District No. 3, St. Clair county, has eight companies with six steam and four vacuum pan blocks, manufacturing capacity of two million barrels of salt.

District No. 4, Iosco county, has one salt company, a steam block, capacity of fifty thousand barrels of salt.

District No. 5, Midland county, has two salt companies, both steam blocks, manufacturing capacity of fifty thousand barrels of salt.

District No. 6, Manistee county, has nine salt companies, with nine steam and three vacuum pan blocks, a manufacturing capacity of three million barrels of salt.

District No. 7, Mason county, has three salt companies, with three steam and two vacuum pan blocks, manufacturing capacity of one million barrels of salt.

District No. 8, Wayne county, has twelve salt companies, with twelve steam and two vacuum pan blocks, and a manufacturing capacity of one million, seven hundred thousand barrels of salt.

RECAPITULATION.

	Medium No. 1.	Granulated No. 1.	Medium No. 1.	Granulated No. 1.	Medium No. 2.	Granulated No. 2.	Packers.	Solar.	Table.	Total.
	Bbls.	Bbls.	Bulk.	Bulk.						
District No. 1, Saginaw County	457,739		87,098		803		5	11,523		557,138
District No. 2, Bay County	150,772	126,683	67,594	9,764	5,292	8,466	3,111			371,482
District No. 3, St. Clair County	213,828	302,855	74,885	64,017	6,038	14,441	18,582		176,870	871,915
District No. 4, Iosco County	17,182									17,182
District No. 5, Midland County	26,600				64					26,664
District No. 6, Manistee County	783,870	287,095	721,048	334,672	1,128	34,088	8,193			2,670,094
District No. 7, Mason County	256,264	180,188	125,672	85,856	357	3,368			984	650,689
District No. 8, Wayne County	255,912	5,363	143,484		10,266		9,588		10,214	434,827
Total	2,142,167	902,184	1,219,449	992,909	23,948	60,363	39,490	11,523	188,068	5,580,101

TABLE SHOWING INCREASED AND DECREASED INSPECTION PER DISTRICT.

Districts.	1900	1901	Increased	Decreased	Net Increase.
District No. 1, Saginaw County	418,053	557,138	139,085		
District No. 2, Bay County	404,053	371,482		32,571	
District No. 3, St. Clair County	509,776	871,915	362,139		
District No. 4, Iosco County	28,847	17,182		11,665	
District No. 5, Midland County	34,021	26,664		7,357	
District No. 6, Manistee County	2,253,709	2,670,094	416,385		
District No. 7, Mason County	718,654	650,689		67,965	
District No. 8, Wayne County	370,912	414,927	44,015		
Total	4,738,085	5,580,101	961,574	119,558	842,016

Number of barrels of salt inspected from December 1, 1900, to December 1, 1901	5,580,101
Estimate in bins, December 1, 1901	1,048,627
Total	6,628,728
Deducted salt in bins December 1, 1900	1,235,437
Amount of salt manufactured during fiscal year, 1901	5,393,291

Comparative Table.

Salt manufactured in the state of Michigan prior to the enactment of the state inspection law in 1869:

	Barrels.
1860	4,000
1861	125,000
1862	243,000
1863	466,000
1864	529,073
1865	477,200
1866	407,997
1867	474,721
1868	555,690
Total	3,282,681

Salt manufactured in the state of Michigan since the enactment of state inspection law in 1869:

	Barrels.
1869	561,288
1870	621,352
1871	728,175
1872	724,481
1873	823,346
1874	1,026,970
1875	1,081,856
1876	1,482,729
1877	1,660,997
1878	1,855,884
1879	2,058,040
1880	2,676,588
1881	2,750,299
1882	3,037,317
1883	2,894,672
1884	3,161,806
1885	3,297,403
1886	3,667,257
1887	3,944,309
1888	3,866,228
1889	3,846,979
1890	3,838,637
1891	3,927,671
1892	3,812,054
1893	3,514,485
	Barrels.
1894	3,138,941
1895	3,529,362
1896	3,336,242
1897	3,622,764
1898	4,171,916
1899	4,732,669
1900	4,738,085
1901	5,580,101
Total	93,710,903
The total amount of salt which Michigan has produced to date	96,993,584

COAL.

In the spring of the year 1899 the legislature passed an act providing for the appointment of an inspector of coal mines, by the Commissioner of Labor. Under this act, among other things, he is empowered to collect any statistics regarding the operation of the coal mines that he may see fit. In this act a penalty is provided in case the companies or mine managers refuse to make such reports as the inspectors may demand. This act was approved May 2nd, 1899.

By comparing the law creating the coal mine inspector and defining his duties, and the law under which the Commissioner of Mineral Statistics now works, it will be readily seen there is very little left for the Commissioner of Mineral Statistics to do in the coal mining region of the state.

This department has, however, sent blanks to each of the operating coal mines or mining companies asking for their total product during the year. Such reports as have been returned to us are published herewith. Under the head "Review of Coal Mines in the State" is published a portion of the report of the Commissioner of Labor, the Hon. Scott Griswold, dated February 1st, 1902.

ALLEN & WATSON.

A co-partnership operating the Arnold mine. Manager and superintendent, Mr. V. Allen, Grand Ledge, Michigan. During the year 2,500 tons were produced.

THE BLACK DIAMOND COAL COMPANY.

The Black Diamond Coal company is the name under which Benj. Jones is operating a mine at Spring Arbor. Post-office address being Jackson, Michigan. Product for the year 1901 was 1,905 tons.

THE BAY COAL MINING COMPANY.

President—M. L. Davies.

Secretary—H. M. Gillett.

Treasurer—W. J. Cummings.

Main Business Office—Bay City, Michigan.

The company operates mines in Frankenlust township, Bay county, Michigan. Superintendent, Jos. Brown; clerk, J. E. Hawkins. During the year 44,655 tons were produced.

GRAND LEDGE COAL COMPANY

This is the name under which Fargo Boyle operates a coal mine at Grand Ledge, Michigan. Product for the year, 1,006 tons.

THE WILKINSON COAL MINE.

The Wilkinson Coal mine is operated by R. F. Wilkinson, just out of Grand Ledge, Michigan. It is estimated that 1,000 tons were mixed during the year.

THE J. C. LIKEN COAL COMPANY.

This is a co-partnership concern operating mines near Sebewaing, Michigan, this being the post-office address. W. O. Smith is manager. Product for the year 1901 was 3,800 tons.

MICHIGAN COAL & MINING COMPANY.

Vice-President—A. McDonell.

Secretary and Treasurer—F. P. Young.

Main Business Office—Bay City, Michigan.

This company operates mines near Monitor, Sam Wormendorf being superintendent. During the year the product was 37,714 tons.

NEW HOPE COAL MINING COMPANY.

President—Jas. Jenkins.

Vice-President—Mrs. A. M. Jones,

Secretary and Treasurer—D. G. Jones.

Main Business Office—Jackson, Michigan.

The company operates mines just outside of Jackson, the superintendent being Jas. Jenkins. The product for the year 1901 was 17,164 tons.

THE OWOSSO COAL COMPANY.

President—R. E. Travis.

Vice President—M. S. Travis.

Secretary—E. I. Travis.

Treasurer—R. E. Travis.

Main Business Office—Corunna, Michigan.

This company did operate the Owosso coal mine; it is now in the hands of a receiver, Carl Pickert, Corunna, Michigan. During the year 5,762 tons were produced.

PITTSBURG COAL COMPANY.

President—M. K. Salsbury.

Secretary and Treasurer—A. C. Munhall.

Main Business Office—1004 Bank for Savings Bldg., Pittsburg, Pa.

The new mine in Frankenlust township, Bay county, was operated only a short time during the year. Post-office address of the mine, Amelith, Bay county, Michigan. Superintendent, J. C. Werner; mine engineers, Lippencott and McNeil. The product for the year was 2,000 tons.

THE ROBERT GAGE COAL COMPANY.

President—Robert Gage.

Vice-President—Chas. Coryell.

Secretary—E. J. Vance.

Treasurer—E. W. Urch.

Main Business Office—Bay City, Michigan.

This company operates coal mines in St. Charles township, Saginaw county. Post-office address of the mines being St. Charles, Michigan. The superintendent is Chas. Coryell; mine engineer, Richard Honeychurch; mine boss, Elias Matthews. The product for the year 1901 was 49,000 tons.

STANDARD MINING COMPANY.

President—Robert Gage.

Vice-President—Arthur D. Eddy.

Secretary and Treasurer—Thomas B. Jones.

Main Business Office—Saginaw, Michigan.

Superintendent, Thomas B. Jones; clerk, Thomas B. Jones, Jr. The product for 1901 was 46,872 tons.

THE ST. CHARLES COAL COMPANY.

President—F. F. Winkler.

Secretary and Treasurer—J. J. Rupp.

Main Business Office—Saginaw, Michigan.

The St. Charles Coal company gave up their mining work in February and do not report any product

VALLEY COAL COMPANY.

Vice-President—Isaac Pierce.

Secretary and Treasurer and Superintendent—I. J. Hiller.

Engineer—W. H. Metcalf.

The mine has not been operated since March, the product for the year was 1,020 tons.

WENONA COAL & MINING COMPANY.

President—Frederick T. Norris.

Vice-President—Geo. D. Jackson.

Secretary—John Conway.

Treasurer and Manager—E. B. Foss.

The company operates in Bangor township, Bay county, Michigan. The mine post-office address is Bay Side. Mine superintendent, Jas. C. Gallagher; mine boss, John Morris. The product for the year was 58,879 tons.

REVIEW OF COAL MINES IN THE 5TATE.

Abandoned Mines.

Since my last annual report the following mines have been abandoned: The St. Charles Coal company's mine, located in the township of St. Charles, Saginaw county, closed down in February, 1901; the Monitor Coal Mine company's mine, located in Colfax township, Bay county, closed down in March, 1901; Pere Marquette Coal company's mine, No. 1, Saginaw, closed down in April, 1901; the Jackson Coal company's mine, located at Woodville, Jackson county, closed down in April. 1901; the Corunna Coal company's mine, located in Shiawassee county, closed down in July, 1901.

Closed for Repairs.

During the year several mines were closed temporarily for repairs and other causes. The Valley coal mine at Frankenlust, Bay county, was closed from April until October, 1901; the Pittsburg Coal company's mine, at Amelith, Bay county, closed in April, 1901, and has not yet started; the Riverside Coal company's mine at James township, Saginaw county, was closed from July to November, 1901; the Owosso Coal company's mine, in Shiawassee county, was closed during the months of September and October.

New Mines and Improvements.

Only one new mine has commenced operation since my last report, the Barnard Coal company's mine, which is located in the city of Saginaw. During the year an electric motor has been installed in the Somers mine,

No. 2, at St. Charles, which means a cheaper transportation of the coal from the mine. No new mining machinery of importance has been installed in the old mines during the year.

Bay County

BAY.

Located seven miles southwest of Bay City, in Monitor township, on the line of the M. C. R. R. It is owned and operated by the Bay Coal company. Their vein of coal is four feet thick, and is worked on the double entry system, and has a fan ventilation; visited the mine six times during the season and on each occasion found the mine in good condition. M. L. Davies, manager; J. Brown, superintendent.

CENTRAL.

Located two miles west of Bay City, in Salzburg township, on the line of the M. C. R. R., and is operated by the Central Coal company. The coal is about 34 inches in thickness and is worked by both double and single entry system. On my last visit there were seven Harrison mining machines in use. The ventilators are operated by exhaust steam. W. A. Knapp, manager; A. Watkins, superintendent.

MICHIGAN.

Located two miles west of Bay City, in Salzburg township, on the line of the M. C. R. R., and is operated by the Michigan Coal & Mining company. The vein of coal is about three feet in thickness, and is worked on the double entry system, and has a fan ventilation. I found the mine in first-class condition. F. P. Young, manager; S. Womerdoif, superintendent.

WENONA.

Located three miles north of Bay City, in Bangor township, on the lines of the Grand Trunk and the D. & M. railroads. The mine is owned and operated by the Wenona Coal company. The vein of coal is over five feet in thickness. Both pick mining and mining machinery are in use, there being eight Harrison machines in operation. The work is on the double entry system, and the mine is ventilated by fans. E. B. Foss, manager; J. Gallagher, superintendent.

HANDY'S.

Located on the Detroit & Mackinac railroad, three miles from Bay City, in the township of Bangor. The mine is owned and operated by the Handy Bros. Mining company. The coal is about four feet in thickness and is worked both on the double and single systems, with fan ventilation. C. W. Handy, manager; D. Jones, superintendent.

WOLVERINE.

Located on the line of the M. C. railroad, seven miles west of Bay City, in Monitor township. The mine is owned and operated by the Handy Bros. Mining company. The coal in this mine runs from three to five feet in thickness, is worked on both double and single entry systems, and is ventilated by means of steam exhaust. C. W. Handy, manager; D. Jones, superintendent.

VALLEY.

Located on the line of the M. C. railroad, four miles south of Bay City, in Frankenlust township. The mine is owned and operated by the Valley Coal company. The vein of coal is about 34 inches in thickness, and is worked on the double entry system. The ventilation is by steam exhaust. J. H. Metcalf, manager; A. Stephenson, superintendent.

PITTSBURG.

Located on the line of the M. C. railroad, about eight miles south of Bay City, in Frankenlust township. The mine is owned and operated by the Pittsburg Coal company. Has been closed since last April. A. C. Munhall, manager; C. Werner, superintendent.

Saginaw County.

RIVERSIDE.

Located on a branch line of the Pere Marquette railroad, three miles from Saginaw, in the township of Jamestown. The mine is owned and operated by the Riverside Coal company. During the season the mine was closed several months for repairs, and is now one of the most modern and best equipped mines in the state. It is worked on the double entry system and has fan ventilation. P. Herrig, manager; J. McGarvey, superintendent.

VERNE.

This is now called the Stephenson mine, and is located on the line of the Grand Trunk railway, about twelve miles south of Saginaw, at Carbon post-office. It was formerly owned by the Verne Coal company, but is now operated with a few men by Geo. Stephenson. It will probably be abandoned in the near future.

SOMER'S NO. ONE.

Located, on the M. C. railroad, near the village of St. Charles, about sixteen miles south of Saginaw. It is owned and operated by the J. H. Somer's Coal company. It has both cannel and bituminous coal; is one of the most orderly and best conducted mines in the state. It has a good two-fan ventilation, and is worked on the double entry system. Over 200 men are employed. F. G. Benham, manager; J. J. Phillips, superintendent.

SOMER'S NO. TWO.

Located south of the village of St. Charles, on the line of the M. C. railroad, 18 miles south of Saginaw. It is owned and operated by the J. H. Somer's Coal company. It is worked on the double entry system and is

ventilated by a fan. F. G. Benham, manager; J. J. Phillips, superintendent.

BLACK PEARL.

Located one-half mile from the village of St. Charles, Saginaw county, on the line of the M. C. railroad. It is owned and operated by the Michigan Coal company, headquarters in Cleveland, Ohio. It is worked on the double entry system, with fan ventilation, and has a splendid vein of coal. C. B. Oliver, manager; Thos. Edward, superintendent.

ROBERT GAGE.

Located three miles southeast of St. Charles, Saginaw county, on the line of the M. C. railroad. It is owned and operated by the Robert Gage Coal company. Is worked on the double entry system, and is one of the best ventilated mines in the state, by means of a fan. C. Coryell, manager; E. Mathews, superintendent.

SAGINAW.

Located one-half mile south of the city of Saginaw, on the lines of the Pere Marquette and the Grand Trunk railroads. It is owned and operated by the Saginaw Coal company. Is the oldest mine worked in the Saginaw valley, and is one of the best conducted and best ventilated mines in the state. Is worked on the double entry system, with fan ventilation. Robt. M. Randall, manager; J. Snowball, superintendent.

PERE MARQUETTE NO. 2.

Located within the city of Saginaw, on Pere Marquette railroad. Is owned and operated by the Pere Marquette Coal company. It is the largest mine in the state, its output being about 600 tons daily, is worked on the double entry system, with fan ventilation. Robt. M. Randall, manager; J. M. Millen, superintendent.

CHAPPELL-FORDNEY.

Located on the line of the Pere Marquette railroad in the city of Saginaw. Is owned and operated by the Chappell-Fordney Coal company. It is worked on the double entry system, with fan ventilation. Robt. M. Randall, manager; R. Stanton, superintendent.

BARNARD.

Located on the line of the Pere Marquette railroad, in the city of Saginaw. Is owned and operated by the Barnard Coal company. This is a new mine, but just commencing operation, and will in the near future develop into one of the largest mines in the state. It is worked on the double entry system, with fan ventilation. Robt. M. Randall, manager; J. Weaver, superintendent.

UNCLE HENRY.

Located on the line of the Pere Marquette railroad, in Blumfield township, Saginaw county. Is owned and operated by the Uncle Henry Coal company. It is worked on the double entry system, with fan ventilation. Robt. M. Randall, manager; C. Leedsburg, superintendent.

STANDARD.

Located on the line of the Grand Trunk railroad, two miles south of the city of Saginaw. Is owned and operated by the Standard Mining company. It is worked on the double entry system, with fan ventilation. T. B. Jones, manager; W. Jones, superintendent.

POKAGON.

Located on branch line of the Pere Marquette, in James township, Saginaw county, seven miles south of the city. Is owned and operated by the Northern Coal & Transportation company. It is now operating eight Harrison mining machines, a compressed air plant having been installed. The mine is worked on the double entry system and has the fan ventilation. F. R. Judd, manager; Thos. Westwood, superintendent.

Huron County.

SEBEWAING.

Located on the line of the Pere Marquette railroad at the village of Sebewaing. The mine was recently purchased by the J. C. Liken Coal company, and is operated by them. A new shaft was sunk during the season, and a new tipple built. The mine is worked on the double entry system and is ventilated by steam exhaust. W. O. Smith, manager.

Jackson County.

NEW HOPE.

Located three miles northwest of the city of Jackson. The vein of coal is about three feet in thickness. It is owned and operated by the New Hope Coal company. The mine supplies the local trade. George Jenkins is the general manager and superintendent.

Shiawassee County.

COAL CREEK.

Located about one and one-half miles northeast of the city of Corunna. Is owned and operated by R. Tanks & Co., on the co-operative plan. The vein of coal is about three feet in thickness. The product is all sold to the local market. It is expected that this mine will develop into larger proportions.

CORUNNA COAL.

Located on the line of the Grand Trunk railroad, three miles east of the city of Corunna. It is owned and was operated by the Corunna Coal company. The vein of coal is 34 inches in thickness. On account of a disagreement with employes the working of the mine was abandoned in July. Tod Kincaid, Owosso, manager.

OWOSSO.

Located near Corunna, five miles east of Owosso, on the line of the Grand Trunk railroad. Is owned and operated

by the Owosso Coal company. The vein of coal is about 34 inches thick. The management was long in charge of R. E. Travis, Owosso, but is now in the hands of a receiver.

Eaton County.

The mines in this county are known as "drift" mines and are located on the Grand river, near the city of Grand Ledge. The vein of coal averages about 18 inches in thickness, the mines, with one exception, being drifted in from the river bluff. Miners generally work by the ton, receiving an average of $1.20 per ton. There are five mines managed as follows:

Grand Ledge mine, Fargo Boyle, manager, 12 employes.

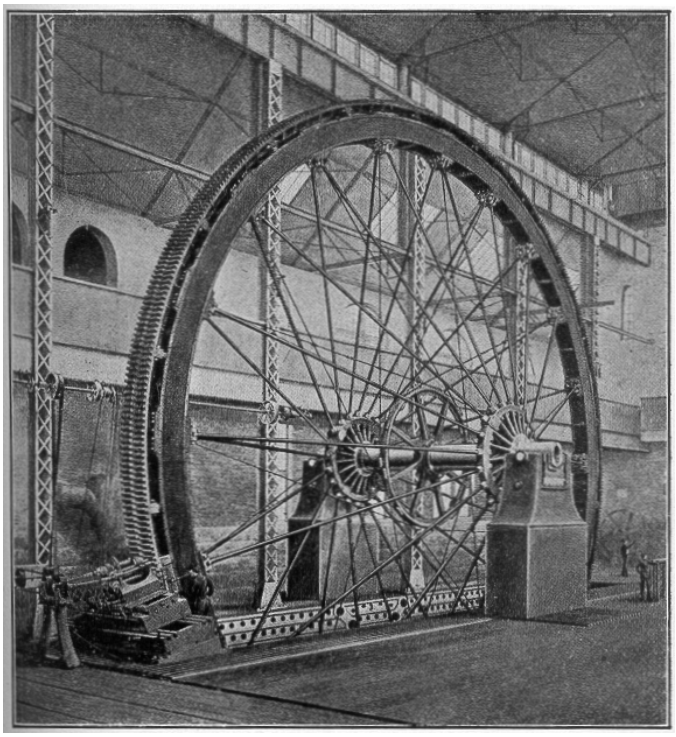
Wilkinson mine, R. F. Wilkinson, manager, 12 employes.

Eagle coal mine, R. H. Pratt, manager, 5 employes.

Arnold coal mine, V. Allen, manager, 5 employes.

Cogswell coal mine, C. Cogswell, manager, 3 employes.

The annual output of these five mines will aggregate over 6,000 tons and goes to supply the local demand.



SAND WHEEL AT CALUMET & HECLA.
(Nearing completion.)

CEMENT.

During the past three years the manufacture of Portland cement in Michigan has become an industry of great importance, several millions of dollars being invested in mills. The combined capacity of those operated during the year being about 3,000,000 barrels per annum. The capacity of the plants in the course of erection will probably equal 3,000,000 barrels annually. The marl and clay beds of Michigan from which the cement is made are said to be inexhaustible, and cover a widely distributed area in the lower peninsula; we also hear of some deposits in the upper peninsula as yet unexplored.

In the report of the Commissioner of Labor in Michigan, the Hon. Scott Griswold, published early in the year 1902, is given a detailed description of the manufacture of cement, and the various companies organized and in operation are also separately described.

The following description is from the United States Geological Survey. Commenting on the last paragraph we would say, without hesitation, the use of cement in this country has hardly begun. When the price to the consumer reaches $1 per barrel, instead of $3, as now, the consumption will increase enormously. That a first-class article will be made and sold for $1 per barrel and a fair profit made, is practically assured.

The Portland Cement Industry in Michigan.

The history of the Portland cement industry in Michigan begins, says Prof. Israel C. Russell of Ann Arbor, in Part III. of the XXII. Annual Report of the United States Geological Survey now in press, with the year 1872, when the Eagle Portland Cement company built a cement plant about two miles northeast of Kalamazoo. The factory was continued in operation until about 1882, but no traces of the kilns are now in existence. Some three miles of sidewalk were put down in Kalamazoo with this cement, and after fifteen or twenty years of use are still in excellent condition. The next factory for making Portland cement was erected by the Peerless Portland Cement company, in 1896 and 1897, at Union City, and was followed by the erection of the factories of the Bronson Portland Cement company at Bronson, in 1897, and of the Michigan Portland Cement company at Coldwater, in 1898.

Portland cement is an artificially prepared substance which has the property of hardening in the air or water when mixed with the suitable proportion of water, and of remaining hard when immersed in water. In its manufacture, a mechanical mixture of finely pulverized limestone or marl and clay or ground shale is calcined, or burned, as the common expression is, and the resulting clinker is ground to a fine powder. This is the Portland cement of commerce. In addition to the raw materials, which enter directly into the composition of Portland cement, fuel is necessary for burning them. For this purpose, in upright kilns crushed coke is generally

used; in the rotating kilns a jet of gas, of petroleum, or of finely pulverized coal is forced in by means of an air blast. The type of kiln now almost universally used in America consists of a steel cylinder about 60 feet long and 6 or 7 feet in diameter, lined with refractory material. These furnaces are rotated rapidly in a nearly horizontal position. The cement is manufactured by what are known respectively as the "wet" and "dry" processes. In the wet process the finely ground limestone and clay are mixed with about 60 per cent of water, and this "slurry" is caused to flow into the higher end of the rotary kiln in a small stream. In the dry process the "slurry" is only sufficiently moistened to prevent it from being blown away as dust. As the "slurry" travels down the cylinder, it is raised to a white heat; and the resulting clinker runs from the rotary in a continuous stream of white-hot pellets, which, after cooling, are ground to a fine powder. The cement as it comes from the grinding machines, is of such fineness that from 90 per cent to 98 per cent of it should pass through a sieve having 100 meshes to the inch. It is then ready for use, but usually improves with age.

Portland cement is used in making the foundations for lighthouses, piers, abutments of bridges, for linings of cisterns, and for many other purposes, and a growing use is in the construction of buildings, and especially of dwellings.

The raw materials which enter into the composition of Portland cement thus far used in Michigan are limestone, marl, shale, clay, gypsum and fuel. One of the limestones used is the Dundee limestone, extending in a belt from about 2 to 9 miles wide northeast and southwest across Wayne, Monroe and Lenawee counties in the southeastern corner of the state. The stone is found also at the extreme northern end of the southern peninsula. The best Dundee limestone thus far discovered is extensively quarried at Sibley and Bellevue, near Trenton, in Wayne county, and is used by the Michigan Alkali company for making Portland cement at Wyandotte. Another group of limestone rocks, the Traverse group, crosses Wayne and Monroe counties in a belt about two miles wide, and crosses also the northern end of the southern peninsula from Alpena, on the border of Lake Huron, to Frankfort, on the shore of Lake Michigan. This limestone is utilized at Alpena by the Alpena Portland Cement company. Another limestone group, the Monroe formation, is extensively quarried in the southeastern part of the state, but its adaptability for the manufacture of Portland cement is doubtful as yet. The limestone of the Michigan series outcrops at Bayport and Sebewaing in Huron county, on the east side of Saginaw bay on the Charity islands, at Bellevue in Eaton county, and near the Portage river. 5 or 6 miles north of Jackson.

The marl beds of Michigan occur in abundance throughout the southern peninsula, and are known to be present also to the north of the Strait of Mackinac. These marl beds vary in extending from a few acres up to hundreds of acres, and. in many instances, for an average depth of 20 feet or more.

The shale used by the Alpena Portland Cement company is quarried about 7 miles north of Alpena and near the shore of Lake Huron. The Cold Water shales are now quarried at a locality about 1½ miles east of Union City, and are utilized by the Peerless Portland Cement company. The Antrim shales are exposed on the shore of Thunder bay and also at several localities in Charlevoix county, though they have not, as yet, been used in making cement. The Saginaw shales are found in several mines near Saginaw and Bay City, and at Flushing. The Lake clays of Michigan, suitable for cement making, are distributed about the border of the southern peninsula, for example, between Detroit and Ypsilanti, about Port Huron, South Haven, Whitehall, over the Saginaw Valley, and also in numerous local basins throughout the state; but it should be noted that, in general, the surface clays of the southern peninsula are not well adapted for making Portland cement, although some of the stony clays, if crushed sufficiently fine, may be used for that purpose. It is commonly found desirable to add a small per cent of gypsum to Portland cement clinker before grinding. Michigan possesses extensive deposits of gypsum, particularly at Grand Rapids; and it is from that place that most of the Portland cement factories in this state derive their supply of gypsum.

The fuel used for heating the rotary kilns is usually bituminous coal, which has been thoroughly dried and ground to a fine dust. This dust is driven into the lower end of the kiln by means of an air blast, and on ignition produces a jet of flame some 15 feet long. Both crude petroleum and pulverized peat have been used, but coal dust is regarded as the best fuel.

The Portland cement industry has had a favorable development in Michigan in the last few years. The Bronson and Peerless Portland Cement companies began operations in 1897, and by May, 1901, ten factories were producing cement, and six others were in process of construction. The capacity of the ten plants now built is about 2,400,000 barrels of cement per annum. The capital stock of all the Michigan Portland cement companies now organized is about $25,000,000, and their estimated capacity is, approximately, 8,600,000 barrels of cement per year. The total consumption of Portland cement in the United States during the year 1900 was between 10,000,000 and 11,000,000 barrels, and the amount manufactured was nearly 8,500,000 barrels. It would seem, then, that Michigan is preparing to supply a demand which does not appear to exist as yet, and as there is a similar activity in this same direction in several other states, it would appear to be evident that the Portland cement industry is in a speculative stage.

PRODUCTION OF CEMENT IN BARRELS.

Name of Company.	1897.	1898.	1899.	1900.	1901.
Alpena Portland Cement Co..	.....	.....	.....	.....	100,000
Bronson Portland Cement Co.	.....	.....	.....	.....	200,000
Elk Rapids Portland Cement Company.....	.....	.....	.....	.....	10,000
*Michigan Portland Cement Company	.....	.....	61,709	180,000	175,000
Newaygo Portland Cement Company	.....	.....	.....	.....	86,000
Peerless Portland Cement Co..	40,000	50,000	75,000	100,000	125,000
Peninsular Portland Cement Company	.....	.....	.....	.....	110,000

*Now Wolverine Portland Cement Co., Coldwater, Mich.

ALPENA PORTLAND CEMENT COMPANY.

President—F. W. Gilchrist.

Vice-President—Win. B. Comstock.

Secretary—Geo. J. Robinson.

Treasurer—Allen W. Fletcher.

Main Business Office—Alpena, Michigan.

The raw materials of this company are limestone and clay, the mill being located at Alpena. Superintendent, F. M. Haldeman. One hundred thousand barrels were produced in 1901, though the capacity is 1,000 barrels per day.

THE BRONSON PORTLAND CEMENT COMPANY.

President—John F. Townsend.

Vice-President—Henry Robinson.

Secretary—J. T. Hutton.

Main Business Office—Bronson, Michigan.

The mills are located at the village of Elk, Eber Davis being superintendent. The raw materials are marl and clay, the annual capacity being 250,000 barrels. The product for the year 1901 was 200,000 barrels.

THE ELK RAPIDS PORTLAND CEMENT COMPANY.

President—Schuyler S. Olds.

Vice-President—Fitch R. Williams.

Secretary and Treasurer—Frank B. Moore.

Main Business Office—Elk Rapids, Michigan.

Superintendent—Geo. H. Sharp.

The company's mills are located at Elk Rapids, and have a capacity of 500 barrels per day. The raw material is marl and clay. During the year 10,000 barrels were made, this being an experimental run.

MICHIGAN PORTLAND CEMENT COMPANY.

President—L. M. Wing.

Vice-President—S. H. Bassett.

Secretary—E. R. Root.

Treasurer—John T. Holmes.

Main Business Office—Coldwater, Michigan.

Early in the year 1902 the company was reorganized as the Wolverine Portland Cement company, with the following officers:

President and General Manager, L. M. Wing.

Vice-President—Chas. Briggs.

Secretary and Treasurer—E. R. Root.

The company operates two mills, one at Coldwater and one at Quincy. The general superintendent is John C. Smallshaw; assistant superintendent, T. R. Crocker. The product for the year 1901 was 175,000 barrels. The capacity of the two plants is 3,000 barrels per day, marl and clay being the raw materials.

NEWAYGO PORTLAND CEMENT COMPANY.

President—D. McCoal.

Vice-President—Wm. Wright.

Secretary and Treasurer—B. T. Becker.

Main Business Office—Newaygo, Michigan.

The mills are located at Newaygo, and W. J. Bell is superintendent. Marl and clay are the raw materials, the capacity of the works being 200,000 barrels annually. The mill began running about July and produced 86,000 barrels during the balance of the year. Water power from the Muskegon river is used to run the mills.

PEERLESS PORTLAND CEMENT COMPANY.

President—A. W. Wright.

Vice-President—S. O. Bush.

Secretary and Treasurer—W. M. Hatch.

Main Business Office—Union City, Michigan.

Marl and clay are the raw materials, the beds and mills being located at Union City. The general manager is J. R. Patterson, and assistant manager is A. Lundteigen. The works have a capacity of 300,000 barrels per

annum, but the product for the year 1901 was 125,000 barrels.

THE PENINSULA PORTLAND CEMENT COMPANY.

President—W. R. Reynolds.

Vice-President—C. A. Newcomb.

Secretary—W. F. Cowham.

Treasurer—N. S. Potter.

Main Business Office—Jackson, Michigan.

The company's works are located at Cement City, Michigan, about thirteen miles south of Jackson, and have a capacity of 1,000 barrels per day. R. D. Hassen is superintendent. Marl and clay are the raw materials, 110,000 barrels being the product for the year 1901.

The Great Northern Portland Cement company is building a plant of 4,000 barrels daily capacity at Baldwin, Michigan.

The Farwell Portland Cement company is building a plant of 600 barrels daily capacity at Farwell, Michigan.

The Twentieth Century Portland Cement company is building works at Fenton, Michigan, of 1,000 barrels daily capacity.

The Detroit Portland Cement company is erecting mills of 1,000 barrels daily capacity at Fenton, Michigan.

OTHER MINERALS.

JACOBS PORTAGE REDSTONE COMPANY.

President—J. H. Jacobs.

Secretary—N. C. Getschell.

Treasurer—John Lees.

Main Business Office—Hancock, Michigan.

Quarries at Jacobsville. The product for the year was 10,000 cubic feet of block stone and 3,000 cords of rubble stone.

MARBLE.

In at least four counties in the upper peninsula, according to information reaching this office, marble can be found—Dickinson, Iron, Marquette and Mackinac. The quarry in Dickinson was operated for some time, but is now idle. Marquette also has marble ledges, there are several outcroppings in Iron, and we are informed there is a large ledge in northern Mackinac of which but little is known.

HATHAWAY GRAPHITE MANUFACTURING COMPANY.

President and Manager—R. Hathaway.

Vice-President—W. W. Orth.

Secretary and Treasurer—M. J. Carroll.

The company mines and refines graphite taken from quarries at L'Anse, Michigan, where the main business office is also located.

ASBESTOS.

Discoveries of this mineral are reported from Marquette and Iron counties. The former promises to be an important one and is now being explored, but little can be learned of the latter.

GOLD.

No gold is now being mined in Michigan, though there are many who believe the precious metal can be found in paying quantities in Marquette county. Corrigan, McKinney & Co., who acquired the Ropes mine at Ishpeming several years ago, have moved the machinery away and apparently abandoned the property.

FELDSPAR.

North of Republic, in T. 46, R. 29, are large deposits of feldspar, which appears to be suitable in glass manufactures. Trial shipment has been made to an Ohio glass factory, through efforts of Messrs. A. B. Stryker, F. C. Nowack, and H. Switzer, of Menominee, Michigan, returns from which, however, have not been received.

GYPSUM.

It may surprise readers of this report that there are large deposits of a high grade of gypsum in Mackinac. The owners of the property seem to be in no hurry to develop their beds and are inclined to give as little information regarding the properties as possible. During a recent visit to St. Ignace the commissioner secured information which warrants him in stating that the beds are among the richest in the West and some day will be the basis of a large industry in Mackinac county. Some gypsum was mined in Mackinac over forty years ago.

MINE INSPECTORS' DIVISION.

The list of casualties at the mines of the upper peninsula is taken from the reports of the various county mine inspectors, whose year ends September 30th, 1901.

The inspectors are as follows:

County.	Name.	Address.
Marquette County	Joseph Tregoning	Ishpeming, Mich.
Iron County	John Warden	Crystal Falls, Mich.
Dickinson County	William Trestrail	Iron Mountain, Mich.
Houghton County	Josiah Hall	Houghton, Mich.
Gogebic County	John H. Taylor	Ironwood, Mich.

Fatal Accidents.

Dickinson District—Total number of fatalities, 27; asphyxiated, 10; from fall of ground, 8; struck by object falling down shaft, 2; knocked off trestle work by car, 1; run over by railroad car, 1; fell down ore chute, 1; blasted, 1; fell from stationary cage, 1; hoisted to sheave by overwind, 1. Average number of men at work, 3,943.

Gogebic District—Total number of fatalities, 18; asphyxiated, 1; fall of ore, 4; fall of rock, 1; fall of timber, 1; fell down shaft, 5; riding on skip or bucket, 4; fell in cave, 1; fall of ladder, 1. Average number of men employed, 3,371.

Houghton District—Total number of fatalities, 33; fall of rock, 16; premature explosion, 5; fell down shaft, 6; over-hoist of skip, 1; falling off staging, 1; struck or crushed by skip, 3; struck by falling timber, 1. Average number of men employed, 13,498.

Iron County District—Total number of fatalities, 10; fall of rock, 5; falling down shaft or raise, 4; riding on skip, 1. Average number of men employed, 1,455.

Marquette District—Total number of fatalities, 29; cave from surface, 3; fall of ground, 6; explosion, 4; premature blast, 1; falling down shafts and chutes, 6; by skip, 1; unknown, 2; drawn down shaft by dirt, 1; blasting in rooms, 3; collapse of rooms, 2. Average number of men employed, 5,200.

MICHIGAN COLLEGE OF MINES.

The Michigan College of Mines has had during its career unusual success as a technical school. This success has been contributed to, not only by its fortunate location in the heart of the copper mining district and within easy reach of the great iron bearing ranges of Upper Michigan, but as well by the hearty support accorded to it by successful mining men who have in many instances sought its good even at a personal sacrifice.

Its Board of Control is made up of men actively connected with live mining operations who appreciate the necessity for the kind of training it affords.

To one familiar with the mining districts of Michigan, the mere mention of the location of this college is sufficient to emphasize the advantages it derives from its location, and the work is so arranged that the student may get the greatest benefit from such location. Its plan of work includes many different ways of bringing the student into actual contact with mining operations in the copper and iron districts. These methods of work, together with the cordial attitude of the mine managers, bring its students wider opportunities for contact with actual mining than are offered by any similar institution.

The college has been fortunate not only in the character of its location and support, but also in that of the students who have come to it for instruction. They have been and are earnest men bent on making the most of their time and of the opportunities offered them. When it is known that the average student takes a course requiring from sixty-five to seventy actual hours of work per week and that he does this from choice, it will be realized that he is not looking for an easy time in college.

In the earlier years of the institution's existence its students were naturally almost all from the Upper Peninsula of Michigan, and the total number was small, there being but twenty-five its first year and twenty-nine the second year. Its enrollment at this writing is 182, distributed as follows: Lower Michigan, 61; Upper Michigan, 54; non-resident students, 67.

It will be seen that the school at present draws more students from Lower Michigan than from the Upper Peninsula.

It trains these young men to work in such a way that they are of use to their employers from the start, and its graduates, now numbering 178, have been almost without exception successful in lines for which they were trained by the College off Mines. They are to be found in almost every important mining camp of the world. Naturally the greater number, 48, are employed in Michigan. Mexico has 17, Arizona 15, British Columbia 10.

So successful have its graduates been that during the greater part of its existence they have found no difficulty in finding work as soon as ready to take positions. Perhaps the success of the institution in its training of men in engineering is best evidenced by the fact, that of the number it has graduated but four have left engineering lines for other pursuits. Its record in this particular is unique and worthy of remark.

Knowing the Michigan College of Mines, and its eminent fitness, thoroughly as we do, this department takes pleasure in commending it to the people of Michigan, and congratulating the state on having so worthy an institution for scientific training.

OPENING AT THE STRAITS.

Following are the dates of opening of navigation at the Straits of Mackinac since 1858:

1902	March	27	1879	April	22
1901	April	14	1878	March	15
1900	April	26	1877	April	18
1898	March	28	1876	April	28
1897	April	7	1875	April	28
1896	April	16	1874	April	29
1895	April	1	1873	May	1
1894	March	29	1872	April	28
1893	April	17	1871	April	2
1892	April	9	1870	April	18
1891	April	17	1869	April	28
1890	April	8	1868	April	19
1889	April	6	1867	April	23
1888	May	4	1866	April	28
1887	April	24	1865	April	21
1886	April	21	1864	April	28
1885	May	5	1863	April	17
1884	April	25	1862	April	18
1883	April	28	1861	April	25
1882	April	3	1860	April	13
1881	May	3	1859	April	3
1880	April	4	1858	April	5