
STATE OF MICHIGAN

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# MICHIGAN'S MINERAL INDUSTRIES 1952

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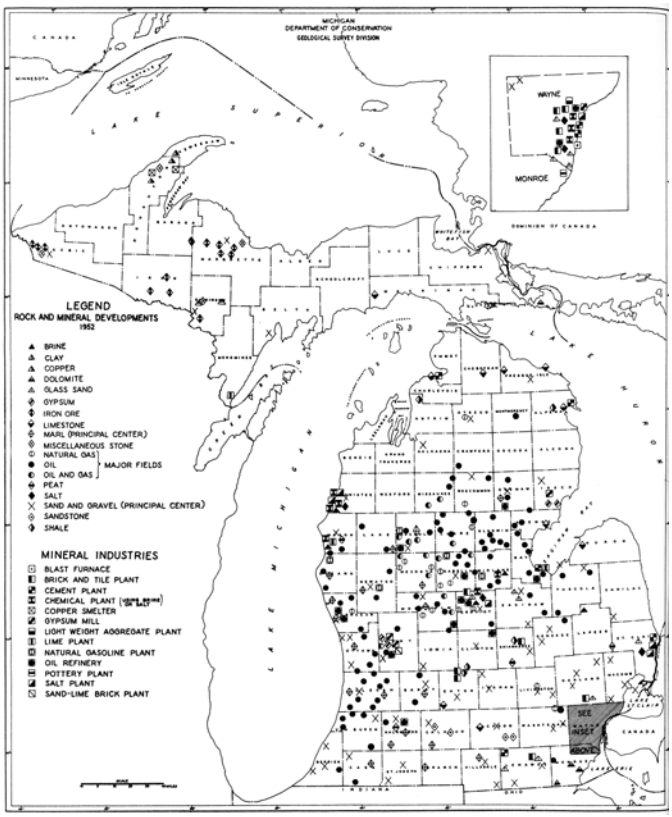
## Contents



## [Map showing locations of rock and mineral developments and mineral industries]




## SUMMARY OF MINERAL INDUSTRIES 1952

Despite decreased production of some minerals, another new record for Michigan's mineral industries was set in 1952. The total value of Michigan's mineral output--$267,089,923--is the highest in the state's history and represents an increase of $9,559,541 over 1951. The general upward trend has been continuous since 1938, as indicated by Figure 1.

A decrease both in production and value for fuels (petroleum, natural gas, and natural gasoline) was recorded in 1952. The gradual yearly decline of these commodities is due, largely, to failure to find new fields of importance and the depletion of present oil and gas fields. Production of metallic minerals (iron ore and copper) was down because of crippling strikes which curtailed production during the middle of the year. The total value of these metallic minerals, however, increased $4,563,883 over 1951 owing to an increase in selling price. Non-metallic minerals (includes all other minerals produced in the state) increased $7,181,306, or approximately 6 per cent, over 1951. This increase was the result of greater output of Portland cement, sand and gravel, clay products, peat, and the miscellaneous minerals (bromine, calcium-magnesium chloride, and clay).

Michigan, ranking twelfth in the nation in mineral production, was first in production of gypsum, salt, marl, and calcium-magnesium chloride; second in iron ore, sand and gravel, magnesium compounds, bromine, and peat; fourth in stone, and fifth in Portland cement.

Production and value of minerals and mineral products for 1950 and 1951 are shown in Tables I and II. A breakdown of the total value of Michigan minerals for 1952 is as follows:

| | | |
|---|---|---|
| Metallic minerals (iron and copper) | $ 94,762,577 | 35.4% |
| Fuels (petroleum, natural gas, natural gasoline, coal) | 38,093,047 | 14.3% |
| Non-metallic minerals and mineral products (all others) | 134,233,799 | 50.3% |
| | | 100.0% |

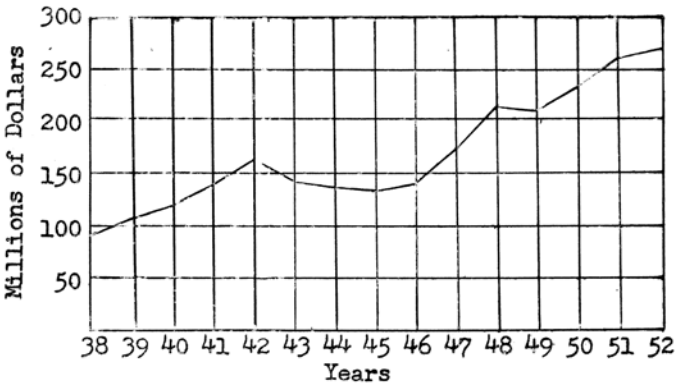



Figure 1. Value of Minerals and Mineral Products in Michigan, 1938 - 1952.

## Metallic Minerals

Iron ore: Of all Michigan minerals; iron ore, valued at $83,942,523 in 1952 (7 per cent more than the 1951 value) remained the state's principal mineral product. A decrease of 1,875,623 tons below 1951 production was the result of a strike which led to the loss of two months' production during the peak of the operating season. The loss, however, was reduced to a large degree by strenuous efforts on the part of the producers and the addition of new freighters to the Great Lakes carrier fleet.

Michigan, exceeded only by Minnesota, continued to rank second in the nation in the production of iron ore. Thirty underground mines and seven open pits were operated on the state's three iron ranges—the Gogebic Range, Gogebic County, Marquette Range, Marquette County; and the Menominee Range, Iron and Dickinson counties.

The large potential resources of iron ores in the form of low-grade iron-bearing rock, brought about construction of the state's second beneficiation plant at Humboldt, Marquette County, and plans were announced for another plant at Republic, Marquette County. These plants, along with the Ohio mine plant near Michigamme, Baraga County, which completed its first year of operation in 1952, will concentrate a shipping product from the low-grade iron-bearing formations which previously had been considered non-commercial.

Iron Ore Shipments by Ranges, 1952

| Range | Number of mines: Underground | Number of mines: Open pit | Iron ore shipped (Long tons): Direct shipping | Iron ore shipped (Long tons): Siliceous | Iron ore shipped (Long tons): Total |
|---|---|---|---|---|---|
| Marquette | 11 | 4 | 4,251,610 | 264,899 | 4,516,509 |
| Menominee | 14 | 2 | 4,183,889 | 93,991 | 4,277,880 |
| Gogebic | 5 | 1 | 3,003,861 | ... | 3,003,861 |
| Total | 30 | 7 | 11,439,360 | 358,890 | 11,798,250 |

Shipments and Value of Iron Ore 1948-1952

| Year | Shipments (Long tons) | Value |
|---|---|---|
| 1948 | 12,768,167 | $59,394,187 |
| 1949 | 10,737,137 | 57,722,248 |
| 1950 | 12,926,756 | 73,214,839 |
| 1951 | 13,673,873 | 78,120,718 |
| 1952 | 11,798,250 | 83,942,523 |

Copper: Copper, Michigan's other metallic mineral, also had a loss in production as a result of a strike. Although a production loss of 11 per cent was recorded, the industry contributed $10,820,054 to the state's total. Nine copper mines, in Hough ton and Keweenaw counties, produced approximately 80 per cent of the total copper output. The remaining 20 per cent was recovered by three reclamation plants from waste or tailings rejected by earlier mill operations.

Early in 1952 it was announced that the Reconstruction Finance Corporation had made a $57,100,000 loan to the White Pine Copper Company to develop the White Pine mine, Ontonagon County. During the year much of the construction was concerned with the townsite, although foundation work and some construction had been done at the various mine and milling buildings. The White Pine mine will be unique in so far as Michigan is concerned since the orebody is in the Nonsuch shale and is mainly copper sulphide (chalcocite) with minor amounts of native copper. Presently operating copper mines in Houghton and Keweenaw counties obtain native copper from the Keweenawan lava flows or interbedded rhyolite conglomerates.

Copper Production in Michigan, 1952

| County | Number of: Mines | Number of: Reclamations | Copper production (Pounds): Mines | Copper production (Pounds): Reclamations | Copper production (Pounds): Total |
|---|---|---|---|---|---|
| Houghton | 3 | 3 | *11,090,636 | 9,191,437 | 20,282,073 |
| Keweenaw | 6 | 0 | 23,657,231 | ... | 23,657,231 |
| Total | 9 | 3 | 34,747,867 | 9,191,437 | 43,939,304 |

*Includes a small output from Ontonagon County.

Copper Production 1948-1952

| Year | Quantity (pounds) | Value |
|---|---|---|
| 1948 | 54,434,042 | $12,242,216 |
| 1949 | 38,498,167 | 7,380,099 |
| 1950 | 51,788,017 | 10,997,185 |
| 1951 | 49,297,864 | 12,077,976 |
| 1952 | 43,939,304 | 10,820,054 |

## Fuels

Petroleum: Petroleum production in Michigan decreased 5 P«r cent in quantity and approximately 4 per cent in value below that of 1951. At the end of the year there were 3,979 oil wells producing in 37 counties, Approximately 46 per cent of the output was from Arenac, Isabella, Oceana, and Osceola--each contributing more than one million barrels. The principal producing oil formations are the Traverse, Dundee, and Detroit River. Minor amounts of oil were taken from the "Michigan Stray", Berea, and Trenton formations. A review of 1952 operations for oil and gas is recorded in the 1952 Summary of Operations, Oil and Gas fields, Michigan Geological Survey.

Natural Gas: Natural gas production declined 17.5 per cent to 8,677,737,000 cubic feet, valued at $1,353,727. At the end of the year there were 1,111 gas wells producing in 22 counties. Livingston, Isabella, and Crawford led all counties—each producing more than one billion cubic feet. The principal gas-producing formations in order of importance were the Salina, "Michigan Stray", and the Detroit River. Other formations furnishing to the output were Traverse, Dundee, Berea, and Antrim.

Table I. Petroleum and Natural Gas Production 1948-1952

| Year | Petroleum Quantity (barrels) | Value | Natural gas Quantity (M.cu.feet) | Value |
|---|---|---|---|---|
| 1948 | 16,871,046 | $48,348,084 | 21,369,587 | $3,040,403 |
| 1949 | 16,517,333 | 45,610,021 | 14,660,247 | 2,101,845 |
| 1950 | 15,826,148 | 43,157,905 | 12,614,024 | 1,967,788 |
| 1951 | 13,926,518 | 37,949,762 | 10,524,495 | 1,641,821 |
| 1952 | 13,251,387 | 36,176,306 | 8,677,737 | 1,353,727 |

Natural Gasoline: Michigan, in 1952„ produced from oil-well gas a total of 5,330,139 gallons of natural gasoline and allied products valued at $533,014. This was a loss of 22 per cent in both quantity and value below that of 1951 when 6,871,119 gallons were produced, valued at $687,112. Six counties entered into the production with Crawford ranking first with 56 per cent of the total state output.

Coal: Coal production, once a major industry in Michigan, now has become history. The closing of the Swan Creek mine, near St. Charles, Saginaw County, during April, marked the end of commercial coal production in the state. More than 46,200,000 tons were produced from 1860 to 1952, with a peak production of 2,035,000 tons in 1907 from 37 mines. Although Michigan has an estimated coal reserve of 220,000,000 tons, the future of the industry does not seem favorable. However, it is possible that changes in fuel economy and technology may, in the future, result in local mining activity. A report "Coal Resources of Michigan", by George V. Cohee, U. S. Geological Survey Circular 77, June 1950, may be obtained through the Michigan Geological Survey.

Table II. Natural Gasoline and Coal Production 1948-1952

| Year | Natural Gasoline Quantity (gallons) | Value | Coal Quantity (short tons) | Value | Number of mines |
|---|---|---|---|---|---|
| 1948 | 4,402,062 | $419,000 | 14,000 | $120,000 | 1 |
| 1949 | 4,268,880 | 230,518 | * | * | 1 |
| 1950 | 5,218,794 | 349,660 | * | * | 1 |
| 1951 | 6,871,119 | 687,112 | * | * | 1 |
| 1952 | 5,330,139 | 533,014 | * | * | 1 |

*One operator; data cannot be revealed.

## Non-Metallic Minerals

Portland cement: A gain of 648,144 barrels, 4.5 per cent over that of 1951, gave a new all time high for Portland cement. The industry was able to make such a record because of the installation of new mill facilities, modernization, and better utilization of existing plants. Alpena County was the leading producer, with Wayne County ranking second. Other producing counties were Bay, Emmet, Lenawee, and St. Clair. Raw materials used in production of Michigan cement included 3,860,560 short tons of crushed limestone (includes lime-mud), 1,163,184 short tons of clay and shale, and 117,974 short tons of gypsum. Antrim shale from Alpena County and Ellsworth shale from Antrim County were used in the manufacture of cement in the northern plants. All the southern plants used local clays. The greater portion of the limestone used was from the Traverse and Dundee formations in the northern part of the Southern Peninsula. All gypsum used by the cement plants was purchased.

A number of improvements were announced by the Huron Portland Cement Company, Alpena, during the year. Shale quarrying operations at the Paxton Quarry were revised. A crusher was installed on the quarry floor and stocking and reclaiming belt systems were built. The shale is hauled by rail eleven miles to the drier building at the cement plant. Orders were placed by the company for four new Allis-Chalmers kilns to be installed at the plant. Also, a fourth vessel was added during the year to their fleet of cargo vessels.

The Consolidated Cement Corporation, Lenawee County, which, for many years, used marl or a combination of marl and limestone from Michigan sources, now is obtaining limestone from a new quarry which is located four miles north of Paulding, Ohio.

Portland Cement Shipments 1948-1952

| Year | Shipments (barrels) | Value | Rank in U.S. | No. of Plants |
|---|---|---|---|---|
| 1948 | 11,116,911 | $23,533,001 | 5 | 7 |
| 1949 | 12,747,791 | 28,823,055 | 5 | 7 |
| 1950 | 12,854,423 | 29,619,766 | 5 | 7 |
| 1951 | 14,112,639 | 35,121,324 | 5 | 7 |
| 1952 | 14,760,783 | 36,819,041 | 5 | 7 |

Stone: Stone sold or used by the Michigan producers in 1952 amounted to 18,001,080 short tons, valued at

$15,590,573. This was a decrease of 14 per cent in quantity and 8.7 per cent in value below 1951. The major contributing factor to this decrease of 2,934,687 short tons was the 2-month strike in the iron ore industry which curtailed the demand for flux by the steel industry. More than a million tons of limestone or dolomite was produced from each of the following countless Alpena, Chippewa, Mackinac, and Presque Isle. Other producing counties included Arenac, Cheboygan, Delta, Eaton, Emmet, Huron, Jackson, and Monroe.

Other stone produced during the year included dimensional limestone in Eaton, Huron, Monroe and Presque Isle counties; sandstone (rough construction, rubbles, and flagging stone) in Jackson County; and crushed sandstone and basalt (road construction) in Houghton County.

Announcement was made during the year that the Kelly Island lime and Transport Company was completing negotiations with six steel companies which will lead to construction of an $8,000,000 limestone plant north of Bell in southeastern Presque Isle County. It was estimated that 4,000,000 tons of limestone will be produced annually from the reopened "Lake of the Woods" quarry to provide the steel firms with flux stone which is used in the steel making operations. The stone to be quarried will be that of the high calcium Dundee formation.

During November the Michigan Stone Company began producing aggregate for road construction purposes from a reopened quarry one and one-half miles west and one mile south of Ambertville, Monroe County. Stone utilised is from one or more members of the Bass Island group.

Stone Production, 1952

| | Quantity (Short tons) | Value |
|---|---|---|
| Limestone and dolomite: | | |
| Crushed | 17,938,709 | $15,499,591 |
| Dimensional | 4,103 | 49,547 |
| Sandstone: | | |
| Crushed | 14,000 | 10,500 |
| Dimensional | 2,268 | 9,926 |
| Basalt: | | |
| Crushed | 42,000 | 21,009 |
| Total | *18,001,080 | $15,590,573 |

Uses of Michigan's Crushed Limestone and Dolomite, 1952

| Uses | Per cent of total | Quantity (Short tons) | Value |
|---|---|---|---|
| Flux | 56.6 | 10,088,650 | $ 7,345,376 |
| Concrete, road metal | 17.8 | 3,273,135 | 3,395,560 |
| Alkali | 14.8 | 2,649,171 | 1,873,791 |
| Agriculture | 3.9 | 695,028 | 931,041 |
| **Other uses | 6.9 | 1,232,725 | 1,953,823 |
| Total | 100.0 | *17,938,709 | $15,499,591 |

*Does not include 6.3 million tons of limestone used in the manufacture of Portland cement and lime.

**Includes calcium carbide, railroad ballast, sugar, paper, stone sand, mineral feeds, riprap, whiting, fill, coal dust, glass, carbon, asphalt, and ornamental concrete (terrazzo).

Production of Stone 1948-1952

| Year | Quantity (Short tons) | Value | Rank in U.S. |
|---|---|---|---|
| 1948 | 19,710,576 | $14,906,111 | 3 |
| 1949 | 16,546,670 | 13,387,334 | 4 |
| 1950 | 19,095,703 | 15,389,684 | 3 |
| 1951 | 20,935,767 | 17,082,206 | 3 |
| 1952 | 18,001,080 | 15,590,573 | 4 |

Sand and gravel: Reported sand and gravel production showed an increase of approximately 10 per cent in quantity and about 15 per cent in value over 1951, "the former record-breaking year. The apparent increase in production of this commodity was due, largely, to additional data obtained from a more complete canvass of new producers. The producers' reports indicated a decrease in tonnage for molding sand only.

Production of sand and gravel was from all but 12 counties with Oakland ranking first. Commercial producers accounted for 23,031,994 tons of sand and gravel which sold at an average price of $0.85 per ton. The remaining 4,069,595 tons was non-commercial sand and gravel, reported by governmental agencies.

Uses of Sand and Gravel, 1952

| Uses | Quantity (Short tons) | Value | Per cent of total |
|---|---|---|---|
| Molding sand | 1,730,833 | $ 1,521,629 | 6.4 |
| Structural sand | 3,307,895 | 2,596,319 | 12.2 |
| Paving and road sand | 3,836,508 | 2,940,180 | 14.2 |
| *Other sand | 1,740,134 | 1,601,337 | 6.4 |
| Structural gravel | 4,252,780 | 3,546,691 | 15.7 |
| Paving and road gravel | 11,505,875 | 8,248,919 | 42.4 |
| Railroad ballast gravel | 534,275 | 434,251 | 1.9 |
| Other gravel | 218,039 | 160,799 | .8 |
| Total | 27,126,339 | $21,050,125 | 100.0 |

*Includes glass sand, grinding and polishing sand, engine sand, and railroad ballast sand.

Production of Sand and Gravel 1948-1952

| Year | Quantity (Short tons) | Value | Rank in U.S. |
|---|---|---|---|
| 1948 | 20,671,078 | $14,071,712 | 2 |
| 1949 | 20,475,996 | 13,992,903 | 2 |
| 1950 | 24,559,253 | 16,699,203 | 2 |
| 1951 | 24,688,264 | 18,324,872 | 2 |
| 1952 | 27,126,339 | 21,050,125 | 2 |

Salt: Salt production for the state decreased 359,292 short tons below that of 1951. Of the five counties reporting salt production, Wayne County was first, with more than 70 per cent of the state's total output. Approximately 80 per cent of the salt produced was used as brine in the manufacture of soda ash, chlorine, and bleaches, and for other chemical uses. Dry and evaporated salt were used principally for food processing, highway maintenance, refrigeration, hides and leather, livestock, table salt, and others.

The Hooker Electrochemical Company, Niagara Falls, New York, announced plans for a new $10,000,000 chemical plant to be constructed at Montague, Muskegon County. Raw material for the plant will be salt brine obtained by solution of Salina salt. The brine will be converted by electrolytic cells into chlorine, caustic soda, and hydrogen. Two salt wells already have been drilled and others will be drilled in the 200 acre area set aside for a brine field. The plant is expected to be in operation by the end of 1953 or early in 1954 with a yearly production rate of 100,000 tons of all products. The output of the plant is intended to serve Midwest industry and, in all probability, will draw other chemical concerns into the area.

Uses of Michigan Salt, 1952

| Uses | Quantity (Short tons) |
|---|---|
| Chemical | 3,150,000 |
| Food processing | 448,000 |
| Highway, dust and ice control | 355,000 |
| Livestock | 247,000 |
| Table and other household | 126,000 |
| Water treatment | 69,000 |
| Metallurgy | 55,000 |
| Textile, hides and leather processing | 48,000 |
| Refrigeration | 47,000 |
| Agriculture | 44,000 |
| Other | 189,000 |
| Total | 4,778,000 |

Salt Production 1948-1952

| Year | Quantity (Short tons) | Value | Rank in U.S. | Per cent of U.S. total |
|---|---|---|---|---|
| 1948 | 4,387,879 | $16,265,743 | 1 | 26.7 |
| 1949 | 4,064,106 | 16,009,117 | 1 | 26.1 |
| 1950 | 4,446,667 | 18,178,765 | 1 | 26.7 |
| 1951 | 5,137,639 | 21,221,330 | 1 | 25.4 |
| 1952 | 4,778,347 | 21,446,382 | 1 | 24.4 |

Clay and shale: A production of 1,580,123 short tons of raw clay and shale was reported for the state during 1952. This is an increase of 3 per cent over 1951. Uses made of the raw clay and shale were approximately 70 per cent for the manufacture of Portland cement, nearly 30 per cent in the manufacture of clay products (brick, tile, pottery, and lightweight aggregate), and a small quantity for prepared clays.

Clay products: The value of Michigan's clay products (brick, tile, pottery, and lightweight aggregate), was estimated at $4,534,000 in 1952, or $578,000 less than 1951. This decrease was the result of the closing of the Haggerty Brick Company and the Ionia Pottery Company in 1951 and the temporary discontinuance of operations at the Natco Corporations Oakland County plant in 1952.

Production of Clay and Shale and Clay Products 1948-1952

| Year | Raw clay and shale: Quantity *(Short tons) | Raw clay and shale: *Value | Clay products: Estimated value |
|---|---|---|---|
| 1948 | 1,308,170 | $ 985,740 | $3,764,000 |
| 1949 | 1,363,440 | 1,013,250 | 3,650,000 |
| 1950 | 1,426,659 | 1,137,002 | 5,499,000 |
| 1951 | 1,531,732 | 1,592,137 | 5,112,000 |
| 1952 | 1,580,123 | 1,615,122 | 4,534,000 |

Gypsum: For the eighth consecutive year Michigan ranked first in the nation in the production of crude gypsum. Total production, however, decreased 5 per cent compared with a 3 per cent national decrease.

All gypsum again was obtained from the Michigan formation from two quarries in Iosco County and two mines in Kent County. Iosco County ranked above Kent County in total production. The manufacture of building materials is by far the most important use of this commodity.

Production of Gypsum 1948-1952

| Year | Quantity (Short tons) | Value | Per cent of U.S. | Rank |
|---|---|---|---|---|
| 1948 | 1,309,331 | $3,617,868 | 18 | 1 |
| 1949 | 1,264,511 | 3,470,294 | 19 | 1 |
| 1950 | 1,474,210 | 4,090,777 | 18 | 1 |
| 1951 | 1,566,276 | 4,402,725 | 18 | 1 |
| 1952 | 1,487,642 | 4,200,418 | 18 | 1 |

*Sold or used; value of clay used in cement and heavy clay products not included in total value of state.

Peat: Five concerns reported peat production in Michigan during 1952. Production was 36,020 short tons valued at $430,156, an increase of 78 per cent in tonnage over 1951. The state ranked second in the nation in the production of peat. Its principal use is in soil improvement and mixed fertilizers.

Production of Peat 1948-1952

| Year | Quantity (Short tons) | Value | Per cent of U.S. | Rank in U.S. |
|---|---|---|---|---|
| 1948 | 12,425 | $154,500 | ... | 4 |
| 1949 | * | * | * | 5 |
| 1950 | 13,629 | 186,000 | 10.4 | 4 |
| 1951 | 20,180 | 320,100 | 10.4 | 5 |
| 1952 | 36,020 | 430,156 | 16.6 | 2 |

*Data concealed.

Marl: Commercial marl production was reported in 24 counties during 1952. The production of 130,613 short tons valued at $119,705 was a decrease of 10 per cent in production and 5 per cent in value in relation to 1951. All marl was used for agricultural purposes.

Production of Marl 1948-1952

| Year | Quantity (Short tons) | Value | Rank in U.S. |
|---|---|---|---|
| 1948 | * | * | * |
| 1949 | 1,500 | $ 1,500 | ... |
| 1950 | 218,429 | 122,212 | 1 |
| 1951 | 144,731 | 125,480 | 1 |
| 1952 | 130,613 | 119,705 | 1 |

*No production reported.

Lime: Lime was produced by three plants in the state. Mason County continued to rank first in production, followed by Menominee and Bay counties. All used raw stone from the high-calcium limestone quarries of northern Michigan. The principal uses of the lime, as reported by the producers, were for chemical and industrial purposes, in the production of calcium carbide and cyanamide, paper manufacture, water purification, agricultural lime, and sugar refining. Smaller amounts of lime were used in tanneries, brick, metallurgy, insecticides, petroleum refining, wood distillations and salt refining.

Bromine, calcium-magnesium chloride, magnesium compounds, potash: Natural brines comprise the raw material for the production of bromine, calcium-magnesium chloride, magnesium compounds, and potash. The value of the natural salines recovered by the plants increased 21.5 per cent over 1951. Midland County again ranked first in production, followed by Mason, Manistee, and Gratiot counties. Magnesium compounds had the greatest increase in volume and, with bromine, retained the rank of second place in the nation. The sales for bromine during the year were accounted for by ethylene dibromide, for use in gasoline antiknock compounds; methyl bromide, used as a fumigant; elemental bromine and other bromine compounds, used in the dye and photographic industries, and for medicinal, chemical, and metallurgical purposes. A larger production of calcium chloride and calcium-magnesium chloride was reported for the year, and usage of these salts for highway and road maintenance increased. Potassium salt (KCl) production remained about the same as for 1951. Only one

company reported recovery of this commodity from natural brines.

Natural brines are pumped from deep wells penetrating the Marshall, Dundee, and Sylvania formations by chemical plants in Midland and Gratiot counties, and from the Filer sandstone member of the Detroit River group by chemical plants in Mason and Manistee counties.

Value of Michigan's Minerals
and
Mineral Products
1938-1952

| Year | Value | Year | Value |
|---|---|---|---|
| 1938 | $ 75,897,923 | 1946 | $133,672,135 |
| 1939 | 109,867,740 | 1947 | 170,269,272 |
| 1940 | 117,991,285 | 1948 | 214,115,771 |
| 1941 | 135,492,921 | 1949 | 207,607,694 |
| 1942 | 152,624,946 | 1950 | 238,474,008 |
| 1943 | 147,113,888 | 1951 | 257,529,882 |
| 1944 | 140,493,319 | 1952 | 267,089,423 |
| 1945 | 128,046,408 | | |

## TABLE I
## MINERAL PRODUCTS OF MICHIGAN, 1952(1)

| Product | Unit | Quantity | Value | Rank in U.S.(2) |
|---|---|---|---|---|
| Iron Ore | Long tons | 11,798,250 | $ 83,942,523 | 2 |
| Portland cement | Barrels | 14,760,783 | 36,819,041 | 5 |
| Petroleum | Barrels | 13,251,387 | 36,176,306 | ... |
| Salt | Short tons | 4,778,347 | 21,446,382 | 1 |
| Sand and gravel | Short tons | 27,126,339 | 21,050,125 | 2 |
| Stone(3) | Short tons | 18,001,080 | 15,590,573 | 4 |
| Copper | Pounds | 43,939,304 | 10,820,054 | ... |
| Clay products | ... | ... | 4,534,000 | ... |
| Gypsum | Short tons | 1,487,642 | 4,200,418 | 1 |
| Natural gas | M. cu. ft. | 8,677,737 | 1,353,727 | ... |
| Clay and shale, raw | Short tons | 1,580,123 | (4) | |
| Natural gasoline | Gallons | 5,330,139 | 533,014 | ... |
| Peat | Short tons | 36,020 | 430,156 | 2 |
| Marl | Short tons | 130,613 | 119,705 | 1 |
| Miscellaneous(5) | ... | ... | 30,073,203 | |
| Total | | | $267,089,423 | |

(1) Statistics compiled in cooperation with the United States Bureau of Mines.

(2) Based upon quantity.

(3) Limestone used in the manufacture of Portland cement and lime not included.

(4) Value of clay and shale used in clay products and cement industries not included in state total value; value of other clays included under miscellaneous.

(5) Includes bromine, magnesium compounds, calcium chloride, calcium-magnesium chloride, clay, coal, lime, and potassium salts.

## TABLE II
## MINERAL PRODUCTS OF MICHIGAN, 1951(1)

| Product | Unit | Quantity | Value | Rank in U.S.(2) |
|---|---|---|---|---|
| Iron ore | Long tons | 13,673,873 | $ 78,120,718 | 2 |
| Petroleum | Barrels | 13,926,518 | 37,949,762 | ... |
| Portland cement | Barrels | 14,112,639 | 35,121,324 | 5 |
| Salt | Short tons | 5,137,639 | 21,221,330 | 1 |
| Sand and gravel | Short tons | 24,688,264 | 18,324,872 | 2 |
| Stone(3) | Short tons | 20,935,767 | 17,082,206 | 3 |
| Copper | Pounds | 49,297,864 | 12,077,976 | ... |
| Clay products | ... | ... | 5,111,585 | ... |
| Gypsum | Short tons | 1,566,276 | 4,402,725 | 1 |
| Natural gas | M. cu. ft. | 10,524,495 | 1,641,821 | ... |
| Clay and shale, raw | Short tons | 1,531,732 | (4) | |
| Natural gasoline | Gallons | 6,871,119 | 687,112 | ... |
| Peat | Short tons | 20,180 | 320,100 | 5 |
| Marl | Short tons | 144,731 | 125,480 | 1 |
| Miscellaneous(5) | ... | ... | 25,257,902 | |
| Total | | | $257,529,882 | |

(1) Statistics compiled in cooperation with the United States Bureau of Mines.

(2) Based upon quantity.

(3) Limestone used in the manufacture of Portland cement and lime not included.

(4) Value of clay and shale used in clay products and cement industries not included in state total value; value of other clays included under miscellaneous.

(5) Includes bromine, magnesium compounds, calcium chloride, calcium-magnesium chloride, clay, coal, lime, and potassium salts.