



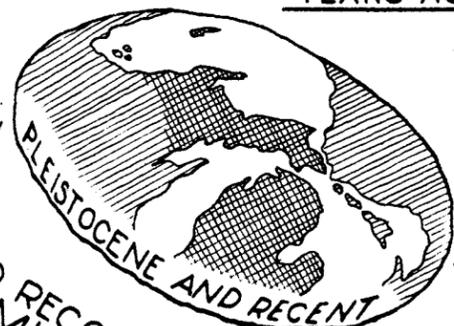
MINERAL RESOURCES AND PRODUCTS

WATER  
SAND  
GRAVEL  
PEAT  
MARL  
CLAY

GYPSUM  
LIMESTONE  
SHALE  
SALT  
BRINE  
OIL  
GAS

COPPER  
IRON

1 MILLION  
YEARS AGO



NO RECORD  
IN MICHIGAN

MESOZOIC  
and  
CENOZOIC

220 MILLION  
YEARS AGO

PALEOZOIC

540 MILLION YEARS AGO

WORLD-WIDE  
LOST INTERVAL

PRECAMBRIAN

1000 MILLION YEARS AGO

2000 MILLION YEARS AGO

ARCHEAN

MICHIGAN'S  
ROCK COLUMN AND TIME SCALE

DEPARTMENT OF CONSERVATION  
GEOLOGICAL SURVEY DIVISION

EARTH ORIGIN 5000(?) MILLION YEARS AGO

MICHIGAN  
MINERAL INDUSTRIES

1960

by

Harry O. Sorensen  
Emery T. Carlson

FOREWORD

This report on the mineral industries of Michigan is a compilation of mineral production for the year 1960. It consists of five sections: preliminary estimate of the Michigan's mineral production for 1961, news items of 1961 happening, a summary of each of the mineral industries, a breakdown of mineral production by counties, and a directory of mineral producers.

Added features in this issue includes a picture presentation of mineral producers and a three-page graph on Michigan's mineral production since 1870. We regret, however, that full coverage of the various mineral industries for the picture presentation was not possible, due to picture shortage within the files of this Department.

Items on 1961 happening in the various mineral fields was drawn heavily from various information sources that includes "Pit and Quarry", "Rock Products", "Mining World", "Steel", "World Oil", and other trade journals, magazines, and publications.

The Michigan Geological Survey expresses appreciation to all the mineral and mineral products producers for the production information they have submitted. Without their cooperation, this report would have been impossible.

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## THE MINERAL INDUSTRY OF MICHIGAN IN 1961\*

(Preliminary)

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Mineral production in Michigan in 1961 was valued at nearly \$435 million, according to the Bureau of Mines, United States Department of the Interior. The mineral output of the State exceeded the 1960 level (\$429 million), primarily because of increased output of copper and petroleum which countered smaller shipments of iron ore, construction materials, and salt. Iron ore was first in value, followed by cement, petroleum, and copper.

## METALS

Metallic minerals accounted for 29 per cent of the total value of mineral production, compared to 31 per cent in 1960.

**Copper:** Production of copper in terms of recoverable metal was 25 per cent larger than in 1960, although value increased only 16 per cent. The preliminary average weighted price in 1961 was 30.0¢ per pound compared with 32.1¢ in the previous year. Copper producers operated throughout the year with the exception of Copper Range Co., which shut down the Champion mine at the end of January and reopened in May. Operating companies included Calumet & Hecla, Inc., Copper Range Co., White Pine Copper Co. (a wholly owned subsidiary of Copper Range Co.), and Quincy Mining Co.

**Iron Ore:** Iron-ore shipments were estimated at 9,285,000 long tons, compared to 10,791,532 in 1960. Value of shipments decreased \$12 million.

Lack of demand from the steel industry kept production levels below the previous year. A notable exception were producers of iron-ore concentrates who operated near capacity. In 1961, it was estimated that about 21 per cent of iron-ore shipments were in the form of concentrates from jaspilite, compared to 11.6 per cent in 1960. During the year, the Hanna Mining Co. announced plans to increase annual capacity of its Groveland iron-ore concentrating plant from 700,000 tons to 1,500,000 tons and will install facilities to produce 1,250,000 tons of high-grade, partially fluxed, iron-ore pellets a year. The pellets will contain more than 60 per cent iron. Cleveland-Cliffs Iron Co. began an expansion program as its Republic mine. Crushing, grinding, and flotation facilities will be enlarged and a pelletizing plant will be built. Annual capacity will be 2,400,000 tons of high-grade iron ore concentrate and 1,600,000 tons of pellets. The excess 800,000 tons of concentrate will be pelletized at the company's Eagle Mills plant. The Empire Mining Co., operated by Cleveland-Cliffs Iron Co., will develop a low-grade magnetic iron ore deposit near Negaunee and construct a concentrator and a 1-million-ton-per-year pelletizing plant.

The lake shipping season for Michigan ores opened at Escanaba and Marquette on April 24 and closed at Marquette on December 4.

## NONMETALS

Of the materials used in building and road construction, only cement and sand and gravel exceeded 1960 shipments. Production of clay, gypsum, lime, and crushed stone was smaller than in 1960. Increased demand for materials for base course construction in the State Highway program resulted in a larger sand and gravel output. Crushed stone production declined because of smaller shipments of fluxstone and stone for lime manufacture. Chemicals derived from brines (bromine, calcium-chloride, magnesium compounds, and potash) were produced at about the same rate as in 1960. Salt production was about 5 per cent less than in the previous year.

## MINERAL FUELS

The value of mineral fuels produced was about 15 per cent of the State's total, compared to 12 per cent in 1960. All types (natural gas and natural-gas products, peat, and petroleum) were produced in greater quantity. The southern Michigan oil fields continued to supply the major part of the State's production of petroleum.

Mineral Production in Michigan, 1961 (1)  
(Estimated)

Mineral	Thousand Short Tons (unless other- wise stated)	Value (thousands)
Cement:		
Portland - thousand 376-pound barrels	21,700	\$ 74,900
Masonry (2) thousand 280-pound barrels	1,500	4,400
Clays	1,700	1,900
Copper (recoverable content of ores, etc.) in short tons	70,060	42,036
Gypsum (crude)	1,383	4,727
Iron Ore (usable) thousand long tons, gross weight	9,285	83,600
Lime	1,131	15,059
Natural Gas - million cubic feet	23,100	6,000
Peat	235,000	3,055
Petroleum (crude) - thousand 42-gallon barrels	19,146	55,715
Salt (common)	3,900	32,332
Sand and gravel (3)	50,000	42,500
Stone	28,720	29,870
Value of items that cannot be disclosed: Bromine, calcium-chloride and calcium- magnesium chloride, gem stones, magnesium compounds, natural-gas liquids, and potassium salts	-	46,723
Total Michigan (5)		\$434,908

- (1) Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
- (2) Previously reported in 376-pound barrels.
- (3) Includes friable sandstone.
- (4) Total adjusted to eliminate duplicating value of clays and stone.

\*Prepared December 15, 1961 by Donald F. Klyce, Commodity-industry Analyst, under the supervision of Samuel A. Gustavson, Supervising Commodity-industry Analyst, Minneapolis Office of Mineral Resources, Region V, Minneapolis, Minn.

## NEWS ITEMS AND DEVELOPMENTS IN 1961

## IRON ORE

It is quite evident that growing competition in the mineral markets, iron ore particularly, much from foreign sources, is demanding closer control of costs, particularly the development of time-saving techniques to offset labor costs. Equally important are the concepts of developing new products and finding new customers.

On Thursday, June 22, 1961, the first session of the hearing on problems of the upper Great Lakes iron ore industry was held before the subcommittee on minerals, materials and fuels of the committee on interior and insular affairs, United States Senate, Washington, D.C. The purpose of the hearing was to learn, through testimonial statements of expert witnesses, what the problems are affecting Great Lakes iron ore industry. Witnesses included: Congressman John A. Blalnik of Minnesota and Senator Jack Miller of Iowa; Representative John B. Bennett of Michigan and Vernon W. Thomson of Wisconsin; Marling J. Ankeny, Director, Bureau of Mines, Department of the Interior and M. E. Volin, Director, Institute of Mineral Research, Michigan College of Mining and Technology; Professor T. D. Tieman and Professor L. D. Clark, Department of Mining and Metallurgy, University of Wisconsin and Professor Henry H. Wade, School of Mines, University of Minnesota; Peter J. Benson, representative of the United Steelworkers of America and Hugo E. Johnson of the American Iron Ore Association.

On Wednesday, October 25, 1961, the Annual Conference of the Michigan Natural Resources Council was held in Lansing. This year's conference dealt with the many problems concerning development of Michigan iron ore and copper - both current and for the future. Speakers of the forenoon session were Elmer W. Pehrson, Mining Engineer and Lecturer of Mineral Economics, Columbia University speaking on "Some Worldwide Aspects of Copper and Iron Ore"; Dr. James Boyd, President of Copper Range Company who spoke on "The Economic Environment of Michigan Copper Industry"; and Dr. Stanley W. Sundeen, Manager of Research and Development for Cleveland Cliffs Iron Company who spoke on "The Economic Role of Michigan Iron Ore". The afternoon session consisted of two panel discussions "The Role of Government in Mineral Resource Development" and "Multiple Use and Conflicting Interests in Mineral Resource Development".

The Humboldt Mining Company (jointly owned by Cleveland-Cliffs Iron Company and Ford Motor Company) opened a new plant in September to produce iron-ore pellets from jaspilite. The plant has an annual capacity of 650,000 tons of pellets. Work was started to increase flotation mill capacity by 50 tons per hour at the Humboldt mill. A new ball mill and related equipment will be installed for operation by 1962. With the expansion, the Humboldt mill will be able to treat 5,000 tons per day of crude ore to produce approximately 2,250 tons per day of high grade iron-ore concentrate as feed to the pelletizing plant.

Cleveland-Cliffs also has plans for the construction of a third jasper concentration plant to be located just outside of Ishpeming and to be completed by 1963. The plant will have a capacity of one million tons per year. The property will be known as the Empire Iron Mining Company and will be an open pit. When the new plant is in operation, the three plants will have a combined capacity of about 3.5 million tons per year.

On January 21, the 189 employees of Inland Steel Company's Morris mine at Ishpeming were notified that the mine would be gradually and permanently closed during the next five months. Ray D. Satterley, General Manager of ore mines for Inland said the company had tried for two years to upgrade the Morris ore, but it did not meet today's grade requirements of furnaces.

On January 23, Pickands Mather and Company laid off about 500 men at its 5 Gogebic Range underground mines. The mines affected were the Sunday Lake at Wakefield, the Peterson at Bessemer, the Newport and Geneva at Ironwood, and the Cary, near Hurley, Wisconsin. The 900 employees remaining after the lay-off were put on 16 day-month. Early in June, however, the company completed a \$150,000 iron ore drying plant at the Geneva mine. The product from the new drying plant is railed to Escanaba for loading into vessels bound for lower lake docks.

Later in the year, Pickands Mather and Company announced the sale of the Sunday Lake Iron Company underground mine at Wakefield for an undisclosed price to four Gogebic Range area men. About 300 men were employed at the mine before it was closed, because the ore could not be marketed. Most of the miners have been out of work since the closing. It was reported the new owners planned to operate the mine on a profit-sharing basis with the employees.

The Tobin mine of Republic Steel Corporation at Crystal Falls was again closed, although a crushing and screening plant recently had been installed in the shaft headframe at a cost of about \$100,000. No assurance as to the mine's reopening was given.

The M. A. Hanna Company installed a long scraper trough, a grizzly, and a 75-horsepower automatically controlled trigger on the 12th level of the Homer-Wauseca mine near Iron River. The installation is expected to result in more efficient development and mining on the 12th level. In operation, the ore will be trammed to the trough and dumped. It will then be scraped onto the grizzly from where it will pass into a strip pocket at the shaft and be hoisted to the surface. The trough will allow continuous production in the event of delays underground.

Approval of a major expansion program was announced by Hanna for its Groveland open pit jasper mine near Iron Mountain on the Menominee Range. The program is to be completed in 1963. New facilities to be installed will permit the first partially fluxed ore pellets for sale in the United States ore markets. The pelletizing capacity of the plant will be increased from 700,000 tons to 1-1/4 million tons per year. The pellets will contain more than 60% iron. The expanded plant will raise the required work force from 180 to 250 by 1963, with a payroll increase of \$500,000 a year.

North Range Mining Company announced that it will terminate its lease and close its underground Penokee iron mine late this year. The present sale contracts will be filled from current operations, but all development work has been stopped. The mine owner, Ironwood Mines Corporation, will continue its deep underground diamond drilling program seeking additional ore bodies at depth.

Early this year, the Chicago and North Western Railway completed a \$250,000 infra-red iron ore thawing plant near its ore dock at Escanaba. This modern all-electric plant, which is 276 feet long and 24 feet wide, is equipped with 1700 quartz lamps that can thaw iron ore, ten 70 ton railroad cars at a time during the freezing weather of early spring and late fall. At present the Escanaba dock is the only iron ore loading facility on Lake Michigan and in the Lake Superior region serving as many as three ranges.

Positive action in the form of substantial rate reductions for movement of iron ore from the Gogebic Range to docks at both Escanaba and Ashland was one of the contributions made by the Chicago and North Western Railway Company in its attempt to help improve the competitive position of Michigan's iron ore.

#### COPPER

No startling new developments or ore discoveries are reported by the copper mining industries of Michigan for 1961.

Total mine production of copper comes from three companies. In order of production they are: (1) White Pine Copper Company, a wholly owned subsidiary of Copper Range Company, operating in Ontonagon County; (2) Calumet Division of Calumet and Hecla, Inc., operating in Keweenaw and Houghton counties, and (3) Copper Range Company - Champion Mine, Houghton County.

Very limited exploration for copper has been conducted during 1961. The United States Metals Refining Company, a wholly owned subsidiary of American Metal Climax, Inc., has done some drilling in Ontonagon County during the summer, but this activity was to be terminated with the coming of winter.

Copper Range Company is continuing to sink a development shaft on the new "Southwest ore body" situated on the western downthrown side of the White Pine fault which cut off the ore of the White Pine ore body. The fault moved the southwest portion of the ore downward so that the new discovery lies just over 2,000 feet below the surface. This portion of the ore body will have to be mined through vertical shaft. The present development shaft is expected to intersect the ore body late in November. The ore at White Pine is essentially sulphide of copper occurring in the Nenesuch Shale.

At White Pine Copper Company, a newly designed underground ore carrier is being tested and studied. This carrier has greater capacity than the shuttle cars presently in use. It is hoped that maintenance and operating costs can be considerably reduced. In addition, several encouraging metallurgical advances are being studied and tested as a possibility for increasing mill recovery.

The Calumet Division of Calumet and Hecla, Inc. is testing ammonium nitrate as a blasting agent and is also testing integral steel bits which appear to last 300% longer than detachable threaded steel bits. The use of a new type mucker, if successful, should make shaft sinking quicker and cheaper. In addition, they are now using the new coromant cut in many drift rounds and raises, thus obtaining faster advance.

#### LIMESTONE

Drummond Dolomite opened a new quarry about five miles east of their present operation on the south shore of Drummond Island. Production from the new pit is to be gradually increased and will eventually supplant the old quarry completely.

Presque Isle Corporation is continuing development work aimed at opening a new pit to the west of their present quarry, but no production has yet come from this new area.

Michigan Limestone Division, U. S. Steel Corporation, has retired one of its self-unloader vessels, the Calcite, and its replacement by conversion of the William G. Clyde to a self-loader vessel re-christened the Calcite II.

#### CEMENT

The month of February marked the completion of a half-million dollar expansion program by Peerless Cement Company in Grand Rapids and Schoolcraft. Peerless recently installed new bulk cement storage silos and a distribution system. The expansion program was designed with consideration for nearness to markets and accessibility of both rail and trucking routes. The Schoolcraft silos will serve the southwestern part of Michigan and northern Indiana. The Grand Rapids expansion program was carried out with the intention of giving more expedient service to the Grand Rapids, Holland, and Muskegon markets, served by Peerless since 1900.

It was reported in August that the Huron Portland Cement Company plant at Alpena, presently the largest single plant in the United States, capacity of 12,000,000 barrels per year, will be enlarged. Present construction will increase capacity to 14,000,000 barrels and it is anticipated that the present capacity will be doubled within the next 14 years. Huron has also reported a 13th cement distributing plant is to be built at Waukegan, Illinois. This facility, which will have capacity of 150,000 barrels, is expected to be completed this year.

#### SAND AND GRAVEL

The 90th anniversary of the Koenig Coal and Supply Company's founding was celebrated in Detroit in October. Diversification of the original business, a retail coal concern, began in 1921, when a sand and gravel plant was opened at Oxford. The present capacity of the gravel plant is 6,000 tons per day of beneficiated aggregate.

#### SALT

The only recent significant technological development in the salt producing industry is the adoption of a unique heat-sensitive method for removing impurities and discolored salt from the mined rock salt in the solid state. The process was developed in part, and initially installed by the International Salt Company at Detroit.

#### CLAY

A producer of natural aggregate has done some exploring and testing of glacial clays as the basic raw material for light-weight aggregate production. Though the resultant product looks good, the presence of small grains and pebbles of carbonate rock produced soft spots in the material. Since this product was not a decided improvement over light-weight aggregate materials now on the market, this program has been tentatively set aside.

#### GYPSUM

Sargent Sand Company reported that it has recently opened a gypsum quarry just east of Turner, Arenac County. Production during the year has largely gone to cement plants for use in the manufacture of cement.

#### PETROLEUM

Although there has been no outstanding crude oil discoveries in 1961, the near completion of the scipio-Albion pool development in Southern Michigan along with limited discoveries in St. Clair and elsewhere counties have helped maintain a healthy glow in the State petroleum picture. Reserves of petroleum are holding near the 77 million barrel level attained last year, during which at most 16 million barrels of crude oil were produced in Michigan. Of the State's current production, 61% comes from Trenton dolomite of Ordovician age in the Scipio-Albion pool.

During the year, an application for exploratory drilling on a leased parcel of land in a dedicated State Recreation Area was turned down by the Conservation Commission. The decision, although applying to this specific parcel of land only, was of concern to the State's petroleum industry.

The October 16, 1961 Oil and Gas Journal reported underground LPG storage facilities developed by dissolving caverns in salt beds for Michigan as follows:

	Capacity in barrels	Product
Aurora Gasoline Co.		
Wayne County	150,000	propane
Wayne County	150,000	butane
City Service Oil Co.		
Kent County (4 caverns)	640,000	propane
Dow Chemical Co.		
Midland County	(Capacity not reported)	ethylene
	" "	propylene
Skelly Oil Co.		
Kent County	190,000	propane
Sun Oil Co.		
Wayne County (3 caverns)	266,000	propane
Wayne County (2 caverns)	188,000	butane

RESEARCH, TECHNOLOGY:

Cleveland-Cliffs Iron Company is carrying on extensive research work to produce better and cheaper concentrates from low grade iron ores. At Ishpeming, a staff of 50 employees in the research laboratory is continuing to improve the quality of the pellets produced at Cliff's Republic and Humboldt open pit jasper mines already operating, and the Empire which is scheduled for production in 1963. Five years of intensive research has already gone into the development of the pellets.

At the Institute of Minerals Research, Michigan College of Mining and Technology, at Houghton, investigation continues in the theory and practice of the reduction of hematite to magnetite and magnetite to iron. The fundamentals of froth action are being studied as they apply to mineral flotation. In another project, the distribution of stresses around mine openings are being simulated and analyzed by means of photo-elastic models. Geophysical research includes a study of induced polarization as a means of exploration for native copper deposits.

At the University of Michigan, work on three new geochemical laboratories, acquired through NSF and University matching funds, is nearing completion. One of these labs will be devoted to high pressure-high temperature phase studies, another to graduate student instruction, and the third to graduate student research. With funds administered by the Great Lakes Institute, flame photometric, x-ray fluorescence, and other equipment for rapid silicate analysis is being installed. In the laboratory of Subsurface Geology, the nature and distribution of the State's gypsum deposits and relative evaporites are being investigated. In this program, which is being supported by the Institute of Science, the applicability of computer techniques to such problems will be evaluated. A comparative study of the salt deposits of Michigan, Ontario, Ohio, and New York will be carried out in cooperation with the University of Kansas and supported by the National Science Foundation. Studies will continue on the petrography and origin of Michigan salt deposits.

LEGISLATION:

## LEGISLATION WHICH BECAME LAW

Act No. 21. Iron Ore. Amends Sec. 4 of Act 77 of 1951. Provides for distribution of taxes on low grade ore to local school districts and governmental units.

Act No. 131. Oil and Gas Wells. Amends secs. 6, 13, and 23 of the oil conservation Act 61 of 1939. Provides for regulation of wells for the storage of dry natural gas and liquified petroleum gas. Correct language relating to uniform spacing of oil and gas well.

## LEGISLATION WHICH WAS INTRODUCED BUT FAILED

House Bill 161. Equalization. Requires tax equalization to be made on basis of classes of property with iron mining property stated separately. Defeated in House.

House Bill 277. Mining. Permits suits for damage in moving houses on company property for strip mining. Died in House Committee on Judiciary.

House Bill 632. Iron Ore. Provides for condemnation to operate low grade iron ore beneficiation operations. Died in House Committee on Conservation.

House Bill 638. Mining. Redefines duties of county mine inspectors; creates safety code advisory board; penalties. Died in House Committee on Labor.

House Bill 676. Iron Ore. Provides for taxation of underground beneficiated iron ore; specifies duties of State Geologist and tax officials. Died in House Committee on General Taxation.

## INTERIM STUDY COMMITTEES

House Resolution 39. Investigate deep-shaft mining industry of the Upper Peninsula.

House Resolution 90. Study metallic mining industry.

Senate Resolution 26. Study method of developing Porcupine Mountains State Park.

TOPOGRAPHIC MAPPING: (U. S. Geological Survey)

## STANDARD SERIES, 15-MINUTE QUADRANGLES

New Issues: Baldwin, Clare, Custer, East Tawas, Evart, Glennie, Harrisville, Hart, Howard City, Lake, Ludington, Montaque, Reed, City, Tawas, City, White Cloud.

Reprints: Carp River, Kalamazoo, Marenisco, Shepherd, Thomaston.

## STANDARD SERIES, 7½-MINUTE QUADRANGLES

New Issues: Allen, Camden, Fayette, Frontier, Hillsdale, Morenci, North Adams, Reading.

RECENT PUBLICATIONS OF INTEREST TO THE MINERAL'S INDUSTRY:

"Geologic Features of parts of Houghton, Keweenaw, Baraga, and Ontonagon counties, Michigan", by K. Spiroff and A. E. Slaughter. Available from: Librarian, Michigan Basin Geological Society, c/o Michigan Department of Conservation, Lansing 26, Michigan. \$4.25.

"Summary of Operations, Oil and Gas Fields, 1960", by L. W. Price, et al. Geological Survey Division, Michigan Department of Conservation, Lansing 26, Michigan. Free.

"Bibliography of Michigan Geology, 1956-1960", by E. A. Kirkby. Supplement to Pub. 50, "An Index of the Geology of Michigan, 1823-1955". Geological Survey Division, Michigan Department of Conservation, Lansing 26, Michigan. Free.

"Geology of the Michigan Basin with Reference to Sub-Surface Disposal of Radioactive Wastes", by Wallace deWitt, Jr., U. S. Geological Survey, Trace Elements. Investigation Report 771 prepared on behalf of the U. S. Atomic Energy Commission. Open file report - not a publication. Copy available for examination in the office of Geological Survey Division, Michigan Department of Conservation, Lansing 26, Michigan.

"Geology of Central Dickinson County, Michigan", Geological Survey Professional Paper 310, prepared by the U. S. Geological Survey in cooperation with the Geological Survey Division, Michigan Department of Conservation. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. \$5.75.

"Portland Cement Plant Map, 1961", shows all existing producing and distribution plants in the United States, Canada, Mexico, and Puerto Rico, plus all plants under construction and expected to be completed by the end of 1962. Data on plant capacity, type of plant (wet or dry), brand name, etc., are included. Available by writing Pit and Quarry Publications, 431 S. Dearborn St., Chicago 5, Illinois. \$1.00.

1961 Transactions of Michigan Natural Resource Council "Iron and Copper in Michigan Economy". To be distributed through Secretary of Michigan Natural Resource Council, c/o Lands Division, Michigan Department of Conservation, Lansing 26, Michigan. Free.

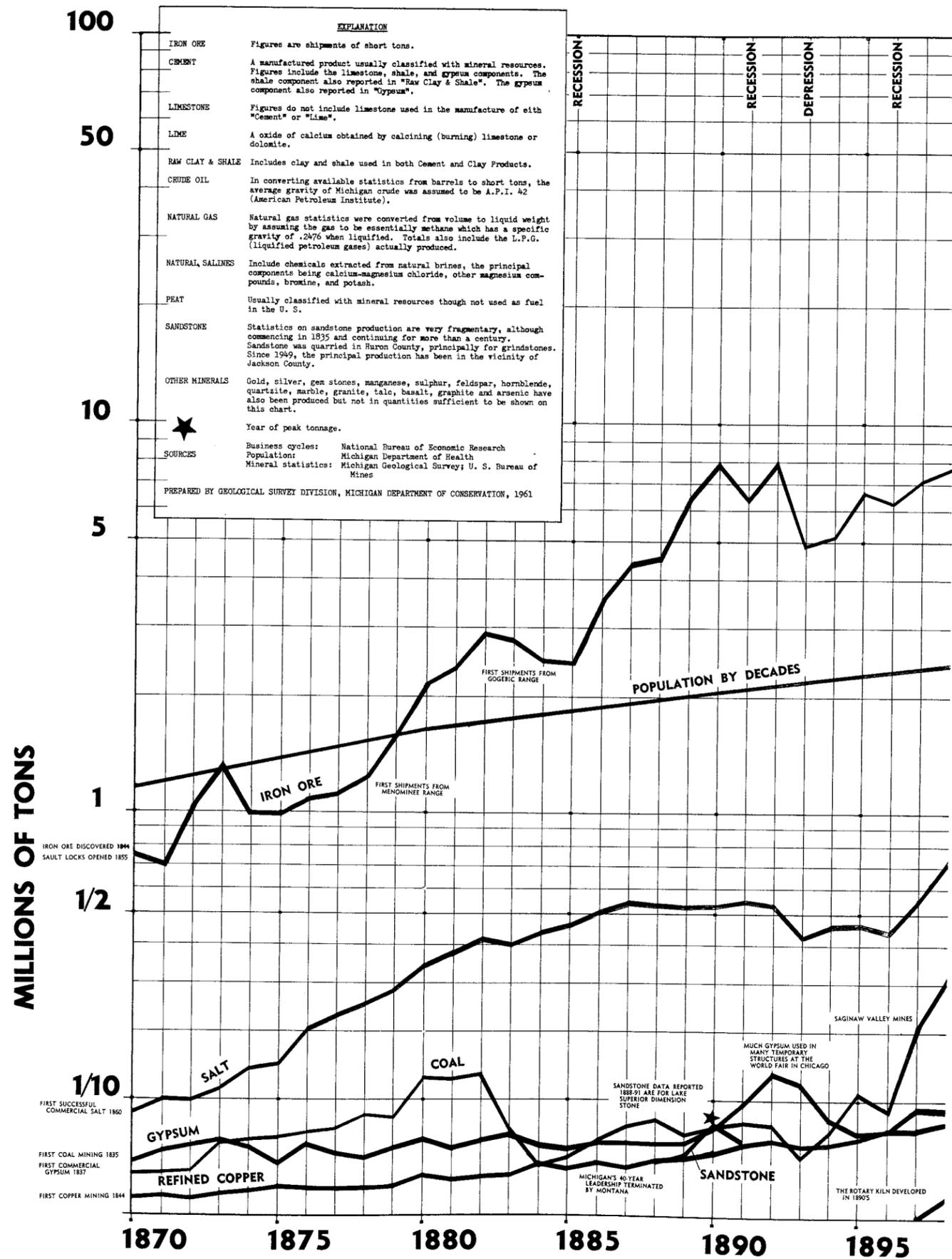
The graph that follows, showing tonnages of Michigan's minerals produced since 1870, was prepared for display at the 7th Annual Conference of the Michigan Natural Resources Council, held October 25, 1961 in Lansing.

Through the reproduction of the graph from its original size (30" x 60"), in color, to this size in black and white, several notations following dates became indistinctly shown. These are:

- 1878 First iron ore shipment from Menominee Range.
- 1884 First iron ore shipment from Gogebic Range.
- 1887 Michigan 40 years copper production leadership terminated by Montana.
- 1892 Michigan gypsum used in many temporary structures of the World's Fair in Chicago.
- 1897 Saginaw Valley coal mines.
- 1901 First iron ore shipment from Mesabi Range. Michigan leadership terminated by Minnesota.
- 1905 Michigan copper production surpassed by Arizona.
- 1906 First concrete road in Detroit and in Calumet.
- 1928 First commercial use of natural gas (casinghead), Muskegon Oil Field.
- 1928 Mount Pleasant Oil Field discovery.
- 1951 Production of beneficiated iron ore commenced.
- 1955 Production of sulphide ore commenced at White Pine.
- 1959 Michigan 36-year salt leadership terminated by Louisiana and Texas.

Peak Production Years:

- 1890 Sandstone
- 1907 Coal
- 1916 Iron ore and refined copper
- 1939 Oil
- 1947 Natural Gas
- 1955 Limestone and gypsum
- 1956 Salt, raw clay and shale
- 1959 Cement, natural salines
- 1960 Lime





MICHIGAN  
MINERAL PRODUCTION  
1960  
GENERAL REVIEW

Mineral production in Michigan in 1960 was valued at \$435,129,790, the highest value in history. The 13 per cent gain over 1959 resulted largely from increased output of iron ore and petroleum. A lag in building construction resulted in a decrease in shipments of cement and gypsum. Output of the other major mineral commodities - sand and gravel, crushed stone, and chemicals derived from well brines - did not vary much from the previous year. Iron ore regained first place in value, displacing cement which was followed by petroleum, natural salines, sand and gravel, copper, salt, and stone. Fuel value increased 50 per cent and metallic value 38 per cent. Nonmetallic value decreased 1 per cent.

In volume of mineral production in the United States, Michigan ranks: First in natural salines, gypsum and peat; Second in iron ore and sand and gravel; Third in salt; Fourth in cement, lime and marl; Fifth in copper; Sixth in stone.

The following table gives the value of Michigan mineral production of 1960:

	VALUE	PER CENT
Nonmetallics	\$250,402,059	57.5
Metallics	134,098,442	30.8
Fuels	50,629,289	11.7
	\$435,129,790	100.0

Value of Michigan's Minerals and Mineral Products 1951-1960

Year	Nonmetallics	Metallic	Fuels	Total
1951	\$127,052,493	\$ 90,278,695	\$ 40,278,695	\$257,529,882
1952	134,233,799	94,762,577	38,093,047	267,089,423
1953	145,124,894	105,235,715	37,332,526	287,693,135
1954	168,374,589	82,525,411	35,666,979	286,549,922
1955	192,353,728	145,379,721	33,623,155	371,356,604
1956	216,806,204	157,219,225	32,537,804	406,563,233
1957	230,789,635	144,235,015	31,784,950	406,809,600
1958	217,702,916	102,118,749	29,700,973	349,522,638
1959	254,240,437	97,362,759	33,718,731	385,321,927
1960	250,402,059	134,098,442	50,629,289	435,129,790

TABLE I  
MINERAL PRODUCTION OF MICHIGAN, 1960 (1)

PRODUCT	UNIT	QUANTITY	VALUE	RANK IN U.S. (2)
Iron Ore	Long Tons	10,955,866	\$ 97,072,686	2
Cement	Barrels	22,361,498	77,694,087	4
Petroleum	Barrels	15,899,206	46,105,421	18
Natural Salines (3)			44,034,486	1
Sand and Gravel	Short Tons	46,910,195	39,304,400	2
Copper	Pounds	115,438,537	37,025,756	5
Salt	Short Tons	4,087,760	33,759,466	3
Stone (4)	Short Tons	21,393,405	24,316,219	6
Lime	Short Tons	1,177,431	15,730,384	4
Clay Products			6,587,345	
Gypsum	Short Tons	1,462,781	5,608,519	1
Clay and Shale (5)	Short Tons	1,989,149		9
Natural Gas	M. Cu. Ft.	19,240,168	3,839,709	17
Peat	Short Tons	214,402	2,755,245	1
Natural Gas Liquids	Gallons	12,217,120	684,159	17
Marl	Short Tons	159,345	91,173	4
Miscellaneous (6)			520,735	
TOTAL			\$435,129,790	

(1) Metallic and fuel statistics compiled by Michigan Geological Survey. Nonmetallic statistics compiled in cooperation with the United States Bureau of Mines.

(2) Based on quantity - 1959 data.

(3) Includes bromine, magnesium compounds, calcium-magnesium chloride and potash.

(4) Does not include 9,582,765 short tons of limestone valued at \$7,775,410 used in the manufacture of cement and lime.

(5) Used in the manufacture of cement and clay products.

(6) Includes mineral pigments, sulfur, clay, and gem stones.

TABLE II  
MINERAL PRODUCTION OF MICHIGAN, 1959 (1)

PRODUCT	UNIT	QUANTITY	VALUE	RANK IN U.S. (2)
Cement	Barrels	23,025,928	\$ 77,323,974	4
Iron Ore	Long Tons	7,258,715	62,117,507	2
Natural Salines (3)			49,286,176	1
Sand and Gravel	Short Tons	48,051,816	41,192,632	2
Salt	Short Tons	4,485,145	35,724,796	3
Copper	Pounds	113,081,533	35,245,252	5
Petroleum	Barrels	10,438,608	30,518,107	18
Stone (4)	Short Tons	20,526,253	22,708,587	6
Clay Products			6,745,027	
Gypsum	Short Tons	1,721,453	6,595,256	1
Natural Gas	M. Cu. Ft.	15,626,227	3,045,976	17
Peat	Short Tons	191,661	2,356,656	1
Clay and Shale (5)	Short Tons	2,049,110		9
Natural Gasoline	Gallons	2,761,551	154,648	17
Marl	Short Tons	201,387	118,240	4
Miscellaneous (6)			12,189,093	
TOTAL			\$385,321,927	

(1) Metallic and fuel statistics compiled by Michigan Geological Survey. Nonmetallic statistics compiled in cooperation with the United States Bureau of Mines.

(2) Based on quantity.

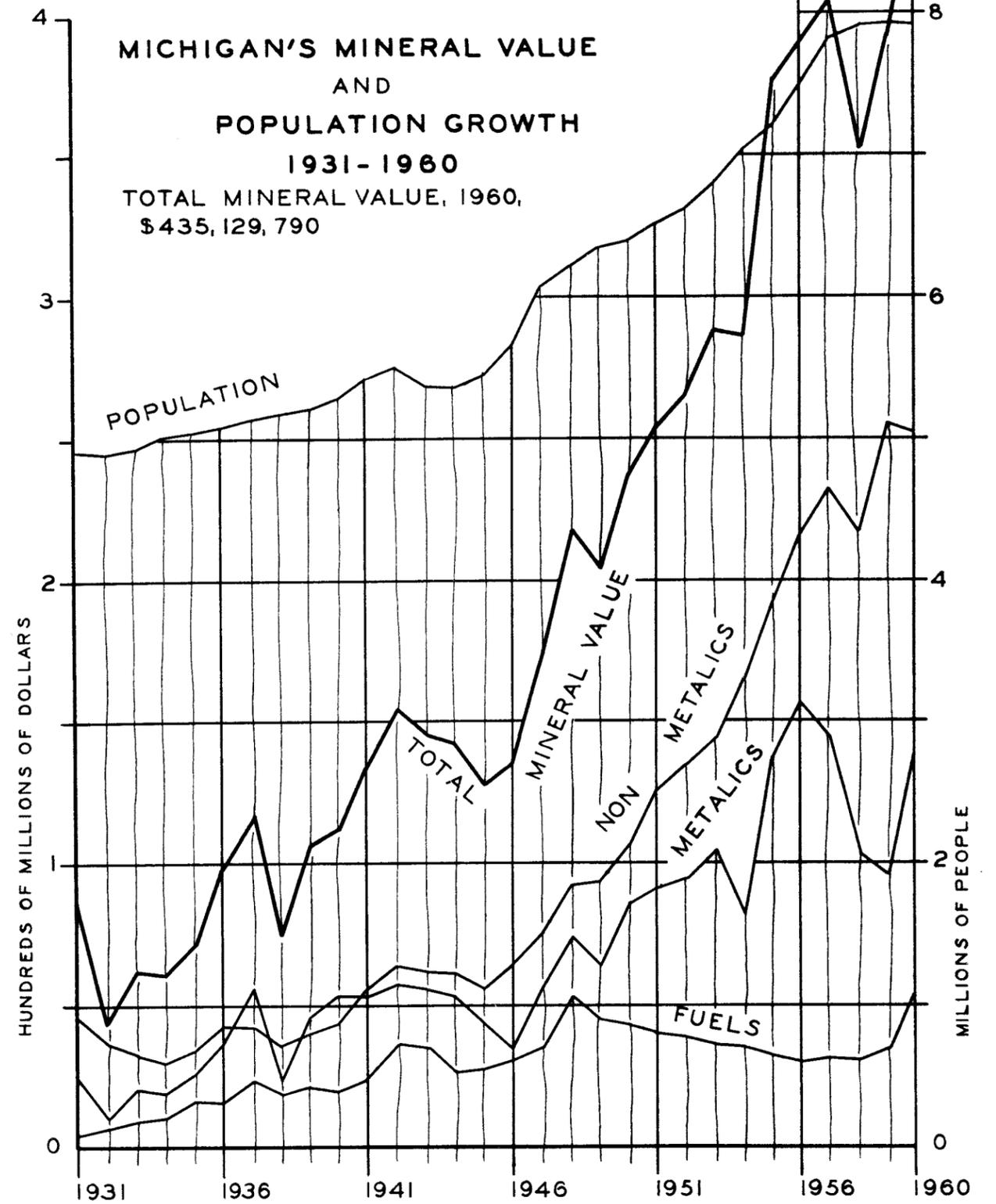
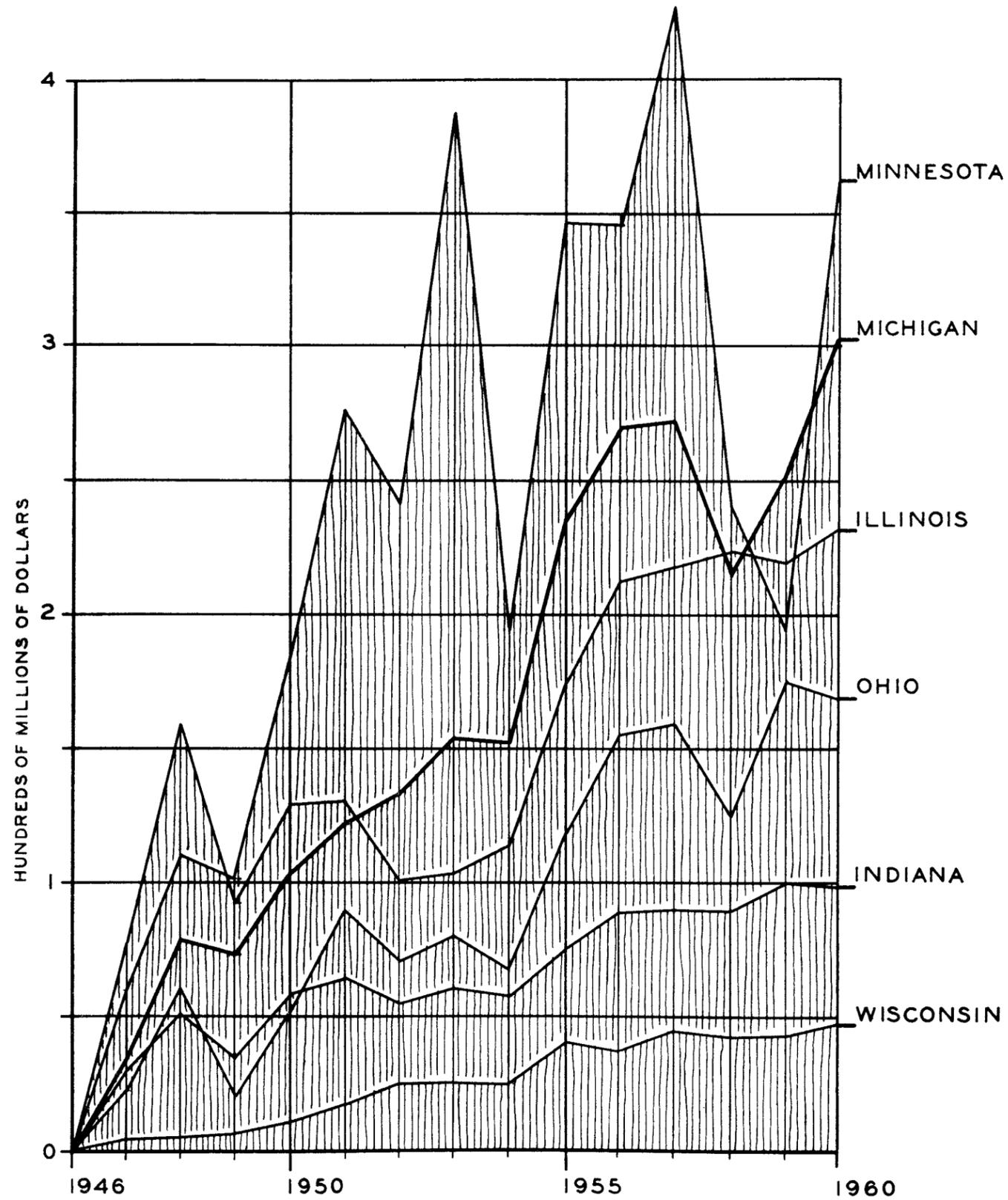
(3) Includes bromine, magnesium compounds, calcium-magnesium chloride and potash.

(4) Does not include 8,828,049 short tons of limestone valued at \$7,001,784 used in the manufacture of cement and lime.

(5) Used in the manufacture of cement and clay products.

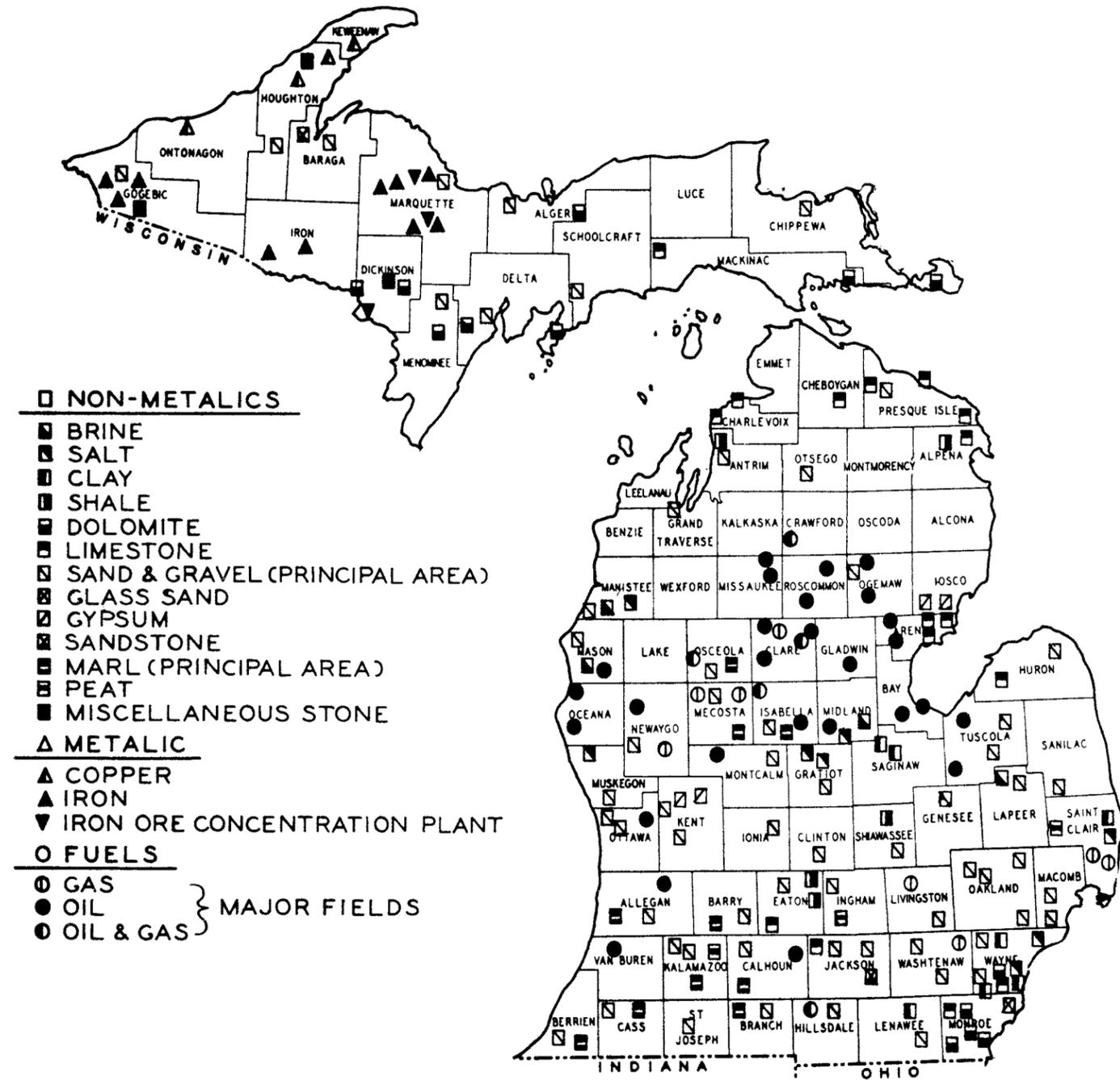
(6) Includes lime, sulfur, mineral pigments, clay, and gem stones.

**GROWTH IN VALUE OF THE MINERAL INDUSTRIES OF MICHIGAN AND BORDERING STATES, 1946 TO 1960**

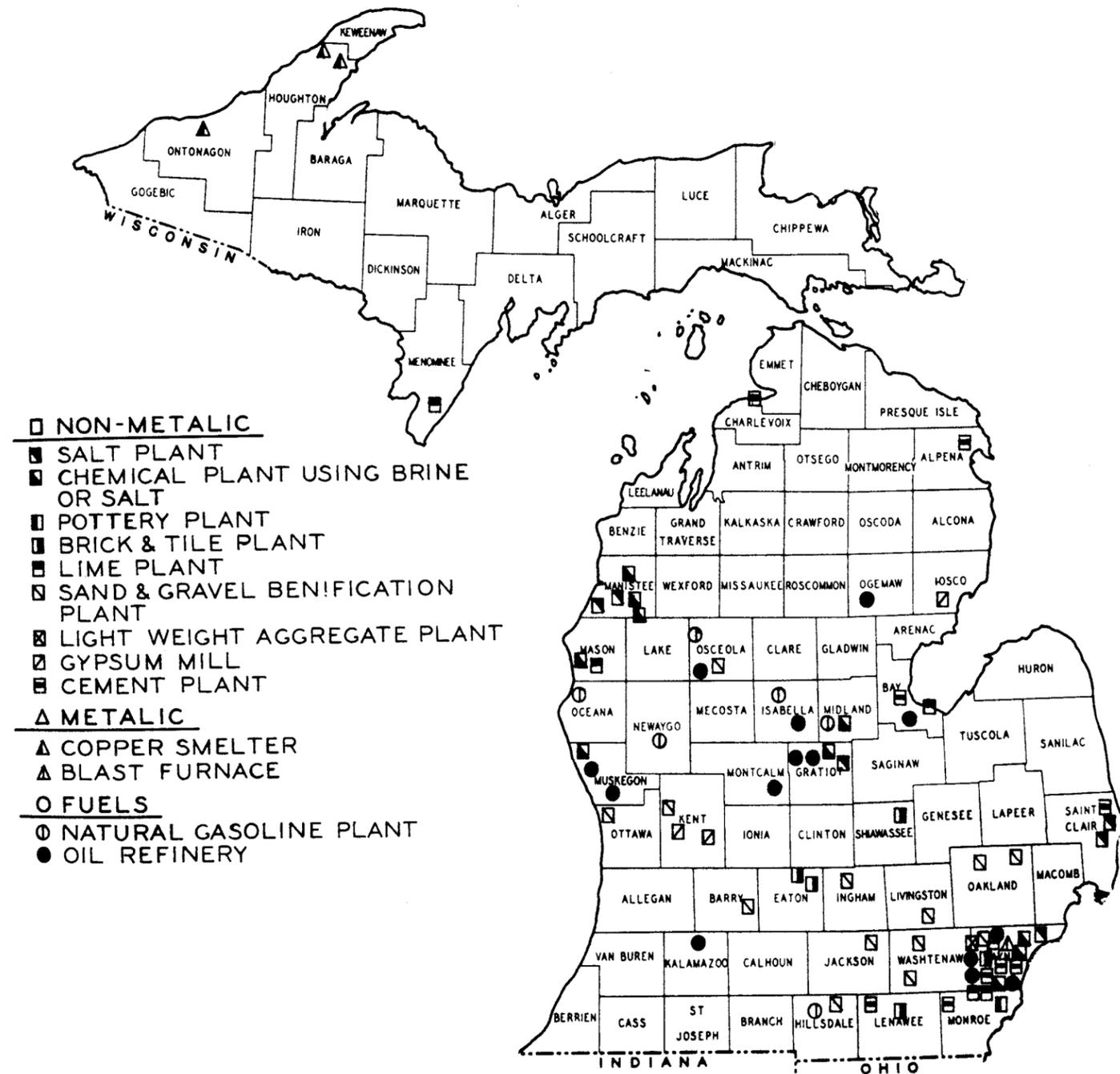


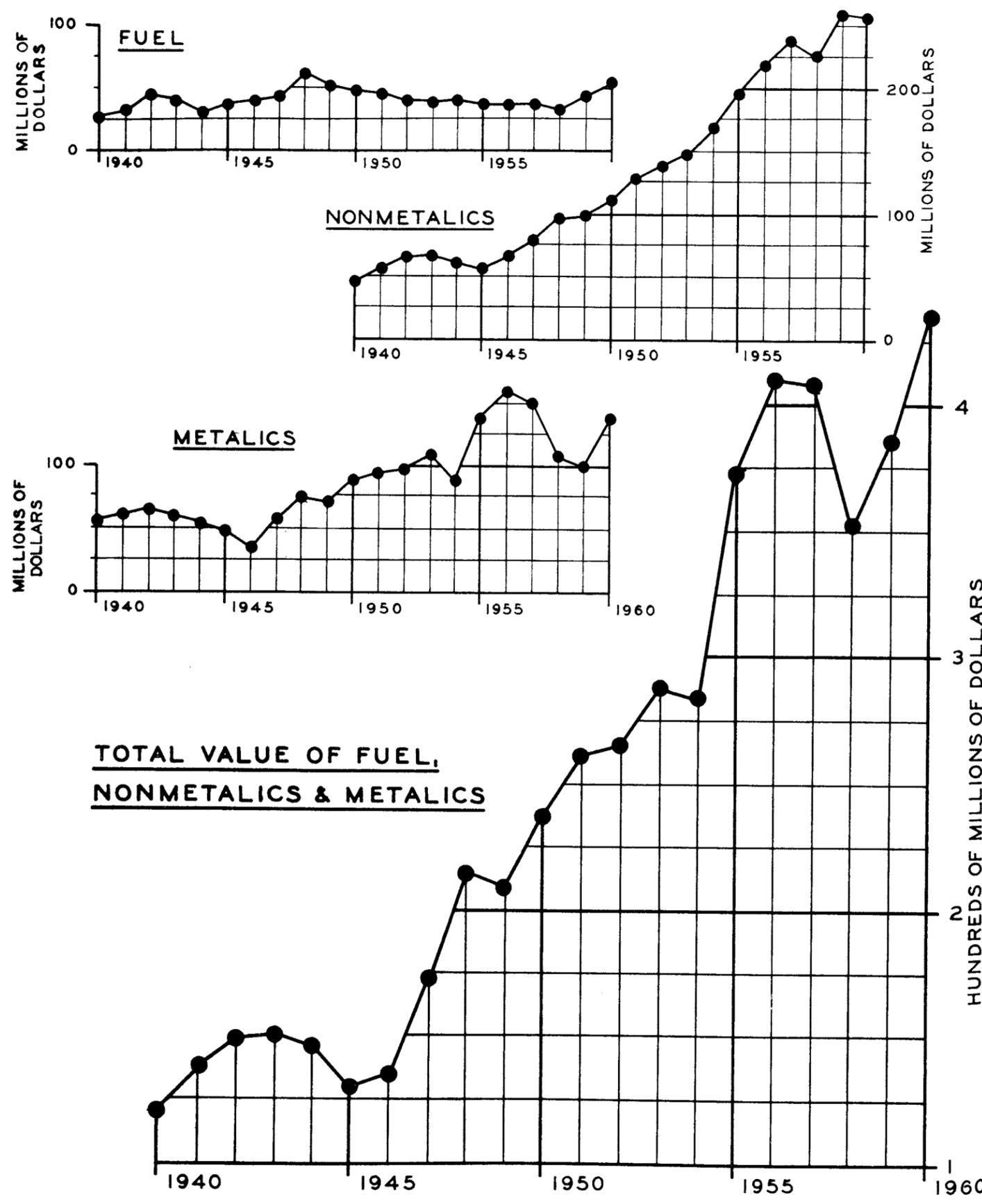
POPULATION STATISTICS FROM MICHIGAN DEPARTMENT OF HEALTH.

## MINERAL PRODUCTION MAP, 1961



## MINERAL PROCESSING MAP, 1961





METALLIC MINERALS\*

IRON ORE

Iron ore shipments totaled 10,955,866 long tons in 1960 compared to 7,258,715 in 1959 and the value of shipments was \$34,955,179 greater than 1959. Production increased in the first part of the year in anticipation of increased business due to the 1959 steel strike. As industrial activity failed to keep pace with expectations and the steel production rate dropped, iron ore shipments were curtailed after mid-year. Shipments of concentrates from jaspilite, a low-grade nonmagnetic ore, continued to increase, and in 1960 represented 11.6 per cent of the State's total iron ore shipments compared to 8.5 per cent in 1959. Dates of first and last lake shipments of iron ore in 1960 from Michigan and Wisconsin ports were: Ashland, April 17 - November 6; Escanaba, March 28 - November 17; Marquette, April 16 - November 26; Superior, April 12 - November 18.

IRON ORE SHIPMENTS BY RANGES, 1960

RANGE	Number of Mines		IRON ORE SHIPMENTS (LONG TONS)		
	Underground	Open Pit	Direct Shipments	Siliceous	Total
Marquette	9	5	4,708,487	236,228	4,944,715
Menominee	8	1	4,121,165		4,121,165
Gogebic	5	0	1,889,986		1,889,986
	22	6	10,719,638	236,228	10,955,866

Humboldt Mining Company doubled its concentrate plant capacity to 640,000 tons of flotation concentrate per year. Official dedication of the new plant was on September 16. Two parallel lines of Allis Chalmers grate kiln systems were installed along with 850 foot heavy duty conveyor system using 1,852 feet of belting.

Pickands Mather and Company, on the Gogebic Iron Range, had two crushing and screening plants under construction. The project was part of a program aimed at upgrading ore from the Gogebic Range to make it more competitive. The plants were being built at the Newport and Geneva mines near Ironwood.

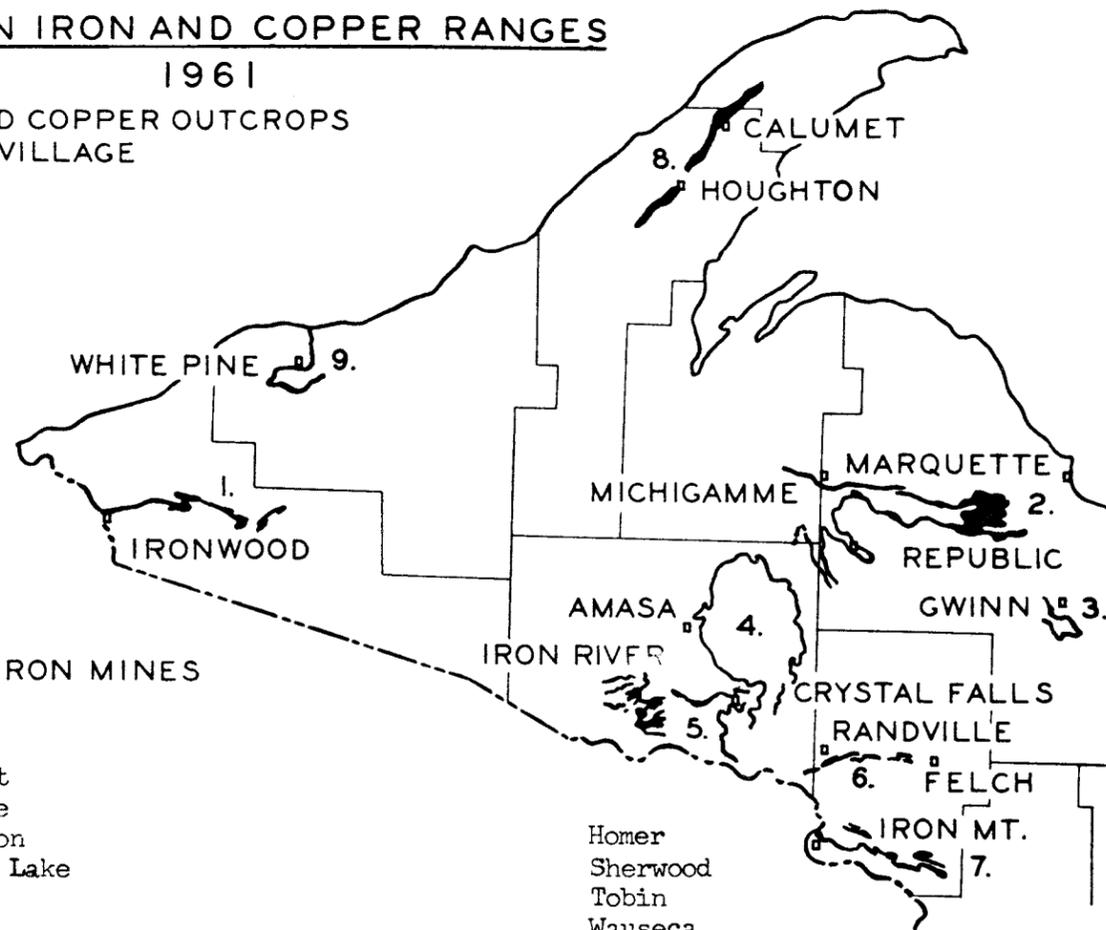
Following a study of the mining industries of Northern Michigan by a special committee of the Michigan Legislature, two statutes were enacted. House Bill No. 586 authorized the use of water for the low-grade iron ore concentration plants. House Bill No. 268 clarified the law relating to the taxation of low-grade iron ore properties.

\*Metallic statistics compiled by Michigan Geological Survey.

# MICHIGAN IRON AND COPPER RANGES

1961

IRON AND COPPER OUTCROPS  
 ■ CITY OR VILLAGE



## OPERATING IRON MINES

### 1. GOGEBIC

- Geneva
- Newport
- Penokee
- Peterson
- Sunday Lake

### 2. MARQUETTE

- Bunker
- Champion
- Cliffs Shaft
- Greenwood
- \*Humboldt (open pit)
- Maas
- Mather "A"
- Mather "B"
- Morris
- \*Republic (open pit)
- oTilden (open pit)
- Tracy

### 3. GWINN

(not active)

### 4. AMASA OVAL

(not active)

### 5. IRON RIVER - CRYSTAL FALLS

- Bristol
- Buck
- Cannon
- Hiawatha

### 6. FELCH

\*Groveland (open pit)

### 7. EAST MENOMINEE

(not active)

## OPERATING COPPER MINES AND RECLAMATION PLANTS

### 8. NATIVE COPPER

- Ahmeek
- Allouez No. 3
- Calumet and Hecla Reclamation
- Centennial
- Champion
- Osceola
- Peninsula
- Quincy Mining Co. Reclamation
- Seneca No. 2

### 9. COPPER SULFIDE

- White Pine

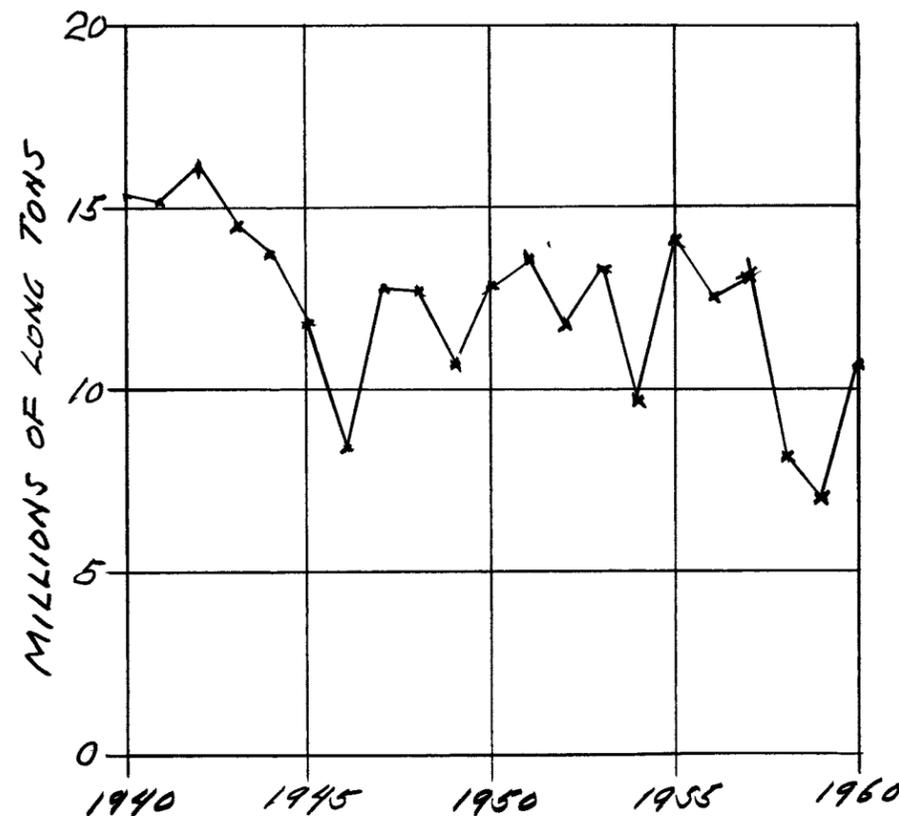
\* Low Grade Iron Ore Developments, open pit.  
 o Siliceous Iron Ore, open pit.

## IRON ORE SHIPMENTS BY RANGES

1956-1960 (Long Tons)

Year	Marquette	Menominee	Gogebic	Total	
				Quantity	Value
1956	5,689,013	3,899,213	2,958,076	12,536,302	\$105,688,087
1957	5,992,772	4,296,567	2,837,407	13,126,746	110,605,689
1958	3,722,139	3,095,239	1,393,528	8,210,906	70,704,419
1959	3,529,949	2,477,980	1,250,786	7,258,715	62,117,507
1960	4,944,715	4,121,165	1,889,986	10,955,866	97,072,686

## IRON ORE SHIPMENTS 1940-1960



COPPER

Michigan produced 115,438,537 pounds of copper during 1960, an increase of 2 per cent in production. The value of copper, however, increased 5 per cent to \$37,025,756. A labor strike at the White Pine Mine that started October 28, 1959 was settled February 22, 1960. All other copper producers operated throughout the year. Average price used for calculating the value of copper was 32.1 cents per pound in 1960 and 31.2 cents in 1959.

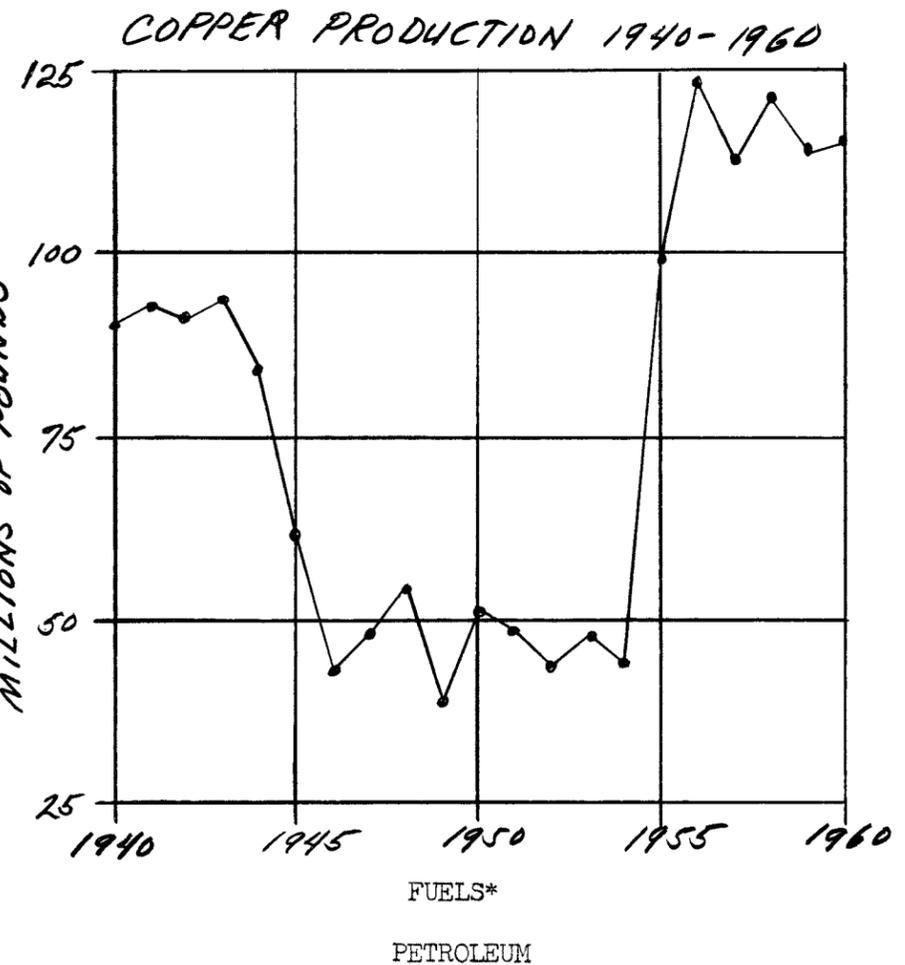
Copper Production by Counties, 1960

County	Mines	Reclamations	Copper Production (pounds)		
			Mines	Reclamation	Total
Houghton	4	3	13,526,601	8,177,675	21,704,276
Keweenaw	4	-	18,029,476	562,739	18,592,215
Ontonagon	1	-	75,142,046	-	75,142,046
<b>TOTAL</b>	<b>9</b>	<b>3</b>	<b>106,698,123</b>	<b>8,740,414</b>	<b>115,438,537</b>

Copper Range Company started a \$2 million program to develop a newly found copper deposit on property west of their White Pine Mine in Ontonagon County. An exploration shaft was being sunk as a further check on drilling results. Additional mining and metallurgical testing was planned following completion of the shaft, scheduled for the fall of 1961. If these tests show the ore and mining conditions comparable to the White Pine Mine, Copper Range planned to establish a mining unit on the site.

COPPER PRODUCTION, 1956-1960

Year	Native Copper	Sands	Sulphide	Total	
	Mines (Pounds)	Reclamation (Pounds)	Ore (Pounds)	Quantity (Pounds)	Value
1956	38,556,211	9,024,928	75,699,096	123,280,235	\$51,531,138
1957	36,147,820	8,937,304	68,562,019	113,647,143	33,629,326
1958	35,301,708	5,100,407	81,656,908	122,059,023	31,414,330
1959	34,167,881	9,266,420	69,647,232	113,081,533	35,245,252
1960	31,577,880	8,740,414	75,120,243	115,438,537	37,025,756

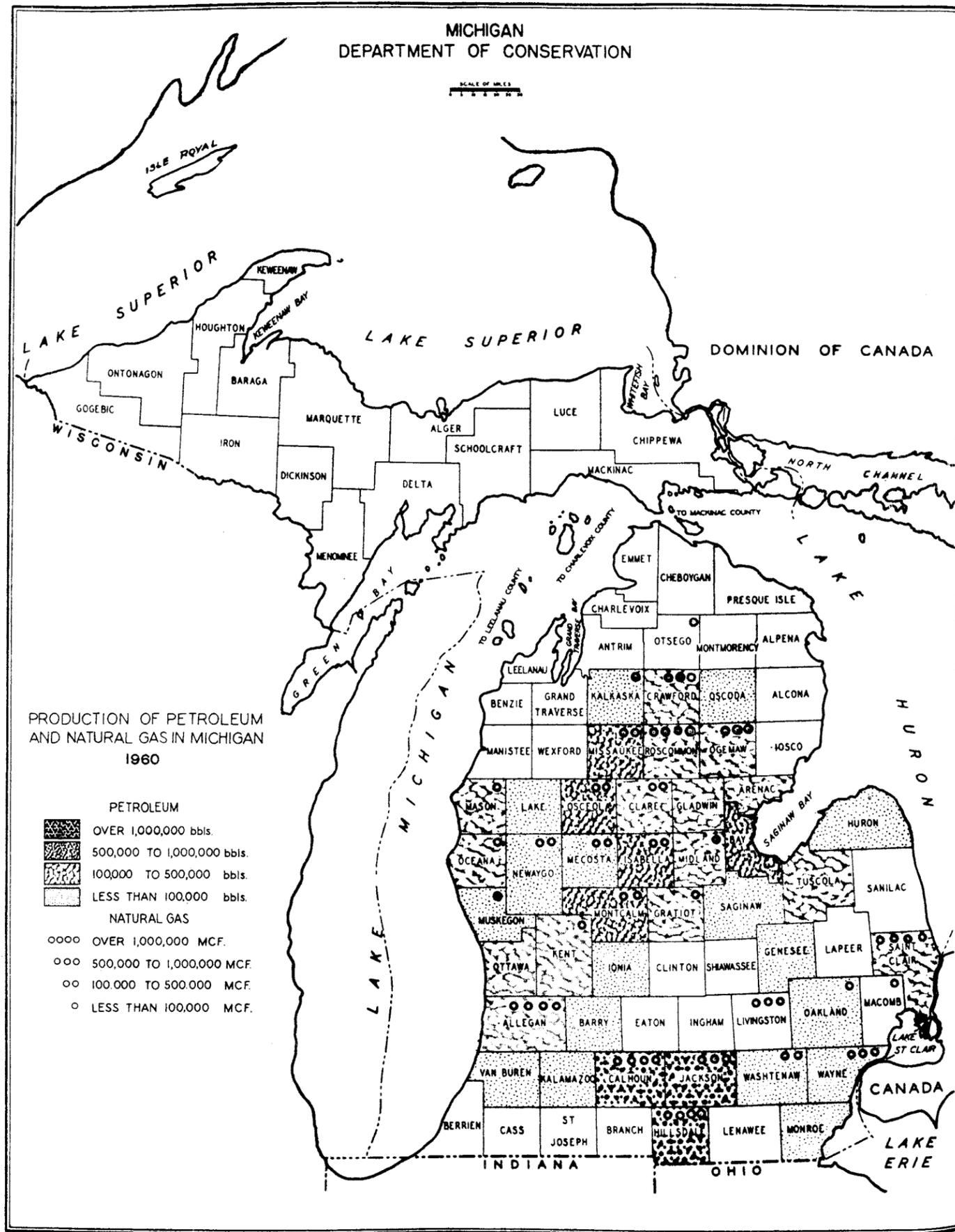


Fuels accounted for 11.7 per cent of the value of the state mineral production compared to 8.7 per cent in 1959. Petroleum production was 52.3 per cent greater than 1959 as development continued in the Albion-Pulaski-Scipio Trend. During the year, 15,899,206 barrels valued at \$46,105,421 were produced. At the end of 1960, 4,555 producing wells were in 40 counties. Approximately 50 per cent of the total output was from Hillsdale, Calhoun and Jackson counties. By the end of December, oil wells were producing at a yearly level of 18,000,000 barrels.

During the year, 832 wells were completed (372 oil producers, 19 gas producers, 441 dry holes). Of these completions 268 were wildcats (11 oil producers, 4 gas producers, and 253 dry holes). The remaining 564 completions were field wells (361 oil producers, 15 gas producers, and 188 dry holes). Fourteen refineries, in nine counties, processed crude oil in Michigan during 1960. The combined normal daily capacity of all Michigan refineries is approximately 186,365 barrels.

Detailed information for oil and gas operations is recorded in "1960 Summary of Operations, Oil and Gas Fields", available from Michigan Geological Survey.

\* Fuel statistics compiled by Michigan Geological Survey.

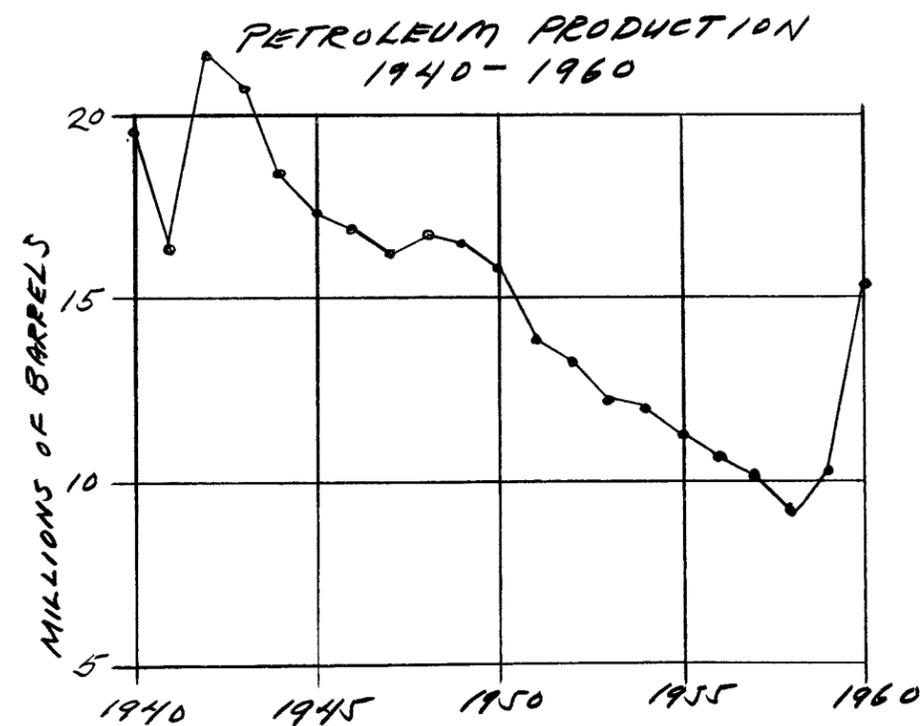


PETROLEUM PRODUCTION AND ACCUMULATED OIL BY FORMATION, 1960

Formation	Production		Accumulated	
	Bbls.	Per Cent	Bbls.	Per Cent
Marshall	1,270	.01	65,255	.01
Berea	19,149	.12	2,155,869	.49
Traverse	1,501,307	9.44	87,720,135	19.86
Dundee	3,987,425	25.08	306,270,131	69.34
Det. River	2,005,871	12.62	32,646,057	7.39
Sal-Niag.	379,806	2.39	990,982	.23
Trenton	8,004,378	50.34	11,836,451	2.68
<b>TOTAL</b>	<b>15,899,206</b>	<b>100.00</b>	<b>441,684,880</b>	<b>100.00</b>

PETROLEUM AND NATURAL GAS PRODUCTION, 1956-1960

Year	Petroleum		Natural Gas	
	Barrels	Value	M. Cu. Ft.	Value
1956	10,739,697	30,607,137	8,840,933	1,556,575
1957	10,168,602	30,505,806	6,639,813	929,574
1958	9,308,018	27,924,954	10,964,378	1,424,852
1959	10,548,608	30,518,107	15,626,227	3,045,976
1960	15,899,205	46,105,421	19,240,168	3,839,709

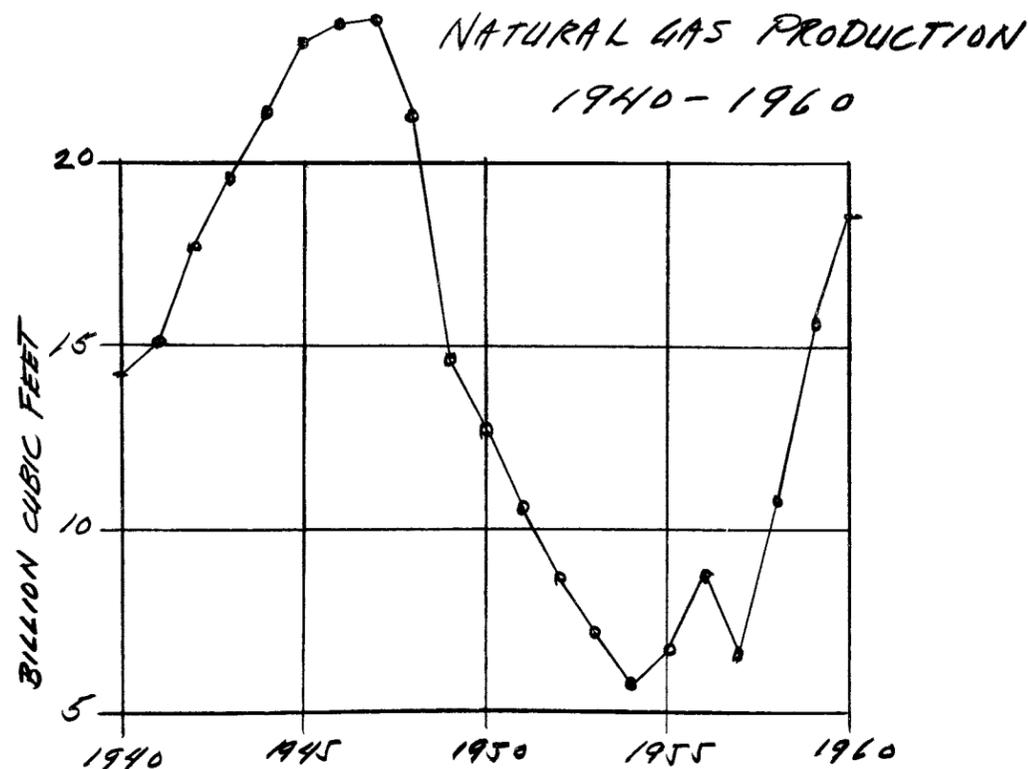


NATURAL GAS

Fifty-one per cent of the natural gas produced in 1960 was from the Salina-Niagaran formation. Natural gas production increased 23 per cent to a total of 19,240,168 M. cu. ft., the largest production since 1948. Of this amount over 8 billion cubic feet was oil well gas. Allegan County with 41 per cent of the state's total was the leading producer followed by Hillsdale, Roscommon, St. Clair, and Calhoun counties all of which produced over 1,000,000 M. cu. ft.

GAS PRODUCTION AND ACCUMULATED GAS PRODUCTION BY FORMATIONS - 1960

Formations	Production		Accumulated	
	M. Cu. Ft.	Per Cent	M. Cu. Ft.	Per Cent
Drift			8,020	.002
Stray-Marshall	855,169	4.44	210,211,140	58.43
Berea	8,800	.05	9,792,454	2.72
Antrim	37,258	.19	202,065	.06
Traverse	164,509	.85	7,548,403	2.10
Dundee-Reed City	504,474	2.62	48,295,367	13.43
Detroit River	3,979,849	20.69	24,310,121	6.76
Salina-Niagaran	9,877,820	51.35	48,927,929	13.60
Trenton-Black River	3,812,289	19.81	10,432,407	2.90
<b>TOTAL</b>	<b>19,240,168</b>	<b>100.00</b>	<b>359,727,906</b>	<b>100.00</b>



NATURAL GAS LIQUIDS - 1960

Michigan in 1960 produced from oil well gas a total of 12,217,120 gallons of natural gas liquids valued at \$684,159. Hillsdale County, with 69.7 per cent of the state total, ranked first among the eight producing counties. The large increase in production over 1959 was due primarily to production from the Albion-Scipio Field.

Year	Quantity (gallons)	Value
1956	3,740,916	374,092
1957	3,495,703	349,570
1958	3,511,671	351,167
1959	2,761,551	154,648
1960	12,217,120	684,159

NONMETALLICS

CEMENT

Portland cement was produced by nine cement plants in the state during 1960. Antrim shale from Alpena County and Ellsworth shale from Antrim County were used by the northern plants. All southern plants used local glacial or lake clays. The greater part of the limestone used was from the Traverse and Dundee formations.

RAW MATERIAL USED IN THE MANUFACTURE OF PORTLAND CEMENT - 1960

Raw Material	Short Tons
Limestone	5,265,094
Clay and Shale	1,566,773
Gypsum	150,009
Other	71,883

Cement ranked second in value following iron ore in 1960. A lag in building construction resulted in a decrease in shipments of cement to 22,361,498 barrels valued at \$77,694,087. Alpena continued to be the leading producer; Wayne County ranked second. Cement was produced also in Bay, Emmet, Lenawee, Monroe, and St. Clair counties.

The \$25 million plant of Dundee Cement Company, located at Dundee, commenced production March 1st with an initial rate of about 5,000,000 barrels per year. The kilns, 16 feet 6 inches in diameter, 460 feet long, and holding about 200 tons of clinkers, are reported to be the largest in the nation.

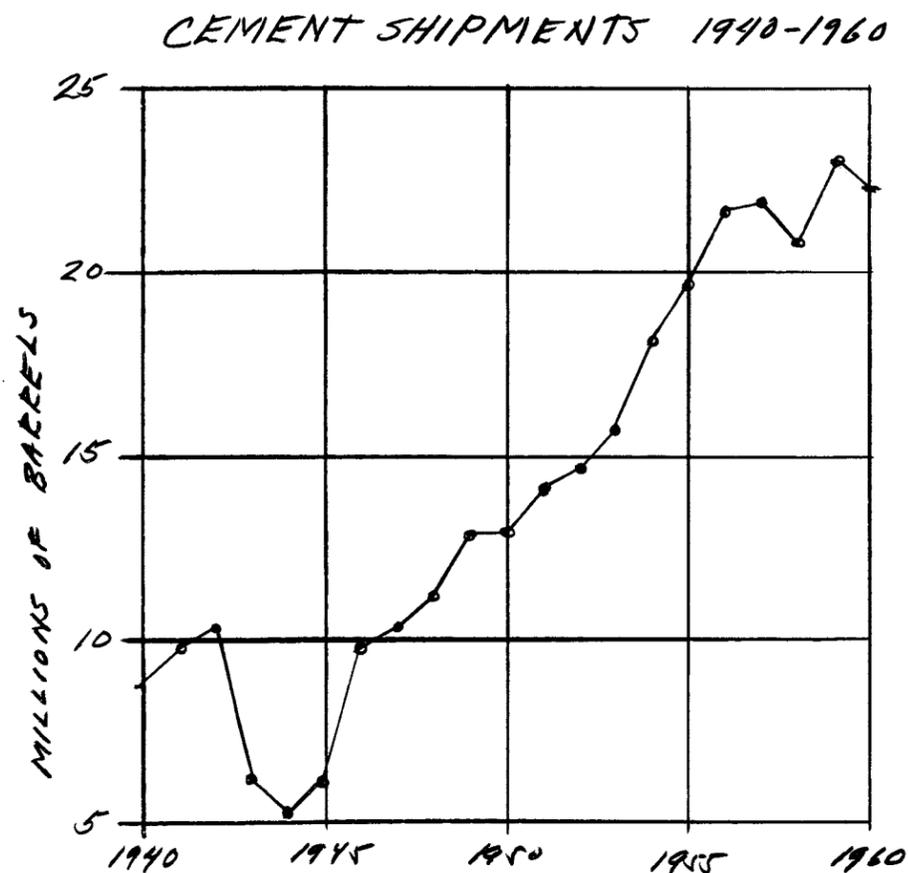
Peerless Cement Company undertook a half-million dollar expansion program calling for construction of new bulk cement storage facility at Grand Rapids and a distribution silo at Schoolcraft near Kalamazoo. The new installations were scheduled for completion in February of 1961 to serve the important commercial areas of western Michigan and northern Indiana.

Facilities to increase the finish-grind capacity of the Alpena mill of Huron Portland cement were under construction. This project adds 7,000 barrels of finish-grind capacity, an increase of more than 15 per cent, bringing the daily total to 53,000 barrels.

The steamer Amoco of American Oil Company was bought by Huron bringing the number of boats in the fleet to seven. The steamer was renamed the H. R. Schemm, in honor of Huron's president.

CEMENT SHIPMENTS, 1956-1960

Year	Shipments (barrels)	Value	Rank in U. S.	Number of Plants
1956	21,880,222	67,798,262	4	8
1957	22,045,034	71,605,137	4	8
1958	20,911,990	70,542,501	4	8
1959	23,025,928	77,323,974	4	8
1960	22,361,498	77,694,087	4	9



NATURAL SALINES

Bromine was produced in 1960 by four companies in six plants in Gratiot, Manistee, Mason, and Midland counties. Magnesium compounds were produced by four companies in Gratiot, Manistee, Mason and Midland counties. Calcium-chloride and calcium-magnesium chloride were produced by three companies in Gratiot, Lapeer, Mason, and Midland counties. The Dow Chemical Company at Midland reported production of potassium salts from natural brines.

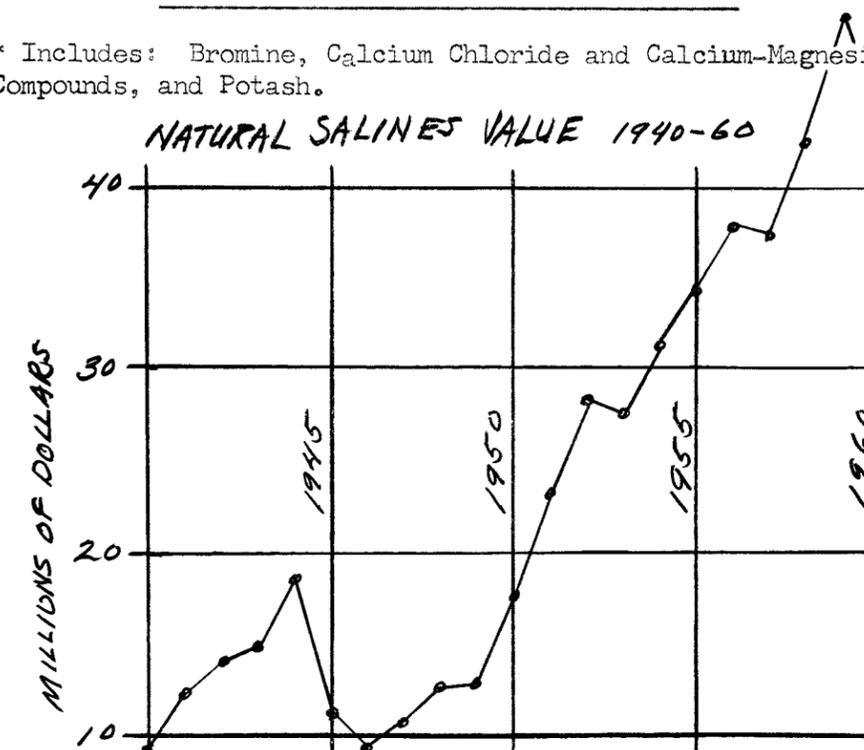
The value of the natural salines recovered by the chemical plants from natural brines in 1960 was \$44,034,486. The highest value was recorded for bromine, followed by magnesium compounds, calcium magnesium chloride and potash.

Kaiser Refractories and Chemicals completed a new \$3 million periclase plant at Midland. The facilities included a 275 foot rotary kiln and associated filtering and handling equipment. The company obtained magnesium hydroxide slurry from the Dow Chemical Company. Annual capacity was 45,000 tons of periclase and refractory magnesia.

VALUE OF NATURAL SALINES\*, 1956 - 1960

Year	Value
1956	\$ 37,873,042
1957	37,664,914
1958	42,360,677
1959	49,286,176
1960	44,034,486

\* Includes: Bromine, Calcium Chloride and Calcium-Magnesium Chloride, Magnesium Compounds, and Potash.



SAND AND GRAVEL

Sand and gravel were obtained from glacial deposits - kames, eskers, outwash plains, deltas of glacial streams, beach ridges, glacial drainage channels, beds of former glacial lakes and in less concentrated deposits in the glacial drift; from present-day beaches, river channels, and lakes; and from sand dunes. Sand was also obtained from the Lower Devonian Sylvania sandstones, a very pure quartz sandstone with grains of uniform fineness very loosely cemented.

Production and value of sand and gravel decreased in 1960 to 46,910,195 short tons valued at \$39,304,400. Sixty-eight per cent of the total sand and gravel output was used in road construction and 18 per cent for structural purposes.

USES OF SAND AND GRAVEL, 1960

Uses	Quantity (short tons)	Value	Per Cent of Total
Paving and Road Sand	5,630,096	\$ 4,501,001	12.0
Structural Sand	4,095,429	3,179,242	8.7
Molding Sand	1,699,124	2,718,827	3.6
Fill Sand	3,151,744	1,134,366	6.7
Other Sand*	675,067	1,631,896	1.4
Paving and Road Gravel	25,780,118	20,180,684	55.5
Structural Gravel	4,547,346	5,332,847	9.7
Fill Gravel	904,162	399,215	1.9
Other Gravel**	227,109	226,322	0.5
<b>TOTAL</b>	<b>46,910,195</b>	<b>\$ 39,304,400</b>	<b>100.0</b>

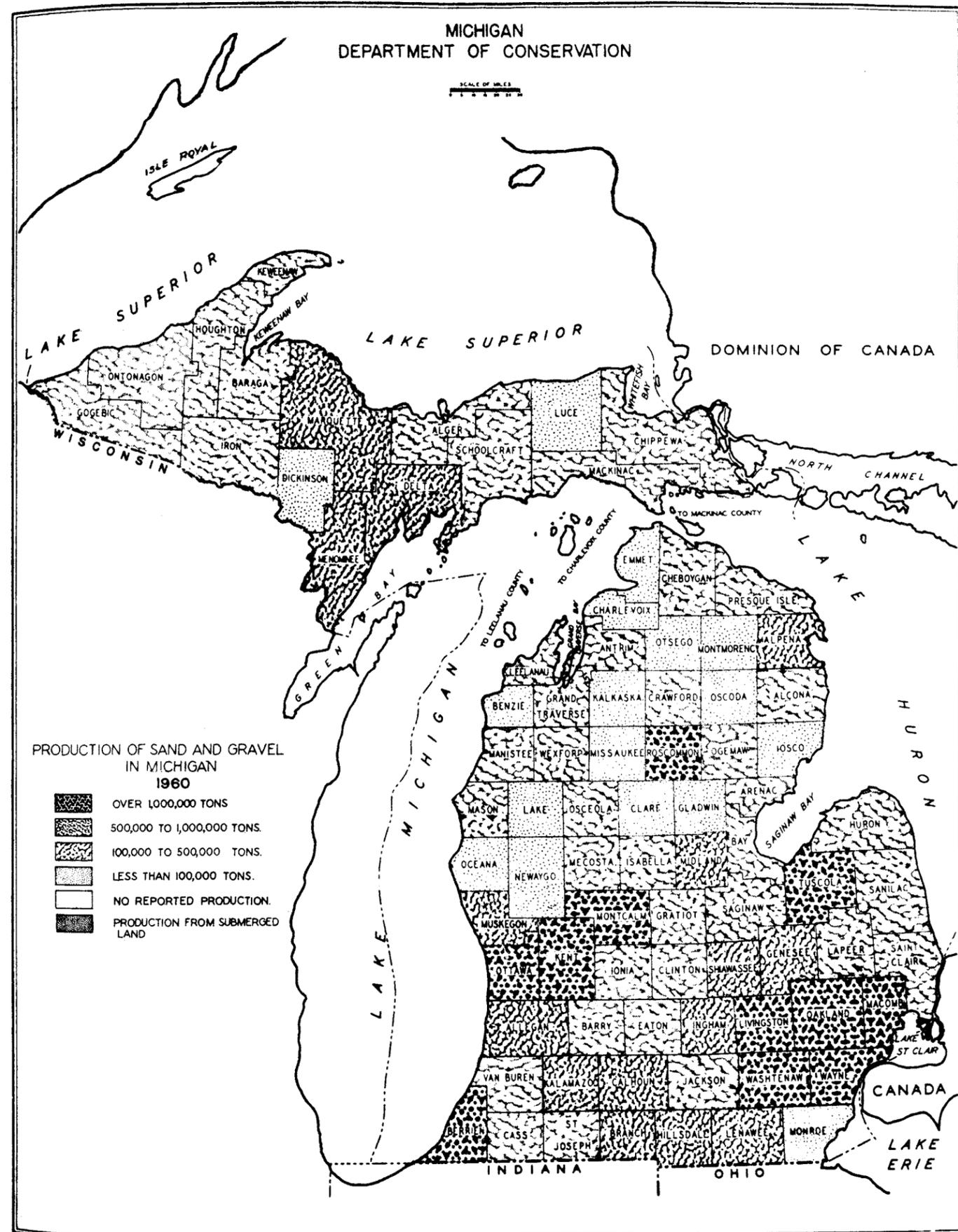
\* Includes - grinding and polishing, glass, railroad ballast, engine, and blast sand.

\*\* Includes - railroad ballast, miscellaneous, and other gravel.

Production of sand and gravel was reported from all of Michigan's 83 counties. Approximately 47 per cent of the total production was from 10 counties; in order of rank - Oakland, Livingston, Kent, Ottawa, Wayne, Washtenaw, Tuscola, Macomb, Berrien, and Roscommon. Twelve per cent of the state total was produced in Oakland County. Each of the other counties produced more than 1,000,000 tons. About 73 per cent of the State's total was reported by commercial producers and the remaining 27 per cent was non-commercial production by county road commissions and other governmental agencies.

The American Aggregates Corporation added a heavy-media separation unit at the Oxford gravel plant, bringing the total beneficiation capacity of their Michigan operations, at Oxford and Green Oaks, to 600 tons per hour. The equipment, consisting of a drum, drainage and washing gear, magnetic separator, densifier, demagnetizer, pumps and controls was supplied by Western Machinery Company.

Fourteen gravel beneficiation plants (12 employing heavy-media separators, one a jig and one an elastic fractionation process) were in operation in Michigan to produce the high quality aggregate specified for highway concrete.

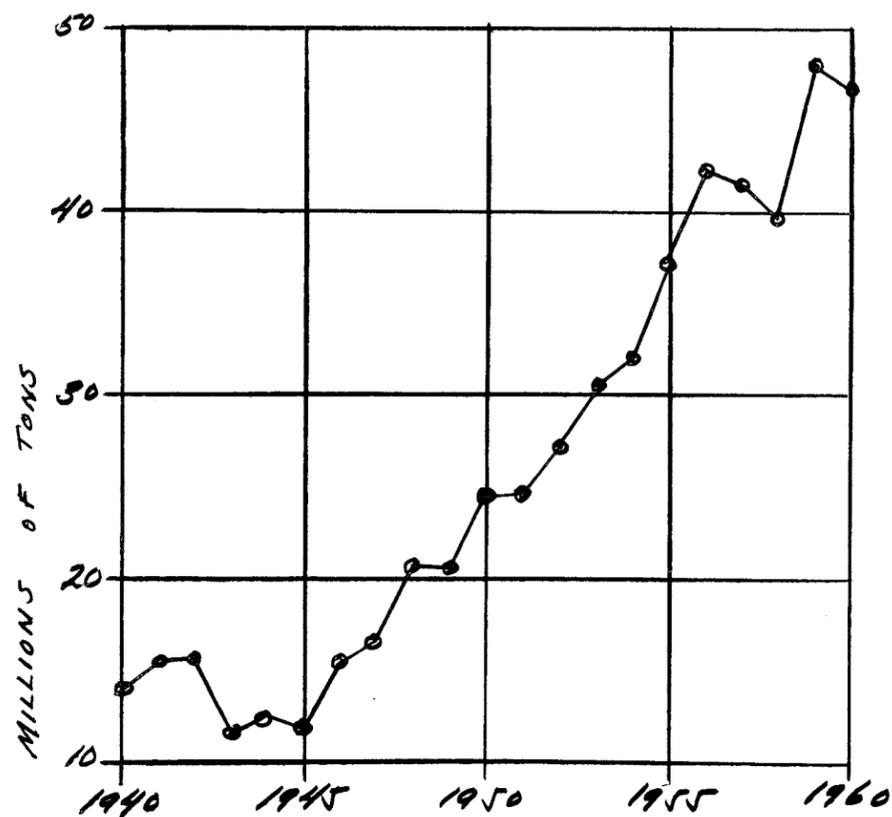


## SAND AND GRAVEL PRODUCTION, 1956-1960

Year	(Short Tons)				Total	
	Building Use	Paving and Road Use	Molding Sand	Others*	Quantity	Value
1956	11,374,625	27,254,840	1,753,195	1,767,286	42,149,946	35,145,953
1957	8,252,239	28,245,358	2,237,004	3,103,293	41,837,894	35,144,352
1958	7,960,834	27,653,570	1,792,447	2,464,351	39,871,202	34,615,648
1959	9,133,388	33,530,911	1,918,507	3,469,010	48,051,816	41,192,632
1960	8,642,775	31,610,214	1,699,124	4,958,082	46,910,195	39,304,400

\* Includes: grinding and polishing sand, glass sand, railroad ballast, engine sand, blast sand, and fill sand and gravel.

### SAND AND GRAVEL PRODUCTION 1940-1960



## SALT

Artificial brines produced by dissolving salt from the Salina formation were recovered by eight plants in Manistee, Midland, Muskegon, St. Clair and Wayne counties. The brine is used for production of evaporated salt and for use in chemical plants. Salina rock salt mined at Detroit is reached by a shaft approximately 1,100 feet in depth. Evaporated salt is produced from natural brines drawn from the Marshall and Dundee formations at St. Louis, Gratiot County, and from artificial brines from the Detroit River formation at Manistee, Manistee County. Artificial brines from the Detroit River and Salina formations are used at the chemical plant in Midland, Midland County.

During 1960, 4,087,760 short tons of salt valued at \$33,759,466 were produced. This was a decrease of 9 per cent in production and 6 per cent in value below 1959. Wayne ranked first of the six counties producing salt - followed by Midland, St. Clair, Manistee, Muskegon, and Gratiot.

Approximately 59 per cent of the salt was used by chemical plants in Wayne, Midland, and Muskegon counties. Over 2.4 million tons of salt were used in the manufacture of soda ash, chlorine, and other chemicals. Approximately 20 per cent of the total production was dried and evaporated salt.

## USES OF SALT, 1960

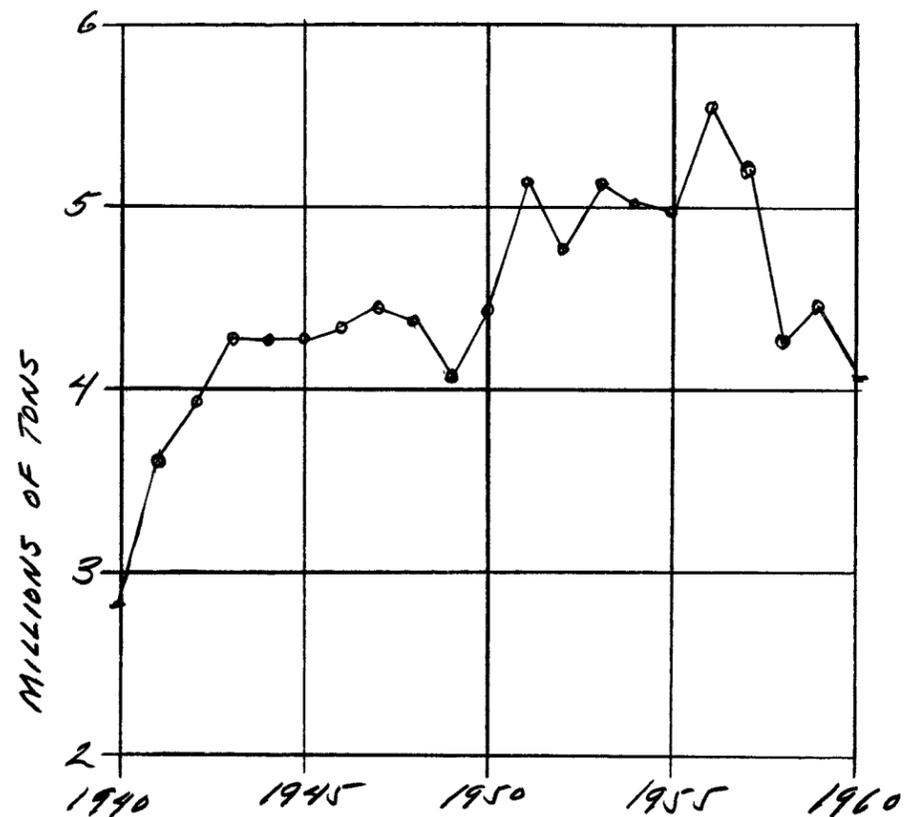
Uses	Quantity (short tons)	Per Cent
Chemical	2,411,440	58
Highway, dust and ice control	718,831	18
Livestock	158,980	4
Textile, hides, and packers	156,191	4
Food Processing	119,709	3
Table and other household	72,647	2
Water treatment	53,906	1
Other	100,916	3
Undistributed	295,140	7
<b>TOTAL</b>	<b>4,087,760</b>	<b>100</b>

International Salt Company installed a process for separating salt from impurities by selectively heating the impure materials with a battery of infra-red heat waves. The separation is possible because the sodium chloride crystals are transparent to the heat waves, whereas the impurities are not. After heating, the actual separation takes place by application of a heat sensitive adhesive to a high speed conveyor belt.

## SALT PRODUCTION, 1956 - 1960

Year	Quantity Short Tons	Value	Per Cent U.S. Total	Rank in U.S.
1956	5,548,178	\$ 35,643,860	22.9	1
1957	5,225,425	41,072,497	21.9	1
1958	4,266,688	33,018,368	19.5	1
1959	4,485,145	35,724,796	17.8	3
1960	4,087,760	33,759,466	-	3

## SALT PRODUCTION - 1940-1960



## STONE

Approximately 90 per cent of the limestone and dolomite produced in Michigan in 1960 was quarried in Presque Isle, Mackinac, and Chippewa counties. Dimensional limestone was produced in Charlevoix, Eaton, Huron, and Presque Isle counties.

Sandstone for rough construction, rubble, and flagging stone was quarried from the Marshall sandstone of Mississippian age in Jackson and Hillsdale counties.

Basalt from Precambrian rocks was crushed and used for road construction in Houghton County.

Stone production and value increased to 21,393,405 tons and \$24,316,219 in 1960\*.

## STONE PRODUCTION, 1960\*

Commodity	Quantity (Short Tons)	Value
Limestone and dolomite- crushed	21,325,012	\$24,104,405
dimensional	6,801	58,889
Sandstone-dimensional	11,615	97,395
Basalt-crushed	49,977	55,530
<b>TOTAL</b>	<b>21,393,405</b>	<b>\$24,316,219</b>

\* Does not include 9,582,765 short tons of limestone valued at \$7,775,410 used in the manufacture of cement and lime.

An additional grinding mill, screens, and storage and material handling equipment were installed at the Rogers City and Cedarville operations of Michigan Limestone Division, U. S. Steel. The new equipment increased production of fluxing fines being used in connection with self fluxing sintered iron ore concentrates.

Inland Lime and Stone Company put in operations a new sinter sand limestone plant at Port Inland.

## USES OF CRUSHED LIMESTONE AND DOLOMITE, 1960

Uses	Per Cent of Total	Quantity (Short Tons)	Value
Flux	57.6	12,292,426	\$13,164,695
Concrete + Road Stone	24.9	5,306,573	6,156,081
Chemical*	13.9	2,971,051	3,534,096
Agricultural	2.7	572,921	931,486
Other**	.9	182,041	318,047
<b>TOTAL</b>	<b>100.0</b>	<b>21,325,012</b>	<b>\$24,104,405</b>

\* Includes: alkali, calcium-carbide, sugar, glass, and paper

\*\* Includes: filler, asphalt, dust for coal mines, mineral food railroad ballast, stone sand, and others.

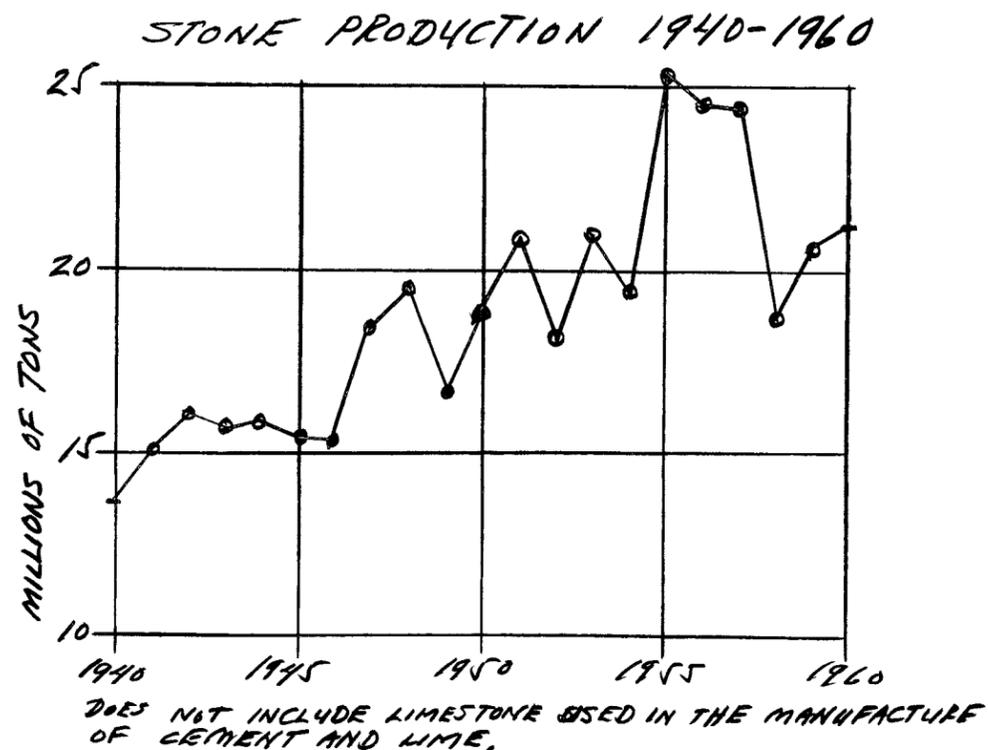
## USES OF CRUSHED LIMESTONE AND DOLOMITE

1956-1960 (short tons)

	1956	1957	1958	1959	1960
Flux	14,039,485	14,624,595	8,821,169	10,805,705	12,292,426
Concrete & Rod Metal	5,442,797	4,954,171	6,063,671	5,311,121	5,306,573
Chemical*	4,206,961	3,574,323	2,985,530	3,729,465	2,971,051
Agriculture	538,439	586,558	486,653	434,116	572,921
Others**	359,258	921,765	165,049	131,526	182,041
Quantity	24,586,940	24,661,412	18,522,072	20,411,933	21,325,012
Value	\$23,832,728	\$26,974,290	\$19,754,092	\$22,432,225	\$24,104,405

\* Includes: alkali, calcium-carbide, sugar, glass, and paper.

\*\* Includes: filler, asphalt, dust for coal mines, mineral foods, railroad ballast, stone sand, reprop and riprap, and others.



## LIME

Seven companies produced quick and hydrated lime in the state. Production of lime increased 37 per cent to 1,177,431 tons during 1960. Wayne County ranked first in production.

At Dow Chemical Company plant in Ludington an Allis Chalmers Lepol-type grate kiln was used for the first time in the United States for lime production. The 11½' x 160' kiln has a capacity of 600 tons of lime per day.

Wyandotte Chemical Corporation proceeded with major improvements in its limestone calcining facilities at Wyandotte. Changes in the burning process were to improve the quality and increase the available capacity of 1.5 million tons of high-grade lime.

## PRODUCTION OF LIME 1959-1960

Year	Production	Value	Rank
1959	861,808	\$11,747,657	4
1960	1,177,431	15,730,384	4

## CLAY AND SHALE

Clay and shale are produced at widespread localities throughout the state. Antrim shale from Alpena County and Ellsworth shale from Antrim County quarries are used in the manufacture of Portland cement. Saginaw shale is used by three plants for manufacture of tile in Eaton and Shiawassee counties. All other tile, brick, pottery, lightweight aggregate and cement plants operating in the state use clay from local surface deposits. Clay produced in Saginaw County is sold for oil well drilling mud, for molding sand bond and for fertilizer.

During 1960, 1,989,149 short tons of clay and shale, valued at \$2,250,950, were produced. Alpena County led in production and value with 32 per cent of the State's total output, followed by Wayne, Saginaw, and Monroe counties. Approximately 78 per cent of all raw clay and shale produced was used by the cement industry. The remaining 22 per cent was used for the manufacture of a small quantity of prepared clays and for clay products - brick, tile, pottery, and lightweight aggregate.

## PRODUCTION OF CLAY AND SHALE AND CLAY PRODUCTS, 1956-1960

Year	Raw Clay and Shale Quantity (short tons)	Value	Value Clay Products
1956	2,110,030	\$2,401,051	\$6,951,866
1957	2,031,890	2,266,599	6,851,113
1958	1,948,444	2,191,909	6,786,247
1959	2,050,760	2,311,917	6,745,027
1960	1,989,149	2,250,950	6,587,345

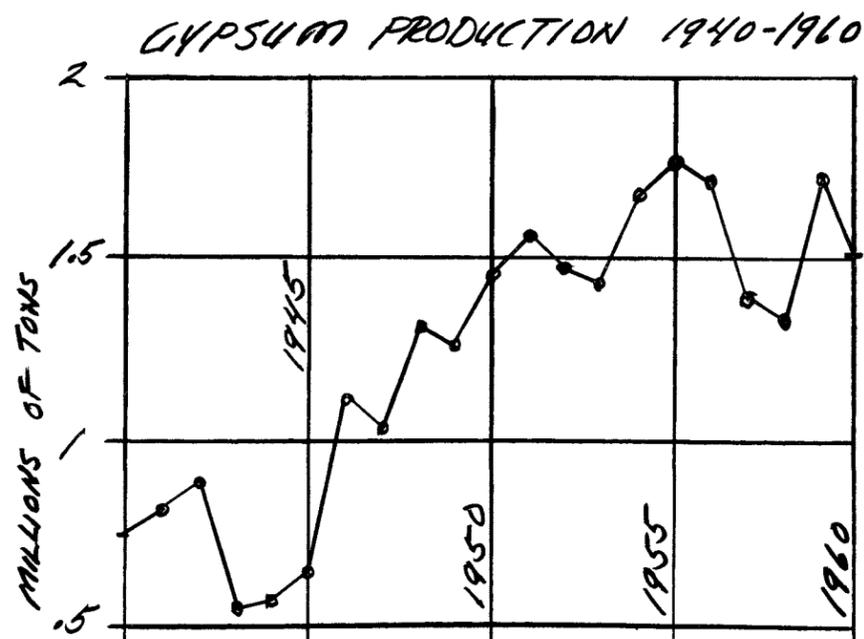
## GYPSUM

Gypsum is quarried at Alabaster and near Tawas City, Iosco County, and is mined in two underground mines at Grand Rapids, Kent County. The raw material is processed in gypsum mills at National City, Grand Rapids, River Rouge, East Chicago, Indiana, Waukegan, Illinois, and Lorain, Ohio. Principal uses for gypsum are in the manufacture of plaster, wallboard, and allied building materials and as a Portland cement retarder. In 1960, production of gypsum decreased to 1,462,781 short tons valued at \$5,608,519 due to the lag in building construction.

National Gypsum Company's automated gypsum plant at Lorain, Ohio went into production of wallboard, 16 inch lath, and plaster. The plant has a dust collection system that returns dust to the production process. The company's Tawas City quarry supplied approximately 3,000 tons of raw gypsum required each week.

GYPSUM PRODUCTION, 1956-1960

Year	Quantity (short tons)	Value	Per Cent of U. S.	Rank in U. S.
1956	1,715,832	\$ 5,861,152	17	1
1957	1,385,952	4,822,810	15	1
1958	1,330,889	4,924,431	14	2
1959	1,721,453	6,595,256	16	1
1960	1,462,781	5,608,519	--	1



## PEAT

Production increased in 1960 to 214,402 tons valued at \$2,755,245. Michigan, with nearly half of the total, led all states in production followed by Florida and California.

Most of the peat produced was used for general soil improvement purposes. Small amounts were used in pottery, in mixed fertilizers, for packing flowers for shipments, and for several miscellaneous uses.

PRODUCTION OF PEAT, 1956-1960

Year	Quantity (short tons)	Value	Per Cent of U.S.	Rank in U. S.
1956	31,111	\$ 474,899	10.7	3
1957	80,271	1,406,195	25.4	1
1958	107,342	1,683,980	32.7	1
1959	191,661	2,356,656	45.7	1
1960	214,402	2,755,245	45.5	1

## MARL

All marl produced in the state is used for agricultural purposes. This material, when added to the soil, plays the same important role as does commercial lime and may be employed in much the same manner. Commercial marl production was reported in 17 counties during 1960. Kalamazoo County ranked first, followed by Calhoun, Allegan, St. Joseph, and Barry counties. These counties produced approximately 73 per cent of the state output.

MARL PRODUCTION, 1956-1960

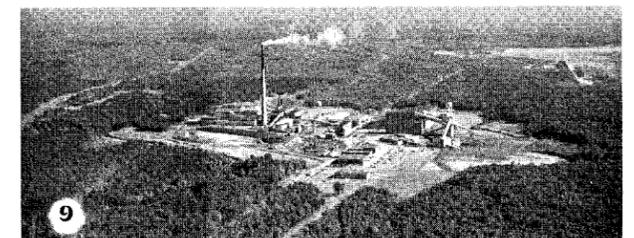
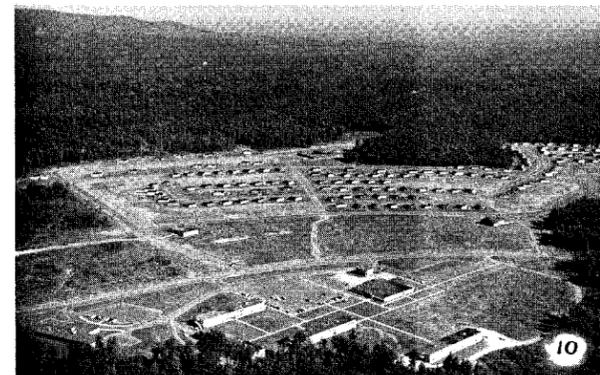
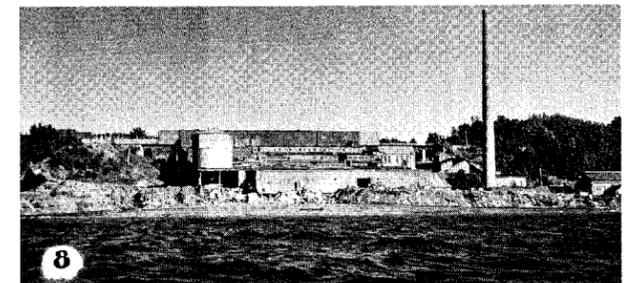
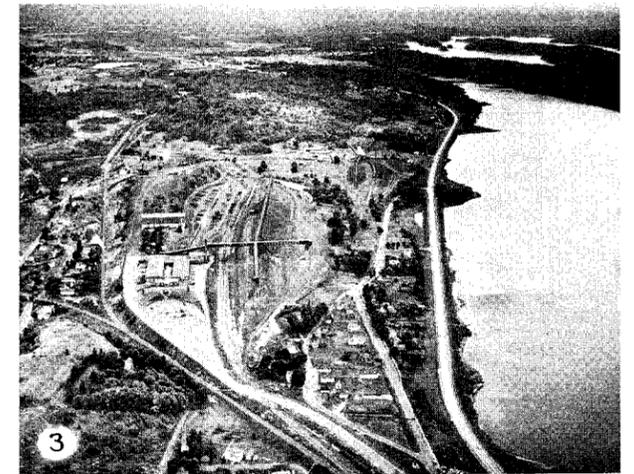
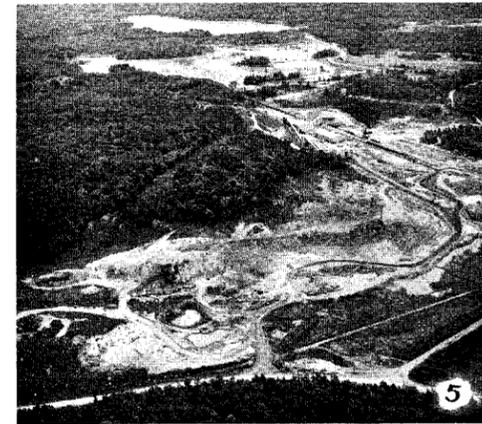
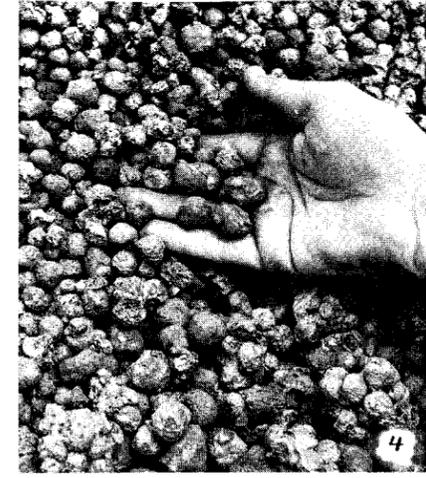
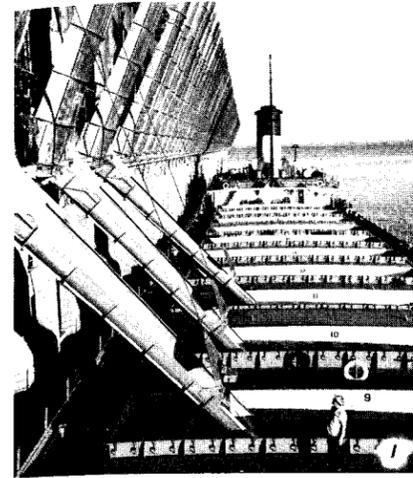
Year	Quantity (short tons)	Value	Rank in U.S.
1956	157,246	\$ 94,821	1
1957	137,020	70,635	1
1958	230,105	130,231	4
1959	201,387	118,240	4
1960	159,345	91,173	4

## IRON ORE

1. Chutes transferring iron ore from dock to ore boat at Marquette.
2. Drilling for blasting in sublevel drift of soft iron ore mine.
3. Aerial view of the surface plant of Cleveland-Cliffs Iron Company, Mather "B" Mine at Negaunee. Right center is Cambria-Jackson Mine now abandoned.
4. Concentrate pellets containing more than 60 per cent iron.
5. Aerial view of Humboldt Mine and Concentration Plant, Humboldt.
6. Loading crude ore at pit of Republic Concentration Plant, Republic.
7. Iron ore pelletizing plant, Eagle Mills.

## COPPER

8. Copper concentrate mill of Copper Range Co., Freda.
9. Aerial view of Surface plant of White Pine Copper Mine, White Pine.
10. Aerial view of White Pine townsite, White Pine. Porcupine Mountains appear in left background.



## LIMESTONE

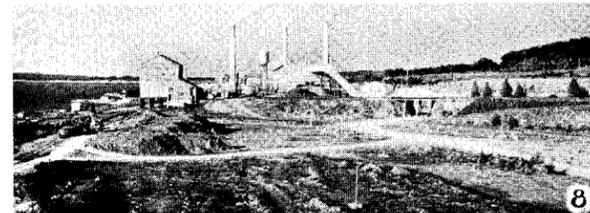
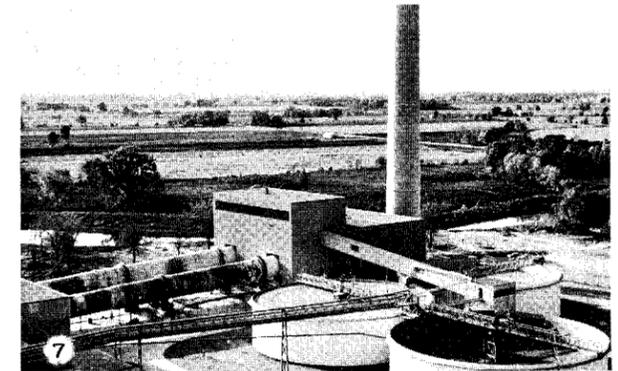
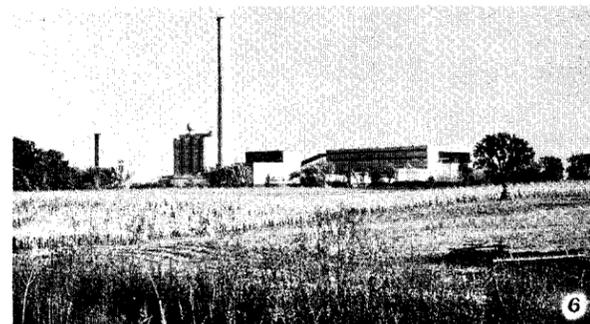
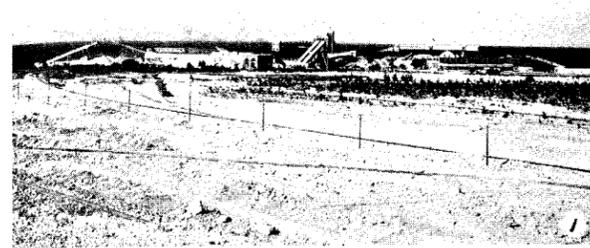
1. World's largest limestone operation. The Rogers City plant of Michigan Limestone Division, U. S. Steel Corp. Some 45 different sizes and chemical combinations are shipped for blast furnace flux, fertilizers, aggregate, cement, the basic ingredient of a number of chemicals and hundreds of other chores.
2. Loading stone into railroad gondolas in the Rogers City quarry. The trip to the processing plant averages about  $3\frac{1}{2}$  miles, but is sometimes more than 6 miles.
3. Dolomite operation of the Michigan Limestone Division, located near Cedarville, Chippewa County. The stone goes for flux use in the manufacture of steel and for road aggregate.
4. Limestone quarry of the Inland Lime and Stone Division of the Inland Steel Co. near Gould City, Mackinac County. The quarried stone is railed 7 miles south to Port Inland on Lake Michigan for processing and shipment.

## CEMENT

5. Quarry view of the world's largest single cement operation, located on the shore of Lake Huron at Alpena. Plant has 26 kilns, having an annual capacity of 12,000,000 barrels, and is owned by National Gypsum Company.
6. The 350 foot stack is a landmark of the Dundee Cement Company Plant at Dundee, Monroe County.
7. Kilns and slurry basins of Dundee Cement Co. at Dundee. The two rotary kilns (only half their 460 foot length showing) rank among the world's greatest.
8. Petoskey plant of the Penn-Dixie Cement Corp. Formerly Petoskey Portland Cement Co. before purchase by Penn-Dixie in 1954.
9. Paxton shale quarry, the source of clay for the world's largest single cement plant at Alpena shown in picture number 5.

## BUILDING STONE

10. At Onaway, Presque Isle County is the Onaway Stone Company. Cut and uncut slabs of thin bedded limestone from this concern is marketed as far south as Lansing.
11. Colorful red and white sandstone being quarried again near Arnheim, Baraga County, for the first time since the "Redstone Era" many decades ago.

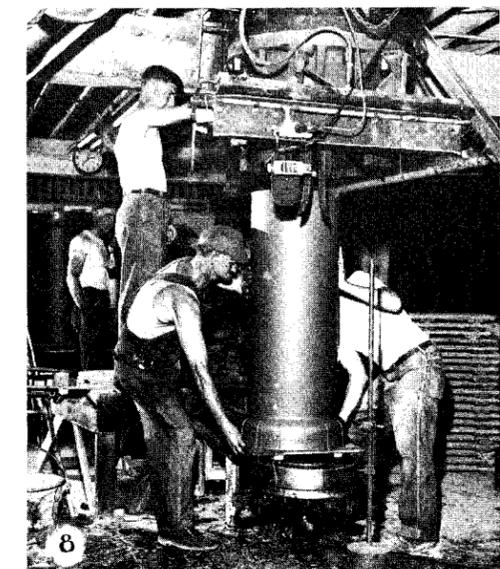
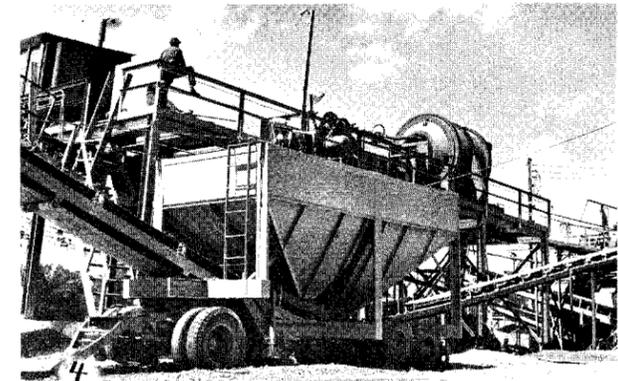
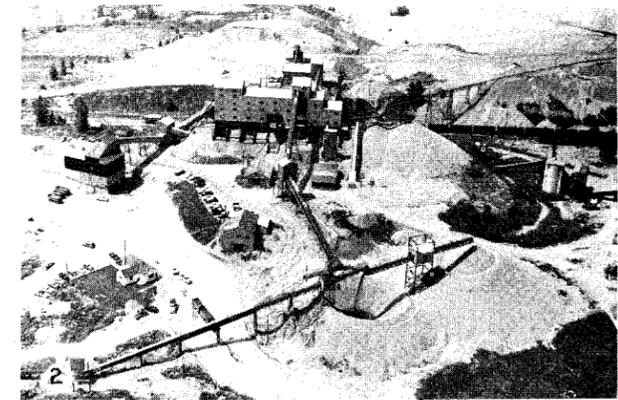


## SAND AND GRAVEL

1. A soft angle of repose at the working face is maintained by hydraulic jetting. Powerful pumps on the dredges suck up the material and move it to the processing plant. Brighton operation of the American Aggregates Corporation.
2. The Brighton Plant of the American Aggregate Corp. has an annual capacity of 3,500,000 tons, making it the largest single gravel operation in Michigan. Beneficiation removes harmful chert, shale, clay, etc.
3. Bundy Hill in Hillsdale County was formed thousands of years ago by meltwater streams tumbling over the front of a great glacier. Installation of beneficiation equipment insured the development of a significant 100 acre tract.
4. In 1955, the Bundy Hill Gravel Company installed the heavy-media separation equipment shown in the picture. The coarse desanded material (picture No. 3) is mixed with a flotation medium having a critical density that is intermediate to the desired heavy components in the gravel and the objectionable light components.
5. The Millersburg "Big Cut" pit of the Straits Aggregate and Equipment Corporation is the largest gravel operation in the northern part of the Lower Peninsula. The deposit is an "esker", sorted sands and gravels, left in the bed of a meandering meltwater stream that had tunnelled a course through the bottom of the glacier.
6. Portable gravel plants permit the development of many local deposits - needed for roads and construction work.

## CLAY

7. An indication of the variety of tile and vitrified were being manufactured at one of Michigan's remaining seven clay products plants. Grand Ledge Clay Products Co., Grand Ledge.
8. A scene at Grand Ledge Clay Products Co. plant at Grand Ledge, showing a fresh, soft, moist tile being removed from a big steam-operated clay extrusion machine.



## SALT

1. The International Salt Company mine at Detroit. This 50 foot haulageway is about 1100 feet below the surface.
2. Electrically operated machinery in the Detroit salt mine precludes fouling the air.
3. Underground assembly and maintenance workshop of the International Salt Co. mine of Detroit. Roadscrapers maintain the many miles of road connecting mining, crushing, sorting, storing, and hoisting operations.

## GYPSUM

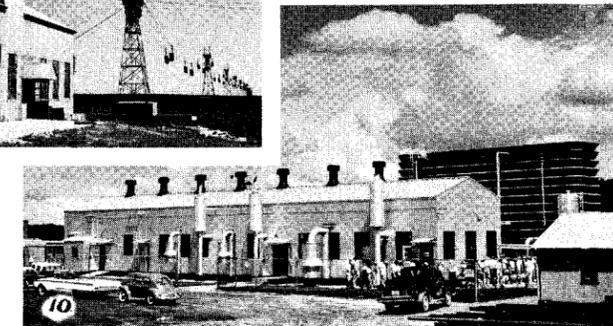
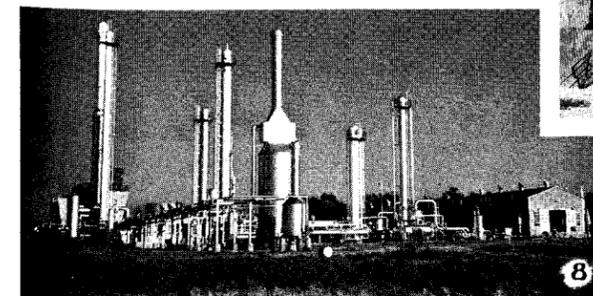
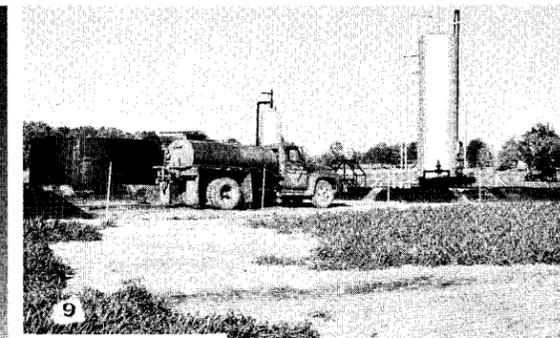
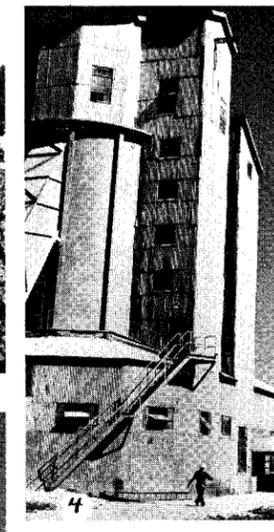
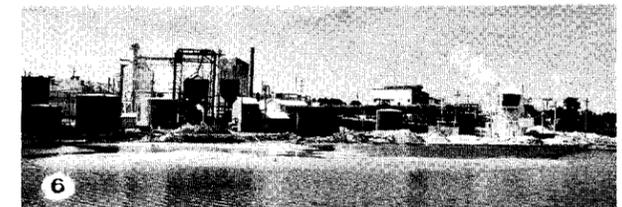
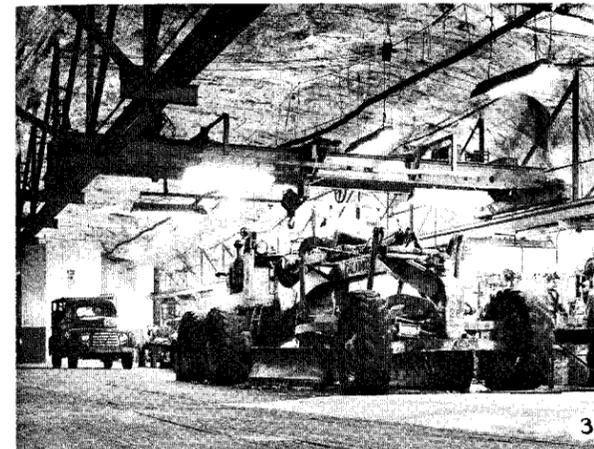
4. The aerial tramway of the United States Gypsum Co. at Alabaster stretches for  $1\frac{1}{4}$  miles into Lake Huron. Crude gypsum is shipped to the company's plants at Detroit and Chicago.
5. The National Gypsum Company's new quarry near National City, Iosco County. Raw material supplies company plants at National City, Lorain (Ohio), and Waukegan (Illinois).

## BRINES

6. Scores of brine wells in Central Michigan, rich in bromine, sodium, calcium and magnesium, are the source of most of the chemical products of Michigan Chemical Corporation at St. Louis.

## OIL AND GAS

7. Sugar beets from rich soil on the surface - oil from rocks 3,500 feet below. Kawkawlin Oil Field.
8. Processing equipment in the state's largest natural "gasoline" plant handling natural gas produced in the Albion-Scipio area.
9. Tank truck loading brine in the Scipio Oil Field. Oilmen are continually faced with the problem of proper disposal of brines produced with crude oil. Michigan statutes require that the unwanted brine be injected into an approved deep rock formation.
10. Sun Oil Co. recycling plant in the East Norwich Field in Missaukee County - an excellent example of a successful conservation program. The life of this field is being extended by the gas injection method of secondary recovery.



PRODUCTION AND VALUE  
OF  
MINERALS AND MINERAL PRODUCTS  
BY COUNTIES

1960

All counties reported mineral production for 1960. Wayne, Marquette, Alpena, Midland, Iron, and Ontonagon counties led all others in value, contributing 49 per cent of the state's total.

The quantity and value of mineral production are given on a commodity basis by counties, where possible. However, in some cases, to avoid disclosure of individual company operations, the county total may be only given or the county combined with others under undistributed at the end of the county breakdown. The value of clay and shale used in manufacture of cement and clay products and the value of limestone used in the manufacture of cement and lime are not included in county totals to avoid duplications of values. The number in parentheses, following the county name, indicates the county's rank in the state in value of mineral production. Figures in parentheses, following a mineral resource, show the rank of the county in production.

All indicated tonnage is in short tons (2,000 lbs.) with the exception of iron ore, which is reported in long tons (2,240 lbs.). Mineral producers contributing production data for 1960 are listed, by county, below production data. Location of the operation, when known, is given by section, township and range, or nearest city to operation.

	<u>Quantity</u>	<u>Value</u>
ALCONA (74)		
Sand and gravel		
Alcona Co. Rd. Comm.	NE SW 7 25N 6E SE SW 7 26N 9E NW NE 11 26N 9E	Sand and gravel
ALGER (72)		
Sand and gravel	150,565 tons	\$ 94,123
Stone	3,750 tons	11,250
Total Value		\$ 105,373
Alger Co. Rd. Comm.	6 47N 20W	Sand and gravel Limestone-crushed
Duluth South Shore and Atlantic R.R. Co.		Sand and gravel
Hocking Constr. Co.		Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel

		<u>Quantity</u>	<u>Value</u>
ALLEGAN (29)			
Natural gas (1st, 41%)		7,880,239 M.cu.ft.	\$ 1,571,048
Petroleum		194,819 bbls.	564,975
Sand and gravel		789,430 tons	540,489
Marl (3rd, 11%)		16,733 tons	9,935
Total value			\$ 2,686,447
Allegan Co. Rd. Comm.		Sand and gravel	
Cleo L. Arndt	Douglas (3½ mi. E. on 130th St.)	Marl	
	NW 23 3N 16W	Sand and gravel	
Gerald Arnsman	Allegan (1½ mi. N.)	Marl	
Bernard Damveld	22 4N 12W	Marl	
Huitt and Son	NE SW 9 2N 13W	Sand and gravel	
Emil Pavlak	NE NW 12 2N 12W	Marl	
Pickitt and Schreur	NW SE 5 1N 14W	Sand and gravel	
	SW NE 34 3N 13W		
	NE 1 3N 13W		
	NW 5 2N 16W	Sand and gravel	
H. R. Vernon	Fennville	Sand and gravel	
Harold O. Voss	NE NE 20 2N 13W	Sand and gravel	
Ben Waanders		Sand and gravel	
West Shore Constr. Co. Inc.	19 1N 14W	Sand and gravel	
	4 2N 16W		
	33 3N 12W		
John G. Yerington	Channel Pit.	Sand and gravel	

## ALPENA (3)

Portland Cement (1st), Stone, Sand and gravel, Shale (1st)			
Gilliland Gravel Co.	W½ NW 13 32N 8E	Sand and gravel	
Huron Portland Cement Co.	NE 30 31N 7E	Shale	
	24 31N 8E	Cement	
	13 31N 8E	Limestone-crushed	
Percy McKinnon	NE SE 23 32N 8E	Sand and gravel	
Michigan State Hwy. Dept.	SE SW 33 30N 6E	Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
ANTRIM (75)			
Sand and gravel		132,699 tons	\$ 67,986
Shale (5th)			
Antrim Co. Rd. Comm.	NE NE 16 31N 6W	Sand and gravel	
	SE 26 32N 8W		
	NE SW 36 32N 9W		
Michigan State Hwy. Dept.		Sand and gravel	
Penn-Dixie Portland Cement Co.	SE 23 32N 8W	Shale	
ARENAC (41)			
Petroleum (10th, 3%)		460,890 bbls.	\$ 1,336,581
Stone		210,266 tons	237,768
Sand and gravel		127,856 tons	70,225
Total value			\$ 1,644,574
Arenac Co. Rd. Comm.	NW 5 19N 7E	Limestone	
Bay Co. Rd. Comm.	34 20N 5E	Sand and gravel	
Eastman Gravel Pit	SW NW 36 19N 5E	Limestone	
Iosco Co. Rd. Comm.	SW 24 20N 7E	Sand and gravel	
Michigan State Hwy. Dept.		Limestone	
		Sand and gravel	

## BARAGA (60)

Iron Ore		34,226 tons	\$ 261,487
Sand and gravel		123,896 tons	71,195
Stone		145 tons	3,050
Total value			\$ 335,732
Baraga Co. Rd. Comm.	NW 23 51N 31W	Sand and gravel	
Cleveland-Cliffs Iron Co.			
Ohio Mine	22 48N 31W	Iron Ore	
Michigan State Hwy. Dept.		Sand and gravel	
Superior Natural Red Stone Quarry	2 52N 33W	Sandstone	

		<u>Quantity</u>	<u>Value</u>
BARRY (54)			
Sand and gravel		475,129 tons	\$ 437,340
Petroleum		23,694 bbls.	68,713
Marl (5th, 8%)		12,503 tons	7,527
Total Value			\$ 513,580
Barry Co. Rd. Comm.	SW NW 25 2N 10W SW NW 29 3N 9W SE NW 4 4N 9W		Sand and gravel
Bender Gravel Co.	SW NW 12 3N 9W		Sand and gravel
Cole Gravel Co.	6 & 7 4N 10W		Sand and gravel
William Currier	6 4N 10W		Marl
E. R. Hamilton	13 2N 7W		Marl
Ionia Co. Rd. Comm.			Sand and gravel
Nashville Gravel Co.	14 & 15 2N 7W		Sand and gravel
BAY (13)			
Cement, Petroleum (7th, 4%)			
Lime, Sand and gravel			
Aetna Portland Cement Co.	Bay City		Cement
Michigan State Hwy. Dept.			Sand and gravel
Monitor Sugar Co. Div.	Bay City		Lime
BENZIE (83)			
Sand and gravel		1,200 tons	\$ 780
Michigan State Hwy. Dept.			Sand and gravel
BERRIEN (46)			
Sand and gravel (9th, 3%)		1,235,198 tons	\$ 1,117,074
Marl		9,373 tons	4,976
Total Value			\$ 1,122,050
J. V. Burkett			Sand and gravel
Ireland and Lester Co.	NW NW 24 4S 19W		Sand and gravel
Kiell Sand and Gravel	Niles (2 mi. N. on U. S. 31)		Sand and gravel
Hugh Martel	24 8S 20W		Marl
Martin Bros. Marl Co.	21 8S 20W		Marl
Michigan State Hwy. Dept.			Sand and gravel
Portage-Manley Sand Co.			Sand
Producers Core Sand Corp.	36 6S 20W		Sand
Rynd Gravel Co.	NE 27 3S 17W		Sand and gravel

		<u>Quantity</u>	<u>Value</u>
BERRIEN (contd.)			
John G. Yerington	NW SW 27 3S 17W NW SE 28 6S 18W NE SW 36 7S 18W Popovich Pit		Sand and gravel
BRANCH (58)			
Sand and gravel		509,160 tons	\$ 406,059
Marl		750 tons	450
Total Value			\$ 406,509
Branch Co. Rd. Comm.	NE SE 19 6S 6W		Sand and gravel
Hayward Dry Marl	14 5S 5W		Marl
H. Stukey Co.	SW SE 4 6S 6W		Sand and gravel
Thompson Gravel Co.	Coldwater		Sand and gravel
Woodward Bldg. Mtls.	NW SW 21 6S 6W		Sand and gravel
CALHOUN (14)			
Petroleum (2nd, 15%)		2,439,677 bbls.	\$ 7,085,063
Sand and gravel		966,593 tons	743,507
Natural Gas (5th, 5%)		1,009,297 M.cu.ft.	201,859
Marl (2nd, 18%)		28,500 tons	17,100
Total Value			\$ 8,047,529
Albaugh and Needham	NE SE 32 2S 5W		Sand and gravel
Carl Avery	2 Pits near Marshall		Marl
Battle Creek Gravel Co.	SW NE 15 1S 7W NW SE 33 1S 8W SW SE 4 2S 8W		Sand and gravel
Calhoun Co. Rd. Comm.			Sand and gravel
Case Bros.	Mutch Pit Smith Pit		Marl
Cole Bros.	SW NE 33 1S 8W		Sand and gravel
Emil Combs	NE SE 18 4S 5W		Sand and gravel
Flemming Gravel Co.			Sand and gravel
Michigan State Hwy. Dept.			Sand and gravel
Pickitt and Schreur	Various Pits		Sand and gravel
Harlan Spoor	23 4S 7W		Marl

		<u>Quantity</u>	<u>Value</u>
CASS (63)			
Sand and gravel		365,567 tons	\$ 258,318
Marl		7,320 tons	<u>4,392</u>
Total Value			\$ 262,710
Cass Co. Road Comm.	NE NE 20 5S 13W NE SE 16 6S 15W SE SE 17 6S 13W	Sand and gravel	
Michigan State Hwy. Dept.		Marl	
Nieb Concrete Products Co.	NW NW 15 7S 16W	Sand and gravel	
Bernard Pipher	Long Lake, Porter Twp.	Marl	
Otto Poehlman, Jr.	13 7S 16W	Marl	
John G. Yerington	NE SW 28 7S 13W Springfield Pit Silver Creek Pit	Sand and gravel	
CHARLEVOIX (77)			
Sand and gravel		61,620 tons	\$ 38,446
Stone		8,945 tons	<u>17,865</u>
Total Value			\$ 56,311
Charlevoix Co. Rd. Comm.		Sand and gravel	
Charlevoix Lime and Stone Co.	29 34N 8W	Limestone-crushed	
Michigan State Hwy. Dept.		Limestone-crushed	
		Sand and gravel	
CHEBOYGAN (66)			
Sand and gravel, stone			
Afton Stone and Lime Co.	SE 25 35N 2W	Limestone-crushed	
Hugh H. Mason and Sons	SE SW 32 33N 3W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
CHIPPEWA (26)			
Stone (3rd), Sand and gravel			
Drummond Dolomite, Inc.	E SW 36 42N 5E	Dolomite-crushed	
I. L. Whitehead Co.	N NW 23 45N 2W E 6 46N 5W NE 17 46N 7W NE SE 35 47N 1W SE SW 14 47N 1W NW NW 28 47N 3W	Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
CLARE (43)			
Petroleum		434,527 bbls.	\$ 1,240,128
Natural Gas		317,363 M.cu.ft.	63,473
Sand and gravel		934 tons	<u>607</u>
Total Value			\$ 1,304,208
Michigan State Hwy. Dept.		Sand and gravel	
CLINTON (64)			
Sand and gravel		388,295 tons	\$ 249,696
Shale			
American Vitriified Prod.	SE 34 5N 4W	Shale	
Boichot Concrete Products	NE SW 3 5N 2W	Sand and gravel	
Grand Ledge Clay Products	SE 34 5N 4W	Shale	
Michigan State Hwy. Dept.		Sand and gravel	
Pickitt and Schreur		Sand and gravel	
Walling Gravel Co.	SE NW 34 8N 2W	Sand and gravel	
CRAWFORD (49)			
Petroleum		158,017 bbls.	\$ 458,249
Natural Gas		925,628 M.cu.ft.	185,126
Sand and gravel		279,810 tons	166,609
Natural Gas Liquids (2nd, 19%)		2,274,000 gals.	<u>127,344</u>
Total Value			\$ 937,328
Crawford Co. Rd. Comm.	SE NW 27 25N 2W NW SW 9 25N 3W SW SW 27 26N 3W S SW 28 26N 3W 34 26N 3W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
DELTA (57)			
Undistributed: Sand and gravel, stone			\$ 418,482
Bark River Const. Co.		Sand and gravel	
Bichler Bros.	NE 12 39N 23W SW 1 39N 23E	Sand and gravel	
Cloverland Milling and Supply Co.	NE SE 16 40N 22W	Limestone-crushed	
Days River Sand and Gravel Co.	15 40N 22W	Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
DELTA (contd.)			
Delta Co. Rd. Comm.	SE SW 10 37N 24W NE NE 5 38N 24W SW NE 12 39N 23W NE SW 24 40N 20W NW NE 28 40N 23W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
DICKINSON (22)			
Iron Ore		604,505 tons	\$ 5,711,363
Undistributed: Stone, sand and gravel			<u>155,155</u>
Total Value			\$ 5,866,518
Dickinson Co. Rd. Comm.	SE NW 7 41N 27W C SE 20 42N 28W SE 28 42N 30W	Sand and gravel	
M. A. Hanna Co.		Iron ore	
Groveland Open Pit	31 42N 29W	Sand and gravel	
City Eng. - Iron Mountain		Dolomite-crushed	
The Metro-Nite Co.	NW 35 42N 28W	Sand and gravel	
Michigan State Hwy. Dept.		Dolomite-crushed	
Superior Rock Prod. Co.	SW SE 30 42N 29W		
EATON (42)			
Undistributed: Clay Products (3rd), Sand and gravel, stone, shale			\$ 1,634,349
American Vitrified Prod.	NE 10 4N 4W	Tile	
Cheney Limestone Co.	NE 29 1N 6W	Limestone-crushed	
Eaton Co. Rd. Comm.	SE NW 5 1N 3W NE NE 19 1N 5W SE SW 32 2N 3W SE NW 23 4N 6W	Sand and gravel	
O. E. Gooding and Co.	E NW 13 2N 3W	Shale-tile	
Grand Ledge Clay Prod.	SE 3 4N 6W	Sand and gravel	
Pryor Bros.	NW SW 7 2N 4W SW SE 3 3N 3W SE NW 15 3N 3W SE NE 7 3N 4W		
Michigan State Hwy. Dept.		Sand and gravel	
Vermontville Gravel Co.	W NE 20 3N 6W	Sand and gravel	
West Shore Constr. Co.	22 1N 5W	Sand and gravel	
Whittum Gravel Co.	Snook Pit NE SE 5 1N 3W	Sand and gravel	

	<u>Quantity</u>	<u>Value</u>
EMMET (12)		
Portland Cement (3rd), Stone, sand and gravel		
Michigan State Hwy. Dept. Penn-Dixie Cement Corp.	2 34N 6W	Sand and gravel Limestone-crushed Portland cement
GENESEE (52)		
Sand and gravel	882,361 tons	\$ 763,830
Petroleum	4,061 bbls.	<u>11,777</u>
Total Value		\$ 775,607
Ferguson Excavating Co. Kurtz Gravel Co.	Richfield Twp. SE SW 1 8N 7E SE NE 20 8N 7E	Sand and gravel Sand and gravel
A. F. Leffler & Sons Mathews Gravel Co. Otisville Stone Co. John Post and Sons Saginaw Core Sand Co. Justus Snelenberger	NW NW 2 9N 8E SW SE 1 8N 7E S NE 13 9N 8E SW NW 7 6N 5E SE NE 28 9N 8E SE 16 9N 5E	Sand and gravel Sand and gravel Sand and gravel Sand and gravel Sand and gravel Sand and gravel
GLADWIN (44)		
Petroleum	445,347 bbls.	\$ 1,291,506
Sand and gravel	16,838 tons	<u>10,867</u>
Total Value		\$ 1,302,373
Gladwin Co. Rd. Comm. Michigan State Hwy. Dept. Peterson Brothers	S SE 26 18N 2W Beaverston	Sand and gravel Sand and gravel Sand and gravel
GOGEBIC (7)		
Iron (3rd, 17%) Sand and gravel	1,889,986 tons 121,382 tons	\$ 17,066,573 <u>65,282</u>
Total value		\$ 17,131,855
Gogebic Co. Road Comm.	NE SW 17 45N 38W SW SE 13 45N 39W SE SW 8 48N 46W	Sand and gravel
Ironwood City Hwy. Dept. Lake Superior Gravel Co.	NE SE 34 47N 47W NW SW 31 48N 46W NW SW 33 48N 46W	Sand and gravel Sand and gravel

	<u>Quantity</u>	<u>Value</u>
GOGEBIC (contd.)		
North Range Mining Co. Penokee Mine	Ironwood	Iron ore
Pickands Mather and Co. Geneva-Davis Mine	18, 19, 47N 46W	Iron ore
Newport-Bonnie Mine	24 47N 46W	
Peterson Mine	16, 17 47N 46W	
Sunday Lake Mine	9 47N 45W	
Piispanen Bros. Sand and Gravel	SE NW 33 48N 46W	Sand and gravel
GRAND TRAVERSE (69)		
Sand and gravel		
Michigan State Hwy. Dept. Paul C. Miller		Sand and gravel Sand and gravel
GRATIOT (21)		
Bromine (2nd), salt, calcium Magnesium Chloride, petroleum, Magnesium compounds, sand and gravel Natural Gas		
Gratiot Co. Rd. Comm.	NW SE 34 11N 4W NW NW 18 12N 4W	Sand and gravel
Michigan Chemical Corp.	St. Louis	Bromine, calcium Magnesium chloride, Magnesium compounds, Salt Sand and gravel Sand and gravel
Michigan State Hwy. Dept. North Star Gravel Co.	NW SE 22 10N 2W NE SE 34 11N 4W	
P and B Gravel Co.	9 10N 1W	Sand and gravel

	<u>Quantity</u>	<u>Value</u>
HILLSDALE (9)		
Petroleum (1st, 23%)	3,679,722 bbls.	\$ 10,678,846
Sand and gravel	901,878 tons	650,263
Natural Gas Liquids (1st, 70%)	8,517,057 gals.	476,954
Natural Gas (2nd, 7%)	1,284,616 M.cu.ft.	256,923
Marl	1,916 tons	1,149
Stone	45 tons	320
Total Value		\$ 12,064,455
Bundy Hill Gravel Co.	7 & 8 5S 1W	Sand and gravel
Canary Hill Stone Quarry	West of Hillsdale	Sandstone
Comstock Constr. Co.	23 8S 2W	Sand and gravel
H. Eckley	8S 2W	Sand and gravel
O. E. Gooding and Co.	NE SW 23 8S 2W	Sand and gravel
Hillsdale Co. Rd. Comm.	NE NE 15 5S 2W NE SE 11 5S 3W SE NW 22 5S 4W SE SE 9 6S 3W NE NW 9 6S 3W SW SE 5 7S 2W NW NE 10 7S 2W SW SE 25 7S 2W NW NE 33 7S 3W SE SE 1 7S 4W SE NE 30 7S 4W	Sand and gravel Sand and gravel
John Hess	14 5S 3W	Marl
Hoover Bros.	NE SE 23 8S 2W	Sand and gravel
Northwest Material, Inc.	SW 23 8S 2W	Sand and gravel
Art Russell's Concrete	14 6S 3W	Sand and gravel
Lowell W. Stukey	6S 4W	Marl
HOUGHTON (16)		
Copper (2nd, 19%)	21,704,276 lbs.	\$ 6,961,429
Sand and gravel	213,758 tons	200,439
Stone	56,017 tons	76,368
Total Value		7,238,236
Calumet and Hecla, Inc.		Copper
Centennial Mine	18 56N 32W	
Osceola Mine	23 56N 33W	
Reclamation Hubbell		
Copper Range Co. Champion Mine	31 54N 34W	Copper
Hocking Construction Co.		Sand and gravel
Houghton County Road Comm.	SE 15 54N 34W NW NE 17 56N 32W Arcadian Mine SE NW 17 53N 35W NE NW 5 56N 32W NW NW 12 56N 33W	Trap Rock-crushed Sand and gravel

		<u>Quantity</u>	<u>Value</u>
HOUGHTON (contd.)			
Limestone Mountain Co. Michigan State Hwy. Dept. Quincy Mining Co. Reclamation	SW 24 51N 35W Mason		Dolomite-crushed Sand and gravel Copper
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HURON (50)			
Stone (5th), Sand and Gravel, Petroleum			\$ 926,342
O. E. Gooding and Co. Huron Co. Rd. Comm. Ed Murawski Vollmer Sand and Gravel Wagner Sand and Gravel	SE SE 17 16N 13E NW SW 31 17N 14E NE SE 20 15N 11E SE NE 20 16N 13E NE SW 27 16N 15E SW SW 22 16N 15E		Sand and gravel Sand and gravel Sand and gravel Sand and gravel Sand and gravel
The Wallace Stone Co.	SW NE 5 16N 10E		Limestone-crushed and dimensional
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INGHAM (47)			
Sand and gravel Lime Total Value		962,720 tons 6,017 tons	\$ 899,997 <u>79,287</u> \$ 979,284
Board of Water and Light Central Michigan Sand and Gravel Cheney Gravel Co. Harold Cogswell Ford and Co. Gillette Sand and Gravel Ingham Co. Rd. Comm.	Lansing SE SW 24 3N 2W SW SE 11 3N 2W Holt SE 19 3N 2W NE SW 4 4N 1W NE SW 16 1N 2W E SW 21 1N 2W NE NE 10 2N 1E SE NE 15 2N 1E SE NW 14 2N 2E NE NW 26 2N 2E SW SE 7 2N 2W SW SE 34 3N 1E SW SE 25 3N 2E NE NW 25 3N 2W SE SE 30 3N 2W		Lime Sand and gravel Sand and gravel Sand and gravel Sand and gravel Sand and gravel
S. E. Ketchum and Sons Mason Gravel Co. Scarlett Gravel Co. Skyway Sand and Gravel Co.	NW 36 3N 2W 25 2N 2W 25 3N 2W		Sand and gravel Sand and gravel Sand and gravel Sand and gravel

		<u>Quantity</u>	<u>Value</u>
INGHAM (contd.)			
Ronald Weaver	11 1N 2W 14, 34 2N 1E 9 2N 1W 7, 24, 25, 34 2N 2W 25, 35 3N 2W		Sand and gravel
West Lansing Gravel Co.	NE 10 4N 2W		Sand and gravel
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IONIA (67)			
Sand and gravel Petroleum Total Value		286,215 tons 1,636 bbls.	\$ 167,768 <u>4,744</u> 172,512
Ionia County Road Comm.	NE SW 18 5N 5W SE NE 24 5N 7W SE SE 8 6N 5W NW SW 28 6N 5W NE SW 15 7N 5W SW SE 21 7N 6W NW NE 33 7N 7W 30 7N 5W		Sand and gravel
Harold L. Martin Michigan State Hwy. Dept. Pickitt and Schreur, Inc.			Sand and gravel Sand and gravel Sand and gravel
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IOSCO (24)			
Gypsum (1st), sand and gravel			
Iosco County Hwy. Dept.	NE NW 1 21N 5E SE NE 30 21N 5E		Sand and gravel
National Gypsum Co. U. S. Gypsum Co.	35 22N 6E 27 21N 7E		Gypsum Gypsum
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IRON (5)			
Iron (2nd, 32%) Sand and gravel Total Value		3,516,660 tons 208,747 tons	\$ 28,670,626 <u>161,527</u> \$ 28,832,153
M. A. Hanna Co.			Iron ore
Cannon Mine Hiawatha Mine 1 and 2 Homer Mine Wauseca-Aronson Mine	36 43N 35W 35, 36 43N 35W 22, 23 43N 35W 23 43N 35W		

		<u>Quantity</u>	<u>Value</u>
IRON (contd.)			
Inland Steel Co.		Iron ore	
Bristol Mine	19, 20 43N 32W		
Sherwood Mine	23 43N 35W		
Iron County Rd. Comm.	SW SW 29 42N 32W	Sand and gravel	
	NW NE 18 43N 32W		
	SW SW 7 43N 35W		
	SE NW 1 43N 36W		
	SW SE 8 44N 33W		
	SE NW 15 44N 33W		
	NE NE 22 44N 33W		
	NE NW 36 44N 34W		
	NW NW 10 44N 37W		
	NW SW 20 45N 33W		
Michigan State Hwy. Dept.		Sand and gravel	
Pickands Mather Co.		Iron ore	
Buck Mine	6, 7 42N 34W		
Republic Steel Corp.		Iron ore	
Tobin-Columbia Mine	30, 31 43N 32W		
ISABELLA (30)			
Petroleum (5th, 5%)		761,121 bbls.	\$ 2,207,251
Sand and gravel		436,346 tons	343,746
Natural Gas		301,843 M.cu.ft.	60,369
Undistributed: Natural Gas Liquids, Marl			16,556
Total Value			\$ 2,627,922
Gatehouse Bros.	35 15N 6W	Marl	
George Hubscher and Son	22 14N 5W	Sand and gravel	
	7 16N 3W		
Michigan State Hwy. Dept.		Sand and gravel	
Pickitt and Schreur, Inc.		Sand and gravel	
C. Utterback	35 15N 6W	Sand and gravel	
JACKSON (20)			
Petroleum (3rd, 11%)		1,813,040 bbls.	\$ 5,257,816
Sand and Gravel		462,395 tons	384,751
Stone		35,425 tons	151,025
Natural Gas		603,447 M.cu.ft.	120,689
Marl		2,073 tons	1,244
Total Value			\$ 5,915,525
Barnes and Brothers	Horton	Marl	
Jackson Co. Rd. Comm.	SE SE 29 1S 1W	Sand and gravel	
Jeffery Limestone Co.	SE 30 2S 2W	Limestone-crushed	
Klumpff Bros. Gravel Co.	SE SE 1 2S 2E	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	

	<u>Quantity</u>	<u>Value</u>
JACKSON (contd.)		
Original Sandstone Quarry	NE NW 6 4S 2E	Sandstone
Palmer Sand and Gravel	SW NW 8 3S 1E	Sand and gravel
Ray Sandstone Quarry	NE NW 6 4S 2E	Sandstone
Star Sandstone Co.	SW SE 31 3S 2E	Sandstone
Gordon D. Stevick	NW SE 26 2S 1W	Sand and gravel
	SE SW 17 3S 2E	
Willson Bros.	Rives Junction	Sand and gravel
KALAMAZOO (53)		
Sand and gravel	693,600 tons	\$ 592,093
Marl (1st, 21%)	42,027 tons	20,416
Petroleum	633 bbls.	1,836
Total Value		\$ 614,345
American Aggregates Corp.	SW NW 15 1S 11W	Sand and gravel
Lee Bertrand	Paw Paw Lake	Marl
Roy Coville	18 3S 9W	Marl
Concrete Products and Building Supplies	NE SE 8 2S 11W	Sand and gravel
David Flora		Marl
Gravel Producers, Inc.	Portage & Cooper Twps.	Sand and gravel
Lawrence Hayward	Brady and Climax Twp.	Marl
Kalamazoo Co. Rd. Comm.	NE NW 34 1S 11W	Sand and gravel
Jack Koetje		Sand and gravel
Pickitt and Schreur	NE NW 34 1S 11W	Sand and gravel
Fred Rumz	30 4S 10W	Marl
KALKASKA (71)		
Petroleum	28,813 bbls.	\$ 83,558
Sand and gravel	62,999 tons	35,030
Natural Gas	94,153 M.cu.ft.	18,831
Total Value		137,419
Kalkaska Co. Rd. Comm.	25N 8W	Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel

		<u>Quantity</u>	<u>Value</u>
KENT (27)			
Sand and gravel (3rd, 5%) Gypsum (2nd), Petroleum, Natural Gas			\$ 3,039,255
Bestwall Gypsum Co.	SW 34 7N 12W	Gypsum	
The Chesapeake and Ohio R. R. Co.	9 6N 12W	Sand and gravel	
Coit Ave. Gravel Co.	29 8N 11W	Sand and gravel	
Cross and White		Sand and gravel	
Ed DeVries and Sons	NE 22 7N 12W	Sand and gravel	
Grand Rapids Gravel Co.	SE NW 9 6N 12W	Sand and gravel	
	NE NW 16 6N 12W		
	SW SW 33 7N 12W		
	NE 34 7N 12W		
Grand Rapids Gypsum Co.		Gypsum	
Ionia Co. Rd. Comm.		Sand and gravel	
Kent Co. Rd. Comm.	NE SW 27 5N 10W	Sand and gravel	
	SE SE 20 6N 9W		
	NE NE 32 7N 9W		
	SE SW 11 10N 12W		
Michigan State Hwy. Dept.		Sand and gravel	
Paul C. Miller	16 10N 11W	Sand and gravel	
Northeast Gravel Co.	NE SW 24 8N 11W	Sand and gravel	
Pekaar and VanDoorn	NE NE 16 6N 12W	Sand and gravel	
Pickitt and Schreur	NE NW 25 5N 12W	Sand and gravel	
	NE NE 10 6N 9W		
	SW SE 23 8N 11W		
Riverside Sand and Gravel Co.	SE SE 33 7N 12W	Sand and gravel	
West Shore Constr. Co.	N NE 20 6N 12W	Sand and gravel	
	Post Pit		
	Fenske Pit		
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KEWEENAW (19)			
Copper (3rd, 16%)		18,592,215 lbs.	\$ 5,963,267
Sand and gravel		137,834 tons	44,188
Total Value			\$ 6,007,455
Calumet and Hecla, Inc.		Copper	
Ahmeek No. 2	28 57N 32W		
Allovez No. 3	32 57N 32W		
Peninsula	28 57N 32W		
Seneca No. 2	27 57N 32W		
Keweenaw Co. Rd. Comm.		Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
LAKE (78)			
Sand and gravel		72,943 tons	\$ 34,435
Petroleum		7,277 bbls.	21,103
Total Value			\$ 55,538
Lake County Rd. Comm.	SE NE 23 18N 13W NW SE 10 20N 14W	Sand and gravel	
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LAPEER (56)			
Sand and gravel, Calcium- Magnesium Chloride			\$ 431,192
Lapeer Co. Rd. Comm.	NE SE 11 6N 10E NE NW 1 8N 9E SE SW 30 8N 10E SW SE 16 9N 10E NW SW 28 9N 12E	Sand and gravel	
William North	NW SW 22 9N 12E SE NW 22 9N 12E	Sand and gravel	
Pine Sand and Gravel Wilkinson Chemical Co.	NW 12 7N 10E	Sand and gravel Calcium-Magnesium Chloride	
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LEELANAU (76)			
Sand and gravel		114,799 tons	\$ 64,862
Leelanau Co. Rd. Comm.	NE NW 16 28N 13W SW SE 12 29N 13W SW NW 19 32N 10W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
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LENAWEE (25)			
Cement, Sand and Gravel, Clay Products, Clay			
Adrian Sand and Gravel	Adrian	Sand and gravel	
Brady's Sand and Gravel	SE 32 5S 4E	Sand and gravel	
Comfort Brick and Tile Co.	SW 2 6S 5E	Clay and tile	
O. E. Gooding and Co.	SW NE 13 8S 1E	Sand and gravel	
Lenawee Co. Rd. Comm.	SE SE 4 6S 4E	Sand and gravel	

		Quantity	Value	
LENAWEE (contd.)				
Michigan State Hwy. Dept.				Sand and gravel
Peninsular Portland Cement Corp.	NE 5 5S 1E			Portland cement
	SW 5 7S 1E			Clay
Stamm Bros. Gravel Co.	SW NE 19 7S 3E			Sand and gravel
Tecumseh Gravel Co.	SW NE 4 6S 4E			Sand and gravel
Tecumseh Materials, Inc.	NE SE 4 6S 4E			Sand and gravel
LIVINGSTON (31)				
Sand and gravel (2nd, 5%)		2,410,869 tons	\$ 2,473,640	
Natural Gas		744,910 M.cu.ft.	<u>145,982</u>	
Total Value			2,619,622	
American Aggregates Corp.	NE NE 11 1N 6E			Sand and gravel
D. and J. Gravel Co.	SW SW 32 3N 4E			Sand and gravel
Van E. Dailey				Sand and gravel
Michigan State Hwy. Dept.				Sand and gravel
Vern Molesworth				Sand and gravel
LUCÉ (81)				
Sand and gravel		38,118 tons	\$ 28,239	
Luce County Rd. Comm.	SW SE 11 45N 10W			Sand and gravel
Michigan State Hwy. Dept.				Sand and gravel
MACKINAC (17)				
Stone (2nd), Sand and Gravel				
Duluth South Shore and Atlantic R. R. Co.	St. Ignace			Sand and gravel
Inland Lime and Stone Co.	6 42N 12W			Limestone-crushed
Mackinac Aggregates Corp.	7 & 8 42N 1W			Sand and gravel
Mike Mangene	SE NE 24 42N 1E			Sand and gravel
Michigan Limestone Div.				
U. S. Steel Corp.	10 42N 1E			Dolomite-crushed
Michigan State Hwy. Dept.				Sand and gravel
Lawrence Tamlyn	SW SW 6 40N 3W			Sand and gravel
Thornton Construction Co.	Maple Block Quarry			Dolomite-crushed

		Quantity	Value	
MACOMB (45)				
Sand and gravel (8th, 3%)		1,593,304 tons	\$ 1,221,721	
Natural Gas		97,017 M.cu.ft.	<u>19,403</u>	
Total Value			\$ 1,241,124	
Advance Bldg. Materials, Inc.	NE NW 8 4N 12E SE NE 31 3N 12E			Sand and gravel
Great Lakes Gravel Co.	NW NW 31 3N 12E			Sand and gravel
Hygrade Sand & Gravel Co.	NE 8 4N 12E			Sand and gravel
Fred Kaatz	16 4N 14E			Sand and gravel
Macomb Co. Road Comm.	8 4N 12E 22 5N 12E 19 5N 13E			Sand and gravel
Ray Malow	SE SE 5 4N 12E			Sand and gravel
Macomb Sand and Gravel	SW SW 30 3N 12E			Sand and gravel
Maertens Sand and Gravel	SE NE 30 3N 12E SE SW 5 4N 12E NW NW 3 1N 13E			Sand and gravel
Louis Marsack and Sons				Sand and gravel
Michigan State Hwy. Dept.				Sand and gravel
Vern Molesworth				Sand and gravel
Morgan Sand and Gravel	30 3N 12E			Sand and gravel
Ray Industries, Inc.	NE SW 18 3N 12E			Sand and gravel
S. K. Rogers	21 3N 14E			Sand and gravel
Rosteck Contractors, Inc.				Sand and gravel
Smith Sand and Gravel Co.	NW SE 8 4N 12E			Sand and gravel
Underwood Sand & Gravel Co.	19 3N 12E			Sand and gravel
Wolverine Contractors, Inc.				Sand and gravel
MANISTEE (11)				
Magnesium Compounds (2nd), Salt (4th), Bromine (3rd), Sand and gravel			\$ 11,362,760	
Frank L. Gauthier	23 23N 16W			Sand and gravel
Gronlund Gravel Co.	SE 7 23N 14W SW NE 7 23N 14W			Sand and gravel
Great Lakes Chemical Corp.	SE SW 18 21N 16W			Bromine
Manistee Co. Rd. Comm.	6 & 7 23N 14W			Sand and gravel
Manistee Salt Works	Manistee			Salt
Michigan Chemical Corp.	NW 7 21N 16W			Bromine
Morton Chemical Co.	12 21N 7W			Bromine, Magnesium Compounds
Morton Salt Co.	Manistee			Salt
Sand Products Corp.	N $\frac{1}{2}$ 11 21N 17W			Sand
Standard Lime and Cement Co.	SE 18 21N 16W			Magnesium Compounds

	<u>Quantity</u>	<u>Value</u>
MARQUETTE (2)		
Iron (1st, 45%)	4,910,489 tons	\$ 45,362,637
Sand and gravel	513,896 tons	<u>441,722</u>
Total Value		45,804,359
The Cleveland Cliffs Iron Co.		
Athens-Bunker Hill Mine	6 47N 26W	Iron ore
Cliffs Shaft Mine	3, 9, 10 47N 27W	
Humbolt Open Pit	10, 15 47N 29W	
Maas Mine	31 48N 26W	
Mather "A" Mine	2 47N 27W	
Mather "B" Mine	1 47N 27W	
Republic Open Pit	7 46N 29W	
Tilden Open Pit	26 47N 27W	
Hocking Constr. Co.		
Inland Steel Co.		
Morris Mine	1, 2 47N 28W	Sand and gravel
Greenwood Mine	14, 23 47N 28W	Iron ore
City of Ishpeming		
Jones and Laughlin Steel Corp.		
Tracy Mine	7, 8 48N 26W	Sand and gravel
Lake Superior and		
Ishpeming R. R.		
A. Lindberg & Sons, Inc.		
	SE SE 8 47N 24W	Sand and gravel
	NW NW 17 47N 25W	Sand and gravel
	NE NW 5 47N 26W	
	SE SE 36 48N 28W	
City Eng. Marquette		
Marquette Co. Rd. Comm.		
	NE NW 1 45N 23W	Sand and gravel
	SE SW 36 46N 23W	Sand and gravel
	NW SE 4 47N 29W	
Michigan State Hwy. Dept.		
North Range Mining Co.		
Champion	31 48N 29W	Sand and gravel
Pickands Mather Co.		
Volunteer Open Pit	25, 30 47N 26W	Iron ore

	<u>Quantity</u>	<u>Value</u>
MASON (15)		
Calcium-Magnesium Chloride (1st), Lime (2nd), Magnesium Compounds, Bromine, Petroleum, Sand and gravel, Natural Gas Liquids, Natural Gas		
The Dow Chemical Co.	NW SW 23 18N 18W	Bromine, Calcium- Magnesium Chloride, Magnesium Compounds, Lime
Harbison-Walker		
Refractories	NE SE 23 18N 18W	Magnesium Compounds
Mason Co. Rd. Comm.	SW SW 11 18N 15W 18 18N 16W	Sand and gravel
Sargent Sand Co.	SW 33 19N 18W	Sand
MECOSTA (62)		
Petroleum	48,856 bbls.	\$ 141,682
Sand and gravel	162,262 tons	98,873
Natural Gas	212,362 M.cu.ft.	42,472
Marl	5,125 tons	<u>3,075</u>
Total Value		286,102
Central Concrete Products Co., Inc.		
Frost & Cumming Marl Co.	17 13N 7W	Sand and gravel
Mecosta Co. Rd. Comm.	NE NE 32 15N 9W	Marl
Michigan Concrete Prod. Co.	Big Rapids	Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel
Orville Truman	13N 8W	Marl
MENOMINEE (48)		
Lime, Sand and gravel		\$ 952,637
Menominee Co. Rd. Comm.		
	SE NE 33 35N 26W	Sand and gravel
	NE NE 9 39N 25W	
Michigan State Hwy. Dept.		
Limestone Products Div.,		
Northwestern-Hanna Fuel Co.	Menominee	Lime
Walsh Sand and Gravel Co.	SW SW 21 33N 27W	Sand and gravel

		<u>Quantity</u>	<u>Value</u>
MIDLAND (4)			
Bromine (1st), Calcium-Magnesium Chloride (2nd), Magnesium Compounds (1st), Salt (2nd), Petroleum, Sand and gravel, Potash, Natural Gas, Natural Gas Liquids			
The Dow Chemical Co.	Midland	Bromine, Calcium-Magnesium Chloride, Potash, Magnesium Compounds, Salt	
Fisher Sand & Gravel Co.	NE SW 19 14N 2E	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
Saginaw Core Sand Co.	SE 21 13N 2E	Sand	
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MISSAUKEE (32)			
Petroleum (4th, 5%)		862,356 bbls.	\$ 2,500,832
Natural Gas		321,579 M.cu.ft.	64,316
Sand and gravel		24,582 tons	15,978
Natural Gas Liquids		64,816 gals.	3,630
Total Value			\$ 2,584,756
Michigan State Hwy. Dept.		Sand and gravel	
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MONROE (18)			
Cement, Stone (4th), Clay Products, Petroleum, Sand and gravel, Clay			
Dundee Cement Co.	7 6S 7E	Cement Limestone Clay	\$ 6,905,043
The France Stone Co.	SE 7 7S 9E	Dolomite-crushed	
Maybee Stone Co.	29 5S 8E	Dolomite-crushed	
Michigan State Hwy. Dept.		Sand and gravel	
Michigan Stone Co.	SW 25 8S 6E	Dolomite-crushed	
Monroe Co. Rd. Comm.	SW 13 6S 7E	Dolomite-crushed	
F. W. Ritter Sons Co., Inc.	SE 16 5S 10E	Clay-pottery	

		<u>Quantity</u>	<u>Value</u>
MONTCALM (33)			
Petroleum		605,339 bbls.	\$ 1,755,483
Sand and gravel		1,005,099 tons	632,404
Natural Gas		384,965 M.cu.ft.	76,669
Natural Gas Liquids (3rd, 5%)		552,029 gals.	30,913
Total Value			2,495,469
The Dyer Co.	SE SE 8 12N 5W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
Paul C. Miller		Sand and gravel	
Montcalm Co. Rd. Comm.	NE SE 13 10N 6W	Sand and gravel	
	NE NE 24 10N 6W		
	NE NW 10 11N 8W		
	SE SE 8 12N 5W		
Frank H. Stoerk	Pierson	Sand and gravel	
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MONTMORENCY (82)			
Sand and gravel		37,099 tons	\$ 15,921
Michigan State Hwy. Dept.		Sand and gravel	
Montmorency Co. Rd. Comm.	SW NW 27 30N 1E	Sand and gravel	
	NE NW 28 30N 1E		
	NE NW 9 32N 4E		
	11 30N 4E		
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MUSKEGON (37)			
Sand and Gravel, Salt			
Petroleum, Natural Gas,			
Marl			\$ 1,881,373
Frank Alfredson		Marl	
Hooker Electro-Chemical Co.	NE 31 12N 17W	Salt	
Michigan State Hwy. Dept.		Sand and gravel	
Paul C. Miller		Sand and gravel	
Nugent Sand Co.	3 9N 17W	Sand	
Sand Products Corp.	E $\frac{1}{2}$ 28 10N 17W	Sand	
Whitehall Gravel Co.		Sand and gravel	
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NEWAYGO (61)			
Petroleum, Natural Gas,			
Sand and gravel, Marl			\$ 322,497
Grant Tufa Lime Co.	29 11N 11W	Marl	
K and V Gravel Co.	NE NW 21 12N 12W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
OAKLAND (23)			
Sand and gravel (1st, 12%)		5,430,865 tons	\$ 5,153,908
Petroleum		3,875 bbls.	11,238
Natural Gas		1,582 M.cu.ft.	316
Total Value			\$ 5,165,462
A. and R. Gravel Co.	Pontiac	Sand and gravel	
American Aggregates Corp.	NE NW 22 5N 10E	Sand and gravel	
Floyd Beardslee	S $\frac{1}{2}$ SE 2 2N 10E	Sand and gravel	
	NE NW 11 2N 10E		
Ray Betham and Son	South Lyon	Sand and gravel	
Foley and Beardslee	NW NW 7 3N 9E	Sand and gravel	
	SW SE 36 4N 8E		
J. Gladstone and Son	NE 8 3N 11E	Sand and gravel	
O. E. Gooding and Co.	NW NE 33 2N 7E	Sand and gravel	
	NE SE 34 2N 7E		
	SW SW 32 5N 9E		
Highland Aggregate Co.	Holly	Sand and gravel	
Holly Mfg. and Mining Co.	NE SE 32 5N 8E	Sand and gravel	
John R. Sand and Gravel Co.	SE 4 4N 10E	Sand and gravel	
Kemler Bros.	SW SW 36 5N 11E	Sand and gravel	
Koan Gravel Co.	SE NE 28 5N 7E	Sand and gravel	
Koenig Coal & Supply Co.	NW 1 3N 8E	Sand and gravel	
	SW SE 24 5N 10E		
Michigan State Hwy. Dept.		Sand and gravel	
Mickelson Corp.	NE NW 21 3N 8E	Sand and gravel	
Paul C. Miller		Sand and gravel	
New Hudson Sand & Gravel	NW NE 33 2N 7E	Sand and gravel	
Oxford Mining Co.	4 4N 8E	Sand and gravel	
Oakland Co. Rd. Comm.	SE SE 9 2N 8E	Sand and gravel	
	NW NW 1 3N 10E		
	SE SW 8 4N 8E		
	SE SW 32 5N 9E		
	SW SE 36 5N 11E		
Salem Gravel & Constr. Co.	E NE 2 4N 9E	Sand and gravel	
Slaters Bald Mountain			
Gravel Pit	SW 36 4N 10E	Sand and gravel	
South Flint Gravel Co.		Sand and gravel	
Underwood Sand & Gravel Co.	SW 2 3N 10E	Sand and gravel	
Walker Sand and Gravel	NE SE 34 2N 7E	Sand and gravel	
	SE SW 2 2N 11E		
F. S. Ward	NW NE 7 3N 9E	Sand and gravel	
Wolverine Contractors Inc.		Sand and gravel	

OCEANA (51)

Petroleum		250,631 bbls.	\$ 726,830
Sand and gravel		65,212 tons	61,588
Natural Gas		46,875 M.cu.ft.	9,375
Total Value			\$ 797,793
Beckman Bros.	NE SW 24 14N 17W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
OGEMAW (40)			
Petroleum (9th, 3%)		491,275 bbls.	\$ 1,424,698
Natural Gas		811,342 M.cu.ft.	162,268
Sand and gravel		383,642 tons	133,075
Total Value			\$ 1,720,041
Ehinger Bros.	West Branch	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
Ogemaw Co. Rd. Comm.	NE SE 3 21N 1E	Sand and gravel	
	NE SE 6 21N 2E		
	NW SW 5 22N 2E		
	NE SE 6 22N 2E		
	NW SE 33 22N 3E		
	NE SE 6 22N 2E		
Walter Rosevear		Sand and gravel	
ONTONAGON (6)			
Copper (1st, 65%)		75,142,046 lbs.	\$ 24,101,060
Sand and gravel		233,625 tons	146,488
Total Value			\$ 24,247,548
Michigan State Hwy. Dept.		Sand and gravel	
Ontonagon Co. Rd. Comm.	Various	Sand and gravel	
White Pine Copper Co.			
White Pine Mine	4,5,9 5N 42W	Copper	
OSCEOLA (34)			
Petroleum (8th, 3%)		527,962 bbls.	\$ 1,531,090
Sand and gravel		339,393 tons	376,195
Natural Gas		445,016 M.cu.ft.	89,003
Marl (6th, 7%)		11,459 tons	7,792
Total Value			\$ 2,004,080
C. Stanley Hooker	24 20N 10W	Marl	
	1 20N 8W		
Michigan State Hwy. Dept.		Sand and gravel	
The Wallace Stone Co.			
Hersey Sand & Gravel Div.	NW SW 20 17N 9W	Sand and gravel	
OSCODA (80)			
Sand and gravel		58,263 tons	\$ 37,871
Petroleum		1,947 bbls.	5,648
Total Value			\$ 43,519
Michigan State Hwy. Dept.		Sand and gravel	

		<u>Quantity</u>	<u>Value</u>
OTSEGO (79)			
Sand and gravel		58,127 tons	\$ 37,291
Natural Gas		37,258 M.cu.ft.	7,452
Total Value			\$ 44,743
Hutchins Sand and Gravel	SE NE 17 29N 3W	Sand and gravel	
Otsego Co. Rd. Comm.	SW NW 16 29N 3W	Sand and gravel	
	NW SW 2 30N 3W		
	NW NW 3 31N 3W		
	NW NE 29 31N 3W		
OTTAWA (28)			
Sand and gravel (4th, 5%)		2,162,393 tons	\$ 2,090,403
Petroleum		213,542 bbls.	619,272
Marl		943 tons	744
Total Value			\$ 2,710,419
Construction Aggregates Corp.	SE SW 16 8N 15W	Sand and gravel	
	7 14N 7W		
Henry DeWent	SW SW 22 6N 13W	Sand and gravel	
William Huizenga	24 5N 15W	Sand and gravel	
Tom Johnston Gravel Co.	7 7N 14W	Sand and gravel	
Henry Koster	23 6N 13W	Marl	
Michigan State Hwy. Dept.		Sand and gravel	
Paul C. Miller		Sand and gravel	
Standard Sand Co.	NW 4 7N 16W	Sand	
West Shore Constr. Co.	19 5N 13W	Sand and gravel	
	2 5N 14W		
	2 6N 13W		
	22 6N 13W		
PRESQUE ISLE (10)			
Stone (1st), Sand and gravel			
Michigan Limestone Div.			
U. S. Steel Corp.	23 35N 5E	Limestone-crushed	
Onaway Stone Co.	5 34N 2E	Limestone-dimensional	
Straits Aggregate and Equipment Corp.	NE NW 19 34N 4E	Sand and gravel	
	NW SW 26 35N 5E		
Presque Isle Corp.	2 33N 8E	Limestone-crushed	

	<u>Quantity</u>	<u>Value</u>
ROSCOMMON (39)		
Petroleum	271,176 bbls.	\$ 786,410
Sand and gravel (10th, 2%)	1,077,925 tons	699,978
Natural Gas (3rd, 6%)	1,201,000 M.cu.ft.	240,200
Natural Gas Liquids	362,295 gals.	20,289
Total Value		\$ 1,746,877
Beckett Sand and Gravel	Roscommon	Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel
Delmar Stanley Gravel Co.	SE SE 24 24N 4W	Sand and gravel
Jessee Stanley Gravel Co.	Houghton Lake	Sand and gravel
SAGINAW (55)		
Sand and gravel, Petroleum, Clay (3rd)		\$ 476,500
Aetna Portland Cement Co.	SW 35 12N 3E	Clay
Michigan State Hwy. Dept.		Sand and gravel
Minco Products Corp.	NW NW 1 11N 3E	Clay
ST. CLAIR (8)		
Salt (3rd, Petroleum, Cement, Natural Gas (4th, 6%))		
Sand and gravel, Clay		
Click Bros. Gravel	NE NW 27 7N 15E	Sand and gravel
The Diamond Crystal Salt Co.	St. Clair	Evaporated salt
Michigan State Hwy. Dept.		Sand and gravel
V. Molesworth	NW NW 5 8N 16E	Sand and gravel
	N SW 29 8N 15E	
	Shipley Pit	
Morton Salt Co.	Marysville	Evaporated salt
Peerless Cement Corp.	Port Huron	Portland cement
	32 6N 16E	Clay
Port Huron Sand and Gravel		Sand and gravel

	<u>Quantity</u>	<u>Value</u>
ST. JOSEPH (68)		
Sand and gravel, Marl (4th, 10%)		\$ 160,217
Aggregates Processors, Inc. NE 7 8S 11W Case Bros. Nystrom Pit	Sand and gravel Marl	
Coy Drake 12 5S 12W	Marl	
Michigan State Hwy. Dept.	Sand and gravel	
Pickitt and Schreur	Sand and gravel	
Robert Bros. 6S 12W	Marl	
St. Joseph Co. Rd. Comm. NW 8 8S 11W	Sand and gravel	
Murland Smart Bur Oak	Marl	
SANILAC (65)		
Sand and gravel	368,772 tons	\$ 213,541
O. E. Gooding & Co.	Sand and gravel	
V. Molesworth	Sand and gravel	
Harold Peters Decker	Sand and gravel	
Sanilac Co. Rd. Comm. SW SW 23 9N 14E	Sand and gravel	
SCHOOLCRAFT (70)		
Sand and gravel	264,737 tons	\$ 137,719
Michigan State Hwy. Dept.	Sand and gravel	
Schoolcraft Co. Rd. Comm. SE SW 7 41N 17W	Sand and gravel	
SHIAWASSEE (35)		
Clay Products (2nd), Sand and gravel, Shale		
Fuoss Gravel Co. SW SW 30 6N 3E	Sand and gravel	
Michigan State Hwy. Dept.	Sand and gravel	
The Michigan Vitrified Tile Co. SE 22 7N 3E	Shale-tile	
Shenk Gravel Co. NW NW 2 6N 4E	Sand and gravel	
	NE NE 2 6N 4E	
Valley Gravel Co. SE SW 3 6N 2E	Sand and gravel	
Ronald Weaver Gravel Co. Various	Sand and gravel	

	<u>Quantity</u>	<u>Value</u>
TUSCOLA (36)		
Sand and gravel (7th, 4%)	1,773,875 tons	\$ 1,565,172
Petroleum	114,411 bbls.	331,792
Total Value		\$ 1,896,964
Anderson Sand & Gravel Co. NW SW 19 11N 9E	Sand and gravel	
	NE NE 20 11N 9E	
Bernthel Sand & Gravel Co. SW SE 6 11N 9E	Sand and gravel	
Cass City Concrete Products SE SW 4 13N 11E	Sand and gravel	
Clarence Cole NW NE 9 12N 8E	Sand and gravel	
Comstock Constr. Co. 8 11N 10E	Sand and gravel	
O. E. Gooding and Co.	Sand and gravel	
Great Lakes Foundry Sand Co.	Sand	
Hile Bros. NW SE 3 12N 8E	Sand and gravel	
C. R. Hunt SE 33 14N 11E	Sand and gravel	
Kester Sand and Gravel SE 21 10N 8E	Sand and gravel	
Michigan State Hwy. Dept.	Sand and gravel	
V. Molesworth	Sand and gravel	
Peterhans Bros. SW NE 35 13N 9E	Sand and gravel	
Powell Sand and Gravel 23 13N 7E	Sand and gravel	
Saginaw Core Sand Co. NW 27 10N 7E	Sand	
Sargent Sand Co. 5 10N 9E	Sand and gravel	
Tuckey's Sand and Gravel 33 14N 10E	Sand and gravel	
Tuscola Co. Rd. Comm.	Sand and gravel	
Vaughans Gravel and Excavating NE NE 25 12N 8E	Sand and gravel	
VAN BUREN (59)		
Sand and gravel		\$ 352,197
Petroleum, Marl		
Clarence Harter 33 2S 13W	Marl	
Klett Construction Co. Hartford	Sand and gravel	
Masterson Sand Co. NE 5 2S 17W	Sand	
Pickitt and Schreur NW SW 24 3S 14W	Sand and gravel	
Standard Sand Co. 2S 17W	Sand and gravel	
John G. Yerington NE SE 24 3S 15W	Sand and gravel	
North Gravel Hill Pit		

	<u>Quantity</u>	<u>Value</u>
WASHTENAW (38)		
Sand and gravel (6th, 4%)	1,878,787 tons	\$ 1,618,025
Petroleum	45,000 bbls.	130,500
Natural Gas	497,387 M.cu.ft.	99,477
Total Value		\$ 1,848,002

Dexter Gravel Co.	SW SE 5 2S 5E	Sand and gravel
O. E. Gooding and Co.	Various	Sand and gravel
Halloway Sand & Gravel Co.	10930 6 Mile Rd.	Sand and gravel
Killins Gravel Co.	SE SE 25 2S 3E	Sand and gravel
	SW SW 25 2S 5E	
	32 2S 7E	Sand and gravel
Kruse Gravel Pit		Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel
Packard Supply Co.	NE NW 12 3S 6E	Sand and gravel
Pickitt and Schreur		Sand and gravel
Lamar Thumn	SW NE 25 3S 7E	Sand and gravel
Washtenaw Co. Rd. Comm.	24 3S 5E	Sand and gravel
Washtenaw Sand and Gravel	4984 Earhardt Rd.	Sand and gravel
Whittaker and Gooding Co.	SW NW 10 2S 5E	Sand and gravel
	SW NE 19 2S 7E	
	NE NE 15 3S 6E	
Youngs Sand and Gravel	SW SW 16 1S 3E	Sand and gravel
	NE NE 15 3S 6E	
	SW 23 3S 7E	

WAYNE (1)

Portland Cement (2nd), Salt (1st), Lime (1st), Clay Products (1st), Sand and gravel (5th, 4%), Stone, Sulfur, Natural Gas, Petroleum, Clay (2nd)		\$ 48,143,183
Allied Chemical Corp.	Trenton	Lime
Aurora Gasoline Co.	Detroit	Sulfur
Clippert Brick Co.	NW 21 2S 11E	Clay-brick
Dachille Trucking Co.	Various	Sand and gravel
W. L. Emery Co.		Sand and gravel
Flat Rock Clay Products	NW SE 30 4S 10E	Clay-tile
Huron River Quarry Corp.	36 4S 9E	Dolomite-crushed
International Salt Co., Inc.	SW 32 2S 11E	Rock salt
Lightweight Aggregate Corp.	NE 27 1S 9E	Clay-lightweight aggregate
Manning and Locklin Gravel Co.	NW SW 2 1S 8E	Sand and gravel
Michigan Foundation Quarry Co.	7 4S 11E	Limestone-crushed
Michigan Silica Co.	SW NE 15 5S 10E	Silica sand
Michigan State Hwy. Dept.		Sand and gravel
Moore Bros. Sand & Gravel	E SE 9 3S 9E	Sand and gravel
Al Morgan Sand	Various Pits	Sand
Northville Sand & Gravel	SE NE 8 1S 8E	Sand and gravel

	<u>Quantity</u>	<u>Value</u>
WAYNE (contd.)		
Peerless Cement Corp.	Detroit	Cement
Penn Salt Chemical Corp.	Wyandotte	Salt
Thomson Sand and Gravel	8 1S 8E	Sand and gravel
Wayne Sand & Gravel Co.	NW SE 12 3S 8E	Sand and gravel
Wyandotte Chemical Corp.	Wyandotte	Salt, cement, lime

WEXFORD (73)

Sand and gravel	125,054 tons	\$ 97,949
Leo Dunbar	SW NE 15 21N 9W	Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel
Wexford Gravel Co.		Sand and gravel

UNDISTRIBUTED

Alcona, Alpena, Bay, Cheboygan, Chippewa, Emmet, Grand Traverse, Gratiot, Iosco, Lenawee, Mackinac, Mason, Midland, Presque Isle, St. Clair, and Shiawassee counties		\$ 147,556,227
Peat, Lime, Sand and gravel, Mineral Pigments, Gem Stones		\$ 5,290,415 152,846,642

Champion, Inc.	Sand and gravel
The Cleveland-Cliffs Iron Co.	Mineral Pigments
Fox Valley Construction Co.	Sand and gravel
Pickands Mather and Co.	Mineral Pigments
Straits Aggregate and Equipment Corp.	Sand and gravel
U. S. Dept. of Agriculture	Sand and gravel
Ronald Weaver	Sand and gravel
Fleming Gravel Co.	Sand and gravel

## COUNTY MINERAL PRODUCTION

1960

County	Rank	Value	County	Rank	Value
Alcona	74	\$ *	Genesee	52	\$ 775,607
Alger	72	105,373	Gladwin	44	1,302,373
Allegan	29	2,686,447	Gogebic	7	17,131,855
Alpena	3	*	Grand Traverse	69	*
Antrim	75	67,986	Gratiot	21	*
Arenac	41	1,644,574	Hillsdale	9	12,064,455
Baraga	60	335,732	Houghton	16	7,238,236
Barry	54	513,580	Huron	50	926,342
Bay	13	*	Ingham	47	979,284
Benzie	83	780	Ionia	67	172,512
Berrien	46	1,122,050	Iosco	24	*
Branch	58	406,509	Iron	5	28,832,153
Calhoun	14	8,047,529	Isabella	30	2,627,922
Cass	63	262,710	Jackson	20	5,915,525
Charlevoix	77	56,311	Kalamazoo	53	614,345
Cheboygan	66	*	Kalkaska	71	137,419
Chippewa	26	*	Kent	27	3,039,255
Clare	43	1,304,208	Keweenaw	19	6,007,455
Clinton	64	249,696	Lake	78	55,538
Crawford	49	937,328	Lapeer	56	431,192
Delta	57	418,482	Leelanau	76	64,862
Dickinson	22	5,866,518	Lenawee	25	*
Eaton	42	1,634,349	Livingston	31	2,619,622
Emmet	12	*	Luce	81	28,239
			Mackinac	17	*
			Macomb	45	1,241,124

County	Rank	Value	County	Rank	Value
Manistee	11	\$ 11,362,760	St. Joseph	68	\$ 160,217
Marquette	2	45,804,359	Sanilac	65	213,541
Mason	15	*	Schoolcraft	70	137,719
Mecosta	62	286,102	Shiawassee	35	*
Menominee	48	952,637	Tuscola	36	1,896,964
Midland	4	*	Van Buren	59	352,197
Missaukee	32	2,584,756	Washtenaw	38	1,848,002
Monroe	18	6,905,043	Wayne	1	48,143,183
Montcalm	33	2,495,469	Wexford	73	97,949
Montmorency	82	15,921	Undistributed		152,846,642
Muskegon	37	1,881,373			
Newaygo	61	322,497	TOTAL STATE VALUE		\$ 435,129,790
Oakland	23	5,165,462			
Oceana	51	797,793			
Ogemaw	40	1,720,041			
Ontonagon	6	24,247,548			
Osceola	34	2,004,080			
Oscoda	80	43,519			
Otsego	79	44,743			
Ottawa	28	2,710,419			
Presque Isle	10	*			
Roscommon	39	1,746,877			
Saginaw	55	476,500			
St. Clair	8	*			

DIRECTORY OF PRODUCERS OF MINERALS  
AND  
MINERAL PRODUCTS, 1960

CHEMICAL PLANTS

(Using Natural Brine or Salt)

<u>Name and Address</u>	<u>Raw Material</u>	<u>Plant Location</u>
Allied Chemical and Dye Corp. The Solvay Process Division P. O. Box 271 Syracuse 1, New York	Salt	Detroit, Wayne Co.
The Dow Chemical Company Midland, Michigan	Natural Brine and Salt	Midland, Midland Co. Ludington, Mason Co.
Great Lakes Chemical Corp. 502 Michigan National Bank Bldg. Grand Rapids 2, Michigan	Natural Brine	Filer City, Manistee Co.
Hooker Electrochemical Co. Niagara Falls, New York	Salt	Montague, Muskegon Co.
Michigan Chemical Corp. 500 North Bankson St. Louis, Michigan	Natural Brine	St. Louis, Gratiot Co. East Lake, Manistee Co.
Morton Chemical Co. 110 N. Wacker Drive Chicago 6, Illinois	Natural Brine	Manistee, Manistee Co.
Pennsalt Chemicals Corp. Wyandotte, Michigan	Salt	Wyandotte, Wayne Co.
Standard Lime and Cement Co. 2000 1st National Bank Bldg. Baltimore 3, Maryland	Natural Brine	Stronack, Manistee Co.
Wyandotte Chemical Corp. Wyandotte, Michigan	Salt	Wyandotte, Wayne Co.

PRODUCERS OF BROMINE, CALCIUM-MAGNESIUM CHLORIDE,  
MAGNESIUM COMPOUNDS AND POTASH

(From Well Brines)

	Bromine	Calcium Magnesium Chloride	Magnesium Compounds	Potash	
Dow Chemical Company	X	X	X		Mason
Dow Chemical Company	X	X	X	X	Midland
Great Lakes Chemical Corp.	X				Manistee
Harbison-Walker Refractories Co.			X		Mason
Michigan Chemical Corp.	X	X	X		Gratiot
Michigan Chemical Corp.	X				Manistee
Morton Chemical Co.	X		X		Manistee
Standard Lime and Cement Co.			X		Manistee
Wilkinson Chemical Co.		X			Lapeer

CEMENT MANUFACTURERS

<u>Name and Address</u>	<u>Plant Location</u>
Aetna Portland Cement Company P. O. Box 392 Bay City, Michigan	Bay City, Bay Co.
Dundee Cement Co. Dundee, Michigan	Dundee, Monroe Co.
Huron Portland Cement Co. Division of National Gypsum Co. 1325 Fort Building Detroit, Michigan	Alpena, Alpena Co.
Peerless Cement Company Division of American Cement Corp. 1144 Free Press Building Detroit 26, Michigan	Detroit, Wayne Co. (2 plants) Port Huron, St. Clair Co.
Peninsular Portland Cement Co. Division of General Portland Cement Co. 1003 National Bank Building Jackson, Michigan	Cement City, Lenawee Co.
Penn-Dixie Cement Corporation P. O. Box No. 152 Nazareth, Pa.	Petoskey, Emmet Co.
Wyandotte Chemical Corporation 1609 Biddle Avenue Wyandotte, Michigan	Wyandotte, Wayne Co.

CLAY PRODUCERS\*

<u>Name and Address</u>	<u>Pit Location</u>
Minco Products Corporation Box 367 2305 Miller Road South Saginaw, Michigan	Near Paines, Saginaw Co. Section 1, T.11 N, R.3 E
Robinson Clay Products Company 65 West State Street Akron 9, Ohio	Near Rockland, Ontonagon Co. Section 17, T 50 N, R 39 W

\*Producers of clay used in clay products, cement, and lightweight aggregate manufacture not included.

## CLAY PRODUCTS PRODUCERS

(Brick, Tile, Pottery, Lightweight Aggregate)

<u>Name and Address</u>	<u>Raw Material</u>	<u>Plant Location</u>
American Vitriified Products Co. 701 National City Bank Bldg. Cleveland, Ohio	Shale	Grand Ledge, Eaton Co. (Tile)
Clippert Brick Co. Wyoming and Southern Ave. Detroit 10, Michigan	Clay	Near Dearborn, Wayne Co. (Brick)
Comfort Brick and Tile Co. Rogers Highway Tecumseh, Michigan	Clay	Tecumseh, Lenawee Co. (Tile)
Flat Rock Clay Products Co. Flat Rock 3, Michigan	Clay	Flat Rock, Wayne Co. (Tile)
Grand Ledge Clay Products Co. West Jefferson Street Grand Ledge, Michigan	Shale	Grand Ledge, Eaton Co. (Tile)
Lightweight Aggregate Corp. 12720 Farmington Road Livonia, Michigan	Clay	Livonia, Wayne Co. (Lightweight Aggregate)
The Michigan Vitriified Tile Co. P. O. Box 450 Findlay, Ohio	Shale	Corunna, Shiawassee Co. (Tile)
F. W. Ritter Sons Co., Inc. South Rockwood, Michigan	Clay	South Rockwood, Monroe Co. (Pottery)

## COPPER PRODUCERS

<u>Name and Address</u>	<u>Mine Locations (Counties)</u>
Calumet and Hecla, Inc. Calumet, Michigan	Houghton and Keweenaw
Copper Range Co. Painsdale, Michigan	Houghton
Quincy Mining Co. Hancock, Michigan	Houghton
White Pine Copper Co. 53 West Jackson Boulevard Chicago, Illinois	Ontonagon

## IRON MINING COMPANIES

<u>Name and Address</u>	<u>Mine Locations (Counties)</u>
The Cleveland-Cliffs Iron Co. 14th Floor Union Commerce Bldg. Cleveland 14, Ohio	Marquette
M. A. Hanna Company 1300 Leader Building Cleveland 14, Ohio	Iron, Dickinson
Inland Steel Company 38 South Dearborn St. Chicago 3, Illinois	Iron and Marquette
Jones and Laughlin Steel Corp. 401 Liverty Avenue Gateway Center Pittsburgh 30, Pennsylvania	Marquette
North Range Mining Company Negaunee, Michigan	Marquette and Gogebic
Pickands Mather and Company 2000 Union Commerce Bldg. Cleveland 14, Ohio	Gogebic and Iron
Republic Steel Corporation Republic Building Cleveland 1, Ohio	Iron

## GYPSUM PRODUCERS

<u>Name and Address</u>	<u>Mine or Quarry Location</u>	<u>Mill Location</u>
Bestwall Gypsum Co. 120 East Lancaster Ave. Ardmore, Pennsylvania	Grand Rapids Kent County (Mine)	Grand Rapids, Kent Co.
Grand Rapids Gypsum Co. 1204 Peoples National Bank Bldg. Grand Rapids 2, Michigan	Grand Rapids Kent County (Mine)	Grand Rapids, Kent Co.
National Gypsum Co. 325 Delaware Avenue Buffalo 2, New York	National City Iosco County (Quarry)	National City, Iosco Co.
United States Gypsum Co. 300 West Adams Street Chicago 6, Illinois	Alabaster Iosco County (Quarry)	Grand Rapids, Kent Co. River Rouge, Wayne Co.

## LIME PRODUCERS

<u>Name and Address</u>	<u>Plant Location</u>
Allied Chemical Corp. The Solvay Process Div. P. O. Box 271 Syracuse 1, New York	Detroit, Wayne Co..
Board of Water & Light 206 S. Cedar St. Lansing, Michigan	Lansing, Ingham Co.
The Dow Chemical Co. Ludington Division Midland, Michigan	Ludington, Mason Co.
Limestone Products Division Northwestern-Hanna Fuel Co. 2150 North Prospect Avenue Milwaukee 1, Wisconsin	Menominee, Menominee Co.
Monitor Sugar Company Div. Robert Gage Coal Company South Euclid Avenue Bay City, Michigan	Bay City, Bay County
Wyandotte Chemicals Corp. 1609 Biddle Avenue Wyandotte, Michigan	Wyandotte, Wayne Co.

## MARL PRODUCERS

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
A.		
Frank Alfredson Cleo L. Arndt Gerald Arnsman Carl Avery	Whitehall R.R.#1, Fennville R.R.#1, Hopkins R.R.#1, Athens	Muskegon Allegan Allegan Calhoun
B.		
Barnes Brothers Lee Bertrand LaVerne Brizendine	Horton Mattawan 308 Pennsylvania Ave. Dowagiac	Jackson Kalamazoo Cass
C.		
Case Brothers Cleveland and Taylor Roy Coville William Currier	R.R.#1, Sherwood R.R.#2, Fremont, Ind. R.R.#1, Climax R.R.#1, Caledonia	Calhoun, St. Joseph Branch, Hillsdale Kalamazoo Barry
D.		
Bernard Damveld Arnie Delebaugh Calvin Dixon Coy Drake	R.R.#1, Dorr R.F.D.#2, Union City Bronson R.R.#1, Three River	Allegan Calhoun Branch St. Joseph
F.		
David Flora Frost & Cummings Marl Co.	R.R.#2, Schoolcraft Blanchard	Kalamazoo Mecosta
G.		
Gatehouse Bros. Grant TUFA Lime Co. Raymond Gross	Weidman Grant Wayland	Isabella Newaygo Allegan
H.		
William Hacker E. R. Hamilton Clarence Harter Kenneth Harter Hayward Dry Marl Lawrence Hayward John Hess C. Stanley Hooker	R.R.#1, Athens R.R.#3, Nashville R.R.#3, Paw Paw R.R.#2, Otsego R.R.#3, Quincy R.R.#1, Vicksburg R.R.#1, Hanover 608 Colfax St., Cadillac	Calhoun Barry Van Buren Allegan Branch Kalamazoo Hillsdale Osceola

## Marl Producers (Contd.)

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
K.		
Henry Koster	1075 Chicago Drive, Jenison	Ottawa
L.		
Ted Lamorix Ray Luegge Emmet J. Lutz	R.R.#3, Hart R.R.#1, Three Rivers R.R.#1, Sherwood	Oceana St. Joseph Branch
M.		
Martel Marl Co. Martin Bros. Marl Co. Claude Mastin Robert Medley Ralph Meyers	Three Oaks R.R.#2, Box 46, Three Oaks Climax R.R.#1, Onondaga R.F.D.#2, Allendale	Berrien Berrien Kalamazoo Ingham Ottawa
O.		
Outman Bros.	Six Lakes	Montcalm
P.		
Emil Paulak Bernard Pipher Otto Polehlman, Jr.	R.R.#2, Hopkins Jones R.R.#2, Cassopolis	Allegan Cass Cass
R.		
Reed and Frisbie Robert Brothers Fred Rumz	Colon R.R.#1, Three Rivers R.R.#2, Vicksburg	St. Joseph St. Joseph Kalamazoo
S.		
Schau Bros. Murland Smart Harlan Spoor C. H. Spies	2882 Bronson, Blvd., Burr Oak R.R.#1, Burlington R.F.D.#2, Box 414 Benton Harbor	Barry St. Joseph Calhoun Berrien
Thomas Springer Stewart & Schaefer Lowell W. Stukey	R.R.#2, Vicksburg R.R.#1, Weidman R.R.#1, Reading	Kalamazoo Isabella Hillsdale

## Marl Producers (Contd.)

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
	T.	
Orville Truman	Mecosta	Mecosta
	W.	
Clifford Williams	Nottawa	St. Joseph
	Z.	
Zylstra Bros.	Howard City	Montcalm

## OIL REFINERIES

<u>Name of Refinery</u>	<u>Location</u>
Bay Refining Corporation	Bay City (1201 Second Nat'l. Bank Bldg., Saginaw)
Crystal Refining Co. of Carson City, Inc.	Carson City
Lakeside Refining Co.	Kalamazoo
Leonard Refineries, Inc. (Leonard Division-Plant #1)	Alma
Leonard Refineries, Inc. (Mid-West Division-Plant #2)	Alma
Leonard Refineries, Inc. (Roosevelt Division-Plant #3)	Mt. Pleasant
Naph-Sol Refining Company	Muskegon
Ohio Oil Co. (Aurora Division) (Detroit Refinery)	15911 Wyoming Avenue Detroit 21
Ohio Oil Company (Muskegon Refinery)	2920 E. Laketon Avenue Muskegon
Osceola Refining Company	Reed City
Petroleum Specialties, Inc.	Flat Rock
Socony-Mobil Oil Co., Inc.	P.O. Box 477, Trenton
West Branch Refineries, Inc.	West Branch
Wyandotte Chemical Corporation	Wyandotte

## PEAT PRODUCERS

<u>Name and Address</u>	<u>Pit Location</u>
George Alber Summerfield Road Petersburgh, Michigan	Near Petersburgh, Monroe Co.
Al-Par Peat Ovid, Michigan	Near Ovid, Clinton County
Anderson Peat Company 2562 Graham Road Imlay City, Michigan	Near Imlay City, Lapeer County
Appleman & Yarger Peat Co. 13316 Ida Center Road Ida, Michigan	Near Ida, Monroe County
W. E. Attaway 18821 Glenmore Detroit, Michigan	Near Salem, Washtenaw County
E. G. Bristol Peat Company 5648 Van Dyke Almont, Michigan	Near Almont, Lapeer County
Jack Coddington 15510 Santa Rosa Detroit 38, Michigan	Near Farmington, Oakland County
Cravens Peat Farm Route 5 - Box 132 Kalamazoo, Michigan	Near Kalamazoo, Kalamazoo County
Dan's Peat Farm 42053 West 12 Mile Road Novi, Michigan	Near Novi, Oakland County
Henry Diekman Peat Company 1640 28th Street, S.W. Grand Rapids 9, Michigan	Near Grand Rapids, Kent County
Charles E. Douglas Wayland, Michigan	Near Wayland, Allegan County
Fletcher and Rickard 54001 Grand River Road New Hudson, Michigan	Near New Hudson, Oakland County
Geoman Nursery & Garden Center 3413 Jefferson Avenue, S.E. Grand Rapids 8, Michigan	Near Grand Rapids, Kent County
Gibbs Peat Company Route 2, 6120 Shappie Road Clarkston, Michigan	Near Clarkston, Oakland County

## Peat Producers (Contd.)

<u>Name and Address</u>	<u>Pit Location</u>
Grant's Trucking & Loading 3192 Rochester Road Troy, Michigan	Near Troy, Oakland County
Great Lakes Peat Moss Company 51 West Miller Street Sandusky, Michigan	Near Sandusky, Sanilac County
Green Thumb Peat Humus Company 247 South Stringer Road Sandusky, Michigan	Near Sandusky, Sanilac County
Gummer's Michigan Peat Company Route #2 Lakeview, Michigan	Near Lakeview, Montcalm County
Bert Hiler Watervliet, Michigan (R#2)	Near Bainbridge Center, Berrien County
Hilu Peat Company 3040 Clinton Trail, Route #3 Charlotte, Michigan	Near Charlotte, Eaton County
Kerr's Peat Moss Route #1 Three Rivers, Michigan	Near Three Rivers, St. Joseph Co.
Barney Kolenbrander & Son 431 13 Mile Road Sparta, Michigan	Near Sparta, Kent County
Frank Mason 9104 Billmyer Road Tecumseh, Michigan	Near Tecumseh, Lenawee County
Michigan Peat, Inc. 67 West 44th Street New York 36, N. Y.	Near Capac, Lapeer & St. Clair Counties. Near Minden City, Sanilac County
Griffin H. Munger 3045 West Michigan Avenue Ypsilanti, Michigan	Near Ypsilanti, Washtenaw County
Albert H. Roodbergen 6262 East "QR" Avenue Scotts, Michigan	Near Scotts, Kalamazoo County
J. C. Roodvoets & Son 4659 Kalamazoo Avenue Grand Rapids, Michigan	Near Middleville, Barry County

## Peat Producers (Contd.)

<u>Name and Address</u>	<u>Pit Location</u>
Rushland Peat Company 2156 West Card Road Card, Michigan	Near Card, Tuscola County
Leo Russell Dirt Farm 42201 12 Mile Road Novi, Michigan	Near Novi, Oakland County
Soulliere Nursery 23650 23 Mile Road Mt. Clemens, Michigan	Near Mt. Clemens, Macomb County
Twin Lakes Nursery 3650 Michigan Road, N.E. Grand Rapids 6, Michigan	Near Grand Rapids, Kent County
West Lansing Gravel Company 1911 Pattengill Avenue Lansing, Michigan	Near Lansing, Ingham County
Winn's Peat Corporation 6476 Bishop Road Lansing, Michigan	Near Delhi, Ingham County

## SALT COMPANIES

<u>Name and Address</u>	<u>Product</u>	<u>Plant Location</u>
Diamond Crystal Salt Co. 916 S. Riverside St. Clair, Michigan	Evaporated Salt	St. Clair, St. Clair County
International Salt Co., Inc. Scranton, Pennsylvania	Rock Salt	Detroit, Wayne County
Manistee Salt Works 800 South Vandeventer Ave. St. Louis 10, Missouri	Evaporated Salt	Manistee, Manistee County
Michigan Salt Company 500 North Bankson St. Louis, Michigan	Evaporated Salt	St. Louis, Gratiot County
Morton Salt Company 110 North Wacker Drive Chicago 3, Illinois	Evaporated Salt	Manistee, Manistee County Marysville, St. Clair County

## COMMERCIAL SAND AND GRAVEL PRODUCERS

(Addresses are all in Michigan unless otherwise designated)

<u>Name and Address</u>	<u>Pit Location</u>
A.	
A and R Gravel Co., 2073 Drawry Lane Route #2, Pontiac	Oakland
Adrian Sand and Gravel, Adrian	Lenawee
Advance Bldg. Materials Co., 46461 Ryan Road Utica	Macomb
Aggregate Processors, Inc., Box 566, White Pigeon	St. Joseph
Albaugh & Needham, N. Parkway, Marshall	Calhoun
John Alexander, Marshall	Calhoun
American Aggregates Corp., Greenville, Ohio	Kalamazoo, Livingston**
American Stone Products, Sashabow Rd., Oxford	Oakland
Anderson Sand & Gravel Co., 1700 S. Werdock St., Saginaw	Tuscola
Arndt, Cleo L., Fennville	Allegan
Aumaugher Gravel Co., Ithaca	Clinton
B.	
Bark River Construction Co., Bark River	Delta
Battle Creek Gravel Co., 3800 Dickman Highway Battle Creek	Calhoun
Beardslee, Floyd, 725 E. Square Lake Rd., Pontiac	Oakland
Beckett, Norman, 19 E. Federal Highway, Roscommon	Roscommon
Beckman Brothers, Shelby	Oceana
Bender Gravel Co., 822 Benton St., Hastings	Barry
The Benjamin Pit, 30404 W. 14 Mile Road Farmington	Oakland
Bernthal Gravel Co., R.F.D. #2, Reese	Tuscola
Ray Betham & Son, 12040 Mettetal, Detroit	Oakland
Bichler Bros., 1615 Ludington, Escanaba	Delta
Blades Construction Co., Beaverton	Clare
Boichot Concrete Products Corp., 1800 Turner St. Lansing	Clinton
Brilinski Sand & Gravel, 9205 2nd. Ave., Alpena	Alpena
Bundy Hill Gravel Co., Somerset Center	Hillsdale**
Brady's Sand & Gravel, Tecumseh	Lenawee
J. V. Burkett, St. Joseph	Berrien
C.	
Caspian Lbr. Co., Caspian	Various
Cass City Concrete Products Co., Cass City	Tuscola
Central Concrete Products Co., Inc., Route #2 Big Rapids	Mecosta
Central Michigan Sand & Gravel, P. O. Box 5, East Lansing	Ingham

## Commercial Sand and Gravel Producers (Contd.)

<u>Name and Address</u>	<u>Pit Location</u>
C. (Contd.)	
Champion, Inc., Iron Mountain	Various
Cheney Gravel Co., Inc., Willoughby Rd., Holt	Ingham
Click Bros. Gravel Co., 8783 Bryce Rd., Goodells	St. Clair
Cloverland Milling & Supply Co., 801 Superior Ave. Gladstone	Delta
Harold Cogswell, 1623 Grovenburg Rd., Holt	Ingham
Coit Avenue Gravel Co., 4772 Coit Ave., N.E. Grand Rapids	Kent
Cole Brothers, Battle Creek	Calhoun
Cole Gravel Co., Route #1, Wayland	Barry
Clarence Cole, Caro	Tuscola
Combs, Emil, Route #1, Tekonsha	Calhoun
Comstock Constr. Co., Box 172, Bay City	Hillsdale, Shiawassee, Tuscola
Concrete Products & Building Supply 1800 Ravine Rd., Kalamazoo	Kalamazoo
Construction Aggregates Corp., 120 S. LaSalle St., Chicago, Illinois	Ottawa (Dredge)
Consumers Sand & Gravel, Kalamazoo	Kalamazoo
Cross & White, 3849 Three Mile Rd., Grand Rapids	Kent
Crystal Gravel Co., Crystal	Montcalm
D.	
D. & J. Gravel Co., Route #1, Fowlerville	Livingston
Dachill Trucking Co., 18945 W. 8 Mile Rd., Detroit	Wayne
Van E. Daily, 410 W. Sibley St., Howell	Livingston
Edward DeVries & Sons, 959 Bristol Ave., Grand Rapids	Kent
DeWent, Henry, U. S. 21, Hudsonville	Ottawa
DeWitt Gravel Co., U. S. 27, Lansing	Clinton
Dexter Gravel Co., 7100 Dexter Ann Arbor Rd., Dexter	Washtenaw
Dowling, Bernard, R#1, Long Rapids Rd., Alpena	Alpena
Dunbar, Leo, 7658 U. S. 131, Cadillac	Wexford
Dyer Company, McBrides	Montcalm
E.	
Eastman Gravel Pit, Route #1, Standish	Arenac
H. Eckley, Pioneer, Ohio	Hillsdale
Ehinger Bros., West Branch	Ogemaw
W. L. Emery Co., 1375 E. Jefferson Ave., Detroit	Wayne (Dredge)
F.	
Ferguson Excavating Co., 5360 N. State Rd., Davison	Genesee
Fiser Supply Co., 1617 E. Jolly Rd., Lansing	Ingham
Fisher Sand & Gravel Co., 921 S. Jefferson Ave., Midland	Midland

## Commercial Sand and Gravel Producers (Contd.)

Name and AddressPit Location

## F (Contd.)

Foley and Beardslee, Route #3, Clarkston	Oakland
Ford and Co., 5960 S. Cedar, Holt	Ingham
Fleming Gravel Co., Allegan	Calhoun, Ionia
Fox Valley Construction Co., Box 827, Appleton, Wisconsin	Various

## G.

Gauthier, Frank L., Onkama	Manistee
George, Jerry, Harrisville	Alcona
Gillett Sand and Gravel, R#1, Haslett	Clinton
Gilliland Gravel Co., R#2, Alpena	Alpena
Gillisee Constr. Co., Grand Rapids	Kent**
J. Gladstone and Son, 423 Oak St., Rochester	Oakland
Gogebic Oil Co., Bessemer	Gogebic
O. E. Gooding Co., 5800 Cherry Hill Rd., Ypsilanti	Eaton, Hillsdale, Huron, Ingham, Jackson**, Lapeer
	Lenawee, Livingston, Oakland, Tuscola, Washtenaw, Kent
Grand Rapids Gravel Co., 2200 Chicago Dr., S.W., Grand Rapids	Kent
Grand Valley Gravel Co., R.F.D. #5, Grand Rapids 4	Kalamazoo
Gravel Producers, Inc., 106 E. Kilgore Rd., Kalamazoo	Tuscola
Great Lakes Foundry Sand Co., 1217 Francis, Palms Bldg., Detroit	Macomb
Great Lakes Gravel Co., Inc., 2900 Auburn Rd., Utica	Manistee
Gronlund Gravel Co., Bear Lake	

## H.

Hatch Gravel Crushing Co., 128 W. Campbell St., Alpena	Alpena
Hersey Gravel Co., Harrisville	Alcona
Highland Aggregate, 8695 N. Milford Rd., Holly	Oakland
Hiles Bros., Route #2, Carc	Tuscola
Hocking Constr. Co., Painsdale	Alger, Houghton, Marquette
Holloway Sand & Gravel Co., 10930 6 Mile Rd., Northville	Washtenaw
Holly Manufacturing & Mining Co., Box 299 Flint or 16240 Tendall Rd., Davisburg	Oakland**
Gunnar F. Holmberg, R.F.D. #1, Gladstone	Delta
Hoover Bros., 1137 Tripp Rd., Waldron	Hillsdale
George Hubscher & Son., Box 411, Mt. Pleasant	Isabella
Huitt & Sons, 322 Water St., Allegan	Allegan
William Huizenga, Route #2, Zeeland	Ottawa
C. R. Hunt, Cass City	Tuscola
E. J. Hurley Sand & Gravel Co., 5609 Bradley, Lansing	Ingham

## Commercial Sand and Gravel Producers (Contd.)

Name and AddressPit Location

## H. (Contd.)

Huron Gravel Co., 2900 Inwood Rd., Romeo	Macomb
Hutchins Sand and Gravel, 320 S. Maple, Gaylord	Otsego
Hygrade Sand and Gravel Corp., 5000 E. 31 Mile Rd., Romeo	Macomb

## I.

Ireland & Lester Co., 220 N. Wayne St., St. Joseph	Berrien (Dredge)
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## J.

Lewis James, 2957 Detroit Rd., Niles	Berrien
John R. Sand & Gravel Co., 1865 Indianwood Rd. Lake Orion	Oakland
Tom Johnston Gravel Co., 114 LaFayette St., Grand Haven	Ottawa

## K.

K. and V. Gravel Co., R#2, Fremont	Newaygo
Fred Kaatz, 62701 Richmond Rd., Richmond	Macomb
Harold Keill, R#3, Niles	Berrien
Kemler Bros., 5900 Cobb Creek Ct., Rochester	Oakland
Kester Sand & Gravel, R#2, Millington	Tuscola
S. E. Ketchum & Sons, R#3, Mason	Ingham
Killins Gravel Co., 3305 Liberty Rd., Ann Arbor	Washtenaw**
Klett Construction Co., Hartford	Van Buren
Klump Bros., 4950 Loveland Rd., Grass Lake	Jackson
Koan Gravel Co., R#1, Holly	Oakland
Koenig Sand & Gravel, 1486 Gratiot Ave., Detroit	Oakland
Jack Koetje, Kalamazoo	Kalamazoo
Kruse Gravel Pit, 1090 Clark Rd., Ypsilanti	Washtenaw
Kurtz Gravel Co., G-5300 N. Dort Hwy., Flint	Genesee

## L.

A. S. Leffler, Davison	Genesee
A. Lindberg & Sons, Inc., Box 154, Ishpeming	Marquette

## M.

Mackinac Aggregates Corp., 245 Marquette, St. Ignace	Mackinac
Macomb Sand & Gravel, 3295 Auburn Rd., Utica	Macomb
Maertens Sand & Gravel Co., 1036 Buckingham, Grosse Pointe	Macomb
Hugh T. McKenzie, 1401 Glenrose, Lansing	Ingham
McKinnon Gravel Co., State St., Alpena	Alpena

## Commercial Sand and Gravel (Contd.)

Name and AddressPit Location

## M. (Contd.)

Ray W. Malow, Utica	Macomb
Mike Mangine, Cedarville	Mackinac
John McKenzie, 13164 Seymour Rd., Montrose	Genesee
Manning-Locklin Gravel Co., Box 216, Northville	Wayne
McGaw Sand & Gravel, Yale	St. Clair
Louis Marsack & Sons, 23633 Denhurst, St. Clair Shores	Macomb
H. L. Martin Gravel Co., Box 54, Westphalia	Ionia
Mason Gravel Co., Mason	Ingham
Hugh H. Mason & Sons, 302 N. Center Ave., Gaylord	Cheboygan
Masterson Sand Co., R#1, Covert	Van Buren
Mathews Gravel Co., G-6226 E. Mt. Morris Rd., Mt. Morris	Genesee
Michigan Silica Co., Rockwood	Wayne
Michelson Corp., 1745 Seymore Lake Rd., Oxford	Oakland
Paul C. Miller, 10300 Sparta Ave., Sparta	Grand Traverse, Kent Montcalm, Muskegon, Ottawa
Vern Molesworth, 106 Park Avenue, Yale	Huron, Livingston, Macomb, Sanilac, St. Clair, Tuscola
Moore Bros. Sand & Gravel, 7635 Wayne Rd., Wayne	Wayne
Morgan Sand & Gravel Co., 45095 Ryan Rd., Utica	Macomb
Al Morgan's Sand, 26291 Pennsylvania Rd., Romulus	Wayne
Edward Murawski, Fillion	Huron
Muskegon Gravel Co., 5395 Dangl Rd., Muskegon	Muskegon
N.	
Nashville Gravel Co., R#2, Nashville	Barry**
New Hudson Sand & Gravel, New Hudson	Oakland
Nieb Concrete Products, 1406 South 11th St., Niles	Cass
William North, 5278 Churchill Rd., Brown City	Lapeer
North Star Gravel Co., Ithaca	Gratiot
Northeast Gravel & Excavating Co., 4300 Cannosburg Rd., Belmont	Kent
Northville Sand & Gravel Co., 18275 Beck Rd., Northville	Wayne
Northwest Materials, Inc., Bryan, Ohio	Hillsdale
Nugent Sand Co., Inc., 2875 Lincoln St., Muskegon	Muskegon
O.	
Oakland Sand & Gravel Co., 741 Glengary Rd., R#4, Walled Lake	Oakland
Okemos Sand & Gravel, 1873 Hamilton Rd., Okemos	Ingham
Otisville Stone Co., Otisville	Genesee
Oxford Mining Co., Davisburg	Oakland

## Commercial Sand and Gravel Producers (Contd.)

Name and AddressPit Location

## P.

P. and B. Gravel Co., R#3, Ithaca	Gratiot
Palmer Sand & Gravel, 2531 E. South, Jackson	Jackson
Paquin's Gravel Sales, R#1, Gladstone	Delta
Paris Gravel Co., Paris	Mecosta
Peterson Bros., Beaverton	Gladwin
Pekaar & Van Doorn, 2774 28th St., Grand Rapids	Kent
William Perry & Son, Peffer St., Harbor Springs	Emmet
Peterhan's Bros., R#2, Caro	Tuscola
Harold Peters, Washed Sand & Gravel, Decker	Sanilac
Pickitt and Schreur, Box 149, Allegan	Allegan, Calhoun, Clinton, Ionia, Isabella, Kalamazoo, Kent, Ottawa, St. Joseph, Van Buren, Washtenaw**
Piispanen Bros., R#1, Box 80, Bessemer	Gogebic
Pine Sand & Gravel, 2690 Imlay City Rd., Lapeer	Lapeer
Poirer Gravel Co., 214 Fair Ave., Alpena	Alpena
Port Huron Sand & Gravel, 2854 20th Ave., Port Huron	St. Clair
Portage-Manley Sand Co., Rockton, Illinois	Berrien
John Post & Sons, R#2, Swartz Creek	Genesee
Powell & Brock Co., Fairgrove	Tuscola
Producers Core Sand Corp., 323 Warren Bldg., Michigan City, Indiana	Berrien
Pryor Bros., 725 N. Cochran, Charlotte	Eaton

## R.

Ray Industries, Inc., P. O. Box 165, Oxford	Macomb
Lawrence Reed, 440 Baldwin, Alpena	Alpena
Don Reynolds, 2405 Peck Rd., Crosswell	Sanilac
Bernie Rief, Fraser	Macomb
Riverside Sand & Gravel Co., 1050 Maynard Ave., S.W., Grand Rapids	Kent
Rock's Sand & Gravel, Grand Rapids	Kent
S. K. Rogers, 48301 Sugar Bush Rd., New Baltimore	Macomb
C. E. Rose Co., 2166 Butterfield, Troy	Oakland
Walter Rosevear Pit, West Branch	Ogemaw
Rosteck Contractors, 32634 Utica Rd., Fraser	Macomb
Art Russell's Concrete Products, R#1, Hillsdale	Hillsdale
Ryno Sand & Gravel, R#1, Coloma	Berrien

## S.

Saginaw Core Sand Co., Saginaw	Genesee, Midland
Salem Gravel & Construction Co., Inc., 17243 W. McNichols Road, Detroit	Oakland
Mrs. Hilma Samuelson, Chatham	Alger
Sand Products Corp., 2489 First National Bank Bldg., Detroit	Manistee, Muskegon
Scarlett Gravel, 1721 S. Cedar, Holt	Ingham
Sargent Sand Co., 2840 Bay Rd., Saginaw	Mason, Tuscola

## Commercial Sand and Gravel Producers (Contd.)

Name and AddressPit Location

## S. (Contd.)

Schicker Bros., Houghton Lake Scio Gravel Co., 2911 W. Delhi, Box 233, Ann Arbor	Roscommon Washtenaw
Sergeant & Son, 4830 Markey Rd., Houghton Lake Shelby Tractor Sales, Shelby Shenk Gravel Co., Durand	Roscommon Oceana Shiawassee
Lawrence B. Skinner, 4536 Packard Rd., Ypsilanti Sky-Way Sand & Gravel Co., 4060 E. Holt Rd., Holt Slaters Bald Mtn., 53 N. Parke, Pontiac	Washtenaw Ingham Oakland
Smith Sand & Gravel Co., Inc., 65985 Mound Rd., Romeo	Macomb
Justus Snellenberger, 1545 W. Fry Road, <sup>b</sup> Qurt South Flint Gravel Co., 6090 Belford Rd., Holly Stamm Bros. Gravel Co., R#1, Adrian Standard Aggregates Inc., 2423 M-87, Holly Standard Sand Co., 14201 Lake Shore Ave., P. O. Box 290, Grand Haven	Genesee Oakland Lenawee Oakland Ottawa, Van Buren
Delmar Stanley Gravel Co., R#1, Roscommon Jessee Stanley Gravel, Houghton Lake Gordon D. Stevick, 424 Patty Ave., Jackson Frank H. Stoerk, Pierson	Roscommon Roscommon Jackson Montcalm
Straits Aggregate & Equipment Corp., R#1, Box 119-A, Oscoda	Presque Isle & Various
H. Stukey, R#2, Coldwater	Branch
Walter Sutton, 1603 Maple St., Niles	Berrien

## T.

Lawrence Tamlyn, 125 Burdette St., St. Ignace Tecumseh Gravel Co., P.O. Box 496, Tecumseh Tecumseh Materials, Inc., Tecumseh Thompson Gravel Co., 234 Garfield, Coldwater Thompson Sand & Gravel, 47399 W. 7 Mile Road, Northville	Mackinac Lenawee Lenawee Branch Wayne
Thornton Construction Co., Hancock Lamar Thumm, 117 S. Grove St., Ypsilanti Tuckey's Sand & Gravel, Cass City	Keweenaw Washtenaw Tuscola

## V.

Valley Sand & Gravel, Three Rivers Shirley Van Deusen, R#1, Standish Chuck Vaughan Gravel & Excavating 2685 Deckerville Rd., Caro Vermontville Gravel Co., R#1, Vermontville H. R. Vernon, R#2, Fennville Charles Vittone, R#2, Box 37, Ironwood Vollmar Sand & Gravel, Pigeon Harold O. Voss, R#2, Fennville	St. Joseph Arenac Tuscola  Eaton Allegan Gogebic Huron Allegan
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## Commercial Sand and Gravel Producers (Contd.)

Name and AddressPit Location

## W.

Ben Waanders, Box 30, Allegan Aubrey Wagner, 220 North 3rd St., Harbor, Beach Walker Sand & Gravel, Box 205, New Hudson Wallace Stone Co., Hersey Sand Gravel Div., Hersey Walling Gravel Co., P. O. Box 52, St. Johns Walsh Sand & Gravel Co., 13th St., Menominee F. S. Ward, Box 185, Clarkston Washtenaw Sand & Gravel, Inc., 4984 Earhardt, Ann Arbor	Allegan Huron Oakland Osceola Clinton Menominee Oakland Washtenaw
Wayne Sand & Gravel Co., 40330 Tyler Rd., Wayne Ronald Weaver, Box 116, Dansville	Wayne Clinton, Ingham Saginaw, Shiawassee Ingham
West Lansing Gravel Co., 1911 Pattengill Ave., Lansing	
West Shore Construction Co., Zeeland	Allegan, Barry Calhoun, Eaton Kent, Ottawa
Wexford Gravel Co., P. O. Box 472, Cadillac Vern Wheeler, Greenville Whitehall Gravel Co., Whitehall I. L. Whitehead Co., Sault Ste. Marie Whittaker & Gooding Co., 5800 Cherry Hill Rd., Ypsilanti	Wexford Montcalm Muskegon Chippewa Washtenaw
Whittum Gravel Co., Eaton Rapids Williams Bros., P. O. Box 78, Ionia Willson Bros., Rives Junction Olga Winkka, 520 Adam St., Iron River Wolverine Contractors, Inc., 19440 James Couzens Highway, Detroit	Eaton Ionia Jackson Alger Macomb, Oakland
Woodward Building Materials, 120 W. Chicago St., Coldwater.	Branch

## Y.

John G. Yerington, R#3, Box 34, Benton Harbor	Allegan, Berrien, Cass, Van Buren
Youngs Sand & Gravel, 9095 S. Huron River Drive, Ypsilanti	Washtenaw

## Z.

Zahns Sand & Gravel, 2315 Ellsworth Rd., Ann Arbor	Washtenaw
Zeigler Sand & Gravel, 901 W. State, Hastings	Barry

\*\* Includes Heavy-Media Separation

STONE PRODUCERS

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Afton Stone & Lime Co. Afton, Michigan	Limestone, Crushed	North of Afton Sec. 25, T.35N., R.2W., Cheboygan County
Arenac County Road Comm. Omer, Michigan	Limestone, Crushed (Non-Commercial)	Northeast of Au Gres Sec. 5, T.19N., R.7E., Arenac County
Charlevoix County Rd. Comm. Charlevoix, Michigan	Limestone, Crushed	Charlevoix County
Bichler Brothers 1615 Ludington Escanaba, Michigan	Limestone, Crushed	Sec. 1, T.39N., R.23E., Delta County
Bay County Road Comm. Bay City, Michigan	Limestone, Crushed (Non-Commercial)	Near Omer Sec. 34, T.20N., R.5E., Arenac County
Canary Hill Stone Quarry R#2, Hillsdale, Michigan	Sandstone (Dimensional)	West of Hillsdale Hillsdale County
Charlevoix Lime & Stone Co. Vanderbilt, Michigan	Limestone, Crushed	West of Charlevoix Sec. 29, T.34N., R.8W., Charlevoix County
Cheney Limestone Co. P. O. Box 125 Bellevue, Michigan	Limestone, Crushed and Dimensional	West of Bellevue Sec. 20, T.1N., R.6W., Eaton County
De Roche Brothers Keweenaw Bay, Michigan	Sandstone (Dimensional)	Sec. 34, T.52N., R.33W., Baraga County
Drummond Dolomite, Inc. P. O. Box 688 Sheboygan, Wisconsin	Dolomite, Crushed	West End Drummond Island Sec. 24, T.42N., R.5E., Chippewa County
The France Stone Co. 1800 Toledo Trust Bldg. Toledo 14, Ohio	Dolomite, Crushed	Monroe Sec. 7, T.7S., R.9E., Monroe County
Gierke Brothers Fairport, Michigan	Dolomite (Dimensional)	North of Fairport Sec. 4, T.37N., R.19W., Delta County
Gogebic County Rd. Comm. Bessemer, Michigan	Miscellaneous Stone (Non-Commercial)	Gogebic County
Houghton County Rd. Comm. Hancock, Michigan	Basalt, Crushed (Non-Commercial)	Houghton County

## Stone Producers (Contd.)

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Huron Portland Cement Co. 1325 Ford Bldg. Detroit, Michigan	Limestone, Crushed	Alpena Sec. 24, T.31N., R.8E., Alpena County
Huron River Quarry Corp. 26068 E. Huron River Drive Flat Rock, Michigan	Dolomite, Crushed	West of Flat Rock Sec. 36, T.4S., R.9E., Wayne County
Inland Lime & Stone Co. Div. Inland Steel Co. Manistique, Michigan	Limestone, Crushed	North of Port Inland Sec. 6, T.42N., R.12W., Mackinac County
Iosco County Rd. Comm. P. O. Box 31 East Tawas, Michigan	Limestone, Crushed (Non-Commercial)	Northeast of Au Gres Sec. 24, T.20N., R.7E., Arenac County
City of Iron Mountain Iron Mountain, Michigan	Granite, Crushed	Dickinson County
Jeffrey Limestone Co. Box 107 Parma, Michigan	Limestone, Crushed	Northeast of Parma Sec. 30, T.2S., R.2W., Jackson County
Limestone Mountain Co. 1028 Ethel Avenue Hancock, Michigan	Dolomite, Crushed	Near Pelkie Sec. 23, T.51N., R.35W., Houghton County
A. Lindberg & Sons, Inc. Box 154 Ishpeming, Michigan	Dolomite, Crushed	NE SE 24, T.46N., R.18W., Alger County
Maybee Stone Co. Maybee, Michigan	Dolomite, Crushed	Near Maybee Sec. 29, T.5S., R.8E., Monroe County
The Metro-Nite Co. 710 E. Silver Spring Drive Milwaukee, Wisconsin	Dolomite, Crushed	Near Felch Sec. 26, T.42N., R.28W., Dickinson County
Michigan Foundation Quarry Company 110 W. Jefferson Avenue Trenton, Michigan	Limestone, Crushed	Trenton Sec. 7, T.4S., R.11E., Wayne County
Michigan Limestone Div. U. S. Steel Corporation 2650 Guardian Bldg. Detroit 26, Michigan	Limestone, Crushed	Near Rogers City Sec. 23, T.35N., R.5E., Presque Isle County
" "	Dolomite, Crushed	Near Cedarville Sec. 10, T.42N., R.1E., Mackinac County

## Stone Producers (Contd.)

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Michigan Silica Co. Rockwood, Michigan	Sandstone, Crushed	Near Rockwood Sec. 15, T.5S., R.10E., Wayne County
Michigan Stone Co. R#2 Ottawa Lake, Michigan	Dolomite, Crushed	East of Ottawa Lake Sec. 25, T.8S., R.6E., Monroe County
Monroe County Rd. Comm. Monroe, Michigan	Dolomite, Crushed (Non-Commercial)	East of Dundee Sec. 13, T.6S., R.7E., Monroe County
Onaway Stone Co. Onaway, Michigan	Limestone, Dimensional	North of Onaway Sec. 5, T.34N., R.2E., Presque Isle County
The Original Sandstone Quarry Napoleon, Michigan	Sandstone	East of Napoleon Sec. 6, T.4S., R.2E., Jackson County
Penn-Dixie Cement Corp. Nazareth, Pa.	Limestone, Crushed	West of Petoskey Sec. 3, T.34N., R.6W., Emmet County
Presque Isle Corporation Chemstone Corp. Agents P. O. Box 321 Alpena, Michigan	Limestone, Crushed	Sec. 2, T.33N., R.8E., Presque Isle County
Ray Sandstone Quarry 303 Nottawaseppe St. Napoleon, Michigan	Sandstone	East of Napoleon Sec. 6, T.4S., R.2E., Jackson County
Star Stone Co. Box 102 Napoleon, Michigan	Sandstone	East of Napoleon Sec. 31, T.3S., R.2E., Jackson, Michigan
Superior Natural Red Stone Quarry Baraga, Michigan	Sandstone	North of Barage Sec. 2, T.52N., R.33W., Baraga County
Superior Rock Products Co. Sagola, Michigan	Dolomite, Crushed Mica Schist, Crushed Feldspar, Crushed	East of Randville Sec. 35, T.42N., R.30W., Sec. 19 and 30, T.42N., R.29W., Dickinson County
Thornton Construction Co. Hancock, Michigan	Dolomite, Crushed	Sec. 6, T.44N., R.8W., Mackinac County NW SE 5, T.38N., R.26W., Menominee County
	Granite, Crushed	Sec. 17, T.47N., R.25W., Marquette County

## Stone Producers (Contd.)

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Delbert W. Turner 1607 N. Rose Street Kalamazoo, Michigan	Sandstone	Marshall Sec. 29, T.19N., R.7E., Calhoun County
The Wallace Stone Co. Bayport, Michigan	Limestone, Crushed and Dimensional	Southeast of Bayport Sec. 5 and 6, T.16N., R.10E., Huron County

## SULFUR PRODUCER

Name and Address

Aurora Division  
Ohio Oil Company  
15911 Wyoming Avenue  
Detroit, Michigan

Location

Detroit, Wayne County

# GENERALIZED COLUMNAR SECTION OF MICHIGAN

## MICHIGAN GEOLOGICAL SURVEY DIVISION

SYSTEM, SERIES	FORMATION, GROUP	LITHOLOGY	THICKNESS	ECONOMIC PRODUCTS
RECENT				
PLEISTOCENE	GLACIAL DRIFT	SAND, GRAVEL, CLAY, boulders, marl	0-1000	SAND, GRAVEL, PEAT, MARL, FRESH WATER
"PERMO-CARBONIFEROUS"	"RED-BEDS"	SHALE, CLAY, SANDY SHALE, gypsum		
PENNSYLVANIAN	GRAND RIVER	SANDSTONE, sandy shale	80-95	BUILDING STONE, FRESH WATER
	SAGINAW	SHALE, SANDSTONE, limestone, coal	20-535	SHALE, COAL, FRESH WATER, BRINE, GAS
MISSISSIPPIAN	BAY PORT	LIMESTONE, SANDY OR CHERTY LIMESTONE, SANDSTONE	2-100	LIMESTONE, FRESH WATER
	MICHIGAN	SHALE, gypsum, anhydrite, sandstone	0-500	GYPSUM
	"MICHIGAN STRAY"	SANDSTONE	0-80	GAS
	MARSHALL	SANDSTONE, sandy shale	100-400	FRESH WATER, BRINE, BUILDING STONE
	COLDWATER	SHALE, sandstone, limestone	500-1100	SHALE, FRESH WATER
	SUNBURY	SHALE	0-140	
	BEREA - BEDFORD	SANDSTONE, SHALE	0-325	GAS, OIL
DEVONIAN	ELLSWORTH - ANTRIM	SHALE, limestone	100-950	SHALE, GAS
	TRAVERSE	LIMESTONE, SHALE	100-800	LIMESTONE, OIL, GAS, FRESH WATER
	BELL	SHALE, Limestone	0-80	SHALE
	ROGERS CITY - DUNDEE	LIMESTONE	0-475	LIMESTONE, OIL, GAS, FRESH WATER
	DETROIT RIVER	DOLOMITE, limestone, salt anhydrite	150-1400	LIMESTONE, DOLOMITE, OIL, GAS, SALT, BRINE, FRESH WATER
	SYLVANIA	SANDSTONE, SANDY DOLOMITE	0-550	GLASS SAND, FRESH WATER
SILURIAN	BOIS BLANC	DOLOMITE, CHERTY DOLOMITE	0-1000	
	BASS ISLAND	DOLOMITE	50-570	DOLOMITE, FRESH WATER
	SALINA	SALT, DOLOMITE, Shale, anhydrite	50-4000	SALT, GAS, OIL
	NIAGARAN (Guelph - Lockport - Engadine) (Manistique - Burnt Bluff) (Cataract)	DOLOMITE, Limestone, shale	150-800	LIMESTONE, DOLOMITE, OIL, GAS, FRESH WATER
	ORDOVICIAN	CINCINNATIAN (Richmond) (Maysville - Eden)	SHALE, LIMESTONE	250-800
TRENTON - BLACK RIVER		LIMESTONE, DOLOMITE	200-1000	OIL, GAS, LIMESTONE, FRESH WATER
ST PETER		SANDSTONE	0-150	FRESH WATER
OZARKIAN OR CANADIAN	PRAIRIE DU CHIEN	DOLOMITE, Shale	0-410	
	HERMANVILLE	DOLOMITE, SANDY DOLOMITE, sandstone	15-500	
CAMBRIAN	LAKE SUPERIOR (Munising) (Jacobsville)	SANDSTONE	500-2000	BUILDING STONE, FRESH WATER
ALGONKIAN	KEWEENAW (Copper formations)	LAVA FLOWS, conglomerate, shale, sandstone	9800-35000	COPPER, SILVER, ROAD METAL, SEMI-PRECIOUS GEM STONES
	KILLARNEY GRANITE	GRANITE, GNEISS, diorite, syenite		
	HURONIAN (Iron formations)	SLATES, HEMATITE, SCHIST, QUARTZITE, GRANITE, marble, dolomite	2000+	IRON ORE, ROOFING SLATE, ROAD METAL, GRAPHITE, MARBLE
ARCHEAN	LAURENTIAN	SCHIST, GNEISS, GRANITE		ROAD METAL, BUILDING STONE, VERDE ANTIQUE, TALC, GOLD
	KEEWATIN	SCHIST, GREENSTONE, SLATE		ROAD METAL