

STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION

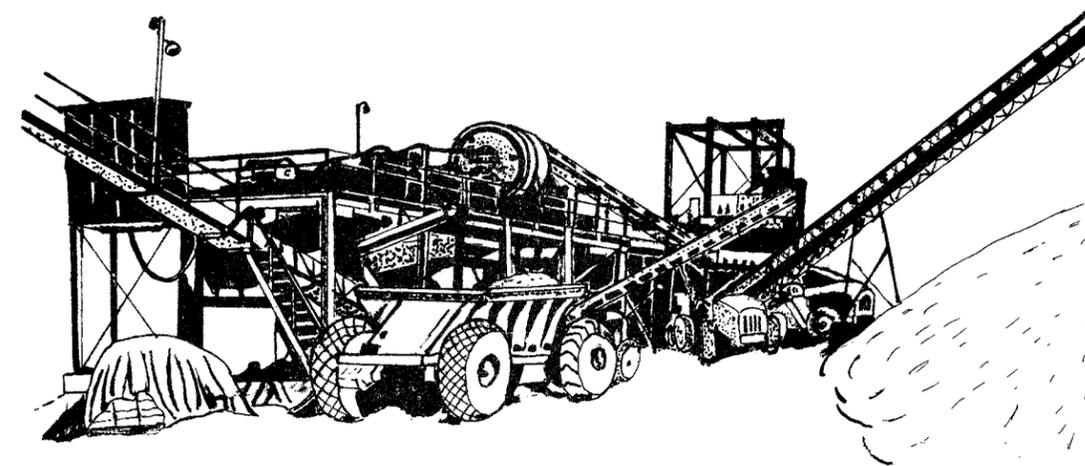
GERALD E. EDDY Director

GEOLOGICAL SURVEY DIVISION

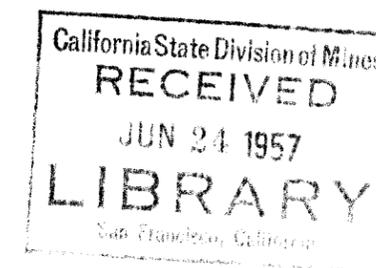
WILLIAM L. DAoust State Geologist

MICHIGAN'S MINERAL INDUSTRIES

1955



April, 1957



MICHIGAN
MINERAL INDUSTRIES
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by

Harry O. Sorenson
Emery T. Carlson

FOREWORD

This report is a record of Michigan Mineral Industries for the calendar year 1955, compiled from statistical reports and information filed by the mineral producers of the state and in cooperation with the Bureau of Mines.

The estimated value of mineral production for 1956 was submitted by the United States Bureau of Mines on January 15, 1957. The section on developments in the mineral industries was prepared from office and field conferences with mineral producers, and from articles published in Pit and Quarry, Rock Products, Mining Journal, and other trade journals. Since water is the most valuable of our mineral resources (but hitherto little considered) a brief summary on its useage and importance is included. The sketch on the cover represents one of Michigan's five heavy-media gravel separation plants which are upgrading marginal gravels to meet concrete specifications of the State Highway Department.

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LATE DEVELOPMENTS IN MICHIGAN'S MINERAL INDUSTRIES

A brief resumé of developments in the mineral industries shows that developments reported for 1954 continues. New processes, techniques and methods have been initiated which develop lower grade and fringe minerals, thus conservation's wise use of the minerals prolong and expand the industries. According to estimates by Bureau of Mines, U.S. Department of Interior, the value of mineral production in Michigan in 1956 was \$389,706,000, an increase of nearly 7 per cent over 1955. Major increases - over ten per cent - were recorded in the production of Portland cement, clay and shale, copper, marl, sand and gravel.

The Republic mine began commercial operation early in 1956. This is the second and larger low grade iron ore operation utilizing Michigan "Jasper ore". The mine is owned by the Marquette Iron Mining Company, a union of the Cleveland-Cliffs Iron Company (which operates the property), Inland Steel Company, International Harvester Company, Jones and Laughlin Steel Corporation and the Wheeling Steel Corporation. Geared to an output of 550,000 tons per year, the Republic set-up follows the Humboldt mine in the new activity in Northern Michigan iron ranges.

Working three shifts on a five day week, the open pit operation supplies the mill with from 3,500 to 4,000 tons per day of the 30 per cent iron Jasper. Two tons of crude yields one ton of concentrate, 63 per cent iron and 8 per cent silica.

Republic features froth flotation treatment using an oil reagent of the forest industries. Two units have 59 flotation cells.

The pelletizing plant located 27 miles away at Eagle Mills, also features new techniques: four "Flying Saucer" agglomerating discs and an up-drift traveling grate that can turn out 2,000 tons of pellets per day. First shipments, about 4500 tons of pellets, were made by boat on October 3, 1956 to the International Harvester Steel plant at Chicago.

Lake Superior and Ishpeming Railroad Company announced that they will construct an iron ore loading facility on Little Bay de Noc on Lake Michigan in the vicinity of Rapid River. The decision to establish this facility was largely due to the demand for iron ore at Chicago and the development and pelletization of low grade ores. The new dock will be a belt conveyor type to speed loading of boats and to minimize breakage in handling iron ore pellets.

M.A. Hanna Company announced plans to sink a new 26-foot diameter, concrete circular shaft to a depth of 2,000 feet on what is known as the Minckler farm property, at Mineral Hill on the Menominee Range. A large surface plant including offices, change house, and shops will also be constructed at the shaft. This will not open a new property but will be a joint plant to serve both the Homer and Wauseca mines.

The Richmond mine, of the M. A. Hanna Company, located near Palmer, was closed permanently April 9, 1956. The Richmond Iron Company was incorporated in 1898 and operated the old Richmond mine until 1927 when a nearby property was opened and operated as the New Richmond until its abandonment.

White Pine Copper Company has authorized the purchase of two long conveyor systems to replace the long underground truck haulage. When the conveyor system has been installed the trucks will carry the ore from the headings to the conveyors which in turn will deliver the ore to the underground crusher and to the surface.

Number 13 shaft of the Calumet & Hecla, Inc., Osceola lode in the Keweenaw Peninsula has been completely unwatered. Mining has started on the lower levels and a substantial rate of production is in progress. Unwatering of the Number 6 shaft was completed late in 1956 and mining of copper ore is expected to begin about mid 1957.

The Huron Portland Cement Company operating the largest plant of its kind in the world, continues to expand its facilities at Alpena to a point where it can produce some 10,000,000 barrels of Portland cement and Masonry cement annually and furnish employment to more than 1,100 men. The company has recently purchased Sportsmen's Dock at Benton Harbor as the site of a storage and handling plant. The site, on the St. Joseph River, is located near the Chesapeake and Ohio Railroad right-of-way.

The recently completed new Peerless Cement Corporation cement plant in Detroit is now producing at the initial rate of 1,250,000 barrels annually. This output, added to the former 5,000,000 barrels volume of Peerless cement, will give the company nearly 30 per cent of the state's total cement production.

One of the most important features of the new plant is the 450 foot rotary kiln, longest in the state. Automation of many processes permits a crew of only 70 workers to handle 3 shifts, 7 days-a-week operation.

Recent expansion projects at the Inland Lime and Stone Company's Port Inland operation will increase the output to an annual capacity expected to total 5,000,000 tons for 8 months' shipping season. Expansion included the installation of belt conveyors and other equipment which will raise screening capacity 50 per cent.

Work on a multi-million dollar crushing plant is in progress at the Wyandotte Chemical Corporation, Alpena quarry site. Wyandotte limestone is used in the manufacture of Portland cement at the adjacent Huron Portland Cement Corporation plant and for the production of Alkali at the Company's Wyandotte, Wayne County plant.

National Gypsum Company, Buffalo, N.Y. is proceeding with development of the Tawas City Gypsum quarry, anticipating production in the spring of 1958. Stripping of the overburden was started in the fall of 1956 and new

machinery delivered at the site in January included 40-ton trucks, bulldozers, graders and drills. Construction of the crusher building is in progress.

Gypsum will be extracted by open pit method. A year's supply of the Gypsum rock will be stock-piled at National City, and the remainder shipped to new plants in Ohio and Illinois. The company will dredge a 12,000 ft. channel, 250 feet wide, in Lake Huron, near Tawas City, to permit loading of lake freighters.

Bestwall Gypsum Company, organized during 1956 at Ardmore, Pennsylvania, acquired and now operates the Certain-Teed Products Corp. Grand Rapids plant and mine. The name of the plant was officially changed to Bestwall July 1, 1956.

Construction was begun on a major expansion program designed to double the capacity at the Standard Lime and Cement Company's chemical plant at Manistee. Included in the expansion program is an additional rotary kiln, more thickeners and settling basins, reactors, and accompanying equipment. Loading facilities at the plant will be improved and enlarged. Completion of the enlarged facilities have been scheduled for June, 1957.

Five commercial sand and gravel plants ranging in capacity from 100 to 300 tons per hour and employing heavy-media separation have ~~not~~ been established in Michigan at pits formerly considered incapable of producing premium-quality gravel suitable for specified highway concrete. These concerns are: American Aggregate Corp., Green Oaks, Livingston County; Bundy Hill Gravel Company, Somerset Center, Hillsdale County; Harry Pickitt, Northville, Wayne County; Killians Gravel Company, Ann Arbor, Washtenaw County; and Groveland Gravel Company, near Davisburg, Oakland County.

Grand Rapids Gravel Company, Grand Rapids, has completed a new office building, the last step in an expansion program begun in 1954. The program has included establishment of a third and fourth ready-mixed concrete plant, and a sand, gravel, and crushed stone screening plant.

Michigan Chemical Corporation announced its entry into the rare earth field through the acquisition of the Assets of Saturnium Corporation. In its new activities, the company will continue rare earth research as well as place in operation pilot-plant procedures. The Saturnium research laboratory at California, Kentucky, will be closed, and its facilities moved to St. Louis, Michigan.

Charred wood unearthed during an archaeological expedition to Isle Royale in Lake Superior has been dated by radio-active carbon 14 method in a University of Michigan laboratory. According to Dr. R.W. Drier, professor of Metallurgical Engineering at Michigan College of Mining and Technology, evidence found indicates there were mining pits on the island as early as 2000 B.C. The ancient miners heated copper-bearing rocks with fire, then poured water on the rocks to split them.

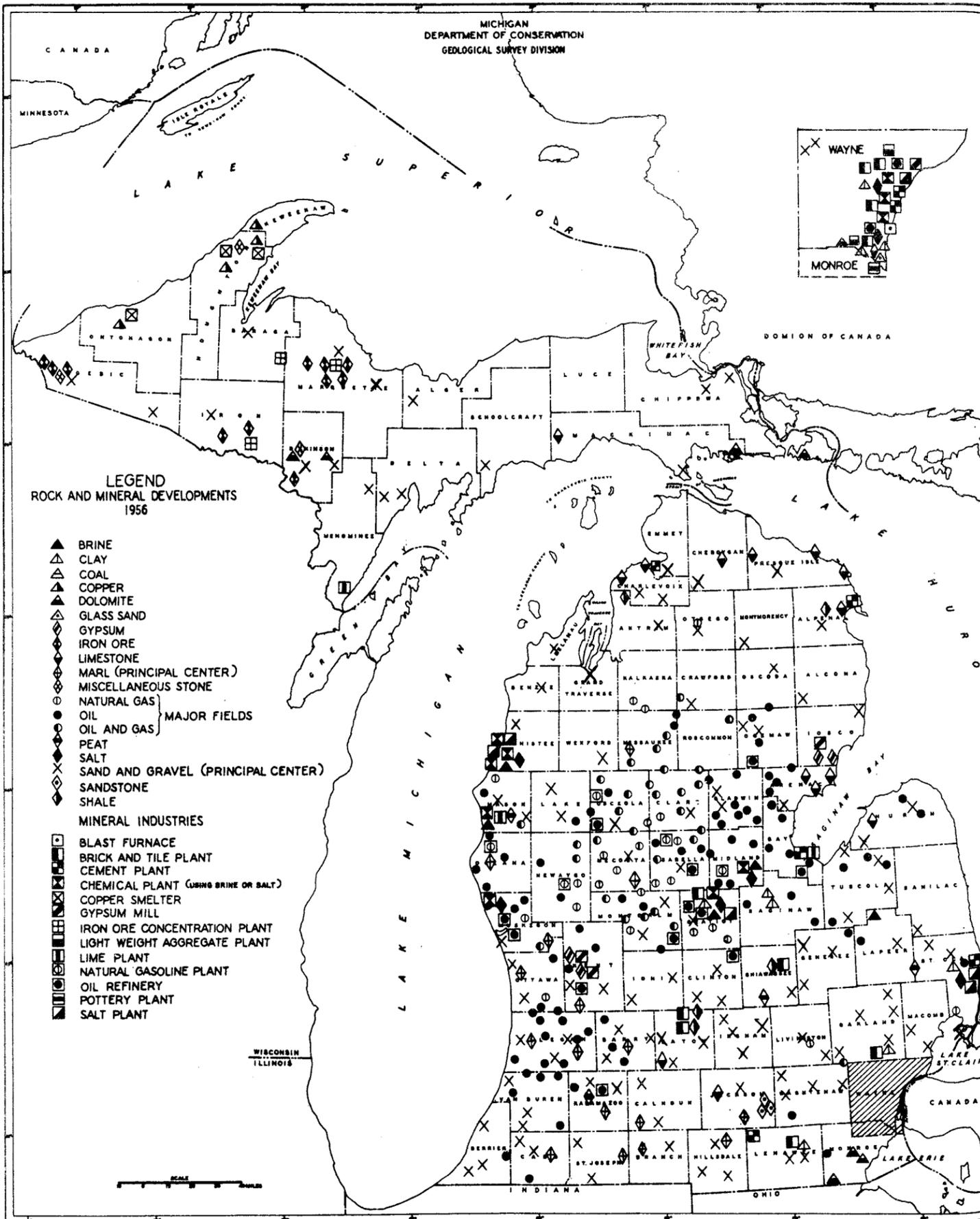
MINERAL PRODUCTION

1955

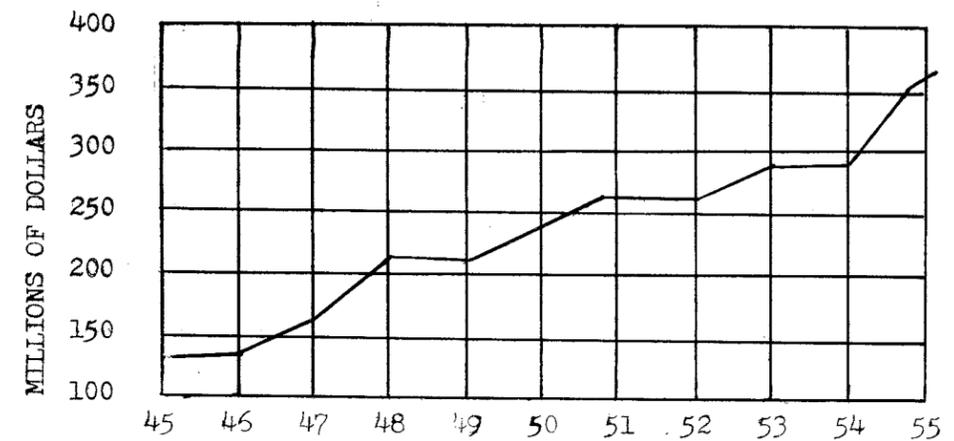
Mineral production in Michigan in 1955 increased 29.6 per cent over 1954 to an all time high. New production highs were established for bromine, clay and shale, sand and gravel, cement, stone, gypsum, magnesium compounds, and calcium-magnesium chloride. Metallic mineral production increased 76% and non-metallic production increased 14%, but the production of fuels declined 6%.

According to estimates by Bureau of Mines, U.S. Department of Interior, the value of mineral production in Michigan in 1956 was \$389,706,000, an increase of nearly 7 per cent over 1955. Major increases - over ten per cent - were recorded in the production of Portland cement, clay and shale, copper, marl, sand and gravel.

Michigan's rank in the United States in volume of mineral production for 1955 is: First in gypsum, salt, and marl; Second in iron ore, bromine, magnesium compounds, sand and gravel; Third in stone and peat; Fourth in Portland cement; Sixth in copper.



	Value	Per Cent
Metallic-minerals (iron and copper)	\$ 145,379,721	39.1%
Fuels (petroleum, natural gas, natural gasoline)	33,623,155	9.1
Non-metallic minerals and mineral products (all others)	<u>192,353,728</u>	<u>51.8%</u>
TOTAL	\$ 371,356,604	100.0%



VALUE OF MINERALS AND MINERAL PRODUCTS IN MICHIGAN, 1945-55

Iron Ore

Geological formation - Huronian. Shipments of iron ore, from 29 underground mines and 8 open pits total 14,148,123 long tons (2,240 lbs.) in 1955, an increase of 45.5 per cent from 1954. This is the highest total shipment since 1943 when 14,510,357 long tons were shipped. The peak year of iron ore shipments was 1916 when 18,812,972 long tons were shipped. Good demand for iron ore and a favorable shipping season accounted for the increase. No shipments of ore containing over 5 per cent manganese were reported from Michigan mines in 1955.

Iron Ore Shipments by Ranges, 1955

Range	Number of Mines		Iron Ore Shipped (Long tons)		
	Underground	Open Pit	Direct Shipping	Siliceous	Total
Marquette	11	5	6,313,187	326,779	6,639,966
Menominee	12	3	4,238,508	87,117	4,325,625
Gogebic	6	0	3,182,532	.	3,182,532
Total	29	8	13,734,227	413,896	14,148,123

Construction continued on the Marquette Iron Mining Company's Republic beneficiation plant and operation was planned to begin in 1956. Iron ore concentrate will be recovered by the flotation process from low-grade jasper ore. Concentrates will be shipped to Eagle Mills, east of Negaunee, where the fine mill product will be agglomerated in the pelletizing plant under construction.

The surface plant of the M.A. Hanna Company's Cannon Mine, near Stambaugh, Iron County was completed and the first iron ore was hoisted through the new shaft late in March 1955. Shaft sinking of the Cannon property started August 22, 1951. Ore is being hoisted 1,000 feet from the new seventh level.

Republic Steel Company planned to open the Genesee iron ore body, which lies adjacent to the Tobian mine, Crystal Falls location.

One of the nation's largest blast furnaces (hearth diameter 30 feet 3 inches) was constructed at Ecorse, Wayne County for Great Lakes Steel Corporation. Operation of this furnace began in 1955.

Shipments and Value of Iron Ore, 1951-1955

Year	Shipments (Long Tons)	Value
1951	13,673,873	\$ 78,120,718
1952	11,798,250	83,942,523
1953	13,380,756	91,402,764
1954	9,722,882	69,226,417
1955	14,148,123	107,890,161

Geological formation - Keweenaw. Michigan produced 99,996,160 pounds of copper during 1955. This was more than double the production of 1954 or an increase of over 123 per cent. Twelve copper mines in Houghton, Keweenaw, and Ontonagon counties produced approximately 93 per cent of the total copper output. The remaining 7 per cent was recovered by two reclamation plants in Houghton County from waste or tailings rejected by earlier mill operations. The increase in production was primarily the result of output from the White Pine Mine, Ontonagon County, of the White Pine Copper Co. The 1955 copper production in Michigan was the largest since 1931 when 118,495,055 pounds were produced. The year of peak production was 1916 when 269,794,531 pounds were produced. Average price used for calculating the value of copper in 1955 was 37.5 cents per pound.

Copper Production, 1955

County	Number of		Copper Production (Pounds)		
	Mines	Reclamations	Mines	Reclamation	Value
Houghton	4	2	11,349,221	6,402,255	\$17,751,476
Keweenaw	6	0	17,534,792	.	17,534,792
Ontonagon	2	0	64,709,892	.	64,709,892
Total	12	2	93,593,905	6,402,255	99,996,160

Copper Production, 1951-1955

Year	Quantity (Pounds)	Value
1951	49,297,864	\$12,077,976
1952	43,939,304	10,820,054
1953	47,999,690	13,832,951
1954	44,786,803	13,298,994
1955	99,996,160	37,489,560

FUELS

Petroleum

Geological formation - Marshall, Berea, Traverse, Dundee, Detroit River, Salina-Niagara, Trenton. Petroleum production in Michigan in 1955 decreased 6 per cent in quantity and 6 per cent in value below 1954. At the end of 1955 there were 4,223 producing wells in 30 counties. Approximately 35 per cent of the total output was from Arenac, Isabella, and Clare counties. More than one million barrels were produced in each county.

During the year 510 wells were completed (204 oil producers, 13 gas producers, and 293 dry holes). Of these completions 203 were wildcats (6 oil producers, 2 gas producers, and 195 dry holes). The remaining 307 completions were field wells (198 oil producers, 11 gas producers, and 98 dry holes).

Fifteen refineries, in ten counties, processed more than 99 per cent of the crude oil produced in Michigan during 1955. Michigan crude supplies nearly one-third of the oil refined in the state. The combined normal daily capacity of all Michigan refineries is approximately 150,500 barrels.

Detailed information for oil and gas operations is recorded in the pamphlet entitled "1955 Summary of Operation, Oil and Gas Fields," available from Michigan Geological Survey.

Petroleum Production and Accumulated Oil by Formations, 1955

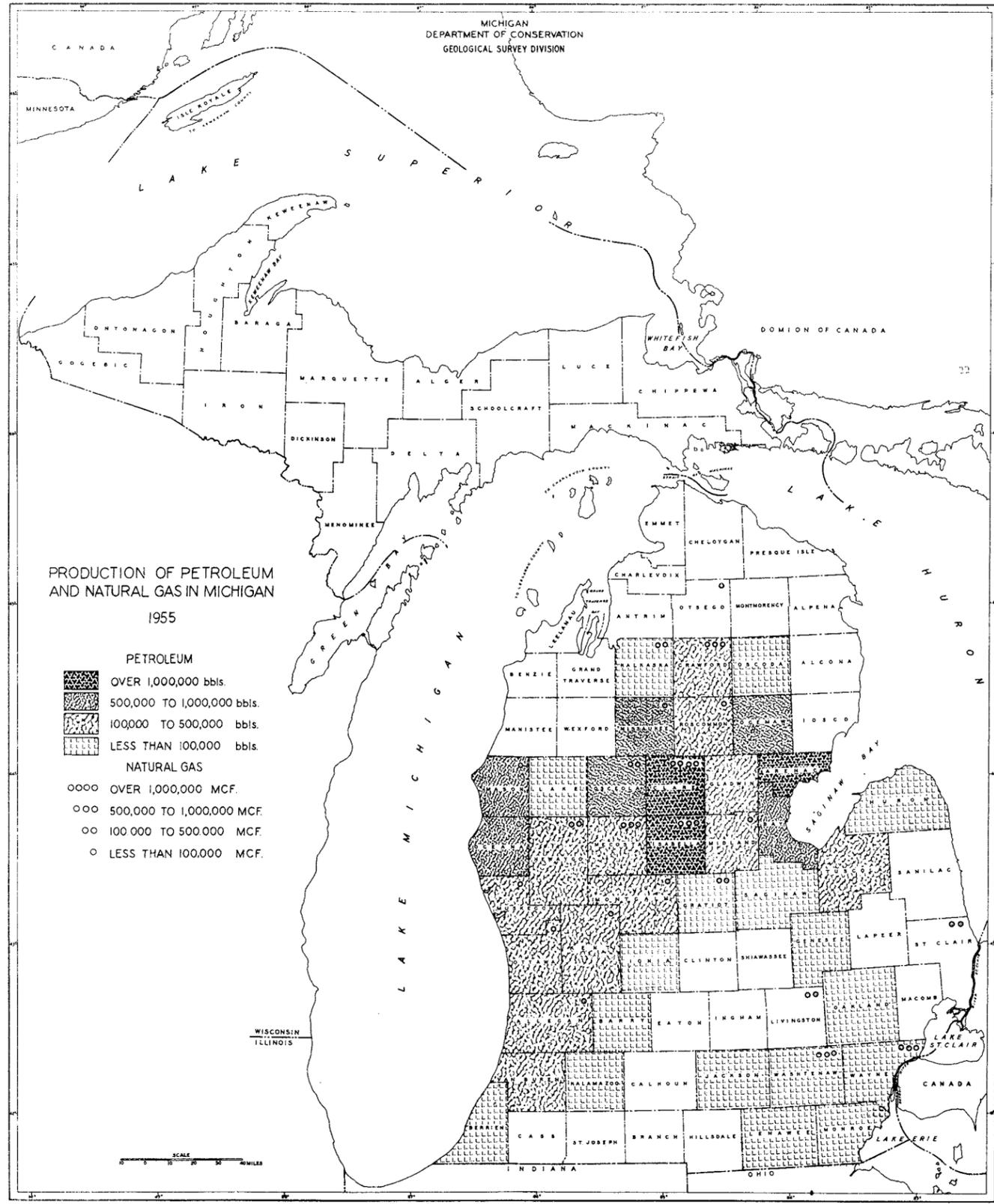
Formation	Production (Barrels)	Per Cent	Accumulated (Barrels)	Per Cent
Marshall	1,662	.02	57,464	.01
Berea	26,193	.23	2,052,275	.53
Traverse	2,047,230	18.17	79,516,720	20.65
Dundee	5,961,864	52.92	282,593,873	73.38
Detroit River	3,099,621	27.51	20,014,332	5.20
Salina-Niagaran	11,139	.10	54,230	.01
Trenton	118,123	1.05	841,855	.22
Total	11,265,832	100.00	385,130,749	100.00

Petroleum and Natural Gas Production, 1951-1955

Year	Petroleum		Natural Gas	
	Barrels	Value	M. cu. ft.	Value
1951	13,926,518	\$ 37,949,762	10,524,495	\$ 1,641,821
1952	13,251,387	36,176,306	8,677,737	1,353,727
1953	12,284,510	35,644,982	7,089,985	1,246,106
1954	12,028,059	34,279,968	5,698,175	997,180
1955	11,265,832	32,074,018	6,787,697	1,187,846

Natural Gas

Geological formation - Glacial drift, Michigan Stray-Marshall, Berea, Antrim, Traverse, Dundee, Detroit River, Richfield, Salina-Niagara, Trenton. Natural gas production increased 19 per cent to 6,787,697,000 cubic feet in 1955. Of this amount 1.96 billion cubic feet was oil well gas. Natural gas was produced from 321 wells in 23 counties. Clare, Washtenaw, Isabella, and Mecosta counties led with 62 per cent of the state total.



Gas Production and Accumulated Gas by Formations - 1955

Formations	Production (M. cu. ft.)	Per Cent	Accumulated (M. cu. ft.)	Per Cent
Glacial Drift	. . .	. . .	8,020	.00
Michigan Stray)				
Marshall	2,420,282	35.66	205,256,896	68.08
Berea	71,455	1.05	10,179,655	3.38
Antrim	8,289	.12	116,410	.04
Traverse	31,671	.47	7,044,017	2.34
Dundee	564,591	8.31	38,148,212	12.65
Detroit River	. . .	. . .	535,811	.18
Richfield	1,432,635	21.11	8,687,844	2.88
Salina-Niagaran	1,202,718	17.72	20,135,303	6.68
Trenton	1,056,056	15.56	1,066,781	.35
Unassigned	. . .	. . .	10,287,581	3.41
Total	6,787,697	100.00	301,466,530	100.00

Natural Gasoline

Michigan, in 1955, produced from oil-well gas a total of 3,612,912 gallons of natural gasoline and allied products valued at \$361,291. Of the six producing counties, Crawford ranked first with 73 per cent of the state total.

Natural Gasoline Production, 1951-1955

Year	Quantity (Gallons)	Value
1951	6,871,119	\$ 387,112
1952	5,330,139	533,014
1953	4,414,351	441,438
1954	3,898,312	389,831
1955	3,612,912	361,291

NON-METALLIC MINERALS

Portland Cement

Portland cement was produced by seven cement plants in the state. Raw materials used in cement manufacturing include clay, shale, limestone and gypsum. Antrim shale from Alpena County and Ellsworth shale from Antrim County were used by the northern plants; all southern plants use local glacial or lake clays. The greater part of the limestone used was from the Traverse and Dundee formations in the northern part of the Southern Peninsula. All gypsum was purchased.

Raw Material Used in the Manufacture of Portland Cement, 1955

Raw Material	Short Tons
Limestone	4,592,317
Clay and shale	1,401,222
Gypsum	123,818

Shipments and value of Portland cement increased for the eleventh consecutive year. Nearly all plants operated at or near capacity during the year. Alpena County continued as the leading producer, and Wayne County ranked second. Portland cement was produced also in Bay, Emmet, Lenawee, and St. Clair counties.

A new cement plant was under construction at Detroit by the Peerless Cement Corporation in 1955. At the Company's Port Huron plant, a stack dust collecting system was installed to eliminate air pollution in the nearby residential district.

The Huron Portland Cement Company at Alpena added facilities to increase production of its plant. New raw grinding, clinker burning and finish grinding equipment were installed. Changes and improvements in the vessel-loading system and equipment for handling, conveying and apportioning raw material were completed. The company purchased the "C. C. Collins", a 440-foot bulk ore carrier. Addition of the "Collins" and the "Presque Isle", purchased in 1954, make a total of six ships owned by Huron.

Penn-Dixie Cement Company at Petoskey added a new 375-foot long kiln to increase its production by 50 per cent. Addition of the kiln was part of a \$4,000,000 expansion program which included a stone crusher and several new tool and work houses.

Wyandotte Chemical Corporation, Wyandotte, Wayne County, expanded its cement plant facilities at a cost of approximately \$2,500,000. This Air pollution control equipment, including an electro-static precipitator were installed. Clinker coolers were installed and linings were extended to the full length of the plant stacks. Addition of two silos, cement conveying systems, and extensions of bulk loading facilities were included in the expansion program. The company also manufactures chlorine, soda-ash, caustic soda, and specialized cleaning compounds.

Portland Cement Shipments, 1951-1955

Year	Shipments (Barrels)	Value	Rank in U.S.	No. of Plants
1951	14,112,639	\$ 35,121,324	5	7
1952	14,760,783	36,819,041	5	7
1953	15,853,096	41,860,464	5	7
1954	18,106,975	50,460,566	5	7
1955	19,738,400	58,048,378	5	7

Stone

Geological formation - Marshall, Traverse, Dundee-Rogers City, Detroit River, Bass Island, Engadine, Burnt Bluff, Keweenawan, Huronian. Limestone and dolomite made up over 99 per cent of Michigan stone production. Approximately 59 per cent of the stone was quarried from the Rogers City, Dundee, and Traverse limestone in Presque Isle, Cheboygan, Alpena, and Wayne counties. The remaining 41 per cent was from the Niagaran limestone and dolomites in Mackinac and Chippewa counties, the Bass Island and Detroit River dolomites in Monroe County,

Dimensional limestone was produced in Eaton, Huron, and Presque Isle counties. Sandstone for rough construction, rubble, and flagging stone was quarried in Jackson County. Basalt was crushed and used for road construction in Houghton and Gogebic counties.

Stone Production, 1955		
Commodity	Quantity (Short tons)	Value
Limestone and dolomite:		
Crushed	25,242,052	\$ 23,150,838
Dimensional	6,932	73,457
Sandstone:		
Dimensional	8,731	79,410
Basalt:		
Crushed	54,579	58,147
Total	25,312,294*	\$ 23,361,852

*Does not include 8.3 million tons of limestone used in the manufacture of Portland cement and lime.

In 1955, stone production increased approximately 6,000,000 tons over the 1954 production, due largely to greater demands by the steel industry for flux stone. More than twenty-two million tons of limestone and dolomite were produced from Chippewa, Mackinac, and Presque Isle counties.

Uses of Crushed Limestone and Dolomite, 1955			
Uses	Per cent of Total	Quantity (Short Tons)	Value
Flux	62.0	15,662,554	\$ 13,603,476
Concrete & road metal	18.9	4,763,440	5,083,510
Chemical*	14.6	3,678,703	3,294,259
Agricultural	2.5	633,483	612,501
Railroad ballast	.9	231,439	249,506
Riprap	.3	84,758	93,286
Other**	.8	187,675	214,300
Total	100.0	25,242,052	\$ 23,150,838

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

** Includes paint filler, putty filler, asphalt, dust for coal mines, mineral food, store sand, and others.

Shipments of limestone from the new \$15,000,000 quarry and plant of the Presque Isle Corporation, owned by five steel companies and located 3 miles north of Bell, Presque Isle County began in April 1955. Five grades of high calcium limestone are produced for open hearth and blast furnace flux stone. Some stone is sold for the manufacture of cement and lime. Chemstone Corporation, Cleveland, Ohio (formerly Kelley Island Lime and Transport Company) ranges and operates the plant on a fee basis. This plant, said to be the second largest flux stone plant in the nation, has a capacity of 2,000 tons of limestone per hour. Stone is quarried from the 50 to 55 foot thick high calcium Rogers City-Dundee limestone.

The year 1955 closed a decade of operation by the Drummond Dolomite Corporation, Drummond Island, Chippewa County. Starting from scratch, in 1945, this company has grown into one of the world's largest dolomite producers, by providing a high quality raw material for chemical, steel and construction purposes throughout the Great Lakes area. The aggregate for the piers and foundation work of the Mackinac Bridge was supplied from Drummond Island. The company is now using a new 120 foot tower equipped with two 90 degree radial stacking conveyors, beneath which a new tunnel has been extended. Another prominent feature now in use, located on high ground near the mill is a new 7,200 square foot Butler-type office-maintenance storage building.

Huron River Quarry Corporation opened a quarry just west of Flat Rock, Wayne County. Dolomite rock quarried from the Amherstberg member of the Detroit River formation is marketed for parking lot and general building purposes.

The new flux stone operation of the Michigan Limestone Division, United States Steel Corporation, near Cedarville, Mackinac County, began full scale production in 1955. The first cargo left their new port, "Port Dolomite", April 16, 1955. This Northern Peninsula dolomite quarry was opened to supplement the high calcium limestone produced at the company's Rogers City operation in the Southern Peninsula.

The wasterock piles and stamp sands of the old copper mines were utilized. Waste piles of the Hancock Mining Company, now owned by the Thornton Construction Company, were used as ballast for railroad crossing and paving between Dollar Bay and Lake Linden, Keweenaw County. The huge deposit of stamp sand at the old Isle Royale mill in Portage Lake, near Houghton, was used as a source of railroad ballast by the D.S.S. and A. Railroad Company. In addition, the Houghton County Road Commission used a considerable quantity of the sand for road repair in Portage and Chassell townships, Houghton County. On September 15, 1955 the company started quarrying dolomite rock from Limestone Mountain at Alston. The stone is crushed and used for agricultural fertilizers.

Production of Stone, 1951-1955			
Year	Quantity (Short tons)	Value	Rank in U.S.
1951	20,935,767	\$ 17,082,206	3
1952	18,001,080	15,590,573	4
1953	21,053,866	17,442,250	3
1954	19,461,818	17,526,743	3
1955	25,312,294	23,361,852	3

Sand and Gravel

Geological formation - Glacial Drift. Production and use of sand and gravel again reached a new high in 1955. Both quantity and value increased approximately 16 per cent to 37,269,709 tons valued at \$29,565,730.

Sixty-three per cent of the total sand and gravel output was used in road construction and 26 per cent for structural purposes.

Uses of Sand and Gravel, 1955

Uses	Quantity (short tons)	Value	Per cent of total
Structural sand	5,243,086	\$ 4,104,182	14.1
Paving and Road sand	5,006,015	3,800,416	13.4
Molding sand	1,895,382	1,795,555	5.1
Grinding & Polishing sand	291,472	102,015	.8
Other sand*	1,117,544	1,427,173	3.0
Paving & road gravel	18,461,929	13,301,294	49.6
Structural gravel	4,459,400	4,430,449	11.9
Railroad ballast gravel	283,761	222,216	.7
Other gravel	511,120	382,430	1.4
Total	37,269,709	\$29,565,730	100.0

*Includes glass sand, engine sand, blast sand, railroad ballast sand, and other sand.

Production of sand and gravel was reported from 80 of the 83 counties of Michigan. Approximately 67 per cent of the total production was from seven counties in order of rank - each producing more than 1,000,000 tons: Oakland (about 18 per cent of state total), Livingston, Wayne, Washtenaw, Macomb, Kent, and Ottawa. About 83 per cent of the state's total was reported by 192 commercial producers and the remaining 17 per cent was non-commercial production by county road commissions and other governmental agencies.

Production of Sand and Gravel, 1951-1955

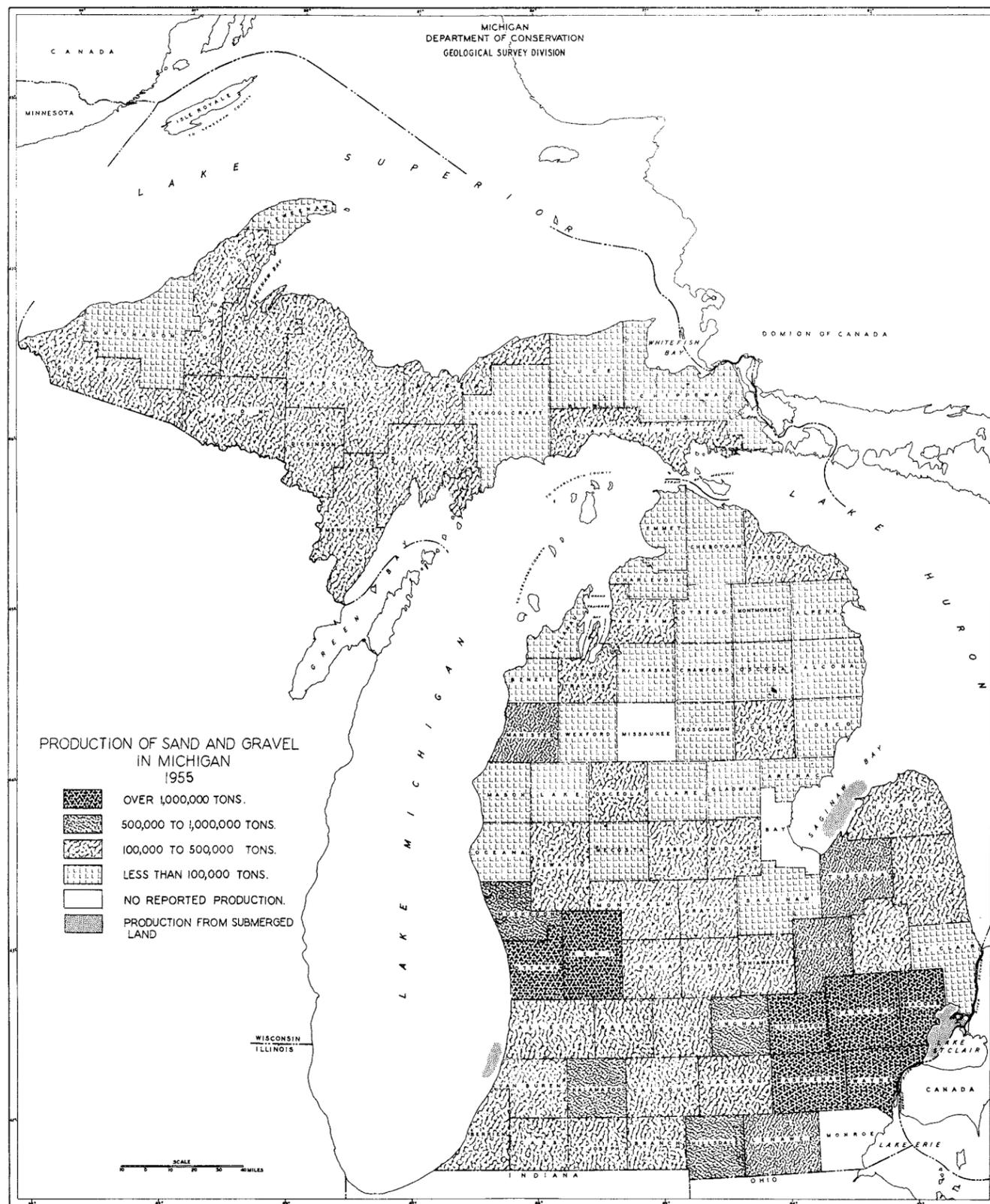
Year	Quantity (short tons)	Value	Rank in U.S.
1951	24,668,264	\$ 18,324,872	2
1952	27,126,339	21,050,125	2
1953	30,459,663	23,170,802	2
1954	32,035,729	25,458,503	2
1955	37,269,709	29,565,730	2

The first commercial application of "beneficiation" of gravel in Michigan involved the installation of a heavy media separation unit to up-grade materials at a plant near Northville, Wayne County. This plant is unique, it has been adapted for operation with portable crushing, screening, and washing units. The process removes objectionable chert and shale to meet Michigan State Highway Department and Wayne County material specifications.

Fenner-Crane and Construction Service Company, Muskegon, purchased a 30 acre tract in Cedar Creek Township, Muskegon County, for sand recovery operations. The sand is sold as hardtopping road mix and for construction work by the Great Lakes Dock and Material Corporation.

Michigan Gravel Company, Muskegon, opened a 90-ton-per hour sand and gravel plant in Casnovia Township near Muskegon. The plant produces washed mortar and concrete sand and several sizes of gravel. A gravel jig for removing impurities has been installed.

The Holly Sand and Gravel Company, Holly, Oakland County, opened a new \$300,000 processing plant. Production capacity was increased 300 per cent to 400 tons of sand and gravel an hour. This expansion permits increased production of ready-mixed concrete by J.P. Burrough and Sons, Incorporated, the parent company.



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

Approximately 66 per cent of the salt was used by chemical plants in Wayne, Midland and Muskegon counties. Over 1.8 million tons of salt were used in soda ash plants, and 1.5 million tons were used for the manufacture of chlorine and other chemicals. Approximately 17 per cent of the total production was dried and evaporated salt.

Uses of Salt, 1955

Uses	Quantity (short tons)
Chemical	3,302,700
Highway, dust and ice control	630,100
Livestock	282,800
Textile, hides, and packers	227,500
Food processing	183,500
Table and other household	112,300
Metallurgy	65,700
Water treatment	57,000
Refrigeration	3,333
Other	110,500
Total	4,975,400

Although tonnage of salt declined slightly in 1955, the value reached an all-time high, due largely to the higher value producers placed on the brine used. Of the six counties producing salt, Gratiot, Manistee, Midland, Muskegon and St. Clair - Wayne County ranked first. Four companies in Wayne County reported a combined total of 3,643,166 tons or approximately 73 per cent of the state's total output.

Salt Production, 1951-1955

Year	Quantity (short tons)	Value	Per cent of U.S. total	Rank in U.S.
1951	5,137,639	\$ 21,221,330	25.4	1
1952	4,778,347	21,406,382	24.4	1
1953	5,127,387	22,171,988	24.7	1
1954	5,063,633	29,396,812	...	1
1955	4,975,442	31,668,351	...	1

Clay and Shale

Geological formation - Glacial Drift. Saginaw, Ellsworth, Antrim. 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. In Eaton and Shiawassee counties, Saginaw shale is used by three plants for manufacture

of tile. Other tile, brick, pottery, and light-weight aggregate plants and some southern Michigan cement plants use local surface clay deposits. Glacial lake clay, produced in Saginaw County, is sold for oil well drilling mud, for molding sand bond; for fungicide and insecticide base and for cosmetic "beauty packs".

A new record high for raw clay and shale production was set by the 12 producing counties. Wayne County led in production and value with 32 per cent of the state's total output, followed by Alpena, Saginaw and St. Clair counties. Approximately 72 per cent of all raw clay and shale produced was used by the Portland cement industry. The remaining 28 per cent was used for the manufacture of a small quantity of prepared clays and for clay products - brick, tile, pottery, and lightweight aggregates.

Clay deposits furnish about 82 per cent of the raw material for the manufacture of clay products and shale deposits the remaining 18 per cent.

Production of Clay and Shale, and Clay Products, 1951-1955

Year	Raw Clay and Shale		Clay Products
	Quantity (short tons)*	Value **	Estimated Value
1951	1,531,732	\$ 1,592,137	\$ 5,112,000
1952	1,580,123	1,615,122	4,534,000
1953	1,605,804	1,646,113	6,995,181
1954	1,890,950	1,940,408	7,331,998
1955	1,937,593	2,019,077	7,292,477

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

Gypsum

Geological formation- Michigan. Gypsum is quarried at Alabaster and National 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, and River Rouge, Wayne County. Principal uses for gypsum are in the manufacture of a variety of plaster, wall board, and allied building materials and as a Portland cement retarder.

Since 1945 Michigan, producing about 18 per cent of the national total, has ranked first in the production of crude gypsum. In 1955, Michigan produced 1,762,105 short tons of crude gypsum valued at \$5,660,587.

Production of Gypsum, 1951-1955

Year	Quantity (short tons)	Value	Per Cent of U.S.	Rank in U.S.
1951	1,566,276	\$ 4,402,725	18	1
1952	1,487,642	4,200,418	18	1
1953	1,446,973	4,091,002	18	1
1954	1,693,279	5,035,550	-	1
1955	1,762,105	5,660,587	-	1

Plans for dredging a 12,000 foot channel, 250 feet wide in Lake Huron from a point just south of Tawas City, was part of a \$90,000,000 expansion program by National Gypsum Company, which operates quarries and a gypsum plant 12 miles southwest of Tawas. New quarries in the area were included in the program. The 6,000 foot tramway will carry gypsum out to lake freighters.

Peat

Geological formation - Pleistocene. Peat is produced in Lapeer, Shiawassee, Kalamazoo, and Mason counties. Michigan peat is used almost exclusively for horticultural purposes, marketed largely as a soil conditioner for lawns, golf courses, gardens, nurseries, and greenhouses. It is estimated by the United States Bureau of Mines that the glacial lakes and bogs of Michigan, Minnesota and Wisconsin contain 75 per cent of the nation's total peat reserves.

Production of Peat, 1951-1955

Year	Quantity (short tons)	Value	Per Cent of U.S.	Rank in U.S.
1951	20,180	\$320,100	10.4	5
1952	36,020	430,156	16.6	2
1953	25,439	257,176	12.5	4
1954	27,847	429,116	-	3
1955	30,000	465,000	-	3

Marl

Geological Formation - Pleistocene. All marl produced in the state is used for agricultural purposes. Commercial marl production was reported by 23 producers in 15 counties during 1955. Kalamazoo County ranked first, followed by Calhoun, Allegan, and Branch counties. Combined, these counties produced approximately 59 per cent of the state output.

Production of Marl, 1951-1955

Year	Quantity (short tons)	Value	Rank in U.S.
1951	144,731	\$ 125,212	1
1952	130,613	119,705	1
1953	183,685	72,781	1
1954	106,668	37,724	1
1955	119,313	57,176	1

Geological formation - Dundee, Burnt Bluff. Production of lime in Michigan increased approximately 29 per cent in production and 25 per cent in value over 1954. Raw stone for its manufacture was obtained from the high calcium Dundee limestone in Presque Isle County and from the Burnt Bluff limestone in Mackinac County. All Lime produced was sold or used for chemical and industrial use. Mason County continued to rank first in production, followed by Menominee and Bay counties.

Until the turn of the century, when the chemical industries began to grow rapidly, lime was used almost entirely in building and agriculture. Since then, progressively larger amounts have been employed in chemical tests and processes. All lime produced in the state is now sold or used for chemical purposes. Lime is used to soften and purify water, to make glass, petrochemicals, bleaches, pharmaceuticals, insecticides, sugar and leather, and as a causticizing agent in paper and pulp manufacturing. It is used as a flux in the purification of steel. It continues to be used widely in mortar, stucco, plastering material and as a fertilizer.

Lime is obtained by calcining or cooking limestone rock. The rock is crushed, screened, and conveyed to rotary or vertical kilns where it is calcined at 2200°F. into quick lime (calcium oxide) by removal of carbon dioxide as gas. Ninety-three per cent of the lime was sold or used as quick lime. The remaining 7 per cent is treated with water to form hydrated lime, a fine white powder.

Bromine, Calcium-Magnesium Chloride,
Magnesium Compounds, Potash

Geological formation - Marshall, Dundee, Sylvania, Detroit River. Natural brines from the Marshall, Dundee and Sylvania formations were used by chemical companies of Midland and Gratiot counties; and brines from the Filer sandstone of the Detroit River formation were used in Mason and Manistee counties. These natural brines are source material for many chemicals and chemical compounds.

Elemental bromine was produced by four companies in six plants in Gratiot, Manistee, Mason and Midland counties. Bromine compounds were produced by three companies in Gratiot, Manistee, 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. Only one plant (Dow Chemical Co., Midland) reported production of potassium salts from natural brines.

Most of the calcium-magnesium chloride sold was for stabilization of dirt roads and for dust control. Other important uses for calcium chloride are the "freeze-proofing" of coal, iron ore and other materials shipped in bulk in railroad cars or stockpiled in the open and for the freeze-proof curing of cement. Magnesium compounds have a variety of uses and are particularly important in the manufacture of fertilizers, oxy-chloride cement, rayon and rubber. Magnesium chloride is at present the

principal raw material used in the production of metallic magnesium. Magnesium sulfate, carbonate, oxide and hydroxide are used extensively in pharmaceuticals.

The value of the natural salines recovered from natural brines in 1955 by the chemical plants increased 10 per cent over the 1954 value. The greatest increase in value was recorded by calcium-magnesium chloride, followed by magnesium compounds, bromine, and potash.

Year	Quantity (tons)	Value	Rank in U.S.
1950	59,036	\$ 4,998,342	2
1951	*	*	1
1952	*	*	2
1953	43,190	4,591,922	2
1954	39,096	4,628,756	2
1955	86,264	5,630,978	2

*Data concealed

Water

Water has finally come to be recognized as the most important and valuable of our mineral resources. Each citizen of modern society requires more than 1300 gallons daily to meet direct and indirect needs. Industry uses tremendous quantities for man's direct needs especially when we consider that for every 100 gallons of water a person uses directly, many times that amount is used for him by industry and service facilities. For example, it takes 14,400 gallons of water to produce one ton of pig iron; 65,000 gallons to produce one ton of finished steel; 18 barrels of water to refine a barrel of oil; 15,000 gallons of water to make an automobile; 100 gallons of water to produce one slice of breakfast bacon. Fortunately Michigan is blessed with an abundance of water.

During the retreat of the great continental glacial many thousands of years ago deposits of glacial drift - sand, clay, gravel, boulders - were laid down on the bed rock. Many Michigan cities, villages, and rural areas now obtain fresh water from the sands and gravel beds of the glacial drift. Sands and gravels deposited in the moraines and outwash plains, or from the beaches and delta deposits of ancient glacial lakes and rivers. In other localities where the drift is relatively thin fresh water is recovered from underlying porous bed rock formations. In some places, however, it has been necessary to pipe large volumes of water from the Great Lakes to industrial areas or cities where groundwater resources are inadequate or contain salty or brackish waters.

Because water resources are renewable (from rains and snows) and are transient (much water runs off to rivers, much is transpired to the air by plants) a great deal of information is required to adequately plan their development and uses. Appraisal of water resources is becoming more and more important to insure a lasting supply sufficient to meet needs of expanding industries as well as an ever increasing population. This appraisal includes consideration of climate, surface, and sub-surface land forms, land uses,

land forms, stream flow and other seemingly remote bits of information. Hydrological conditions regarding rainfall, runoff, and percolation must be understood in developing a water supply.

Precipitation is the source of all water supply. Only a small part of the rain-snow fall on the land is converted by man to his use. With an average rainfall of 30 to 33 inches per year only about 5 inches become useful groundwater. The remainder runs off to streams on its way back to the sea. Of the precipitation that enters the ground, plants transpire an enormous amount, and rainfall is not concentrated where water is most needed, in the industrial and irrigation areas.

Underground water is a source of supply of small communities but large cities with a few exceptions, either utilize waters of the Great Lakes or of the rivers on whose shores they were founded.

Best estimates available from the U.S. Department of Commerce indicate that 30,000 water wells are drilled in Michigan each year. Approximately one million water wells are in use for all purposes. One of the most serious shortages on data on groundwater exists in the water well log files of the Geological Survey. Only by compiling many hundreds of logs of a given area is it possible to unravel the geologic puzzle and thus make an educated guess concerning the underground reservoir capacity.

In the Saturday Evening Post, May 13, 1950, Hugh H. Bennett of the United States Conservation Service warns that cities and areas plagued by water shortages grow in number every year. In 1955, for example, the city of Flushing ran out of water. With adequate hydrological investigations, however, shortage in most communities can be met intelligently or avoided, by making an approximate analysis of the quantity and quality of water needed and by designing the systems on the basis of reliable information on the source of the water to be developed. Water can be provided in adequate quantity and quality in any part of the state if the funds are available to construct the necessary facilities.

What is the monetary value of the mineral water? No data has been compiled on the gallons used for domestic, industrial, agricultural, scenic and recreational purposes and no dollar value has been assessed.

Value of Michigan's Minerals and Mineral Products 1940-1955

Year	Value	Year	Value
1940	\$ 117,991,285	1948	\$ 214,115,771
1941	135,492,921	1949	207,607,694
1942	152,624,946	1950	238,474,008
1943	147,113,888	1951	257,529,882
1944	140,493,319	1952	267,089,423
1945	128,046,408	1953	287,693,135
1946	133,682,135	1954	286,549,922
1947	170,269,272	1955	371,356,604

TABLE I
MINERAL PRODUCTS OF MICHIGAN, 1955⁽¹⁾

<u>Product</u>	<u>Unit</u>	<u>Quantity</u>	<u>Value</u>	<u>Rank in U.S. (2)</u>
Iron ore	Long tons	14,148,123	\$107,890,161	2
Portland cement	Barrels	19,738,400	58,048,378	4
Copper	Pounds	99,996,160	37,489,560	6
Petroleum	Barrels	11,265,832	32,074,018	12
Salt	Short tons	4,975,442	31,668,351	1
Sand and Gravel	Short tons	37,269,709	29,565,730	2
Stone (3)	Short tons	25,312,294	23,361,852	3
Clay Products	. . .	. . .	7,292,477	. . .
Gypsum	Short tons	1,762,105	5,660,587	1
Magnesium Compounds	Short tons	86,264	5,630,978	2
Clay and Shale, raw	Short tons	1,886,976	(4)	9
Natural Gas	M. cu. ft.	6,787,697	1,187,846	17
Peat	Short tons	30,000	465,000	3
Natural Gasoline	Gallons	3,612,912	361,291	15
Marl	Short tons	119,313	57,176	1
Miscellaneous (5)	. . .	. . .	<u>30,603,199</u>	. . .
Total			\$371,356,604	

(1) Statistics compiled in co-operation with the United States Bureau of Mines.

(2) Based upon quantity.

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

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

(5) Includes bromine, calcium chloride, calcium-magnesium chloride, clay, lime, potassium salts, and gem stones (Agates, Datolite, Petoskey stone, Chlorastrolite, Jasper, and Thomsonite).

TABLE II
MINERAL PRODUCTS OF MICHIGAN, 1954 (1)

Product	Unit	Quantity	Value	Rank in U.S. (2)
Iron ore	Long tons	9,722,882	\$69,226,417	2
Portland Cement	Barrels	18,106,975	50,460,566	4
Petroleum	Barrels	12,028,059	34,279,968	...
Salt	Short tons	5,063,633	29,396,812	1
Sand and Gravel	Short tons	32,035,729	25,458,503	2
Stone (3)	Short tons	19,461,818	17,526,743	4
Copper	Pounds	44,786,803	13,298,994	...
Clay Products	...	...	7,331,998	...
Gypsum	Short tons	1,693,279	5,035,550	1
Magnesium Compounds	Short tons	39,096	4,628,756	2
Clay and Shale, raw	Short tons	1,886,976	(4)	...
Natural Gas	M. cu. ft.	5,698,175	997,180	...
Natural Gasoline	Gallons	3,898,312	389,831	...
Peat	Short tons	27,847	429,116	2
Marl	Short tons	106,668	37,724	1
Miscellaneous (5)	...	...	28,068,821	...
Total			\$286,566,979	

(1) Statistics compiled in co-operation with the United States Bureau of Mines.

(2) Based upon quantity.

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

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

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

PRODUCTION AND VALUE
of
MINERALS AND MINERAL PRODUCTS
BY COUNTIES

1955

All counties reported mineral production for 1955. Marquette, Wayne, Iron, Midland and Alpena led all others in value, contributing 47 per cent of the state's total.

The quantity and value of mineral production are given on a county basis, where possible. In some cases it has been necessary to show the county value as an undistributed total or to combine them as one group at the end of the county breakdown portion to avoid disclosure of individual company operations. 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 the production.

All indicated tonnage is in short tons (2,000 lbs.), with the exception of iron ore, which is reported in long tons (2,340 lbs.).

Mineral producers and their products are listed, by counties, below production data. Location of the operation, when known, is given by section, township, and range, or nearest city to operation.

	Quantity	Value
ALCONA (80)		
Sand and gravel	82,151 tons	\$ 25,442
Alcona County Road Comm.	NE SW 7 25N 6E) SE SW 7 26N 9E) NW NE 11 26N 9E)	Sand and Gravel
E.P. Brady and Co.	Alcona Co. Pit	Sand and Gravel
U.S. Forest Service	NW 8 26 N 6E	Sand and Gravel
ALGER (68)		
Sand and Gravel	145,105 tons	\$ 106,312
Alger County Rd. Comm.	NW NE 4 45N 21W	Sand and Gravel
Duluth, South Shore and Atlantic Railroad Co.		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Hilma Samuelson	NE SE 35 46N 21W	Sand and Gravel

	<u>Quantity</u>	<u>Value</u>
ALLEGAN (41)		
Petroleum	225,698 bbls.	\$ 643,239
Sand and Gravel	261,606 tons	152,284
Marl (3rd., 13%)	15,343 tons	7,801
Natural gas	24,398 M.cu.ft.	4,270
Total value		\$ 807,594

Allegan County Rd. Comm.		Sand and Gravel
Cleo L. Arndt	24 3N 16 W	Sand and Gravel
L.Z. Arndt	Douglas (3½ mi. E. on 130th St.)	Marl
Gerald Arnsman	Hopkins	Marl
Ralph W. Bodine		Sand and Gravel
Emil Pavlak	Martin	Marl
Harry Pickitt	NW SE 5 1N 14W	Sand and Gravel
	SW NE 34 3N 13W	
Huitt and Son	NE SW 9 2N 13W	Sand and Gravel
H. R. Vernon	Fennville	Sand and Gravel
Ben Waanders	Allegan	Sand and Gravel
West Shore Constr. Co.		Sand and Gravel
John G. Yerington	NE NE 22 3N 15W) SE NW 15 4N 11W)	Sand and Gravel

ALPENA (5)

Undistributed: Portland cement (1st), stone-crushed Limestone (5th), shale* (2nd), sand and gravel		\$27,691,489
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E.P. Brady and Co.	NE NE 2 30N 6E	Sand and Gravel
Gilliland Gravel Co.		Sand and Gravel
Huron Portland Cement Co.	NE 30 31N 7E	Shale
	24 31N 8E	Portland cement
Michigan State Hwy. Dept.		Sand and Gravel
Wyandotte Chemical Corp.	13 31N 8E	Limestone-crushed

ANTRIM (73)

Shale*, sand and gravel		**
Antrim Co. Rd. Comm.	NE NE 16 31N 6W) SE 26 32N 8W)	Sand and Gravel
A.L. Dyer and Sons	NE SW 36 32N 9W)	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Penn-Dixie Portland Cement Co.	SE 23 32N 8W	Shale

*Value of shale used in manufacture of Portland cement not included in county total.

**Mineral value included under undistributed at end of county breakdown.

	<u>Quantity</u>	<u>Value</u>
ARENAC (19)		
Petroleum (1st, 14%)	1,553,992 bbls.	\$ 4,428,877
Stone	111,322 tons	117,060
Sand and Gravel	27,227 tons	21,806
Total value		\$ 4,567,743

Arenac Co. Rd. Comm.	NW 5 19 N 7E	Limestone
Eastman Gravel Pit	Omer	Sand and Gravel
Iosco Co. Rd. Comm.	SW 24 20N 7E	Limestone
Shirley Van Deusen	SE SE 26 19N 5E	Sand and Gravel

BARAGA (41)

Iron	139,180 tons	\$ 1,030,717
Sand and Gravel	122,167 tons	107,322
Total value		\$ 1,138,039

Baraga Co. Rd. Comm.	SW SE 7 49N 33W	Sand and Gravel
	SW SW 20 49N 33W	
	SW NE 23 51N 32W	

The Cleveland Cliffs Iron		Iron Ore
Ohio-Webster Mine	22, 26, 27, 48N 31W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
I.L. Whitehead Co.		Sand and Gravel

BARRY (57)

Sand and Gravel	306,344 tons	\$ 194,394
Petroleum	42,976 bbls.	122,482
Marl	5,000 tons	3,000
		\$ 319,876

Barry County Rd. Comm.	SW NW 25 2N 10W	Sand and Gravel
	SW NW 29 3N 9W	
	SE NW 4 4N 9W	

Bender Gravel Co.	SW NW 12 3N 9W	Sand and Gravel
Cole Gravel Co.	7 4N 10W	Sand and Gravel
A.L. Dyer and Sons		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Nashville Gravel Co.	Nashville	Sand and Gravel
A.D. Pennock	SW NW 1 2N 7W	Sand and Gravel
Harry Pickitt	Barry Co. pit	Sand and Gravel
H.A. Carlton Schau	Kalamazoo	Marl
John G. Yerington		Sand and Gravel

BAY (11)

Undistributed: Portland cement (3rd)
petroleum (5th, 6%), lime (3rd) \$ 8,240,145

Aetna Portland Cement Co. Bay City Portland cement
Monitor Sugar Co. Div. Bay City Lime

BENZIE (81)

Sand and Gravel 35,859 tons \$ 17,930

Benzie Co. Rd. Comm. SE SW 8 25N 13W) Sand and Gravel
SE NE 8 26N 14W)
SW SE 26 26N 15W)
SE SW 16 27N 13W)
SE NE 31 27N 13W)
NW SE 26 27N 15W)

BERRIEN (59)

Sand and Gravel 449,759 tons \$ 266,190
Petroleum 1,752 bbls. 4,988
\$ 271,178

Ireland and Lester Co. NW NW 24 4S 19W Sand and Gravel
Harold Kiell Niles Sand and Gravel
Fred M. Ott Troy Sand and Gravel
Producers Core Sand Corp. Sawyer Sand
Wakeman and Neva Ryno Coloma Sand and Gravel
John G. Yerington NE SW 36 7S 18W Sand and Gravel

BRANCH (66)

Sand and Gravel 229,971 tons \$ 122,011
Marl (4th, 9%) 11,142 tons 4,011
\$ 126,022

Branch Co. Rd. Comm. 1 pit near Bronson) Sand and Gravel
Case Bros. 2 pits near Coldwater) Marl
Harry Pickitt NW NW 19 6S 6W Sand and Gravel
H. Stukey Co. SW SE 4 6S 6W Sand and Gravel
Union City Gravel Co. Union City Sand and Gravel

CALHOUN (61)

Sand and Gravel 421,957 tons \$218,979
Marl (2nd, 15%) 18,090 tons 9,295
\$228,274

John Alexander, Sr. Marshall Sand and Gravel
Carl Avery 2 pits near Marshall Marl
Battle Creek Gravel Co. SW NE 15 1 S 7W) Sand and Gravel
NW SE 33 1S 8W)
SW SE 4 2S 8W)
Calhoun Co. Rd. Comm. Sand and Gravel
Case Bros. Sherwood Marl
City Eng., Battle Creek Battle Creek Sand and Gravel
Emil Combs NE SE 18 4S 5W Sand and Gravel
Arnie Delebaugh Union City Marl
Harry Pickitt Sand and Gravel
Clyde M. Reed Union City Marl

CASS (62)

Sand and Gravel, Marl (6th) \$188,329

Grant Brizendine Edwardsburg Marl
Cass Co. Rd. Comm. NE NE 20 5S 13W)
SE SE 17 6S 13W) Sand and Gravel
NE SE 16 6S 15W)
Frank R. Hixon Marcellus Marl
Michigan State Hwy. Dept. Sand and Gravel
Nieb Concrete Products Co. NW NW 15 7S 16W Sand and Gravel
Harry Pickitt NE SW 10 5S 16W Sand and Gravel
John G. Yerington NW SE 10 5S 16W Sand and Gravel

CHARLEVOIX (78)

Sand and Gravel 50,854 tons \$ 33,564

Charlevoix Co. Rd. Comm. SE NE 5 32N 7W)
NW SW 13 32N 5W)
SE NW 27 33N 6W) Sand and Gravel
NW NE 28 33N 7W)
SE NE 5 33N 8W)

	<u>Quantity</u>	<u>Value</u>
CHEBOYGAN (79)		
Sand and Gravel	29,036 tons	\$ 23,362
Stone - crushed limestone	24,110 tons	<u>9,644</u>
Total value		\$ 33,006
A.L. Dyer and Sons .		Sand and Gravel
Hugh H. Mason and Sons	SE SW 32 33N 3W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Ralph Tanner and Assoc.	SE 25 35 N 2W	Limestone-Crushed
CHIPPEWA (27)		
Stone - crushed dolomite (3rd) sand and gravel	**	
Drummond Dolomite, Inc.	36 42 N 5E	Dolomite-crushed
Gilliland Gravel Co.	NE NE 27 44N 4W	Sand and Gravel
I.L. Whitehead Co.	N $\frac{1}{2}$ NW 23 45N 2 W) E $\frac{1}{2}$ 6 46N 5W) NE 17 46 N 7W) NE SE 35 47N 1W) SE SW 14 47N 1W) NW NW 28 47N 3W)	Sand and Gravel
CLARE (23)		
Petroleum (3rd, 11%)	1,136,510 bbls.	\$3,239,054
Natural gas (1st, 19%)	1,311,942 M.cu.ft.	229,590
Sand and Gravel	45,474 tons	<u>25,474</u>
Total value		\$3,494,118
Michigan State Hwy. Dept.		Sand and Gravel
CLINTON (56)		
Sand and Gravel	489,712 tons	\$ 321,448
Shale*		
American Vitrified Products Co.	NE SW 3 5N 2W)	Shale
Boichot Concrete Products Corp.	NW NW 27 5N 2W)	Sand and Gravel
E.P. Brady and Co.	SE NW 22 8N 1W	Sand and Gravel
Clinton Co. Rd. Comm.	NE 13 5N 4W	Sand and Gravel
H.L. Martin Gravel Co.		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Harry Pickitt	NE 32 5N 1W	Sand and Gravel
The Taber Co.	N $\frac{1}{2}$ NW 25 8N 2W	Sand and Gravel
Walling Gravel Co.	SE NW 34 8N 2W	Sand and Gravel

** Mineral value included under undistributed at end of county breakdown.

	<u>Quantity</u>	<u>Value</u>
CRAWFORD (43)		
Petroleum	244,453 bbls.	\$696,691
Natural gasoline (1st, 73%)	2,634,500 gals.	263,450
Natural gas	482,509 M.cu.ft.	84,439
Sand and Gravel	31,880 tons	<u>18,287</u>
Total value		\$1,062,867
Crawford Co. Rd. Comm.	34 26N 3W	Sand and Gravel
A.L. Dyer and Sons		Sand and Gravel
DELTA (64)		
Sand and Gravel	197,024 tons	\$ 149,371
Bichler Bros.	SW SE 1 39N 23W	Sand and Gravel
Cloverland Milling and Supply Co.	Gladstone	Sand and Gravel
Days River Sand and Gravel Co.	Gladstone	Sand and Gravel
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
U.S. Forest Service		Sand and Gravel
DICKINSON (54)		
Undistributed: sand and gravel, iron ore, stone- crushed dolomite		\$ 422,267
Champion, Inc.	SW SE 26 42N 28W) C SE 20 42N 28W)	Sand and Gravel
Dickinson Co. Rd. Comm.	SE 28 42N 30W)	Sand and Gravel
Fox Valley Constr. Co.		Sand and Gravel
Globe Iron Co.		Iron ore
Globe-Cornell (open pit)	20 40N 30W	Iron ore
Jackson Iron and Steel Co.		Iron ore
Bradley (open pit)	25 40N 31W	Dolomite-crushed
The Metro-Nite Co.	NW 35 42N 28W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Superior Rock Products Co.	SW SE 30 42N 29W) SE SE 19 42N 29W) NW SW 35 42N 30W)	Hornblende schist- crushed Feldspar-crushed Dolomite-crushed

		<u>Quantity</u>	<u>Value</u>
EATON (33)			
Undistributed: Clay products, sand and gravel stone-crushed and dimensional limestone, shale*			\$1,611,456
American Vitrified Products	NE 10 4N 4W	Tile	
F.G. Cheney Limestone Co.	NW SE 20 1N 6W	Limestone-crushed	
Grand Ledge Clay Products	SE 3 4N 6W	Shale- tile	
Michigan State Hwy. Dept.		Sand and Gravel	
Pryor Bros.	SE NW 15 3N 3W) SW SE 3 3N 3W)	Sand and Gravel	
Vermontville Gravel Co.	Vermontville	Sand and Gravel	
West Shore Constr. Co.	NW NE 18 1N 5W	Sand and Gravel	
EMMET (16)			
Portland cement (4th), sand and gravel		**	
Michigan State Hwy. Dept.		Sand and Gravel	
Penn-Dixie Cement Corp.	2 34N 6W	Portland cement, Limestone-crushed	
GENESEE (48)			
Sand and Gravel (8th, 3%)		932,436 tons	\$ 667,395
Petroleum		3,707 bbls.	<u>10,565</u>
Total value			\$ 677,960
Ferguson Excavating Co.		Sand and Gravel	
Hansen Gravel Co.	SW SE 25 8N 5E	Sand and Gravel	
Kurtz Gravel Co.	SE SW 1 8N 7E) SE NE 20 8N 7E)	Sand and Gravel	
A.S. Leffler Gravel Co.	SW SE 7 8N 8E	Sand and Gravel	
Mathews Gravel Co.	SW SE 1 8N 7E	Sand and Gravel	
Otisville Stone Co.	NE 28 9N 8E	Sand and Gravel	
John Post and Sons	SW NW 7 6N 5E	Sand and Gravel	
Saginaw Core Sand Co.		Sand and Gravel	
Justus Snellenberger	Burt.	Sand and Gravel	

* Value of clay used in manufacture of clay products not included in county total.

** Mineral value included under undistributed at end of county breakdown.

		<u>Quantity</u>	<u>Value</u>
GLADWIN (39)			
Petroleum		422,362 bbls.	\$ 1,203,732
Sand and Gravel		39,743 tons	<u>30,946</u>
Total value			\$ 1,234,228
Gladwin Co. Hwy. Dept.		Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
GOGEBIC (6)			
Iron (3rd, 22%)		3,182,532 tons	\$24,708,968
Sand and Gravel		157,232 tons	143,730
Stone		37,800 tons	<u>16,200</u>
Total value			\$24,868,898
Gogebic Co. Rd. Comm.	SW SW 4 46N 42W) NE SW 33 48N 46W) SW NW 33 48N 48W)	Sand and Gravel	
Gogebic Co. Rd. Comm.		Stone	
Ironwood Concrete Products Co.	Ironwood	Sand and Gravel	
Lake Superior Gravel Co.	SW 31 48N 46W) SE 33 48N 46W)	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
Mid-American Eng.		Sand and Gravel	
Oliver Iron Mining Div.- Davis Geneva Mine	18,19 47N 46W	Iron ore	
Pickands Mather and Co.- Anvil-Palms-Keweenaw Mine	11,14, 47N 46W	Iron ore	
Newport-Bonnie Mine	24, 47N 46W		
Peterson Mine	16,17, 47N 46W		
Sunday Lake Mine	9,10 47N 45W		
Republic Steel Corp.- Penokee Group	23 47N 47W	Iron ore	
U.S. Forest Service		Sand and Gravel	
GRAND TRAVERSE (72)			
Sand and Gravel		185,373 tons	\$ 67,998
Michigan State Hwy. Dept.		Sand and Gravel	
Paul C. Miller		Sand and Gravel	
Peninsula Asphalt and Constr. Co.	SE SE 15 27N 11W	Sand and Gravel	

GRATIOT (21)

Salt (5th), magnesium compounds (3rd), bromine (3rd) calcium-magnesium chloride (3rd), sand and gravel, clay products, natural gas, clay*, petroleum		**	
Clay Products Co.	NE 25 12N 3W	Clay - tile	
Roy Dayringer	NW SE 9 10N 1N	Sand and Gravel	
A.L. Dyer and Sons		Sand and Gravel	
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.	
Michigan State Hwy. Dept.		Sand and Gravel	
North Star Washed Sand & Gravel Co.	NW SE 22 10N 21W NE SE 34 11N 4W	Sand and Gravel	
The Taber Co.		Sand and Gravel	

HILLSDALE (52)

Sand and gravel		677,267 tons	\$ 510,809
Bundy Hill Gravel Co.	NE 7 5S 1W	Sand and Gravel	
Elliott Ice and Coal Co.	SE SE 15 6S 3W	Sand and Gravel	
Hillsdale Co. Rd. Comm.	NE SE 11 5S 3W) SE SE 9 6S 3W) SW SE 5 7S 2W) SE SE 1 7S 4W) SE NE 30 7S 4W)	Sand and Gravel	
Hoover Bros.	NE SW 23 8S 2W	Sand and Gravel	
Northwest Materials, Inc.	Ransom	Sand and Gravel	
Art Russell's Concrete Products	Hillsdale (1 mi. N)	Sand and Gravel	
Southern Michigan Materials, Inc.	Ransom	Sand and Gravel	

HOUGHTON (12)

Copper (2nd. 18%)	17,751,476 lbs.	\$6,655,196
Sand and Gravel	145,718 tons	81,808
Stone - traprock	16,779 tons	41,947
Total value		\$6,778,951

*Value of clay used in manufacture of clay products not included in county total.

** Mineral value included under undistributed at end of county breakdown.

Houghton Co. - contd.

Calumet and Hecla, Inc.-			
Centennial Mine	18 56N 32W)		
North Kearsarge Mine	5 56N 32W)	Copper	
Osceola Mine	23 56N 33W)		
Reclamation	12 55N 33W)		
Copper Range Co. - Champion	31 54N 34W	Copper	
Copper Range Railroad Co.		Sand and Gravel	
Duluth, South Shore and Atlantic Railroad Co.		Sand and Gravel	
Houghton Co. Rd. Comm.		Trap rock - crushed	
Michigan State Hwy. Dept.		Sand and Gravel	
Quincy Mining Co. - Reclamation	23 55N 33W	Copper	
U.S. Forest Service	SW NE 19 47N 35W	Sand and Gravel	

HURON (46)

Undistributed: Stone - crushed and
dimensional Limestone, sand and
gravel, petroleum \$ 749,481

E.P. Brady and Co.	NE NE 35 16N 13E) NE SW 27 16N 15E)	Sand and Gravel
Huron Co. Rd. Comm.	SE SE 17 16N 13E	Sand and Gravel
Wagner Sand and Gravel	NE SW 22 16N 15E	Sand and Gravel
The Wallace Stone Co.	5 16N 10E	Limestone - crushed and dimensional

INGHAM (49)

Sand and Gravel 804,194 tons \$ 646,306

Angell Constr. Co.	Lansing	Sand and Gravel
Cheney Gravel Co.	SW SE 11 3N 2W	Sand and Gravel
Delhi Gravel Co.	NW SW 24 3N 2W	Sand and Gravel
The Ferris Co., Inc.	Mason	Sand and Gravel
Ingham Co. Rd. Comm.	NE NE 10 2N 1E) SE NE 15 2N 1E) SW SE 34 3N 1E) NE NW 25 3N 2W) SW SE 25 3N 2W)	Sand and Gravel
S.E. Ketchum and Sons	Mason	Sand and Gravel
Mason Gravel Co.	Mason	Sand and Gravel
West Lansing Gravel Co.	Lansing	Sand and Gravel

		<u>Quantity</u>	<u>Value</u>
IONIA (67)			
Sand and Gravel		188,240 tons	\$ 110,705
Petroleum		6,874 bbls.	<u>19,591</u>
Total value			\$ 130,296
Ionia Co. Rd. Comm.	NE SW 18 5N 5W) SE SE 8 6N 5W) SW SE 21 7N 6W) NW NE 33 7N 7W)	Sand and Gravel	
Harry Pickitt	NW SE 21 7N 6W) NE NE 16 7N 5W)	Sand and Gravel	
The Taber Co.		Sand and Gravel	

 IOSCO (20)

Gypsum (1st.), Sand and Gravel		**	
National Gypsum Co.	16 21N 6E	Gypsum	
U.S. Forest Service	SE SW 14 24N 6E	Sand and Gravel	
U.S. Gypsum Co.	27 21N 7E	Gypsum	

 IRON (3)

Iron (2nd., 30%)		4,238,508 tons	\$ 29,777,059
Sand and Gravel		140,854 tons	<u>154,634</u>
Total value			\$ 29,931,693
Caspian Lumber and Coal Co.	SE SE 28 43N 35W	Sand and Gravel	
Champion, Inc.	NE NW 1 43N 36W	Sand and Gravel	
The Cleveland-Cliffs Iron Co.		Iron ore	
Spies-Virgil Mine	24 43N 35W		
M.A. Hanna Co.		Iron ore	
Cannon Mine	36 43N 35W)		
Hiawatha Mine	35, 36 43N 35W)		
Homer-Cardiff-Minckler	22, 23 43N 35W)	Iron ore	
Wauseca-Aronson Mine	23 43N 35W)		
Inland Steel Co.		Iron ore	
Bristol-Youngstown Mine	19,20 43N 32W)		
Sherwood Mine	23 43N 35W)		
Iron Co. Rd. Comm.	SW SW 7 43N 35W	Sand and Gravel	
Michigan State Hwy. Dept.	NW NW 13 42N 35W	Sand and Gravel	
North Range Mining Co.		Iron Ore	
Book Mine	12 42N 33W)		
Warner	9 44N 33W)		

** Mineral value included under undistributed at end of county breakdown.

		<u>Quantity</u>	<u>Value</u>
Iron Co. - contd.			
Pickands Mather and Co.			
Baltic Group	6, 7 42N 34W)	Iron ore	
Fortune Lake Mine	24,25,26 43N 33W)		
Lawrence Mine	36 43N 33W)		
Volunteer-Maitland Mine	30 47N 26W)		
Republic Steel Corp.		Iron ore	
Monongahela Mina	36 43N 33W)		
Tobin-Columbia Mine	30,31 43N 32W)		
U.S. Forest Service	SE NE 11 46N 37W	Sand and Gravel	

 ISABELLA (22)

Petroleum, (2nd, 11%)		1,286,579 bbls.	\$ 3,666,750
Sand and Gravel		491,945 tons	281,648
Natural Gas (4th, 10%)		681,514 M. cu.ft.	119,265
Natural Gasoline (2nd, 12%)		417,956 gals.	<u>41,796</u>
Total value			\$ 4,109,459

Denslow and Denslow	Weidman	Sand and Gravel	
A.L. Dyer and Sons		Sand and Gravel	
George Hubscher and Son	22 14N 5W) 7 16N 3W)	Sand and Gravel	
C. Utterback		Sand and Gravel	

 JACKSON (53)

Sand and Gravel		430,292 tons	\$ 308,327
Stone		45,731 tons	153,510
Petroleum		1,955 bbls.	5,572
Marl		7,924 tons	<u>4,754</u>
Total value			\$ 472,163

Barnes and Van Antwerp	Horton	Marl	
Jackson Co. Rd. Comm.	SE SE 29 1S 1W	Sand and Gravel	
John C. Jeffery	SE 30 2S 2W	Limestone-crushed	
Klump Bros.	SE SE 1 2S 2E	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
Original Sandstone Quarry	NE NW 6 4S 2E	Sandstone	
Ed. Palmer and Sons		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	

 KALAMAZOO (50)

Sand and Gravel		750,498 tons	\$ 560,226
Marl (1st, 21%)		25,550 tons	11,230
Petroleum		1,498 bbls.	<u>4,269</u>
Total value			\$ 575,725

Kalamazoo - contd.

		Quantity	Value
American Aggregate Corp.	SW NW 15 1S 11W	Sand and Gravel	
Casper H. Hass Co.		Sand and Gravel	
City Eng. - Kalamazoo	NW SW 2 3N 11W	Sand and Gravel	
Gravel Producers, Inc.	Portage & Cooper Twps.	Sand and Gravel	
Lawrence Hayward	Scotts	Marl	
Claude Mastin	Climax	Marl	
Michigan State Hwy. Dept.		Sand and Gravel	
Paul C. Miller		Sand and Gravel	
Harry Pickitt		Sand and Gravel	
Dan Slack	Kalamazoo	Marl	

KALKASKA (60)

Petroleum	54,385 bbls.	\$ 154,997
Natural gas	482,509 M.cu.ft.	84,439
Sand and Gravel	32,237 tons	<u>15,268</u>
		\$ 254,704

Kalkaska Co. Rd. Comm.	Sand and Gravel
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KENT (25)

Sand and Gravel (6th, 5%)	1,920,104 tons	\$1,679,980
Undistributed: Gypsum (2nd)		
petroleum, natural gas		<u>1,684,523</u>
Total value		\$3,364,503

Mathew J. Brown	Byron Center	Marl
Certain-Teed Products Corp.	SW 34 7N 12W	Gypsum
The Chesapeake & Ohio R.R.Co.		Sand and Gravel
Coit Ave. Gravel Co.	Grand Rapids	Sand and Gravel
Cross and White	Grand Rapids	Sand and Gravel
Ed. DeVries and Sons	Grand Rapids	Sand and Gravel
Grand Rapids Gravel Co.	SE SW 3 6N 12W)	Sand and Gravel
	NW NE 9 6N 12W)	
	SW 18 6N 12W)	
Grand Rapids Plaster Co.	NE 34 7N 12W	Gypsum
Grande Brick Co.	Grand Rapids	Sand and Gravel
Kent Co. Rd. Comm.	NE SW 27 5N 10W)	
	SE SE 20 6N 9W)	Sand and Gravel
	NE NE 32 7N 9W)	
	SE SW 11 10N 12W)	
Lowell Gravel Co.	Lowell	Sand and Gravel
Pekaar and Van Doorn	NW NE 16 6N 12W	Sand and Gravel
Harry Pickitt		Sand and Gravel
H.F. Postma Gravel Co.	SW SE 9 6N 12W)	Sand and Gravel
	SE SW 8 6N 12W)	
Riverside Sand & Gravel Co.	(1050 Maynard Ave. SW)	Sand and Gravel
United States Gypsum Co.	NE 34 7N 12W	Gypsum
West Shore Constr. Co.	NW NE 16 6N 12W	Sand and Gravel
Harry Zeeff & Sons Gravel Co.	SW SW 33 7N 12W	Sand and Gravel

Quantity Value

KEWEENAW (13)

Sand and Gravel	74,714 tons	\$ 69,757
Copper (3rd, 17%)	17,534,792 lbs.	<u>6,573,979</u>
Total value		\$6,643,736

Calumet and Hecla, Inc.-

Ahmeek and Allouez	28 57N 32W)	Copper
Allouez No. 3	32 57N 32W)	
Douglass	28 57N 32W)	
Iroquois	22 57N 32W)	
Peninsula	28 57N 32W)	
Seneca No. 2	27 57N 32W)	

Fox Valley Constr. Co.	Mohawk	Sand and Gravel
Keweenaw Co. Rd. Comm.		Sand and Gravel

LAKE (70)

Petroleum	10,241 bbls.	\$ 29,187
Sand and Gravel	97,949 tons	<u>65,157</u>
Total value		\$ 94,344

Lake Co. Rd. Comm.	SE NE 23 18N 13W)	Sand and Gravel
	NW SE 10 20N 14W)	

The Taber Co.		Sand and Gravel
U.S. Forest Service		Sand and Gravel

LAPEER (55)

Sand and Gravel	333,902 tons	\$170,277
Calcium-Magnesium Chloride	13,235 tons	<u>163,250</u>
Total value		\$333,527

Gilliland Gravel Co.		Sand and Gravel
Lapeer Co. Rd. Comm.	SE SW 30 8N 10E)	
	SW SE 16 9N 10E)	Sand and Gravel
	SW NW 28 9N 12E)	

Pine Sand and Gravel	NW 12 7N 10E	Sand and Gravel
Wilkinson Chemical Co.		Calcium-Magnesium Chloride

LEELANAU (75)

Sand and Gravel	97,762 tons	\$ 50,327
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Leelanau Co. Rd. Comm.	NE NW 16 28N 13W)	Sand and Gravel
	SW SE 12 29N 13W)	
	SW NW 19 32N 10W)	

Michigan State Hwy. Dept.		Sand and Gravel
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		<u>Quantity</u>	<u>Value</u>
LENAWEE (18)			
Sand and Gravel		528,614 tons	\$ 287,817
Undistributed: Portland cement (5th)			4,363,791
clay products, clay*, petroleum			<u>4,651,608</u>
Total value			
Don Bills			Sand and Gravel
Donald F. Clark	Morenci		Sand and Gravel
Comfort Brick and Tile Co.	SW 2 6S 5E		Clay - tile
Consolidated Cement Corp.	NE 5 5S 1E)		Portland cement
	5 7S 1E)		Clay
Lenawee Co. Rd. Comm.	NW NW 9 6S 4E)		Sand and Gravel
	SE SE 4 6S 4E)		
Michigan State Hwy. Dept.			Sand and Gravel
Cy Page			Sand and Gravel
Harry Pickitt			Sand and Gravel
Porter Sand and Gravel Co.	NE SE 4 6S 4E		Sand and Gravel
Stamm Bros. Gravel Co.	SW NE 19 7S 3E		Sand and Gravel
Tecumseh Gravel Co.	SW NE 4 6S 4E		Sand and Gravel
John Woerner Pit	2½ mi. NW of Adrian		Sand and Gravel

LIVINGSTON (24)

Sand and Gravel (2nd, 9%)		3,236,708 tons	\$3,370,581
Natural gas		227,379 M.cu.ft.	<u>39,791</u>
Total value			\$3,410,372
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	Howell		Sand and Gravel
Michigan State Hwy. Dept.			Sand and Gravel
Harry Pickitt			Sand and Gravel

LUCE (77)

Sand and Gravel		47,007 tons	\$ 36,685
Luce Co. Rd. Comm.	SW SE 11 45N 11W)		
	NE SE 11 45N 11W)		Sand and Gravel
	NE NE 14 45N 11W)		
Michigan State Hwy. Dept.			Sand and Gravel
I.L. Whitehead Co.			Sand and Gravel

*Value of clay used in manufacture of clay products not included in county total.

		<u>Quantity</u>	<u>Value</u>
MACKINAC (15)			
Stone (2nd)		6,023,301 tons	\$ 5,855,454
Sand and Gravel		127,405 tons	<u>94,190</u>
Total value			\$ 5,949,644
Duluth, South Shore and Atlantic R.R. Co.	NW SW 7 40N 3W		Sand and Gravel
Fiborn Limestone Co.	16 44N 7W		Limestone-crushed
Gilliland Gravel Co.	NW NE 8 42N 1W		Sand and Gravel
Inland Lime and Stone Co.	6 42N 12W		Limestone-crushed
Mike Mangene	Cedarville		Sand and Gravel
Michigan State Hwy. Dept.			Sand and Gravel
Lawrence Tamlyn	St. Ignace		Sand and Gravel
I.L. Whitehead Co.	NW NE 36 42N 5W		Sand and Gravel

MACOMB (38)

Sand and Gravel (5th, 5%)		1,971,348 tons	\$ 1,274,801
Advance Bldg. Materials Inc.	NE NW 8 T4N R12E)		Sand and Gravel
	SE NE 31 T3N R12E)		
Daniel J. Bollig	Mt. Clemens		Sand and Gravel
Great Lakes Gravel Co.	NW NW 31 2N 12E		Sand and Gravel
Hygrade Sand and Gravel	NE 8 4N 12E		Sand and Gravel
Fred Kaatz	SE NW 21 4N 14E		Sand and Gravel
Macomb Co. Rd. Comm.	17 4N 12E		Sand and Gravel
Macomb Sand and Gravel	SW SW 30 3N 12E		Sand and Gravel
Maertens Sand and Gravel Co.	SE NE 30 3N 12E)		Sand and Gravel
	SE SW 5 4N 12E)		
Louis Marsack and Sons	NW NW 3 1N 13E		Sand and Gravel
Michigan Sand and Gravel	SW NE 19 3N 12E		Sand and Gravel
Michigan State Hwy. Dept.			Sand and Gravel
Morgan Sand and Gravel Co.	Utica		Sand and Gravel
Ray Industries, Inc.	NE SW 18 3N 12E		Sand and Gravel
Bernie Rief			Sand and Gravel
S.K. Rogers			Sand and Gravel
Rosteck Contractors			Sand and Gravel
Smith Sand and Gravel Co.	NW SE 8 4N 12E		Sand and Gravel
Underwood Sand and Gravel Co.			Sand and Gravel

		Quantity	Value
MANISTEE (10)			
Salt (3rd) Magnesium compounds (1st)			
bromine (2nd), sand and gravel			**
Frank L. Gauthier	23 23N 16W	Sand and Gravel	
Great Lakes Chemical Corp.	SE SW 18 21N 16W	Bromine	
Manistee Co. Rd. Comm.	NE NW 18 22N 14W) NW SE 26 24N 16W)	Sand and Gravel	
Manistee Salt Works		Salt	
Michigan Chemical Corp.	NW 7 21N 16W	Bromine	
Michigan State Hwy. Dept.		Sand and Gravel	
Morton Salt Co.	12 21N 17W	Bromine, Magnesium, compounds, Salt	
Sand Products Corp.	N $\frac{1}{2}$ 11 21N 17W	Sand	
Standard Lime and Stone Co.	SE 18 21N 16W	Magnesium compounds	
The Taber Co.		Sand and Gravel	
U.S. Forest Service		Sand and Gravel	
MARQUETTE (1)			
Iron ore (1st, 45%)		6,500,786 tons	\$ 52,139,179
Sand and Gravel		452,396 tons	424,598
Stone		49,916 tons	95,416
Total value			\$ 52,659,193
Champion, Inc.	SW SE 23 48N 30W) NW NE 26 48N 30W)	Sand and Gravel	
The Cleveland Cliffs Iron Co. -			
Athens-Bunker Hill Co.	6 47N 26W)		
Cambria-Jackson Mine	35,36 48N 27W)		
Cliffs Shaft Mine	3,9,10 47N 27W)		
Humbolt Open Pit	10, 15 47N 29W)		
Lloyd-East Lloyd Mine	6 47N 27W)	Iron ore	
Mass-Race Course 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)		
M.A. Hanna Co.			
New Richmond Open Pit	27 47N 2W	Iron ore	
Inland Steel Co. -			
Morris Mine	1,2 47N 28W	Iron ore	
Greenwood Mine	14,23 47N 28W		
Jones and Laughlin Steel Corp. -			
Tracy Mine	7,8, 47 N 26W	Iron ore	
Lake Superior and Ishpeming Railway Co.		Sand and Gravel	
A. Lindberg and Sons, Inc.	NW SE 8 47N 25W	Sand and Gravel Dolomite-crushed	
Marquette Co. Rd. Comm.	NE NW 17 47N 25W) SE SW 30 46N 23W)	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	

** Mineral value included under undistributed at end of county breakdown.

		Quantity	Value
MARQUETTE Co. - contd.			
North Range Mining Co. -			
Blueberry Mine	3,4, 47N 28W	Iron ore	
Champion Mine	31 48N 29W	Iron ore	
Pickands Mather & Co. -			
Volunteer-Maitland Open Pit	25,30 47N 26W	Iron ore	
MASON (17)			
Bromine (4th), calcium-magnesium chloride (2nd), lime (1st), magnesium compounds (4th), natural gas, natural gasoline (3rd, 6%), petroleum (8th, 5%), sand and gravel			**
The Dow Chemical Co.	NW SW 23 18N 18W	Bromine, calcium- magnesium chloride, magnesium compounds, lime	
Mason Co. Rd. Comm.	SW SW 11 18N 15W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	
MECOSTA (51)			
Petroleum		150,263 bbls.	\$ 428,250
Natural gas (5th, 9%)		603,672 M.cu.ft.	105,643
Sand and gravel		97,948 tons	34,832
Marl		7,500 tons	4,500
Total value			\$ 573,225
A.L. Dyer and Sons		Sand and gravel	
Wilson Frost	Blanchard	Marl	
Steve Lyle Sand and Gravel	Big Rapids(1 $\frac{1}{2}$ mi.E.)	Sand and gravel	
Mecosta Co. Rd. Comm.	NE NE 32 15N 9W	Sand and gravel	
Paul C. Miller	SW SE 31 51N 7W) NE SE 9 16N 7W)	Sand and gravel	
MENOMINEE (44)			
Lime (2nd), Sand and Gravel			\$ 911,023
Champion, Inc.	NW NW 26 34N 27W	Sand and Gravel	
Limestone Products Co.	Menominee	Lime	
Menominee Co. Rd. Comm.	NE NE 9 39N 25W	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
Walsh Sand and Gravel Co.	Menominee (6 mi. N)	Sand and Gravel	

** Mineral value included under undistributed at end of county breakdown.

MIDLAND (4)

Bromine (1st), Potash (1st), Calcium-magnesium chloride (1st), magnesium compounds (2nd) petroleum, salt (4th) natural gas, natural gasoline (4th, 3%), sand and gravel

**

The Dow Chemical Midland

Bromine, calcium-magnesium chloride, potash, magnesium compounds, salt Sand and Gravel Sand and Gravel Sand

Fisher Sand and Gravel Co. NE SW 19 14N 2E Midland Co. Rd. Comm. Saginaw, Core Sand Co.

MISSAUKEE (34)

Petroleum (9th, 5%)	552,299 bbls.	\$ 1,573,952
Natural Gasoline (4th, 5%)	171,339 gals.	17,134
Natural Gas	25,887 M.cu.ft.	4,530
Marl	608 tons	389
Total value		\$ 1,596,005

C. Stanley Hooker Cadillac Marl

MONROE (30)

Undistributed: stone-crushed dolomite (4th), clay products, petroleum, clay* \$ 1,780,054

The France Stone Co.	SE 7 7S 9E	Dolomite-crushed
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.	NW 21 5S 10E	Clay - pottery

*Value of clay used in manufacture of clay products not included in county total.

** Mineral value included under undistributed at end of county breakdown.

MONTCALM (42)

Petroleum	351,539 bbls.	\$ 1,001,886
Sand and Gravel	147,089 tons	81,219
Natural Gas	42,974 M.cu.ft.	7,520
Total value		\$ 1,090,625

A.L. Dyer and Sons	SE SE 8 12N 5W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Montcalm Co. Rd. Comm.	NE SE 13 10N 6W NE NE 24 10N 6W	Sand and Gravel
Frank H. Stoerk	Pierson	Sand and Gravel

MONTMORENCY (82)

Sand and Gravel		**
Gilliland Gravel Co.		Sand and Gravel
Montmorency Co. Rd. Comm.	SW NW 27 30N 1E) NE NW 9 32N 4E)	Sand and Gravel

MUSKEGON (32)

Undistributed: Sand and gravel (9th, 2%) salt, petroleum, natural gas \$ 1,651,057

Hooker Electro-Chemical Co.	NE 31 12N 17W	Salt
Nugent Sand Co., Inc.	Muskegon	Sand
Harry Pickitt	SW SE 32 10N 13W	Sand and Gravel
Sand Products Corp.	C E $\frac{1}{2}$ 28 10N 17W	Sand

NEWAYGO (47)

Petroleum	197,072 bbls.	\$ 561,655
Sand and Gravel	168,977 tons	103,909
Natural gas	263,159 M.cu.ft.	46,053
Total value		\$ 711,617

A.L. Dyer and Sons		Sand and Gravel
K. & V. Gravel Co.	Fremont	Sand and Gravel
Paul C. Martin		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Harry Pickitt		Sand and Gravel
West Shore Constr. Co.		Sand and Gravel
U.S. Forest Service		Sand and Gravel

**Mineral value included under undistributed at end of county breakdown.

		<u>Quantity</u>	<u>Value</u>
OAKLAND (14)			
Sand and Gravel (1st, 18%)		6,557,946 tons	\$ 5,915,489
Clay products			310,350
Clay*		12,414 tons	
Petroleum		2,494 bbls.	<u>6,908</u>
Total value			\$ 6,232,747
American Aggregates Corp.	NE NW 22 5N 10E	Sand and Gravel	
Avon Asphalt and Gravel Co.	Rochester	Sand and Gravel	
Floyd Beardslee	NE NW 11 2N 10E)	Sand and Gravel	
The Benjamin Pit	S 1/2 SE 2 2N 10E)	Sand and Gravel	
Dachille Trucking Co.	Farmington	Sand and Gravel	
Foley and Beardslee	NW NW 7 3N 9E)	Sand and Gravel	
	SW SE 36 4N 8E)		
Holly Sand and Gravel Co.	NW SW 19 5N 8E	Sand and Gravel	
John R. Sand and Gravel Co.	S 1/2 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 and Supply Co.	NW 1 3N 8E)	Sand and Gravel	
	SW SE 24 5N 10E)		
Michigan State Hwy. Dept.		Sand and Gravel	
Michelson Bros.	NE NW 21 3N 8E	Sand and Gravel	
Paul C. Miller		Sand and Gravel	
Natco Corp.	SE 36 2N 9E	Clay - tile	
Oakland Co. Rd. Comm.	SW SE 36 5N 11E)		
	SE SE 9 2N 8E)		
	SE SW 32 5N 9E)	Sand and Gravel	
	SE SW 8 4N 8E)		
	NW NW 1 3N 10E)		
Oakland Sand and Gravel Co.	Walled Lake	Sand and Gravel	
Pontiac City Engr.	SW SE 36 5N 11E	Sand and Gravel	
Slaters Bald Mountain Gravel Pit	SW NW 1 3N 10E	Sand and Gravel	
Underwood Sand and Gravel Co.	SW 2 3N 10E	Sand and Gravel	
Lyle J. Walker Sand and Gravel	SE SW 2 2N 11E	Sand and Gravel	
F.S. Ward	NW NE 7 3N 9E	Sand and Gravel	
White Lake Gravel, Inc.	Clarkston	Sand and Gravel	

OCEANA (29)

Petroleum (6th, 6%)	668,405 bbls.	\$ 1,904,954
Sand and Gravel	37,397 tons	33,657
Natural gas	97 M.cu.ft.	<u>17</u>
Total value		\$ 1,938,628

Michigan State Hwy. Dept.	Sand and Gravel
West Shore Constr. Co.	Sand and Gravel

*Value of clay used in manufacture of clay products not included in county total.

	<u>Quantity</u>	<u>Value</u>
OGEMAW (26)		
Petroleum (4th, 8%)	860,214 bbls.	\$ 2,451,610
Sand and Gravel	243,573 tons	190,990
Marl	163 tons	<u>98</u>
Total value		\$ 2,642,698
E.P. Brady and Co.	SE NE 11 22N 2E)	Sand and Gravel
	NE SE 6 22N 2E)	
Ehinger Bros.	West Branch	Marl
Ogemaw Co. Rd. Comm.	NE SE 3 21N 1E)	Sand and Gravel
	NE SE 6 22N 2E)	
	NW NW 28 22N 3E)	
Walter Rosevear	NE SE 6 22N 2E	Sand and Gravel
ONTONAGON (7)		
Copper (1st, 65%)	64,709,892 lbs.	\$24,260,385
Sand and Gravel	77,236 tons	<u>76,534</u>
Total value		\$24,336,919
Fox Valley Constr. Co.	NE SE 13 51N 43W)	Sand and Gravel
	NW SW 18 51N 42W)	
Michigan State Hwy. Dept.		Sand and Gravel
Ontonagon Co. Rd. Comm.		Sand and Gravel
White Pine Copper Co. - White Pine Mine	4,5,9 5N 42W	Copper
OSCEOLA (28)		
Petroleum (7th, 6%)	656,241 bbls.	\$ 1,870,287
Sand and Gravel	172,860 tons	135,460
Natural gas	317,371 M.cu.ft.	55,538
Marl	5,798 tons	<u>3,710</u>
Total value		\$ 2,064,995
Hersey Sand and Gravel Div.	NW SW 20 17N 9W	Sand and Gravel
C. Stanley Hooker	Cadillac	Marl
Wallace Stone Co.		Sand and Gravel

	Quantity	Value
OSCODA (83)		
Sand and Gravel	10,545 tons	\$ 8,547
Petroleum	2,214 bbls.	6,310
Total value		\$14,857
Gilliland Gravel Co.	Sand and Gravel	
Michigan State Hwy. Dept.	Sand and Gravel	
U.S. Forest Service	NW NE 1 25N 1E)	
	SW NW 32 25N 1E)	
	SE NE 14 26N 3E)	

OTSEGO (74)

Sand and Gravel	93,041 tons	\$55,691
Natural gas	8,289 M.cu.ft.	1,451
Total value		\$57,142
Hutchins Sand and Gravel	SE NE 17 29N 3W	Sand and Gravel
Otsego Co. Rd. Comm.	NW SW 2 30N 3W)	
	NW NW 3 31N 3W)	Sand and Gravel
	NW NE 29 31N 3W)	
Harry Pickitt	NW SW 29 32N 2W	Sand and Gravel

OTTAWA (35)

Sand and Gravel (7th, 5%)	848,878 tons	\$1,213,362
Petroleum	127,942 bbls.	364,635
Natural gas	13,200 M.cu.ft.	2,310
Marl	2,300 tons	1,150
Total value		\$1,581,457

Construction Aggregates Corp.	SE SW 16 8N 15W	Sand and Gravel
Henry De Went	Hudsonville (2 mi.E)	Sand and Gravel
William Huizenga	Zeeland	Sand and Gravel
Thomas F. Johnston	Ferrysburg	Sand and Gravel
Ralph Meyers	West Olive	Marl
Harry Pickitt	(Ottawa Co. pit)	Sand and Gravel
Standard Sand Co.	NW 4 7N 16W	Sand
West Shore Constr. Co.	SW 9 6N 13W	Sand and Gravel
Wierenga Bros.	Spring Lake	Marl

PRESQUE ISLE (8)

Undistributed: Stone-crushed and dimensional limestone (1st) Sand and gravel		\$11,534,233
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	Quantity	Value
Presque Isle - contd.		
E.P. Brady and Co.	SE SW 28 34N 3E	Sand and Gravel
Gilliland Gravel Co.		Sand and Gravel
Michigan Limestone Div.- U.S. Steel Corp.	23 35N 5 E	Limestone-crushed
Michigan State Hwy. Dept.		Sand and Gravel
Onaway Stone Co.	5 34N 2E	Limestone-dimensional
Straits Aggregate and Equipment Corp.	Millersburg	Sand and Gravel

ROSCOMMON (40)

Undistributed: Natural gas, petroleum, natural gasoline, sand and gravel		\$ 1,233,416
Michigan State Hwy. Dept.		Sand and Gravel
Harry Pickitt	SW SW 24 24N 4W	Sand and Gravel

SAGINAW (65)

Clay*(3rd), petroleum, sand and gravel		**
Aetna Portland Cement Co.	35 12N 3E	Clay
Michigan State Hwy. Dept.		Sand and Gravel
Minco Products Corp.	NW NW 1 11N 3E	Clay
Saginaw Core Sand Co.		Sand and Gravel

SANILAC (69)

Sand and Gravel	189,905 tons	\$ 98,774
Orville J. Fair	Deckerville	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Harold Peters	Decker	Sand and Gravel
Sanilac Co. Rd. Comm.	SW SW 23 9N 14E	Sand and Gravel
Robert Van Camp	SW SE 28 10N 15E	Sand and Gravel

SCHOOLCRAFT (71)

Sand and Gravel	84,404 tons	\$ 74,440
E.P. Brady and Co.		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Schoolcraft Co. Rd. Comm.	SE SW 7 41N 17W	Sand and Gravel
I.L. Whitehead Co.		Sand and Gravel

**Mineral value included under undistributed at end of county breakdown.

* Value of clay or shale used in manufacture of Portland cement and clay products not included in county total.

SHIAWASSEE (37)

Undistributed: Clay products (3rd), shale, sand and gravel \$ 1,365,313

Harry Fuess	Durand	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
The Michigan Vitrified Tile Co.	SE 22 7N 3E	Shale - tile
John A. Parks Sand & Gravel	NE 13 5N 1E	Sand and Gravel
Shank Gravel Co.	NW NW 2 6N 4E)	Sand and Gravel
	NE NE 2 6N 4E)	

ST. CLAIR (9)

Undistributed: Clay*(4th), natural gas Portland cement, salt (2nd), sand and gravel \$10,981,397

William Click, Sr.	NE NW 27 7N 15E	Sand and Gravel
The Diamond Crystal Salt Co.	St. Clair	Evaporated Salt
Harvey G. Hall	Port Huron (2339 Wright St.)	Sand and Gravel
Lakeport Sand & Gravel Co.	Port Huron	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Morton Salt Co.	Marysville	Evaporated Salt
Peerless Cement Corp.	Port Huron)	Portland cement
	32 6N 16E)	Clay

ST. JOSEPH (63)

Sand and Gravel 230,399 tons \$ 171,237
 Marl 7,454 tons 862
 Total Value \$ 172,099

Aggregates Processors, Inc.	White Pigeon	Sand and Gravel
Leslie Knox	Colon (3 1/2 mi. SW)	Marl
Harry Pickitt	SE NW 15 5S 12W	Sand and Gravel
St. Joseph Co. Rd. Comm.		Sand and Gravel
Kenneth Wood	Colon	Marl
John G. Yerington		Sand and Gravel

*Value of clay used in manufacture of Portland cement not included in county total.

TUSCOLA (37)

Sand and Gravel (10th, 2%) 863,767 tons \$ 988,897
 Petroleum 108,768 bbls. 309,989
 Total value \$1,298,886

Andersen Sand and Gravel Co.	NE NE 20 11N 9E	Sand and Gravel
Berthel Sand and Gravel Co.	SW SE 6 11N 9E	Sand and Gravel
Great Lakes Foundry Sand Co.		Sand
Hile Bros.	NW SE 3 12N 8E	Sand and Gravel
C.R. Hunt	Cass City	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Peterhans Bros.	SW NE 35 13N 9E	Sand and Gravel
E.L. Schwaderer	NW NE 33 12N 10E)	
	SW SE 4 13N 11E)	
	NW SE 36 12N 11E)	Sand and Gravel
	NW NW 16 13N 10E)	
	SW SE 33 14N 11E)	
	NW SW 34 14N 11E)	
Tuscola Co. Rd. Comm.		Sand and Gravel
Vaughans Sand and Gravel	NE NE 25 12N 8E)	Sand and Gravel
	NW NW 25 12N 8E)	

VAN BUREN (58)

Undistributed: Marl, petroleum, sand and gravel \$ 310,100

Clifford Ellis	Grand Junction	Marl
Garrett Sand Co.	South Haven	Sand
Michigan State Hwy. Dept.		Sand and Gravel
Harry Pickitt	NW SW 24 3S 14W	Sand and Gravel
South Haven Sand Co.	South Haven	Sand and Gravel
John G. Yerington	SW NW 11 3S 15W)	Sand and Gravel
	SE SE 12 3S 15W)	
	SW NE 36 3S 15W)	
	NE NE 33 4S 15W)	

WASHTENAW (31)

Sand and Gravel (4th, 6%) 2,052,574 tons \$ 1,335,405
 Petroleum 85,130 bbls. 242,621
 Natural gas (2nd, 12%) 821,916 M.cu.ft. 143,835
 Total value \$ 1,721,861

Dexter Gravel Co.	SW SE 5 2S 5E	Sand and Gravel
Killins Gravel Co.	SE SE 25 2S 3E	Sand and Gravel
Kruse Gravel Pit	Ypsilanti (1090 Clark Rd.)	Sand and Gravel

Washtenaw - contd.

		<u>Quantity</u>	<u>Value</u>
Harry Pickitt		Sand and Gravel	
Scio Gravel Co.		Sand and Gravel	
Lawrence B. Skinner		Sand and Gravel	
Lamar Thumm	SW NE 25 3S 7E	Sand and Gravel	
Whittaker and Gooding Co.	SW NE 19 2S 7E	Sand and Gravel	
Youngs Sand and Gravel	NE NE 15 3S 6E) SW SW 16 1S 3E)	Sand and Gravel	
Washtenaw Co. Rd. Comm.	24 3S 5E	Sand and Gravel	
Zahns Sand and Gravel	Ann Arbor (2315 Ellsworth Rd.)	Sand and Gravel	

WAYNE (2)

Salt (1st)	3,643,166 tons	\$15,442,732
Sand and Gravel (3rd, 6%)	2,156,159 tons	2,830,840
Natural gas (3rd, 12%)	819,875 M. cu. ft.	143,478
Petroleum	19,636 bbls.	55,963
Undistributed: Portland cement (2nd), stone-crushed limestone, clay* (1st), clay products (1st)		\$16,991,427
Total value		\$35,464,440

Allied Chemical Dye Corp.	Trenton	Chlorine, soda ash, caustic soda, etc.
Clippert Brick Co.	NW 21 2S 11E	Clay - brick
W.L. Emery Co.		Sand and Gravel
Flat Rock Clay Products	NW SE 30 4S 10E	Clay - tile
International Salt Co., Inc.	SW 32 2S 11E	Rock salt
Lightweight Aggregate Corp.	NE 27 2S 11E	Clay - lightweight aggregate
Manning & 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	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Moore Bros. Sand & Gravel	E½ SE 9 3S 9E	Sand and Gravel
Northville Sand & Gravel	SE NE 8 1S 8E	Sand and Gravel
Peerless Cement Corp.	Detroit	Portland cement
Pennsylvania Salt Mfg. Co.	Wyandotte	Chlorine, caustic soda
Harry Pickitt	SE NE 8 1S 8E	Sand and Gravel
Thomson Sand & Gravel	Northville	Sand and Gravel
U.S. Gypsum Co.	River Rouge	Gypsum products
Wayne Sand & Gravel Co.	NW SE 2 3S 8E	Sand and Gravel
Wolverine Contr. Inc.	Roseville	Sand and Gravel
Wyandotte Chemical Corp.	Wyandotte	Soda ash, chlorine, caustic soda, etc.
Wyandotte Chemical Corp.	Wyandotte	Portland cement

*Value of clay used in manufacture of Portland cement and clay products not included in county total.

QuantityValue

WEXFORD (76)

Sand and Gravel		83,160 tons	\$ 42,079
Michigan State Hwy. Dept.		Sand and Gravel	
Harry Pickitt	SW SE 34 24N 12W	Sand and Gravel	
U.S. Forest Service	NW SW 20 23N 11W	Sand and Gravel	
Wexford Gravel Co.	Cadillac	Sand and Gravel	

UNDISTRIBUTED

Not segregated by counties (includes Antrim, Chippewa, Emmett, Gratiot, Iosco, Isabella, Manistee, Mason, Midland, Montmorency, Saginaw)			\$62,871,416
Peat	30,000 tons		465,000
Sand and Gravel	614,965 tons		315,429
Gem Stones	231 lbs.		250
Total value			\$63,652,130

Gravens Peat Moss		Peat
Gilliland Gravel Co.		Sand and Gravel
O.E. Gooding and Co.		Sand and Gravel
Green Thumb Peat Humus Co.	24 7N 12E	Peat
Michigan Mineralogical Society		Gem Stones
Michigan Peat, Inc.	24 7N 12E	Peat
Perry Peat Co., Inc.	Morris	Peat
Irving L. Pratt & Sons	SE SW 35 19N 17W	Peat
Ronald Weaver		Sand and Gravel

TOTAL STATE VALUE

\$371,356,604

COUNTY MINERAL PRODUCTION

1955

<u>County</u>	<u>Rank</u>	<u>Value</u>	<u>County</u>	<u>Rank</u>	<u>Value</u>
Alcona	80	\$ 25,442	Genesee	48	\$ 677,960
Alger	68	106,312	Gladwin	39	1,234,228
Allegan	45	807,594	Gogebic	6	24,868,898
Alpena	5	27,691,489	Grand Traverse	72	67,998
Antrim	73	*	Gratiot	21	*
Arenac	19	4,567,743	Hillsdale	52	510,809
Baraga	41	1,138,039	Houghton	12	6,778,951
Barry	57	319,876	Huron	46	749,481
Bay	11	8,240,145	Ingham	49	646,306
Benzie	81	17,930	Ionia	67	130,296
Berrien	59	217,178	Iosco	20	*
Branch	66	126,022	Iron	3	29,931,693
Calhoun	61	228,274	Isabella	22	*
Cass	62	188,329	Jackson	53	472,163
Charlevoix	78	33,564	Kalamazoo	50	575,725
Cheboygan	79	33,006	Kalkaska	60	254,704
Chippewa	27	*	Kent	25	3,364,503
Clare	23	3,494,118	Keweenaw	13	6,643,736
Clinton	56	321,448	Lake	70	94,344
Crawford	43	1,062,867	Lapeer	55	333,527
Delta	64	149,371	Leelanau	75	50,327
Dickinson	54	422,267	Lenawee	18	4,651,608
Eaton	33	1,611,456	Livingston	24	3,410,372
Emmet	16	*	Luce	77	36,685

<u>County</u>	<u>Rank</u>	<u>Value</u>	<u>County</u>	<u>Rank</u>	<u>Value</u>
Mackinac	15	\$ 5,949,644	Schoolcraft	71	\$ 74,440
Macomb	38	1,274,801	Shiawassee	36	1,365,313
Manistee	10	*	St. Clair	9	10,981,397
Marquette	1	52,659,193	St. Joseph	63	172,099
Mason	17	*	Tuscola	37	1,298,886
Mecosta	51	573,225	Van Buren	58	310,100
Menominee	44	911,023	Washtenaw	31	1,721,861
Midland	4	*	Wayne	2	35,464,440
Missaukee	34	1,596,005	Wexford	76	42,079
Monroe	30	1,780,054	*Not segregated by counties (includes Antrim, Chippewa, Emmet, Gratiot, Iosco, Isabella, Manistee, Mason, Midland, Montmorency, Saginaw)		
Montcalm	42	1,090,625			
Montmorency	82	*			
Muskegon	32	1,651,057			
Newaygo	47	711,617			
Oakland	14	6,232,747			
Oceana	29	1,938,628			
Ogemaw	26	2,642,698			
Ontonagon	7	24,336,919			
Osceola	28	2,064,995			
Oscoda	83	14,857			
Otsego	74	57,142			
Ottawa	35	1,581,457			
Presque Isle	8	11,534,233			
Roscommon	40	1,233,416			
Saginaw	65	*			
Sanilac	69	98,774			
			62,871,416		
			TOTAL STATE VALUE \$371,356,604		

(Preliminary)

Mineral production in Michigan in 1956 had an estimated value of \$390 million according to the Bureau of Mines, United States Department of the Interior. Over-all the total value of minerals produced was 7 percent greater than 1955 when output was valued at \$364 million. A wide range of change was noted in the various mineral commodities. Copper showed an increase in value of output of 38 percent, sand and gravel 28 percent and portland cement 22 percent. Iron ore production, reflecting the work stoppage caused by the steel and shipping strikes, decreased about 10 percent in value. The value for petroleum and natural gas was about 5 percent less than in 1955.

Iron ore continued to rank first in value of minerals produced, followed by cement, copper, sand and gravel, salt, petroleum and stone. Of the total value of output, nonmetallic minerals accounted for 54 percent, metals 37 percent and fuels 9 percent. In 1955 the percentage breakdown of values was: nonmetallics 51 percent, metals 39 percent and fuels 10 percent.

METALS

Copper.-Production of copper in Michigan in 1956, in terms of recoverable metal, was 20 percent greater, while value was up 38 percent over 1955. Production was reported by the White Pine Copper Co. in Ontonagon County, the Calumet and Hecla operations in Houghton and Keeweenaw Counties and the Quincy Mining Co. and Copper Range Co. in Houghton County.

Average weighted prices used for calculating the value of copper was 41.9 cents per pound in 1956 and 37.3 cents in 1955. Quoted market prices for copper, per pound, delivered Connecticut Valley, opened 1956 at 43 cents, was increased to 46 cents in the latter part of February, lowered to 40 cents in July and was further lowered to 36 cents in October where it remained beyond the year end.

Iron & Manganese.-Iron ore production fell off 12 percent due chiefly to labor strikes. Increases in the value of the ore held dollar loss to about 10 percent less than 1955 totals. Mines are located in Baraga, Dickinson, Gogebic, Iron and Marquette Counties.

Dates of first and last lake shipments of ore in 1956 from Michigan and Wisconsin ports were: Ashland-Soo, April 23 - Nov. 25; Ashland-C&NW, April 25 - Nov. 28; Escanaba-C&NW, April 7 - Dec. 3; Marquette-DSSA, April 26 - Nov. 11; Marquette-LS&S, April 9 - Dec. 5; Superior-GN, April 5 - Dec. 8; Superior-NP-Soo, April 8 - Nov. 25.

No shipments of ore containing over 5 percent manganese were reported from Michigan mines in 1956. The last shipments for such ore were in 1954.

*Prepared January 15, 1957 by Donald F. Klyce, Commodity Industry Analyst, under the supervision of Samuel A. Gustavson, Chief, Minneapolis Field Office, Division of Mineral Industries, Region V.

NONMETALS

Michigan produces a variety of nonmetallic minerals. The most important group are used in the construction industry and include cement, clay, gypsum, lime, sand and gravel and stone. They represent 37 percent of the value of the State's mineral output.

Salines from brine wells are the source of raw materials in the production of several chemicals, notably bromine and magnesium compounds and common salt. The value of salt and salines produced accounted for 17 percent of the 1956 dollar total for mineral production.

MINERAL FUELS

Mineral fuels (peat, petroleum, natural gas and natural gas products) accounted for about 9 percent of the total value of minerals produced in 1956. Over-all production of fuels was slightly less than in 1955. Peat, although classified as a fuel, is sold principally as a soil conditioner. No coal production was reported.

Mineral Production in Michigan, 1956 (1)
(Estimated)

<u>Commodity</u>	<u>Short Tons (unless other- wise stated)</u>	<u>Value</u>
Cement:		
portland	21,000,000	\$64,050,000
masonry	1,775,000	6,460,000
Clay	2,225,000	2,300,000
Copper (recoverable content of ores, etc.)	61,450	51,495,100
Gypsum (crude)	1,790,000	5,750,000
Iron ore (usable) long tons, gross weight	12,334,552	(2)
Magnesium compounds (except for metal)	48,500	5,500,000
Marl, calcareous	140,000	69,000
Natural gas (million cubic feet)	8,700	1,200,000
Petroleum (crude) 42-gallon barrels	10,753	31,400,000
Salt (common)	5,000,000	32,000,000
Sand and gravel (3)	42,000,000	37,800,000
Silver (troy ounces)	365,000	331,158
Stone	33,700,000	29,000,000
Undistributed: bromine, calcium chloride and calcium magnesium chloride, gemstones, lime, magnesium chloride, natural gasoline, L-P gases, peat and potassium salts		127,950,250
Total Michigan (4)		\$389,706,000

- (1) Production as measured by mine shipments, sales or marketable production (including consumption by producers).
(2) Included with "Undistributed."
(3) Includes friable sandstone.
(4) Total has been adjusted to eliminate duplication of value of clays and limestone used in the manufacture of cement and lime.

DIRECTORY OF PRODUCERS OF MINERALS
AND
MINERAL PRODUCTS, 1955

CHEMICAL PLANTS

(Using Natural Brine or Salt)

<u>Name and Address</u>	<u>Raw Material</u>	<u>Plant Location</u>
Allied Chemical & 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 Building 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 Salt Company 120 South La Salle Street Chicago, Illinois	Natural brine	Manistee, Manistee Co.
Pennsylvania Salt Mfg. Co. 1000 Widener Building Philadelphia 7 Pennsylvania	Salt	Wyandotte, Wayne Co.
Standard Lime & Stone Co. 2000 First National Bank Building 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
Michigan Chemical Corp.	X	X	X		Gratiot
Michigan Chemical Corp.	X				Manistee
Morton Salt Company	X		X		Manistee
Standard Lime & Stone Company			X		Manistee
Wilkinson Chemical Company		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.
Consolidated Cement Corporation 1003 National Bank Building Jackson, Michigan	Cement City, Lenawee Co.
Huron Portland Cement Co. 1325 Ford Building Detroit, Michigan	Alpena, Alpena Co.
Peerless Cement Corporation 1144 Free Press Building Detroit, 26, Michigan	Detroit, Wayne Co. Port Huron, St. Clair Co.
Penn-Dixie Cement Corp. P. O. Box No. 152 Nazareth, Pa.	Petoskey, Emmet Co.
Wyandotte Chemical Corporation Wyandotte, Michigan (Operated by Huron Portland Cement Co.)	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.11N., R.3E.
Robinson Clay Products Company 65 West State Street Akron, 9, Ohio	Near Rockland, Ontonagon Co. Section 17, T.50N., R.39W.
Saginaw Clay Products Box 275 Saginaw, Michigan	Near Paines, Saginaw Co. Section 1, T.11N., R.3E.

*Producers of clay used in clay products, Portland cement, and lightweight aggregate manufacturers not included.

CLAY PRODUCTS PRODUCERS

(Brick, Tile, Pottery, Lightweight Aggregate)

<u>Name and Address</u>	<u>Raw Material</u>	<u>Plant Location</u>
American Vitrified Products Co. 701 National City Bank Bldg. Cleveland, Ohio	Shale	Grand Ledge, Eaton (Tile)
Clay Products Company R.F.D. 2 St. Louis, Michigan	Clay	St. Louis, Gratiot Co. (Tile)
Clippert Brick Company Wyoming and Southern Avenues Detroit 10 Michigan	Clay	Near Dearborn, Wayne Co. (Brick)
Comfort Brick and Tile Co. R.F.D. No. 1 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. 12601 Merriman Road Livonia, Michigan	Clay	Livonia, Wayne Co. (Lightweight aggregate)
The Michigan Vitrified Tile Co. P. O. Box 59 Findlay, Ohio	Shale	Corunna, Shiawassee Co. (Tile)
Natco Corporation 327 Fifth Avenue Pittsburgh 22 Pennsylvania	Clay	Franklin, Oakland Co. (Tile)
F.W. Ritter Sons Company, Inc. South Rockwood, Michigan	Clay	South Rockwood, Monroe Co. (Pottery)

GYPSUM PRODUCERS

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

LIME PRODUCERS

<u>Name and Address</u>	<u>Plant Location</u>
The Dow Chemical Company Ludington Division Midland, Michigan	Ludington, Mason County
Limestone Products Company 320 First Street Menominee, Michigan	Menominee, Menominee Co.
Monitor Sugar Company Division Robert Gage Coal Company South Euclid Avenue Bay City, Michigan	Bay City, Bay County

IRON MINING COMPANIES

<u>Name and Address</u>	<u>Mine Locations (Counties)</u>
The Cleveland-Cliffs Iron Company 14th Floor Union Commerce Building Cleveland 14 Ohio	Baraga, Iron, Marquette
Globe Iron Company Jackson, Ohio	Dickinson
M.A. Hanna Company 1300 Leader Building Cleveland 14 Ohio	Iron and Marquette
Inland Steel Company 38 South Dearborn Street Chicago 3 Illinois	Iron and Marquette
Jackson Iron and Steel Company Jackson, Ohio	Dickinson
Jones and Laughlin Steel Corporation 401 Liberty Avenue Gateway Center Pittsburgh 30 Pennsylvania	Marquette
North Range Mining Company Negaunee, Michigan	Iron, Marquette, Gogebic
Oliver Iron Mining Division U. S. Steel Corporation Wolvin Building Duluth 2 Minnesota	Gogebic
Pickands Mather and Company 2000 Union Commerce Building Cleveland 14 Ohio	Gogebic, Iron, Marquette
Republic Steel Corporation Republic Building Cleveland 1 Ohio	Iron

COPPER PRODUCERS

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

MARL PRODUCERS

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
A.		
L.Z. Arndt	R.F.D. #2, Fennville	Allegan
Gerald Arnsman	R.F.D. #1, Hopkins	Allegan
Carl Avery	Athens	Calhoun
B.		
Barnes & Van Antwerp	Horton	Jackson
Grant Brizendine	R.F.D. #2, Edwardsburg	Cass
Case Bros.	R.F.D. #1, Sherwood	Branch, Calhoun
Mathew J. Brown	R.F.D. #3, Byron Center	Kent
*Lester O. Brown	1720 Colfax Ave. Benton Harbor	Berrien
D.		
Arnie Delebaugh	R.F.D. #2, Union City	Calhoun
E.		
Ehinger Bros.	West Branch	Ogemaw
Clifford Ellis	Grand Junction	Van Buren
F.		
Wilson Frost	Blanchard	Mecosta
H.		
*Vernon C. Harris	Ravenna	Ottawa
Lawrence Hayward	Scotts	Kalamazoo
Frank R. Hixon	R.F.D. #2, Marcellus	Cass
C. Stanley Hooker	608 Colfax St., Cadillac	Missaukee, Osceola
K.		
Leslie Knox	Colon	St. Joseph
M.		
Claude Mastin	Climax	Kalamazoo
Ralph Meyers	R.F.D. #2, West Olive	Ottawa
P.		
Emil Pavlak	R.F.D. #2, Hopkins	Allegan

Marl Producers (Contd.)

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
R.		
Clyde M. Reed	Union City	Calhoun
S.		
H.A. Carlton Schau	858 Coy Blvd., Kalamazoo	Barry
Dan Slack	R.F.D. #4, Kalamazoo	Kalamazoo
W.		
Wierenga Bros.	Spring Lake	Ottawa
Kenneth L. Wood	Colon	St. Joseph

*Producers with no output in 1955

PEAT PRODUCERS

<u>Name and Address</u>	<u>Pit Location</u>
Cravens Peat Moss R.F.D. #5, Box 359 Kalamazoo, Michigan	Near Kalamazoo, Kalamazoo County
Green Thumb Peat Humus Company Capac, Michigan	Near Capac, St. Clair and Lapeer counties
Michigan Peat, Incorporated 267 Fifth Avenue New York 16 New York	Near Capac, Lapeer and St. Clair counties
Perry Peat Company, Incorporated Box 667 Morrice, Michigan	Near Morrice, Shiawassee County
Irving L. Pratt & Son Scottville, Michigan	Near Scottville, Mason County

SALT COMPANIES

<u>Name and Address</u>	<u>Product</u>	<u>Plant Location</u>
Diamond Crystal Salt Co. St. Clair, Michigan	Evaporated Salt	St. Clair, St. Clair Co.
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 Co.
Michigan Chemical Corp. 500 North Bankson St. Louis, Michigan	Evaporated Salt	St. Louis, Gratiot Co.
Morton Salt Company 120 South LaSalle St. Chicago, Illinois	Evaporated Salt	Manistee, Manistee Co. Marysville, St. Clair Co.

COMMERCIAL SAND AND GRAVEL PRODUCERS

(Addresses are all in Michigan unless otherwise designated)

<u>Name and Address</u>	<u>Pit Location (County)</u>
A.	
Advance Bldg. Materials Co., 46461 Ryan Road Utica	Macomb
Aggregates Processors, White Pigeon John W. Alexander, Sr. Route #1, Marshall American Aggregates Corp., Greenville, Ohio	St. Joseph Calhoun. Kalamazoo, Livingston, Oakland
Andersen Sand & Gravel Co., 401 Atwater St. Saginaw	Tuscola
Angell Construction Co., P.O. Box 5, East Lansing	Ingham
Arndt, Cleo L., Fennville	Allegan
Avon Asphalt & Gravel Co. J. Gladstone & Son, 423 Oak St., Rochester	Oakland
B.	
Battle Creek Gravel Co. 3800 Dickman Highway, Battle Creek	Calhoun
Floyd Beardslee, R.F.D. #3, Pontiac	Oakland
Bender Gravel Co., 822 Benton St., Hastings	Barry
The Benjamin Pit, 30404 W. 14 Mile Rd., Farmington	Oakland
Berthel Sand & Gravel Co., Reese	Tuscola
Bichler Bros., 1615 Ludington, Escanaba	Delta
Don Bills, Hudson	Lenawee
Boichot Concrete Products Corp. 1800 Turner St., Lansing	Clinton
Daniel J. Bollig, 38068 Lakeshore Dr. Route 6, Mt. Clemens	Macomb
E.P. Brady & Co., 600 Citizens Bank Bldg. Flint 3	Alcona, Clinton, Huron, Alpena, Ogemaw, Presque Isle Schoolcraft
*Bunce Gravel, Route #1, Ravenna	Muskegon, Ottawa
Bundy Hill Gravel Co., Somerset Center	Hillsdale
Bodine, Ralph W., 226 Court, Otsego	Allegan
C.	
*Geo. H. Campbell, 606 E. Cross St., Ypsilanti	Washtenaw
Caspian Lbr. Co., Caspian	Iron
*W.A. Cecil & Son, 400 Albion Rd., Concord	Jackson
Champion, Inc., Iron Mountain	Dickinson, Iron, Marquette, Menominee
Cheney Gravel Co., Inc., Willoughby Rd., Holt	Ingham

Commercial Sand and Gravel Producers (contd.)

Name and AddressPit Location (County)

C. (contd.)

*William Cinader, 622 South Main St., Clawson
 Donald F. Clark, Route #1, Morenci
 William Click, Sr., 8783 Bryce Rd., Goodells
 Cloverland Milling, Supply Co.
 801 Superior Ave., Gladstone
 Coit Avenue Gravel Co., 4772 Coit Ave., N.E.
 Grand Rapids
 Cole Gravel Co., Route #1, Dorr
 Emil Combs, Route #1, Tekonska
 Construction Aggregates Corp., 33 N. LaSalle St.
 Chicago, Illinois
 *Continental Sand Co., 15381 Plainview, Detroit 23
 *Cross and White, 3849 Three Mile Road,
 Grand Rapids

D.

D. & J. Gravel Co., Route 1, Fowlerville
 Dachill Trucking Co., 18945 W. 8 Mile Rd., Detroit
 Van E. Daily, 410 W. Sibley St., Howell
 Roy Dayringer, Route 4, Ithaca
 Days River Sand & Gravel Co., Route #1, Gladstone
 Edward De Vries & Sons, 1400 Walker St.
 Grand Rapids 4
 Henry De Went, U.S. 21, Hudsonville
 Delhi Gravel Co., U.S. 127, Holt
 Denslow & Denslow, Weidman
 Dexter Gravel Co., 7100 Dexter Ann Arbor Road,
 Dexter
 *Dobb's Truck and Crane Service
 1382 Beidler St., Muskegon
 A.L. Dyer & Sons, McBrides

E.

Eastman Gravel Pit, Route #1, Standish
 Elliott Ice & Coal Co., Paul W. Elliott
 Hillsdale
 W.L. Emery Co., 1375 E. Jefferson Ave., Detroit
 *George A. Everson, Sand & Gravel Co.
 1033 First St., Menominee

Oakland
 Lenawee
 St. Clair
 Delta
 Kent
 Barry
 Calhoun

Ottawa (Dredge)
 Wayne

Kent

Livingston
 Oakland
 Livingston
 Gratiot
 Delta

Kent
 Ottawa
 Ingham
 Isabella

Washtenaw

Kent
 Antrim, Barry, Cheboygan,
 Crawford, Gratiot, Isabella
 Mecosta, Newaygo

Arenac
 Hillsdale
 Wayne (Dredge)

Commercial Sand and Gravel Producers (contd.)

Name and AddressPit Location (County)

F.

Orville J. Fair, Route 2, Deckerville
 Ferguson Excavating Co., 5360 N. State Rd.
 Davison
 The Ferris Co., Mason
 Fisher Sand & Gravel Co., Ralph J. Fisher
 Route #2, Midland
 Foley & Beardslee, Route #3, Clarkston
 Harry Fuoss, Route 1, Durand
 Fox Valley Constr. Co., Box 827, Appleton, Wisc.

Sanilac
 Genesee
 Ingham
 Midland
 Oakland
 Shiawassee
 Ontonagon, Keweenaw,
 Dickinson

G.

Garrett Sand Co., 411 Phoenix St., South Haven
 Frank L. Gauthier, Onkama
 Gilliland Gravel Co., Alpena

Van Buren
 Manistee
 Alpena, Chippewa, Lapeer
 Mackinac, Montmorency
 Oscoda, Presque Isle
 Ingham, Oakland, Washtenaw

O.E. Gooding Co., 5800 Cherry Hill Rd., Ypsilanti
 Grande Brick Co., 1456 Fuller Ave., S.E.
 Grand Rapids 7
 Grand Rapids Gravel Co., 2200 Chicago Dr., S.W.
 Grand Rapids 9
 Gravel Producers, Inc., Kalamazoo 85
 Great Lakes Foundry Sand Co., 720 United Artists
 Building, Detroit
 Great Lakes Gravel Co., 2900 Auburn Road, Utica

Kent

Kent
 Kalamazoo

Tuscola
 Macomb

H.

*Haley Gravel Co., 2016 Pattengill, Lansing
 Harvey G. Hall, 2854 20th Ave., Port Huron
 Hansen Gravel Co., Harry Hansen, Pierson Rd.
 Flushing
 Casper H. Hass Co., 1800 RA, Kalamazoo
 *Heides Sand & Gravel, 1683 Thomson Road,
 Route #1, Niles
 Hale Bros., Rt. #2, Caro
 Holly Sand & Gravel Co., Grange Hall,
 Route #1, Holly
 Hoover Bros., K.F. Hoover, Waldron
 George Huescher & Son, 1111 E. Pickard St.
 Mt. Pleasant
 Huitt & Sons, 322 Water St., Allegan
 William Huizenga, Route #2, Zeeland

St. Clair

Genesee
 Kalamazoo

Berrien, Cass
 Tuscola

Oakland
 Hillsdale

Isabella
 Allegan
 Ottawa

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location (County)</u>
H. (contd.)	
C. R. Hunt, Cass City Hutchins Sand & Gravel, Rodney C. Hutchins 320 S. Maple, Gaylord Hygrade Sand & Gravel Corp., 707 Majestic Bldg., Detroit	Tuscola Otsego Macomb
I.	
Ireland & Lester Co., 220 N. Wayne St., St. Joseph Ironwood Concrete & Products Co., Route #1, Box 7A Ironwood	Berrien (Dredge) Gogebic
J.	
John R. Sand and Gravel Co., 1865 Indianwood Rd. Lake Orion *Leonard Johnson, Box 31, Chatham Thomas F. Johnston (Tom Johnston Gravel Co.) 114 LaFayette St., Grand Haven *Carl Jones Concrete Products, 7628 Toma Road Pinckney	Oakland Alger Ottawa Livingston, Washtenaw
K.	
K. & V. Gravel Co., Route #1, Fremont Fred Katz, 62701 Richmond Road, Richmond Harold Keill, Route #3, Niles Kemler Bros., 5900 Cobb Creek Ct., Rochester S.E. Ketchum & Sons, Route #3, Mason Killins Gravel Co., 3305 Liberty Road, Ann Arbor *King Sand & Gravel Co., 202 South St., Archbold, Ohio Klumpp Bros., Chelsea Koan Gravel Co., Route #1, Holly Koenig Coal & Supply Co., 1486 Gratiot Ave. Detroit, Michigan Kruse Gravel Pit, 1090 Clark Rd., Ypsilanti Kurtz Gravel Co., G-5300 N. Dort Hwy., Flint	Newaygo Macomb Berrien Oakland Ingham Washtenaw Lenawee Jackson Oakland Oakland Washtenaw Genesee
L.	
Lake Superior Gravel Co., 640 $\frac{1}{2}$ Lake Ave., Ironwood Lakeport Sand and Gravel Co., Lakeport A.S. Leffler Gravel Co., Davison A. Lindberg & Sons, Inc., Box 134, Ishpeming	Gogebic St. Clair Genesee Marquette

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location (County)</u>
L. (contd.)	
Lowell Gravel Co., Grand River Drive R.F.D., Lowell Steve Lyle, Sand & Gravel, 124 W. Pine Big Rapids	Kent Mecosta
M.	
Paul C. Martin, Newaygo Macomb Sand & Gravel, 3295 Auburn Road, Utica Maertens Sand and Gravel Co., 1036 Buckingham Grosse Point Mike Mangine, Cedarville Manning-Locklin Gravel Co., Box 216, Northville Louis Marsack & Sons, 23633 Denhurst, St. Clair Shores H.L. Martin Gravel Co., Box 154, Westphalia Mason Gravel Co., Mason Mathews Gravel Co., G-6226 E. Mt. Morris Rd. Mt. Morris Michigan Sand and Gravel, 3405 Hamlin Rd., Utica Michigan Silica Co., Rockwood Mickelson Bros., 1745 Seymore Lake Road, Oxford *Mid American Eng. Corp., 4842 Dempster St. Skokie, Illinois Paul C. Miller, 10300 Sparta Ave., Sparta	Newaygo Macomb Macomb Mackinac Wayne Macomb Clinton Ingham Genesee Macomb Wayne Oakland Kent Grand Traverse, Kalamazoo Mecosta, Oakland Marquette Wayne Washtenaw Macomb
N.	
Nashville Gravel Co., R.F.D. #2, Nashville Nieb Concrete Products, Route 1, Niles North Star Washed Sand & Gravel Co. (Donald & Rood Owner), Ithaca *Northland Construction Co., Box 160, Petoskey Northville Sand & Gravel Co., 18275 Beck Rd. Northville Northwest Materials, Inc., Bryan, Ohio Nugent Sand Co., Inc., P.O. Box 506, Muskegon	Barry Cass Gratiot Emmet Wayne Hillsdale Muskegon

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location (County)</u>
O.	
Oakland Sand & Gravel Co., 741 Glengary Road Route 3, Walled Lake	Oakland
Otisville Stone Co., 5300 N. Dort Hwy., Flint (Howard & Bigelow Partners) Fred M. Ott, Bridgman	Genesee Berrien
P.	
Packard Supply Co., 4536 Packard Road, Ypsilanti Cy Page, Manitou Beach	Washtenaw Lenawee
Edward Palmer & Son, 2527 E. South, Jackson	Jackson
John Parks Sand & Gravel, R.F.D. 1, Perry	Shiawassee
Pekaar & Van Doorn, 2774 S. Beltline S.W. Grand Rapids 9	Kent
Peninsula Asphalt & Construction Co. Route 4, Box 185, Traverse City	Grand Traverse
A.D. Pennock, Nashville	Barry
*William Perry & Son, Peffer S., Harbor Springs	Emmet
Peterhans Bros. Sand & Gravel, 506 Pear St. Caro	Tuscola
Harold Peters, Washed Sand & Gravel, Decker	Sanilac
Harry Pickitt, 409 Hubbard St., Allegan	Allegan, Barry, Calhoun, Branch, Cass, Clinton, Ionia, Kalamazoo, Kent, Lenawee, Livingston, Muskegon, Newaygo, Otsego, Ottawa, Roscommon, St. Joseph, Van Buren, Washtenaw
Pine Sand & Gravel, 2690 Imlay City Rd., Lapeer	Wayne, Wexford Lapeer
Porter Sand & Gravel Co., P. & H. Cement Products, Route 2, Tecumseh	Lenawee
John Post & Sons, R.F.D. 2, Swartz Creek	Genesee
H.F. Postma, 3643 28th St., S.W., Grand Rapids	Kent
Producers Core Sand Corp., 323 Warren Bldg. Michigan Center, Ind.	Berrien
Pryor Bros., 725 N. Cochran, Charlotte	Eaton
R.	
Ray Industries, Inc., P.O. Box 165, Oxford	Macomb
Bernie Rief, Fraser	Macomb
Riverside Sand & Gravel Co., Route 5, Grand Rapids 4	Kent

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location (County)</u>
R. (contd)	
*Kay Robinson, Contractor, 4491 Vrooman Road Jackson	Jackson
Walter Rosevear Pit, West Branch	Ogemaw
Rosteck Contractors, 15921 Fourteen Mile Road, Fraser	Macomb
Art Russell's Concrete Products, Hillsdale	Hillsdale
S.K. Rogers, 48301 Sugar Bush Rd., New Baltimore	Macomb
S.	
Saginaw Core Sand Co., Saginaw	Saginaw, Genesee, Midland, Alger
Mrs. Hilma Samuelson, Chatham	
John R. Sand & Gravel Co., 1865 Indianwood Rd. Lake Orion	Oakland
Sand Products Corp., 2489 First Nat'l. Bank Bldg., Detroit	Manistee, Muskegon
Justus Scelenberger, 1545 W. Fry Road, Burt	Genesee
E.L. Schwaderer, Cass City	Tuscola
Scio Gravel Co., 2911 W. Delhi, Box 233, Ann Arbor	Washtenaw
Shenk Gravel Co., Donald Shenk, Sr., Durand	Shiawassee
Lawrence B. Skinner, 4536 Packard Rd., Ypsilanti	Washtenaw
Slaters Bald Mtn., 53055 N. Parke St., Pontiac, 16	Oakland
Smith Sand and Gravel Co., Inc. 65985 Mound Road, Romeo	Macomb
South Haven Sand Co., P.O. 290, Grand Haven	Van Buren
Southern Michigan Materials Co., Bryan, Ohio	Hillsdale
Stamm Bros. Gravel Co., Route 1, Adrian	Lenawee
Standard Sand Co., 14201 Lake Shore Ave., P.O. Box 290, Grand Haven	Ottawa
Gordon D. Stevick, 424 Patty Ave., Jackson	Jackson
Frank H. Stoerk, Pierson	Montcalm
Straits Aggregate & Equipment Corp., Box 569, East Tawas	Presque Isle
H. Stukey, Coldwater	Branch

Commercial Sand and Gravel Producers (contd.)

Name and Address

T.

The Tabor Co., 125 Front Ave., N.W. Grand Rapids
 Lawrence Tamlyn, 125 Burdette St., St. Ignace
 Tecumseh Gravel Co., P.O. Box 496, Tecumseh
 Thompson Sand & Gravel, 48399 W. 7 Mile Road
 Northville
 Lamar Thumm, 117 S. Grove St., Ypsilanti
 *Twin Lakes Sand & Gravel Co., Riverdale

U.

Underwood Sand & Gravel Co., 16525 Woodward Ave.,
 Detroit 3
 C. Utterback, R.F.D. #2, Mt. Pleasant
 Union City Gravel Co., Union City

V.

Robert Van Camp, Route 2, Peck Road, Crosswell
 Shirley Van Deusen, Route 1, Standish
 *Van Enkevorts Bros., Bark River
 Vaughans Sand & Gravel Co., 2685 Deckerville Rd.,
 Caro
 Vermontville Gravel Co., Karl S. Benson,
 Route 1, Vermontville
 H.R. Vernon, Route 2, Fennville

W.

Ben Waanders, Route 5, Allegan
 Aubrey Wagner, Harbor Beach
 Wakeman & Neva Ryns, Route 1, Coloma
 Lyle J. Walker Sand & Gravel, 21040 Coolidge Hwy.
 Detroit 35
 Wallace Stone Co., Hersey Sand & Gravel Div., Hersey
 Walling Gravel Co., P.O. Box 52, St. Johns
 Walsh Sand and Gravel Co., 13th St., Menominee
 F.S. Ward, Route 1, Clarkston
 Wayne Sand & Gravel Co., 40330 Tyler Road,
 Wayne
 Ronald Weaver, Route 1, Owosso
 West Lansing Gravel Co., 1911 Pattengill Ave.
 Lansing
 West Shore Constr. Co., Zeeland
 Wexford Gravel Co., P.O. Box 472, Cadillac
 I.L. Whitehead Co., Sault Ste. Marie

Pit Location (County)

Clinton, Gratiot,
 Ionia, Lake, Manistee.
 Mackinac
 Lenawee
 Wayne
 Washtenaw
 Montcalm

Oakland, Macomb
 Isabella
 Branch

Sanilac
 Arenac
 Delta

Tuscola

Eaton
 Allegan

Allegan
 Huron
 Berrien

Oakland
 Osceola
 Clinton
 Menominee
 Oakland

Wayne
 Various

Ingham
 Allegan, Eaton, Ottawa,
 Kent, Newaygo, Oceana
 Wexford
 Baraga, Chippewa, Luce
 Schoolcraft

Commercial Sand and Gravel Producers (contd.)

Name and Address

W. (Contd.)

White Lake Gravel, Inc., 622 S. Main, Clawson
 Whittaker & Gooding Co., 5800 Cherry Hill Rd.,
 Ypsilanti
 John Woerner, Adrian
 Wolverine Contractors, Inc., 19440 James Couzens
 Highway, Detroit 35

Y.

John G. Yerington, Route 3, Box 34, Benton Harbor
 Youngs Sand & Gravel, Harold-George Young
 9095 S. Huron River Drive, Ypsilanti

Z.

Zahns Sand & Gravel, 2315 Ellsworth Rd.
 Ann Arbor

*Producers with no output or failing to report for 1955

Pit Location (County)

Oakland
 Washtenaw
 Lenawee
 Wayne

Barry, Berrien, Allegan
 Cass, St. Joseph,
 Van Buren

Washtenaw

Washtenaw

STONE PRODUCERS

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Afton Stone and Lime Co. Afton, Michigan	Limestone, crushed	North of Afton Sec. 25, T.35N., R.2W. Cheyboygan, County
H.C. Albaugh N. Parkview Marshall, Michigan	Sandstone	Marshall Sec.29, T.2 S., R.6W. Calhoun County
Arenac County Road Commission	Limestone, crushed (non-commercial)	Northeast of Au Gres Sec.5, T.19N., R.7E. Arenac County
Bay County Road Commission	Limestone, crushed (non-commercial)	North of Omer Sec.3, T.19N., R.5E. Arenac County
Charlevoix Lime & Stone Company Charlevoix, Michigan	Limestone, crushed	West of Charlevoix Sec.29, T.34N., R.8W. Charlevoix County
F.G. Cheney Limestone Company, Incorporated	Limestone, crushed and dimensional	West of Bellevue Sec.20, T.1N., R.6W. Eaton County
Chemstone Corporation 1122 Leader Bldg. Cleveland 14 Ohio	Limestone, crushed	Sec.2, T.33N., R.8E. Presque Isle County
Drummond Dolomite, Inc. P.O. Box 688 Sheboygan, Wisconsin	Dolomite, crushed	Western end Drummond Is. Sec.24, T.42N., R.5E. Chippewa County
Fiborn Limestone Co. Saulte Ste. Marie Ontario, Canada	Limestone, crushed	Sec. 16, T.44N., R.7W. Mackinac County
Earl A. Flock 50 Waubascon Rd. Battle Creek, Michigan	Sandstone	East of Battle Creek Sec.22, T.2S., R.7W. Calhoun County
The France Stone Co. 1800 Toledo Trust Bldg. Toledo 14 Ohio	Dolomite, crushed	Monroe Sec.7, T.7S., R.9E. Monroe County
Gogebic County Road Commission	Miscellaneous stone (non-commercial)	Gogebic County
Houghton County Road Commission 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 River Quarry, Corp. Flat Rock, Michigan	Dolomite, crushed	Sec.36, T.4S., R.9E. Wayne County
Inland Lime and Stone Co. Manistique, Michigan	Limestone, crushed	North of Hunt Spur Sec 6, T.42N., R.12W. Mackinac County
Iosco County Road Commission	Limestone, crushed (non-commercial)	Northeast of Au Gres Sec.24, T.20N., R.7E. Iosco County
John C. Jeffery Box 107 Parma, Michigan	Limestone, crushed	Northeast of Parma Sec.19, T.2S., R.2W. Jackson County
A. Lindberg and Sons, Inc. Ishpeming, Mich.	Dolomite, crushed	Sec.8, T.47N., R.25W. Marquette County
The Metro-nite Company 3523 W. Silver Spring Dr. Milwaukee 9 Wisconsin	Dolomite, crushed	Near Felch Sec.26, T.42N., R.28W. Dickinson County
Michigan Foundation Quarry Company Trenton, Michigan	Limestone, crushed	Trenton Sec.7, T.4S., R.11E. Wayne County
Michigan Limestone Div. U.S. Steel Corporation 170 East Woodward Ave. Rogers City, Michigan	Limestone, crushed	Near Rogers City Sec.23, T.35N., R.5E. Presque Isle County and
" " "	Dolomite, crushed	near Cedarville Sec.10, T.42N., R.1E. Mackinac County
Michigan Silica Co.	Sandstone, crushed	near Rockwood Sec.15, T.5S., R.10E. Wayne County
Michigan Stone Company R.F.D. #2 Ottawa Lake, Michigan	Dolomite, crushed	East of Ottawa Lake Sec.25, T.8S., R.6E. Monroe County
Monroe County Road Commission Monroe, Michigan	Dolomite, crushed (non-commercial)	East of Dundee Sec.13, T.6S., R.7E. Monroe County
Onaway Stone Company Onaway, Michigan	Limestone, dimensional	North of Onaway Sec.5, T.34N., R.2E. Presque Isle County

Stone Producers - contd.

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
The Original Sandstone Quarry Napoleon, Michigan	Sandstone.	East of Napoleon Sec.6,T.4S.,R.2E. Jackson County
Penn-Dixie Cement Corp. 60 E. 42nd St. New York 17 New York	Limestone, crushed	West of Petoskey Sec. 3, T.34N.,R.6W. Emmet County
Ray Sandstone Quarry 303 Nottawaseppee Napoleon, Michigan	Sandstone	East of Napoleon Sec.6,T.4S.,R.2E. Jackson County
Star Sandstone Company Box 102 Napoleon, Michigan	Sandstone	East of Napoleon Sec.31,T.3S.,R.2E. Jackson County
Superior Rock Products Company Sagola, Michigan	Dolomite, crushed Mica Schist, crushed Feldspar, crushed	East of Randville Sec.35,T.42N.,R.30W. Secs. 19 and 30,T.42N., R.29W. Dickinson County
Thornton Construction Co. Hancock, Michigan	Dolomite, crushed	Northeast of Alston Sec.23,T.51N.,R.35W. Houghton County
The Wallace Stone Company Bayport, Michigan	Limestone, crushed and dimensional	Southeast of Bayport Sec.6,T.16N.,R.10E. Huron County
Wyandotte Chemicals Corporation Wyandotte, Michigan	Limestone, crushed	Alpena Sec.24,T.31N.,R.8E. Alpena 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 "MICHIGAN STRAY"	SHALE, gypsum, anhydrite, sandstone SANDSTONE	0-500 0-80	GYPSUM 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
	ELLSWORTH - ANTRIM	SHALE, limestone	100-950	SHALE, GAS
DEVONIAN	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
	BOIS BLANC	DOLOMITE, CHERTY DOLOMITE	0-1000	
SILURIAN	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