

STATE OF MICHIGAN
DEPARTMENT OF CONSERVATION
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MICHIGAN'S MINERAL INDUSTRIES 1959



DECEMBER 1960

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MINERAL RESOURCES AND PRODUCTS

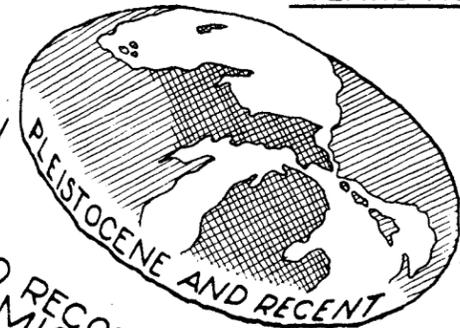
1 MILLION YEARS AGO

WATER
SAND
GRAVEL
PEAT
MARL
CLAY

GYPSUM
LIMESTONE
SHALE
SALT
BRINE
OIL
GAS

COPPER

IRON



NO RECORD
IN MICHIGAN

MESOZOIC
and
CENOZOIC

220 MILLION
YEARS AGO

PALEOZOIC

540 MILLION YEARS AGO

WORLD-WIDE
LOST INTERVAL

1000 MILLION YEARS AGO

PRECAMBRIAN

2000 MILLION YEARS AGO

ARCHEAN

MICHIGAN'S
ROCK COLUMN AND TIME SCALE

DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION

EARTH ORIGIN 5000(?) MILLION YEARS AGO

MICHIGAN
MINERAL INDUSTRIES

1959

by

Harry O. Sorensen
Emery T. Carlson

FOREWORD

This report is a record of the Michigan Mineral Industry for the calendar year 1959. Metallic and fuel statistics were compiled by the Michigan Geological Survey. Nonmetallic statistics were compiled in cooperation with the United States Bureau of Mines. The preliminary value of mineral production for 1960 was prepared by the Bureau of Mines.

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THE MINERAL INDUSTRY OF MICHIGAN IN 1960*

(Preliminary)

Mineral production in Michigan in 1960 was valued at \$427 million, according to the Bureau of Mines, United States Department of the Interior. The 12 percent gain over 1959 resulted largely from increased output of iron ore and petroleum. A lag in building construction resulted in a decrease in shipments of cement and gypsum. Output of the other major mineral commodities--sand and gravel, crushed stone, and chemicals derived from well brines--did not vary much from the previous year. Iron ore regained first place in value displacing cement which was followed by petroleum, sand and gravel, copper, salt, and stone.

METALS

Metallic minerals accounted for nearly 31 percent of the total value of the State mineral production compared to 27 percent in 1959.

Copper. - Production of copper in terms of recoverable metal was about the same as in 1959, although value increased 5.6 percent. The preliminary average weighted price in 1960 was 32.0¢ per pound compared to 30.7¢ in the previous year. A labor strike at the White Pine Mine that started October 28, 1959 was settled February 22, 1960. All other copper producers operated throughout the year. Operating companies included Calumet & Hecla, Inc., Copper Range Company, White Pine Copper Company (a wholly owned subsidiary of Copper Range Company), and Quincy Mining Company.

Iron Ore. - Iron-ore shipments were estimated at 10,750,000 long tons compared to 7,247,449 in 1959. Value of shipments increased over \$31 million. Production increased in the first part of the year in anticipation of increased business due to the 1959 steel strike. As industrial activity failed to keep pace with expectations and the steel production rate dropped iron-ore shipments were curtailed after mid-year.

Shipments of concentrates from jaspilite, a low-grade nonmagnetic ore, continued to increase and in 1960 represented about 10 percent of the State total iron-ore shipments. In September the Humboldt Mining Company (jointly owned by Cleveland-Cliffs Iron Company and Ford Motor Company) opened a plant to produce iron-ore pellets from jaspilite. The plant has an annual capacity of 650,000 tons of pellets and is the second facility in the State that produces pellets from low-grade material.

Dates of first and last lake shipments of iron ore in 1960 from Michigan and Wisconsin ports were: Ashland, April 17 - November 6; Escanaba, March 28 - November 17; Marquette, April 16 - November 26; Superior, April 12 - November 18.

NONMETALS

Nonmetallic mineral production (except mineral fuels) was fractionally less than in 1959 and was valued at nearly a quarter of a billion dollars. Materials used by the construction industry (cement, clay, gypsum, sand and gravel, stone) accounted for nearly three-fifths of the total value of nonmetallic minerals. Chemicals derived from well brines (bromine, calcium-chloride, magnesium compounds, potassium, salt and lime) comprised the remainder and were used chiefly by the chemical industry.

*Prepared December 15, 1960 by Donald F. Klyce, Commodity-industry Analyst, under the supervision of Samuel A. Gustavson, Supervising Commodity-industry Analyst, Minneapolis Office of Mineral Resources, Region V, Minneapolis, Minn.

MINERAL FUELS

Mineral fuels accounted for nearly 12 percent of the value of the State mineral production compared to 9 percent in 1958 and 1959. Much of the increase was due to greatly expanded petroleum production which was nearly 50 percent larger than in 1959. Continued development of the Albion-Pulaski-Scipio trend in Calhoun, Hillsdale and Jackson counties resulted in petroleum production of about 8 million barrels from fields in this area compared to 2 million barrels in 1959. Total State production in 1960 was estimated at 15,386,000 barrels compared to 10,439,000 in the previous year. The output of natural gas liquids and natural gas were respectively 7 percent and 3 percent larger than in 1959. Peat, although classified as a mineral fuel, was used mainly for soil conditioning. Production was 4 percent higher than in 1959.

Mineral Production in Michigan, 1960 (1)
(Estimated)

Mineral	Thousand Short Tons (unless other- wise stated)	Value (thousands)
Cement:		
Portland - thousand 376-pound barrels	19,300	\$ 66,600
Masonry - thousand 376-pound barrels	1,200	4,700
Clays	1,800	1,950
Copper (recoverable content of ores, etc.) in short tons	56,000	35,840
Gypsum (crude)	1,517	4,790
Iron ore (usable) thousand long tons	10,750	94,000
Lime	1,170	16,000
Manganiferous ore (5 to 35 percent Mn)	147	(2)
Natural gas - million cubic feet	19,500	4,490
Peat	200	2,450
Petroleum (crude) - thousand 42-gallon barrels	15,386	44,312
Salt (common)	4,150	34,800
Sand and gravel (3)	47,000	40,500
Stone	31,000	32,000
Value of items that cannot be disclosed:		
Bromine, calcium-chloride and calcium- magnesium chloride, gem stones, magnesium compounds, natural-gas liquids, potassium salts and values indicated by footnote (2)	-	52,171
Total Michigan (4)	-	\$427,000

- (1) Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
- (2) Figure withheld to avoid disclosing individual company confidential data.
- (3) Includes friable sandstone.
- (4) Total adjusted to eliminate duplicating the value of clays and stone.
- (5) Revised figure.

1960 NEWS ITEMS

ORGANIZATIONAL DEVELOPMENTS:

IRON ORE

The trend to pelletizing taconite, jaspilite and low-grade iron ores for use by the steel industry was traced by the Wall Street Journal. It predicted that capacity for pellet making will top 14 million tons for 1960, and reach 30 million tons by 1964. Because pelletizing boosts iron yield of low-grade ore above that of good domestic ore, it steps up blast furnace efficiency in steel mills almost 20 percent. Therefore, repercussions are being felt in the mining industry, particularly in the Mesabi range and neighboring ranges in Northern Wisconsin and Michigan. They formerly furnished all but about 20 percent of the country's requirement. Now, up-graded pelletized ore and increased imports of foreign ore (the latter representing 33.7 percent of ore consumption during the first half of the year) are taking business away from the older mines.

Pickands Mather and Company, on the Gogebic Iron Range, has two crushing and screening plants under construction. The project is part of a program aimed at up-grading ore from the Gogebic Range to make it more competitive. The plants are being built at the Newport and Geneva mines near Ironwood.

The Bristol mine, near Crystal Falls, shut down for two weeks during January 1960 for installation of a new hoist to accommodate the recent 250 foot deepening of the shaft to the 1900 foot level. Formerly operated by Oglebay, Norton Company and closed in 1932 because of the depression the mine was taken over by Inland Steel in 1948 and dewatered. The first ore was hoisted a year later. A red hematite ore, not previously worked, is now being produced.

Humboldt Mining Company, owned jointly by the Cleveland Cliffs Iron Company and the Ford Motor Company doubled its concentrate plant capacity to 640,000 tons of flotation concentrate per year. Official dedication of the new plant was on September 16. Two parallel lines of Allis Chalmers grate kiln systems were installed along with a 850 foot heavy duty conveyor system using 1852 feet of belting, the initial beneficiation plant started operation in 1954 producing 320,000 annual tons of flotation concentrate. Concentrate is shipped to Lower Lake steel mills and sintered.

Early in the year the M. A. Hanna Company notified owners of about a dozen homes on mining property near Iron River that their homes would be moved by November 1. The houses were threatened by approaching surface cavings from underground operations of the Company's Hiawatha mine.

M. A. Hanna's new 2,745 foot Homer-Wauseca shaft near Mineral Hills is one of the few U.S. mines having the automatic Koepe hoist. The headframe, with green corrugated plastic windows, is 130 feet high. It has an elevator which carries passengers to the top floor, 110 feet, where the Koepe hoist motors are located. The two 14-ton capacity skips, moving at 1900 feet per minute, can lift 800 tons of ore per hour, far beyond the productive capacity of the mines. One skip will hoist ore from the Homer mine, the other, the Wauseca mine - a unique arrangement made necessary by different fee ownerships which require that the ore from the two mines be kept entirely separate from each other.

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

PORTLAND CEMENT

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

Facilities to increase the finish-grind capacity of the Alpena mill of Huron Portland Cement Company were to have been completed by mid-year. This project will add 7000 bbls. of finish-grind capacity, an increase of more than 15 percent, bringing daily total to 53,000 bbls. The previously announced harbor development project is designed to increase the mill shipping capacity at Alpena.

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

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

STONE

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

Inland Lime and Stone Company have in operation a new sinter sand limestone plant at Port Inland. Production of sinter sand limestone, of minus one-eighth inch size, will eventually comprise about 10 percent of total plant production. The fluxing limestone is used at the company's Indiana Harbor steel plants where the sinter sand is combined with fuel and finely ground ore and then charged in a sinter machine which produces clinkers which in turn, are charged into blast furnaces.

There is a likelihood that the sandstone industry may be revived in the Copper Country. Loads of white and red banded stone have been reported leaving the Arnheim area for points in lower Michigan and elsewhere. Six projects in Marquette County are scheduled to utilize the sandstone. In early 1880 sandstone quarrying in the Keweenaw Peninsula area was a booming industry and the original operator of the Arnheim quarry was Superior Natural Redstone Quarries.

SAND AND GRAVEL

Twenty companies located in Southern Michigan have organized the Michigan Sand and Gravel Producers Association with headquarters at 1305 Industrial Building, Grand and Washington Blvds., Detroit 26, Michigan. President Lyle J. Walker announced: "We plan to promote greater understanding and cooperation between sand and gravel users and the industry." The new group will aid in establishing and maintaining standards for aggregate materials used in concrete and bituminous construction, and expects to promote legislation in the best interest of the public.

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

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

SALT

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

GYPSUM

National Gypsum Company's newest and automated gypsum plant at Lorain, Ohio went into production of wallboard, 16 inch lath, and plaster. The plant features a dust collection system that returns dust to the production process. The company's Tawas City quarry supplies the approximate 3000 tons of raw gypsum required each week.

OTHERS (Lime, periclase)

At the Dow Chemical Company plant in Ludington an Allis Chalmers Lepol-type grate kiln is being used for the first time in the United States for lime production. The 11 1/2' x 160' kiln has a capacity of 600 tons of lime per day. ACL kilns have been used by cement producers for several years. The new kiln unit calcinates northern Michigan limestone to chemical grade lime, a basic raw material at the Ludington plant.

Kaiser Refractories and Chemicals completed a new \$3 million periclase plant at Midland. Periclase, a crystalline, hard-burned magnesia, is one of the raw materials used in the manufacture of refractory brick mixes. Other products include magnesite and refractory-grade magnesia. The facilities include a 275-foot rotary kiln and associated filtering and handling equipment. The company obtains magnesium hydroxide slurry from Dow Chemical Company. Annual capacity is reported as 45,000 tons of periclase and refractory magnesia.

Wyandotte Chemical Corporation is proceeding with major improvements in its limestone calcining facilities at Wyandotte. Changes in the burning process are expected to improve the quality and increase the available capacity of 1.5 million tons of high-grade lime. The first unit is scheduled to be in operation early in 1961.

PETROLEUM

The year 1960 witnessed a strong upturn in Michigan petroleum activities as oil and gas production registered their best annual total since 1950 and 1948, respectively. Spearheaded by the Albion-Scipio field of Southern Michigan, which yielded nearly one-half of the state's total output, oil production jumped 50 percent above 1959 to an estimated 15,386,000 barrels. By the end of December, oil wells were producing at a yearly level of 18,000,000 barrels. Natural gas production rose to almost 19 billion cubic feet, some 20 percent over the year before.

RESEARCH, TECHNOLOGY:

Research in iron ore beneficiation, in blast furnace and direct reduction process and on mining methods will be conducted by the U.S. Bureau of Mines during the fiscal year commencing July 1, 1960. It is hoped that results will improve competitive positions of Lake Superior ores.

U.S. Bureau of Mines long-range fundamental aggregate research continues with a view toward solving problems in the field of explosives, methods of fragmentation, and the characteristics and damaging effects of blasting vibration on structures, the physics of rock breakage using both standard and special equipment, and mining and processing methods.

LEGISLATION:

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

PUBLICATIONS:

Publication of the first two volumes of the three-volume Mineral Yearbook for 1959 was announced December 31 by the Bureau of Mines, United States Department of the Interior. Both Volume 1, "Metals and Nonmetals (except fuels)" and Volume 2, "Fuels", can be purchased from the Government Printing Office, Washington, D. C. The third volume titled "Area Reports" will be issued shortly, the Bureau said.

A publication "Iron Ore Resources of the United States including Alaska and Puerto Rico, 1955" by Martha S. Carr and Carl E. Dutton, Geologic Survey Bulletin 1082-C, Geological Survey, U. S. Department of the Interior (1959), is available for 30 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. This pamphlet is a survey of iron ore resources of the United States with selected bibliography and tables of iron ore reserves and potential ore.

A valuable reference work on the gypsum and anhydrite industry in the United States and Puerto Rico has been published as Bulletin 1105 of the U. S. Geological Survey. The authors, Charles F. Withington and Marion C. Jaster, have researched and annotated more than 400 references.

Other valuable reference publications of the Bureau of Mines includes special publication titled "List of Publications issued by the Bureau of Mines from July 1, 1910 to January 1, 1960, with Subject and Author Index", by Hazel J. Straton and Bulletin 585, "Mineral Facts and Problems," 1960 edition by the Bureau of Mines staff. Both are available at a cost of \$4.25 (paper bound) and \$6.00 (cloth bound), respectively, by writing the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

MICHIGAN
MINERAL PRODUCTION
1959
GENERAL REVIEW

The value of Michigan mineral production totaled \$385,321,927 in 1959, an increase of 10 percent from the 1958 figure. Record highs were established in the value of shipments of cement, gypsum, lime, peat, sand and gravel, and natural salines. Cement ranked first in value followed by iron ore, natural salines, sand and gravel, salt, copper, petroleum and stone. Metallic mineral value decreased 5 percent and fuel value increased 14 percent while nonmetallic minerals increased 17 percent to a new high.

Commodities in the nonmetals group, mainly construction and chemical materials, represented about two-thirds of the state's output of minerals.

The annual value of iron ore and copper prior to 1900 represented approximately 90% of the total value of all mineral products. The years 1895 to 1900, however, were important years for Michigan's non-metallic industries, as the first successful portland cement plant was begun in 1896. Increasing quantities of marl, clay, limestone, and shale were required. The development of the salt industry at Detroit beginning with the year 1895 resulted in increased production of that product.

The non-metallics grew slowly but steadily in value from 1900 to 1914, but following that year growth was rapid due first to demands for war materials, and subsequently to the great era of industrial expansion which began in 1922, with constantly increasing demands for construction and road building materials. Important new uses and new products were developed which added greatly to the mounting value of non-metallic production. By 1929 this had reached a total of \$71,000,000.

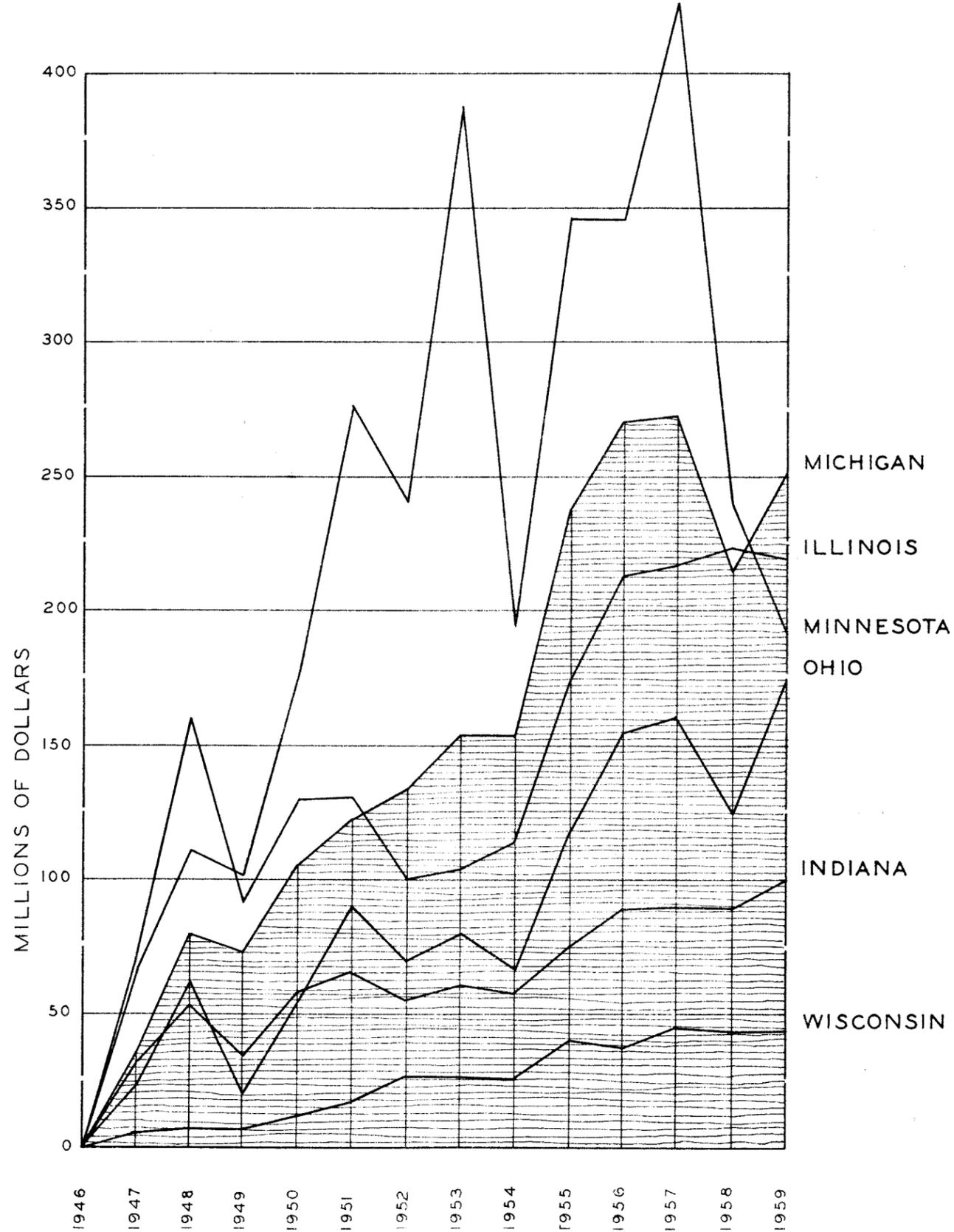
In 1921, 1924, and 1927 the values of non-metallic minerals and mineral products surpassed those of iron ore and copper, and beginning with 1930 the non-metallic definitely assumed the lead.

In volume of mineral production in 1959 in the United States, Michigan ranks: First in salt, peat, gypsum, and magnesium compounds; Second in iron ore, sand and gravel, and bromine; Fourth in cement and marl; Fifth in copper; Sixth in stone.

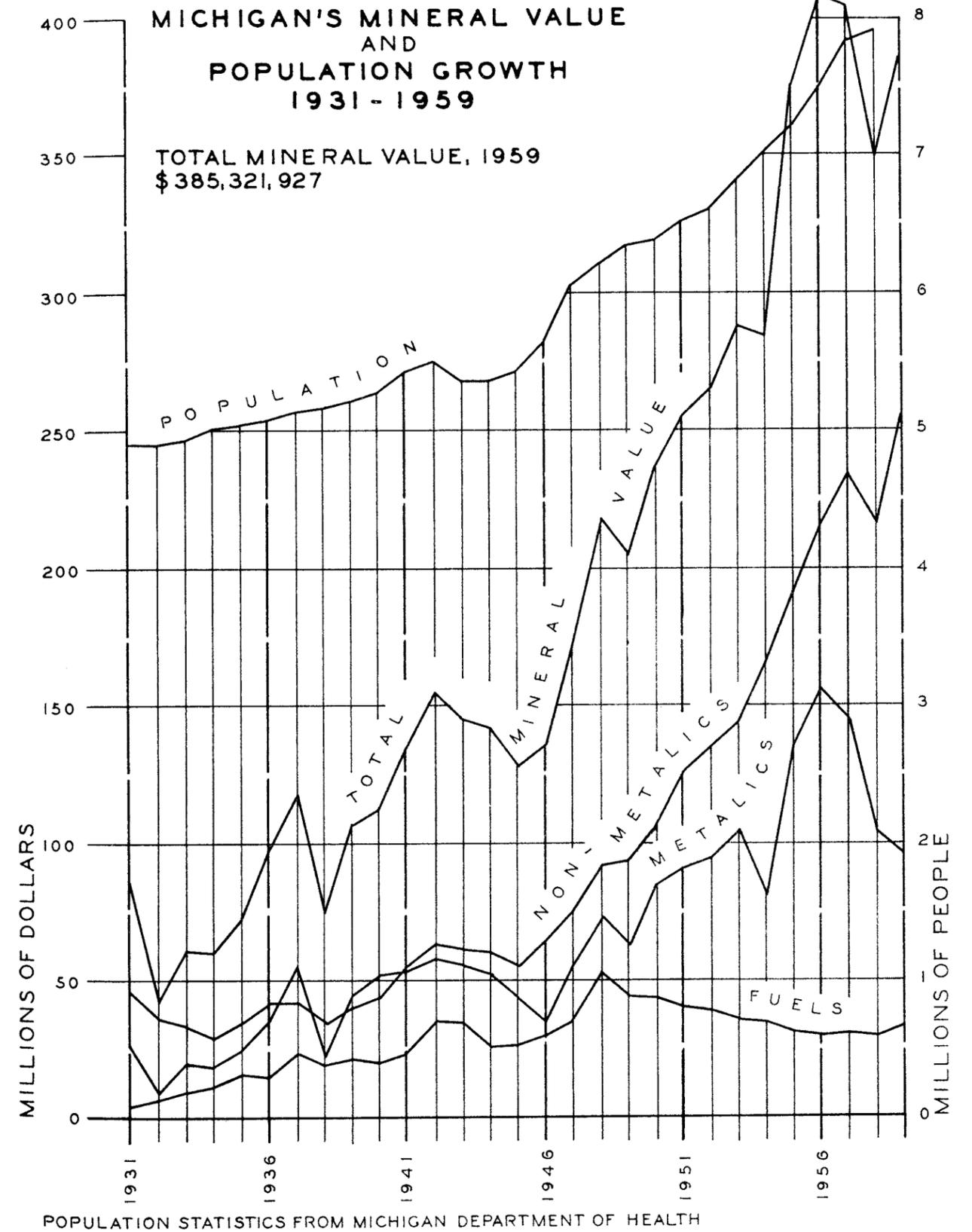
The following table gives the value of Michigan Mineral Production in 1959:

	Value	Per Cent
Nonmetallics	\$254,240,437	66.0
Metallics	97,362,759	25.3
Fuels	33,718,731	8.7
	\$385,321,927	100.0

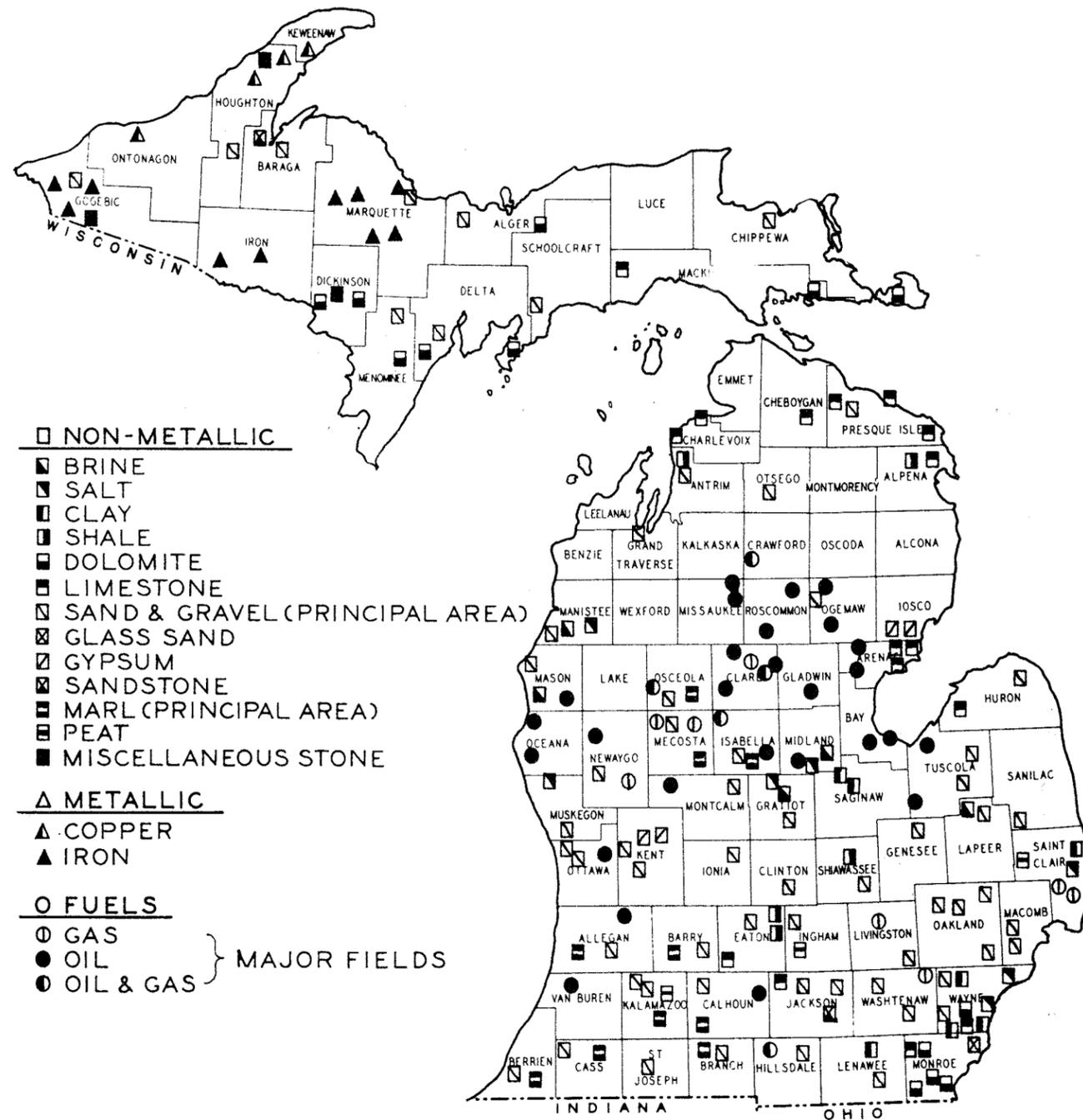
GROWTH IN VALUE OF THE MINERAL INDUSTRIES OF MICHIGAN AND BORDERING STATES 1946 TO 1959



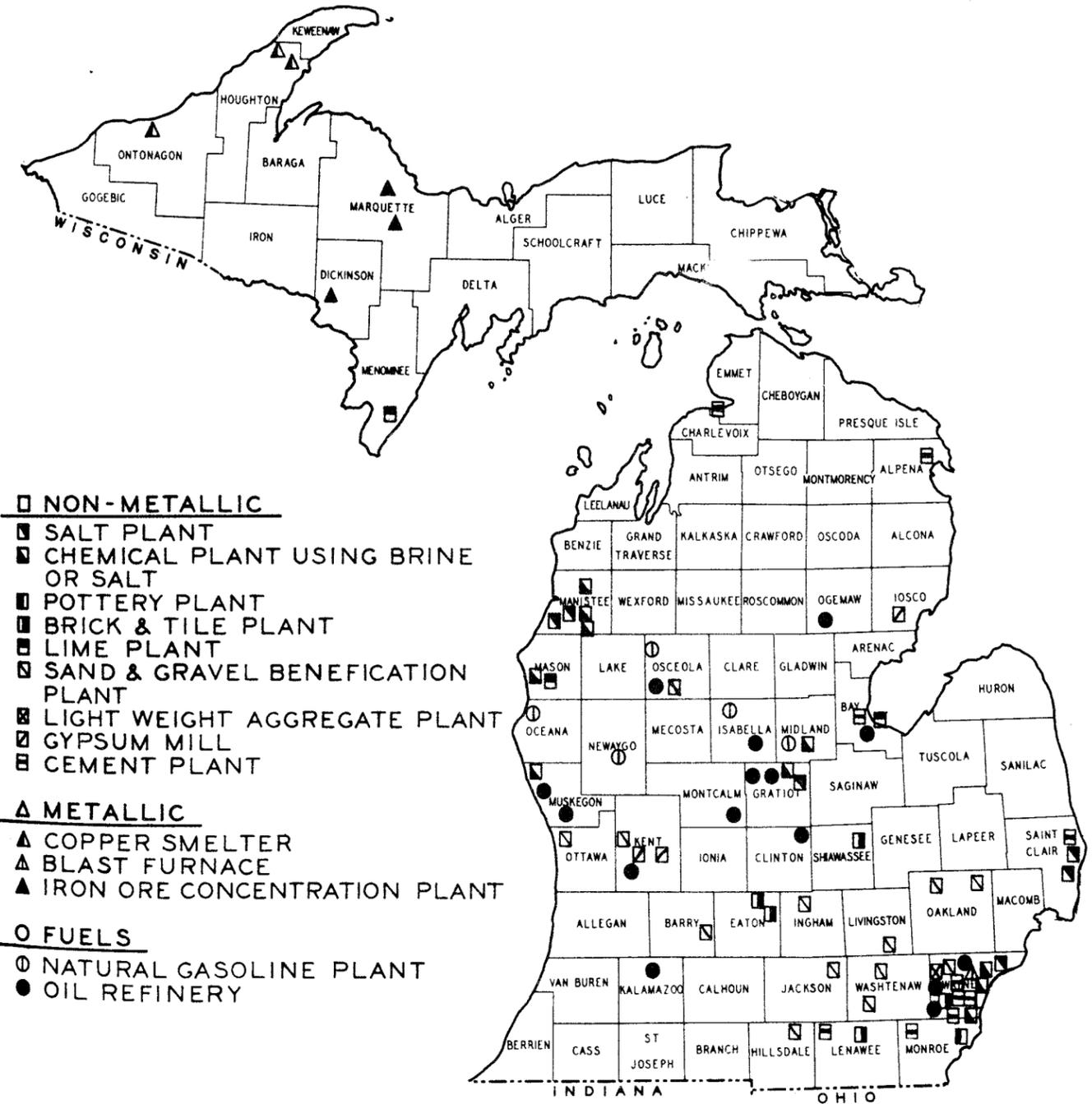
MICHIGAN'S MINERAL VALUE AND POPULATION GROWTH 1931 - 1959



PRODUCTION MAP, 1960



PROCESSING MAP, 1960



METALLIC MINERALS*

IRON ORE

Geological formation - Huronian. Iron ore is a mineral containing iron in such quantity, grade, and chemical combination as to make extraction commercially profitable. A large number of minerals are iron-bearing, however, only four, magnetite, hematite, limonite, and siderite, are important as a source of the metal. Hematite is the principal mineral utilized in Michigan. The most important iron-bearing rocks are of middle Huronian age. The iron ore is found as isolated masses in a rock called iron formation. Iron formation is a banded sedimentary rock commonly composed of layers of silica alternating with layers of iron minerals. Precambrian banded iron formations are found in a few other places on the earth's surface, principally Labrador - Quebec, Manchuria, India, Brazil and the Krivoy Rog area of Russia, but until recently such deposits have been little utilized for iron ore production excepting the United States.

The iron and steel industry experienced the longest strike in its history in 1959. Largely as a result of the 116 day shutdown which began July 14 the state's iron ore output was the lowest since 1938. Shipments of iron ore in 1959, from 22 underground mines and 6 open pits comprised 7,258,715 long tons (2,240 lbs.); a decrease of 12 per cent from 1958. Value of shipments dropped to \$62,117,507 and iron ore failed to rank first of minerals produced for the first time since 1938. Dates of first and last lake shipments of ore in 1959 from Michigan and Wisconsin ports were: Ashland - C & NW - Soo, April 24 - November 18; Escanaba - C & NW, April 10 - December 8; Marquette - DSS & A, April 27 - December 4; Marquette - LS & I, April 24 - December 12; Superior - GN, April 17 - December 20; Superior - NP - Soo, April 27 - November 29.

Underground mines increased working time at the start of 1959. M. A. Hanna Company stepped up its work to 6 days in its 4 iron mines in the Iron River district. Pickands Mather and Company's operations on the Gogebic Range increased to a full 4-day week of 16 shifts after working 12 shifts for some time. North Range Mining Company reopened the Penokee mine at Ironwood idled since March of 1958.

Pickands Mather and Company's Buck mine at Caspian reopened in April after having been closed since July, 1958. Opened on a trial basis, miners worked on a straight company account rate as in contract mines and agreed to maintain production at the rate prevailing when the mine closed.

The Republic Steel Corporation, as in the case of Pickands Mather and Company, was shipped from a single mine on the Menominee Range, the Tobin at Crystal Falls. The Tobin was closed October 16, 1957 except for pumping and maintenance through 1958. Repair work was begun on March 9, 1959. Republic leased the adjacent Genesee Mine on May 1959 and planned to mine and hoist through the Tobin shaft after driving a 300 foot drift.

The Bradley open pit mine at Iron Mountain closed upon the death of Edward C. Bradley. The mine, operated by Mr. Bradley and his sons, produced a high silica ore for the Jackson Iron and Steel Company. A total of 313,941 tons of ore was produced the last 11 years of its 20 year existence.

*Metallic statistics compiled by Michigan Geological Survey.

Expansion started early in 1959 on the Cleveland-Cliffs beneficiation plant at Humboldt to bring it up to a production level of 600,000 tons of pellets annually. Facilities include expansion of the crushing, grinding, and flotation section of the plant and construction of an agglomerating section at the concentrator. The company also planned a new pelletizing process for their beneficiation plant at Republic in the hopes of an eventual 2 million tons annual production of high grade pellets there. The Mather "A" mine at Ishpeming began installation of one of the world's largest slope conveyors. The belt will have a center distance of 3,791 feet and will carry 700 tons per hour of iron ore. The ore will be carried from the 12th to the 9th levels - an elevation of about 800 feet. When all materials have been excavated for the conveyor location in the mine and all succeeding sections of the belt have been added, a total of over 7,500 feet of belting will be operated on this unit.

The M. A. Hanna Company's new 20 foot circular shaft near Iron River was put in operation. This 2,740 foot shaft serves the Homer and Wauseca mines for an expected annual production of 1 million tons of iron ore. Hanna's new Groveland open pit mine and beneficiation plant, near Randville was in production. Estimated reserve on the 3,000 acres is 100,000,000 tons of ore. First shipment of 65% concentrate went to the Granite Steel Company in Illinois. This is the third iron ore beneficiation plant to be established in the Northern Peninsula.

Great Lakes Steel's \$100 million construction and expansion program was announced in February. A new 80-inch strip mill will be built on 70 acres adjoining the Detroit Edison Plant on River Rouge. This new installation is $\frac{1}{2}$ mile from the main plant at Ecorse. Completion is scheduled for the middle of 1961 - part of a \$300 million expansion program by the parent National Steel Corporation.

The Branch of Ferrous metals and Ferroalloys, U. S. Bureau of Mines, planned to publish the first progress report on the Bureau's integrated study of the iron ores of the Lake Superior District. The study includes investigation of geology, exploration and development on all major iron ranges in the Lake Superior District. Eventually each range will be sampled systematically to determine the mineral combination present and appropriate mineral dressing methods. As part of the study the Bureau is sponsoring research fellowships at the University of Minnesota and Michigan College of Mining and Technology on (1) diamond drilling; (2) the primary iron minerals of Lake Superior District; (3) flotation of iron-magnetic iron minerals present in taconite; and (4) flotation of undeslimed iron ores.

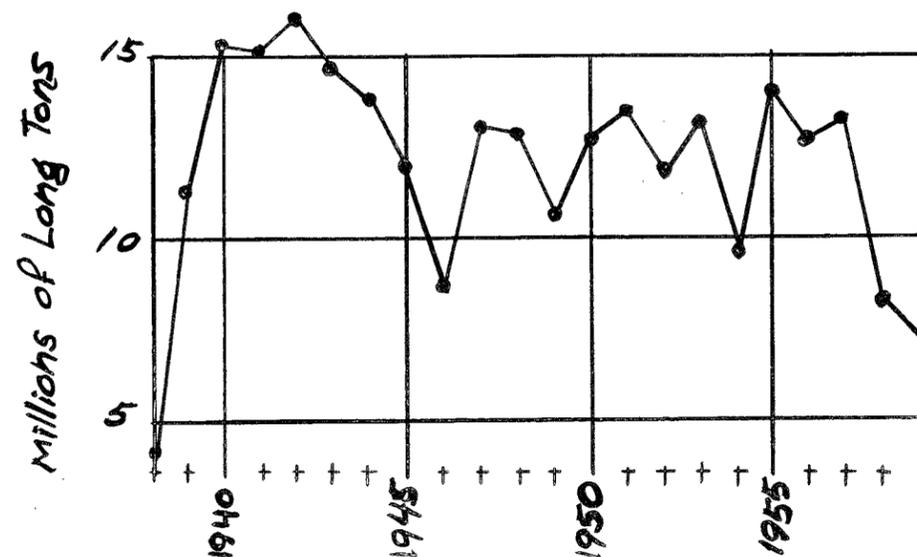
Iron Ore Shipments by Ranges, 1959

Range	Number of Mines		Iron Ore Shipments (Long Tons)		
	Underground	Open Pit	Direct Shipments	Siliceous	Total
Marquette	9	4	3,252,552	277,397	3,529,949
Menominee	8	2	2,471,376	6,604	2,477,980
Gogebic	5	-	1,250,786	-	1,250,786
	22	6	6,974,714	284,001	7,258,715

Shipments and Value of Iron Ore, 1955 - 1959

Year	Shipments (Long Tons)	Value
1955	14,148,123	\$ 107,890,161
1956	12,536,302	105,688,087
1957	13,126,746	110,605,689
1958	8,210,906	70,704,419
1959	7,258,715	62,117,507

IRON ORE SHIPMENTS 1938 - 1959



COPPER

Geological formation - Keweenawan. Copper is present in many horizons throughout the Keweenawan series which extends from the tip of the Keweenaw Peninsula south and westward into Wisconsin. The copper mines of Houghton and Keweenaw counties produce native copper from the lava flows and interbedded conglomerates, but the White Pine Mine, in Ontonagon County, produces mostly copper sulphide (chalcocite) from the Nonesuch Shale. Some copper is also produced in Houghton County by reclamation of stamp sand tailings of earlier mill operations.

Michigan produced 113,081,533 pounds of copper during 1959, a decrease of 7 per cent in production. The value of copper, however, increased 12 per cent to \$35,245,252 due to a higher average price. Average price used for calculating

the value of copper was 31.2 cents per pound in 1959 and 25.7 cents in 1958. At the beginning of 1959 the price of copper stood at 29 cents a pound unchanged since October 24, 1958. In early February, however, it advanced to 30 cents and on March 9 to 31½ cents. By July 15 the price dropped to 30 cents and remained there until early September. Thereafter, prices ranged from 30 to 33 cents until November 12, when a 33 cent price was established.

No silver was recovered from Michigan copper during 1959 as virtually all output was fire refined and marketed as "Lake Copper" at a slight price premium because of the silver content.

Copper Production by Counties, 1959

County	Mines	Reclamations	Copper Production (pounds)		
			Mines	Reclamation	Total
Houghton	3	2	11,832,002	8,857,231	20,689,233
Keweenaw	5	0	22,321,176	409,189	22,730,365
Ontonagon	1	0	69,661,935	-	69,661,935
TOTAL	9	2	103,815,113	9,266,420	113,081,533

The White Pine Copper Company shut-down its mine, mill, and smelter in November because of a strike. Copper Range Company shipped ore from the Champion mine and tailings from Redridge to their Freda mill throughout the year. Concentrates from the Freda mill were processed at the White Pine Company's smelter.

Calumet and Hecla, Inc. operated several of its mines and the Ahmeek mill, the Tamarack reclamation plant, and the Hubbell smelter throughout the year.

Quincy Mining Company operated their tailings reclamation plant. Concentrates were smelted at the Calumet and Hecla, Inc. smelter until March when Quincy Mining Company's Hancock smelter was put into operation. Reconditioning of Quincy Mining Company's No. 5 copper smelting at Ripley was completed in June and commenced handling concentrates on hand. On October 28th the Hancock smelter was shut-down for repairs and to build up stocks of concentrates. Operations were resumed in the latter part of November.

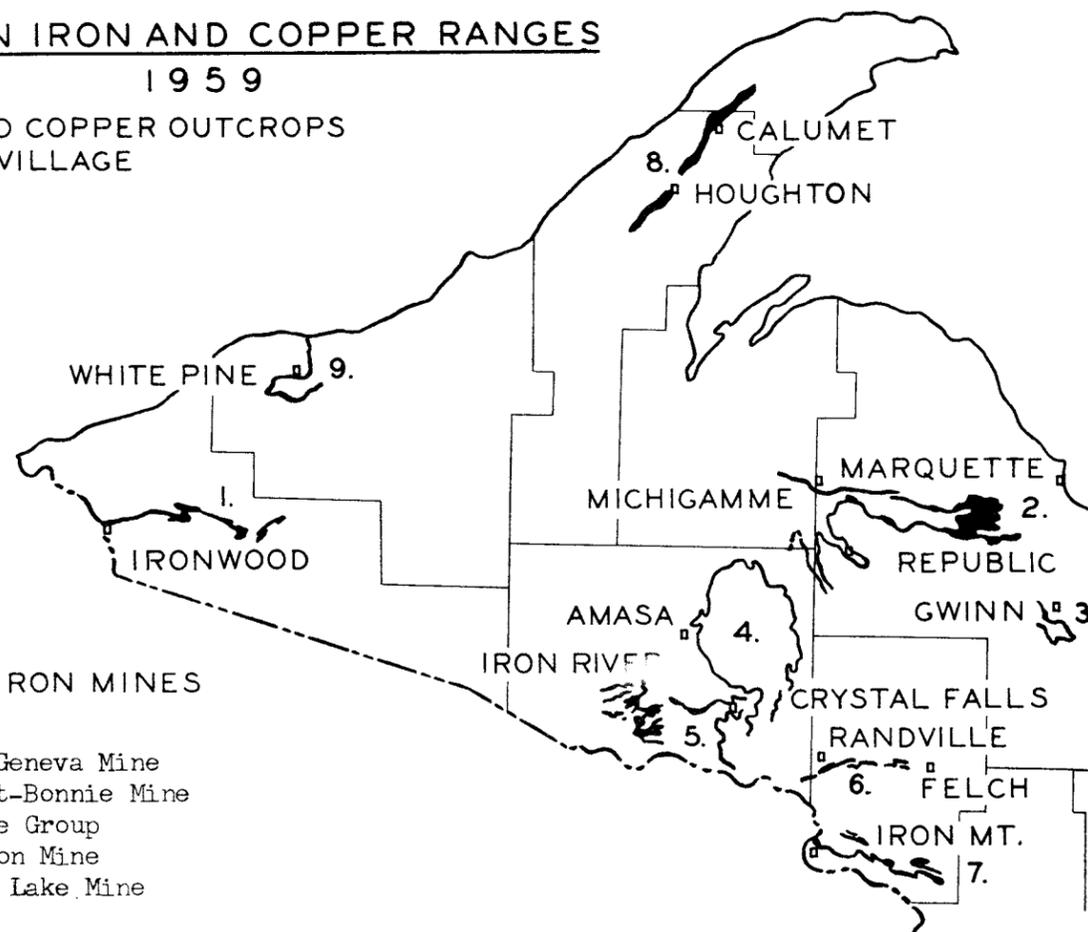
COPPER PRODUCTION 1955 - 1959

Year	Quantity (pounds)	Value
1955	99,996,160	37,489,560
1956	123,280,235	51,531,138
1957	113,647,143	33,629,326
1958	122,059,023	31,414,330
1959	113,081,533	35,245,252

MICHIGAN IRON AND COPPER RANGES

1959

- IRON AND COPPER OUTCROPS
 □ CITY OR VILLAGE



OPERATING IRON MINES

1. GOGEBIC

Davis-Geneva Mine
 Newport-Bonnie Mine
 Penokee Group
 Peterson Mine
 Sunday Lake Mine

2. MARQUETTE

Bunker Hill Mine
 Champion Open Pit
 Cliffs Shaft Mine
 Greenwood Mine
 Humboldt Open Pit
 Maas Race Course Mine
 Mather "A" Mine
 Mather "B" Mine
 Morris Mine
 Ohio-Webster Open Pit
 Republic Open Pit
 Tilden Open Pit
 Tracy Mine
 Volunteer-Maitland Open Pit

3. GWINN

(not active)

4. AMASA OVAL

(not active)

5. IRON RIVER - CRYSTAL FALLS

Baltic Group
 Book Mine
 Bristol-Youngstown Mine
 Cannon Mine
 Hiawatha Mine
 Homer-Cardiff-Minckler Mine

Sherwood Mine
 Tobin Mine
 Wauseca-Aronson Mine

6. FELCH

Groveland Open Pit

7. EAST MENOMINEE

(not active)

OPERATING COPPER MINES AND RECLAMATION PLANTS

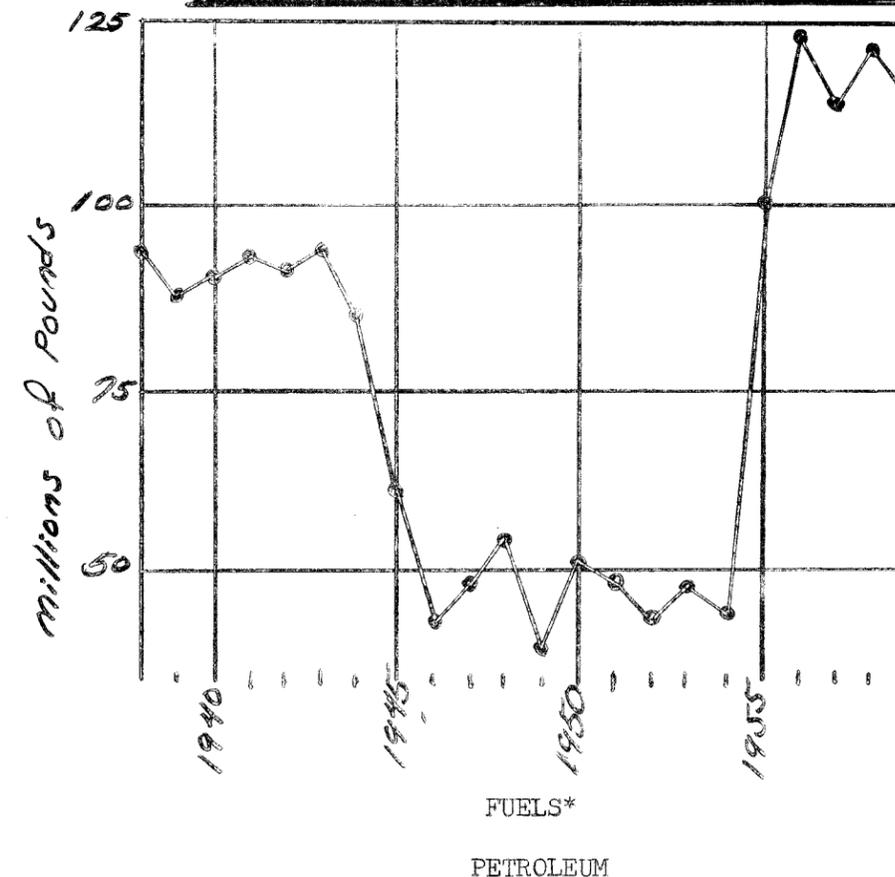
8. NATIVE COPPER

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

9. COPPER SULFIDE

White Pine Mine

COPPER PRODUCTION 1938-1959



Petroleum production increased in 1959 reversing a declining trend which began more than a decade ago. During the year 10,438,608 barrels valued at \$30,518,107 were produced. At the end of 1959, 4,327 producing wells were in 41 counties. Approximately 58 per cent of the total output was from Hillsdale, Isabella, Montcalm, Bay, Osceola, Arenac, Ogemaw, and Gladwin counties; more than half a million barrels were produced in each of these counties.

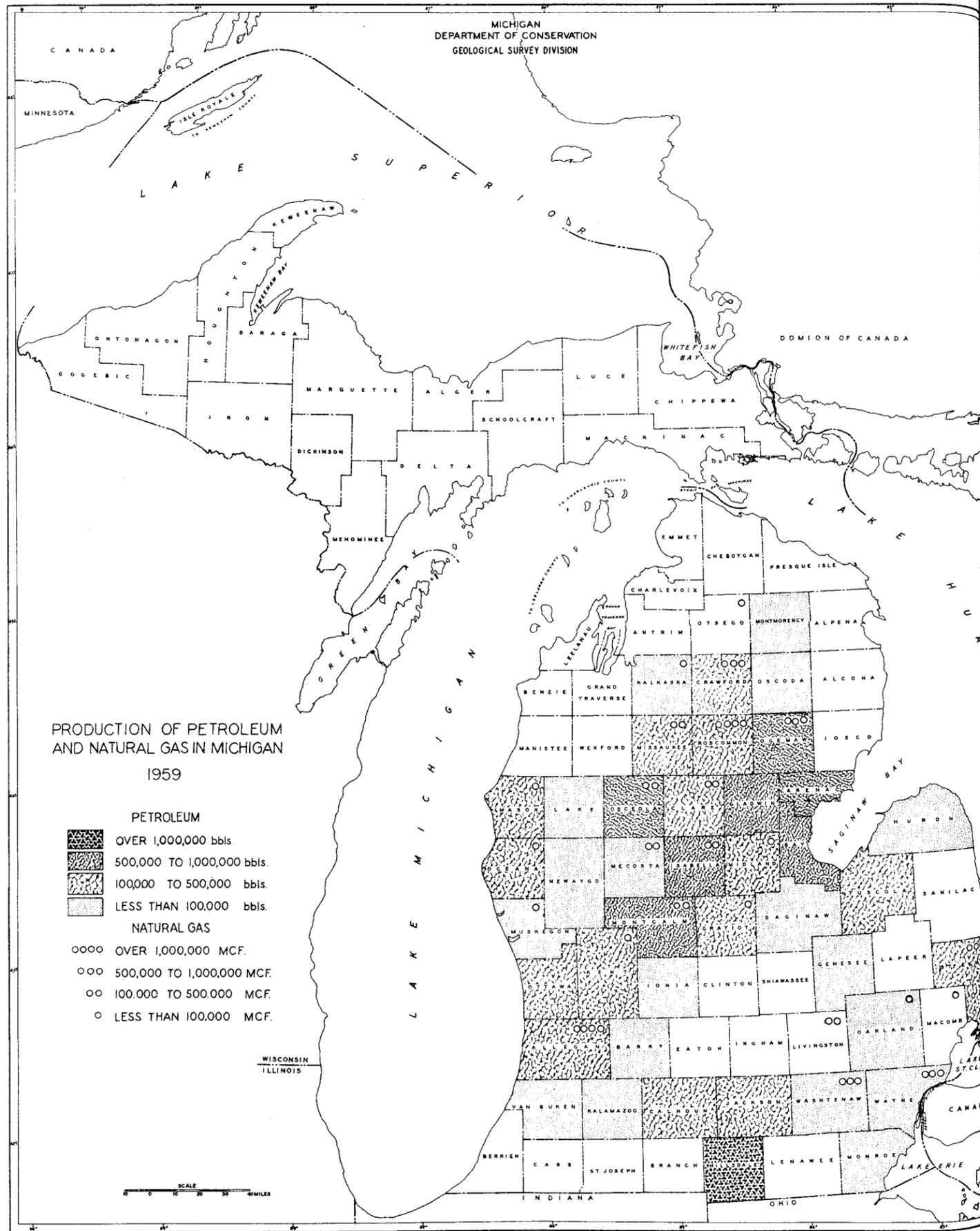
During the year 598 wells were completed (256 oil producers, 48 gas producers, 294 dry holes). Of these completions 187 were wildcats (11 oil producers, 6 gas producers, and 170 dry holes). The remaining 411 completions were field wells (245 oil producers, 42 gas producers, and 124 dry holes).

Thirteen refineries, in nine counties, processed more than 99 per cent of the crude oil produced in Michigan during 1959. The combined normal daily capacity of all Michigan refineries is approximately 183,200 barrels.

The Northern Peninsula Oil Refining Inc. of Rapid River announced, in June, plans for construction of an oil refinery. The refinery will be on U. S. 41 in Rapid River and will refine crude oil from the Trans-Canada pipe line traversing the area. The plant will market straight run gasoline, kerosene, range oil, diesel fuel, gas and residential fuels within a 100 mile radius of Rapid River.

Detailed information for oil and gas operations is recorded in the "1959 Summary of Operations, Oil and Gas Fields", available from the Michigan Geological Survey.

* Fuel statistics compiled by Michigan Geological Survey.



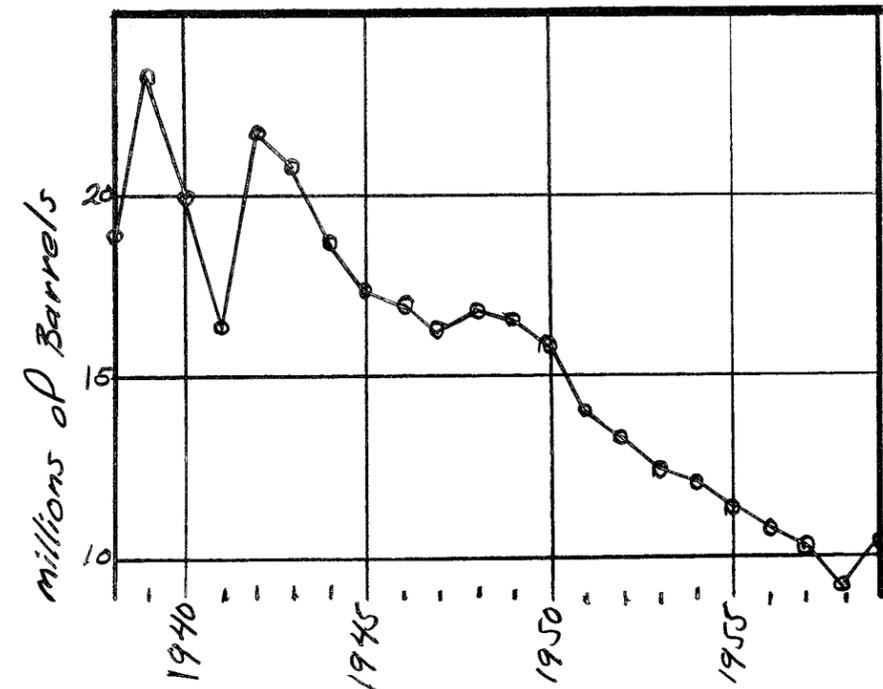
PETROLEUM PRODUCTION AND ACCUMULATED OIL BY FORMATION, 1959

Formation	Production		Accumulated	
	Bbls.	Per Cent	Bbls.	Per Cent
Marshall	1,430	.01	63,985	.02
Berea	20,702	.20	2,136,720	.50
Traverse	1,511,950	14.48	86,218,828	20.25
Dundee	4,155,217	39.81	302,282,706	70.99
Det. River	2,238,621	21.45	30,640,186	7.20
Sal-Niag.	392,527	3.76	611,176	.14
Trenton	2,118,161	20.29	3,832,073	.90
TOTAL	10,438,608	100.00	425,785,674	100.00

PETROLEUM AND NATURAL GAS PRODUCTION, 1955 - 1959

Year	Petroleum		Natural Gas	
	Barrels	Value	M. Cu. Ft.	Value
1955	11,265,832	32,074,018	6,787,697	1,187,846
1956	10,739,697	30,607,137	8,840,933	1,556,575
1957	10,168,602	30,505,806	6,639,813	929,574
1958	9,308,018	27,924,954	10,964,378	1,424,852
1959	10,548,608	30,518,107	15,626,227	3,045,976

PETROLEUM PRODUCTION 1938-1959



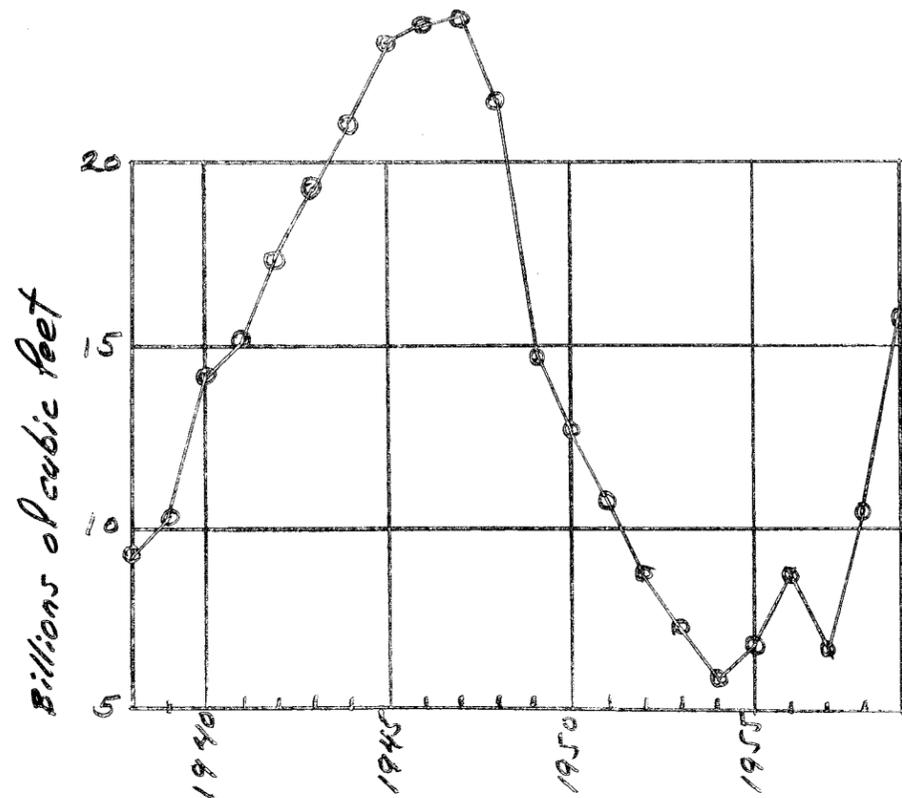
NATURAL GAS

Over 61 per cent of the natural gas produced in Michigan has been from the Michigan Stray - Marshall formations. Natural gas production increased 4,661,849,000 cubic feet in 1959 to a total of 15,626,227,000 cubic feet the largest production since 1948. Of this amount over 4 billion cubic feet was oil well gas. Natural gas was produced from 167 wells in 24 counties. Allegan County with 53 per cent of the state's total was the leading producer followed by Roscommon, Livingston, Ogemaw, and Crawford counties.

GAS PRODUCTION AND ACCUMULATED GAS PRODUCTION BY FORMATIONS - 1959

Formations	Production		Accumulated	
	M. Cu. Ft.	Per Cent	M. Cu. Ft.	Per Cent
Drift			8,020	.00
Stray-Marshall	674,191	4.31	209,355,971	61.49
Berea	8,032	.05	9,783,654	2.88
Antrim	14,912	.10	164,807	.05
Traverse	135,217	.87	7,383,894	2.17
Dundee-Reed City	343,265	2.20	47,790,893	14.03
Detroit River	3,649,466	23.35	20,330,272	5.97
Salina-Niagaran	9,720,047	62.20	39,050,109	11.47
Trenton-Black River	1,081,097	6.92	6,620,118	1.94
TOTAL	15,626,227	100.00	340,487,738	100.00

NATURAL GAS PRODUCTION 1938-1959



NATURAL GASOLINE

Michigan in 1959 produced from oil well gas a total of 2,761,551 gallons of natural gasoline and allied products valued at \$154,648. Crawford County, with 71 per cent of the state total, ranked first among the six producing counties.

NATURAL GASOLINE PRODUCTION, 1955 - 1959

Year	Quantity (gallons)	Value
1955	3,612,912	361,291
1956	3,740,916	374,092
1957	3,495,703	349,570
1958	3,511,671	351,167
1959	2,761,551	154,648

NONMETALLIC MINERALS

PORTLAND CEMENT

Portland cement is an artificial chemical combination of lime, silica, alumina, iron oxide, and small amounts of other ingredients to which gypsum is added to regulate the set. Chief raw materials used in cement manufacturing in Michigan are limestone, and shale or clay. These raw materials are obtained from Paleozoic limestone and shales and from Pleistocene clays.

Portland cement was produced by nine cement plants in the state. 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.

RAW MATERIAL USED IN THE MANUFACTURE OF PORTLAND CEMENT, 1959

Raw Material	Short Tons
Limestone	5,395,084
Clay and shale	1,620,242
Gypsum	146,598

Cement ranked first in value in 1959 followed by iron ore. Cement shipments increased 2,113,938 barrels and the value increased \$6,781,473 over 1958 to the highest point in history. Alpena County continued to be the leading producer; Wayne County ranked second. Portland cement was produced also in Bay, Emmet, Lenawee, Monroe, and St. Clair counties.

Construction continued on the new cement plant at Dundee. The 30 million dollar plant, with its newly developed quarry in the Dundee formation is one of the largest and most efficient on the North American continent. The plant is located about 40 miles southwest of Detroit.

General Portland Cement Company and Consolidated Cement Company merged April 30 and the re-elected directors of both companies became members of the board of the combined company. The firm has an annual capacity of 25,000,000 barrels making it the fifth largest in the United States. Consolidated formerly operated three plants located at Cement City, Michigan; Paulding, Ohio; and Fredonia, Kansas.

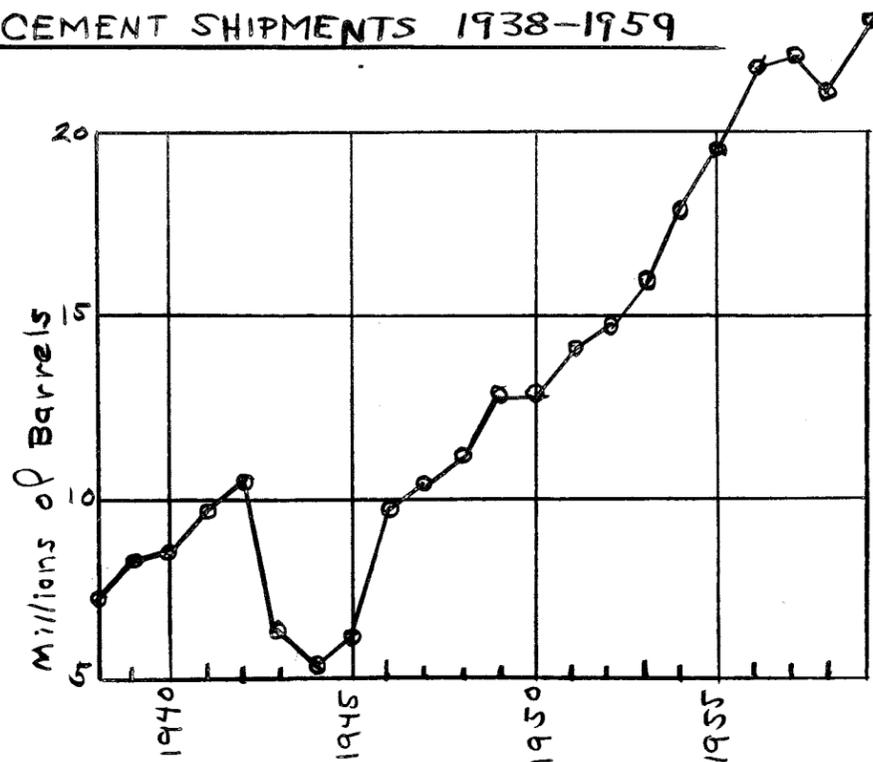
A new cement distributing plant at St. Joseph was completed by the Huron Cement Company. This facility, the company's 13th distributing plant, has ten silos with a combined storage capacity of 150,000 barrels.

National Gypsum Company of Buffalo, New York, exchanged more than 1 million shares of stock, valued at \$67 million, to acquire Huron Portland Cement Company. Huron continued with its own sales force, production units, accounting, and research facilities.

PORTLAND CEMENT SHIPMENTS, 1955 - 1959

Year	Shipments (barrels)	Value	Rank in U.S.	Number of plants
1955	19,738,400	58,048,378	4	7
1956	21,880,222	67,798,262	4	8
1957	22,045,034	71,605,137	4	8
1958	20,911,990	70,542,501	4	8
1959	23,025,928	77,323,974	4	8

CEMENT SHIPMENTS 1938-1959



Geological Formations - Marshall, Detroit River, Dundee, Salina. Almost the entire Southern Peninsula of Michigan is underlain by great thicknesses of rock salt - one of the largest basins of salt depositions in the world.

Successful manufacture of salt began at Saginaw in 1860. Prior to that time the State had set aside lands on which salt springs were located, and appropriated funds for borings upon these lands. Owing, however, to lack of specific knowledge of the geology of the State, the borings obtained brines too weak for salt manufacture, and the State abandoned attempts to manufacture this product. However, to stimulate private enterprise in the development of the salt resources of the state, the legislature of 1859 passed an act exempting all properties engaged in the manufacture of salt from taxation, and furthermore, provided for the payment of a bounty of ten cents per bushel for all salt obtained from wells within the State. This legislation was soon amended and eventually repealed, but by that time the industry was established on a firm basis, and growth was rapid. As early as 1880 Michigan led all states in salt production.

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

Approximately 57 per cent of the salt was used by chemical plants in Wayne, Midland and Muskegon counties. Over 2.5 million tons of salt were used in the manufacture of soda ash, chlorine, and other chemicals. Approximately 19 per cent of the total production was dried and evaporated salt.

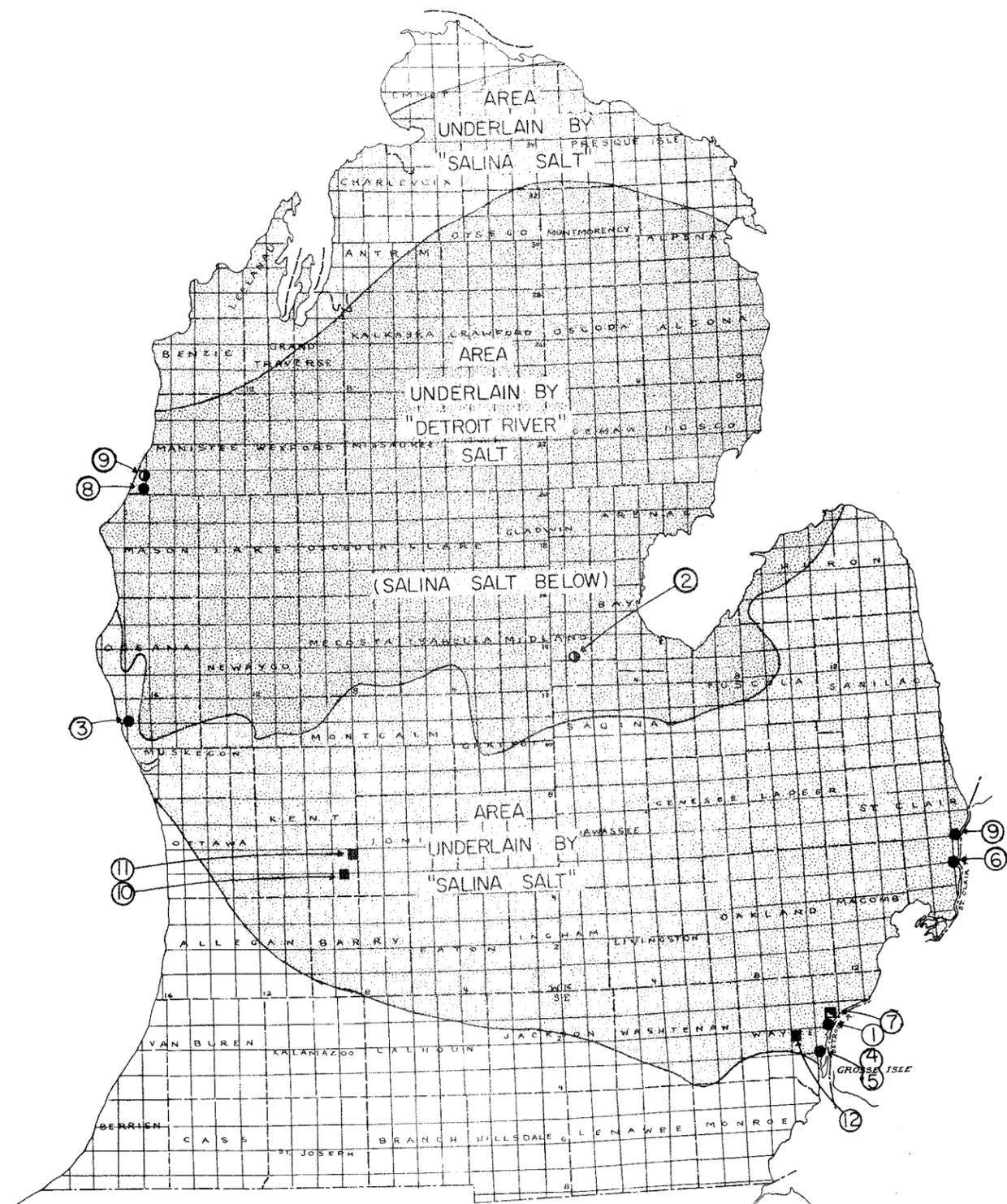
During 1959, 4,485,145 short tons of salt valued at \$35,724,796 were produced. This was an increase of 5 per cent in production and 8 per cent in value over 1958. Wayne ranked first of the six counties producing salt - followed by St. Clair, Manistee, Midland, Muskegon, and Gratiot.

USES OF SALT, 1959

Uses	Quantity (short tons)	Per Cent
Chemical	2,567,922	57
Highway, Dust & Ice Control	851,607	19
Textile, Hides and Packers	170,811	4
Livestock	175,908	4
Food Processing	128,047	3
Table and Other Household	75,965	2
Water Treatment	51,823	1
Other	112,867	2
Undistributed	350,195	8
TOTAL	4,485,145	100

MICHIGAN ROCK SALT DEVELOPMENT

1959



CHEMICAL PLANTS

1. Allied Chemical & Dye Corp. (soda ash)
2. The Dow Chemical Corp. (chlorine, other chemicals)
3. Hooker Electrochemical Co. (chlorine, hydrogen, caustic soda)
4. Pennsalt Chemical Corp. (chlorine, caustic soda)
5. Wyandotte Chemical Corp. (chlorine, soda ash)

LPG STORAGE RESERVOIRS

10. Skelly Oil Co.
11. Cities Service
12. Sun Oil Co.

SALT PLANTS

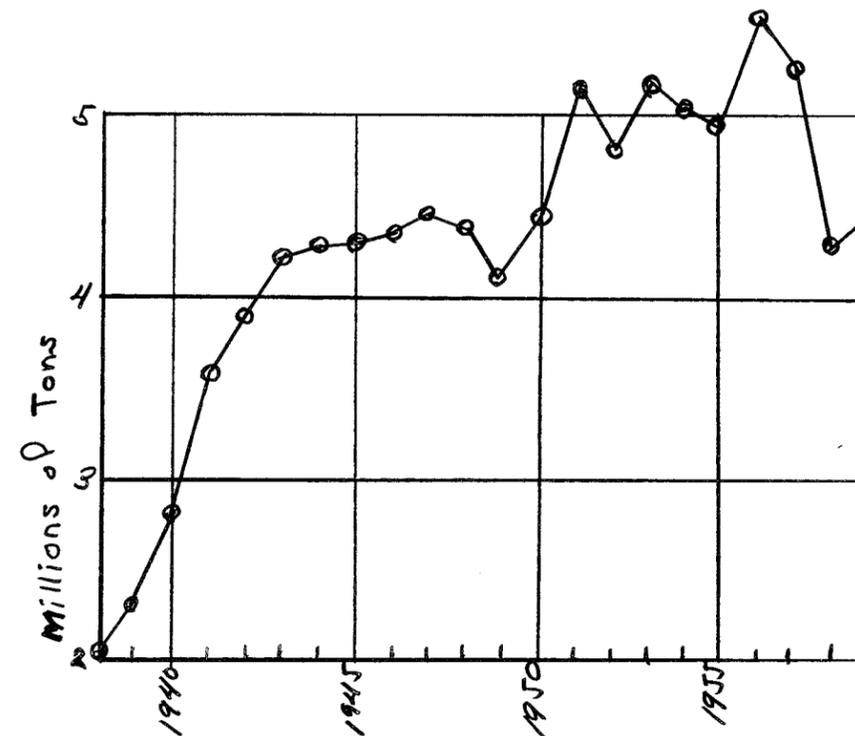
6. Diamond Crystal Salt Co.
7. International Salt Co., Inc.
8. Manistee Salt Works
9. Morton Salt Co.

- artificial brine - "Salina" salt
- artificial brine - "Detroit River" salt
- ◐ artificial brine - "Salina & Detroit River" salts
- mine - "Salina" salt
- LPG - "Salina" salt

SALT PRODUCTION, 1955 - 1959

Year	Quantity Short Tons	Value	Per Cent U.S. Total	Rank in U.S.
1955	4,975,442	\$31,668,351	21.9	1
1956	5,548,178	35,643,860	22.9	1
1957	5,225,425	41,072,497	21.9	1
1958	4,266,688	33,018,368	19.5	1
1959	4,485,145	35,724,796	-	1

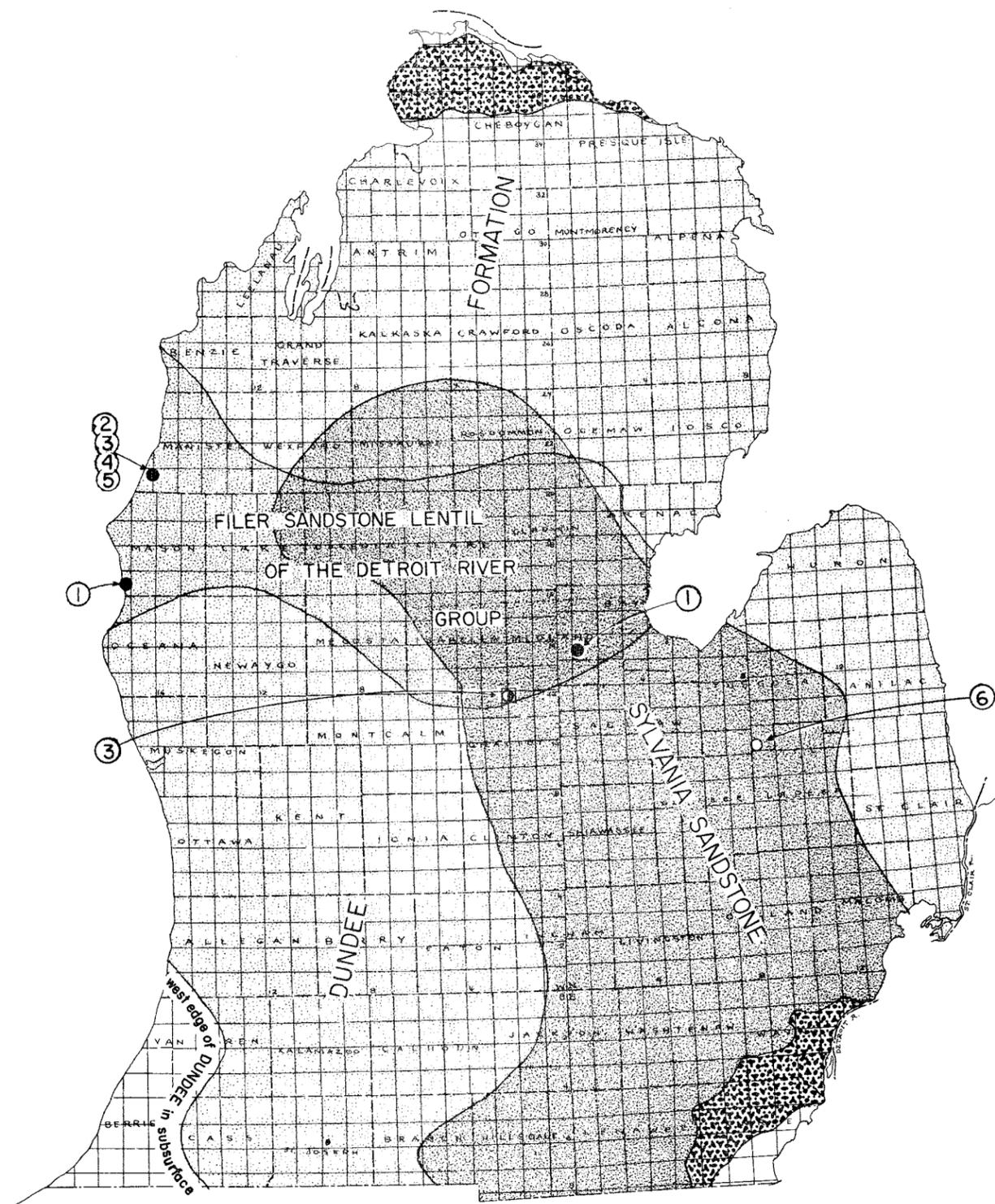
SALT PRODUCTION 1938-1959



NATURAL SALINES

Geological Formation - Sylvania, Detroit River. Natural brine recovered from the Sylvania formation is used by chemical companies in Midland and Gratiot counties. Brine from the Filer sandstone of the Detroit River formation is produced in Mason and Manistee counties. These natural brines are source material for many chemicals and chemical compounds.

1959



CHEMICAL PLANTS

1. The Dow Chemical Co. (bromine, calcium magnesium chloride, magnesium compounds, potash)
2. Great Lakes Chemical Corp. (bromine)
3. Michigan Chemical Corp. (bromine, calcium magnesium chloride, magnesium compounds, salt)
4. Morton Salt Co. (bromine, calcium magnesium chloride, magnesium compounds)
5. Wilkinson Chemical Co. (calcium magnesium chloride)

- Dundee brine
- Detroit River brine
- ◐ Sylvania brine
- ◑ Dundee & Detroit River brine
- ▨ area of shallow drift and outcrop of brine bearing formations

Bromine was produced in 1958 by four companies in six plants in Gratiot, Manistee, Mason, and Midland counties. Magnesium compounds were produced by four companies in Gratiot, Manistee, Mason and Midland counties. Calcium-chloride and calcium-magnesium chloride were produced by three companies in Gratiot, Lapeer, Mason, and Midland counties. The Dow Chemical Company at Midland, reported production of potassium salts from natural brines.

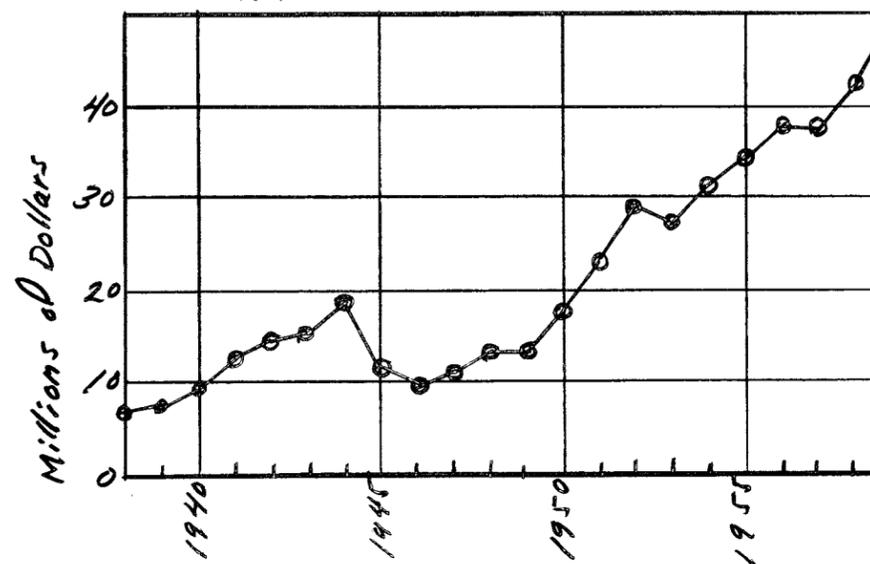
The value of the natural salines recovered by the chemical plants from natural brines in 1959 increased 16 per cent over the 1958 value. The highest value was recorded for bromine, followed by magnesium compounds, calcium magnesium chloride and potash.

Field studies in Michigan showed 25 per cent more clear space on icy pavements after 1 hour treatment with 1:3 calcium chloride salt mixture. When calcium chloride dissolves, it releases the heat that salt requires to dissolve, which explained the greater effectiveness of the mixture in melting ice. It has demonstrated that premixed calcium chloride and salt could be stockpiled if dry and protected from rain. Underneath the protecting crust that formed the saline mixture remained free flowing.

VALUE OF NATURAL SALINES*, 1955 - 1959

Year	Value
1955	\$ 34,282,204
1956	37,873,042
1957	37,664,914
1958	42,360,677
1959	49,286,176

NATURAL SALINES VALUE 1938-1959



* Includes: bromine, calcium chloride and calcium-magnesium chloride, magnesium compounds, and potash.

SAND AND GRAVEL

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

Production and value of sand and gravel increased in 1959 to 48,051,816 short tons valued at \$41,192,632 the highest recorded to date. Seventy per cent of the total sand and gravel output was used in road construction and 19 per cent for structural purposes.

Production of sand and gravel was reported from 79 of Michigan's 83 counties. Approximately 45 per cent of the total production was from 10 counties; in order of rank - Oakland, Livingston, Wayne, Kent, Washtenaw, Ottawa, Macomb, Calhoun, Ingham, and Tuscola. Thirteen per cent of the state total was produced in Oakland County. Each of the other counties produced more than 1,000,000 tons. About 72 per cent of the state's total was reported by commercial producers and the remaining 28 per cent was non-commercial production by county road commissions and other governmental agencies.

USES OF SAND AND GRAVEL, 1959

Uses	Quantity (short tons)	Value	Per Cent of Total
Paving and Road Sand	7,097,683	\$ 5,226,574	14.8
Structural Sand	4,829,462	3,753,893	10.1
Molding Sand	1,918,507	2,849,091	4.0
Fill Sand	1,865,559	666,438	3.7
Other Sand*	768,226	1,721,413	1.6
Paving and Road Gravel	26,433,228	21,245,735	55.1
Structural Gravel	4,303,926	5,107,463	9.0
Fill Gravel	525,977	286,106	1.1
Other Gravel**	309,248	335,919	.6
TOTAL	48,051,816	\$ 41,192,632	100.0

* Includes - Grinding and polishing, glass, railroad ballast, engine, blast, filtration, and other sand.

** Includes - Railroad ballast, miscellaneous, and other gravel.

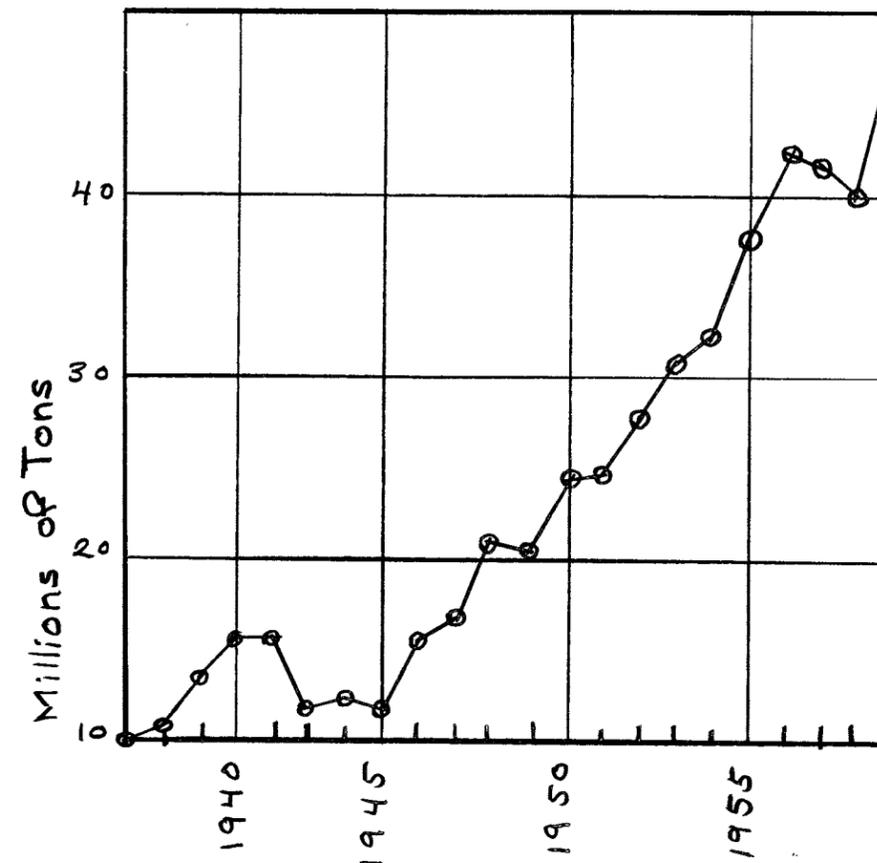
The elastic fractionation process developed in 1957 was used on a commercial scale by a Michigan operation. The particles were bounced off a steel plate so that poor quality gravel with little elasticity dropped in the first compartment while the highest quality material rebounded to the third compartment.

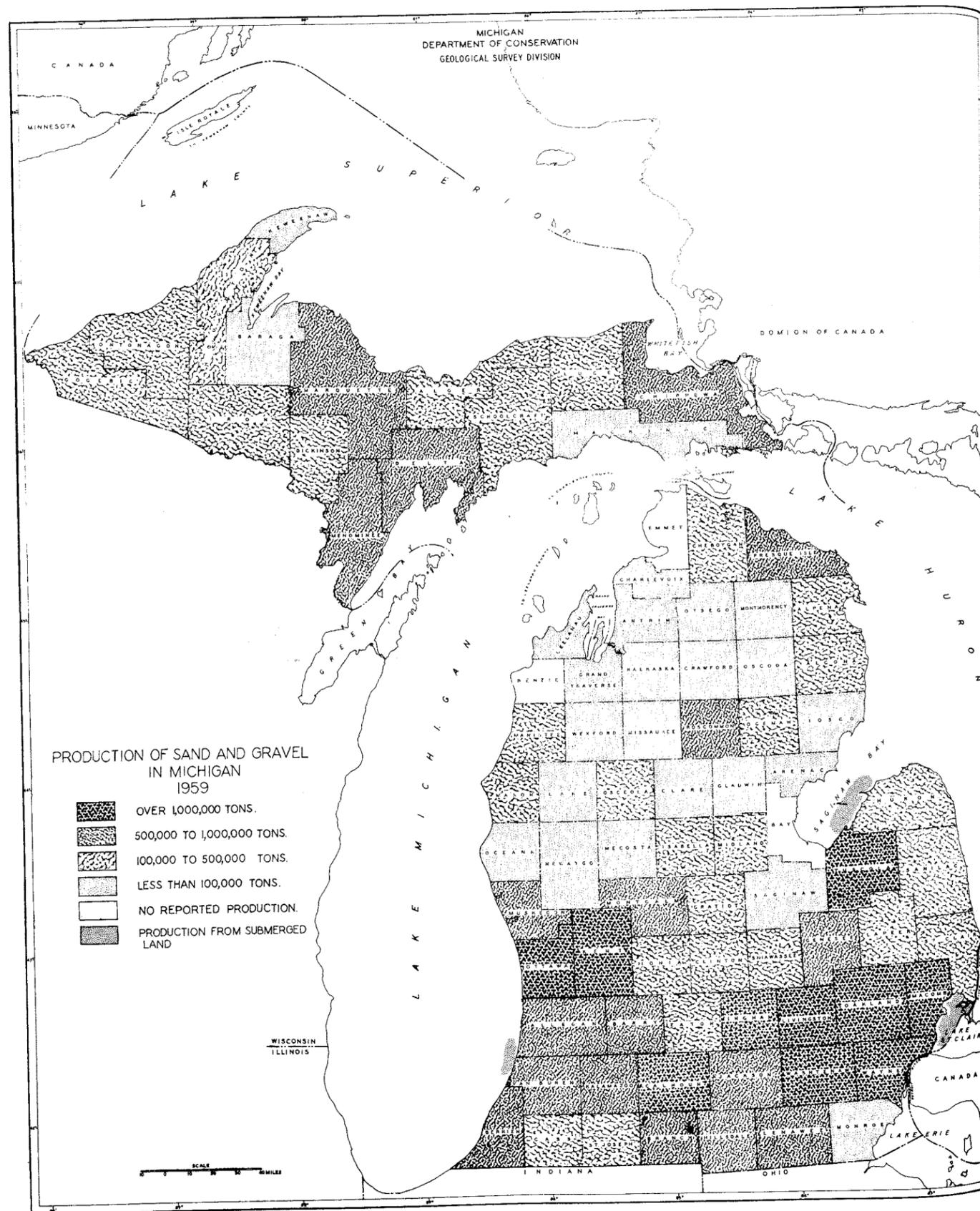
Assets and equipment of the Postma Gravel Company and Postma Equipment Company, Grandville, were acquired by the Grand Rapids Gravel Company. H. F. Postma, the former owner, who had been in the gravel business for 30 years and in the ready-mix concrete business for 12 years, retained title to company land and buildings which were leased to Grand Rapids Gravel. The Postma Equipment Company's sale included a fleet of 80 trucks and concrete mixers.

SAND AND GRAVEL PRODUCTION 1955 - 1959

Year	Quantity (short tons)	Value	Rank in U. S.
1955	37,269,709	\$ 29,565,730	2
1956	42,149,946	35,145,953	2
1957	41,837,894	35,144,352	2
1958	39,871,202	34,615,648	2
1959	48,051,816	41,192,632	2

SAND & GRAVEL PRODUCTION 1938-1959





Geological formations - Bayport, Marshall, Traverse, Dundee-Rogers City, Detroit River, Bass Island, Engadine, Burnt Bluff, Trenton, Keweenaw, Huronian.

Approximately 61 per cent of the limestone and dolomite produced in Michigan in 1959 was quarried from the Rogers City - Dundee, Detroit River, and Traverse limestone formations in Presque Isle, Charlevoix, Cheboygan, Emmet, Alpena, and Wayne counties. The remaining 30 per cent was from Mackinac, Chippewa, Huron, Eaton, Jackson, Arenac, Monroe, Delta, Dickinson, and Houghton counties. Dimensional limestone was produced in Charlevoix, Eaton, Huron, and Presque Isle counties.

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

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

Stone production and value increased to 20,526,253 tons and \$22,708,587 in 1959*.

STONE PRODUCTION, 1959

Commodity	Quantity (short tons)	Value
Limestone and dolomite-crushed	20,411,933*	\$ 22,432,225
dimensional	6,503	58,120
Sandstone - dimensional	21,779	154,510
Basalt - crushed	86,038	63,732
TOTAL	20,526,253	\$ 22,708,587

USES OF CRUSHED LIMESTONE AND DOLOMITE, 1959

Uses	Per Cent of Total	Quantity (short tons)	Value
Flux	52.9	10,805,705	\$ 11,478,863
Concrete & road metal	26.1	5,311,121	6,248,660
Chemical**	18.3	3,729,465	3,697,773
Agricultural	2.1	434,116	749,590
Other***	.6	131,526	257,339
TOTAL	100.0	20,411,933	\$ 22,432,225

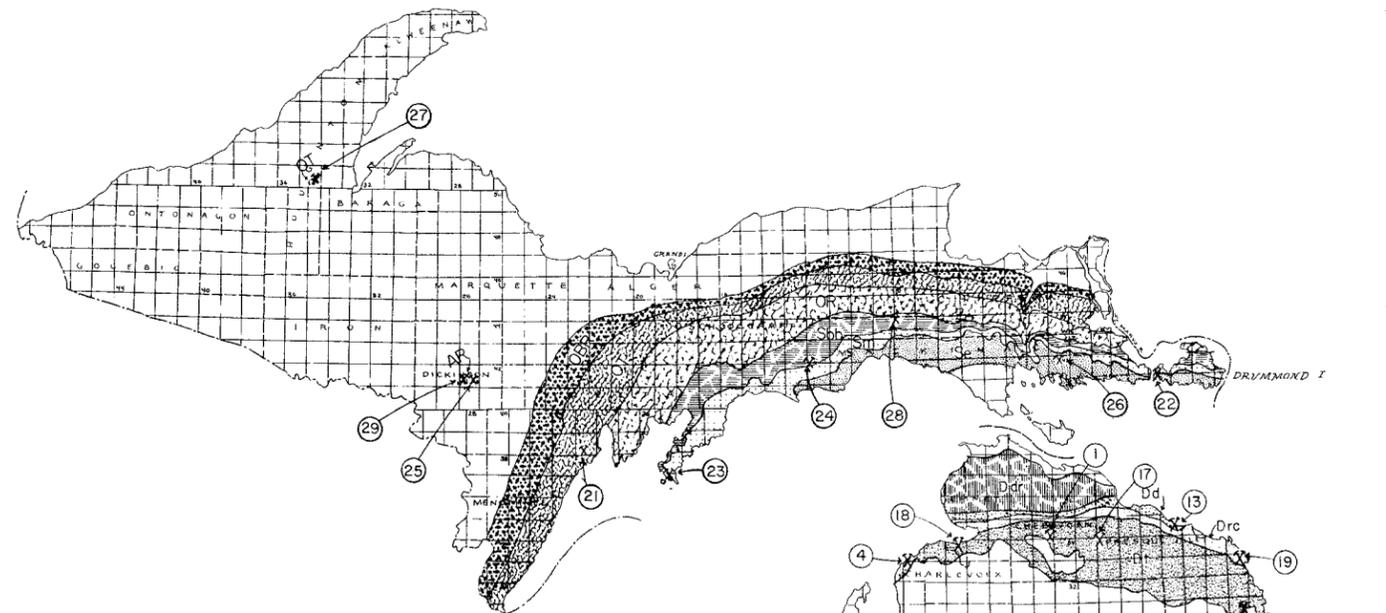
* Does not include 8,828,049 short tons of limestone valued at \$7,001,784 used in manufacture of cement and lime.

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

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

MICHIGAN LIMESTONE DEVELOPMENTS

1959



SOUTHERN PENINSULA

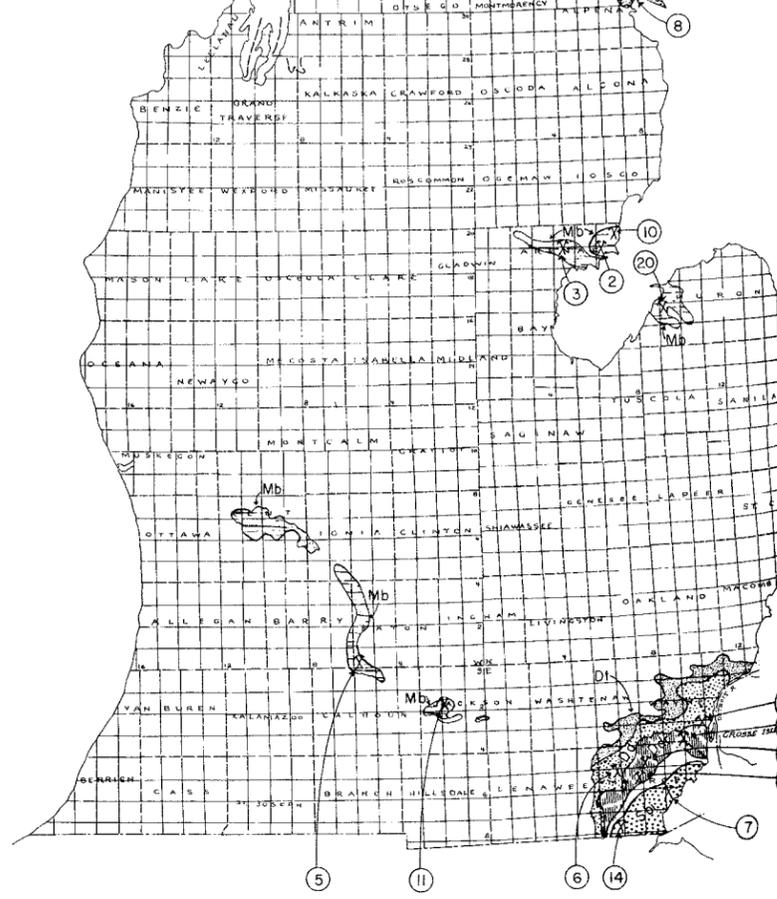
1. Afton Stone & Lime Co. (aggregate)
2. Arenac County Rd. Comm. (road stone)
3. Bay County Rd. Comm. (road stone)
4. Charlevoix Lime & Stone Co. (ag-stone)
5. Cheney Limestone Co. (aggregate, ag-stone, bldg. stone)
6. Dundee Cement Co. (Portland cement)
7. France Stone Co. (aggregate, railroad ballast, ag-stone, riprap, flux)
8. Huron Portland Cement Co. (Portland cement)
9. Huron River Quarry, Inc. (aggregate)
10. Iosco County Rd. Comm. (road stone)
11. John C. Jeffery Quarry (ag-stone, aggregate)
12. Michigan Foundation Quarry Co. (aggregate, riprap)
13. Michigan Limestone Division (flux, chemical stone, aggregate, etc.)
14. Michigan Limestone Co., No. 1 (aggregate, riprap)
15. Michigan Limestone Co., No. 2 (aggregate)
16. Monroe County Rd. Comm. (road stone)
17. Onaway Stone Co. (bldg. stone)
18. Penn-Dixie Cement Corp. (Portland cement)
19. Presque Isle Corp. (flux, aggregate)
20. Wallace Stone Co. (aggregate, railroad ballast, bldg. stone, ag-stone)

NORTHERN PENINSULA

21. Bichlers Bros. (aggregate)
22. Drummond Dolomite, Inc. (aggregate, flux, ag-stone, stone sand)
23. Girke Bros. (bldg. stone)
24. Inland Lime & Stone Co. (flux, aggregate, ag-stone, chemicals stone, cement & lime stone)
25. The Metro-Nite Co. (paint filler, putty filler, terrazzo, roofing granules)
26. Michigan Limestone Division (flux, aggregate, ag-stone)
27. Limestone Mt. Co. (ag-stone)
28. Thornton Construction Co. (aggregate)
29. Superior Rock Products Co. (terrazzo, ornamental concrete)

LEGEND
(Limestone Formations)

MISSISSIPPIAN		ORDOVIGIAN	
Bayport Is.	Mb	Richmond	OR
DEVONIAN		Trenton	OT
Traverse fm.	Dt	Black River	OBR
Rogers City ls	Drc	PRE-CAMBRIAN	
Dundee ls	Dd	Huronian	AR
Detroit River Group	Ddr		
SILURIAN			
Bass Island	Sbi		
Engadine	Se		
Manistique Series	Sm		
Burnt Bluff	Sob		



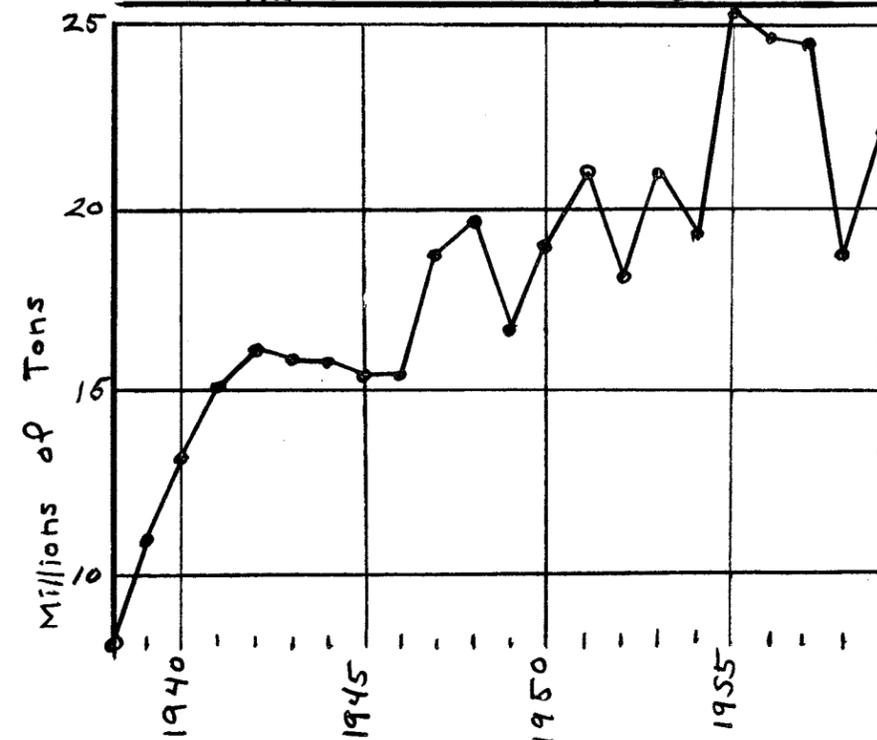
Drummond Dolomite, Inc. continued to develop reserves on Drummond Island, much of this under state lease. Intensive exploration on 2,700 acres since 1956 resulted in proving up some 150,000,000 tons of high quality dolomite extending from the northern tip of Huron Bay westward to Warner's Cove and Canoe Bay. Drummond Dolomite now processes ten sizes of crushed stone for the metallurgical, chemical, and construction industries at the rate of 2,500,000 tons a year. The plant was removed to Drummond Island from Sturgeon Bay, Wisconsin, in 1944.

The United States Bureau of Mines published Information Circular 7917, "Mining and Milling Methods, Inland Lime and Stone Company, Port Inland, Michigan". Written by L. G. Marshall, mine examination and exploration engineer for the Bureau at Minneapolis, this publication covers details of a limestone quarry which produces flux for the steel industry and crushed stone for manufacturing concrete.

STONE PRODUCTION, 1955 - 1959*

Year	Quantity (short tons)	Value	Rank in U. S.
1955	25,312,294	\$ 23,361,852	3
1956	24,702,487	24,135,997	2
1957	24,586,940	26,974,290	4
1958	18,584,890	19,997,244	6
1959	20,526,253	22,708,587	6

STONE PRODUCTION 1938-1959



* Does not include limestone used in the manufacture of cement and lime.

Geological formations - 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. Saginaw shale is used by three plants for manufacture of tile in Eaton and Shiawassee counties. All other tile, brick pottery, lightweight aggregate and cement plants operating in the state use clay from local surface deposits. Clay produced in Saginaw County is sold for oil well drilling mud, for molding sand bond and for fertilizer.

During 1959, 2,050,760 short tons of clay and shale, valued at \$2,311,917 were produced. Wayne County led in production and value with 33 per cent of the state's total output, followed by Alpena, Saginaw, and St. Clair counties. Approximately 79 per cent of all raw clay and shale produced was used by the cement industry. The remaining 21 per cent was used for the manufacture of a small quantity of prepared clays and for clay products -brick, tile, pottery, and lightweight aggregate.

About 66 per cent of the raw material for the manufacture of clay products was from glacial clay and the balance was from shale deposits.

PRODUCTION OF CLAY AND SHALE, AND CLAY PRODUCTS, 1955 - 1959

Year	Raw clay and shale quantity (short tons)	Value	Clay Products
1955	1,937,593	\$ 2,091,077	7,292,477
1956	2,110,030	2,401,051	6,951,866
1957	2,031,890	2,266,599	6,851,113
1958	1,948,444	2,191,909	6,786,247
1959	2,050,760	2,311,917	6,745,027

GYPSUM

Geological formation - Michigan.

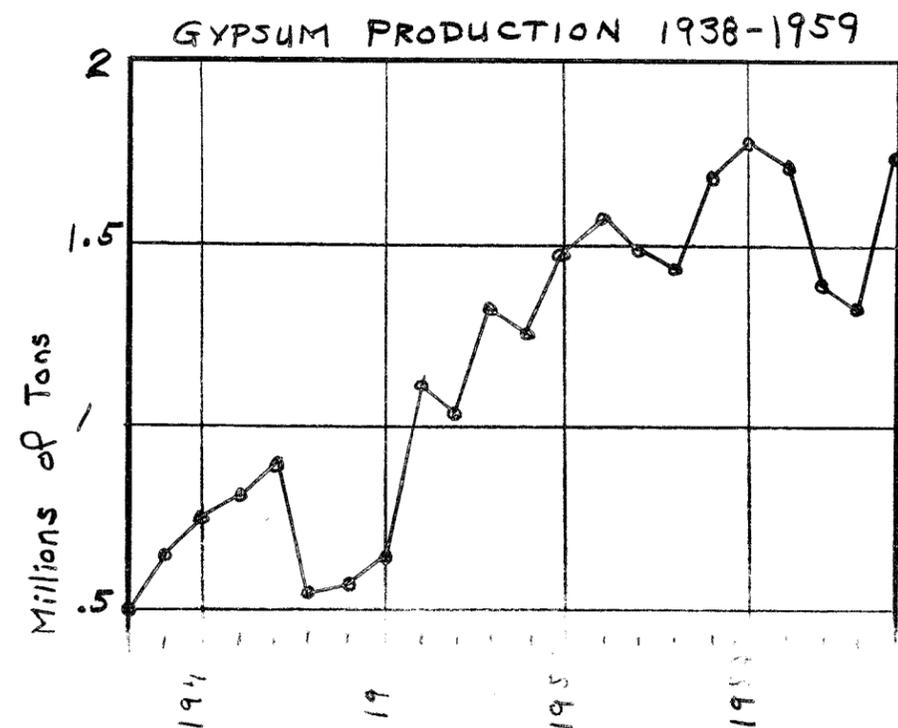
Gypsum is quarried at Alabaster and near Tawas City, Iosco County, and is mined in two underground mines at Grand Rapids, Kent County. The raw material is processed in gypsum mills at National City, Grand Rapids, River Rouge, East Chicago, Indiana, and Waukegon, Illinois. Principal uses for gypsum are in the manufacture of plaster, wallboard, and allied building materials and as a Portland cement retarder.

During 1959 Michigan gypsum production increased 390,564 tons to a total of 1,721,453 tons valued at \$6,595,256. This is the highest value recorded for crude gypsum although a slightly greater tonnage was produced in 1955.

Shipments of raw gypsum from National Gypsum Company's new quarry near Tawas City were made from their new dock south of Tawas City. Shipments were to the company's plant at Waukegon, Illinois. Later shipments are to be made to the Lorain, Ohio plant which was under construction for processing into wallboard, lath, plaster and other gypsum building products.

PRODUCTION OF GYPSUM, 1955 - 1959

Year	Quantity (short tons)	Value	Per Cent of U. S.	Rank in U. S.
1955	1,762,105	\$ 5,660,587	17	1
1956	1,715,832	5,861,152	17	1
1957	1,385,952	4,822,810	15	1
1958	1,330,889	4,924,431	14	2
1959	1,721,453	6,595,256	-	1



LIME

Geological formations - Dundee, Burnt Bluff, Engadine.

Raw stone for the manufacture of lime was obtained from the high calcium Dundee limestone in Presque Isle County, the Burnt Bluff limestone in Mackinac County, and the Engadine dolomite in Chippewa County.

Six companies produced quick and hydrated lime in the state. Production of lime reported during 1959 increased greatly over 1958, however, this was primarily due to the addition of two producers. Forty per cent of the lime sold and used was quick lime. Wayne County ranked first in production.

Until about 1900, when the chemical industries began to grow rapidly, lime was used almost entirely in construction and agriculture. Since then, progressively larger amounts have been employed in chemical and processing industries. All lime produced in the state is now sold or used for chemical and industrial use.

PEAT

Geological formation - Pleistocene. Peat is partly decomposed and more or less disintegrated vegetable matter that has accumulated in places where ordinary decay or chemical decomposition of the material has been retarded by immersion in water. A peat deposit is an accumulation of many generations of plants from one or several groups of vegetation. Thus, an individual bog may contain several different types of peat. Peat deposits of Michigan are largely in muskegs and grass-sedge marshes in basins of glacial origin. Although the most extensive deposits are in the Northern Peninsula, the bogs near centers of population in the Southern Peninsula are more important commercially. It has been estimated that the reserves of peat in Michigan total 1 billion tons.

Production increased in 1959 to 191,661 tons valued at \$2,356,656. Michigan, with nearly half of the total, led all states in production followed by California and Florida.

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

PRODUCTION OF PEAT, 1955 - 1959

Year	Quantity (short tons)	Value	Per Cent of U. S.	Rank in U. S.
1955	30,000	\$ 465,000	11.0	3
1956	31,111	474,899	10.7	3
1957	80,271	1,406,195	25.4	1
1958	107,342	1,683,980	32.7	1
1959	191,661	2,356,656	45.7	1

MARL

Geological formation - Pleistocene.

Marl is a loosely consolidated earthy material composed largely of calcium carbonate. It is essentially a form of limestone which has undergone partial induration and is often quite variable in composition. The wide distribution and accessibility of marl throughout the state affords a potential source of almost unlimited supply of agricultural lime. Marl deposits are not continuous over large areas, but are restricted to isolated bodies situated in small basins, depressions and drainage channels. The material occurs not only in present existing water bodies, but is often found buried under muck and peat in swamps and decadent lakes and also along old river channels. In places it forms the upper terraces of lakes and streams and may there be exposed to the surface. Many of the large and some of the smaller lake beds of the state contain marl layers of varying thickness. In some lakes the marl is a narrow rim or shelf around the margin which in places has developed considerable thickness. The deposits of marl are limited in extent and thickness by the depressions which confines them. Deposits range in area from merely a fraction of an acre to several square miles and may be from 10 to 15 feet thick. More than 30 feet of marl is of rare occurrence.

All marl produced in the state is used for agricultural purposes. This material when added to the soil plays the same important role as does commercial lime and may be employed in much the same manner. Commercial marl production was reported in 18 counties during 1959. Kalamazoo County ranked first, followed by Isabella, Branch, Barry, and Calhoun counties. These counties produced approximately 65 per cent of the state's output.

MARL PRODUCTION, 1955 - 1959

Year	Quantity (short tons)	Value	Rank in U. S.
1955	119,313	\$ 57,176	1
1956	157,246	94,821	1
1957	137,020	70,635	1
1958	230,105	130,231	4
1959	201,387	118,240	4

VALUE OF MICHIGAN'S MINERALS AND MINERAL PRODUCTION 1944 - 1959

Year	Dollars	Year	Dollars
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
1948	214,115,771	1956	406,563,233
1949	207,607,694	1957	406,809,600
1950	238,474,008	1958	349,522,638
1951	257,529,882	1959	385,321,927

TABLE I
MINERAL PRODUCTION OF MICHIGAN, 1959 (1)

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

TOTAL

\$ 385,321,927

- (1) Metallic and fuel statistics compiled by Michigan Geological Survey. Nonmetallic statistics compiled in cooperation with the United States Bureau of Mines.
- (2) Based upon quantity.
- (3) Includes bromine, magnesium compounds, calcium-magnesium chloride and potash.
- (4) Does not include 8,828,049 short tons of limestone valued at \$7,001,784 used in the manufacture of cement and lime.
- (5) Used in the manufacture of cement and clay products.
- (6) Includes lime, sulfur, mineral pigments, clay, and gem stones.

TABLE II
MINERAL PRODUCTS OF MICHIGAN, 1958 (1)

PRODUCT	UNIT	QUANTITY	VALUE	RANK IN U.S. (2)
Iron Ore	Long Ton	8,210,906	\$ 70,704,419	2
Cement	Barrels	20,911,990	70,432,501	4
Natural Salines (3)			42,360,677	1
Sand and Gravel	Short Ton	39,871,202	34,615,648	2
Salt	Short Ton	4,266,688	33,018,368	1
Copper	Pounds	122,059,023	31,414,330	5
Petroleum	Barrels	9,308,018	27,924,954	17
Stone (4)	Short Ton	18,584,890	19,997,224	6
Clay Products			6,786,247	-
Gypsum	Short Ton	1,330,889	4,824,431	2
Clay and Shale (5)	Short Ton	1,946,794		9
Peat	Short Ton	107,342	1,683,980	1
Natural Gas	M. Cu. Ft.	10,964,378	1,424,852	20
Natural Gasoline	Gallons	3,511,671	351,167	15
Marl	Short Ton	230,105	130,231	4
Miscellaneous (6)			3,853,609	-

TOTAL

\$ 349,522,638

- (1) Metallic and fuel statistics compiled by Michigan Geological Survey.
- (2) Based upon quantity.
- (3) Includes bromine, magnesium compounds, calcium-magnesium chloride and potash.
- (4) Does not include 8,208,577 short tons of limestone valued at \$6,421,508.
- (5) Used in the manufacture of cement and clay products.
- (6) Includes lime, sulfur, mineral pigments, gem stones, and clay.

PRODUCTION AND VALUE
OF
MINERALS AND MINERAL PRODUCTS
BY COUNTIES

1959

All counties with the exception of Benzie reported mineral production for 1959. Wayne, Alpena, Midland, Marquette, Ontonagon, and Iron led all others in value, contributing 50 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 production.

All indicated tonnage is in short tons (2,000 lbs.) with the exception of iron ore, which is reported in long tons (2,240 lbs.)

Mineral producers contributing production data for 1959 are listed, by county, below production data. Location of the operation, when known, is given by section, township and range, or nearest city to operation.

	<u>Quantity</u>	<u>Value</u>
ALCONA (69)		
Sand and gravel	338,311 tons	\$ 96,987
Alcona Co. Rd. Comm.	NE SW 7 25N 6E SE SW 7 26N 9E NW NE 11 26N 9E NE NW 3 25N 9E	Sand and gravel
Michigan State Hwy. Dept.		Sand and gravel
ALGER (70)		
Sand and gravel		213,825 tons \$ 75,208
Alger Co. Rd. Comm.	6 47N 20W	Sand and gravel

	<u>Quantity</u>	<u>Value</u>
ALLEGAN (24)		
Natural gas (1st, 53%)	8,220,667 M.cu.ft.	\$ 1,603,030
Sand and gravel	986,133 tons	757,510
Petroleum	196,995 bbls.	575,216
Undistributed: peat, marl (6th, 6%)		17,722
Total value		\$ 2,953,478
Allegan Co. Rd. Comm. Cleo L. Arndt	Douglas (3½ mi. E. on 130th St.) NW 23 3N 16W	Sand and gravel Marl
Gerald Arnsman Bernard Damveld	Allegan (1½ mi. N.) 22 4N 12W	Sand and gravel Marl
Huitt and Son	NE SW 9 2N 13W	Sand and gravel
Mid-American Eng. Corp.	Near Allegan	Sand and gravel
Emil Pavlak	NE NW 12 2N 12W	Marl
Pickitt and Schreur	NW SE 5 1N 14W SW NE 34 3N 13W NE 1 3N 13W	Sand and gravel
H.R. Vernon	NW 5 2N 16W	Sand and gravel
Ben Waanders	NE NE 20 2N 13W	Sand and gravel
West Shore Constr. Co., Inc.	26 3N 14W	Sand and gravel
ALPENA (2)		
Cement (1st), Stone - Crushed limestone*, Shale*(2nd), Sand and gravel		**
Gilliland Gravel Co.	W½ NW 13 32N 8E	Sand and gravel
Huron Portland Cement Co.	NE 30 31N 7E 24 31N 8E 13 31N 8E	Shale Cement Limestone-Crushed
Percy McKinnon	NE SE 23 32N 8E	Sand and gravel
Michigan State Hwy. Dept.	SE SW 33 30N 6E	Sand and gravel

* Value of stone and 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>
ANTRIM (73)		
Sand and gravel Shale* (5th)	97,191 tons	\$ 49,385
Antrim Co. Rd. Comm.	NE NE 16 31N 6W SE 26 32N 8W NE SW 36 32N 9W	Sand and gravel
Michigan State Hwy. Dept. Penn-Dixie Portland Cement Co.	SE 23 32N 8W	Sand and gravel Shale
ARENAC (32)		
Petroleum (6th, 5%) Stone	563,013 bbls. 138,206 tons	\$ 1,643,998 199,577
Sand and gravel Total Value	37,397 tons	24,068 \$ 1,867,643
Arenac Co. Rd. Comm.	NW 5 19N 7E	Limestone Sand and gravel
Bay Co. Rd. Comm. Eastman Gravel Pit	34 20N 5E SW NW 36 19N 5E	Limestone Sand and gravel
Iosco Co. Rd. Comm.	SW 24 20N 7E	Limestone
BARAGA (75)		
Sand and Gravel	92,139 tons	\$ 43,652
Baraga Co. Rd. Comm. Michigan State Hwy. Dept.	NW 23 51N 31W	Sand and gravel Sand and gravel

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

	<u>Quantity</u>	<u>Value</u>
BARRY (56)		
Sand and gravel	668,572 tons	\$ 618,935
Petroleum	24,965 bbls.	72,888
Marl(4th, 8%)	16,455 tons	<u>9,693</u>
		\$ 701,516

Barry Co. Rd. Comm.	SW NW 25 2N 10W SW NW 29 3N 9W SE NW 4 4N 9W	Sand and gravel
Bender Gravel Co.	SW NW 12 3N 9W	Sand and gravel
Cole Gravel Co.	6 & 7 4N 10W	Sand and gravel
William Currier	Caledonia	Marl
E.R. Hamilton	13 2N 7W	Marl
Michigan State Hy. Dept.		Sand and gravel
Nashville Gravel Co.	14 & 15 2N 7W	Sand and gravel
Schau Bros.	23 2N 10W 28 2N 10W	Sand and gravel Marl

BAY (11)

Cement, Petroleum (4th, 6%)
Lime

**

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

BENZIE (83)

No Production Reported

BERRIEN (49)

Sand and gravel	932,165 tons	\$ 972,568
Undistributed: Marl,		<u>7,082</u>
Peat		\$ 979,650

J.V. Burkett		Sand and gravel
Ireland and Lester Co.	NW NW 24 4S 19W	Sand and gravel
Harold Kiell	Niles (2 mi. N. on U.S. 31)	Sand and gravel
Hugh Martel	24 8S 20W	Marl
Martin Bros.	20 8S 20W	Marl
Michigan State Hwy. Dept.		Sand and gravel
Portage-Manley Sand Co.		Sand
Producers Core Sand Corp.	36 6S 20W	Sand

	<u>Quantity</u>	<u>Value</u>
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BERRIEN (contd.)

Wakeman Ryno	NE 27 3S 17W	Sand and Gravel
C. H. Spies	4S 17W	Marl
John G. Yerington	Ryno Pit	Sand and Gravel
	Rhode Pit	
	Whaley Pit	
	U.S. 12 - M 140 W.	

BRANCH (59)

Undistributed: Sand and Gravel, Marl (3rd)		\$ 357,269
Branch Co. Rd. Comm.	NE SE 19 6S 6W	Sand and Gravel
Case Bros.	Various	Marl
Michigan State Hwy. Dept.		Sand and Gravel
H. Stuckey Co.	SW SE 4 6S 6W	Sand and Gravel
Woodward-Pollock Lbr. Co.	NW SW 21 6S 6W	Sand and Gravel

CALHOUN (28)

Sand and Gravel (8th, 3%)	1,461,647 tons	\$ 1,237,627
Petroleum	341,256 bbls.	996,468
Marl (5th, 7%)	14,325 tons	<u>8,595</u>
Total Value		\$ 2,242,690

Albaugh and Needham	NE SE 32 2S 5W	Sand and Gravel
Carl Avery	2 Pits near Marshall	Marl
Battle Creek Gravel Co.	SW NE 15 1S 7W NW SE 33 1S 8W SW SE 4 2S 8W	Sand and Gravel

Calhoun Co. Road Comm.		Sand and Gravel
Cole Bros.	SW NE 33 1S 8W	Sand and Gravel
Emil Combs	NE SE 18 4S 5W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Pickitt and Schreur	Various Pits	Sand and Gravel
Clyde M. Reed	21 4S 7W	Marl
Harlan Spoor	23 4S 7W	Marl
West Shore Constr.	NE NW 31 3S 4W	Sand and Gravel

		<u>Quantity</u>	<u>Value</u>
CASS (66)			
Sand and Gravel, Marl			**
Cass Co. Road Comm.	SE SE 17 6S 13W NE NE 20 5S 13W NE SE 16 6S 15W	Sand and gravel	
Richard Grabmeyer	15 5S 16W	Marl	
Nieb Concrete Products Co.	NW NW 15 7S 16W	Sand and gravel	
Otto Poehlman Jr.	13 7S 16W	Marl	
John G. Yerington	NE SW 28 7S 13W	Sand and gravel	

CHARLEVOIX (78)			
Stone		7,609 tons	\$ 16,740
Sand and Gravel		5,215 tons	3,129
Total value			\$ 19,869
Charlevoix Lime and Stone Co.	29 34N 8W	Limestone-crushed	
Michigan State Hwy. Dept.		Sand and gravel	

CHEBOYGAN (64)			
Sand and Gravel		325,934 tons	\$209,360
Stone		26,440 tons	17,490
Total value			\$226,850
Afton Stone and Lime Co.	SE 25 35N 2W	Limestone-crushed	
Hugh H. Mason and Sons	SE SW 32 33N 3W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	

CHIPPEWA (22)			
Stone (3rd), Sand and Gravel			**
Chippewa Co. Rd. Comm.	NW SE 15 45N 2W E 6 46N 5W	Sand and gravel	
Drummond Dolomite, Inc.	NW NW 25 47N 1W E SW 36 42N 5E	Dolomite-crushed	
Michigan State Hwy. Dept.		Sand and gravel	
I. L. Whitehead Co.	N NW 23 45N 2W E 6 46N 5W NE 17 46N 7W NE SE 35 47N 1W SE SW 14 47N 1W NW NW 28 47N 3W	Sand and gravel	

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

		<u>Quantity</u>	<u>Value</u>
CLARE (40)			
Petroleum (9th, 5%)		474,876 bbls.	\$ 1,386,638
Natural Gas		354,741 M.cu.ft.	69,174
Sand and Gravel		50,893 tons	30,536
Total value			\$ 1,486,348
Michigan State Hwy. Dept.		Sand and Gravel	

CLINTON (61)			
Undistributed: Sand and Gravel, Shale*, Peat			\$ 340,694
American Vitrified Products	SE 34 5N 4W	Shale	
Boichot Concrete Products	NE SW 3 5N 2W	Sand and Gravel	
Clinton Co. Road Comm.		Sand and Gravel	
Gillette Sand and Gravel	25 5N 1W	Sand and Gravel	
Grand Ledge Clay Products	SE 34 5N 4W	Shale	
Michigan State Hwy. Dept.		Sand and Gravel	
Walling Gravel Co.	SE NW 34 8N 2W	Sand and Gravel	
Ronald Weaver	13 6N 1W	Sand and Gravel	

CRAWFORD (54)			
Petroleum		171,146 bbls.	\$ 499,747
Natural Gas (5th, 5%)		771,324 M.cu.ft.	150,408
Natural Gasoline (1st, 71%)		1,957,900 gals.	109,642
Sand and Gravel		56,068 tons	35,258
Total value			\$ 795,055
Crawford Co. Road Comm.	SE NW 27 25N 2W NW SW 9 25N 3W SW SW 27 26N 3W S SW 28 26N 3W 34 26N 3W	Sand and gravel	
Michigan State Hwy. Dept.		Sand and gravel	

DELTA (46)			
Sand and Gravel, Stone			**
Bark River Const. Co.		Sand and gravel	
Bichler Bros.	NE 12 39N 23W SW 1 39N 23E	Sand and gravel Limestone-crushed	
Cloverland Milling and Supply Co.	NE SE 16 40N 22W	Sand and gravel	
Days River Sand and Gravel Co.	15 40N 22W	Sand and gravel	

** Mineral value included under undistributed at end of County breakdown.
* Value of clay used in manufacture of Portland cement and clay products not included in county total.

		<u>Quantity</u>	<u>Value</u>
DELTA (contd.)			
Delta County 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	
DICKINSON (38)			
Iron Ore		149,715 tons	\$ 1,365,670
Stone		6,693 tons	110,074
Sand and Gravel		129,376 tons	49,689
Total value			\$ 1,525,433
Dickinson Co. Rd. Comm.	SE NW 7 41N 27W C SE 20 42N 28W SE 28 42N 30W	Sand and Gravel	
M. A. Hanna Co.			
Groveland Open Pit	31 42N 29W	Iron Ore	
The Metro-Nite Co.	NW 35 42N 28W	Dolomite-crushed	
Michigan State Hwy. Dept.		Sand and Gravel	
Pickands Mather and Co.			
Cornell Mine	17 40N 30W	Iron Ore	
Superior Rock Products Co.	SW SE 30 42N 29W	Hornblende Schist - crushed	
EATON (36)			
Undistributed: Clay Products (3rd), Sand and Gravel, Stone, Shale*, Peat			\$ 1,657,218
American Vitrified Products	NE 10 4N 4W	Tile	
Cheney Limestone Co.	NE 29 1N 6W	Limestone-crushed	
Eaton County Road Comm.	SE NW 5 1N 3W NE NE 19 1N 5W SE SW 32 2N 3W SE NW 23 4N 6W	Sand and Gravel	
O.E. Gooding and Co.	E NW 13 2N 3W	Sand and Gravel	
Grand Ledge Clay Products	SE 3 4N 6W	Shale-Tile	
Pryor Bros.	NW SW 7 2N 4W SW SE 3 3N 3W SE NW 15 3N 3W SE NE 7 3N 4W	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
Vermontville Gravel Co.	W NE 20 3N 6W	Sand and Gravel	
West Shore Constr. Co.	28 2N 4W	Sand and Gravel	
	Bust Pit Moon Pit Smith Pit Morton Pit		

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

		<u>Quantity</u>	<u>Value</u>
EMMET (13)			
Portland Cement (3rd) Stone*			**
Penn-Dixie Cement Corp.	2 34N 6W	Limestone-crushed Portland cement	
GENESEE (55)			
Sand and Gravel		874,044 tons	\$ 755,491
Petroleum		3,783 bbls.	11,047
Total value			\$ 766,538
Ferguson Excavating Co.	Richfield Twp.	Sand and Gravel	
Kurtz Gravel Co.	SE SW 1 8N 7E SE NE 20 8N 7E NW NW 2 9N 8E	Sand and Gravel	
A. S. Leffler	NW NW 2 9N 8E	Sand and Gravel	
Mathews Gravel Co.	SW SE 1 8N 7E	Sand and Gravel	
Otisville Stone Co.	S NE 13 9N 8E	Sand and Gravel	
John Post and Sons	SW NW 7 6N 5E	Sand and Gravel	
Saginaw Core Sand Co.	SE NE 28 9N 8E	Sand and Gravel	
Justus Snellenberger	SE 16 9N 5E	Sand and Gravel	
GLADWIN (42)			
Petroleum (8th, 5%)		506,422 bbls.	\$ 1,478,753
Sand and Gravel		3,905 tons	2,343
Total value			\$ 1,481,096
Gladwin Co. Road Comm.	S SE 26 18N 2W	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
GOGEBIC (10)			
Undistributed: Iron (3rd, 17%), Sand and Gravel			\$ 10,698,454
Gogebic Co. Road Comm.	NE SW 17 45N 38W SW SE 13 45N 39W SE SW 8 48N 46W	Sand and Gravel	
Ironwood Concrete Products Co.	5 47N 47W	Sand and Gravel	
Lake Superior Gravel Co.	NW SW 31 48N 46W NW SW 33 48N 46W	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	

* Value of stone used in the 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>
GOGEBIC (contd.)		
North Range Mining Co. Penokee Mine	Ironwood	Iron Ore
Pickands Mather and Co. Geneva-Davis Mine	18, 19 47N 46W	Iron Ore
Newport-Bonnie Mine	24 47N 46W	
Peterson Mine	16, 17 47N 46W	
Sunday Lake Mine	9 47N 45W	
Elmer Piispanen	SE NW 33 48N 46W	Sand and Gravel
GRAND TRAVERSE (80)		
Sand and Gravel	14,680 tons	\$ 8,778
Michigan State Hwy. Dept.		Sand and Gravel
GRATIOT (18)		
Bromine (3rd), Salt, Magnesium Compounds, Calcium-Magnesium Chloride (3rd), Petroleum, Sand and Gravel, Natural Gas		**
Gratiot County Road 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
Mid-America Eng. Corp.		Sand and Gravel
North Star Gravel Co.	NW SE 22 10N 2W NE SE 34 11N 4W	Sand and Gravel
P and B Gravel Co.	9 10N 1W	Sand and Gravel
The Taber Co.		Sand and Gravel

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

	<u>Quantity</u>	<u>Value</u>
HILLSDALE (19)		
Petroleum (1st, 14%)	1,496,936 bbls.	\$ 4,371,054
Sand and Gravel	886,791 tons	715,035
Undistributed: Marl, Stone		954
Total value		\$ 5,087,043
Bundy Hill Gravel Co.	7 & 8 5S 1W	Sand and Gravel
Canary Hill Stone Quarry	West of Hillsdale	Sandstone
Comstock Constr. Co.	23 8S 2W	Sand and Gravel
H. Eckley	8S 2W	Sand and Gravel
O. E. Gooding and Co.	NE SW 23 8S 2W	Sand and Gravel
Hillsdale County Road Comm.	NE NE 15 5S 2W	Sand and Gravel
	NE SE 11 5S 3W	
	SE NW 22 5S 4W	
	SE SE 9 6S 3W	
	NE NW 9 6S 3W	
	SW SE 5 7S 2W	
	NW NE 10 7S 2W	
	SW SE 25 7S 2W	
	NW NE 33 7S 3W	
	SE SE 1 7S 4W	
	SE NE 30 7S 4W	
Hoover Bros.	NE SW 23 8S 2W	Sand and Gravel
Northwest Material, Inc.	SW 23 8S 2W	Sand and Gravel
Art Russell's Concrete	14 6S 3W	Sand and Gravel
Southern Mich. Mtls., Inc.	NW SW 23 8S 2W	Sand and Gravel
Lowell W. Stukey		Marl
HOUGHTON (15)		
Copper (3rd, 18%)	20,689,233 lbs.	\$ 6,448,420
Undistributed: Sand and Gravel, Stone		327,417
		\$ 6,775,837
Calumet and Hecla, Inc.		Copper
Centennial Mine	18 56N 32W	
Osceola Mine	23 56N 33W	
Reclamation		
Copper Range Co.		Copper
Champion Mine	31 54N 34W	
Hocking Constr. Co.		Sand and Gravel
Houghton County Road Comm.	SE 15 54N 34W	Trap Rock-crushed
	NW NE 17 56N 32W	
	Arcadian Mine	
Limestone Mountain Co.	SW 24 51N 35W	Dolomite-crushed
Michigan State Hwy. Dept.		Sand and Gravel
Quincy Mining Co.		Copper
Reclamation	Mason	

	<u>Quantity</u>	<u>Value</u>
HURON (48)		
Stone (5th), Sand and Gravel, Petroleum		**
Huron County Road Comm.	SE SE 17 16N 13E	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
V. Molesworth		Sand and Gravel
Ed Murawski	NW SW 31 17N 14E	Sand and Gravel
Wagner Sand and Gravel	SW SW 22 16N 15E	Sand and Gravel
	SE NE 20 16N 13E	
	NE SW 27 16N 15E	
The Wallace Stone Co.	SW NE 5 16N 10E	Limestone-crushed and dimensional
INGHAM (47)		
Sand and Gravel (9th, 2%)	1,081,808 tons	\$ 1,060,402
Undistributed: Lime, Peat		110,765
Total value		\$ 1,171,167
Board of Water and Light	Lansing	Lime
Central Michigan Sand and Gravel	SE SW 24 3N 2W	Sand and Gravel
Cheney Gravel Co.	SW SE 11 3N 2W	Sand and Gravel
Fisher Supply Co.	34 4N 2W	Sand and Gravel
Ford & Co.	SE 19 3N 2W	Sand and Gravel
O. E. Gooding		Sand and Gravel
Ingham County Road Comm.	NE SW 16 1N 2W	Sand and Gravel
	E SW 21 1N 2W	
	NE NE 10 2N 1E	
	SE NE 15 2N 1E	
	SE NW 14 2N 2E	
	NE NW 26 2N 2E	
	SW SE 7 2N 2W	
	SW SE 34 3N 1E	
	SW SE 25 3N 2E	
	NE NW 25 3N 2W	
	SE SE 30 3N 2W	
S.E. Ketchum and Sons	NW 36 3N 2W	Sand and Gravel
Mason Gravel Co.	25 2N 2W	Sand and Gravel
Scarlett Gravel Co.	25 3N 2W	Sand and Gravel
Skyway Sand and Gravel Co.		Sand and Gravel
Ronald Weaver	11 1N 2W	Sand and Gravel
	14, 34 2N 1E	
	9 2N 1W	
	7, 24, 25, 34 2N 2W	
	25, 35 3N 2W	

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

	<u>Quantity</u>	<u>Value</u>
IONIA (74)		
Sand and Gravel, Petroleum		**
Ionia County Road Comm.	NE SW 18 5N 5W	Sand and Gravel
	SE NE 24 5N 7W	
	SE SE 8 6N 5W	
	NW SW 28 6N 5W	
	NE SW 15 7N 5W	
	SW SE 21 7N 6W	
	NW NE 33 7N 7W	
	30 7N 5W	
Harold L. Martin		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
IOSCO (17)		
Gypsum (1st), Sand and Gravel		**
Iosco County Hwy. Dept.	NE NW 1 21N 5E	Sand and Gravel
	SE NE 30 21N 5E	
Michigan State Hwy. Dept.		Sand and Gravel
National Gypsum Co.	35 22N 6E	Gypsum
U.S. Gypsum Co.	27 21N 7E	Gypsum
IRON (6)		
Iron (2nd, 32%)	2,328,265 tons	\$ 18,998,843
Sand and Gravel	100,525 tons	85,022
Total value		\$ 19,083,865
M. A. Hanna Co.		Iron Ore
Cannon Mine	36 43N 35W	
Hiawatha Mine 1 and 2	35, 36 43N 35W	
Homer Mine	22, 23 43N 35W	
Wauseca - Aronson Mine	23 43N 35W	
Inland Steel Co.		Iron Ore
Bristol Mine	19, 20 43N 32W	
Sherwood Mine	23 43N 35W	
Iron County Road Comm.	SW SW 29 42N 32W	Sand and Gravel
	NW NE 18 43N 32W	
	SW SW 7 43N 35W	
	SE NW 1 43N 36W	
	SW SE 8 44N 33W	
	SE NW 15 44N 33W	
	NE NE 22 44N 33W	
	NE NW 36 44N 34W	
	NW NW 10 44N 37W	
	NW SW 20 45N 33W	

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

	<u>Quantity</u>	<u>Value</u>
IRON (contd.)		
Michigan State Hwy. Dept. Pickands Mather Co. Buck Mine	6, 7 42N 34W	Sand and gravel Iron Ore
Republic Steel Corp. Tobin-Columbia Mine	30, 31 43N 32W	
<hr/>		
ISABELLA (23)		
Petroleum (2nd, 8%)	854,488 bbls.	\$ 2,632,488
Natural Gas	319,505 M.cu.ft.	62,303
Natural Gasoline (3rd, 7%)	213,066 gals.	11,932
Undistributed: Sand and Gravel, Marl (2nd, 20%)		<u>290,520</u>
Total value		\$ 2,997,243
<hr/>		
Gatehouse Bros.	35 15N 6W	Marl
George Hubscher	22 14N 5W 7 16N 3W	Sand and gravel
Stewart and Schaefer		Marl
William Stuart	12 15N 5W	Marl
C. Utterback	35 15N 6W	Sand and gravel
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JACKSON (41)		
Sand and Gravel	915,024 tons	\$ 648,333
Petroleum	208,092 bbls.	607,629
Stone	51,039 tons	223,760
Marl	8,628 tons	<u>5,177</u>
Total value		\$ 1,484,899
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Barnes and Brothers	Horton	Marl
O.E. Gooding and Co.	SW SW 35 1S 2E	Sand and gravel
John Hess	Hanover	Marl
Jackson County Road Comm.	SE SE 29 1S 1W	Sand and gravel
Jeffery Limestone Co.	SE 30 2S 2W	Limestone-crushed
Klumpp 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
Palmer Sand and Gravel	SW NW 8 3S 1E	Sand and gravel
Ray Sandstone Quarry	NE NW 6 4S 2E	Sandstone
Star Sandstone Co.	SW SE 31 3S 2E	Sandstone
Gordon D. Stevick	NW SE 26 2S 1W SE SW 17 3S 2E	Sand and gravel
Willson Bros.	Rives Junction	Sand and gravel

	<u>Quantity</u>	<u>Value</u>
KALAMAZOO (51)		
Sand and Gravel, Marl (1st, 20%), Peat, Petroleum		**
American Aggregates Corp. Roy Coville	SW NW 15 1S 11W Climax	Sand and Gravel Marl
Concrete Products and Building Supplies	NE SE 8 2S 11W	Sand and Gravel
David Flora		Marl
Gravel Producers, Inc.	Portage and Cooper Twps.	Sand and Gravel
Lawrence Hayward	Brady and Climax Twps.	Marl
Michigan State Hwy. Dept.		Sand and Gravel
Pickitt and Schreur	NE NW 34 1S 11W	Sand and Gravel
Fred Rumz	30 4S 10W	Marl
Dan Slack	9 1S 12W	Marl
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KALKASKA (67)		
Petroleum	33,104 bbls.	\$ 96,664
Sand and Gravel	44,991 tons	23,011
Natural Gas	98,273 M.cu.ft.	<u>19,163</u>
Total value		\$ 138,838
<hr/>		
Kalkaska County Road Comm.	25N 8W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
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KENT (27)		
Sand and Gravel (4th, 4%), Gypsum (2nd), Petroleum, Natural Gas, Peat		\$ 2,884,160
Bestwall Gypsum Co.	SW 34 7N 12W	Gypsum
The Chesapeake and Ohio R.R. Co.	9 6N 12W	Sand and Gravel
Coit Ave. Gravel Co.	29 8N 11W	Sand and Gravel
Cross and White		Sand and Gravel
Ed. DeVries and Sons	NE 22 7N 12W	Sand and Gravel
City Eng. Grand Rapids		Sand and Gravel
Grand Rapids Gravel Co.	SE SW 3 6N 12W NW NE 9 6N 12W SE NW 9 6N 12W NE NW 16 6N 12W SW SW 33 7N 12W NE 34 7N 12W	Sand and Gravel
Grand Rapids Gypsum Co.		Sand and Gravel

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

		<u>Quantity</u>	<u>Value</u>
KENT (contd.)			
Kent County Road Comm.	NE SW 27 5N 10W SE SE 20 6N 9W NE NE 32 7N 9W SE SW 11 10N 12W		Sand and Gravel
Michigan State Hwy. Dept. Paul C. Miller	16 10N 11W		Sand and Gravel
Northeast Gravel Co.	NE SW 24 8N 11W		Sand and Gravel
Pekaar and Van Doorn	NE NE 16 6N 12W		Sand and Gravel
H.F. Postma Gravel Co.	SE SW 8 6N 12W SW SE 9 6N 12W		Sand and Gravel
Pickitt and Schreur	NE NE 10 6N 9W NE NW 25 5N 12W SW SE 23 8N 11W		Sand and Gravel
Riverside Sand and Gravel Co.	SE SW 33 7N 12W		Sand and Gravel
United States Gypsum Co.	NE 34 7N 12W		Gypsum
West Shore Constr. Co.	N NE 20 6N 12W		Sand and Gravel
	Post Pit Fenske Pit		
KEWEENAW (14)			
Copper (2nd, 20%)		22,730,365 lbs.	\$ 7,084,600
Sand and Gravel		16,527 tons	15,991
Total value			\$ 7,100,591
Calumet and Hecla Inc.			Copper
Ahmeek No. 2	28 57N 32W		
Allouez No. 3	32 57N 32W		
Peninsula	28 57N 32W		
Seneca No. 2	27 57N 32W		
Keweenaw County Road Comm.			Sand and Gravel
LAKE (76)			
Petroleum		7,153 bbls.	\$ 20,887
Sand and Gravel		22,238 tons	20,344
Total value			\$ 41,231
Michigan State Hwy. Dept. Lake County Road Comm.	SE NE 23 18N 13W NW SE 10 20N 14W		Sand and Gravel Sand and Gravel

		<u>Quantity</u>	<u>Value</u>
LAPEER (53)			
Peat (2nd), Calcium-Magnesium Chloride, Sand and Gravel			\$ 843,826
O. E. Gooding Co.			Sand and Gravel
Lapeer County Road Comm.	NE SE 11 6N 10E NE NW 1 8N 9E SE SW 30 8N 10E SW SE 16 9N 10E NW SW 28 9N 12E NW 12 7N 10E		Sand and Gravel Sand and Gravel
Pine Sand and Gravel Wilkinson Chemical Co.			Sand and Gravel Calcium-Magnesium Chloride
LEELANAU (79)			
Sand and Gravel		39,106 tons	\$ 19,553
Leelanau Co. Rd. Comm.	NE NW 16 28N 13W SW SE 12 29N 13W SW NW 19 32N 10W		Sand and Gravel
LENAWEE (21)			
Cement, Sand and Gravel, Clay Products, Clay*, Peat			**
Adrian Sand and Gravel Comfort Brick and Tile Co.	Adrian SW 2 6S 5E		Sand and Gravel Clay and Tile
O. E. Gooding and Co.	SW NE 13 8S 1E		Sand and Gravel
Lenawee Co. Road Comm.	SE SE 4 6S 4E		Sand and Gravel
Peninsular Portland Cement Corp.	NE 5 5S 1E SW 5 7S 1E		Portland Cement Clay
Stamm Bros. Gravel Co.	SW NE 19 7S 3E		Sand and Gravel
Tecumseh Gravel Co.	SW NE 4 6S 4E		Sand and Gravel
Tecumseh Materials, Inc.	NE SE 4 6S 4E		Sand and Gravel

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

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

	<u>Quantity</u>	<u>Value</u>
LIVINGSTON (25)		
Sand and Gravel (2nd, 5%)	2,454,525 tons	\$ 2,782,504
Natural Gas (3rd, 5%)	801,786 M.cu.ft.	<u>156,348</u>
Total value		\$ 2,938,852

American Aggregates Corp.	NE NE 11 1N 6E	Sand and Gravel
D. and J. Gravel Co.	SW SW 32 3N 4E	Sand and Gravel
Van E. Dailey		Sand and Gravel
O. E. Gooding Co.		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel

LUCE (68)

Sand and Gravel	165,735 tons	\$ 103,779
Luce County Road Comm.	SW SE 11 45N 10W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel

MACKINAC (20)

Stone (2nd), Sand and Gravel		**
Inland Lime and Stone Co.	6 42N 12W	Limestone-crushed
Mackinac Aggregates Corp.	7 and 8 42N 1 W	Sand and Gravel
Mike Mangene	SE NE 24 42N 1E	Sand and Gravel
Michigan Limestone Div.		
U.S. Steel Corp.	10 42N 1E	Limestone-crushed
Michigan State Hwy. Dept.		Sand and Gravel
Lawrence Tamlyn	SW SW 6 40N 3W	Sand and Gravel

MACOMB (45)

Sand and Gravel (7th, 3%)	1,528,874 tons	\$ 1,233,038
Undistributed: Peat, Natural Gas		<u>10,384</u>
Total value		\$ 1,243,422

Advance Bldg. Materials, Inc.	NE NW 8 4N 12E SE NE 31 3N 12E	Sand and Gravel
Great Lakes Gravel Co.	NW NW 31 3N 12E	Sand and Gravel
Hygrade Sand and Gravel Co.	NE 8 4N 12E	Sand and Gravel
Fred Kaatz	16 4N 14E	Sand and Gravel
Macomb Co. Road Comm.	8 4N 12E 22 5N 12E 19 5N 13E	Sand and Gravel

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

	<u>Quantity</u>	<u>Value</u>
MACOMB (contd.)		
Macomb Sand and Gravel	SW SW 30 3N 12E	Sand and Gravel
Maertens Sand and Gravel	SE NE 30 3N 12E SE SW 5 4N 12E NW NW 3 1N 13E	Sand and Gravel
Louis Marsack and Sons		Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Morgan Sand and Gravel	30 3N 12E	Sand and Gravel
Ray Industries, Inc.	NE SW 18 3N 12E	Sand and Gravel
S.K. Rogers	21 3N 14E	Sand and Gravel
Smith Sand and Gravel Co.	NW SE 8 4N 12E	Sand and Gravel
Underwood Sand and Gravel Co.	19 3N 12E	Sand and Gravel
Wolverine Contractors, Inc.		Sand and Gravel
Allen Zavitz	2N 14E	Sand and Gravel

MANISTEE (8)

Undistributed: Salt (3rd), Magnesium Compounds (1st), Bromine (2nd), Sand and Gravel		\$ 12,594,089
Frank L. Gauthier	23 23N 16W	Sand and Gravel
Great Lakes Chemical Corp.	SE SW 18 21N 16W	Bromine
Manistee Co. Road Comm.	6 and 7 23N 14W	Sand and Gravel
Manistee Salt Works	Manistee	Salt
Michigan Chemical Corp.	NW 7 21N 16W	Bromine
Michigan State Hwy. Dept.		Sand and Gravel
Morton Chemical Co.	12 21N 7W	Bromine, Magnesium Compounds
Morton Salt Co.		Salt
Sand Products Corp.	N ¹ / ₂ 11 21N 17W	Sand
Standard Lime and Cement Co.	SE 18 21N 16W	Magnesium Compounds

MARQUETTE (4)

Iron (1st, 49%)	3,529,949 tons	\$ 31,146,329
Sand and Gravel	543,175 tons	<u>488,052</u>
Total value		\$ 31,634,381

The Cleveland Cliffs Iron Co.		Iron Ore
Athens-Bunker Hill Mine	6 47N 26W	
Cambria Mine	35, 36 48N 27W	
Cliffs Shaft Mine	3, 9, 10 47N 27W	
Humbolt Open Pit	10, 15 47N 29W	
Maas Mine	31 48N 26W	
Mather "A" Mine	2 47N 27W	

	<u>Quantity</u>	<u>Value</u>
MARQUETTE (contd.)		
Mather "B" Mine	1 47N 27W	
Republic Open Pit	7 46N 29W	
Tilden Open Pit	26 47N 27W	
Inland Steel Co.		Iron Ore
Morris Mine	1, 2 47N 28W	
Greenwood Mine	14, 23 47N 28W	
Jones and Laughlin Steel Corp.		Iron Ore
Tracy Mine	7, 8 48N 26W	
Lake Superior and Ishpeming R.R.		Sand and Gravel
A. Lindberg and Sons, Inc.	SE SE 8 47N 24W	Sand and Gravel
	NW NW 17 47N 25W	
	NE NW 5 47N 26W	
	SE SE 36 48N 28W	
City Eng. Marquette		Sand and Gravel
Marquette Co. Rd. Comm.	NE NW 1 45N 23W	Sand and Gravel
	SE SW 36 46N 23W	
	NW SE 4 47N 29W	
Michigan State Hwy. Dept.		Sand and Gravel
North Range Mining Co.		Iron Ore
Champion	31 48N 29W	
Pickands Mather Co.		Iron Ore
Volunteer Open Pit	25, 30 47N 26W	
MASON (12)		
Calcium-Magnesium Chloride (2nd), Magnesium Compounds (3rd), Lime (2nd), Petroleum, Bromine, Sand and Gravel, Natural Gasoline, Natural Gas		**
The Dow Chemical Co.	NW SW 23 18N 18W	Bromine, Calcium-Magnesium Chloride, Magnesium Compounds, Lime
Harbison-Walker Refractories	NE SE 23 18N 18W	Magnesium Compounds
Mason Co. Rd. Comm.	SW SW 11 18N 15W	Sand and Gravel
	18 18N 16W	
Sargent Sand Co.	SW 33 19N 18W	Sand

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

	<u>Quantity</u>	<u>Value</u>
MECOSTA (62)		
Petroleum	63,742 bbls.	\$ 186,127
Natural Gas	241,031 M.cu.ft.	47,001
Sand and Gravel	87,824 tons	36,913
Marl	12,450 tons	7,470
Total value		\$ 277,511
Wilson Frost	17 13N 7W	Marl
Mecosta Co. Rd. Comm.	NE NE 32 15N 9W	Sand and Gravel
Orville Truman	13N 8W	Marl
MENOMINEE (50)		
Lime, Sand and Gravel		**
Menominee Co. Rd. Comm.	SE NE 33 35N 26W	Sand and Gravel
	NE NE 9 39N 25W	
Michigan State Hwy. Dept.		Sand and Gravel
Northwestern-Hanna Fuel Co.	Menominee	Lime
Walsh Sand and Gravel Co.	SW SW 21 33N 27W	Sand and Gravel
MIDLAND (3)		
Bromine (1st), Calcium-Magnesium Chloride (1st), Magnesium Compounds (2nd), Salt (4th), Petroleum, Potash, Sand and Gravel, Natural Gas, Natural Gasoline		**
The Dow Chemical Co.	Midland	Bromine, Calcium-Magnesium Chloride, Potash, Magnesium Compounds, Salt
Fisher Sand and Gravel Co.	NE SW 19 14N 2E	Sand and Gravel
Saginaw Core Sand Co.	SE 21 13N 2E	Sand
MISSAUKEE (43)		
Petroleum (10th, 4%)	458,990 bbls.	\$ 1,340,251
Natural Gas	209,322 M.cu.ft.	40,818
Sand and Gravel	23,324 tons	13,994
Natural Gasoline	72,439 gals.	4,057
Marl	1,694 tons	1,252
Total value		\$ 1,400,372
C. Stanley Hooker	3 21N 7W	Marl
Michigan State Hwy. Dept.		Sand and Gravel

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

	<u>Quantity</u>	<u>Value</u>
MUSKEGON (31)		
Undistributed: Sand and Gravel, Salt, Petroleum Natural Gas		\$ 1,941,249
Hooker Electro-Chemical Co.	NE 31 12N 17W	Salt
Muskegon Co. Rd. Comm.		Sand and Gravel
Nugent Sand Co.	3 9 N 17W	Sand
Oceana Sand and Gravel, Inc.	12N 16W	Sand and Gravel
Sand Products Corp.	E $\frac{1}{2}$ 28 10N 17W	Sand
NEWAYGO (60)		
Petroleum	98,671 bbls.	\$ 288,119
Sand and Gravel	71,348 tons	52,409
Marl	2,820 tons	<u>1,692</u>
Total value		\$ 342,220
K. and V. Gravel Co.	NE NW 21 12N 12W	Sand and Gravel
Dennis Lettings	29 11N 11W	Marl
Michigan State Hwy. Dept.		Sand and Gravel
OAKLAND (16)		
Sand and Gravel (1st, 13%)	6,468,097 tons	\$ 5,803,226
Peat (3rd)	42,535 tons	126,169
Petroleum	2,626 bbls.	7,668
Natural Gas	4,735 M.cu.ft.	<u>923</u>
Total value		\$ 5,937,986
American Aggregates Corp.	NE NW 22 5N 10E	Sand and Gravel
Floyd Beardslee	S $\frac{1}{2}$ SE 2 2N 10E	Sand and Gravel
	NE NW 11 2N 10E	
Foley and Beardslee	NW NW 7 3N 9E	Sand and Gravel
	SW SE 36 4N 8E	
J. Gladstone and Son	NE 8 3N 11E	Sand and Gravel
O. E. Gooding and Co.	NW NE 33 2N 7E	Sand and Gravel
	NE SE 34 2N 7E	
	SW SW 32 5N 9E	
Holly Mfg. and Mining Co.	NE SE 32 5N 8E	Sand and Gravel
John R. Sand and Gravel Co.	SE 4 4N 10E	Sand and Gravel
Kemler Bros.	SW SW 36 5N 11E	Sand and Gravel
Koan Gravel Co.	SE NE 28 5N 7E	Sand and Gravel
Koenig Coal and Supply Co.	NW 1 3N 8E	Sand and Gravel
	SW SE 24 5N 10E	
Michigan State Hwy. Dept.		Sand and Gravel

	<u>Quantity</u>	<u>Value</u>
MONROE (37)		
Undistributed: Stone (4th), Clay Products, Peat, Sand and Gravel, Petroleum, Clay*		\$ 1,608,595
The France Stone Co.	SE 7 7S 9E	Dolomite-crushed
Maybee Stone Co.	29 5S 8E	Dolomite-crushed
Michigan State Hwy. Dept.		Sand and Gravel
Michigan Stone Co.	SW 25 8S 6E	Dolomite-crushed
Monroe Co. Rd. Comm.	SW 13 6S 7E	Dolomite-crushed
F.W. Ritter Sons Co., Inc.	SE 16 5S 10E	Clay-Pottery
MONTCALM (26)		
Petroleum (3rd, 8%)	797,571 bbls.	\$ 2,328,907
Sand and Gravel	590,436 tons	551,681
Undistributed: Natural Gas, Peat		<u>34,190</u>
Total value		\$ 2,914,778
The Dyer Co.	SE SE 8 12N 5W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Montcalm Co. Rd. Comm.	NE SE 13 10N 6W	Sand and Gravel
	NE NE 24 10N 6W	
	NE NW 10 11N 8W	
	SE SE 8 12N 5W	
Frank H. Stoerk	Pierson	Sand and Gravel
MONTMORENCY (82)		
Sand and Gravel	11,273 tons	\$ 6,025
Petroleum	165 bbls.	<u>482</u>
Total value		\$ 6,507
Michigan State Hwy. Dept.		Sand and Gravel
Montmorency Co. Rd. Comm.	SW NW 27 30N 1E	Sand and Gravel
	NE NW 28 30N 1E	
	NE NW 9 32N 4E	
	11 30N 4E	

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

	<u>Quantity</u>	<u>Value</u>
OAKLAND (contd.)		
Mickelson Corp.	NE NW 21 3N 8E	Sand and Gravel
New Hudson Sand and Gravel	NW NE 33 2N 7E	Sand and Gravel
Oxford Mining Co.	4 4N 8E	Sand and Gravel
Oakland Co. Rd. Comm.	SE SE 9 2N 8E	Sand and Gravel
	NW NW 1 3N 10E	
	SE SW 8 4N 8E	
	SE SW 32 5N 9E	
	SW SE 36 5N 11E	
Pontiac City Eng.		Sand and Gravel
Salem Gravel and Constr. Co.	E NE 2 4N 9E	Sand and Gravel
Slaters Bald Mountain Gravel Pit	SW 36 4N 10E	Sand and Gravel
U.S. Aggregates		Sand and Gravel
Underwood Sand and Gravel Co.	SW 2 3N 10E	Sand and Gravel
Lyle J. Walker Sand and Gravel	NE SE 34 2N 7E	Sand and Gravel
	SE SW 2 2N 11E	
F.S. Ward	NW NE 7 3N 9E	Sand and Gravel
Western Constr.		Sand and Gravel
Wolverine Contractors Inc.		Sand and Gravel
OCEANA (52)		
Petroleum	307,677 bbls.	\$ 898,417
Undistributed: Natural Gas, Sand and Gravel, Marl		28,404
Total value		\$ 926,821
Ted Lamdrix	25 16N 18W	Marl
Michigan State Hwy. Dept.		Sand and Gravel
OGEMAW (35)		
Petroleum (7th, 5%)	541,858 bbls.	\$ 1,582,225
Natural Gas (4th, 5%)	800,254 M.cu.ft.	156,047
Sand and Gravel	191,105 tons	69,281
Total value		\$ 1,807,553
Ehinger Bros.		Sand and Gravel
Ogemaw Co. Rd. Comm.	NE SE 3 21N 1E	Sand and Gravel
	NE SE 6 21N 2E	
	NW SW 5 22N 2E	
	NE SE 6 22N 2E	
	NW SE 33 22N 3E	
Walter Rosevear	NE SE 6 22N 2E	Sand and Gravel

	<u>Quantity</u>	<u>Value</u>
ONTONAGON (5)		
Copper (1st, 62%)	69,661,935 lbs.	\$ 21,712,232
Sand and Gravel	129,080 tons	63,792
Total value		\$ 21,776,024
Michigan State Hwy. Dept.		Sand and Gravel
Ontonagon Co. Rd. Comm.	Various Pits	Sand and Gravel
White Pine Copper Co.		Copper
White Pine Mine	4,5, 9 5N 42W	
OSCEOLA (30)		
Petroleum (5th, 6%)	611,276 bbls.	\$ 1,784,926
Sand and Gravel	285,166 tons	224,341
Natural Gas	491,114 M.cu.ft.	95,767
Marl	10,443 tons	7,804
Total value		\$ 2,112,838
C. Stanley Hooker	24 20N 10W	Marl
	1 20N 8W	
Michigan State Hwy. Dept.		Sand and Gravel
The Wallace Stone Co.		
Hersey Sand and Gravel Div.	NW SW 20 17N 9W	Sand and Gravel
OSCODA (81)		
Petroleum	1,941 bbls.	\$ 5,668
Sand and Gravel	3,429 tons	2,057
Total value		\$ 7,725
Michigan State Hwy. Dept.		Sand and Gravel
OTSEGO (77)		
Sand and Gravel	36,650 tons	\$ 24,360
Natural Gas	14,912 M.cu.ft.	2,908
		\$ 27,268
Hutchins Sand and Gravel	SE NE 17 29N 3W	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Otsego Co. Rd. Comm.	SW NW 16 29N 3W	Sand and Gravel
	NW SW 2 30N 3W	
	NW NW 3 31N 3W	
	NW NE 29 31N 3W	

		<u>Quantity</u>	<u>Value</u>
OTTAWA (29)			
Sand and Gravel (6th, 4%), Petroleum, Marl			**
Construction Aggregates Corp.	SE SW 16 8N 15W	Sand and Gravel	
Henry DeWent	SW SW 22 6N 13W	Sand and Gravel	
William Huizenga	24 5N 15W	Sand and Gravel	
Tom Johnston Gravel Co.	7 7N 14W	Sand and Gravel	
Kenry Koster	23 6N 13W	Marl	
Pickitt and Schreur	Ottawa Co. Pit	Sand and Gravel	
Standard Sand Co.	NW 4 7N 16W	Sand	
West Shore Constr. Co.	6 5N 14W	Sand and Gravel	

PRESQUE ISLE (9)			
Stone (1st), Sand and Gravel			**
Michigan Limestone Div.- U.S. Steel Corp.	23 35N 5E	Limestone-crushed	
Onaway Stone Co.	5 34N 2E	Limestone-dimensional	
Straits Aggregate and Equipment Corp.	NE NW 19 34N 4E NW SW 26 35N 5E	Sand and Gravel	
Presque Isle Corp.	2 33N 8E	Limestone-crushed	

ROSCOMMON (39)			
Petroleum	314,104 bbls.	\$ 917,184	
Sand and Gravel	606,677 tons	335,471	
Natural Gas (2nd, 8%)	1,173,377 M.cu.ft.	227,678	
Natural Gasoline (2nd, 13%)	350,351 Gals	19,620	
Total value		<u>\$1,499,953</u>	
Michigan State Hwy. Dept.		Sand and Gravel	
Delmar Stanley Gravel Co.	SE SE 24 24N 4W	Sand and Gravel	
Jessee Stanley		Sand and Gravel	

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

		<u>Quantity</u>	<u>Value</u>
SAGINAW (63)			
Undistributed: Petroleum, Clay* (3rd), Sand and Gravel			\$ 269,458
Aetna Portland Cement Co.	SW 35 12N 3E	Clay	
Michigan State Hwy. Dept.		Sand and Gravel	
Minco Products Corp.	NW NW 1 11N 3E	Clay	
Ronald Weaver	SE SE 14 9 N 2E	Sand and Gravel	

ST. CLAIR (7)			
Salt (2nd), Portland Cement, Peat, Petroleum, Sand and Gravel, Natural Gas, Clay* (4th)			**
Click Bros.	NE NW 27 7N 15E	Sand and Gravel	
The Diamond Crystal Salt Co.	St. Clair	Evaporated Salt	
Michigan State Hwy. Dept.		Sand and Gravel	
V. Molesworth	NW NW 5 8N 16E N SW 29 8N 15E	Sand and Gravel	
	Brown Pit		
	Shipley Pit		
Morton Salt Co.	Marysville	Evaporated Salt	
Peerless Cement Corp.	Port Huron 32 6N 16E	Portland Cement	
		Clay	
Port Huron Sand and Gravel	Port Huron	Sand and Gravel	

ST. JOSEPH (65)			
Undistributed: Sand and Gravel, Marl, Peat			\$ 200,538
Aggregates Processors, Inc.	NE 7 8S 11W	Sand and Gravel	
Coy Drake	12 5S 12W	Marl	
Michigan State Hwy. Dept.		Sand and Gravel	
Pickitt and Schreur		Sand and Gravel	
Robert Bros.	6S 12W	Marl	
St. Joseph Co. Rd. Comm.	NW 8 8S 11W	Sand and Gravel	

* Value of clay 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>
SANILAC (57)			
Undistributed: Peat (4th), Sand and Gravel			\$ 660,548
V. Molesworth		Sand and Gravel	
Sanilac Co. Rd. Comm.	SW SW 23 9N 14E	Sand and Gravel	
Van Camp's Gravel Pit	SW SE 28 10N 15E	Sand and Gravel	
SCHOOLCRAFT (71)			
Sand and Gravel		128,674 tons	\$ 66,476
Schoolcraft Co. Rd. Comm.	SE SW 7 41N 17W	Sand and Gravel	
SHIAWASSEE (33)			
Clay Products (2nd), Sand and Gravel, Shale*			**
Harry Fuoss	SW SW 30 6N 3E	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
The Michigan Vitriified Tile Co.	SE 22 7N 3E	Shale-Tile	
Shenk Gravel Co.	NW NW 2 6N 4E	Sand and Gravel	
	NE NE 2 6N 4E		
Valley Gravel Co.	SE SW 3 6N 2E	Sand and Gravel	
Ronald Weaver	Various	Sand and Gravel	
TUSCOLA (44)			
Undistributed: Sand and Gravel (10th, 2%), Petroleum and Peat			\$ 1,368,208
Anderson Sand and Gravel Co.	NW SW 19 11N 9E NE NE 20 11N 9E	Sand and Gravel	
Bernthel Sand and Gravel Co.	SW SE 6 11N 9E	Sand and Gravel	
Cass City Concrete Products	SE SW 4 13N 11E	Sand and Gravel	
Clarence Cole	NW NE 9 12N 8E	Sand and Gravel	
Comstock Constr. Co.	8 11N 10E	Sand and Gravel	
Great Lakes Foundry Sand Co.	Near Vassar	Sand	

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

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

		<u>Quantity</u>	<u>Value</u>
TUSCOLA (contd.)			
Hile Bros.	NW SE 3 12N 8E	Sand and Gravel	
C. R. Hunt	SE 33 14N 11E	Sand and Gravel	
Kester Sand and Gravel	SE 21 10N 8 E	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
V. Molesworth		Sand and Gravel	
Peterhans Bros.	SW NE 35 13N 9 E	Sand and Gravel	
Powell and Brock	23 13N 7 E	Sand and Gravel	
Saginaw Core Sand Co.	NW 27 10N 7 E	Sand	
Sargent Sand Co.	5 10N 9 E	Sand and Gravel	
Tuckey's Sand and Gravel	33 14N 10E	Sand and Gravel	
Vaughans Gravel and Excavating	NE NE 25 12N 8 E	Sand and Gravel	
Wilkinson Chemical Co.	Mayville	Calcium-Magnesium Chloride	
VAN BUREN (58)			
Sand and Gravel		572,251 tons	\$ 453,197
Petroleum		23,783 bbls.	69,446
Marl		266 tons	160
Total value			\$ 522,803
Clarence Harter	33 2S 13W	Marl	
Otis Klett		Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	
Pickitt and Schreur	NW SW 24 3S 14W	Sand and Gravel	
Standard Sand Co.	2S 17W	Sand and Gravel	
John G. Yerington	NE SE 24 3S 15W	Sand and Gravel	
	SE SE 12 3S 15W		
	Stoughton Pit		
	Boudreau Pit		
WASHTENAW (34)			
Sand and Gravel		1,844,584 tons	\$ 1,532,813
Petroleum		51,005 bbls.	148,935
Undistributed: Natural Gas, Peat			132,357
Total value			\$ 1,814,105
Dexter Gravel Co.	SW SE 5 2S 5E	Sand and Gravel	
O. E. Gooding and Co.	Various	Sand and Gravel	
Killins Gravel Co.	SE SE 25 2S 3E	Sand and Gravel	
	SW SW 25 2S 5E		
Kruse Gravel Pit	32 2S 7E	Sand and Gravel	
Michigan State Hwy. Dept.		Sand and Gravel	

	<u>Quantity</u>	<u>Value</u>
WASHTENAW (contd.)		
Pickitt and Schreur		Sand and Gravel
Lamar Thumm	SW NE 25 3S 7E	Sand and Gravel
Whittaker and Gooding Co.	SW NW 10 2S 5E	Sand and Gravel
	SW NE 19 2S 7E	
	NE NE 15 3S 6E	
Youngs Sand and Gravel	SW SW 16 1S 3E	Sand and Gravel
	NE NE 15 3S 6E	
	SW 23 3S 7E	
Washtenaw Co. Rd. Comm.	24 3S 5E	Sand and Gravel
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WAYNE (1)		
Portland Cement (2nd), Salt (1st), Lime (1st), Clay Products (1st), Sand and Gravel (3rd, 5%), Stone, Sulfur, Natural Gas, Petroleum, Clay* (1st)		\$ 47,485,987
Allied Chemical and Dye Corp.	Trenton	Soda Ash
Aurora Gasoline Co.	Detroit	Sulfur
Clippert Brick Co.	NW 21 2S 11E	Clay-Brick
Dachille Trucking Co.	Various	Sand and Gravel
W. L. Emery Co.		Sand and Gravel
Flat Rock Clay Products	NW SE 30 4S 10E	Clay-Tile
Huron River Quarry Corp.	36 4S 9E	Dolomite-crushed
International Salt Co., Inc.	SW 32 2S 11E	Rock salt
Lightweight Aggregate Corp.	NE 27 1S 9E	Clay-Lightweight aggregate
Manning and Locklin Gravel Co.	NW SW 2 1S 8E	Sand and Gravel
Michigan Foundation Quarry Co.	7 4S 11E	Limestone-crushed
Michigan Silica Co.	SW NE 15 5S 10E	Sand and Gravel
Michigan State Hwy. Dept.		Sand and Gravel
Moore Bros. Sand and Gravel	E SE 9 3S 9E	Sand and Gravel
Al Morgan	Various Pits	Sand and Gravel
Northville Sand and Gravel	SE NE 8 1S 8E	Sand and Gravel
Peerless Cement Corp.	Detroit	Cement
Penn Salt Chemical Corp.	Wyandotte	Chlorine, Caustic Soda
Thomson Sand and Gravel	8 1S 8E	Sand and Gravel
U.S. Gypsum Co.	River Rouge	Gypsum Products
Wayne Sand and Gravel Co.	NW SE 12 3S 8E	Sand and Gravel
Wyandotte Chemical Corp.	Wyandotte	Chlorine, Soda Ash, Portland cement

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

	<u>Quantity</u>	<u>Value</u>
WEXFORD (72)		
Sand and Gravel		**
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UNDISTRIBUTED		
Not segregated by counties (includes Bay, Cass, Chippewa, Delta, Emmet, Gratiot, Huron, Ionia, Iosco, Kalamazoo, Lenawee, Mackinac, Mason, Menominee, Midland, Ottawa, Presque Isle, St. Clair, Shiawassee, Wexford)		\$ 123,595,619
Undistributed: Sand and Gravel, Lime, Mineral Pigments, Gem Stones		5,427,987
		<hr/> \$ 129,023,606
Champion, Inc.		Sand and Gravel
The Cleveland-Cliffs Iron Co.		Mineral Pigments
Fox Valley Constr.		Sand and Gravel
National Park Service		Sand and Gravel
Pickands Mather Co.		Mineral Pigments
Straits Aggregate and Equipment Co.		Sand and Gravel
U.S. Dept. of Agriculture		Sand and Gravel
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TOTAL STATE VALUE		\$ 385,321,927
**Mineral value included under undistributed at end of county breakdown.		

COUNTY MINERAL PRODUCTION

1959

County	Rank	Value	County	Rank	Value
Alcona	69	\$ 96,987	Genesee	55	\$ 766,538
Alger	70	75,208	Gladwin	42	1,481,096
Allegan	24	2,953,478	Gogebic	10	10,698,454
Alpena	2	*	Grand Traverse	80	8,778
Antrim	73	49,385	Gratiot	18	*
Arenac	32	1,867,643	Hillsdale	19	5,087,043
Baraga	75	43,652	Houghton	15	6,775,837
Barry	56	701,516	Huron	48	*
Bay	11	*	Ingham	47	1,171,167
Benzie	83	0	Ionia	74	*
Berrien	49	979,650	Iosco	17	*
Branch	59	357,269	Iron	6	19,083,865
Calhoun	28	2,242,690	Isabella	23	2,997,243
Cass	66	*	Jackson	41	1,484,899
Charlevoix	78	19,869	Kalamazoo	51	*
Cheboygan	64	226,850	Kalkaska	67	138,838
Chippewa	22	*	Kent	27	2,884,160
Clare	40	1,486,348	Keweenaw	14	7,100,591
Clinton	61	340,694	Lake	76	41,231
Crawford	54	795,055	Lapeer	53	843,826
Delta	46	*	Leelanau	79	19,553
Dickinson	38	1,525,433	Lenawee	21	*
Eaton	36	1,657,218	Livingston	25	2,938,852
Emmet	13	*	Luce	68	103,779

County	Rank	Value	County	Rank	Value
Mackinac	20	\$ *	Saginaw	63	\$ 269,458
Macomb	45	1,243,422	St. Clair	7	*
Manistee	8	12,594,089	St. Joseph	65	200,538
Marquette	4	31,634,381	Sanilac	57	660,548
Mason	12	*	Schoolcraft	71	66,476
Mecosta	62	277,511	Shiawassee	33	*
Menominee	50	*	Tuscola	44	1,368,208
Midland	3	*	Van Buren	58	522,803
Missaukee	43	1,400,372	Washtenaw	34	1,814,105
Monroe	37	1,608,595	Wayne	1	47,485,987
Montcalm	26	2,914,778			
Montmorency	82	6,507			
Muskegon	31	1,941,249			
Newaygo	60	342,220			
Oakland	16	5,937,986			
Oceana	52	926,821			
Ogemaw	35	1,807,553			
Ontonagon	5	21,776,024			
Osceola	30	2,112,838			
Oscoda	81	7,725			
Otsego	77	27,268			
Ottawa	29	*			
Presque Isle	9	*			
Roscommon	39	1,499,953			

*Not segregated by counties (Bay, Cass, Chippewa, Delta, Emmet, Gratiot, Huron, Ionia, Iosco, Kalamazoo, Lenawee, Mackinac, Mason, Menominee, Midland, Ottawa, Presque Isle, St. Clair, Shiawassee, Wexford) also includes undistributed.

\$ 129,023,606

TOTAL STATE VALUE \$ 385,321,927

DIRECTORY OF PRODUCERS OF MINERALS
AND
MINERAL PRODUCTS, 1959

CHEMICAL PLANTS

(Using Natural Brine or Salt)

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

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

(From Well Brines)

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

CEMENT MANUFACTURERS

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

CLAY PRODUCERS*

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

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

CLAY PRODUCTS PRODUCERS

(Brick, Tile, Pottery, Lightweight Aggregate)

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

COPPER PRODUCERS

<u>Name and Address</u>	<u>Mine Locations (Counties)</u>
Calumet and Hecla, Inc. Calumet, Michigan	Houghton and Keweenaw
Copper Range Co. Painsdale, Michigan	Houghton
Quincy Mining Co. Hancock, Michigan	Houghton
White Pine Copper Co. 24 Federal Street Boston, Mass.	Ontonagon

IRON MINING COMPANIES

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

GYPSUM PRODUCERS

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

LIME PRODUCERS

<u>Name and Address</u>	<u>Plant Location</u>
Board of Water and Light 116 W. Ottawa Lansing, Michigan	Lansing, Ingham County
The Dow Chemical Company Ludington Division Midland, Michigan	Ludington, Mason County
Limestone Products Division Northwestern-Hanna Fuel Co. McKnight Bldg. 2nd Ave. South at 5th St. Minneapolis 1 Minnesota	Menominee, Menominee County
Monitor Sugar Company Div. Robert Gage Coal Company South Euclid Avenue Bay City, Michigan	Bay City, Bay County
Wyandotte Chemicals Corp. 1609 Biddle Ave. Wyandotte, Michigan	Wyandotte, Wayne County

MARL PRODUCERS

<u>Name</u>	<u>Address</u>	<u>Pit Location (County)</u>
A.		
Frank Alfredson	Whitehall	Muskegon
James Anger	Big Rapids	Mecosta
Cleo L. Arndt	R.R. #1, Fennville	Allegan
Gerald Arnsman	R.R. #1, Hopkins	Allegan
Carl Avery	R.R. #1, Athens	Calhoun
B.		
Barnes Brothers	Horton	Jackson
Lee Bertrand	Mattawan	Van Buren
LaVerne Brizendine	308 Pennsylvania Ave. Dowagiac	Cass
Mathew J. Brown	R.F.D. #3, Byron Center	Kent
C.		
Case Brothers	R.R. #1, Sherwood	Branch
Lawrence Chipman	Fenwick	Montcalm
Cleveland and Taylor	R.R. #2, Fremont, Ind.	Branch, Hillsdale
Roy Coville	R.R. #1, Climax	Kalamazoo
William Currier	R.R. #1, Caledonia	Kent
D.		
Bernard Damvelo	R.R. #1, Dorr	Allegan
Arnie Delebaugh	R.F.D. #2, Union City	Calhoun
Calvin Dixon	Bronson	Branch
Coy Drake	R.R. #1, Three Rivers	St. Joseph
F.		
David Flora	R.R. #2, Schoolcraft	Kalamazoo
Wilson Frost	R.R. #2, Blanchard	Mecosta
G.		
Gatehouse Bros.	Weidman	Isabella
Richard Grabmeyer	R.R. #1, Dowagiac	Cass

Marl Producers (Contd.)

<u>Name</u>	<u>Address</u>	<u>Pit Location County</u>
H.		
William Hacker	R.R. #1, Athens	Calhoun
E. R. Hamilton	R.R. #3, Nashville	Barry
Clarence Harter	R.R. #3, Paw Paw	Van Buren
Glen Hayward	R.R. #3, Quincy	Branch
Lawrence Hayward	R.R. #1, Vicksburg	Kalamazoo
John Hess	R.R. #1, Hanover	Hillsdale
C. Stanley Hooker	608 Colfax Street, Cadillac	Missaukee, Osceola
K.		
Glen Kermeen	R.R. #1, Middleville	Barry
Leslie Knox	Colon	St. Joseph
Henry Koster	1090 Rosewood, Jenison	Ottawa
L.		
Ted Lamorix	R.R.#3, Hart	Oceana
Dennis Lettinga	Grant	Newaygo
Ray Luegge	R.R. #1, Three Rivers	St. Joseph
Emmet J. Lutz	R.R. #1, Sherwood	Branch
M.		
Hugh Martel	Three Oaks	Berrien
Martin Bros.	Three Oaks	Berrien
Claude Mastin	Climax	Kalamazoo
Robert Medley	R.R. #1, Onondaga	Ingham
Ralph Meyers	R.F.D. #2, West Olive	Ottawa
O.		
Outman Bros.	Six Lakes	Montcalm
P.		
Emil Pavlak	R.R. #2, Hopkins	Allegan
Bernard Pipher	Jones	Cass
Otto Poehlman, Jr.	R.R. #2, Cassopolis	Cass
R.		
C. M. Reed	R.R. #2, Union City	Calhoun
Reed and Frisbie	Colon	St. Joseph
Robert Brothers	R.R. #1, Three Rivers	St. Joseph
Fred Rumz	R.R. #2, Vicksburg	Kalamazoo

Marl Producers (Contd.)

<u>Name</u>	<u>Address</u>	<u>Pit Location County</u>
	S.	
Schau Bros. Dan Slack Murland Smart Harlan Spoor C. H. Spies	2882 Bronson Blvd., Kalamazoo R.R. #4, Kalamazoo Burr Oak R.R. #1, Burlington R.F.D. #2, Box 414 Benton Harbor	Barry Kalamazoo St. Joseph Calhoun Berrien
Thomas Springer Stewart and Schaefer William R. Stuart Lowell W. Stukey	R.R. #2, Vicksburg R.R. #1, Weidman Mt. Pleasant R.R. #1, Reading	Kalamazoo Isabella Isabella Hillsdale
	T.	
Orville Truman	Mecosta	Mecosta
	W.	
Clifford Williams Marion E. Wolkins	Nottawa R.R. #1, Bristol	St. Joseph Lake
	Z.	
Zylstra Bros.	Howard City	Montcalm

PEAT PRODUCERS

<u>Name and Address</u>	<u>Pit Location</u>
George Alber Summerfield Road Petersburgh, Michigan	Near Petersburgh, Monroe County
Al-Par Peat Ovid, Michigan	Near Ovid, Clinton County
Anderson Peat Company 2562 Graham Road Imlay City, Michigan	Near Imlay City, Lapeer County
Appleman and Yarger Peat Company 13316 Ida Center Road Ida, Michigan	Near Ida, Monroe County
W. E. Attaway 18821 Glenmore Detroit, Michigan	Near Salem, Washtenaw County
E. G. Bristol Peat Company 5648 Van Dyke Almont, Michigan	Near Almont, Lapeer County
Jack Coddington 15510 Santa Rosa Detroit 38, Michigan	Near Farmington, Oakland County
Cravens Peat Farm Route 5 - Box 132 Kalamazoo, Michigan	Near Kalamazoo, Kalamazoo County
Dan's Peat Farm 42053 West 12 Mile Road Novi, Michigan	Near Novi, Oakland County
Henry Diekman Peat Company 1640 28th Street, S.W. Grand Rapids 9, Michigan	Near Grand Rapids, Kent County
Charles E. Douglas Wayland, Michigan	Near Wayland, Allegan County
Fletcher and Rickard 54001 Grand River Road New Hudson, Michigan	Near New Hudson, Oakland County
Geoman Nursery and Garden Center 413 Jefferson Avenue, S.E. Grand Rapids 8, Michigan	Near Grand Rapids, Kent County
Gibbs Peat Company Route 2, 6120 Shappie Road Clarkston, Michigan	Near Clarkston, Oakland County

Peat Producers Continued

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

Peat Producers Continued

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

SALT COMPANIES

<u>Name and Address</u>	<u>Product</u>	<u>Plant Location</u>
Diamond Crystal Salt Co. 916 S. Riverside St. Clair, Michigan	Evaporated Salt	St. Clair, St. Clair County
International Salt Co., Inc. Scranton, Pennsylvania	Rock Salt	Detroit, Wayne County
Manistee Salt Works 800 South Vandeventer Ave. St. Louis 10 Missouri	Evaporated Salt	Manistee, Manistee County
Michigan Salt Co. 500 North Bankson St. Louis, Michigan	Evaporated Salt	St. Louis, Gratiot County
Morton Salt Co. 120 South LaSalle St. Chicago, Illinois	Evaporated Salt	Manistee, Manistee County Marysville, St. Clair County

COMMERCIAL SAND AND GRAVEL PRODUCERS

(Addresses are all in Michigan unless otherwise designated)

<u>Name and Address</u>	<u>Pit Location</u>
A.	
Adrian Sand and Gravel, Adrian	Lenawee
Advance Bldg. Materials Co., 46461 Ryan Road, Utica	Macomb
Aggregate Processors, Inc., Box 566, White Pigeon	St. Joseph
Albaugh and Needham, N. Parkway, Marshall	Calhoun
John Alexander, Marshall	Calhoun
American Aggregates Corp., Greenville, Ohio	Kalamazoo, Livingston**
	Oakland
American Stone Products, Sashabow Rd., Oxford	Oakland
Anderson Sand and Gravel Co., 1700 S. Werdock St., Saginaw	Tuscola
Aremaughs Gravel Pit, Ithaca	Gratiot
Arndt, Cleo L., Fennville	Allegan
Aumaugher Gravel Co., Ithaca	Clinton
B.	
Bark River Construction Co., Bark River	Delta
Battle Creek Gravel Co., 3800 Dickman Highway, Battle Creek	Calhoun
Floyd Beardslee, 725 E. Square Lake Rd., Pontiac	Oakland
Norman Beckett, 19 E. Federal Hwy., Roscommon	Roscommon
Bender Gravel Co., 822 Benton St., Hastings	Barry
The Benjamin Pit, 30404 W. 14 Mile Rd., Farmington	Oakland
Bernthal Gravel Co., R.F.D. #2, Reese	Tuscola
Ray Betham and Son, 12040 Mettetal, Detroit	Oakland
Bichler Bros., 1615 Ludington, Escanaba	Delta
Blades Construction Co., Beaverton	Clare
Boichot Concrete Products Corp., 1800 Turner St., Lansing	Clinton
Brilinski Sand and Gravel, 920 S. 2nd Ave., Alpena	Alpena
Bundy Hill Gravel Co., Somerset Center	Hillsdale**
J. V. Burkett, St. Joseph	Berrien
C.	
Caspian Lbr. Co., Caspian	Various
Cass City Concrete Products Co., Cass City	Tuscola
Central Concrete Products Co., Inc., Route #2 Big Rapids	Mecosta
Central Michigan Sand and Gravel, P.O. Box 5, East Lansing	Ingham

Commercial Sand and Gravel Producers (contd.)

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

Commercial Sand and Gravel Producers (contd.)

Name and Address	Pit Location
F.	
Ferguson Excavating Co., 5360 N. State Rd. Davison	Genesee
Fiser Supply Co., 1617 E. Jolly Rd., Lansing	Ingham
Fisher Sand and Gravel Co., 921 S. Jefferson Ave., Midland	Midland
Foley and Beardslee, Route #3, Clarkston	Oakland
Ford and Co., 5960 S. Cedar, Holt	Ingham
Harry Fuoss, Route #1, Durand	Shiawassee
Fox Valley Construction Co., Box 827, Appleton, Wisconsin	Various
G.	
Garrett Construction Co., Augusta	Calhoun
Frank L. Gauthier, Onekama	Manistee
Jerry George, Harrisville	Alcona
Gillett Sand and Gravel, Route #1, Haslett	Clinton
Gilliland Gravel Co., Route #2, Alpena	Alpena
Gillisee Constr. Co., Grand Rapids	Kent **
J. Gladstone and Son, 423 Oak St., Rochester	Oakland
Gogebic Oil Co., Bessemer	Gogebic
O. E. Gooding Co., 5800 Cherry Hill Rd., Ypsilanti	Eaton, Hillsdale, Ingham, Jackson**, Lapeer, Lenawee, Livingston, Oakland, Washtenaw
Grand Rapids Gravel Co., 2200 Chicago Dr. S.W., Grand Rapids	Kent
Gravel Producers, Inc., 106 E. Kilgore Rd. Kalamazoo	Kalamazoo
Great Lakes Foundry Sand Co., 1217 Francis Palms Bldg., Detroit	Tuscola
Great Lakes Gravel Co., Inc., 2900 Auburn Rd. Utica	Macomb
H.	
Hatch Gravel Crushing Co., 128 W. Campbell St. Alpena	Alpena
Highland Aggregate, 8695 N. Milford Rd., Holly	Oakland
Hile Bros., Route #2, Caro	Tuscola
Kenneth Hodgins and Sons, Marquette	Marquette
Hodgkiss and Douma, P.O. Box 311, Petoskey	Charlevoix
Holland Construction Co., Holland	Allegan
Holly Manufacturing and Mining Co., Box 299, Flint	Oakland **
Gunnar F. Holmberg, R.F.D. #1, Gladstone	Delta
Hoover Bros., 1137 Tripp Rd., Waldron	Hillsdale
George Hubscher and Son, Box 411, Mt. Pleasant	Isabella
Huitt and Sons, 322 Water St., Allegan	Allegan
William Huizenga, Route #2, Zeeland	Ottawa

Commercial Sand and Gravel Producers (contd.)

Name and Address	Pit Location
H. (contd.)	
C. R. Hunt, Cass City	Tuscola
E. J. Hurley Sand and Gravel Co., 5609 Bradley, Lansing	Ingham
Hutchins Sand and Gravel, 320 S. Maple, Gaylord	Otsego
Hygrade Sand and Gravel Corp., 5000 E. 31 Mile Rd., Romeo	Macomb
I.	
Ireland and Lester Co., 220 N. Wayne St., St. Joseph	Berrien (Dredge)
Ironwood Concrete and Products Co., Route #1 Box 7A, Ironwood	Gogebic
J.	
Lewis James, 2957 Detroit Rd., Niles	Berrien
John R. Sand and Gravel Co., 1865 Indianwood Rd., Lake Orion	Oakland
Tom Johnston Gravel Co., 114 LaFayette St., Grand Haven	Ottawa
K.	
K. and V. Gravel Co., R.R. #4, Fremont	Newaygo
Fred Kaatz, 62701 Richmond Road, Richmond	Macomb
Harold Keill, Route #3, Niles	Berrien
Kemler Bros., 5900 Cobb Creek Ct., Rochester	Oakland
Kester Sand and Gravel, Route #2, Millington	Tuscola
S.E. Ketchum and Sons, Route #3, Mason	Ingham
Killins Gravel Co., 3305 Liberty Rd., Ann Arbor	Washtenaw **
Klett Construction Co., Hartford	Van Buren
Klumpp Bros., 4950 Loveland Rd., Grass Lake	Jackson
Koan Gravel Co., Route #1, Holly	Oakland
Koenig Sand and Gravel, Oxford	Oakland
Kruse Gravel Pit, 1090 Clark Rd., Ypsilanti	Washtenaw
Kurtz Gravel Co., G-5300 N. Dort Hwy., Flint	Genesee
L.	
A. S. Leffler, Davison	Genesee
A. Lindberg and Sons, Inc., Box 154, Ishpeming	Marquette

Commercial Sand and Gravel Producers (contd.)

Name and Address	Pit Location
M.	
Mackinac Aggregates Corp., 245 Marquette, St. Ignace	Mackinac
Macomb Sand and Gravel, 3295 Auburn Rd., Utica	Macomb
Maertens Sand and Gravel Co., 1036 Buckingham, Grosse Pointe	Macomb
Hugh T. McKenzie, 1401 Glenrose, Lansing	Ingham
McKinnon Gravel Co., State St., Alpena	Alpena
Mike Mangine, Cedarville	Mackinac
John McKenzie, 13164 Seymour Rd., Montrose	Genesee
Manning-Locklin Gravel Co., Box 216, Northville	Wayne
McGaw Block, Yale	St. Clair
Louis Marsack and Sons, 23633 Denhurst St. Clair Shores	Macomb
H. L. Martin Gravel Co., Box 54, Westphalia	Ionia
Mason Gravel Co., Mason	Ingham
Hugh H. Mason and Sons, 302 N. Center Ave., Gaylord	Cheboygan
Masterson Sand Co., Route #1, Covert	Van Buren
Mathews Gravel Co., G-6226 E. Mt. Morris Rd. Mt. Morris	Genesee
Michigan Silica Co., Rockwood	Wayne
Mickelson Corp., 1745 Seymour Lake Road, Oxford	Oakland
Mid American Eng. Corp., 716 Old Orchard Prof. Bldg., Skokie, Illinois	Allegan, Gratiot
Paul C. Miller, 10300 Sparta Ave., Sparta	Kent
Vern Molesworth, Yale	Huron, St. Clair, Sanilac, Tuscola
Moore Bros. Sand and Gravel, 7635 Wayne Rd., Wayne	Wayne
Morgan Sand and Gravel Co., 45095 Ryan Rd., Utica	Macomb
Al Morgan's Sand, 26291 Pennsylvania Rd., Romulus	Wayne
Edward Murawski, Fillion	Huron
Muskegon Gravel Co., 5395 Dangl Rd., Muskegon	Muskegon
N.	
Nashville Gravel Co., R.F.D. #2, Nashville	Barry**
New Hudson Sand and Gravel, New Hudson	Oakland
Nieb Concrete Products, 1406 South 11th St., Niles	Cass
William North, Churchill Rd., Brown City	Lapeer
North Star Gravel Co., Ithaca	Gratiot

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location</u>
N. (contd.)	
Northeast Gravel and Excavating Co., 4300 Cannosburg Road, Belmont	Kent
Northville Sand and Gravel Co., 18275 Beck Rd., Northville	Wayne
Northwest Materials, Inc., Bryan, Ohio	Hillsdale
Nugent Sand Co., Inc., 2875 Lincoln St., Muskegon	Muskegon
O.	
Oakland Sand and Gravel Co., 741 Glengary Road, Route #4, Walled Lake	Oakland
Oceana Sand and Gravel, Inc., 173 Hawley St., Hesperia	Muskegon
Okemos Sand and Gravel, 1873 Hamilton Rd., Okemos	Ingham
Otisville Stone Co., Otisville	Genesee
Oxford Mining Co., Davisburg	Oakland
P.	
P. and B. Gravel Co., Route #3, Ithaca Cy Page, Manitou Beach	Gratiot
Palmer Sand and Gravel, 2531 E. South, Jackson	Lenawee
Paris Gravel Co., Paris	Jackson
Pekaar and Van Doorn, 2774 28th St., Grand Rapids	Mecosta
William Perry and Son, Peffer St., Harbor Springs	Kent
Peterhans Bros., Route #2, Caro	Emmet
Harold Peters, Washed Sand and Gravel, Decker	Tuscola
Pickitt and Schreur, Box #149, Allegan	Sanilac
	Allegan, Calhoun, Kalamazoo, Kent, Ottawa, St. Joseph, Van Buren, Washtenaw **
Piispanen Bros., Route #1, Box 80, Bessemer	Gogebic
Pine Sand and Gravel, 2690 Inlay City Rd., Lapeer	Lapeer
Poirer Gravel Co., 214 Fair Ave., Alpena	Alpena
Polhamus Gravel Co., Ovid	Shiawassee
Port Huron Sand and Gravel, 2854 20th Ave., Port Huron	St. Clair
Portage-Manley Sand Co., Rockton, Ill.	Berrien
John Post and Sons, R.F.D. #2, Swartz Creek	Genesee
Powell and Brock Co., Fairgrove	Tuscola
Producers Core Sand Corp., 323 Warren Bldg., Michigan City, Ind.	Berrien
Pryor Bros., 725 N. Cochran, Charlotte	Eaton

Commercial Sand and Gravel Producers (contd.)

<u>Name and Address</u>	<u>Pit Location</u>
R.	
Ray Industries, Inc., P.O. Box 165, Oxford	Macomb
Lawrence Reed, 440 Baldwin, Alpena	Alpena
Ed Reetz, Box 58, W. Branch	Ogemaw
Bernie Rief, Fraser	Macomb
Riverside Sand and Gravel Co., 1050 Maynard Ave., S.W., Grand Rapids	Kent
S. K. Rogers, 48301 Sugar Bush Rd., New Baltimore	Macomb
Walter Rosevear Pit, West Branch	Ogemaw
Rosteck Contractors, 32634 Utica Rd., Fraser	Macomb
Art Russell's Concrete Products, R.F.D. #1 Hillsdale	Hillsdale
Wakeman Ryno, Route #1, Coloma	Berrien
S.	
Saginaw Core Sand Co., Saginaw	Genesee, Midland Tuscola Oakland
Salem Gravel and Construction Co., Inc., Box 45, 5 Mile and Curtis Rd., Salem	
Mrs. Hilma Samuelson, Chatham	Alger
Sand Products Corp., 2489 First National Bank Bldg., Detroit	Manistee, Muskegon
Scarlett Gravel, 1721 S. Cedar, Holt	Ingham
Sargent Sand Co., 2840 Bay Rd., Saginaw	Tuscola, Mason
Schicker Bros., Houghton Lake	Roscommon
Scio Gravel Co., 2911 W. Delhi, Box 233, Ann Arbor	Washtenaw
Sergeant and Son, 4830 Markey Rd., Houghton Lake	Roscommon
Shenk Gravel Co., Durand	Shiawassee
Lawrence B. Skinner, 4536 Packard Rd., Ypsilanti	Washtenaw
Sky-Way Sand and Gravel Co., 4060 E. Holt Road, Holt	Ingham
Slaters Bald Mtn., 451 E. Wilson Ave., Pontiac	Oakland
Smith Sand and Gravel Co., Inc., 65985 Mound Road, Romeo	Macomb
Justus Snellenberger, 1545 W. Fry Road, Burt	Genesee
South Flint Gravel Co., 6090 Belford Rd., Holly	Oakland
South Haven Sand Co., P.O. 290, Grand Haven	Van Buren
Southern Michigan Materials Co., Bryan, O.	Hillsdale
Stamm Bros. Gravel Co., Route #1, Adrian	Lenawee
Standard Aggregates Inc., 2423 M-87, Holly	Oakland

Commercial Sand and Gravel Producers (contd.)

Name and Address	Pit Location
S. (contd.)	
Standard Sand Co., 14201 Lake Shore Ave., P.O. Box 290, Grand Haven	Ottawa, Van Buren
Delmar Stanley Gravel Co., Route #1, Roscommon	Roscommon
Jessee Stanley, Houghton Lake	Roscommon
Gordon D. Stevick, 424 Patty Ave., Jackson	Jackson
Frank H. Stoerk, Pierson	Montcalm
Straits Aggregate and Equipment Corp., Route #1, Box 119-A, Oscoda	Presque Isle
H. Stukey, R.F.D. #2, Coldwater	Branch
Walter Sutton, 1603 Maple St., Niles	Berrien
T.	
Lawrence Tamlyn, 125 Burdette St., St. Ignace	Mackinac
Tecumseh Gravel Co., P.O. Box 496, Tecumseh	Lenawee
Tecumseh Materials, Inc., Tecumseh	Lenawee
Thompson Gravel Co., 234 Garfield, Coldwater	Branch
Thompson Sand and Gravel, 47399 W. 7 Mile Road, Northville	Wayne
Thornton Constr. Co., Hancock	Keweenaw
Lamar Thumm, 117 S. Grove St., Ypsilanti	Washtenaw
Tuckey's Sand and Gravel, Cass City	Tuscola
U.	
Underwood Sand and Gravel Co., 2255 Hamlin Rd., Utica	Oakland, Macomb
U.S. Aggregates, 3430 Ormond Rd., Davisburg	Oakland
C. Utterback, R.F.D. #2, Mt. Pleasant	Isabella
Union City Gravel Co., Union City	Branch
V.	
Valley Gravel Co., Route #5, Owosso	Shiawassee
Valley Sand and Gravel, Three Rivers	St. Joseph
Van Camps, 2405 Peck Rd., Croswell	Sanilac
Shirley Van Deusen, Route #1, Standish	Arenac
Chuck Vaughan Gravel and Excavating, 2685 Deckerville Rd., Caro	Tuscola
Vermontville Gravel Co., Route #1, Vermontville	Eaton
H. R. Vernon, Route #2, Fennville	Allegan
Charles Vittone, Route #2, Box 37, Ironwood	Gogebic
Vollmar Sand and Gravel, Pigeon	Huron

Commercial Sand and Gravel Producers (contd.)

Name and Address	Pit Location
W.	
Ben Waanders, Box 30, Allegan	Allegan
Aubrey Wagner, 220 North 3rd St., Harbor Beach	Huron
Lyle J. Walker Sand and Gravel, Box 205, New Hudson	Oakland
Wallace Stone Co., Hersey Sand and Gravel Div., Hersey	Osceola
Walling Gravel Co., P.O. Box 52, St. Johns	Clinton
Walsh Sand and Gravel Co., 13th St., Menominee	Menominee
F. S. Ward, Box 185, Clarkston	Oakland
Wayne Sand and Gravel Co., 40330 Tyler Road, Wayne	Wayne
Ronald Weaver, Box 116, Dansville	Clinton, Ingham Saginaw, Shiawassee
West Lansing Gravel Co., 1911 Pattengill Ave., West Shore Constr. Co., Zeeland	Ingham Allegan, Barry, Calhoun, Eaton, Kent, Ottawa
Wexford Gravel Co., P.O. Box 472, Cadillac	Wexford
I. L. Whitehead Co., Saülte Ste. Marie	Chippewa
White Lake Gravel, Inc., 622 S. Main, Clawson	Oakland
Whittaker and Gooding Co., 5800 Cherry Hill Rd., Ypsilanti	Washtenaw
Whittum Gravel Co., Eaton Rapids	Eaton
Williams Bros., 4053 S M-66, Ionia	Ionia
Willson Bros., Rives Junction	Jackson
Olga Winkka, 520 Adam St., Iron River	Alger
John Woerner, R.F.D. #4, Adrian	Lenawee
Wolverine Contractors, Inc., 19440 James Couzens Highway, Detroit	Macomb, Oakland
Woodward-Pollock Lbr. Co., 120 W. Chicago St., Coldwater	Branch
Y.	
John G. Yerington, Route #3, Box 34, Benton Harbor	Berrien, Cass, Van Buren
Youngs Sand and Gravel, 9095 S. Huron River Drive, Ypsilanti	Washtenaw
Z.	
Zahns Sand and Gravel, 2315 Ellsworth Rd., Ann Arbor	Washtenaw
Allen Zavitz, 37835 Mallast, Mt. Clemens	Macomb
Zeigler Sand and Gravel, 901 W. State, Hastings	Barry

** Includes Heavy-Media Separation

STONE PRODUCERS

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Afton Stone and Lime Co. Afton, Michigan	Limestone, crushed	North of Afton Sec. 25, T.35N., R.2W. Cheboygan County
Arenac County Road Commission Omer, Michigan	Limestone, crushed (non-commercial)	Northeast of Au Gres Sec. 5, T.19N., R.7E. Arenac County
Bark River Const. Bark River	Granite, crushed	NE SE Sec. 20, T.46N., R.25W. Marquette County
Bichler Bros. 1615 Ludington Escanaba, Michigan	Limestone, crushed	Sec. 1, T.39N., R.23E. Delta County
Bay County Road Comm. Bay City, Michigan	Limestone, crushed (non-commercial)	Near Omer Sec. 34, T.20N., R.5E., Arenac County
Gansry Hill Stone Quarry Route #2, Hillsdale, Michigan	Sandstone (dimensional)	West of Hillsdale Hillsdale County
Charlevoix Lime and Stone Co. Vanderbilt, Michigan	Limestone, crushed	West of Charlevoix Sec. 29, T.34N., R.8W. Charlevoix County
Cheney Limestone Co. P.O. Box #125 Bellevue, Michigan	Limestone, crushed and dimensional	West of Bellevue Sec. 20, T.1N., R.6W. Eaton County
De Roche Bros. Keweenaw Bay, Michigan	Sandstone (dimensional)	Sec. 34, T.52N., R.33W. Baraga County
Drummond Dolomite, Inc. P.O. Box 688 Sheboygan, Wisconsin	Dolomite, crushed	West end Drummond Island Sec. 24, T.42N., R.5E. Chippewa County
The France Stone Co. 1800 Toledo Trust Bldg. Toledo 14 Ohio	Dolomite, crushed	Monroe Sec. 7, T.7S., R.9E. Monroe County
Gierke Brothers Fairport, Michigan	Dolomite (dimensional)	North of Fairport Sec. 4, T.37N., R.19W. Delta County
Gogebic County Road Comm. Bessemer, Michigan	Miscellaneous Stone (non-commercial)	Gogebic County
Houghton County Road Comm. Hancock, Michigan	Basalt, crushed (non-commercial)	Houghton County

Stone Producers - contd.

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Huron Portland Cement Co. 1325 Ford Bldg. Detroit, Michigan	Limestone, crushed	Alpena Sec. 24, T.31N., R.8E. Alpena County
Huron River Quarry Corp. 26068 E. Huron River Drive Flat Rock, Michigan	Dolomite, crushed	West of Flat Rock Sec. 36, T.4S., R.9E. Wayne County
Inland Lime and Stone Co. Div. Inland Steel Co. Manistique, Michigan	Limestone, crushed	North of Hunt Spur Sec. 6, T.42N., R.12W. Mackinac County
Iosco County Road Comm. P.O. Box 31 East Tawas, Michigan	Limestone, crushed (non-commercial)	Northeast of Au Gres Sec. 24, T.20N., R.7E. Arenac County
City of Iron Mountain Iron Mountain, Michigan	Granite, crushed	Dickinson County
Jeffrey Limestone Co. Box 107 Parma, Michigan	Limestone, crushed	Northeast of Parma Sec. 19, T.2S., R.2W. Jackson County
Limestone Mountain Co. 1028 Ethel Ave. Hancock, Michigan	Dolomite, crushed	Near Pelkie Sec. 23, T.51N., R.35W. Houghton County
A. Lindberg and Sons, Inc. Box 154 Ishpeming, Michigan	Dolomite, crushed	NE SE 24, T.46N., R.18W. Alger County
Maybee Stone Co. Maybee, Michigan	Dolomite, crushed	Near Maybee, Sec. 29, T.5S., R.8E. Monroe County
The Metro-Nite Company P.O. Box 243, Station F Milwaukee 9 Wisconsin	Dolomite, crushed	Near Felch Sec. 26, T.42N., R.28W. Dickinson County
Michigan Foundation Quarry Company 1110 W. Jefferson Ave. Trenton, Michigan	Limestone, crushed	Trenton Sec. 7, T.4S., R.11E. Wayne County

Stone Producers - contd.

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
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
" "	Dolomite, crushed	Near Cedarville Sec. 10, T.42N., R.1E. Mackinac County
Michigan Silica Co. Rockwood, Michigan	Sandstone, crushed	Near Rockwood Sec. 15, T.5S., R.10E. Wayne County
Michigan Stone Co. R.F.D. #2 Ottawa Lake, Michigan	Dolomite, crushed	East of Ottawa Lake Sec. 25, T.8S., R.6E. Monroe County
Monroe County Road Comm. Monroe, Michigan	Dolomite, crushed (non-commercial)	East of Dundee Sec. 13, T.6S., R.7E. Monroe County
Onaway Stone Co. Onaway, Michigan	Limestone, dimensional	North of Onaway Sec. 5, T.34N., R.2E. Presque Isle County
The Original Sandstone Quarry Napoleon, Michigan	Sandstone	East of Napoleon Sec. 6, T.4S., R.2E. Jackson County
Penn-Dixie Cement Corp. Nazareth, Pa.	Limestone, crushed	West of Petoskey Sec. 3, T.34N., R.6W. Emmet County
Presque Isle Corporation Chemstone Corp. Agents P.O. Box 321 Alpena, Michigan	Limestone, crushed	Sec. 2, T.33N., R.8E. Presque Isle County
Ray Sandstone Quarry 303 Nottawaseppe St. Napoleon, Michigan	Sandstone	East of Napoleon Sec. 6, T.4S., R.2E. Jackson County
Star Stone Co. Box 102 Napoleon, Michigan	Sandstone	East of Napoleon Sec. 31, T.3S., R.2E. Jackson County
Superior Natural Red Stone Quarry Baraga, Michigan	Sandstone	

Stone Producers - contd.

<u>Name and Address</u>	<u>Type of Stone</u>	<u>Quarry Location</u>
Superior Rock Products Co. Sagola, Michigan	Dolomite, crushed Mica Schist, crushed Feldspar, crushed	East of Randville Sec. 35, T.42N., R.30W. Sec. 19 and 30, T.42N. R. 29 W. Dickinson County
Thornton Construction Co. Box 154 Ishpeming, Michigan	Dolomite, crushed	Sec. 28, T.39N., R.23W. Delta County Sec. 6, T.44N., R.8W. Mackinac County NW SE 5, 38N, 26W. Menominee County
Delbert W. Turner 1607 N. Rose St. Kalamazoo, Michigan	Granite, crushed Sandstone	Sec. 17, T.47N., R.25W. Marquette County Marshall Sec. 29, T.19N., R.7E. Calhoun County
The Wallace Stone Co. Bayport, Michigan	Limestone, crushed and dimensional	Southeast of Bayport Sec. 5 and 6, T.16N., R.10E. Huron County

GENERALIZED COLUMNAR SECTION OF MICHIGAN

MICHIGAN GEOLOGICAL SURVEY DIVISION

SYSTEM, SERIES	FORMATION, GROUP	LITHOLOGY	THICKNESS	ECONOMIC PRODUCTS
RECENT				
PLEISTOCENE	GLACIAL DRIFT	SAND, GRAVEL, CLAY, boulders, marl	0-1000	SAND, GRAVEL, PEAT, MARL, FRESH WATER
"PERMO-CARBONIFEROUS"	"RED-BEDS"	SHALE, CLAY, SANDY SHALE, gypsum		
PENNSYLVANIAN	GRAND RIVER	SANDSTONE, sandy shale	80-95	BUILDING STONE, FRESH WATER
	SAGINAW	SHALE, SANDSTONE, limestone, coal	20-535	SHALE, COAL, FRESH WATER, BRINE, GAS
MISSISSIPPIAN	BAY PORT	LIMESTONE, SANDY OR CHERTY LIMESTONE, SANDSTONE	2-100	LIMESTONE, FRESH WATER
	MICHIGAN	SHALE, gypsum, anhydrite, sandstone	0-500	GYPSUM
	"MICHIGAN STRAY"	SANDSTONE	0-80	GAS
	MARSHALL	SANDSTONE, sandy shale	100-400	FRESH WATER, BRINE BUILDING STONE
	COLDWATER	SHALE, sandstone, limestone	500-1100	SHALE, FRESH WATER
	SUNBURY	SHALE	0-140	
	BEREA - BEDFORD	SANDSTONE, SHALE	0-325	GAS, OIL
DEVONIAN	ELLSWORTH - ANTRIM	SHALE, limestone	100-950	SHALE, GAS
	TRAVERSE	LIMESTONE, SHALE	100-800	LIMESTONE, OIL, GAS, FRESH WATER
	BELL	SHALE, Limestone	0-80	SHALE
	ROGERS CITY - DUNDEE	LIMESTONE	0-475	LIMESTONE, OIL, GAS, FRESH WATER
	DETROIT RIVER	DOLOMITE, limestone, salt anhydrite	150-1400	LIMESTONE, DOLOMITE, OIL, GAS, SALT, BRINE, FRESH WATER
	SYLVANIA	SANDSTONE, SANDY DOLOMITE	0-550	GLASS SAND, FRESH WATER
	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