

AN INDEX
of the
GEOLOGY OF MICHIGAN
1823-1955

State of Michigan
DEPARTMENT OF CONSERVATION
Gerald E. Eddy, Director

GEOLOGICAL SURVEY DIVISION
William L. Daoust, State Geologist

Publication 50

AN INDEX
of the
GEOLOGY OF MICHIGAN
1823-1955



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FOREWORD

To the Director, and Commissioners of the
Department of Conservation:

Gentlemen:

I have the honor and pleasure to transmit herewith An Index to The Geology of Michigan, prepared and compiled by Helen M. Martin and Muriel Tara Straight.

Publication of such an index or survey has become of paramount importance. It will be of value not only to students and teachers of geology as a pure science, but of greater importance to those interested in the economic development of the mineral resources of Michigan. It will be of value to industries, now developing, that not only require a knowledge of the rocks and their resources that industry needs but also require a knowledge of rock formations that will aid in disposal of waste. It will answer numerous requests for reference material on Michigan's basic resources received from industrial, educational, agricultural and even social groups. The maps, the chart, and list of publications and laws are a brief of the history of the Geological Survey since 1837. The Index to Nomenclature and the Author-Subject References to Michigan Geology review the geological work that has been done in the State and by their numbers show the geologic value of our area.

Respectfully submitted,

William L. Daoust

State Geologist
April 1956

PREFACE

Compilation of various parts of this book was started by both authors before becoming staff members of the Geological Survey Division, to meet our needs as geologists in public and private enterprise and later was put to continuous use as reference material for consultation on the Survey. Compilation of the chart showing the development of the geological nomenclature of Michigan formations was an outgrowth of a request to the senior author by Professor E. C. Case, late of the University of Michigan, to compile such a chart for the Devonian formations. Much of the other material in the book is from notes accumulated for a history of the Survey, for discussions of stratigraphy, for use as lecture material, and in response to requests for information made by students, teachers, and geologists in industry newly come to the State, and geologists employed by the State.

The References to Michigan Geology with a subject index was an indispensable tool of readily obtainable references prepared by the junior author when an undergraduate and later a geologist on the staff of the United States Geological Survey.

We have felt that compilation of all this material was needed by other members of the Survey staff, by students of geology and especially by professional geologists in industry. We are happy to share our accumulated data hoping our sins of omission are not too many.

Such a sharing would not be possible without the encouragement of four State Geologists: R. A. Smith, Gerald E. Eddy, Franklin G. Pardee, and William L. Daoust. Nor would it be possible if we had not had the devoted assistance of Mrs. Norma Guyer in preparation of the junior author's manuscript, and of Mrs. Joyce D'Valentine who not only typed but edited the manuscript of the senior author, discovered and corrected elisions, errors in dates, spelling, locations, and made numerous suggestions which will make this book of value to others than geologists. James Campbell has painstakingly drafted the maps and Robert Kelley compiled the section of laws relating to the Survey. To all of these we express our appreciation and thanks.

Helen M. Martin

Muriel Tara Straight

AN INDEX OF MICHIGAN GEOLOGY

by

HELEN M. MARTIN

and

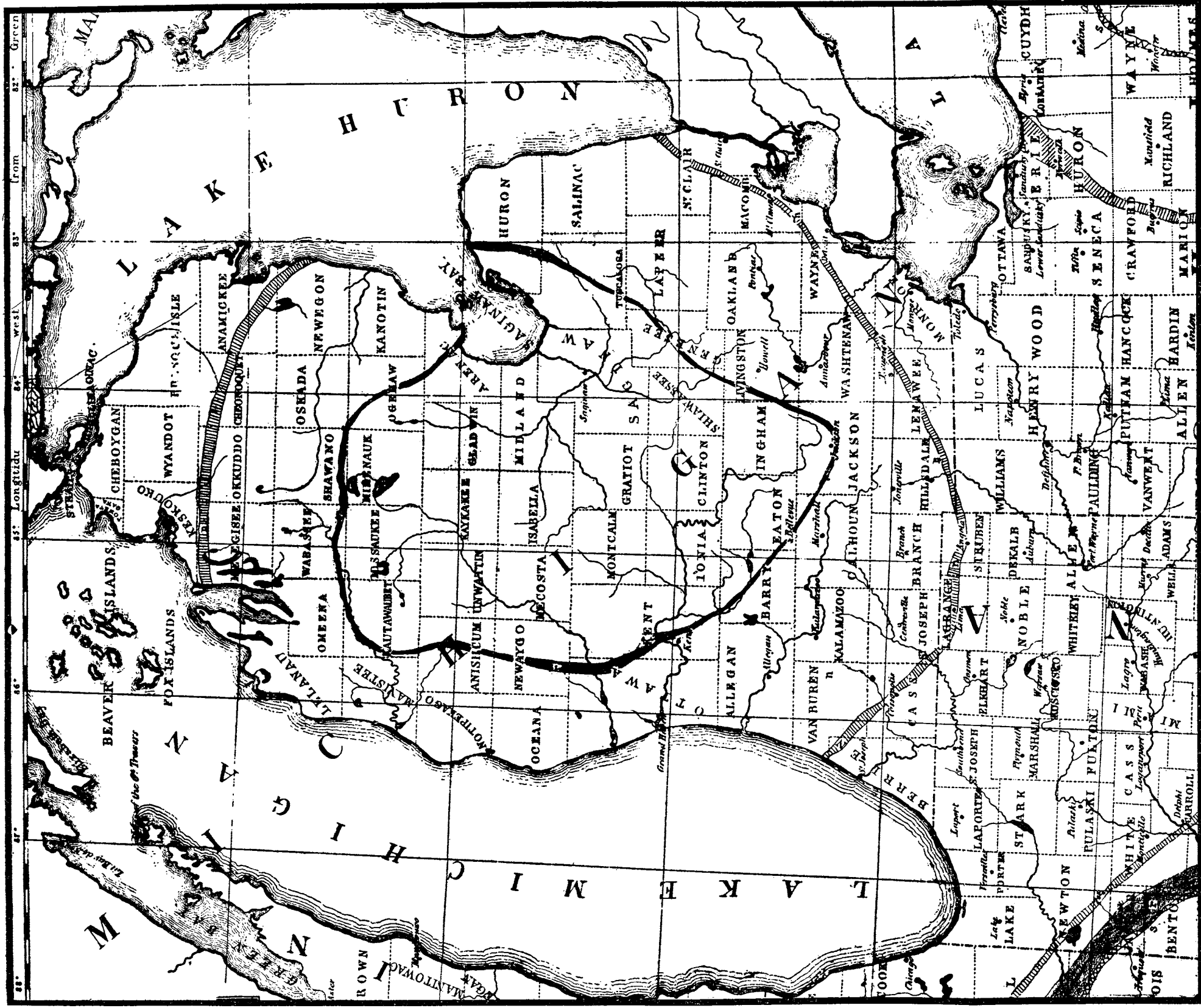
MURIEL TARA STRAIGHT

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Map 1. After the Geologic Map of the Middle and Western States published in Natural History of New York, Part IV, Geology by James Hall (Survey of the 4th Geological District) 1843. Albany, New York.
 On page 681 Hall stated: "Dr. Houghton, State Geologist of Michigan has obligingly furnished me with a geologic map of that state of which I possessed a very imperfect knowledge." The Houghton manuscript is lost.
 The map is hand colored and outlines the Coal Measures (gray), Carboniferous limestone (blue), Portage and Chemung groups (light gray), Hamilton group (pinkish), Helderberg limestones (pale blue), in descending order.

PUBLICATIONS
of the
MICHIGAN GEOLOGICAL SURVEY
1838-1921
and of the
GEOLOGICAL SURVEY DIVISION
MICHIGAN DEPARTMENT OF CONSERVATION
1921-1955

DOUGLASS HOUGHTON, State Geologist 1838-1846.

The first reports of the Michigan Geological Survey under the direction of Douglass Houghton were made directly to the legislature and were issued as twenty-six legislative documents in the House and Senate Journals of the Michigan Legislature of 1838 through 1846.

Note: S. D. means Senate Document; H. D., House Document; J. D., Joint Document. State Geologist is abbreviated S. G., and State Geological Survey, S. G. S.

1838.

1. Report of a select committee of the Board of Regents of the University on the collection of the S. G.: H. D. Vol. I, p. 1-2; S. D. No. 1, p. 1. H. D. No. 55 is duplicate of S. D. No. 1.

2. Statement of the expenditures on account of the S. G. S. for the year 1837: H. D. No. 8, pp. 115-118; S. D. No. 21. (First annual account of the S. G.), pp. 315-318.

3. Report of the S. G. (first annual): H. D. No. 24, pp. 276-317, separately, No. 14, pp. 1-39.

4. Communication from the S. G.: H. D. No. 46, pp. 457-460.

1839.

1. Report of the S. G., in relation to the improvement of State salt springs: H. D. No. 2, pp. 39-45; S. D. No. 1, pp. 1-7.

2. Report of the committee on the S. G.'s report in relation to the improvement of the State salt springs: H. D. No. 4, p. 123.

3. Report of the S. G. in relation to the iron ore, etc., on the school section in town five south, range seven west, in Branch County: H. D. No. 21, pp. 342-344.

4. Second annual report of the S. G.: H. D. No. 23, pp. 380-507; S. D. No. 12, pp. 264-391.

5. Report of the Committee of the Senate on Manufacturers, to whom was referred the communication of the S. G. relative to salt springs and the salines of the State: S. D. No. 3, pp. 85-86 (Parallel to H. D. No. 4).

6. Communication from the S. G. relative to the S. G. S.: S. D. No. 25, pp. 463-466.

1840.

1. Report of S. G. relative to the improvement of the salt springs: H. D. No. 2, Vol. I, pp. 18-23; S. D. No. 8, Vol. II, pp. 153-158.

2. Annual report of the S. G. (third, map of Wayne County): H. D. No. 27, Vol. II, pp. 206-293; S. D. No. 7, Vol. II, pp. 66-153, separately, No. 8, pp. 1-120.

3. Report of the select committee to whom was referred the several reports of the S. G.: H. D. No. 46, Vol. II, pp. 455-461.

4. Report of the majority of the Committee on Finance on the communication and accounts of the S. G. for 1839; Report of the minority of the Committee on Finance on the same subject; Report of the select committee on S. G.'s report and account relative to improvement of salt springs, etc.; S. G.'s account for the year 1839, the same being the subject matter of the three preceding reports: S. D. Nos. 15, 16, 17, 18, pp. 209-224.

1841.

1. Special message concerning State salt springs: H., S. and J. D. No. 5, pp. 235-254.

2. Annual report of the S. G. (fourth): H., S. and J. D. No. 11, pp. 472-607, separately, H. D. No. 27, pp. 1-184.

3. Report of the S. G. relative to county state maps: H. D. No. 35, pp. 94-98.

1842.

1. Report of the S. G. relative to the State salt springs: H. D. No. 2, pp. 15-21; S. D. No. 1, pp. 1-9.

2. Report of the select committee in relation to the report of the S. G.: H. D. No. 19, pp. 77-79.

3. Annual report of the S. G. (fifth): J. D. No. 9, pp. 436-441.

1843.

1. Annual report of the S. G. (sixth): J. D. No. 8, pp. 398-402.

2. Report of the S. G. relative to the State salt springs: S. D. No. 9, pp. 402-408.

1844.

1. Annual report of the S. G. (seventh): S. D. No. 11 (three pages).

D. Houghton undertook an arrangement with the Linear Survey of the U. S. Land Office by which a certain amount of geological work was done, which was never published by the State, the results of which appear largely in the township plats of the Land Office, and in the report of C. T. Jackson, 1849, U. S. Ex. D. No. 1, pp. 371-935, H. Ex. D. No. 5, Vol. 3, Part 3, including sub-reports of W. A. Burt and Bela Hubbard on the geology of the subdivisions of the Linear Survey, First Session 31st Congress, and of Foster and Whitney, U. S. Geologists, Part I, H. Ex. D. No. 69, pp. 1-224 and 12 Plates, First Session 31st Congress; S. Ex. D. No. 2, Vol. 2, p. 147, Second Session 31st Congress; Part II, S. Ex. D. No. 4, Vol. 3, p. 3, Special Session 32d Congress.

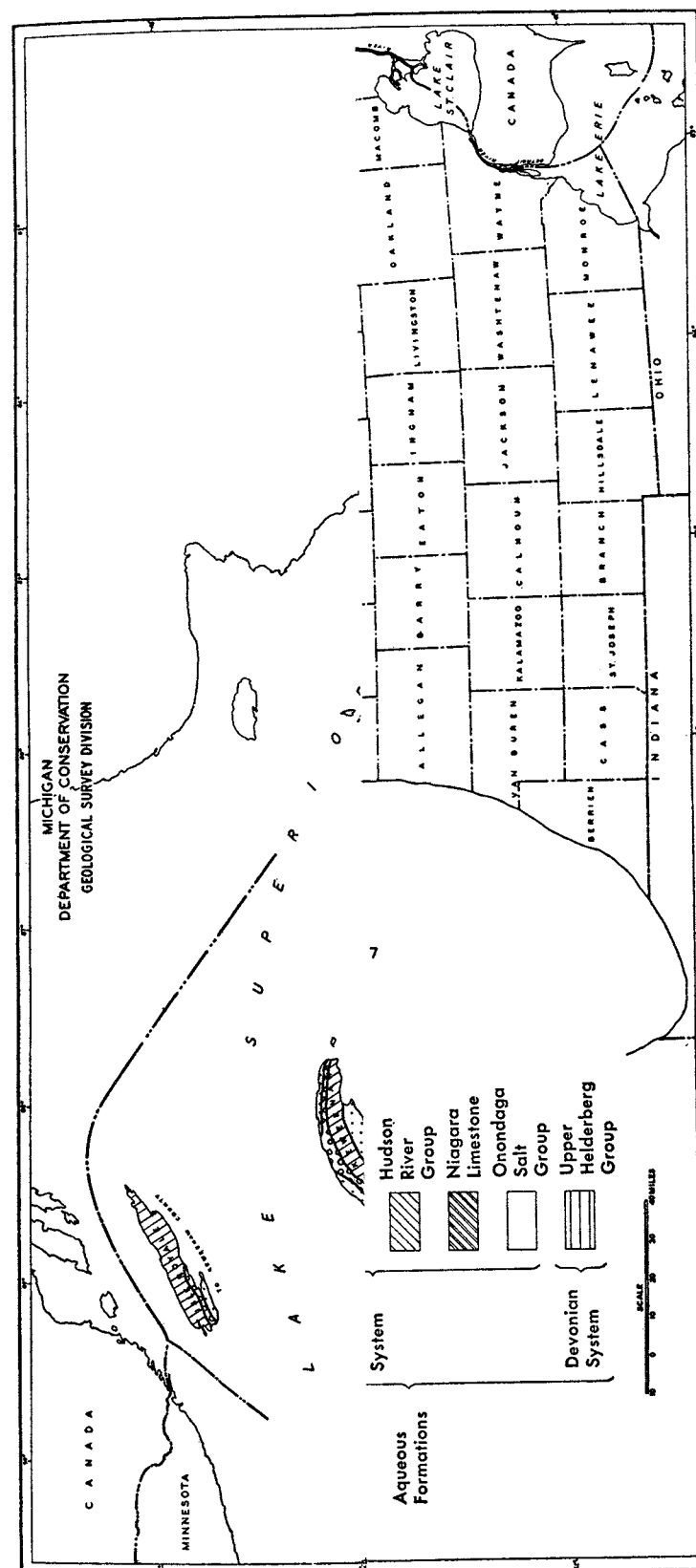
The work of the Geological Survey was interrupted by the death of D. Houghton while actively engaged in exploration.

1846.

1. Report from Geological Department by S. W. Higgins, principal assistant: J. D. No. 12, 22 pp.

2. Report of the joint committee relative to the Geological Survey: J. D. No. 15, 8 pp.

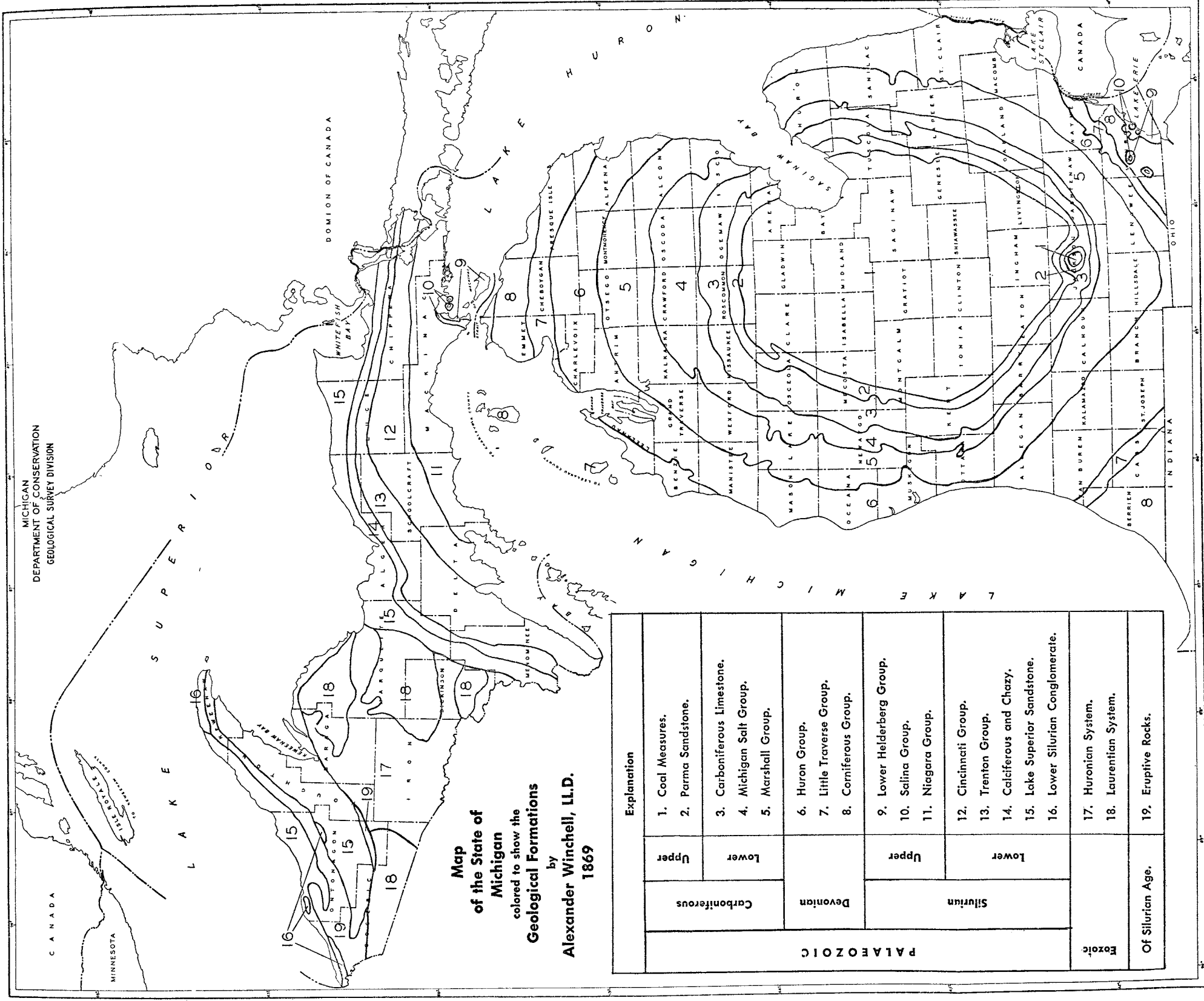
The annual reports for 1838, 1839, 1840, 1841, 1842, 1843, 1844, and 1846 were collected and reprinted in a single volume by the Michigan Historical Commission in 1928.



Map 2. After: "Geological Map of the Lake Superior Land District. Prepared pursuant to an Act of Congress approved March 1st 1847 entitled "An Act to Establish a New Land District and to provide for the sale of Mineral Lands in the State of Michigan".

by
J. W. Foster, J. D. Whitney U. S. Geologists"

This map is a part of the Foster and Whitney report on the geology of the Lake Superior Land District, Michigan, published as Ex. Doc. 69 House of Representatives 31st Congress, 1st Session.



Map 3. After "Map of the State of Michigan colored to show the geologic formations. By Alexander Winchell LL.D." 1869. Published in Atlas of the State of Michigan by H. F. Walling 1873. Known also as Tackabury Atlas. Colors are numbered in the legend as map indicates.

The early reports on Michigan geology by Jackson, and by Foster and Whitney, were published as Federal documents in the United States Senate and House of Representatives Journals.

ALEXANDER WINCHELL, State Geologist 1859-1863, 1869-1871

Formal reports under the imprimatur of the Michigan Geological Survey and direction of the State Geologist began with the small volume issued in 1861, First biennial report of the progress of the Geological Survey, Alexander Winchell.

1860.

First biennial report of the progress of the Geological Survey of Michigan embracing observations on the geology, zoology and botany of the Lower Peninsula.

Part I—Geology, pp. 1-210. Contains: Physical structure of the northwest and general sketch of the geology of Michigan.

Part II—Zoology, pp. 211-242. Contains: Catalogue of the mammals, birds, reptiles, and mollusks of Michigan.

Part III—Botany, pp. 243-330. Contains: Catalogue of phaenogamous and acrogenous plants . . . of Michigan and the islands at the head of Lake Huron.

1869-1955

Since 1873 printed reports have been issued in three types of format and binding known as: Volumes, Annual Reports, Publications. Summary, Progress, and Technical reports are mimeographed and bound. Reports of the State Geologist were made to the Board of the Geological Survey until 1921. Since 1921 summary reports of the State Geologist and Geological Survey Division are a part of the Biennial Reports of the Department of Conservation.

VOLUMES

Vol. I Upper Peninsula of Michigan, 1869-1873.

Atlas—The Atlas of 23 plates contains geologic maps and cross-sections by T. B. Brooks, R. Pumpelly and C. Rominger.

Part I—Iron-bearing rocks (economic), T. B. Brooks (320 pp., 24 pls., 29 figs.).

Part II—Copper district, Raphael Pumpelly (144 pp.).

Part III—Paleozoic rocks, Carl Rominger (106 pp.).

Part I was also issued as a separate publication.

Vol. II Upper Peninsula, 1869-1873.

Appendices to Pt. I, Vol. I, Iron-bearing rocks (economic), T. B. Brooks (298 pp.).

CARL ROMINGER, State Geologist 1872-1885

Vol. III Lower Peninsula, 1873-1876.

Part I—Geology of Lower Peninsula, Carl Rominger (226 pp., 4 pls., map).

Part II—Palaeontology; fossil corals, Carl Rominger (162 pp., 55 pls.).

Vol. IV Upper Peninsula, 1878-1880 (248 pp., map).

Part I—Marquette iron region, Carl Rominger.

Part II—Menominee iron region, Carl Rominger.

**C. E. WRIGHT and M. E. WADSWORTH, State Geologists
1885-1893**

Report of the State Board of Geological Survey for 1891 and 1892.

Includes reports of State Geologist Dr. Carl Rominger for 1881 and 1882; of State Geologist C. E. Wright for 1885 to 1888; and of State Geologist M. E. Wadsworth for 1889, 1890, 1891, 1892 and a provisional report by Dr. Wadsworth on the Geology of the Iron, Gold and Copper Districts of Michigan (192 pp.).

L. L. HUBBARD, State Geologist 1893-1899

Vol. V Upper Peninsula, 1881-1884; Lower Peninsula, 1885-1893.

Part I—Geological report on the Upper Peninsula of Michigan, iron and copper regions, Carl Rominger (180 pp., 2 pls., map).

Part II—The geology of Lower Michigan with reference to deep borings, edited by A. C. Lane from notes of C. E. Wright (101 pp. 73 pls., map).

Vol. VI Upper Peninsula, 1893-1897.

Part I—Geological report on Isle Royale, A. C. Lane (282 pp., 16 pls., 29 figs.).

Part II—Keweenaw Point, with particular reference to the felsites and their associated rocks, L. L. Hubbard (pp. 1-156, 10 pls., 11 figs.).

Part II—Appendix. The crystallization of the calcite from the copper mines of Lake Superior, Charles Palache (pp. 157-184, 6 pls.).

A. C. LANE, State Geologist 1899-1909

During Dr. Lane's administration, the activities of the Survey were formally enlarged to include a biological survey. Parts of Volumes VII, VIII, IX were issued also as separate publications.

Vol. VII Lower Peninsula, 1896-1900.

Part I—Geological report on Monroe County, Michigan, W. H. Sherzer (240 pp., 17 pls., 8 figs., incl. 3 maps).

Part II—Geological report on Huron County, Michigan, A. C. Lane (330 pp., 11 pls., 12 figs., incl. 2 maps).

Part III—Geological report on Sanilac County, Michigan, C. H. Gordon (34 pp., 5 pls., 2 figs., incl. map).

Vol. VIII Lower Peninsula, 1900-1903.

Part I—Clays and shales of Michigan, Heinrich Ries (68 pp., 4 pls., 6 figs.).

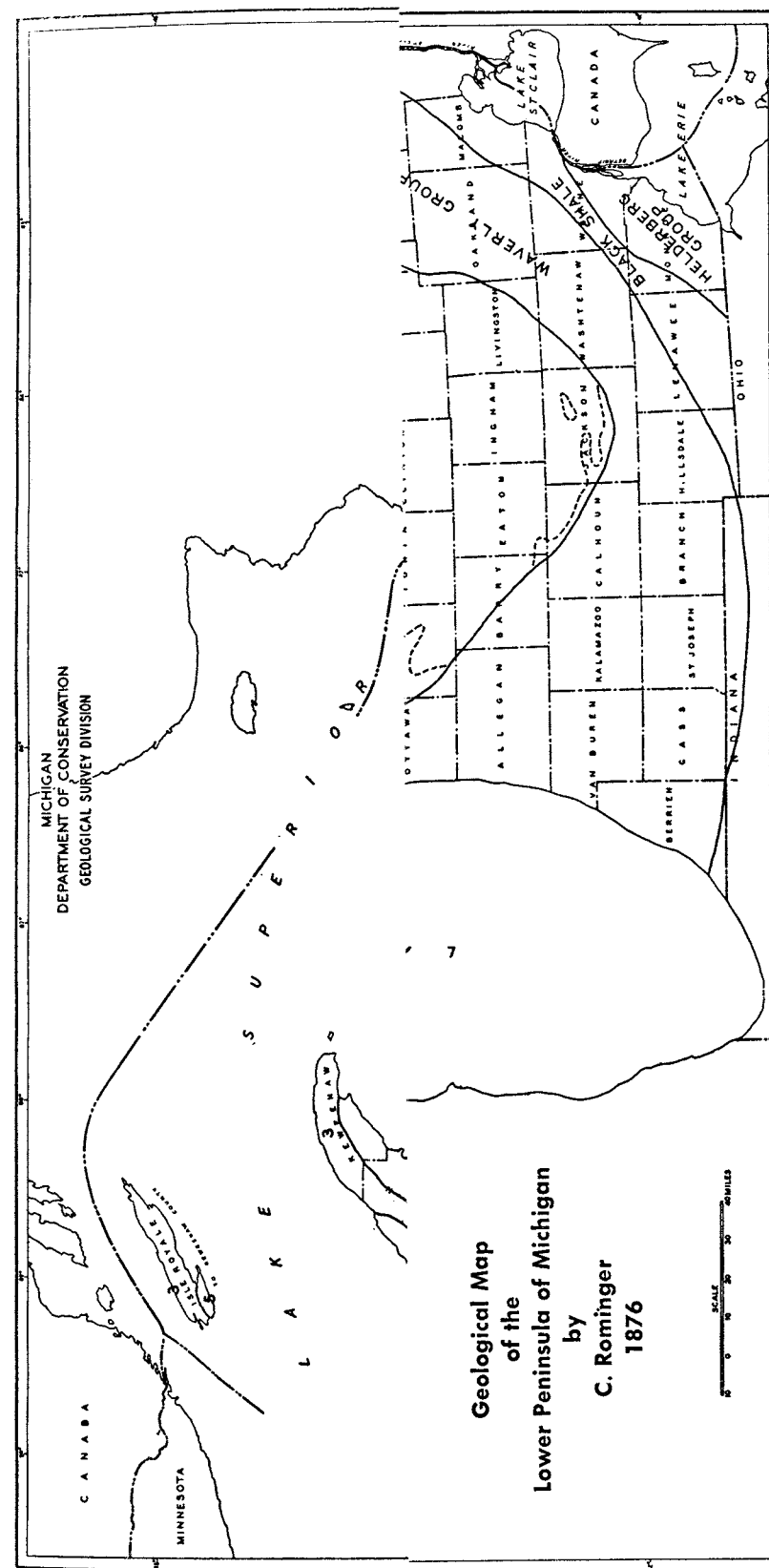
Part II—Coal of Michigan, A. C. Lane (234 pp., 9 pls., 9 figs., incl. map).

Part III—Marl (bog lime) and its application to the manufacture of Portland cement, D. J. Hale, et al (400 pp., 23 pls., 44 figs.).

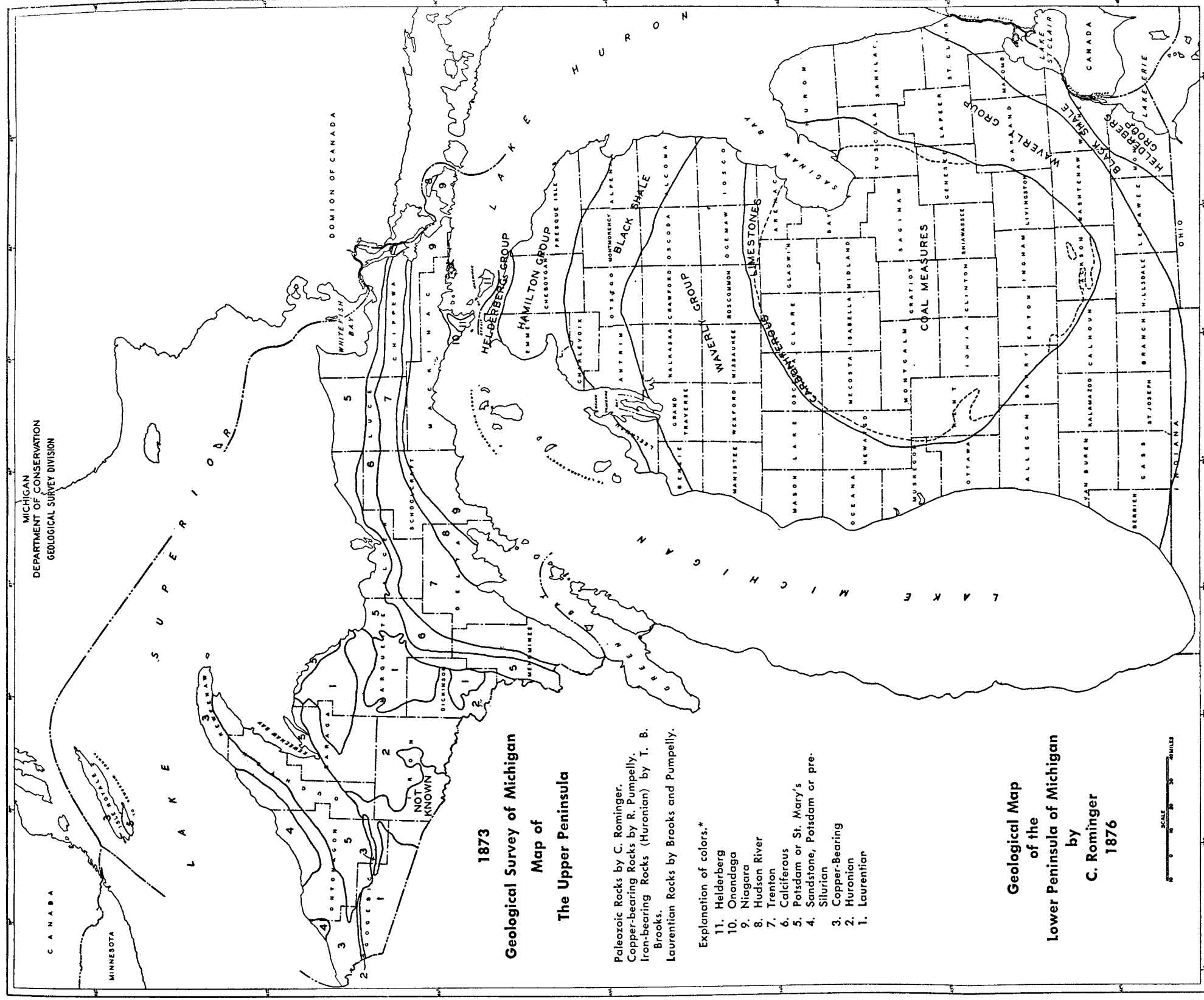
Vol. IX 1903-1904.

Part I—The delta of the St. Clair River, L. J. Cole (28 pp., 4 pls., 2 figs., incl. map).

Part II—The gypsum of Michigan and the plaster industry, G. P. Grimsley (248 pp., 29 pls., 49 figs., incl. 6 maps).

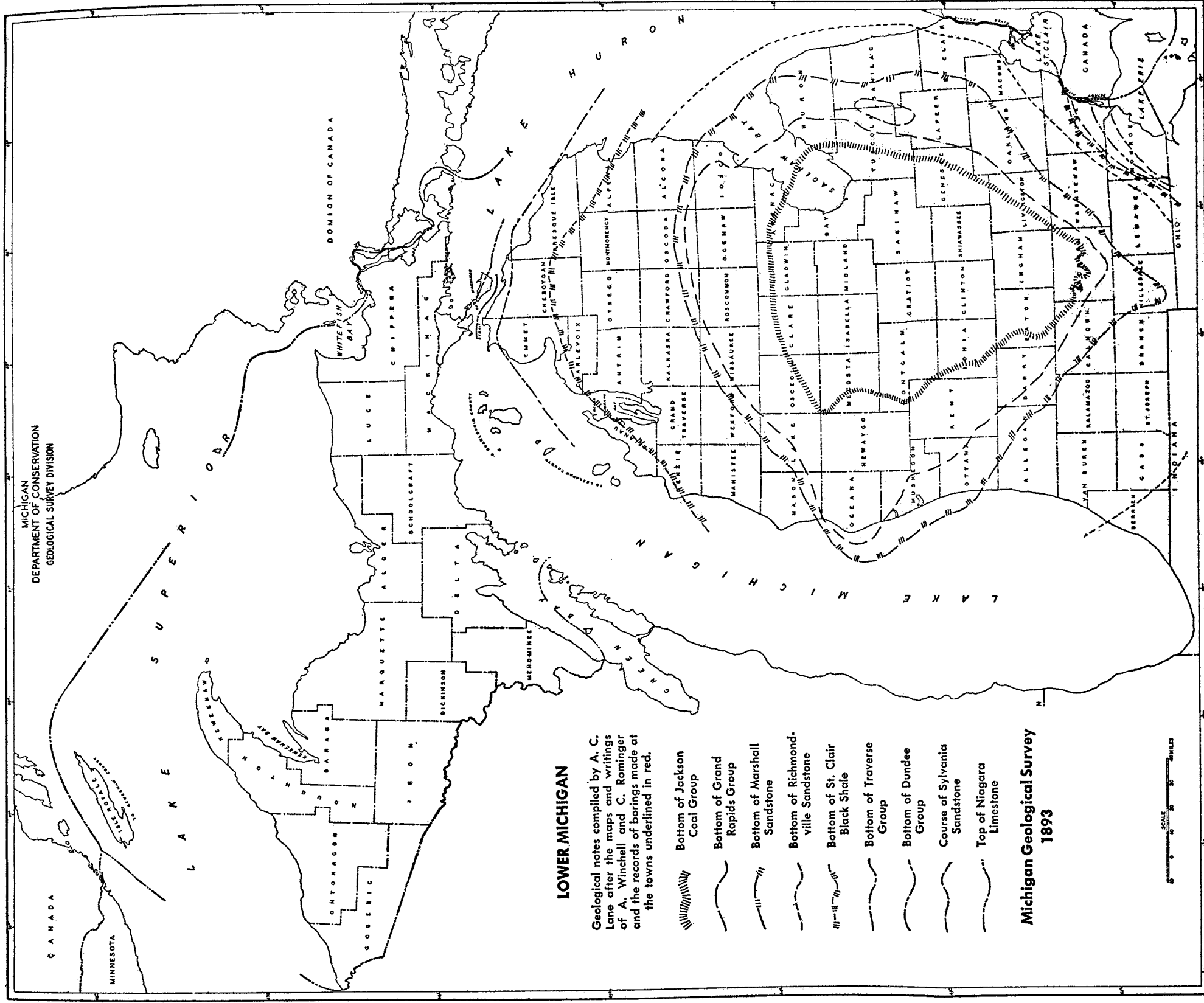


Map 4. This map is a combination of the Rominger, Pumpelly, Brooks map of the Northern Peninsula published in the Atlas accompanying Vol. I, and of Rominger's map of the Southern Peninsula published in Vol. III. *The map of the Northern Peninsula is in numbered colors and the legend bears the title "Explanation of colors." Map of the Southern Peninsula is also published in colors, named in the legend as on this map. 1873, 1876.



Map 4. This map is a combination of the Rominger, Pumpelly, Brooks map of the Northern Peninsula published in the Atlas accompanying Vol. I, and of Rominger's map of the Southern Peninsula published in Vol. III. *The map of the Northern Peninsula is in numbered colors and the legend bears the title "Explanation of colors."

Map of the Southern Peninsula is also published in colors, named in the legend as on this map. 1873. 1876.



Map 5. After a black and white map published in Vol. V. during the administration of L. L. Hubbard, State Geologist, 1893.

ANNUAL REPORTS

Annual Reports by the State Geologist were bound in black cloth. Parts of several of the Annual Reports were also bound and issued as separates.

Annual Report for 1901 (304 pp.).

(a)—Notes on the progress of work in Tuscola, Saginaw, Bay, Alpena, Kent, Washtenaw, and Muskegon counties.

(b)—Preliminary report on Arenac County, W. M. Gregory; limestone, gypsum, coal, water supplies, water power and flowing wells, clays and shales.

(c)—Report on Alcona County: Surface geology, Frank Leverett; sub-surface geology, A. C. Lane. Climate, glacial deposits, lake history, economic resources, soils, marl, clay, water power, wells and borings, oil and gas possibilities, salt, water and mineral water, peat, etc., maps of surface and bedrock geology.

(d)—The distribution of the plant societies of Kent County, Michigan, B. E. Livingston.

(e)—Surface geology of Lapeer County, Michigan. Map of surface deposits, F. B. Taylor.

(f)—Economic geology.

(g)—Limestones: Distribution, character, and analyses of various limestone formations in the state; development of deposits.

(h)—Stratigraphy of the Traverse group of Michigan, A. W. Grabau.

(i)—Deep wells and borings for oil and gas in Michigan.

(j)—Salt.

(k)—Meteorites.

(l)—Geothermal gradient.

(m)—The Port Huron oil field; Wave cutting on west shore of Lake Huron, Sanilac County, Michigan, C. H. Gordon.

Annual Report for 1902 (26 pp., map), published in *Michigan Miner*, Saginaw, 1903.

(a)—Preliminary report on the gypsum deposits of Michigan, G. P. Grimsley.

(b)—Field and laboratory tests of Bay County waters.

(c)—Notes on economic products: Molding sand, peat, limestone, road metal, iron bearing rocks, water power, wells and deep borings, etc.

Annual Report for 1903 (342 pp., 6 pls., 10 figs., soil, vegetation, geologic maps).

(a)—Progress reports on county geological surveys.

(b)—Relation of soils to natural vegetation in Roscommon and Crawford counties, B. E. Livingston.

(c)—Report on progress made in Porcupine Mountains.

(d)—Water supply of the Lower Peninsula of Michigan, W. F. Cooper.

(e)—Waters of the Upper Peninsula of Michigan, A. C. Lane.

(f)—Limestone.

(g)—Building and road materials.

(h)—Analyses.

(i)—Transmission of heat into the earth, A. C. Lane.

(j)—The theory of copper deposition, A. C. Lane.

(k)—The Tamarack mine cross-section and the Keweenawan lodes.

(l)—Deep borings for oil and gas (2 well records).

(m)—Peat.

(n)—Topographical survey.

(o)—Recent shore forms.

Annual Report for 1904 (182 pp., 3 maps).

(a)—Failure of wells along the lower Huron River, Michigan, in 1904, M. L. Fuller.

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(b)—A geological reconnaissance along the north shores of lakes Huron and Michigan, I. C. Russell.

(c)—Executive report on some non-metallics.

(d)—Report of special committee on nomenclature and correlation for the Lake Superior region.

(e)—Lake Superior gold mining.

(f)—Black River work.

(g)—Wells and borings.

Annual Report for 1905 (638 pp.). Parts a, b, c, were bound and issued as separates.

(a)—An ecological survey in northern Michigan (Porcupine Mountains and Isle Royale), C. C. Adams and others.

(b)—Geological report on Bay County, W. F. Cooper.

(c)—An illustrated catalogue of the Mollusca of Michigan, Bryant Walker.

(d)—Annual report of the State Geologist. Contains notes on the origin of strontium, on wells, artesian and mineral waters, building material, marl, shale, sand lime brick, road metal, gypsum, paint, iron, coal.

Annual Report for 1906 (602 pp., illus., incl. maps). Parts a, b, c, d, were bound and issued as separates.

(a)—The surface geology of portions of Menominee, Dickinson, and Iron counties, Michigan, I. C. Russell.

(b) Peat, essays on its origin, uses and distribution in Michigan, C. A. Davis.

(c)—A geological section from Bessemer down Black River, W. C. Gordon.

(d)—Crataegus in southern Michigan, C. S. Sargent.

(e)—Annual report of the State Geologist, containing notes on gold (placer) in Michigan, limestone, earthquakes, molding sand, clay, water and water supplies, coal, oil and gas, sand lime brick, biological and topographic surveys, etc.

Annual Report for 1907 (288 pp., illus., incl. maps). Parts b, c, d, were issued as separates.

(a)—State Geologist's report containing notes on the topographic survey, on reforestation, leasing of state lands for oil and gas etc. exploration, peat, coal and coal analyses, limestone, cement and lime, tests, and analyses.

(b)—Foundry sands, Heinrich Ries and J. A. Rosen.

(c)—Summary of the surface geology of Michigan, A. C. Lane. Map.

(d)—A biological survey of Walnut Lake (Oakland County), Michigan, T. L. Hankinson, C. A. Davis and J. G. Needham.

Annual Report for 1908 (402 pp., illus., incl. maps). Parts b, c, d were issued as separates.

(a)—Annual report of the State Geologist, containing notes on water, sand lime brick, peat, and salt licks.

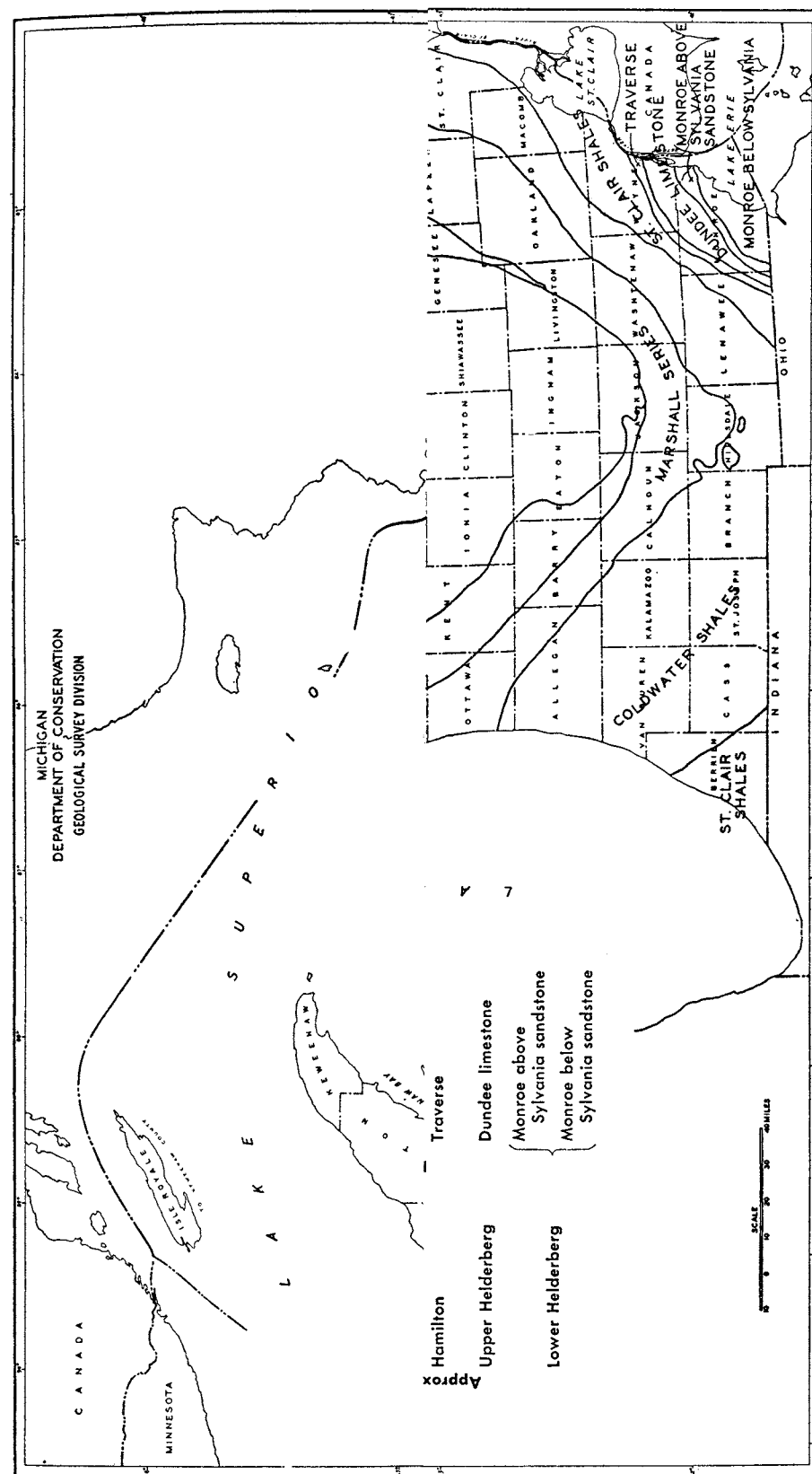
(b)—Notes on the geological section of Michigan, A. C. Lane and A. E. Seaman.

(c)—Report on the geology of Tuscola County, C. A. Davis.

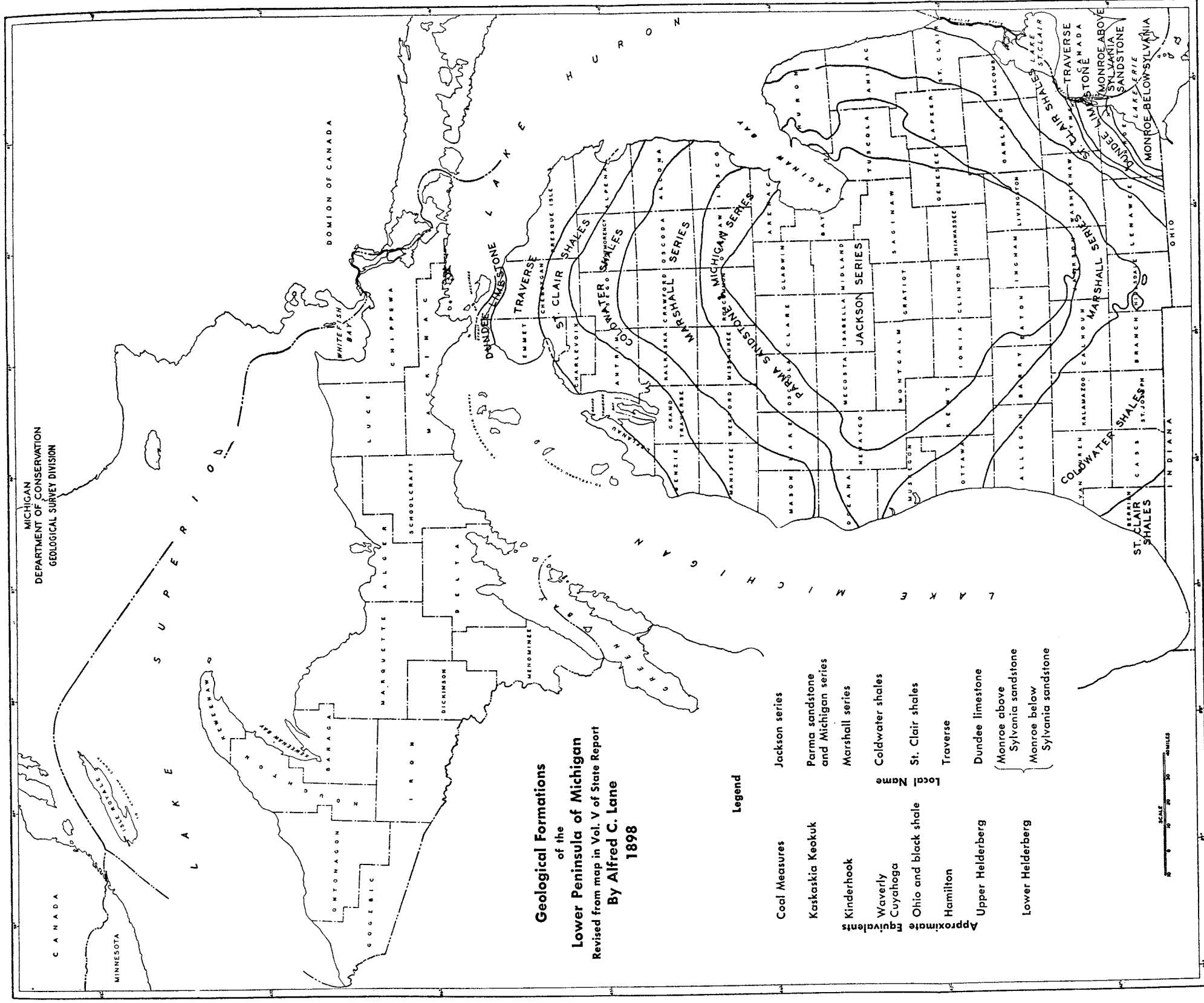
(d)—The intrusive rocks of Mount Bohemia, Michigan, F. E. Wright.

An Ecological Survey of Isle Royale, Lake Superior prepared under the direction of C. C. Adams; published as part of the report of the Board of the Geological Survey for 1908 (468 pp., 63 figs., incl. 5 maps).

Contains annotated lists of fauna and flora and contributions from twelve biologists.



Map 6. After a map published in colors in U. S. Geological Survey W.S.P. 31. 1898.



Map 6. After a map published in colors in U. S. Geological Survey W.S.P. 31. 1898.

R. C. ALLEN, State Geologist 1909-1919
A. G. RUTHVEN, Chief Naturalist 1908-1921

PUBLICATIONS

Publication of the Annual Report was discontinued after 1908 and reports were issued as Publications in two series—Geological and Biological. Publications have consecutive numbers followed by series numbers. They are bound in paper and in gray vellum. Parts of the Biological Series were published also as separates.

In 1911 the office of Commissioner of Mineral Statistics was abolished and his duties were transferred to the Survey. Statistical data in Publications 21, 24, 27, 29, 32, 33, 34, 35, and 37 were collected in co-operation with the United States Department of the Interior, Bureau of Mines.

Publication 1, Biological Series 1, 1910 (96 pp., 17 pls., incl. map).

(a)—The crawfishes of Michigan, A. S. Pearse.

(b)—The insect galls of Michigan, M. T. Cook.

(c)—The birds of School Girl's Glen region, Ann Arbor, Michigan: A study in local ornithology, A. D. Tinker.

(d)—Preliminary list of the sites of aboriginal remains in Michigan, H. I. Smith.

Publication 2, Geological Series 1, 1910 (248 pp., 32 pls., 9 figs.).

The Monroe formation of southern Michigan and adjoining regions, A. W. Grabau and W. H. Sherzer.

Publication 3, Geological Series 2, 1910 (152 pp., 18 figs., 17 pls., incl. 2 maps).

The Iron River iron-bearing district of Michigan, R. C. Allen.

Publication 4, Biological Series 2, 1911 (348 pp., 19 pls., map).

A biological survey of the sand dune region on the southern shore of Saginaw Bay, A. G. Ruthven et al.

Publication 5, Geological Series 3, 1911 (96 pp.).

(a)—The late glacial and post-glacial uplift of the Michigan basin (48 figs., 2 pls.).

(b)—Earthquakes in Michigan, W. H. Hobbs (5 figs., 2 pls.).

Publication 6, Geological Series 4, 1911.

The Keweenaw series of Michigan, A. C. Lane.

Vol. I—(pp. 1-499, 15 pls., 47 figs., incl. maps).

Vol. II—(pp. 500-984, 22 figs., incl. maps).

Publication 7, Geological Series 5, 1911 (92 pp., 9 pls., 7 figs., incl. map).

Surface geology of the Northern Peninsula of Michigan, Frank Leverett.

Publication 8, Geological Series 6, 1912 (466 pp., 19 figs., 21 pls., incl. 14 maps).

Mineral resources of Michigan . . . for 1910 and prior years.

(a)—The copper industry, R. E. Hore.

(b)—The iron mining industry, R. C. Allen.

(c)—The pig iron industry, A. E. White.

(d)—The Jones step process, A. E. White.

(e)—Michigan coal, R. A. Smith.

(f)—Gypsum and gypsum products, R. A. Smith.

(g)—The salt industry, C. W. Cook.

(h)—Michigan cement, C. W. Cook.

(i)—Gold in Michigan, R. C. Allen.

(j)—Oil and gas in Michigan, R. A. Smith.

Publication 9, Geological Series 7, 1912 (144 pp., 15 pls., 16 figs., incl. 3 maps).
Surface geology and agricultural conditions of the Southern Peninsula of Michigan, Frank Leverett.

Climate of Michigan, C. F. Schneider.

Publication 10, Biological Series 3, 1912 (190 pp., 55 figs., 20 pls.).

The herpetology of Michigan, A. G. Ruthven, Crystal Thompson and Helen Thompson.

Memoranda towards a bibliography of the archaeology of Michigan, H. I. Smith.

Publication 11, Geological Series 8, 1912 (146 pp., 6 pls., 18 figs.).

Geological report on Arenac County, W. M. Gregory.

Publication 12, Geological Series 9, 1913 (388 pp., 32 pls., 22 figs., incl. maps).

Geological report on Wayne County, W. H. Sherzer.

Publication 13, Geological Series 10, 1913 (256 pp., 8 pls., 1 fig.).

Mineral resources of Michigan . . . for 1912 and prior years.

(a)—The copper industry of Michigan, R. E. Hore.

(b)—Potash.

(c)—Sand and gravel.

(d)—Preliminary statement on limestone.

(e)—Statistical tables.

(f)—Directory of mineral producers of Michigan.

Publication 14, Geological Series 11, 1914 (282 pp., 3 pls., 19 figs., incl. map).

The occurrence of oil and gas in Michigan, R. A. Smith.

Publication 15, Geological Series 12, 1914 (188 pp., 15 pls., 47 figs., incl. maps).

The brine and salt deposits of Michigan, C. W. Cook.

Publication 16, Geological Series 13, 1914 (150 pp.).

Mineral resources of Michigan. . . for 1913 and prior years.

Part I—Copper industry, R. E. Hore.

Iron ore reserves, R. C. Allen.

Part II—Non-metallic minerals, R. A. Smith.

Publication 17, Geological Series 14, 1914 (104 pp., map).

Biennial report of the Director, Michigan Geological and Biological Survey, 1912-1914, R. C. Allen.

Publication 18, Geological Series 15, 1915 (190 pp.).

Part I—Contributions to the pre-Cambrian geology of northern Michigan and Wisconsin, R. C. Allen and L. P. Barrett (12 pls., 11 figs.).

Part II—The geology of Limestone Mountain and Sherman Hill in Houghton County, Michigan, E. C. Case and W. I. Robinson (5 figs.).

Publication 19, Geological Series 16, 1915 (360 pp., 18 pls., 24 figs.).

Mineral resources of Michigan . . . for 1914 and prior years.

Part I—Metallic minerals, R. E. Hore.

Part II—Non-metallic minerals, R. A. Smith.

Publication 20, Biological Series 4, 1916 (180 pp., 28 pls., 3 figs., incl. maps).
Miscellaneous papers on the zoology of Michigan.

(a)—Observations on the fishes of Houghton County, T. L. Hankinson.

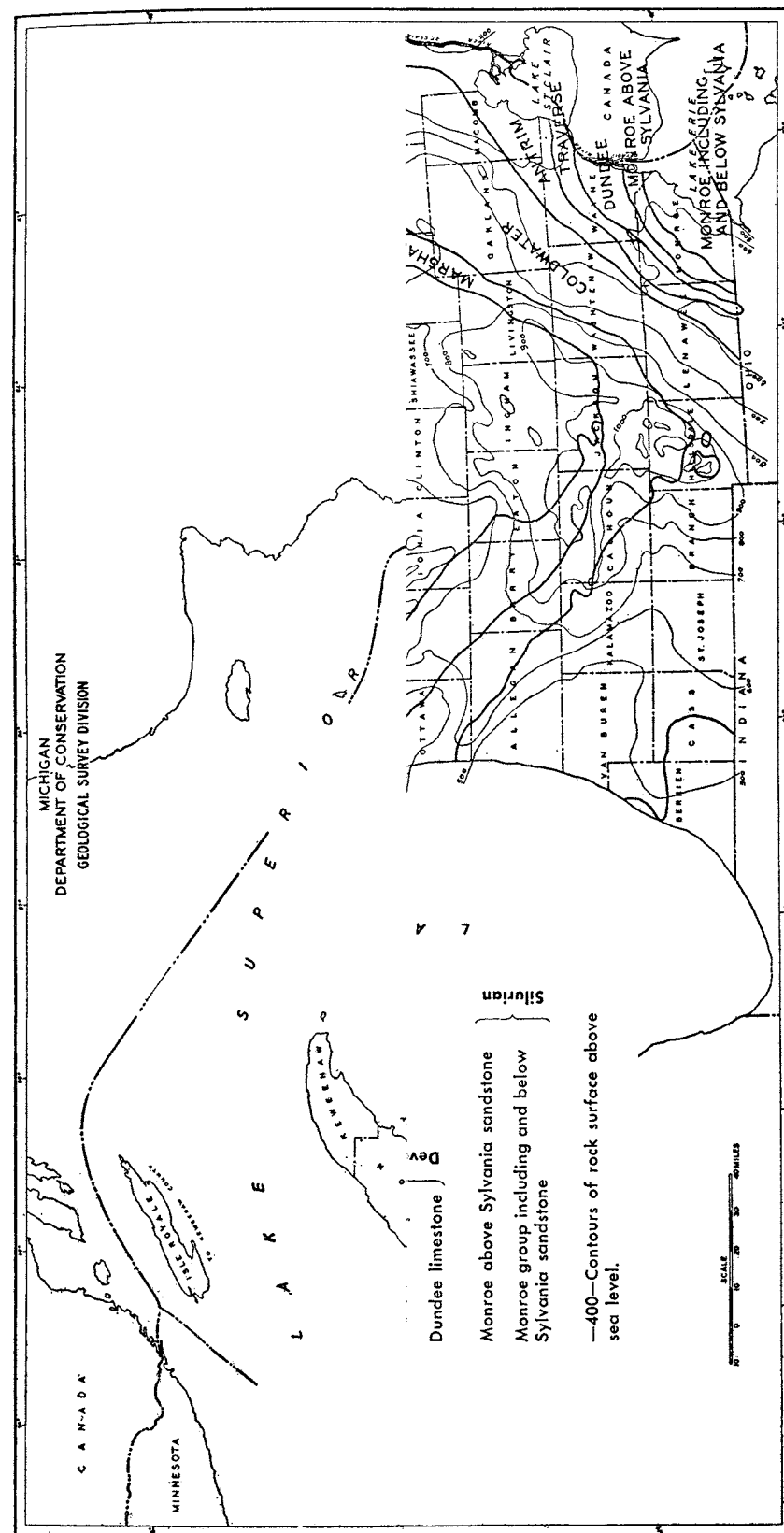
(b)—An ecological study of the fish fauna of the Douglas Lake region, R. J. Colbert.

(c)—Dragonflies of the Douglas Lake region, A. T. Evans.

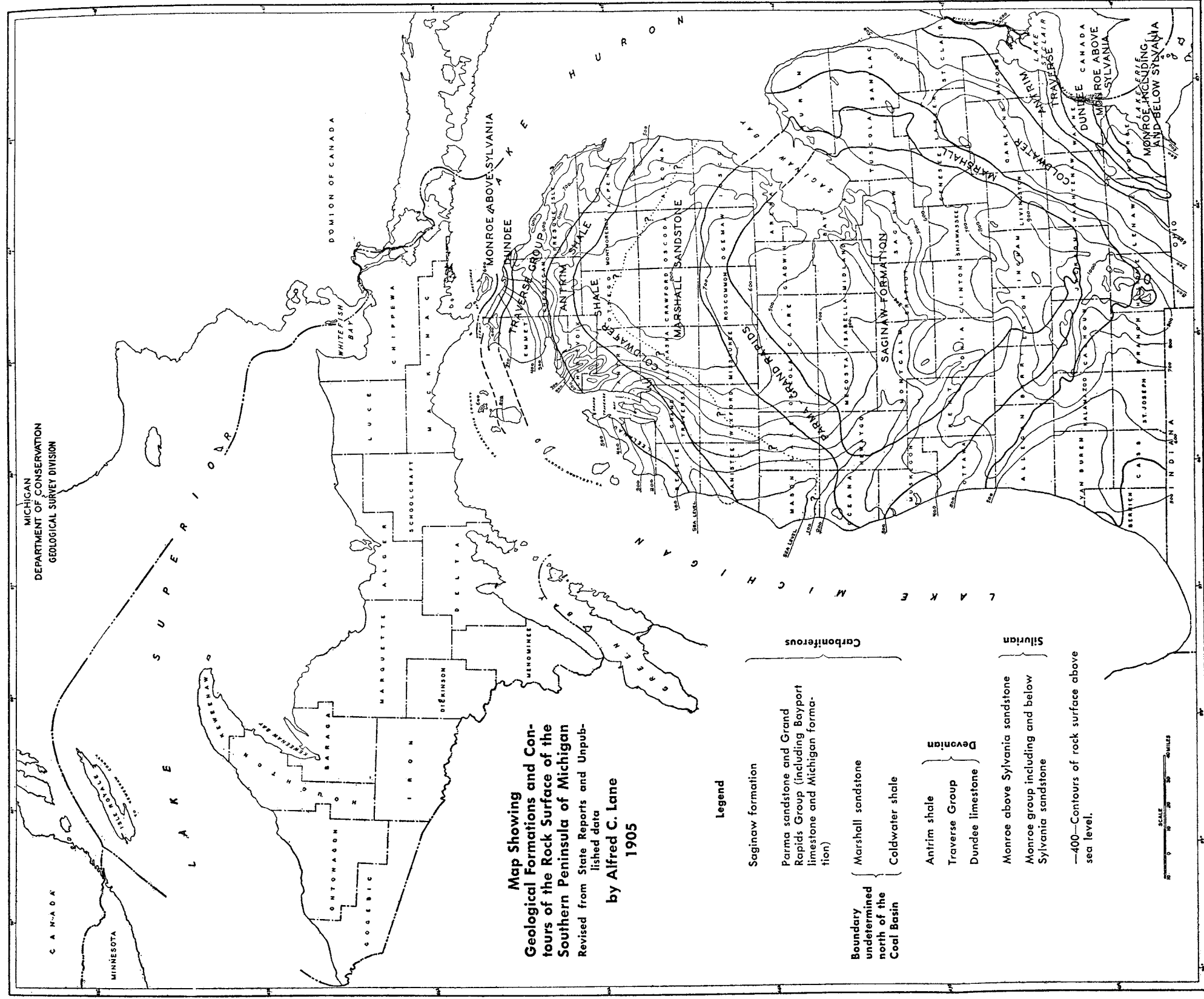
(d)—The reptiles and amphibians of Monroe County, Crystal Thompson.

(e)—Results of the Mershon expedition to the Charity Islands, Lake Huron: Coleoptera, A. W. Andrews.

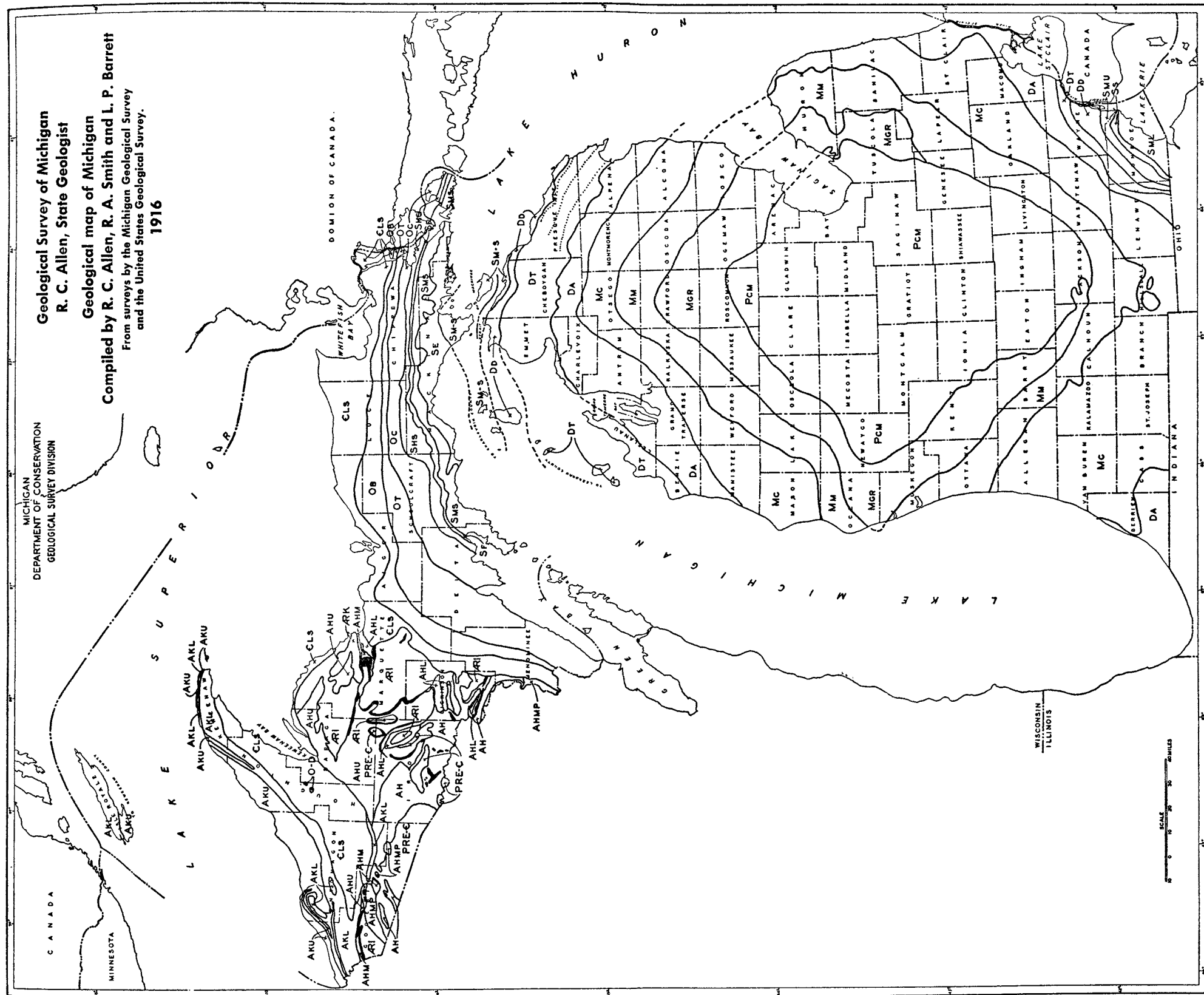
(f)—Results of the Shiras expeditions to Whitefish Point: Fishes, T. L. Hankinson.



Map 8. After map by A. C. Lane published as Plate VI in the Michigan Annual Report for 1907 and as Plate II in U. S. Geological Survey W.S.P. 183. It is published in colors and patterns with 100-foot bedrock and surface contours by Frank Leverett. This is the first map of Michigan to show surface and bedrock topography by contours.

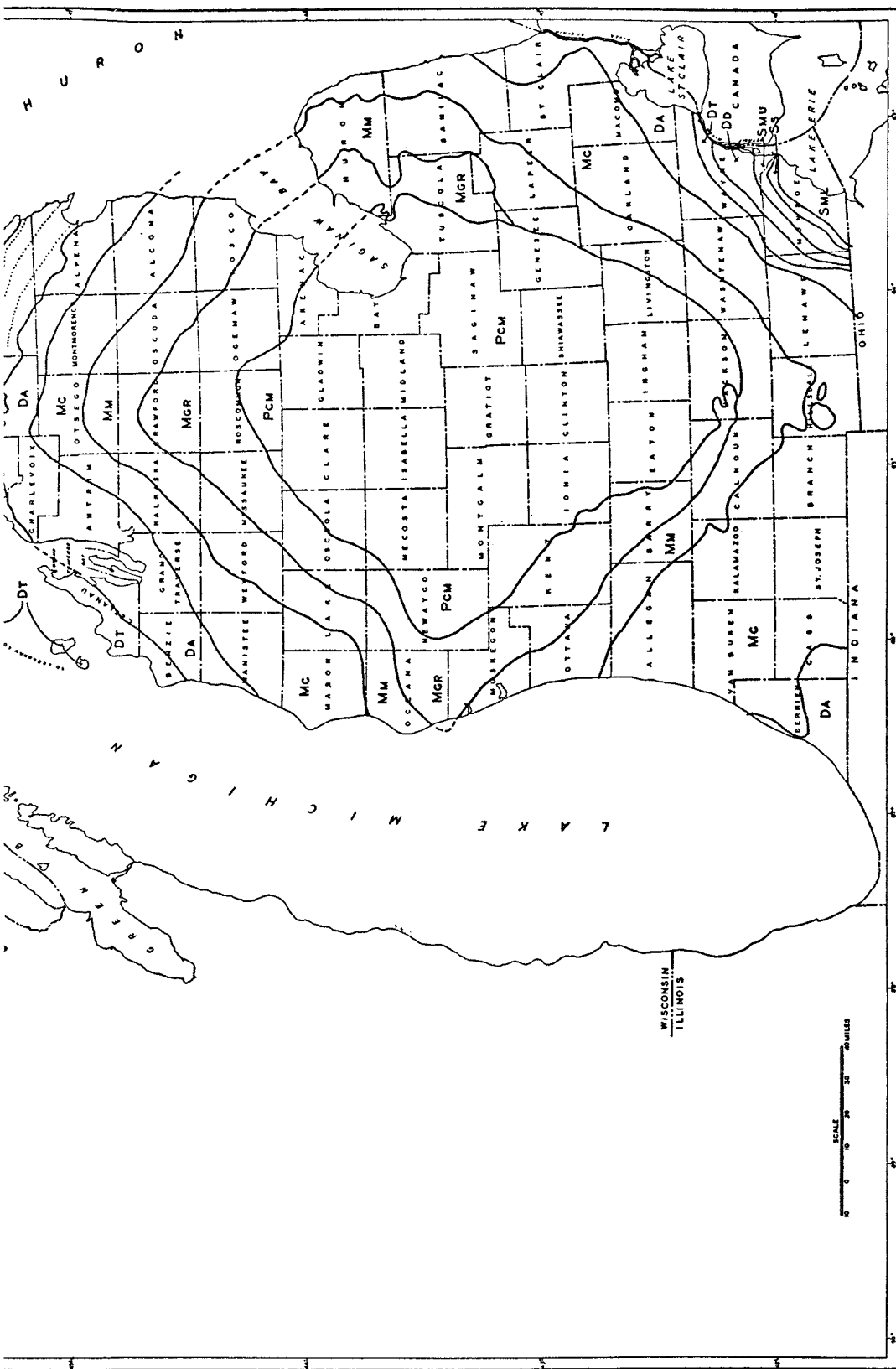


Map 8. After map by A. C. Lane published as Plate VI in the Michigan Annual Report for 1907 and as Plate II in U. S. Geological Survey W.S.P. 183. It is published in colors and patterns with 100-foot bedrock and surface contours by Frank Leverett. This is the first map of Michigan to show surface and bedrock topography by contours.



Map 9. After the geological map issued as Publication 23 of the Michigan Geological Survey publications. Printed in colors. It is the first map issued by the Survey to have a geologic column and a comprehensive legend dividing the rock formations into system, series, formation, member, with description of the rocks and their economic resources. Magnetic lines are in red overprint. Also the first map issued by Michigan's Survey as a separate publication. The legend printed here is greatly abbreviated.

Legend		
System	Series	Formation, Member
Quaternary	Pleistocene	Recent Deposits
		Wisconsin Drift
		Illinoian and pre-Illinoian (?) Drift
Carboniferous	Pennsylvanian	Woodville sandstone
		Saginaw formation
		Coal Measures
	U. Mississippian	Parma sandstone or conglomerate
		Bayport (Maxville) or Upper Grand Rapids limestone
		Michigan or Lower Grand Rapids series
	M. Mississippian	Napoleon or Upper Marshall sandstone
		Lower Marshall
	L. Mississippian	Coldwater shale
		Sunbury shale
Devonian	U. Devonian	Berea sandstone
		Bedford shale ?
	M. Devonian	Antrim shale
		Upper Traverse or Thun Bay series
		Alpena limestone
		Petoskey limestone
	L. Devonian	Long Lake series
		Bell (Marcellus) shale
		Dundee (Onondaga) limestone
Silurian	Upper Silurian or Monroan	Lucas dolomite
		Upper Monroe or Detroit River series
		Amherstburg dolomite
		Anderdon limestone
	Monroe	Flat Rock dolomite
		Middle Monroe or Sylvania sandstone
		Raisin River dolomite
	Lower Monroe or Bass Island series	Put-in-Bay dolomite
		Tymochtee shale
		Greenfield dolomite
Paleozoic	Middle Silurian or Salinan	Salina
		Guelph
		Engadine dolomite
		Guelph ?
	Lower Silurian	Manistique series
		Fiborn limestone
Paleozoic	Lower Silurian	Hendricks series
		Lockport (Niagara)



Map 9. After the geological map issued as Publication 23 of the Michigan Geological Survey publications. Printed in colors. It is the first map issued by the Survey to have a geologic column and a comprehensive legend dividing the rock formations into system, series, formation, member, with description of the rocks and their economic resources. Magnetic lines are in red overprint. Also the first map issued by Michigan's Survey as a separate publication. The legend printed here is greatly abbreviated.

			Legend			
System	Series	Formation, Member				
Quaternary	Pleistocene	Recent Deposits				
		Wisconsin Drift				
		Illinoian and pre-Illinoian (?) Drift				
Carboniferous	Pennsylvanian		Woodville sandstone			
			Saginaw formation			
		Coal Measures	Parma sandstone or conglomerate			
	Mississippian	U. Mississippian	Grand Rapids series	Bayport (Maxville) or Upper Grand Rapids limestone		
				Michigan or Lower Grand Rapids series		
		M. Mississippian	Marshall	Napoleon or Upper Marshall sandstone		
				Lower Marshall		
		L. Mississippian		Coldwater shale		
				Sunbury shale		
	Paleozoic	Devonian	U. Devonian	Bedford shale ?		
				Antrim shale		
			M. Devonian	Traverse (Hamilton-Marcellus)	Upper Traverse or Thunder Bay series	
{ Alpena limestone Petoskey limestone						
Long Lake series						
Bell (Marcellus) shale						
L. Devonian			Dundee (Onondaga) limestone			
Silurian			Upper Silurian or Monroan	Monroe	Upper Monroe or Detroit River series	Lucas dolomite
						Amherstburg dolomite
						Anderdon limestone
						Flat Rock dolomite
					Middle Monroe or Sylvania sandstone	
		Raisin River dolomite				
	Lower Silurian or Niagaran	Lower Monroe or Bass Island series		Put-in-Bay dolomite		
				Tymochtee shale		
				Greenfield dolomite		
			Middle Silurian or Salinan	Salina		
					Guelph	Engadine dolomite
					Guelph ?	Manistique series
		Lockport ?			Fiborn limestone	
		Lower Silurian or Niagaran			Hendricks series	
				Lockport (Niagara)		
				Rochester shale		
				Clinton		
				Medina (Cataract ?)		
Cataract (Medina)	Cabots Head shale					
	Manitoulin limestone					

			Legend		
System	Series	Formation, Member			
PALEOZOIC	Ordovician	Upper Ordovician or Cincinnati	Cincinnati	Richmond shale	
				Lorraine shale	
				Utica shale	
		Middle Ordovician	Trenton limestone		
			St. Peter sandstone		
		Lower Ordovician	Beekmantown (Calcareous) sandstone including Hermansville limestone		
	Cambrian	Upper Cambrian or Potsdam	Lake Superior sandstone	Munising sandstone	
				Jacobsville sandstone	
	ALGONKIAN	Keweenawan	Upper Keweenawan (Cambrian ?)	Freda sandstone (May be equivalent to Jacobsville)	
				Nonesuch shale	
				Outer Conglomerate	
					Lake Shore traps
			Great conglomerate		
			Eagle River and Ashbed groups		
Lower Keweenawan			Mesnard epidote		
			Central Mine group		
			Conglomerate 8		
		Bohemia Range group			
Huronian		Upper Huronian	Clarksburg formation		
			Michigamme-Copps formation		
			Goodrich formation		
		Middle Huronian (Animikie)	Presque Isle granite		
			Quinnesec schist		
	Tyler and Hanbury formations				
	Negaunee, Vulcan, and Ironwood formations				
	Ajibik, Siamo, and Palms formations				
	Hemlock formation				
	Lower Huronian		Kona, Randville, and Bad River formations		
		Mesnard, Sturgeon, and Sunday formations			
ARCHEAN	Laurentian				
	Keewatin				

- Publication 21, Geological Series 17, 1916 (402 pp., 8 pls., 15 figs.).
Mineral resources of Michigan . . . for 1915 and prior years.
Part I—Metallic minerals, W. E. Hopper and R. C. Allen.
Part II—Non-metallic minerals, R. A. Smith.
Limestones of Michigan, R. A. Smith
- Publication 22, Geological Series 18, 1916 (118 pp., 9 maps).
Biennial report of the Director and report on retracement and permanent monumenting of the Michigan-Ohio boundary line.
- Publication 23, Geological Series 19, 1917.
Geological map of Michigan (Scale: 1:750,000), R. C. Allen, R. A. Smith and L. P. Barrett.
- Publication 24, Geological Series 20, 1917 (292 pp., 7 figs., incl. maps).
Mineral resources of Michigan . . . for 1916 and prior years.
Part I—Metallic minerals, W. E. Hopper.
Part II—Non-metallic minerals, R. A. Smith.
The Portland cement industry, R. A. Smith.
Part III—Deep borings in Michigan.
- Publication 25, Geological Series 21, 1917 (224 pp., 15 pls., 25 figs., incl. maps).
(A revision of publications 7 and 9).
Surface geology and agricultural conditions of Michigan, Frank Leverett.
Chapter on climate, C. F. Schneider.
- Publication 26, Biological Series 5, 1918.
The Agaricaceae of Michigan, C. H. Kauffman.
Vol. I—Text (924 pp., 4 figs.).
Vol. II—Plates (172 pls.).
- Publication 27, Geological Series 22, 1918 (226 pp., 2 figs.).
Mineral resources of Michigan . . . for 1917 and prior years.
Part I—Metallic minerals, W. E. Hopper.
Part II—Non-metallic minerals, R. A. Smith.
- Publication 28, Geological Series 23, 1919 (134 pp., 13 pls., 5 figs., incl. maps).
Drainage in Michigan, D. G. Miller and P. T. Simons.
- Publication 29, Geological Series 24, 1920 (214 pp., 4 figs.).
Mineral resources of Michigan . . . for 1918 and prior years.
Part I—Metallic minerals, L. P. Barrett and O. R. Hamilton.
Part II—Non-metallic minerals, H. M. Martin.

R. A. SMITH, State Geologist 1919-1946

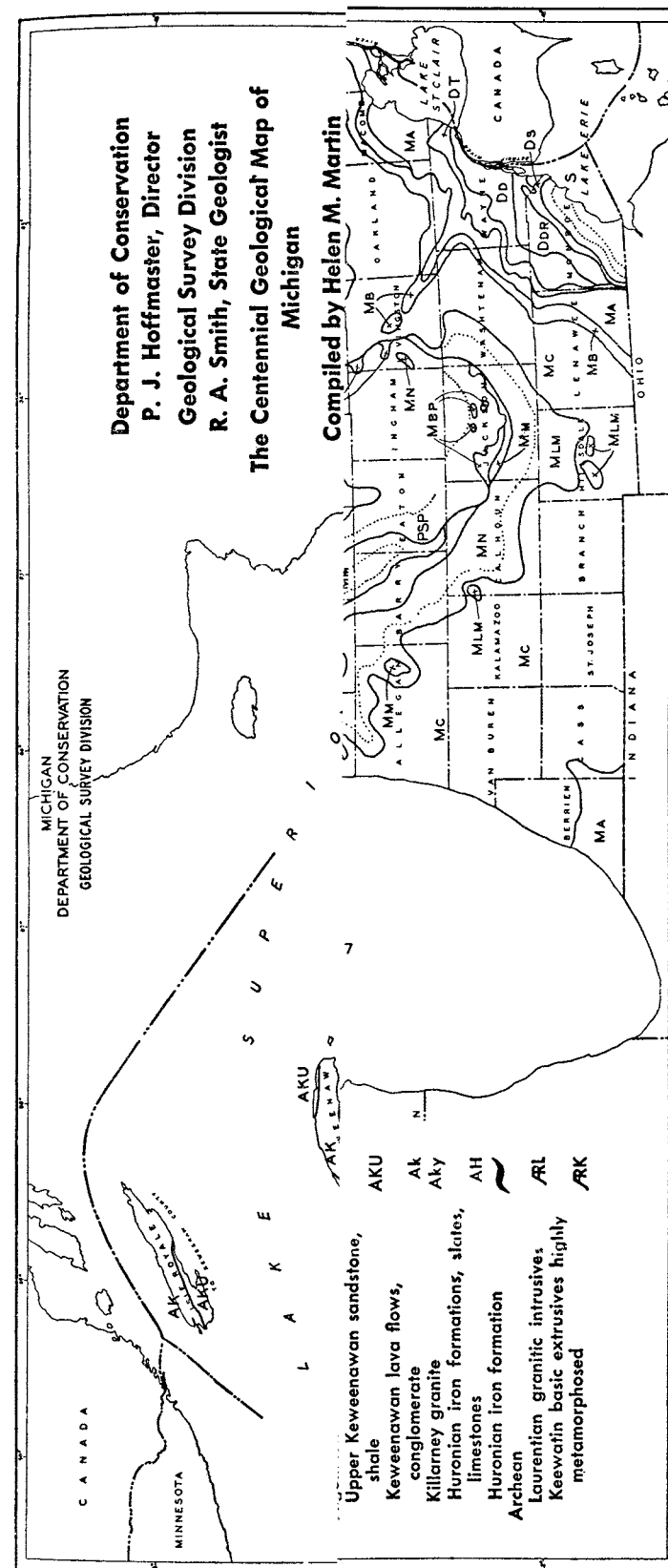
Reports were issued as formal Publications and mimeographed progress reports.

- Publication 30, Geological Series 25, 1921 (384 pp., 20 pls., 93 figs., incl. maps).
Inland lakes of Michigan, I. D. Scott.
- Publication 31, Biological Series 6, 1921 (234 pp., map).
Miscellaneous papers on the botany of Michigan, C. K. Dodge.

In 1921, the Geological Survey became a Division of the Department of Conservation and publications of the biological series were discontinued by the Survey; thus, Publication 31, Biological Series 6 is the final report of the series. Annual and biennial reports of the Geological Survey Division are published in the Biennial Reports of the Department of Conservation.

- Publication 32, Geological Series 26, 1922 (146 pp.).
Mineral resources of Michigan . . . for 1920 and prior years.

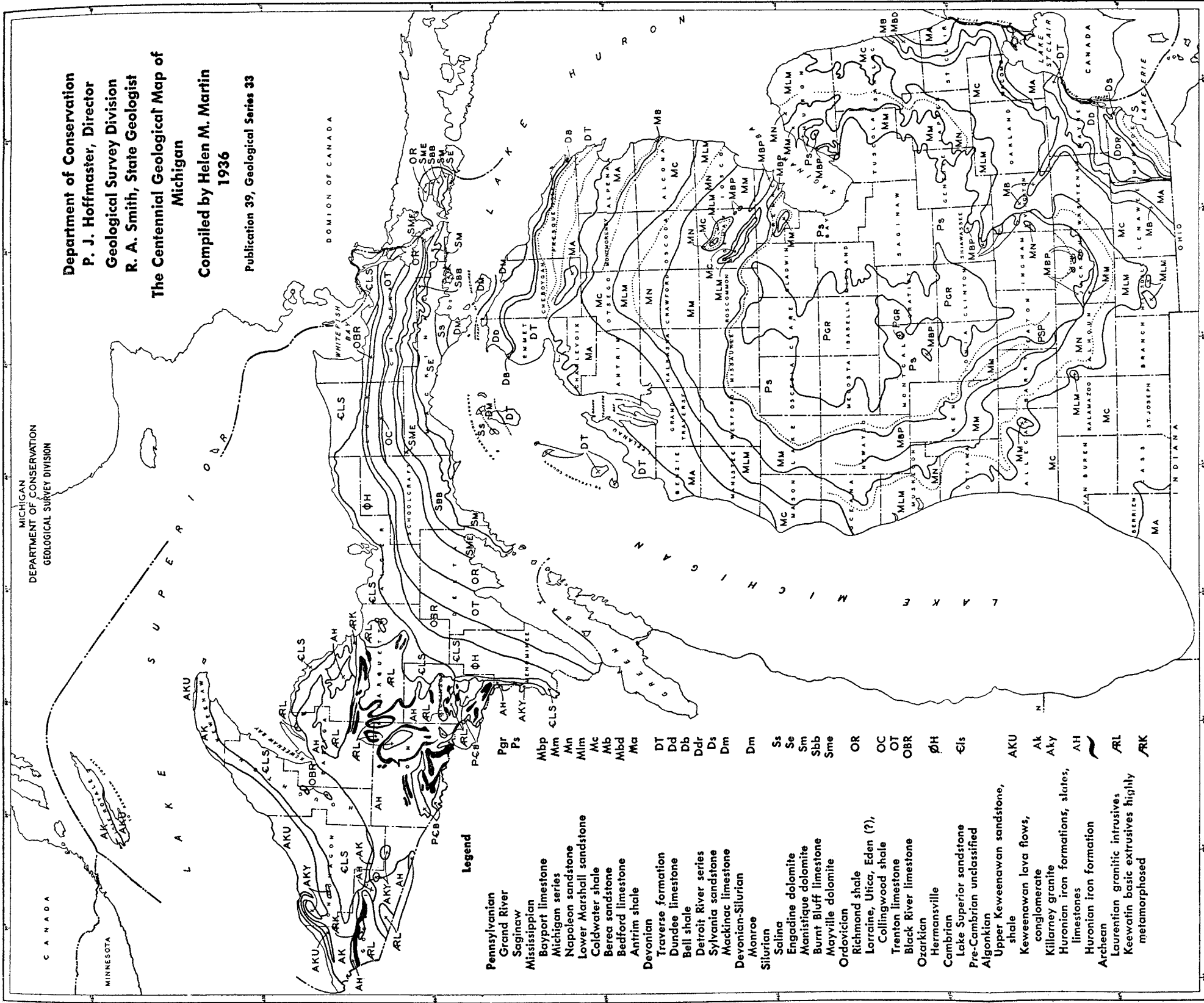
- Part I—Metallic minerals, L. P. Barrett.
 Part II—Non-metallic minerals, H. M. Martin.
 Oil and gas in Michigan, W. I. Robinson.
- Publication 33, Geological Series 27, 1923 (138 pp.).
 Mineral resources of Michigan . . . for 1921 and prior years.
 Part I—Metallic minerals.
 Part II—Non-metallic minerals, H. M. Martin.
- Publication 34, Geological Series 28, 1924 (146 pp.).
 Mineral resources of Michigan . . . for 1921 and prior years.
 Part I—Metallic minerals, L. P. Barrett.
 Part II—Non-metallic minerals.
- Publication 35, Geological Series 29, 1925 (116 pp., 2 figs.).
 Mineral resources of Michigan . . . for 1923 and prior years.
 Part I—Metallic minerals, L. P. Barrett.
 Part II—Non-metallic minerals.
- Publication 36, Geological Series 30, 1926 (444 pp., 41 pls., 69 figs., incl. maps).
 Clays and shales of Michigan and their uses, G. G. Brown.
- Publication 37, Geological Series 31, 1928 (322 pp., 10 figs., incl. maps).
 Mineral resources of Michigan . . . for 1924, 1925, 1926 and prior years.
 Part I—Metallic minerals, F. G. Pardee.
 Part II—Non-metallic minerals, O. F. Poindexter and R. B. Newcombe.
 Part III—Oil and gas developments in Michigan, R. B. Newcombe.
- Publication 38, Geological Series 32, 1933 (294 pp., 10 pls., 41 figs., 23 tables, incl. maps).
 Oil and gas fields of Michigan, R. B. Newcombe.
 Part I—General geology.
 Part II—Economic geology.
- Publication 39, Geological Series 33, 1937.
 The centennial geological map of Michigan (Scale: 1:500,000), H. M. Martin.
 Part I—Northern Peninsula.
 Part II—Southern Peninsula.
- Publication 40, Geological Series 34, 1936 (260 pp., 16 figs., 27 pls., incl. maps).
 Occasional papers on the geology of Michigan.
 Part I—The Pleistocene history of the Tahquamenon and Manistique drainage region of the Northern Peninsula, S. G. Bergquist.
 Part II—The Pennsylvanian system in Michigan, W. A. Kelly.
 Part III—The Trenton and Black River rocks of Michigan, R. C. Hussey.
- Publication 41, Geological Series 35, 1936 (262 pp., 34 figs., 42 tables, 2 maps).
 Molding sands of Michigan and their uses, G. G. Brown.
 Part I—Chemical and physical properties of, and cause of bond in sands.
 Part II—Tests of Michigan sands.
- Publication 42, 1939.
 Rocks and minerals of Michigan, O. F. Poindexter, H. M. Martin and S. G. Bergquist (81 pp., 10 figs., incl. fossils, mineral crystals and map).
 Third edition, revised 1951, Helen M. Martin. Second printing 1953 (124 pp., 21 pls., 5 figs.).
- Publication 43, Geological Series 36, 1945 (74 pp., 31 figs., map).
 Pre-historic Mackinac Island, G. M. Stanley.
- Publication 44, Geological Series 37, 1945 (204 pp., 14 pls., incl. maps).
 Geology of the Mackinac Straits region, K. K. Landes, G. M. Ehlers and G. M. Stanley.



Map 10. After the "Centennial Map", Publication 39 of the Michigan Geological Survey, commemorating the 100th anniversary of the establishment of the Michigan Geological Survey. The map published in colors is in two parts: The Northern Peninsula and The Southern Peninsula. Both maps have appropriate cross sections and comprehensive legends dividing the rock formations into System-Series, Group, Formation-Stage-Member-Bed, with dating of nomenclature, and descriptions of the rocks and their economic resources.

The Centennial Map was compiled from surveys of the Michigan Geological Survey, from unpublished data supplied by geologists of the University of Michigan and Michigan State College and by the geological departments of several oil companies.

The legend of Map 10 is abbreviated from the legend of the Centennial Map to explain the symbols used.



Department of Conservation
P. J. Hoffmaster, Director
Geological Survey Division
R. A. Smith, State Geologist
The Centennial Geological Map of
Michigan

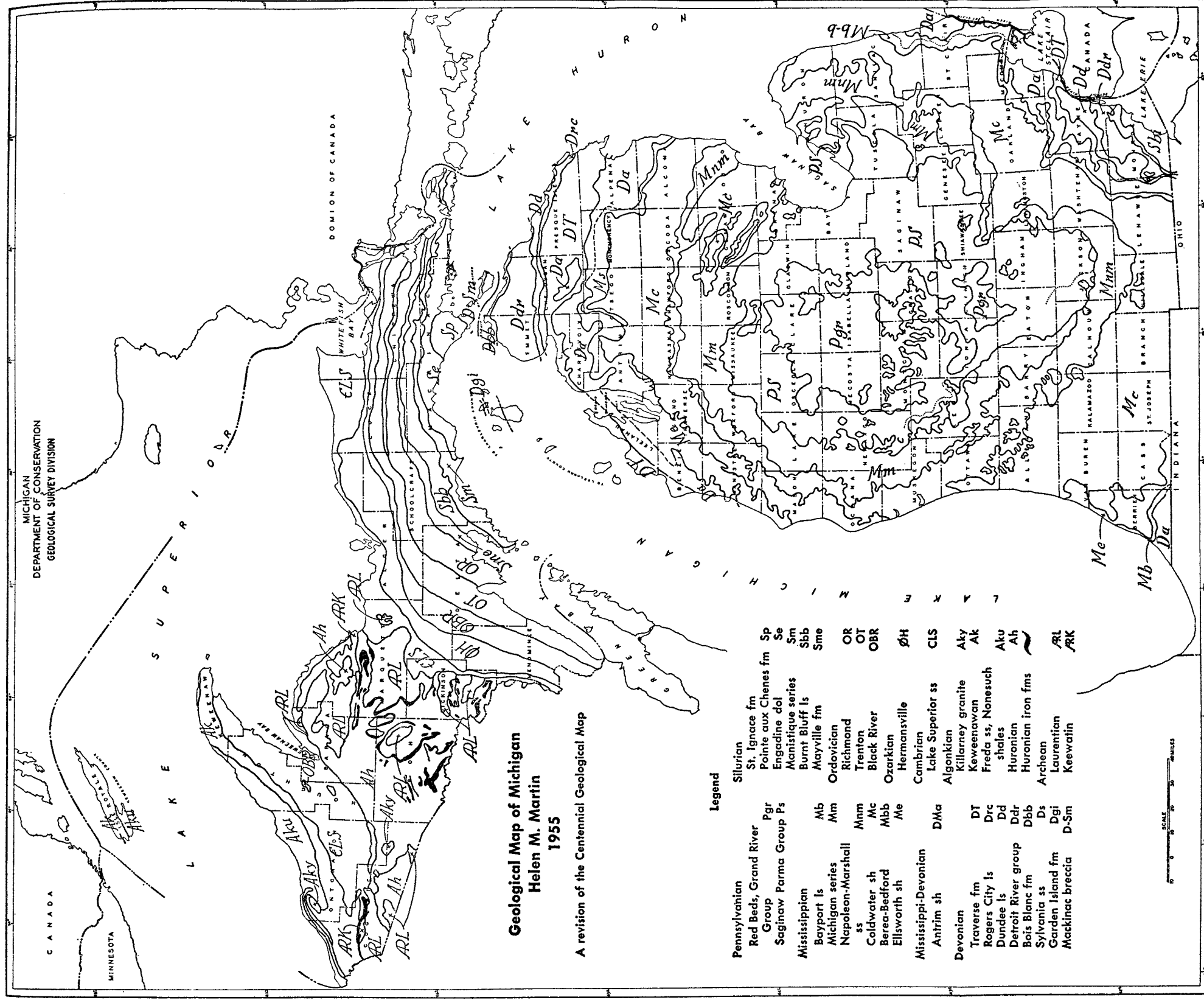
Compiled by Helen M. Martin
1936

Publication 39, Geological Series 33

Map 10. After the "Centennial Map", Publication 39 of the Michigan Geological Survey, commemorating the 100th anniversary of the establishment of the Michigan Geological Survey. The map published in colors is in two parts: The Northern Peninsula and The Southern Peninsula. Both maps have appropriate cross sections and comprehensive legends dividing the rock formations into System-Series, Group, Formation-Stage-Member-Bed, with dating of nomenclature, and descriptions of the rocks and their economic resources.

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Map. 11. After 1955 manuscript-revision of the Centennial Map, compiled from data obtained from oil and water well logs, from core testing generously supplied by several oil companies and from the map of the Mackinac Straits area in Publication 44. Only in the St. Ignace area is the Centennial Map of the Northern Peninsula revised.

G. E. EDDY, State Geologist 1946-1951

Reports were issued as Publications, Progress Reports, Technical Reports and Research Publications. Many of these reports were in co-operation with various federal, state and educational agencies.

Publication 45, Geological Series 38, 1948.

Occasional papers on the geology of Michigan for 1946.

Part I—The post-glacial geology of the Grand Marais embayment in Berrien County, Michigan, G. C. Tague (82 pp., 27 pls., 6 figs., incl. maps).

Part II—The glacial and post-glacial history of the Platte and Crystal lake depressions, Benzie County, Michigan, J. L. Calver (70 pp., 16 pls., 9 figs., map).

F. G. PARDEE, State Geologist 1951-1952

Publication 46, Geological Series 39, 1952 (90 pp., 10 pls., 11 figs.).

The Middle and Upper Ordovician rocks of Michigan, R. C. Hussey.

**W. L. DAOUST, Acting State Geologist 1952-1954
State Geologist 1954—**

In 1953, use of the term "Geological Series" was discontinued and only publication numbers retained.

Publication 47, 1954.

Oil and gas conservation in Michigan, L. S. Miller.

Publication 48, 1955.

Occasional papers on the geology of Michigan for 1954.

Part I—The glacial geology and groundwater resources of Van Buren County, Michigan, F. W. Terwilliger.

Part II—A survey of the groundwater resources in Oakland County, Michigan, A. J. Mozola.

Publication 49, 1955.

Map of the surface formations of the Southern Peninsula of Michigan (Scale: 1:500,000), H. M. Martin.

Publication 50, 1956.

A survey of Michigan geology, 1821 to 1955, H. M. Martin and M. T. Straight.

PROGRESS REPORTS

Progress reports have been issued during the administration of State Geologists Smith, Eddy, Pardee, and Daoust. They are mimeographed and bound. Editions have been small as it is the intent of the Geological Survey to combine them eventually in several monographic reports.

Progress Report No. 1, 1936.

Geology of the Crystal oil field, Montcalm County, G. E. Eddy.

Progress Report No. 2, 1937.

Geology of Ogemaw County and the West Branch oil field, E. A. Newman.

Progress Report No. 3, 1937.

Geology of Arenac County, G. H. Pringle.

Progress Report No. 4, 1938.

Geology of Allegan County, C. H. Riggs.

Progress Report No. 5, 1939.

Geology of the Menominee Range, Dickinson County, C. E. Dutton and C. A. Lamey.

Progress Report No. 6, 1941.

Geology of the Menominee Range, vicinity of Iron Mountain, C. A. Lamey and C. E. Dutton.

Progress Report No. 7, 1941.

Dip-needle survey of the Wyandotte-Winona area, Houghton County, and Cherokee area, Ontonagon County, Kiril Spiroff.

Progress Report No. 8, 1942.

Geology of the Menominee Range, Norway to Waucedah, C. A. Lamey and C. E. Dutton.

Progress Report No. 9, 1942.

Economic geology of a part of the Menominee Range, C. E. Dutton.

Progress Report No. 10, 1944.

Strategic mineral investigations in Marquette and Baraga counties, 1943, A. K. Snelgrove, W. A. Seaman and V. L. Ayres.

(In co-operation with the Michigan College of Mining and Technology)

Progress Report No. 11, 1945.

Geology of the Spruce River and Peshekee River areas, Marquette and Baraga counties, W. A. Seaman.

(In co-operation with the Michigan College of Mining and Technology)

Progress Report No. 12, 1945.

Ground water resources of the Benton Harbor area, W. T. Stuart and R. W. Stallman.

(In co-operation with the U. S. Dept. of Interior, Geological Survey)

Progress Report No. 13, 1945.

Ground water resources of the Lansing area, Michigan, W. T. Stuart.

(In co-operation with the U. S. Dept. of Interior, Geological Survey)

Progress Report No. 14, 1951.

Ground-water resources of the glacial deposits in the Bessemer area, Michigan, E. A. Brown and W. T. Stuart.

(In co-operation with the U. S. Dept. of Interior, Geological Survey)

Progress Report No. 15, 1952.

The Richfield challenge, G. H. Hautau.

Progress Report No. 16, 1954.

Ground-water resources of southeastern Oakland County, J. G. Ferris, E. M. Burt, G. J. Stramel and E. G. Crosthwaite.

(In co-operation with the U. S. Dept. of Interior, Geological Survey)

TECHNICAL REPORTS

The first technical report was published in March 1948 in co-operation with the United States Department of the Interior, Geological Survey. These reports are mimeographed and bound. Editions are limited.

Technical Report No. 1, 1948.

Ground water hydraulics as a geophysical aid, J. G. Ferris.

Technical Report No. 2, 1948.

Ground-water problems of the Iron River district, W. T. Stuart, C. V. Theis and G. M. Stanley.

Technical Report No. 3, 1954.

Ground water investigations of the Marquette iron-mining district, W. T. Stuart, E. A. Brown and E. C. Rhodehamel.

RESEARCH PUBLICATIONS

Research publications are published by the University of Michigan, Engineering Research Institute, Lake Hydraulics Laboratory as part of a co-operative project with the Michigan Department of Conservation, Geological Survey Division.

Research Publication No. 1, 1950.

Bibliography on beach erosion and related subjects.

Research Publication No. 2, 1950.

Beach erosion in Michigan, E. F. Brater.

Research Publication No. 3, 1952.

Low cost shore protection for the Great Lakes.

(In co-operation with Michigan Water Resources Commission)

MISCELLANEOUS PUBLICATIONS

Mines and mineral statistics. Annual reports of the Commissioners of mineral statistics, 1877 and previous years to 1909.

You never miss the water, 1952, J. L. Slaughter and J. M. Campbell.

Statistics covering costs and production of Michigan iron mines. Published annually since 1927.

Summary of operations, oil and gas fields. Published annually since 1946.

Logs of water wells, oil and gas wells, other borings, drillers, company and sample logs. Filed and issued as requested.

General regulations governing oil and gas operations in the state of Michigan, June 9, 1949.

General regulations governing the spacing, drilling, deepening and plugging of wells for natural dry gas, June 9, 1949.

ACT NO. 61, PUBLIC ACTS 1939 as amended.

This Act provides for a Supervisor of wells.

ACT NO. 194, PUBLIC ACTS 1939 as amended by Acts 121 and 194, Public Acts 1954. (Inland lake levels).

ACT NO. 326, PUBLIC ACTS 1937 as amended.

This Act provides for a Supervisor of natural dry gas wells.

Price list of oil and gas and geologic maps available from Geological Survey Division.

Index maps to topographic quadrangles in Michigan.

A guide to uranium prospectors in Michigan, 1949, B. E. Kennedy.

Lake gazetteer, Gogebic County, Michigan, compiled by Michigan Committee on Geographic Names, June 1952, revised July 1954.

A quantitative method for determining ground water characteristics for drainage design, J. G. Ferris.

List of publications Geological Survey Division, with prices.

CO-OPERATIVE REPORTS

In co-operation with
United States Department of Interior
Bureau of Mines

Publications 21, 24, 27, 29, 32, 33, 34, 35, and 37.

Statistical data on mineral resources.

Summary Report No. 1, 1933.

Production and value of minerals and mineral products in Michigan, 1927 to 1931 and prior years, Wayland Osgood and O. F. Poindexter.

Summary Report No. 2, 1936.

Production and value of minerals and mineral products in Michigan, 1930 to 1934 and prior years, Wayland Osgood and O. F. Poindexter.

- Mineral industries of Michigan, 1934 to 1938 and prior years, O. F. Poindexter.
Michigan's mineral industries 1946, 1948 (includes summary statistics for 1947), 1949, 1951, and 1952.
Michigan's mineral industries 1953, H. O. Sorensen and E. T. Carlson.
U. S. Bureau of Mines Report of Investigations 3313, 1936.
Extent and availability of natural gas reserves in Michigan "Stray" sandstone horizon of central Michigan, E. L. Rawlins and M. A. Schellhardt.

In co-operation with
United States Department of Interior
Geological Survey

- U. S. Geological Survey Circular 26, 1948.
Magnetic survey and geology of the eastern and southeastern parts of the Iron River district, Iron County, Michigan, H. L. James and K. L. Wier.
U. S. Geological Survey Circular 43, 1949.
Geology of the central part of the Iron River district, Iron County, Michigan, C. E. Dutton.
U. S. Geological Survey Circular 55, 1949.
Magnetic survey and geology of the Stager area, Iron County, Michigan, S. E. Good and F. J. Pettijohn.
U. S. Geological Survey Circular 77, 1950.
Coal resources of Michigan, G. V. Cohee et al.
(In co-operation with the University of Michigan).
U. S. Geological Survey Circular 84, 1950.
Progress of geologic work in Iron and Dickinson counties, Michigan, C. E. Dutton.
U. S. Geological Survey Circular 120, 1951.
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1934. Michigan Academy of Science Geological Field Trip.
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1935. Guide to Fifth Annual Field Trip, Section Geology and Mineralogy,
Michigan Academy of Science.
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Arts and Letters.
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1944. Mackinac Straits Field Conference, Michigan Geological Society.
1945. Field Trip Northwestern Ohio. No Guidebook prepared.
1946. Michigan Geological Society, Ontario Field Trip.
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Many informal reports are available for study, i.e., statistical material, map and list of glacial striae and others.

INDEX OF
THE PUBLICATIONS OF THE
MICHIGAN GEOLOGICAL SURVEY 1838-1955

By
HELEN M. MARTIN

INDEX OF THE PUBLICATIONS OF THE MICHIGAN GEOLOGICAL SURVEY 1838-1955.

Two reports not published by the Survey are briefly indexed: (1) Report of the C. T. Jackson Survey, Lake Superior Mineral Lands; (2) Report of the Geology and Topography of the Lake Superior Land District, Part I, Copper Lands and Geology of the Lake Superior Land District; Part II, Iron Lands, by J. W. Foster and J. D. Whitney. These reports were published as United States Congressional Documents. The Jackson report is Part III of the message of the President of the United States to the 31st Congress, Senate Document No. 1, 1849, House of Representatives Executive Document No. 5. The Foster and Whitney reports were a part of the President's message to the Special Session of the United States 31st Congress and were published for the House of Representatives as Executive Document No. 69, 1850.

These documents are included in this index inasmuch as the surveys they report were continuations of the plans and surveys of Douglass Houghton. Work of the surveys was done by men associated with Houghton and trained by him; and the reports embody maps and reports of work started under Houghton and continued after his death by such men as Bela Hubbard, C. C. Douglass, S. W. Hill, Jacob Houghton, Judge Burt, James Hall, S. W. Higgins, William Ives, and other members of the original Survey staff.

The Jackson Report is abbreviated C.T.J.

The Foster and Whitney reports are abbreviated F. and W. pt. 1, and F. and W. pt. 2.

Survey reports have been published as:

1. Michigan Legislative documents. Abbreviated S.D., Senate Document; H.D., House Document; J.D., Joint Document; Houghton.
2. First Biennial Report. Abbreviated Winchell.
3. Volumes I through IX. Abbreviated Vol. I-IX.
4. Annual Reports 1901 through 1908. Abbreviated Ann. Rept. 1901-1908.
5. Publications 1 through 50. Abbreviated Pub. 1-50.
6. Progress Reports 1 through 16. Abbreviated P.R. 1-16.
7. Technical Reports 1 through 3. Abbreviated T.R. 1-3.
8. Open file and miscellaneous. Abbreviated Misc., includes Land Economic Survey open file, abbreviated L.E.S. See list of publications.
9. Research Publications. Abbreviated R.P. 1-3.
10. Summary Reports 1 and 2. Abbreviated S.R. 1-2.

The field notes of Douglass Houghton, Bela Hubbard, A. Winchell, N. H. Winchell, Carl Rominger and Frank Leverett have been transcribed, indexed, and are in open file in the Survey library.

For reference to stratigraphy see Index to Nomenclature of Michigan Geologic Formations.

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65, 1869 provides for a further Geological Survey of the State: Pub. 17.

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250, 1905 provides for a Biological Survey: Ann. Rept. 1905; Pub. 17.

251, 1905 provides for topographic mapping: Ann. Rept. 1905.

7, 1911 provides for collection of mineral statistics: Pub. 17.

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65, 1927 creates office of Supervisor of Wells, designates director of Conservation as Supervisor: Pub. 47.

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16, 1929 crude oil carriers controlled by Public Utilities Commission: Pub. 47.

185, 1931 requires a performance bond: Pub. 47.

326, 1937 relates to prevention of waste of gas.

61, 1939 provides for supervisor of wells and advisory board.

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|---------------------------|-----------------|
| abrasive | magnesium |
| agate | magnetite |
| amphibole | marble |
| andalusite | marl |
| anthophyllite | martite |
| asbestos | mica |
| brick and tile | mineral paints |
| bromine | mineral waters |
| calcite | muscovite |
| calcium chloride | natural gas |
| celestite | novaculite |
| cement | oil |
| chalco-pyrite | orthoclase |
| chlorite | peat |
| clay | petroleum |
| coal | potash |
| copper | pottery |
| dolomite | pyrite |
| epidote | pyrolusite |
| feldspar | pyroxine |
| foundry sand | quartz |
| galena | quartzite |
| garnet | salt |
| gems and precious stones: | sand and gravel |
| agate | sand lime brick |
| carnelian | sandstone |
| chlorastrolite | scheelite |
| diamond | serpentine |
| Petoskey agates | shale |
| thompsonite | siderite |
| glass sand | silver |
| gold | slate |
| gothite | sphalerite |
| granite | staurolite |
| graphite | strontianite |
| grindstones | talc |
| gypsum | tourmaline |
| hematite | trap rock |
| iron | turgite |
| kaolin | verde antique |
| lime | water |
| limestone and dolomite | wolframite |
| limonite | |
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 - Activities in water. For schools.
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 - lakes: Pub. 30.
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 - molding sands: Pub. 41.
 - oil and gas: Pub. 38; Misc.
 - road materials: Open file.
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- Mississinewa shale, Silurian. See Index to Nomenclature.
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