

Michigan Geology: A Bibliography

Peter Voice

March, 2016



Michigan Geological Survey Data Compilation Series
Volume 1

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Cover Illustration: View of Haymeadow Falls flowing across the Haymeadow Member of the Trenton Formation, southern central Upper Peninsula. Picture courtesy of Mrs. Linda Harrison.

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A Brief Introduction to the Bibliography of Michigan Geology

Introduction

The Michigan Geological Survey produced a historic Index of Michigan Geology with an extensive bibliography in 1956. This current bibliography is an update of the bibliography in the Martin and Straight compilation. It is not comprehensive, but provides a starting place for anyone interested in Michigan Geology. The Michigan Geological Survey plans to update this bibliography periodically with newly published citations as well as other older citations we find.

Sources

The following sources were used to compile this bibliography:

1. Martin, H. M. and Straight, M. T. 1956. An Index of Michigan Geology 1823-1955. Michigan Geological Survey Division Publication 50: 461 p.
2. Curran, D. L.; Leske, D. N.; and Miller, L. J. 1981. Hydrogeologic Atlas of Michigan. Department of Geology, Western Michigan University, 174 p.
3. Currie, W. W. 1978. Annotated List of the Publications of the Michigan Geological Survey, 1838-1977. Michigan Geological Survey Division, Circular 16: 38 p.
4. Kirkby, E. A. 1967. Index to Michigan Geologic Theses. Michigan Geological Survey Circular 7: 32 p.
5. Catacosinos, P. A.; Harrison, W. B., III; Reynolds, R. F.; Westjohn, D. B.; and Wollensak, M. S. 2001. Stratigraphic Lexicon for Michigan. Geological Survey Division and Michigan Basin Geological Society, Bulletin 8: 56 p.
6. Patrick Colgan's Michigan Quaternary Bibliography (http://wwwtest.gvsu.edu/cms3/assets/D6E8414C-AF66-B551-1E348F48454A2E42/Colgan/michigan_quaternary_bibliography.pdf). Accessed June, 2015.
7. Index of Michigan Basin Geological Society's Publications (<http://www.mbgs.org/publications.html>). Accessed June, 2015.
8. Index of Institute on Lake Superior Geology's Publications (http://www.d.umn.edu/prc/ILSG_Volumes.html). Accessed July, 2015.
9. Hauck, S. A. 1995. Midcontinent Rift System Bibliography. Technical Report NRRI/TR-95/33. Natural Resources Research Institute, 267 p.
10. Wilson, S., 2013, Michigan Geology Library, Michigan Department of Environmental Quality, 40 p.
11. The U.S. Geological Survey Michigan Water Science Center List of Publications (<http://mi.water.usgs.gov/publications/pubs.html>). Accessed, March, 2016.

In addition, targeted searches were performed using the bibliographic search engines: Georefs, Geoscienceworld, Proquest Dissertations and Web of Science and in publisher search engines: Springerlink, Elsevier's Science Direct and Taylor and Francis Online. Citations were compiled into an Endnote library. Bill Harrison, Alan Kehew and John Esch provided lists of publications and suggestions for sources that were used to compile the current bibliography.

Bibliographic lists of theses from the major universities with graduate geology programs were also used to compile the bibliography. The lists were filtered for theses that dealt with all aspects of Michigan Geology. Larry Lemke provided a list of Wayne State University

Department of Geology theses. The Library Research staff, John Gierke and Wayne Pennington provided information on Michigan Tech's student works – from the Department of Geology and Geological Engineering and its predecessors. Clara Castro and Lori Tschirhart provided lists and advice on accessing the library resources at the University of Michigan in order to find student work from the Department of Earth and Environmental Sciences. The faculty (Ron Chase, Bill Harrison, Al Kehew, Carla Koretsky, R.V. Krishnamurthy, and Bill Sauck) in the Western Michigan University Department of Geosciences provided lists of the students that they oversaw who worked on aspects of Michigan geology as well as relevant publications. Mike Velbel, Dave Long and Duncan Sibley provided lists of Michigan State University Department of Geological Sciences student theses and dissertations. Linda Harrison and Jenny Trout provided lists of historic documents generated by the Institute of Water Sciences and the Michigan Geological Repository for Research and Education at Western Michigan University.

Attempts were made to record items that had underwent some critical review before publication. Journal articles, theses, edited books and survey publications were added first. Some publications from the gray literature - magazine articles, popular works, etc. were also incorporated into this database when relevant. Conference abstracts were usually ignored, unless they were longer (Conference papers) or one of the few resources on a specific formation.

Finding these Citations

Citations in this document can be found at your local university library. Some of the publications can be accessed at the Michigan Electronic Library (<http://mel.org>). Older publications (pre-1910) may be accessible online at Google Books (<https://books.google.com>), the Biodiversity Heritage Library (<http://www.biodiversitylibrary.org>) or the Hathi Trust Digital Library (<https://www.hathitrust.org>). Publications produced by the Michigan Geological Survey are available for purchase at <http://wmich.edu/geologysurvey/publications>.

Organization

The references compiled in this database were sorted with 4 main keywords: Basin, Glacial, Precambrian and Other. These keywords were assigned as the reference was added to the original endnote library. Some references fell under more than one of the 4 categories – and can be found in two or more sections of the bibliography. The terms Basin, Glacial and Precambrian best encapsulate the three major partitions in Michigan Geology and provide a natural way to organize the bibliography.

Precambrian papers deal with the metallic economic resources of the western Upper Peninsula including copper, iron, nickel and gold. Precambrian stratigraphy and bedrock mapping were also included. Papers dealing with the pre-basin rock record in the Lower Peninsula were added to this section on the assumption that these rocks are likely Precambrian in age. Topics also include Precambrian Paleontology (microfossils, *grypania*, stromatolites).

Basin papers deal with the sedimentology, stratigraphy, paleontology and petroleum geology of the Paleozoic rocks of Michigan. This section also includes papers that deal with non-petroleum resources hosted in Paleozoic rocks – salt, crushed rock, and bedrock aquifers. Papers on karsting of Michigan's shallow limestones are included in both this section and in the glacial section of the bibliography. The small set of papers dealing with the Jurassic deposits in the

central basin were also included in the Basin section – these papers primarily dealt with biostratigraphy and descriptions of the Jurassic rocks in the basin.

Glacial papers include topics such as soil science, hydrology/hydrogeology, environmental geology and modern depositional environments. In addition, papers dealing with the Pleistocene glaciation including landform analysis, glacial dynamics, quaternary paleontology and glacial depositional environments/sedimentology are in this section. Publications that describe aggregate resources were also added to the glacial section.

Other documents include a variety of topics that do not necessarily fit into the other three general categories. This section includes papers on the history of the geological survey and biographies of famous Michigan Geologists. In addition, documents that provide broad overviews of Michigan Geology or of Michigan’s natural resources were included in this section. Materials designed for the general public including Martin’s county overviews and other educational resources were included in the Other section.

Bibliography Metrics

Approximately, 6,600 citations were entered into the Michigan Geology Bibliography. The oldest publications in the database were published in 1821 and publications are found almost every year after that to the present (see Figure 1). Figures 2 through 5 show trends in the publication history sorted for specific aspects of Michigan geology.

Feedback

Any feedback on the Bibliography of Michigan Geology is greatly appreciated. If you come across citations that are not in this bibliography but should be, please contact the author.

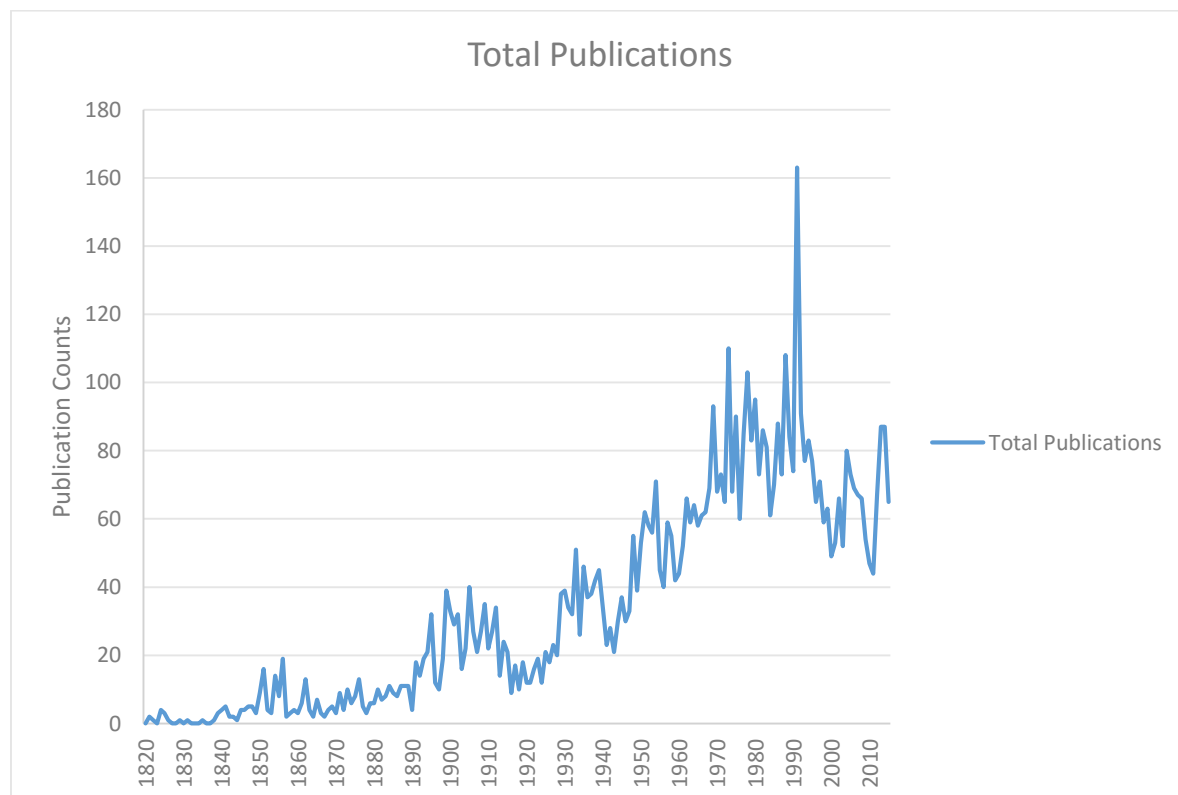


Figure 1: Historical trends in publication counts per calendar year. Note the overall increase in publication through the late 1970's followed by a drop off in publication.

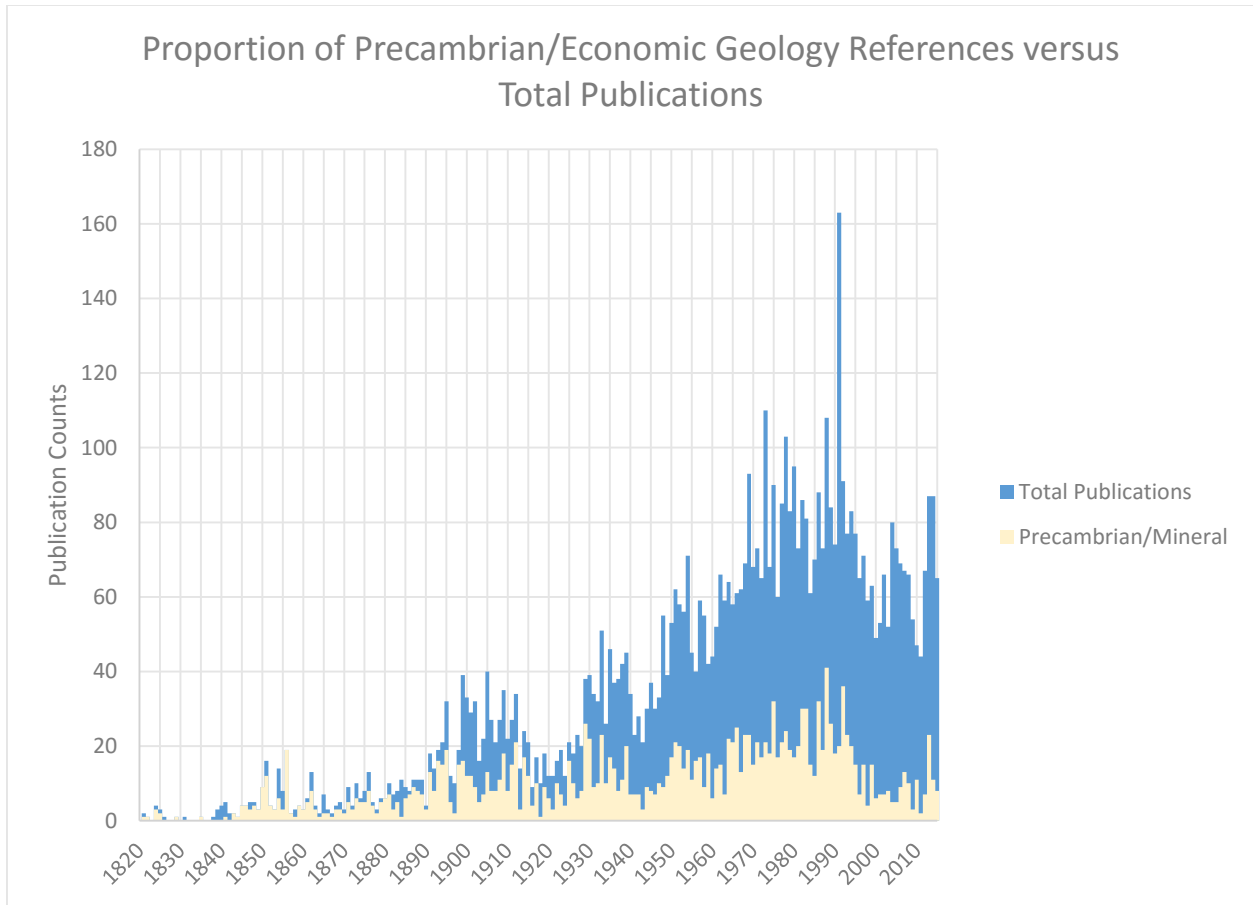


Figure 2: Trends in publications dealing with all aspects of Precambrian geology in Michigan. Note that Precambrian studies dominated the early history of Michigan geologic research until the 1930's. After the 1930's, Precambrian studies continued to be important through the 1990's.

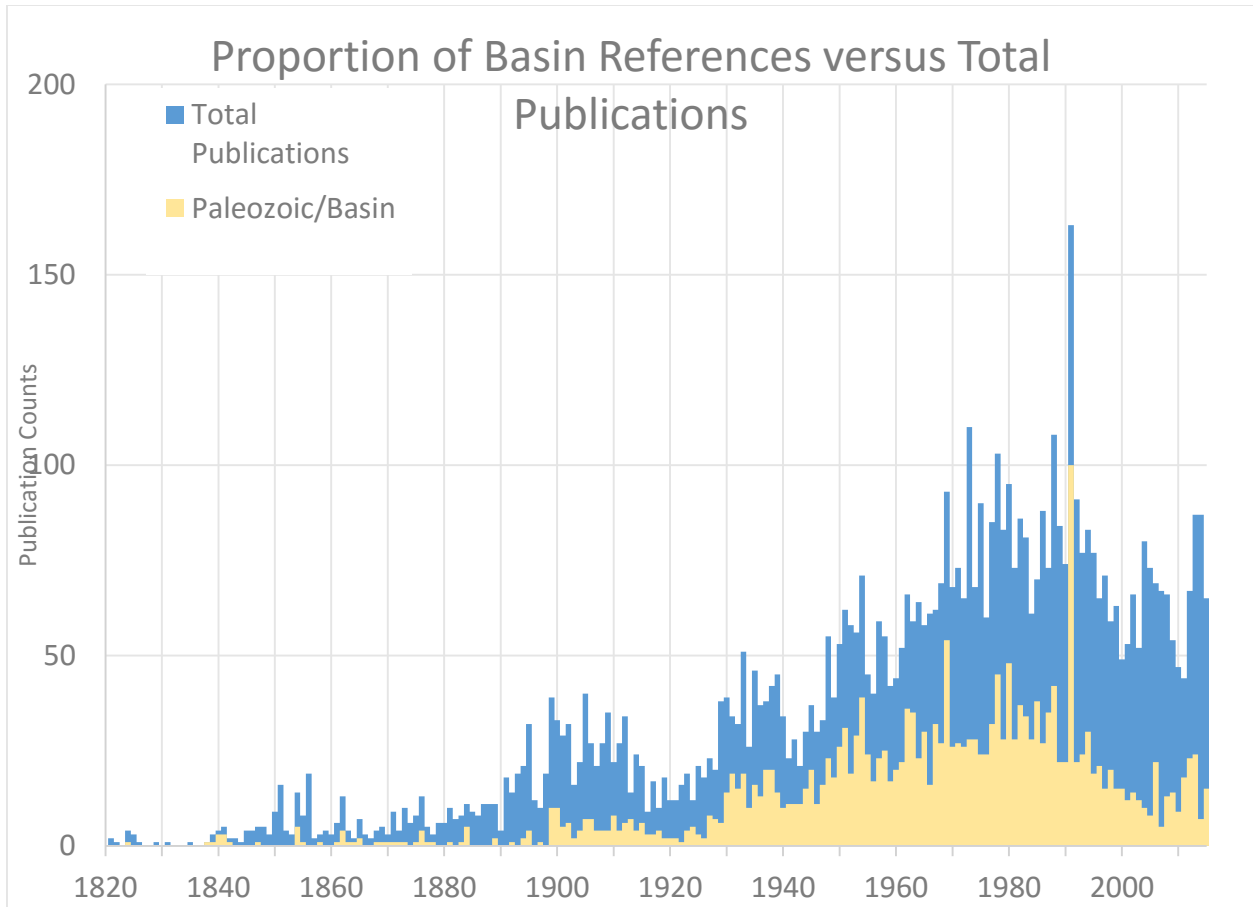


Figure 3: Studies of the Paleozoic geology of Michigan became prevalent in the 1920's as hydrocarbon exploration started to boom in the state. Note that Paleozoic studies were the dominant type of research over the mid-part of the twentieth century until the 1990's.

Proportion of Quaternary References versus Total Publications

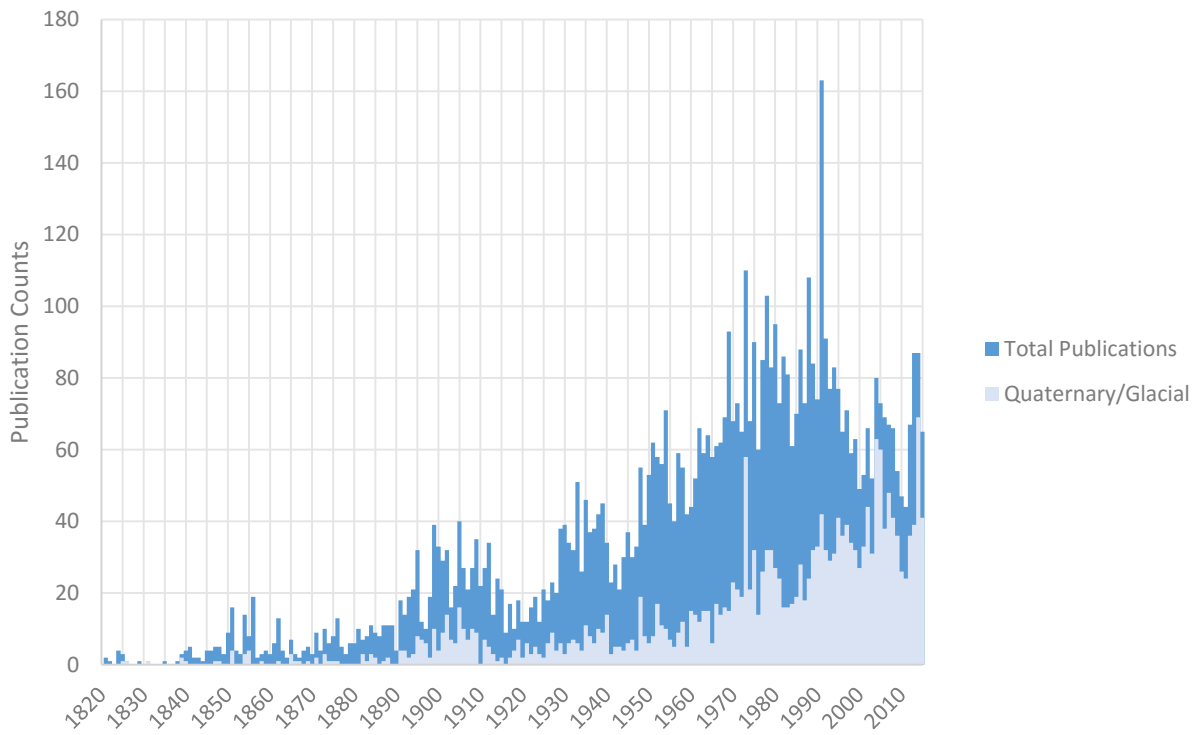


Figure 4: Studies of the Quaternary sediments in Michigan show an increasing trend over time, with the bulk of studies performed after 1960.

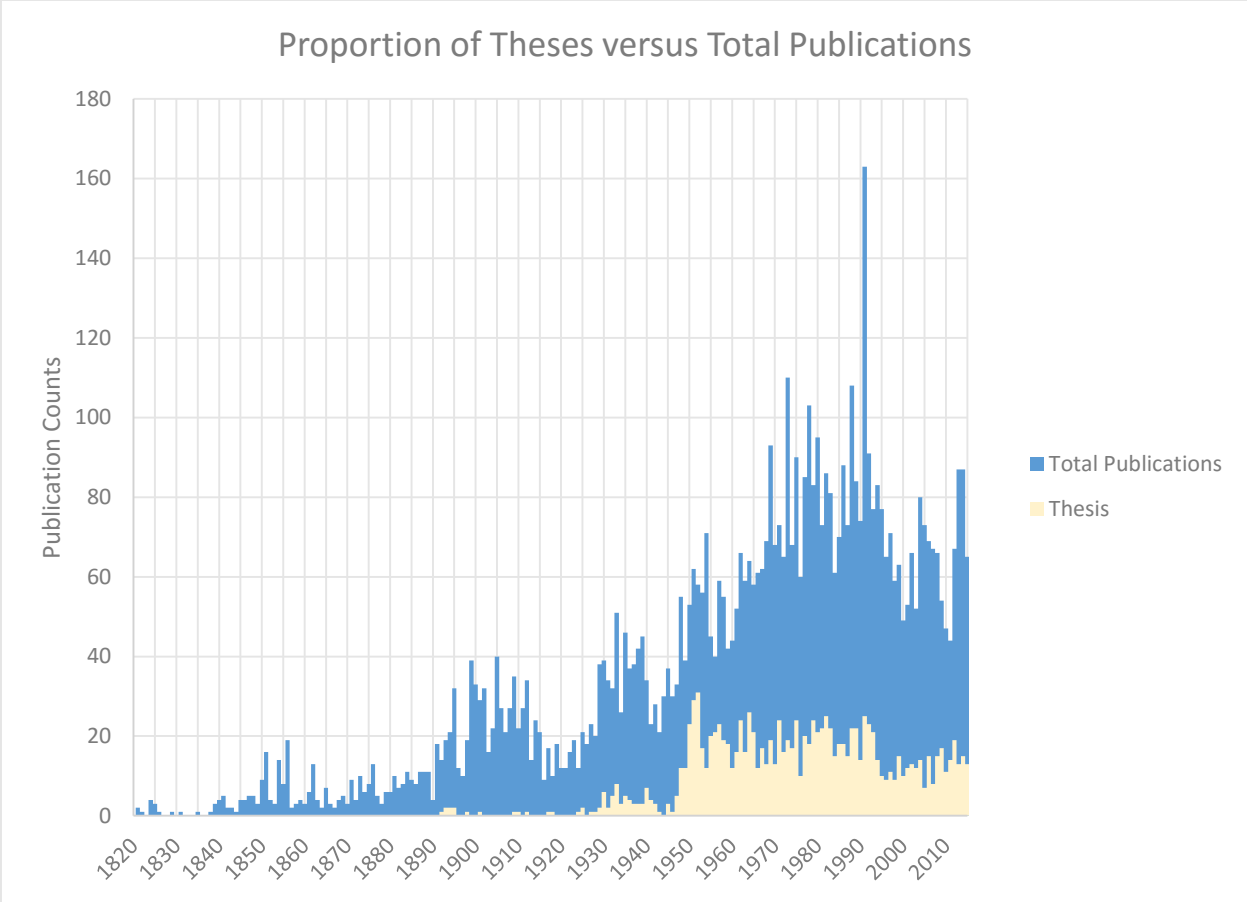


Figure 5: Production of student work exhibits a dramatic increase in the late 1940's suggesting the influence of the post-World War II GI Bill. Production of theses and dissertations remained relatively constant through the 1990's, but has dropped off to a lower plateau over the last 20 years.

Michigan Precambrian References

- Abel, C. D., 1985, Petrology and sedimentology of the Jacobsville Sandstone (northern Michigan) and Bayfield Group (northern Wisconsin), MS: University of Wisconsin, 294 p.
- Ackermann, H. W., 1875, Die Kupferführenden Schichten am Lake Superior: Sitzungsberichte der Naturwissenschaftlichen Gesellschaft ISIS zu Dresden, p. 101-105.
- Adams, C. L., 1929, Copper concentrating practice at the Mohawk mill: Proceedings of the Lake Superior Mining Institute, v. 27, p. 98-104.
- Adams, R. N., 1930, Amygdaloid tailings: Proceedings of the Lake Superior Mining Institute, v. 28, p. 192-198.
- Adler, J. L., 1935, Stratigraphic zones in the Negaunee Iron Formation of Marquette County, Michigan: Journal of Geology, v. 43, no. 2, p. 113-132.
- Agassiz, A., 1868, On the position of the sandstone of the southern slope of a portion of Keweenaw Point, Lake Superior: Boston Society of Natural History Proceedings, v. 11, p. 244-246.
- , 1895, On underground temperatures at great depths: American Journal of Science, v. 150, no. 300, p. 503-504.
- Aho, G. D., 1969, Reflection seismic investigation of thickness and structure of the Jacobsville sandstone, Keweenaw Peninsula, Michigan, MS: Michigan Technological University.
- Albert, D., Comer, P., Cuthrell, D., Penskar, M., Rabe, M., and Reschke, C., 1994, Bedrock Shoreline Surveys of the Keweenaw Peninsula and Drummond Island in Michigan's Upper Peninsula: Land and Water Management Division. 94 p.
- Aldrich, H. R., 1929, A demonstration of the reflection of geologic conditions in observed magnetic intensity: American Institute of Mining Engineers Transactions, v. 81, p. 385-400.
- , 1933, Gogebic range to Duluth, *in* Hotchkiss, W. O., ed., Lake Superior Region, Volume 23: Washington, D. C., U.S. Government, p. 66-67.
- Aldrich, L. T., Davis, G. L., and James, H. L., 1965, Ages of minerals from metamorphic and igneous rocks near Iron Mountain, Michigan: Journal of Petrology, v. 6, p. 445-472.
- Alessi, A. J., 1936a, Hunting agates around Lake Superior: Rocks and Minerals, v. 11, no. 9, p. 139-139.
- , 1936b, Serpentine at Ishpeming, Michigan: Rocks and Minerals, v. 11, no. 1, p. 11-11.
- , 1937, Some minerals in Ishpeming, Michigan: Rocks and Minerals, v. 12, no. 7, p. 209-209.
- , 1938, Chloride garnets of Michigan: The Mineralogist, v. 6, no. 6, p. 9-10.
- Ali, H. M., 1982, Keweenawan Volcanic rocks of the Grandview-Minong Area, Northwestern Wisconsin, PhD: The University of Wisconsin - Madison, 376 p.
- Allen, C. W., 1934, Subsidence resulting from the Athens system of mining at Negaunee, Michigan: American Institute of Mining Engineers Transactions, v. 109, p. 195-202.
- , 1936, Blasting practice at a Michigan iron ore pit: Proceedings of the Lake Superior Mining Institute, v. 29, p. 108-117.
- , 1939, Combating sulphur dioxide gas at the Spies-Virgil Mine: Proceedings of the Lake Superior Mining Institute, v. 30, p. 33-36.
- Allen, D. J., Hinze, W. J., and Cannon, W. F., 1992, Drainage, topographic, and gravity anomalies in the Lake Superior Region: Evidence for a 1100 Ma mantle plume: Geophysical Research Letters, v. 19, no. 21, p. 2119-2122.
- Allen, R. C., 1910, The Iron River Iron-Bearing District of Michigan: State of Michigan Geological and Biological Survey Publication, v. 3, no. 2, p. 1-151.
- Allen, R. C., and Barrett, L. P., 1915, Contributions to the Pre-Cambrian Geology of Northern Michigan and Wisconsin: Geological and Biological Survey Publication, v. 18, no. 15, p. 1-189.

- Anderson, G. J., and Han, T. M., 1957, The relationship of diagenesis, metamorphism and secondary oxidation to the concentrating characteristics of the Negaunee Iron-Formation of the Marquette Range, *in* Snelgrove, A. K., ed., Geological Exploration, p. 63-69.
- Anderson, R. R., and McKay, R. M., 1997, Clastic rocks associated with the mid-continent rift system in Iowa: U. S. Geological Survey Bulletin, v. 1989-I, p. 1-44.
- Anderson, T. D., 1980, Magnetic investigations of the Baraga County diabase, Baraga County, Michigan, MS: Michigan Technological University.
- Andress, J. E., 1944, Michigan's Copper Country, Keweenaw Peninsula, Lake Superior Region: Rocks and Minerals, v. 37, no. 3-4, p. 264-275.
- Annels, R. N., 1973, Keweenawan volcanic rocks of Michipicoten Island, Lake Superior, Ontario: An eruptive centre of Proterozoic age: Geological Survey of Canada Bulletin, v. 218, p. 1-141.
- Anonymous, 1938, Lake Superior Iron Ores, Cleveland, Lake Superior Iron Ore Association, 364 p.
- , 1939, The Precambrian Geology of the Lake Superior Region, Michigan Geological Survey and Michigan Academy of Science, Arts and Letters, Ninth Annual Field Excursion of the Michigan Academy of Science, Arts, and Letters Section of Geology and Mineralogy, 23 p.
- , 1957, Association of American State Geologists Annual Meeting, 1957; Field Trips: Keweenaw Copper Range and Marquette Iron Range, Michigan Geological Survey and Michigan College of Mining and Technology.
- Antonellini, M. A., and Cambray, F. W., 1992, Relations between sill intrusions and bedding-parallel extensional shear zones in the Mid-continent Rift System of the Lake Superior region: Tectonophysics, v. 212, no. 3-4, p. 331-349.
- Archibald, R. S., 1925, Exploration for iron ore in the Lake Superior District: Proceedings of the Lake Superior Mining Institute, v. 24, p. 280-288.
- Archibald, R. S., and Chabot, L. S., Jr., 1937, Development, equipment and operation of the Blueberry mine, Marquette iron district: American Institute of Mining Engineers Transactions, v. 126, p. 9-26.
- Argast, A., 2002, The lower Proterozoic Fern Creek Formation, northern Michigan: mineral and bulk geochemical evidence for its glaciogenic origin: Canadian Journal of Earth Sciences, v. 39, no. 4, p. 481-492.
- Atekwana, E. A., 1996, Precambrian basement beneath the central Midcontinent United States as interpreted from potential field imagery, *in* Van der Pluijm, B. A., and Catacosinos, P. A., eds., Basement and Basins of Eastern North America, Volume 308: Boulder, Geological Society of America, p. 33-44.
- Attoh, K., 1973, Metamorphic reactions in the Michigamme Formation, Iron County, Michigan, PhD: Northwestern University, 164 p.
- Attoh, K., and Klasner, J. S., 1989, Tectonic implications of metamorphism and gravity field in the Penokean orogen of Northern Michigan: Tectonics, v. 8, p. 911-933.
- Attoh, K., and Vandermeulen, M. J., 1984, Metamorphic Temperatures in the Michigamme Formation Compared with the Thermal Effect of an Intrusion, Northern Michigan: Journal of Geology, v. 92, no. 4, p. 417-432.
- Atwater, G. I., 1935, A summary of the stratigraphy and structure of the Gogebic iron district, Michigan and Wisconsin: Kansas Geological Society Guidebook, v. 9th Annual Field Conference, p. 417-420.
- Atwater, G. I., 1936, Correlation of the Tyler and Copps Formations of the Gogebic Iron Range, Michigan and Wisconsin, PhD: The University of Wisconsin - Madison.
- Atwater, G. I., 1938, Correlation of the Tyler and the Copps Formations of the Gogebic Iron District: Geological Society of America Bulletin, v. 49, p. 151-194.

- Autra, K. B., 1977, A syngenetic model for the origin of the copper mineralization in the Precambrian Nonesuch Shale, White Pine, Michigan, MS: Michigan State University, 51 p.
- Awramik, S. M., and Barghoorn, E. S., 1977, The Gunflint Microbiota: Precambrian Research, v. 5, p. 121-142.
- Ayer, F. A., 1950, White Pine Mine, potential major copper producer: Mining Congress Journal, v. 36, p. 26-30.
- Ayres, V. L., 1939, Stilpnomelane, nontronite, and halloysite from northern Michigan: American Mineralogist, v. 24, no. 12, part II, p. 2-2.
- , 1940a, Mineral notes from the Michigan iron county: American Mineralogist, v. 25, no. 6, p. 432-434.
- , 1940b, Stilpnomelane, nontronite, and halloysite from northern Michigan: American Mineralogist, v. 25, no. 3, p. 203-203.
- Ayres, V. L., and Higgins, W. D., 1939, Differentiation in xenolithic lamprophyre dikes at Marquette, Michigan: Journal of Geology, v. 47, no. 6, p. 561-582.
- Babcock, L. L., 1966, The manganese-bearing silicate minerals of Champion mine, Champion, Michigan, MS: Michigan Technological University.
- , 1974, Mineralogy, geochemistry, and genesis of the magnetite-jacobsite mineral series and manganese-ferrite-bearing iron-formation from Champion Mine, Champion, Michigan, MS: Michigan Technological University.
- , 1975, The Jacobsville Sandstone: Evidence for a Lower-Middle Keweenaw Age, *in* Earney, F. C. F., and Hughes, J. O., eds., Twenty-first Annual Institute on Lake Superior Geology Proceedings, p. 87-123.
- Bacon, L. O., 1957, Relationship of Gravity to Geological Structure in Michigan's Upper Peninsula, *in* Snelgrove, A. K., ed., Geological Exploration, p. 54-58.
- , 1966, Geologic Structure East and South of the Keweenaw Fault on the Basis of Geophysical Evidence, *in* Steinhart, J. S., and Smith, T. J., eds., The Earth Beneath the Continents, Volume 10, American Geophysical Union, p. 42-55.
- Bacon, L. O., and Wyble, D. O., 1952, Gravity investigations in the Iron River-Crystal Falls Mining district of Michigan: American Institute of Mining Engineers Transactions, v. 193, p. 973-979.
- Bacon, R. F., 1975, Gravity interpretation of geologic structure, northern Marquette County, Michigan, MS: Michigan Technological University.
- Baer, A. J., 1981, Two orogenies in the Grenville Belt?: Nature, v. 290, p. 129-131.
- Bain, G. W., 1975, Geology and Exploration of Southern Province of Canadian Shield in Wisconsin-Michigan-Discussion: CIM Bulletin, v. 68, p. 102-103.
- Balsley, J. R., Jr., James, H. L., and Wier, K. L., 1949, Aeromagnetic survey of parts of Baraga, Iron and Houghton counties, Michigan with preliminary geologic interpretations: U.S. Geological Survey Geophysical Investigations.
- Barghoorn, E. S., Meinschein, W. G., and Schopf, J. W., 1965, Paleobiology of a Precambrian shale: Science, v. 148, no. 3669, p. 461-472.
- Barghoorn, E. S., Meinschein, W. G., and Schopf, J. W., 1974, Paleobiology of a Precambrian shale, *in* Kvenholden, K. A., ed., Geochemistry and the Origin of Life, Volume 14, John Wiley and Sons, p. 282-282.
- Barghoorn, E. S., and Tyler, S. A., 1965, Microorganisms from the Gunflint Chert: Science, v. 147, p. 563-577.
- Barlow, R. E., 1895, Thesis on underground haulage of the Copper district, ME: Michigan Mining School, 35 p.
- Barovich, K. M., Patchett, P. J., Peterman, Z. E., and Sims, P. K., 1989, Nd isotopes and the origin of 1.9-1.7 Ga Penokean continental crust of the Lake Superior region: Geological Society of America Bulletin, v. 101, no. 3, p. 333-338.

- Barrett, L. P., 1925, Michigan Iron Mining industry: Proceedings of the Lake Superior Mining Institute, v. 24, p. 182-199.
- , 1927a, Huronian slate areas of northeastern Baraga County: Geological Society of America Bulletin, v. 38, no. 1, p. 117-117.
- , 1927b, Huronian slate areas of northeastern Baraga County: The Pan American Geologist, v. 47, no. 1, p. 68-69.
- Barrientos, G., 1967, Determination of an anchorage horizon for roof bolting in full column mining at White Pine Mine, Ontonagon County, Michigan, MS: Michigan Technological University.
- Bath, G. D., 1951, Magnetic base stations in Lake Superior iron districts: U.S. Bureau of Mines Report of Investigation, v. 4804, p. 1-16.
- , 1962, Magnetic anomalies and magnetizations of the Biwabik iron-formation, Mesabi area, Minnesota: Geophysics, v. 27, p. 627-650.
- Bauermann, H., 1866, Remarks on the copper mines of the State of Michigan: Geological Society of London Quarterly Journal, v. 22, p. 448-463.
- Baxter, C. H., 1911, Diversion of the Sturgeon River at the Loretto Mine: Proceedings of the Lake Superior Mining Institute, v. 16, p. 168-170.
- Baxter, D. A., 1988, Geology and geochemistry of hydrothermal alteration associated with precious metal mineralization in the Clark Creek Region, Marquette County, Michigan, MS: Michigan Technological University.
- Baxter, D. A., Bornhorst, T. J., and Van Alstine, J. L., 1987, Geology, Structure and associated precious metal mineralization of Archean Rocks in the Vicinity of Clark Creek, Marquette County, Michigan: Michigan Geological Survey Open File Report, v. 87-8.
- Baxter, D. A., and MacLellan, M. L., 1988, Geological Framework of a part of the Archean Marquette Greenstone Belt North of the Dead River Storage Basin, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A19-A31.
- Bayfield, H. W., 1829, Outlines of the Geology of Lake Superior: Literary and Historical Society of Quebec, v. 1, p. 1-43.
- Bayley, R. W., 1956, Geology of the Lake Mary Quadrangle, Iron County, Michigan, PhD: The Ohio State University, 213 p.
- , 1959, Geology of the Lake Mary Quadrangle Iron County, Michigan: U.S. Geological Survey Bulletin, v. 1077, p. 1-108.
- Bayley, R. W., Dutton, C. E., and Lamey, C. A., 1966, Geology of the Menominee iron-bearing district, Dickinson County, Michigan and Florence and Marinette Counties, Wisconsin: U.S. Geological Survey Professional Paper, v. 513, p. 1-96.
- Bayley, W. S., 1893a, The basic massive rocks of the Lake Superior Region: Journal of Geology, v. 1, no. 7, p. 688-716.
- , 1893b, The basic massive rocks of the Lake Superior Region: Journal of Geology, v. 1, no. 6, p. 587-596.
- , 1893c, The basic massive rocks of the Lake Superior Region: Journal of Geology, v. 1, no. 5, p. 433-445.
- , 1894, The basic massive rocks of the Lake Superior Region: Journal of Geology, v. 2, no. 8, p. 814-825.
- , 1895, The basic massive rocks of the Lake Superior Region: Journal of Geology, v. 3, no. 1, p. 1-20.
- , 1900, The geological features of the Menominee iron district of Michigan: American Association for the Advancement of Science Proceedings, v. 49, p. 189-190.
- , 1904, The Menominee Iron-bearing district of Michigan: U.S. Geological Survey Monograph, v. 46, p. 1-513.

- Beard, R. C., 1964, A photogeological study of a part of the Arvon area of northeastern Baraga County, Michigan, MS: Michigan Technological University.
- Beck, J. W., 1988, Implications for Early Proterozoic tectonics and the origin of continental flood basalts, based on combined trace element and neodymium/strontium isotopic studies of mafic igneous rocks of the Penokean Lake Superior Belt, Minnesota, Wisconsin and Michigan, PhD: University of Minnesota, 262 p.
- Becker, H., 1931a, Die praekambrische Geschichte des Lake Superior Gebietes, Nordamerika: Geologische Rundschau, v. 22, no. 6, p. 385-411.
- Becker, H., 1931b, A study of the heavy minerals of the pre-Cambrian and Paleozoic rocks of Baraboo Range, Wisconsin: Journal of Sedimentary Research, v. 1, no. 2, p. 91-95.
- Beh, B., 2013, Depositional processes operating on the Paleoproterozoic Gowganda ice margin, MS: Lakehead University, 208 p.
- Behnke, D., 1983, Copper country microminerals: The Mineralogical Record, v. 14, no. 4, p. 219-226.
- Behrendt, J. C., Green, A. G., Cannon, W. F., Hutchinson, D. R., Lee, M. W., Milkereit, B., Agena, W. F., and Spencer, C., 1988, Crustal structure of the mid-continent rift system: results from GLIMPCE deep seismic reflection profiles: Geology, v. 16, p. 81-85.
- Behrendt, J. C., Green, A. G., Lee, M. W., Hutchinson, D. R., Cannon, W. F., Milkereit, B., Agena, W. F., and Spencer, C., 1989, Crustal extension in the Midcontinent Rift System; results from GLIMPCE deep seismic reflection profiles over lakes Superior and Michigan, *in* Mereu, R. F., Mueller, S., and Fountain, D. M., eds., Properties and processes of Earth's lower crust, Volume 51, International Union of Geodesy and Geophysics, p. 81-89.
- Behrendt, J. C., Hutchinson, D. R., Lee, M., Thornber, C. R., Trehu, A., Cannon, W. F., and Green, A. G., 1990, GLIMPCE seismic reflection evidence of deep-crustal and upper-mantle intrusions and magmatic underplating associated with the Midcontinent rift system of North America: Tectonophysics, v. 173, p. 595-615.
- Bekker, A., Karhu, J. A., and Kaufman, A. J., 2006, Carbon isotope record for the onset of the Lomagundi carbon isotope excursion in the Great Lakes area, North America: Precambrian Research, v. 148, no. 1-2, p. 145-180.
- Bell, J. M., 1974, The petrology of a copper rich conglomerate and its bearing on in situ leaching, Centennial Mine, Houghton County, Michigan, MS: Michigan Technological University, 64 p.
- Bell, R., 1899, The geological history of Lake Superior: Canadian Institute Transactions, v. 6, p. 45-60.
- Belliveau, L. P., 1991, Fractures in the Jacobsville Sandstone and the Precambrian "W" rocks in eastern Marquette County, Michigan, MS: Western Michigan University, 82 p.
- Belsky, T., Johns, R. B., McCarthy, E. D., Burlingame, A. L., Richter, W., and Calvin, M., 1965, Evidence of Life Processes in a Sediment Two and a Half Billion Years Old: Nature, v. 206, no. 4983, p. 446-447.
- Benedict, C. H., 1925, Calumet and Hecla reclamation plant: Proceedings of the Lake Superior Mining Institute, v. 24, p. 68-88.
- , 1930a, Methods and costs of treatment at the Calumet and Hecla reclamation plant: U.S. Bureau of Mines Information Circular, v. 6357, p. 1-11.
- , 1930b, Milling method and cost at the Conglomerate mill of the Calumet and Hecla consolidated Copper Co.: U.S. Bureau of Mines Information Circular, v. 6364, p. 1-22.
- Benedict, C. H., and Kenny, H. C., 1924, Ammonia leaching of Calumet and Hecla tailings: American Institute of Mining Engineers Transactions, v. 70, p. 595-610.
- Berendsen, P., and Barczuk, A., 1993, Petrography and correlation of Precambrian clastic sedimentary rocks associated with the Midcontinent Rift System: U. S. Geological Survey Bulletin, p. E1-E20.

- Berg, J. H., and Klewin, K. W., 1988, High-MgO lavas from the Keweenawan midcontinent rift near Mamainse Point, Ontario: *Geology*, v. 16, p. 1003-1006.
- Berner, P. C., 1952, The Petrography and Structure of "Bald Knob", Huron Amherst Mountains, Michigan, MS: Wayne State University, 28 p.
- Berry, M. J., and West, G. F., 1966a, An interpretation of the first-arrival data of the Lake Superior Experiment by the time-term method: *Bulletin of the Seismological Society of America*, v. 56, no. 1, p. 141-171.
- , 1966b, A Time-Term Interpretation of the First-Arrival Data of the 1963 Lake Superior Experiment, *in* Steinhart, J. S., and Smith, T. J., eds., *The Earth Beneath the Continents*, Volume 10, American Geophysical Union, p. 166-180.
- Berteling, J. F., 1926, Notes on mining the North Palms ore body: *Proceedings of the Lake Superior Mining Institute*, v. 25, p. 52-62.
- Best, B. G., 1926, The Gogebic range mines of the Oliver Iron Mining Company: *Proceedings of the Lake Superior Mining Institute*, v. 25, p. 75-111.
- Beutner, E. C., 1980, Slaty cleavage unrelated to tectonic dewatering: The Siamo and Michigamme Slates revisited: *Geological Society of America Bulletin*, v. 91, p. 171-178.
- Beutner, E. L., 1932, Intrusive rocks of the Marenisco range, Michigan and Wisconsin MS: Northwestern University, 51 p.
- Bhatt, K. J., 1952, *Geology of Mount Bohemia, Michigan*, MS: Michigan College of Mining and Technology, 53 p.
- Bickford, M. E., Van Schmus, W. R., Karlstrom, K. E., Mueller, P. A., and Kamenov, G. D., 2015, Mesoproterozoic-trans-Laurentian magmatism: A synthesis of continent-wide age distributions, new SIMS U–Pb ages, zircon saturation temperatures, and Hf and Nd isotopic compositions: *Precambrian Research*, v. 265, p. 286-312.
- Bickford, M. E., Wooden, J. L., and Bauer, R. L., 2006, SHRIMP study of zircons from Early Archean rocks in the Minnesota River Valley: Implications for the tectonic history of the superior province: *Geological Society of America Bulletin*, v. 118, no. 1-2, p. 94-108.
- Bigsby, J. J., 1821, Geological and Mineralogical observations along northwest portion of Lake Huron: *American Journal of Science*, v. 3, p. 254-272.
- , 1824, Notes on the geography and geology of Lake Superior: *Quarterly Journal of Science*, v. 18, p. 1-34.
- , 1825a, Notes on the geography and geology of Lake Superior: *Royal Institution of Great Britain, Quarterly Journal*, v. 18, p. 1-35.
- , 1825b, Notes on the geography and geology of Lake Superior: *Royal Institution of Great Britain, Quarterly Journal*, v. 18, p. 228-267.
- , 1852a, On the physical geography, geology and commercial resources of Lake Superior: *The Edinburgh new philosophical journal*, v. 53, p. 55-62.
- , 1852b, On the physical geography, geology and commercial resources of Lake Superior: *Royal Institute of Great Britain Proceedings*, v. 1, p. 154-162.
- , 1852c, Region of Lake Superior: *American Journal of Science*, v. 64, no. 40, p. 138-138.
- Birch, F., 1954, Thermal conductivity, climatic variations and heat flow near Calumet, Michigan: *American Journal of Science*, v. 252, no. 1, p. 1-25.
- Birkinbine, J., 1887, The resources of the Lake Superior Region: *American Institute of Mining Engineers Transactions*, v. 16, p. 168-203.
- , 1898, The Iron Ore Supply: *American Institute of Mining Engineers Transactions*, v. 27, p. 519-528.
- , 1911, The United States Iron Industry 1871-1910: *American Institute of Mining Engineers Transactions*, v. 42, p. 222-235.
- , 1914, The reserves of iron ore for the United States: *American Institute of Mining Engineers Transactions*, v. 50, p. 197-203.

- Bjornerud, M. G., 2010, Evidence for Grenville-Age Seismicity and Thick-Skinned Deformation in Northern Wisconsin, USA: *Journal of Geology*, v. 118, no. 1, p. 45-58.
- Blackwell, F., 1914, The sinking of a vertical shaft at the Palms mine of the Newport Mining Co., at Bessemer, MI [with discussion]: *Proceedings of the Lake Superior Mining Institute*, v. 19, p. 116-130.
- Blackwell, R. J., 1964, The analysis of gravity data over Lake Superior type iron formations, MS: Michigan State University.
- Blake, W. P., 1876, The mass copper of the Lake Superior mines and the method of mining it: *American Institute of Mining Engineers Transactions*, v. 4, p. 110-112.
- Blandy, J. F., 1874, Stamp mills of Lake Superior: *American Institute of Mining Engineers Transactions*, v. 2, p. 208-215.
- , 1900, The origin of the native copper in the Michigan Deposits: *Engineering Mining Journal* v. 70, p. 278-279.
- Blaske, A. R., Bornhorst, T. J., Johnson, A. M., Rantti, G. E., and Reed, R. C., 1988, Manganese Investigation in Keweenaw County, Michigan: Michigan Geological Survey Open File Report, v. 88-2.
- Boben, C. L., 1986, Geological comparison of three precious metal prospects in Marquette County, Michigan, MS: Michigan Technological University.
- Boben, C. L., Bornhorst, T. J., and Van Alstine, J. L., 1986, Detailed Geologic study of three precious metal prospects in Marquette County and one in Gogebic County, Michigan: Michigan Geological Survey Open File Report, v. 86-1.
- Bodus, T. M., 1992, Paleomagnetic and ground magnetic assessment of the Niagara Fault System in Northeastern Wisconsin and Western Upper Peninsula Michigan, PhD: University of Wisconsin, Milwaukee, 319 p.
- Bodwell, W. A., 1972, Geologic compilation and nonferrous metal potential Precambrian section, Northern Michigan, MS: Michigan Technological University.
- Bodwell, W. A., and Kalliokoski, S., 1976, Precambrian geology of the Upper Peninsula, Michigan: Michigan Technological University Press, scale 1:250,000.
- Boerboom, T. J., Holm, D., Woodruff, L. G., Cannon, W. F., and Wirth, K., 2005, The western margin of the Keweenawan mid-continent rift system: geologic highlights of Archean, Paleoproterozoic, Mesoproterozoic and Paleozoic Bedrock in Eastern Minnesota and Northwestern Wisconsin, in Robinson, L., ed., *Field Trip Guidebook for Selected Geology in Minnesota and Wisconsin*, Volume 21, Minnesota Geological Survey, p. 181-207.
- Bohman, R. P., 1976, A geochemical study of the Portage Lake Basalts in the Winona Quadrangle Houghton County, Michigan, MS: Wayne State University, 83 p.
- Bolz, P., 2014, Development of a methodology for the characterization of mafic rocks with respect to their use for mineral carbonation: The mineralogy, petrology, and geochemistry of the Portage Lake Volcanics in the Keweenaw Peninsula, Michigan, MS: University of Alaska.
- Bond, W., 1894, Sinking "C" shaft, West Vulcan: *Proceedings of the Lake Superior Mining Institute*, v. 2, p. 105-110.
- Books, K. G., 1968, Magnetization of the lowermost Keweenawan lava flows in the Lake Superior area: U.S. Geological Survey Professional Paper, v. 600-D, p. D248-D254.
- , 1972, Paleomagnetism of some Lake Superior Keweenawan rocks: U.S. Geological Survey Professional Paper, v. 760, p. 1-42.
- Booth, J. C., and Hulbert, E. J., 1855, Geological and topographical map of the mineral district of Lake Superior.
- Borie, J., 1860, Notice sur le lac Supérieur et ses mines de cuivre de la rive américaine: *Société de l'Industrie minière Bulletin*, v. 6, p. 233-284.

- , 1861, Notice sur le lac Supérieur et ses mines de cuivra de la rive américaine: Societe de l'Industrie minerale Bulletin, v. 7, p. 185-251.
- , 1862a, Notice sur le lac Supérieur et ses mines de cuivra de la rive américaine: Societe de l'Industrie minerale Bulletin, v. 8, p. 201-271.
- , 1862b, Notice sur le lac Supérieur et ses mines de cuivra de la rive américaine: Allegemeine berg- und hüttenmännische Zeitung, v. 4, p. 448-450.
- , 1862c, Notice sur le lac Supérieur et ses mines de cuivra de la rive américaine: Allegemeine berg- und hüttenmännische Zeitung, v. 4, p. 457-460.
- , 1862d, Notice sur le lac Supérieur et ses mines de cuivra de la rive américaine: Allegemeine berg- und hüttenmännische Zeitung, v. 4, p. 469-471.
- Bornhorst, L. E., 1985, Mineralogy and engineering properties of pleistocene silts and clays from selected sites in the Upper Peninsula, Michigan, MS: Michigan Technological University.
- Bornhorst, T. J., 1988, Geological Overview of the Marquette Greenstone Belt, Michigan, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A1-A18.
- , 1992a, Keweenaw copper deposits of western upper Michigan, *in* Bornhorst, T. J., ed., Society of Economic Geologists, Guidebook Series, Volume 13, Society of Economic Geologists, p. 197.
- , 1992b, Michigan Tech earth science laboratory and experimental mine connecting with the Quincy native copper mine, *in* Bornhorst, T. J., ed., Keweenaw copper deposits of the North American Midcontinent rift system, Volume 13, Society of Economic Geologists.
- , 1995, Relationship between native copper deposits and tectonic development of the North American Midcontinent Rift System, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., Basement Tectonics 10: Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers, p. 19-23.
- Bornhorst, T. J., and Barron, R. J., 2013, Field Trip 1: Geologic Overview of the Keweenaw Peninsula, Michigan, *in* Bornhorst, T. J., and Barron, R. J., eds., 59th Annual Meeting of the Institute on Lake Superior Geology, Volume 59, p. 1-42.
- Bornhorst, T. J., Barron, R. J., and Whiteman, R., 2013a, Field Trip 1: Caledonia Mine, Keweenaw Peninsula Native Copper District, Ontonagon County, Michigan, *in* Miller, J., ed., Field Guide to the Copper-Nickel-Platinum Group Element Deposits of the Lake Superior Region, Precambrian Research Center University of Minnesota Duluth, p. 51-63.
- Bornhorst, T. J., Barron, R. J., and Whiteman, R. C., 2013b, Field Trip 2: Caledonia Mine, Keweenaw Peninsula, Native Copper District, Ontonagon County, Michigan, *in* Bornhorst, T. J., and Barron, R. J., eds., 59th Annual Meeting of the Institute on Lake Superior Geology, Volume 59, p. 43-57.
- Bornhorst, T. J., and Baxter, D. A., 1988, Geological Field Trip to the Marquette Greenstone Belt: Part II Day 2 Road Log - Stops A to E, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A65-A71.
- , 1990, Reconnaissance Evaluation of Platinum-Group Elements in Selected Precambrian Rocks of the Western Upper Peninsula of Michigan: Contribution to Michigan Geology Report, v. 90-2, p. 1-7.
- Bornhorst, T. J., Baxter, D. A., MacLellan, M. L., and Johnson, R. C., 1988a, Geological Field Trip to the Marquette Greenstone Belt: Part I Day 1 Road Log - Stops 1 to 11, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A54-A64.
- Bornhorst, T. J., Blaske, A. R., Anderson, D., and Repaal, T. D., 2013c, Field Trip 2: Geology and Hydrogeology at the Copperwood Deposit, Gogebic County, Michigan, *in* Miller, J., ed., Field Guide to the Copper-Nickel-Platinum Group Element Deposits of the Lake

- Superior Region, Precambrian Research Center University of Minnesota Duluth, p. 65-82.
- , 2013d, Field Trip 6: Geology and Environmental Site Conditions of the Copperwood Deposit, Gogebic County, Michigan, *in* Bornhorst, T. J., and Barron, R. J., eds., 59th Annual Meeting of the Institute on Lake Superior Geology, Volume 59, p. 97-118.
- Bornhorst, T. J., Duskin, D. J., Johnson, R. C., Mahin, R. A., Quigley, T. O., and Scott, G. W., 1999, Field Trip 2: Archean Ishpeming Greenstone Belt and Gold Mineralization, Michigan, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 11-44.
- Bornhorst, T. J., and Johnson, R. C., 1993, Geology of Volcanic Rocks in the Southern Half of the Ishpeming Greenstone Belt, Michigan: U. S. Geological Survey Bulletin, v. 1904, no. P, p. 1-13.
- Bornhorst, T. J., Kalliokoski, G. J., and Paces, J., 1986, The Keweenaw Native-Copper District, *in* Brown, A. C., and Kirkham, R. V., eds., Geological Association of Canada, Mineralogical Association of Canada, Canada Geophysical Union, Joint Annual Meeting: Ottawa, p. 21-36.
- Bornhorst, T. J., and Logsdon, M. J., 2016, Predicting Future Water-Quality Impacts from Mining: A 52-Year-Old Field Analog for Humidity Cell Testing, Copperwood Deposit, Michigan: *Economic Geology*, v. 111, no. 2, p. 527-542.
- Bornhorst, T. J., Paces, J. B., Grant, N. K., Obradovich, J. D., and Huber, N. K., 1988b, Age of native copper mineralization, Keweenaw Peninsula, Michigan: *Economic Geology*, v. 83, no. 3, p. 619-625.
- Bornhorst, T. J., and Rose, W. I., 1994, Self-guided geological field trip to the Keweenaw Peninsula, Michigan, Houghton, Institute on Lake Superior Geology, Institute on Lake Superior Geology Proceedings, v. 40, 185 p.
- Bornhorst, T. J., Rose, W. I., Jr., and Paces, J. B., 1983, Field Guide to the Geology of the Keweenaw Peninsula, Michigan, Annual Institute on Lake Superior Geology Meeting Guidebook, 116 p.:
- Bornhorst, T. J., Ruotsala, A. P., and Stadnik, P. M., 1987, Cobalt, nickel, and vanadium contents of pyrite concentrates from the Michigamme Formation, Northern Michigan: Michigan Geological Survey Open File Report, v. 87-6.
- Bornhorst, T. J., Thorpe, R. I., and Johnson, R. C., 1998, Lead isotope study of veins in the Archean Ishpeming greenstone belt, Michigan: *Economic Geology*, v. 93, no. 1, p. 102-107.
- Bornhorst, T. J., and Whiteman, R. C., 1992, The Caledonia native copper mine, Michigan, *in* Bornhorst, T. J., ed., Keweenawan copper deposits of the North American Midcontinent rift system, Volume 13, Society of Economic Geologists, p. 139-144.
- Bornhorst, T. J., and Williams, W. C., 2013, The Mesoproterozoic Copperwood Sedimentary Rock-Hosted Stratiform Copper Deposit, Upper Peninsula, Michigan: *Economic Geology*, v. 108, no. 6, p. 1325-1346.
- Boss, C. M., 1898a, Some dike features of the Gogebic Iron Range: *American Institute of Mining Engineers Transactions*, v. 27, p. 978-978.
- , 1898b, Some dike features of the Gogebic Iron Range: *American Institute of Mining Engineers Transactions*, v. 27, p. 556-563.
- Bowers, M. C., 1989, Vertical petrologic changes of the Jacobsville sandstone at Rice Lake hole Number 1, MS: Michigan Technological University, 176 p.
- Bowers, R. W., 1925, Method of sampling ores on the Marquette Range: *American Institute of Mining Engineers Transactions*, v. 72, p. 657-658.
- Boyum, B. H., 1964a, The Cleveland-Cliffs Iron Company Paper on the Marquette Mineral District, Michigan, *in* Boyum, B. H., ed., Institute of Lake Superior Geology Guidebook, Volume 10, p. 17-37.

- , 1964b, The Marquette Mineral District, Michigan, The Cleveland-Cliffs Iron Company, p. 17-46.
- , 1975, The Marquette Mineral District of Michigan, *in* Earney, F. C. F., and Hughes, J. O., eds., Twenty-first Annual Institute on Lake Superior Geology Proceedings, p. 189-261.
- Boyum, B. H., and Reed, R. C., 1988, Marquette Mineral District of Michigan Mining History and Geology, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. B1-B15.
- Boyum, B. H., Reed, R. C., and Kangas, W., 1988, Marquette Mineral District of Michigan with emphasis on Mining History and Geology, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. B16-B32.
- Bradshaw, B. A., 1956, Petrological comparison of Lake Superior iron formations, PhD: University of Toronto.
- Brady, J. M., 1960, Ore and sedimentation of the lower sandstone at the White Pine Mine, Michigan, MS: Michigan College of Mining and Technology.
- Brady, M. B., 1952, A petrographic and structural study of an area in the Huron Mountains, Michigan, MS: Wayne State University, 28 p.
- Brandes, P. T., 2004, A Comparative [i.e. Comparative] Study of Copper Sulfide Prospects on the Keweenaw Peninsula, Keweenaw County, Michigan, MS: Michigan Technological University.
- Brecke, E. A., 1968, Copper mineralization in upper part of Copper Harbor Conglomerate at White Pine, Michigan: *Economic Geology*, v. 63, no. 3, p. 294-294.
- Breithart, M. S., 1983, The significance of the distribution of clastic lenses within the Negaunee Iron Formation at the eastern end of the Palmer Basin, Marquette Synclinorium, Northern Michigan, MS: Michigan State University, 121 p.
- Brett, G. W., 1955, Cross-bedding in the Baraboo Quartzite of Wisconsin: *Journal of Geology*, v. 63, p. 143-148.
- Brewer, C., 1914, List of iron mining properties of Michigan and Wisconsin: *Proceedings of the Lake Superior Mining Institute*, v. 19, p. 252-268.
- Brewster, D. L., 1979, Vertical variations of heat flow in a five kilometer deep Michigan Basin borehole, MS: University of Michigan.
- Brinsmade, R. B., 1908a, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 425-427.
- , 1908b, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 444-446.
- , 1908c, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 465-467.
- , 1908d, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 484-485.
- , 1908e, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 505-507.
- , 1908f, The great iron fields of the Lake Superior District: *Mining Science*, v. 58, p. 528-530.
- , 1909a, The great iron fields of the Lake Superior District: *Mining Science*, v. 59, p. 127-129.
- , 1909b, The great iron fields of the Lake Superior District: *Mining Science*, v. 59, p. 149-151.
- , 1909c, The great iron fields of the Lake Superior District: *Mining Science*, v. 59, p. 304-306.
- , 1909d, The great iron fields of the Lake Superior District: *Mining Science*, v. 59, p. 325-327.
- , 1910, The Michigan Copper Mines and Methods: *Mining World*, v. 32, p. 549-552.
- Broan, J. M., 1915, Sinking of the Woodbury shaft at the Newport Mine, Ironwood, Michigan with discussion: *Proceedings of the Lake Superior Mining Institute*, v. 20, p. 37-53.
- Broderick, A. T., 1957a, Geological Factors Affecting Beneficiation of Lake Superior Iron Ores, *in* Snelgrove, A. K., ed., *Institute of Lake Superior Geology Geological Exploration*, p. 60-62.
- Broderick, T. M., 1929a, Zoning in Michigan copper deposits and its significance: *Economic Geology*, v. 24, no. 2, p. 149-162.
- , 1929b, Zoning in Michigan copper deposits and its significance: *Economic Geology*, v. 24, no. 3, p. 311-326.

- , 1929c, Zoning in Michigan copper deposits and its significance: *Economic Geology*, v. 25, no. 3, p. 285-286.
- , 1931, Fissure vein and lode relations in Michigan copper deposits: *Economic Geology*, v. 26, no. 8, p. 840-856.
- , 1933a, Application of geology to problems of iron ore concentration with discussion: *Michigan College of Mining and Technology Bulletin*, v. 6, no. 4.
- , 1933b, Application of geology to problems of iron ore concentration with discussion: *American Institute of Mining Engineers Transactions*, v. 115, p. 273-289.
- , 1933c, Geology, exploration and mining in the Michigan copper district, *in* Hotchkiss, W. O., ed., *Lake Superior Region, Volume 23*: Washington, D. C., U.S. Government, p. 29-49.
- , 1935a, Differentiation in lavas of the Michigan Keweenaw: *Geological Society of America Bulletin*, v. 46, no. 4, p. 503-558.
- , 1935b, Differentiation in lavas of the Michigan Keweenaw: *Michigan College of Mining and Technology Bulletin*, v. 8, no. 4, p. 301-312.
- , 1945, Geology of the Ropes Gold Mine, Marquette County, Michigan: *Economic Geology*, v. 40, no. 2, p. 115-128.
- , 1952, The origin of Michigan copper deposits [with discussion]: *Economic Geology*, v. 47, no. 2, p. 215-219.
- , 1957b, Comments on Preceding Papers, *in* Snelgrove, A. K., ed., *Institute of Lake Superior Geology Geological Exploration*, p. 18-25.
- Broderick, T. M., and Hohl, C. D., 1928a, Geophysical methods applied to exploration and geologic mapping in the Michigan Copper District: *Proceedings of the Lake Superior Mining Institute*, v. 26, p. 65-84.
- , 1928b, Geophysical methods applied to exploration and geologic mapping in the Michigan Copper District: *Economic Geology*, v. 23, no. 5, p. 489-514.
- , 1931, Geology and exploration in the Michigan copper district: *Mining Congress Journal*, v. 17, no. 10, p. 478-481.
- , 1935a, Differentiation in traps and ore deposition: *Michigan College of Mining and Technology Bulletin*, v. 8, no. 4, p. 301-312.
- , 1935b, Differentiation in traps and ore deposition: *Economic Geology*, v. 30, no. 3, p. 301-312.
- , 1935c, Differentiation in traps and ore deposition discussion: *Economic Geology*, v. 30, no. 8, p. 924-927.
- , 1935d, The Michigan copper district, *Copper Resources of the World*, p. 271-284.
- , 1939, Geophysical methods applied to exploration and geologic mapping in the Michigan Copper District: A communication, *Magnetic Surveys in Michigan copper country*: *Economic Geology*, v. 34, no. 5, p. 581-581.
- Broderick, T. M., Hohl, C. D., and Eidenmiller, H. P., 1964, Recent contributions to the geology of the Michigan Copper District: *Economic Geology*, v. 41, p. 675-725.
- Brojanigo, A., 1984, *Keweenaw Fault: structures and sedimentology*, MS: Michigan Technological University, 124 p.
- Broman, W. H., 1953, *Geophysical investigation of the Bear Lake area, Houghton County, Michigan*, MS: Michigan College of Mining and Technology, 46 p.
- Brooke, G. L., 1951, *Sub-Huronian (Timiskaming) sediments of the Lake Enchantment Area, Marquette County, Michigan* MS: Michigan State College, 1-44 p.
- Brooks, E. R., and Garbutt, P. L., 1969, Age and genesis of quartz-porphyry near White Pine, Michigan: *Economic Geology*, v. 64, no. 3, p. 342-346.
- Brooks, T. B., 1873, The method and cost of mining the red specular and magnetic ores of the Marquette iron region of Lake Superior [with discussion]: *American Institute of Mining Engineers Transactions*, v. 1, p. 193-202.
- , 1876a, Classified lists of the rocks observed in the Huronian series, south of Lake Superior, with remarks on their abundance, transitions, and geographical distribution; also a

- tabular presentation of the sequence of the beds, with an hypothesis of equivalency: American Journal of Science, v. 112, no. 69, p. 194-204.
- , 1876b, On the youngest Huronian rocks south of Lake Superior and the age of the copper-bearing series: American Journal of Science, v. 111, no. 63, p. 206-211.
 - , 1880, Sketch of the Laurentian rocks of Michigan, The Geology of the Menominee iron region, Oconto County, Wisconsin, pt. VII, Geology of Wisconsin, Volume 3, Wisconsin Geological Survey.
- Brooks, T. B., Julien, A. A., and others, a., 1873a, Upper Peninsula; pt. 1, Iron-bearing rocks: Michigan Geological Survey Publication, v. 1, p. 1-319.
- , 1873b, Upper Peninsula; pt. 2, appendices to pt. 1: Michigan Geological Survey Publication, v. 1, p. 1-298.
- Brooks, T. B., and Pumpelly, R., 1872, On the age of the Copper-bearing rocks of Lake Superior: American Journal of Science, v. 111, p. 1-5.
- Brothers, J. A., 1967, Physical, chemical, and ion-exchange properties of laumontite from the Osceola #6 Mine, Houghton County, Michigan, MS: Michigan Technological University, 55 p.
- Broughton, S. H., 1863, Remarks on the mining interest and details of the geology of Ontonagon County, Philadelphia, King and Baird, Printers, 24 p.
- Brown, A. C., 1965, Mineralogy at the top of the cupriferous zone, White Pine mine, Ontonagon Co., Michigan, MS: University of Michigan.
- , 1968, Zoning in the White Pine Copper Deposit, Ontonagon County, Michigan, PhD: University of Michigan, 234 p.
 - , 1971, Zoning in the White Pine copper deposit, Ontonagon County, Michigan: Economic Geology, v. 66, no. 4, p. 543-573.
 - , 1973, Mineral assemblages in the White Pine copper deposit, northern Michigan (USA), Probleme der paragenese: Topical report of IAGOD, Volume IV, p. 65-83.
 - , 1974a, The copper province of northern Michigan, U.S.A, in Bartholome, P., ed., Gisements stratiformes et provinces cupriferes: Liege, Societe Geologique de Belgique, p. 317-330.
 - , 1974b, An epigenetic origin for stratiform Cd-Pb-Zn sulfides in the lower Nonesuch Shale, White Pine, Michigan: Economic Geology, v. 69, no. 2, p. 271-274.
 - , 1992, Sediment-hosted stratiform copper deposits: Geoscience Canada, v. 19, no. 2, p. 125-141.
 - , 2005, Refinements for footwall red-bed diagenesis in the sediment-hosted stratiform copper deposit model: Economic Geology, v. 100, p. 765-771.
 - , 2006, Genesis of native copper lodes in the Keweenaw District northern Michigan: A hybrid evolved meteoric and metamorphogenic model: Economic Geology, v. 101, no. 7, p. 1437-1444.
 - , 2008, District-scale concentration of native copper lodes from a tectonically induced thermal plume of ore fluids on the Keweenaw Peninsula, Northern Michigan: Economic Geology, v. 103, no. 8, p. 1691-1694.
 - , 2009, A process-based approach to estimating the copper derived from red beds in the sediment-hosted stratiform copper deposit model: Economic Geology, v. 104, no. 6, p. 857-868.
 - , 2014, Latent thermal effects from Porcupine Volcanics calderas underlying the White Pine-Presque Isle stratiform copper mineralization, northern Michigan: Economic Geology, v. 109, no. 7, p. 2035-2050.
- Brown, B. A., 1986, The Baraboo Interval in Wisconsin: Geoscience Wisconsin, v. 10, p. 1-14.
- Brown, E. F., 1895, Distribution of phosphorus and system of sampling at the Pewabic mine, Iron Mountain, Michigan: Proceedings of the Lake Superior Mining Institute, v. 3, p. 49-55.

- , 1898, A system of mining ore bodies of uniform grade: Proceedings of the Lake Superior Mining Institute, v. 5, p. 40-45.
- Brown, L., Jensen, L., Oliver, J., Kaufman, S., and Steiner, D., 1982, Rift structure beneath the Michigan Basin from COCORP profiling: *Geology*, v. 10, p. 645-649.
- Brown, L. D., 1987, Proterozoic Tectonic Elements of the U.S. Mapped by Cocorp Deep Seismic Profiling, Proterozoic Lithospheric Evolution, American Geophysical Union, p. 69-83.
- Browne, D. H., 1889a, The distribution of phosphorus in the Ludington mine, Iron Mountain, Michigan: a study in isochemic lines: *American Institute of Mining Engineers Transactions*, v. 17, p. 616-632.
- , 1889b, The distribution of phosphorus in the Ludington mine, Iron Mountain, Michigan: a study in isochemic lines: *American Journal of Science*, v. 137, p. 299-310.
- Browne, J. L., and Haynes, C. W., 1956, *Geology of the Mount Gratiot area, Keweenaw County, Michigan*, MS: Michigan College of Mining and Technology, 44 p.
- Browning, T. D., 1986, Age of copper mineralization in the flow tops of the Portage Lake Lava Series determined by paleomagnetic methods, MS: Michigan Technological University.
- Browning, T. D., and Beske-Diehl, S. J., 1987, Paleomagnetism and the age of copper mineralization in the Portage Lake Volcanics, Upper Peninsula, Michigan: *Canadian Journal of Earth Sciences*, v. 24, no. 12, p. 2396-2404.
- Brozdowski, R. A., 1988, *Geology of the Ropes Gold Mine*, in Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A32-A53.
- , 1989, Ropes pyritic gold deposit in a dilational bend, Marquette Greenstone, Belt, PhD: The University of Western Ontario, 585 p.
- Brozdowski, R. A., and Scott, G. W., 1988, Geological Field Trip to the Marquette Greenstone Belt: Part III Callahan Mining Corporation Ropes Mine Property, in Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. A72-A73.
- Bruce, E. L., 1945, Pre-Cambrian iron formations: *Geological Society of America Bulletin*, v. 56, no. 6, p. 589-602.
- Brumleve, C., 1976, Petrology and fracture characteristics of a native copper bearing conglomerate, Kingston Mine, Keweenaw County, Michigan, MS: Michigan Technological University, 97 p.
- Buell, J. L., 1906, Menominee Range: Proceedings of the Lake Superior Mining Institute, v. 11, p. 38-49.
- Bufe, C. G., 1962, An investigation of the remanent magnetization of the Covington dike, MS: Michigan College of Mining and Technology.
- Bumgarner, E. L., 1980, *Geology of the Portage Lake Volcanics in the M.T.U. mining laboratory Hancock, Michigan*, MS: Michigan Technological University, 138 p.
- Burnie, S. W., Schwarcz, H. P., and Crocket, J. H., 1972, A Sulfur Isotopic Study of the White Pine Mine, Michigan: *Economic Geology*, v. 67, no. 7, p. 895-914.
- Burr, F. L., 1911, Square set mining at the Vulcan mines: Proceedings of the Lake Superior Mining Institute, v. 16, p. 144-155.
- Butler, B. S., and Burbank, W. S., 1929a, The Copper Deposits of Michigan: U. S. Geological Survey Professional Paper, v. 144, p. 1-238.
- , 1929b, The Copper Deposits of Michigan: Proceedings of the Lake Superior Mining Institute, v. 37, p. 76-83.
- Buzas, A., 1960, The interpretation of the aeromagnetics of southeastern Marquette County, Michigan, MS: Michigan State University.
- Cain, J. A., 1964, Precambrian Geology of the Pembine Area, Northeastern Wisconsin: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 49, p. 81-103.
- Callender, J. A., 1854, The Lake Superior Copper Mines: *Mining Magazine*, v. 2, p. 249-253.

- Cambray, F. W., 1977, Field Guide to the Marquette District, Michigan, Michigan Basin Geological Society, 62 p.
- , 1979, The Precambrian basement of Michigan in the hydrocarbon potential of the Michigan Basin, the way ahead: Symposium Michigan Basin Geological Society, p. 5.
- , 2004, The evolution of a Paleoproterozoic plate margin, Northern Michigan, East Lansing, Michigan State University, 45 p.
- Campbell, C. A., and Van Evara, R. W., 1954, Recent drilling trends at Calumet and Hecla: Mining Congress Journal, v. 40, no. 5, p. 26-28.
- Campbell, R. E., 1952, Geophysical investigations of the Silver Mountain area, Houghton County, Michigan, MS: Michigan College of Mining and Technology, 1-64 p.
- Cannon, W. F., 1973, The Penokean Orogeny in Northern Michigan: Geological Association of Canada Special Paper, v. 12, p. 251-271.
- , 1974, Bedrock geologic map of of the Greenwood Quadrangle, Marquette County, Michigan, scale 1:24,000.
- , 1975, Bedrock geologic map of of the Republic Quadrangle, Marquette County, Michigan, scale 1:24,000.
- , 1976, Hard iron-ore of Marquette Range, Michigan: Economic Geology, v. 71, no. 6, p. 1012-1028.
- , 1977, Map showing precambrian geology in parts of the Baraga, Dead River, and Clark Creek Basins, Marquette and Baraga Counties, Michigan, scale 1:62,500.
- , 1978, Geologic map of the Iron River 1 degree by two degree Quadrangle, Michigan and Wisconsin, scale 1:250,000.
- , 1979, Day 6; Marquette iron district, *in* Morey, G. B., ed., Field trip guidebook for Archean and Proterozoic stratigraphy of the Great Lakes area, United States and Canada, Volume 13, Minnesota Geological Survey, p. 59-62.
- , 1980, Copper-bearing quartzite near Watersmeet, Michigan: U.S. Geological Survey Open-File Report, v. OFR 80-390.
- , 1982, Mineral Resource Assessment of the Iron River 1° x 2° quadrangle, Michigan and Wisconsin: U.S. Geological Survey Open-File Report, v. 82-223.
- , 1992, The midcontinent rift in the Lake Superior region with emphasis on its geodynamic evolution: Tectonophysics, v. 213, p. 41-48.
- , 1994, Closing of the Midcontinent rift--A far-field effect of Grenvillian compression: Geology, v. 22, no. 2, p. 155-158.
- , 1995, Summary of GLIMPCE geophysical investigations of the Midcontinent Rift System in the Lake Superior region, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. A., eds., Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers, p. 7-10.
- , 1999, Field Trip 1: Early Proterozoic Strata of the Marquette Iron Range, Michigan, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 1-10.
- , 2008, Field Trip 5: The Sudbury Impact Layer at the McClure Site, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 115-126.
- Cannon, W. F., Daniels, D. L., Nicholson, S. W., Phillips, J., Woodruff, L. G., Chandler, V. W., Morey, G. B., Boerboom, T., Wirth, K. R., and Mudrey, M. G., 2001, New map reveals origin and geology of North American mid-continent rift: Eos, Transactions American Geophysical Union, v. 82, no. 8, p. 97-101.
- Cannon, W. F., and Fralick, P. W., 2010, Field Trip 1: Western Gogebic Iron Range in Wisconsin, *in* Miller, J. D., ed., Field Guide to the Geology of Precambrian Iron

- Formations in the Western Lake Superior Region, Minnesota and Michigan, Precambrian Research Center University of Minnesota Duluth, p. 1-14.
- Cannon, W. F., and Gair, J. E., 1970, A Revision of Stratigraphic Nomenclature for Middle Precambrian Rocks in Northern Michigan: Geological Society of America Bulletin, v. 81, p. 2843-2846.
- Cannon, W. F., Gair, J. E., Klasner, J. S., and Boyum, B. H., 1975, Marquette Iron Range, *in* Earney, F. C. F., and Hughes, J. O., eds., Twenty-first Annual Institute on Lake Superior Geology Proceedings, p. 125-174.
- Cannon, W. F., Green, A. G., Hutchinson, D. R., Lee, M., Milkereit, B., Behrendt, J. C., Halls, H. C., Green, J. C., Dickas, A. B., Morey, G. B., Sutcliffe, R., and Spencer, C., 1989, The North American Mid-continent Rift beneath Lake Superior from GLIMPCE Seismic reflection profiling: Tectonics, v. 8, no. 305-332.
- Cannon, W. F., and Hinze, W. J., 1992, Speculations on the origin of the North American midcontinent rift: Tectonophysics, v. 213, p. 49-55.
- Cannon, W. F., and Klasner, J. S., 1975, Stratigraphic relationships within Baraga Group of Precambrian age, Central Upper Peninsula, Michigan: Journal of Research of the US Geological Survey, v. 3, no. 1, p. 47-51.
- , 1976a, Geologic Map and geophysical interpretation of the Witch Lake Quadrangle, Marquette, Iron and Baraga Counties, Michigan, scale 1:62,500.
- , 1976b, Phosphorite and other apatite-bearing sedimentary rocks in the Precambrian of Northern Michigan: US Geological Survey Circular, v. 746, p. 1-6.
- , 1977, Bedrock geologic map of the southern part of the Diorite and Champion 7 1/2-minute Quadrangles, Marquette County, Michigan, scale 1:24,000.
- , 1978, Bedrock geologic map of the southern part of the Michigamme and Three Lakes Quadrangles, Marquette and Baraga Counties, Michigan, scale 1:24,000.
- Cannon, W. F., Klasner, J. S., and LaBerge, G. L., 2003a, Field Trip 3: Stratigraphy and Structure of the Iron River-Crystal Falls Basin, *in* Cannon, W. F., ed., 49th Annual Meeting of the Institute on Lake Superior Geology, Volume 49, p. 64-85.
- Cannon, W. F., Lee, M. W., Hinze, W. J., Schulz, K. J., and Green, A. G., 1991, Deep crustal structure of the Precambrian basement beneath northern Lake Michigan, midcontinent North America: Geology, v. 19, p. 207-210.
- Cannon, W. F., Meier, J. G., and Waggoner, T. D., 2003b, Field Trip 4: Life cycle of an iron deposit - The Republic Mine from ore genesis to mine restoration, *in* Cannon, W. F., ed., 49th Annual Meeting of the Institute on Lake Superior Geology, Volume 49, p. 86-107.
- Cannon, W. F., and Mudrey, M. G., Jr., 1981, The potential for diamond-bearing kimberlite in Northern Michigan and Wisconsin: U.S. Geological Survey Circular, v. 842.
- Cannon, W. F., and Nicholson, S. W., 1992, Revisions of stratigraphic nomenclature within the Keweenaw Supergroup of northern Michigan: U.S. Geological Survey Bulletin, v. 1970A, p. 1-21.
- Cannon, W. F., Nicholson, S. W., Hedgman, C. A., Woodruff, L. G., and Schulz, K. J., 1992, Geology of Keweenaw Supergroup Rocks near the Porcupine Mountains, Ontonagon and Gogebic Counties, Michigan, *in* Dickas, A. B., and Brown, B. A., eds., 38th Annual Meeting of the Institute on Lake Superior Geology, Volume 38, p. 75-102.
- Cannon, W. F., Peterman, Z. E., and Sims, P. K., 1993, Crustal-scale thrusting and origin of the Montreal River Monocline – a 35-km-thick cross section of the mid-continent rift in Northern Michigan and Wisconsin: Tectonics, v. 12, p. 728-744.
- Cannon, W. F., and Schulz, K. J., 2008, Field Trip 2: Archean-Paleoproterozoic unconformity at Silver Lake -- Seismites from the Sudbury Impact?, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 45-63.

- Cannon, W. F., Schulz, K. J., Horton, J. W., and Kring, D. A., 2010, The Sudbury impact layer in the Paleoproterozoic iron ranges of northern Michigan, USA: Geological Society of America Bulletin, v. 122, no. 1-2, p. 50-75.
- Cannon, W. F., and Simmons, G. C., 1973, Geology of part of the southern complex, Marquette District, Michigan: Journal of Research of the US Geological Survey, v. 1, p. 165-172.
- Carlson, C. G., 1917, The occurrence and genesis of the disseminated copper ores of the Nonesuch shales and sandstone, BA: University of Wisconsin, 31 p.
- Carlson, C. G., 1932, Bitumen in Nonesuch Formation of Keweenaw series of northern Michigan: American Association of Petroleum Geologists Bulletin, v. 16, no. 8, p. 737-740.
- Carlson, S. M., and Floodstrand, W., 1994, Part 4 - Michigan kimberlites and diamond exploration techniques, 40th Annual Meeting of the Institute on Lake Superior Geology, 15 p.
- Carlson, S. M., Robinson, G. W., Elder, M. J., Jaszczak, J. A., and Bornhorst, T. J., 2007, Grenockite and Associated Uranium-Vanadium, Minerals from the Huron River Uranium Prospect Baraga County, Michigan: Rocks & Minerals, v. 82, no. 4, p. 298-309.
- Carpenter, R. H., 1962, Some vein-wall rock relations in the White Pine mine, Ontonagon County, Michigan, MS: University of Wisconsin.
- , 1963, Some vein-wall rock relationships in the White Pine Mine, Ontonagon County, Michigan: Economic Geology, v. 58, no. 5, p. 643-666.
- Carrigan, W. J., and Cameron, E. M., 1991, Petrological and stable isotope studies of carbonate and sulfide minerals from the Gunflint Formation, Ontario - evidence for the origin of early Proterozoic iron-formation: Precambrian Research, v. 52, no. 3-4, p. 347-380.
- Carter, N. C., 1962, Geology of a part of the Republic Trough, Marquette, Michigan, MS: Michigan College of Mining and Science.
- Carter, P. J., Jr., 1989, Finite strain estimations for Archean Mona Schist pillows and early Proterozoic Enchantment Lake Formation metawackes in the eastern Upper Peninsula of Michigan, MS: Michigan State University, 109 p.
- Cascaddan, A. E., 1969, Petrology and petrofabrics of the Jacobsville sandstone (Precambrian or Cambrian) in the vicinity of the Keweenaw fault (northern Michigan), MS: Michigan State University.
- Case, J. E., and Gair, J. E., 1965, Aeromagnetic map of parts of Marquette, Dickinson, Baraga, Alger and Schoolcraft counties, Michigan and its geologic interpretation, scale 1:62,500.
- Catacosinos, P. A., 1981, Origin and stratigraphic assessment of pre-Mt. Simon clastics (Precambrian) of Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 65, no. 9, p. 1617-1620.
- Catacosinos, P. A., and Daniels, P. A., Jr., 1991a, Early Sedimentary Evolution of the Michigan Basin, Geological Society of America Special Publication, Volume 256: Boulder, Geological Society of America, 248 p.
- Catacosinos, P. A., and Daniels, P. A., Jr., 1991b, Stratigraphy of middle Proterozoic to Middle Ordovician formations of the Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 53-71.
- Catlin, J. M., 1835, Large mass of native copper: American Journal of Science, v. 27, no. 2, p. 381-381.
- Cayeux, L., 1911, Existence de restes organiques dans les roches ferrugineuses associées aux minerais de fer huroniens des États-Unis: Académie des sciences, Comptes rendus, v. 153, p. 910-912.
- Chabot, L. S., Jr., 1929, Field blasting at the Volunteer Miner: Proceedings of the Lake Superior Mining Institute, v. 27, p. 259-270.

- , 1936, The development of mining and caving of the east orebody Blueberry mine: Proceedings of the Lake Superior Mining Institute, v. 29, p. 124-130.
- Chamberlin, R. T., 1909, The gases in rocks: *Journal of Geology*, v. 17, no. 6, p. 534-568.
- , 1937, Shifting orogenic belts of the southern Canadian Shield: *Journal of Geology*, v. 45, no. 6, p. 663-681.
- Chamberlin, T. C., 1883, The copper-bearing series of Lake Superior: *Science*, v. 1, no. 16, p. 453-455.
- Chan, S. S., Thomas, H. E., and Bada, N., 1975, Air injection and hot-film flow logging for evaluation of roof cracks in White Pine Mine: *American Institute of Mining Engineers Transactions*, v. 256, p. 131-137.
- Chandler, V. W., 1983, Correlation of magnetic anomalies in east-central Minnesota and northwestern Wisconsin: Constraints on magnitude and direction of Keweenawan rifting: *Geology*, v. 11, p. 174-176.
- Chandler, V. W., Boerboom, T. J., and Jirsa, M. A., 2007, Penokean tectonics along a promontory-embayment margin in east-central Minnesota: *Precambrian Research*, v. 157, no. 1-4, p. 26-49.
- Chandler, V. W., Bowman, P. L., Hinze, W. J., and O'Hara, N. W., 1982, Long-wavelength gravity and magnetic anomalies of the Lake Superior Region, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 223-237.
- Chandler, V. W., McSwiggen, P. L., Morey, G. B., Hinze, W. J., and Anderson, R. R., 1989, Interpretation of Seismic Reflection, Gravity, and Magnetic Data Across Middle Proterozoic Mid-Continent Rift System, Northwestern Wisconsin, Eastern Minnesota, and Central Iowa: *American Association of Petroleum Geologists Bulletin*, v. 73, no. 3, p. 261-275.
- Channing, J. P., 1895, Address by the President [mining accidents]: *Proceedings of the Lake Superior Mining Institute*, v. 3, p. 34-48.
- , 1914, The caving system of mining in Lake Superior iron mines [with discussion]: *Proceedings of the Lake Superior Mining Institute*, v. 19, p. 245-251.
- Chapman, R. H., 1952, Seismic depth to ledge studies as related to water problems at Morris Mine, Ishpeming, Michigan, MS: Michigan College of Mining and Technology, 1-51 p.
- Chartier, T., 1993, Diamond-bearing Kimberlite and Related Geology in the Upper Peninsula of Michigan, Michigan Basin Geological Society, 38 p.
- Chase, C. G., and Gilmer, T. H., 1973, Precambrian plate tectonics: the Midcontinent gravity high: *Earth and Planetary Science Letters*, v. 21, p. 70-78.
- Chaudhuri, S., 1966, The geochronology of the Keweenawan rocks of Michigan and the origin of the Copper Deposits, PhD: The Ohio State University, 145 p.
- Chaudhuri, S., and Faure, G., 1964, The whole-rock Rb-Sr age of the Precambrian Nonesuch Shale in Michigan, U. S. Atomic Energy Commission Contract At(30-1)-1381.
- Chaudhuri, S., and Faure, G., 1967, Geochronology of the Keweenawan rocks, White Pine, Michigan: *Economic Geology*, v. 62, no. 8, p. 1011-1033.
- Chaudhuri, S., and Faure, G., 1968, Rubidium-strontium age of the Mount Bohemia intrusion in Michigan: *Journal of Geology*, v. 76, p. 488-490.
- Chester, A. H., 1876, On the percentage of iron in certain ores: *American Institute of Mining Engineers Transactions*, v. 4, p. 219-220.
- Church, G. B., 1894, Brakes and safety appliances as applied to mine hoisting machinery in the copper mining district of Michigan, ME: Michigan Mining School, 35 p.
- Chynoweth, C. E., 1951, The petrography of some Huronian rocks in Baraga County, Michigan, MS: Wayne State University, 38 p.
- Clark, J. L., 1974, Sulfide mineralization in the Kona Dolomite, Marquette County, Michigan, MS: Michigan Technological University.

- Clark, L. D., 1955, Pre-Cambrian geology of the Norway Lake Area, Dickinson County, Michigan, PhD: The University of Chicago.
- Clark, L. D., Cannon, W. F., and Klasner, J. S., 1975, Bedrock geologic map of the Negaunee SW Quadrangle, Marquette County, Michigan, scale 1:24,000.
- Clarke, R. E., 1853a, Notes from the copper region: Harpers Magazine, v. 6, p. 433-448.
- , 1853b, Notes from the copper region: Harpers Magazine, v. 6, p. 577-588.
- Classen, E., 1882, Mineralogical Notes: (1) Analysis of orthoclase from Ishpeming, Marquette County, Michigan; (2) On regular polyhedral cavities in hematite: American Journal of Science, v. 123, no. 133, p. 67-67.
- Clayton, R. N., and Epstein, S., 1958, The relationship between O18/O16 ratios in coexisting quartz, carbonate, and iron oxides from various geological deposits: Journal of Geology, v. 66, p. 352-373.
- Clements, J. M., 1895, The volcanics of the Michigamme district of Michigan: Journal of Geology, v. 3, no. 7, p. 801-822.
- , 1898, A study of some examples of rock variation: Journal of Geology, v. 6, no. 4, p. 372-392.
- , 1899, A contribution to the study of contact metamorphism: American Journal of Science, v. 157, no. 38, p. 81-91.
- Clements, J. M., Smyth, H. L., Bayley, W. S., and Van Hise, C. R., 1899, The Crystal Falls iron-bearing district of Michigan, with a chapter on the Sturgeon River tongue by W. S. Bayley and an introduction by C. R. Van Hise: U. S. Geological Survey Monograph, v. 36, p. 1-512.
- Cloud, P., 1973, Paleoecological significance of the banded iron-formation: Economic Geology, v. 68, p. 1135-1143.
- Cloud, P., and Morrison, K., 1980, New microbial fossils from 2 Gyr old rocks in northern Michigan: Geomicrobiology Journal, v. 2, no. 2, p. 161-178.
- Cochran, R., 1954, New plant successfully floats Michigan jasper: Engineering Mining Journal v. 155, no. 8, p. 100-104, 114.
- Cohen, T. J., 1966, Explosion Seismic studies of the mid-continent gravity high, PhD: University of Wisconsin.
- Colbert, S. J., 2011, Fluid inclusion study of the Mesoproterozoic Nonesuch Formation-- Biogenic sources and thermal history of oil, MS: Colorado State University.
- Coleman, A. P., 1902, The Huronian question: American Geologist, v. 29, no. 6, p. 325-334.
- Collins, J. A., 1974, The sedimentary copper universal; from sedimentologic and stratigraphic syntheses of the Proterozoic of Icon, Quebec; Grinnell Formation, Alberta; Nonesuch Shale, Michigan; and the Mississippian Horton-Windsor formations of Nova Scotia, PhD: Queen's University, 259 p.
- Colwell, A. B., 1894, Notes on the geology of the Michigamme River, ME: Michigan Mining School, 35 p.
- Conlin, T., and O'Brien, P., 1911, Historical sketch of Menominee Range: Proceedings of the Lake Superior Mining Institute, v. 16, p. 7-16.
- Connan, J., 1976, Etude geochimique d'un echantillon d'huile de la mine de White Pine (Michigan, U.S.A.): Centre de Recherches-Pau, Department des Recherches en Geologie, Informal Report, p. 1-5.
- Conrad, M. A., 1952, Contact metamorphic effects of three pegmatitic dikes in the Upper Peninsula of Michigan, MS: Michigan College of Mining and Technology, 1-31 p.
- Cooke, H. C., 1926, Between the Archean and Keweenaw in the Huronian: Royal Society of Canada Proceedings and Transactions, v. ser. 3, v. 20, no. 4, p. 17-37.
- Coombs, S. L., 1969, Footwall features as related to ore occurrence in the Kingston Conglomerate, Keweenaw County, Michigan, MS: University of Arizona.

- Coons, R. L., 1966, Precambrian basement geology and Paleozoic structure of the mid-continent gravity high, PhD: University of Wisconsin.
- Coons, W. E., III, 1975, Affects of thermal assimilation and low grade metamorphism on a xenolith bearing basalt dike in Marquette, Michigan, MS: Western Michigan University, 92 p.
- Cooper, D. G., 1939, Geographic Influences on the History and Development of Isle Royale, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 24, no. 3, p. 1-8.
- Cooper, J. B., 1901, Historical sketch of smelting and refining lake copper: Proceedings of the Lake Superior Mining Institute, v. 7, p. 44-49.
- Cooper, R. W., 1973, Middle Precambrian and Keweenaw rocks north of the Gogebic Range in Wisconsin, MS: University of Wisconsin, 83 p.
- Cordier, L., 1849, Note sur une masse de cuivre natif provenant des rives du lac Superieur aux États-Unis d'Amérique: Academie des sciences, Comptes rendus, v. 28, p. 161-162.
- Corey, G. W., 1906, The Nonesuch Sandstone: Engineering Mining Journal v. 82, no. 17, p. 778-778.
- Cornwall, H. R., 1947, Differentiation in doleritic lavas of the Michigan Keweenaw and the origin of the copper deposits, PhD: Princeton University.
- Cornwall, H. R., 1951a, Differentiation in lavas of the Keweenaw series and the origin of the copper deposits of Michigan: Geological Society of America Bulletin, v. 62, p. 159-202.
- , 1951b, Differentiation in lavas of the Keweenaw series and the origin of the copper deposits of Michigan: Economic Geology, v. 46, no. 6, p. 658-659.
- , 1951c, Differentiation in magmas of the Keweenaw series: Journal of Geology, v. 59, p. 151-172.
- , 1951d, Ilmenite, magnetite, hematite and copper in lavas of the Keweenaw series: Economic Geology, v. 46, no. 1, p. 51-67.
- , 1954a, Bedrock geology of the Delaware quadrangle, Michigan.
- , 1954b, Bedrock geology of the Lake Medora quadrangle, Michigan.
- , 1954c, Bedrock geology of the Phoenix quadrangle, Michigan.
- , 1955, Bedrock geology of the Fort Wilkins quadrangle, Michigan.
- , 1956, A summary of ideas on the origin of native copper deposits: Economic Geology, v. 51, no. 7, p. 615-631.
- Cornwall, H. R., and Rose, H. R., 1957, Minor elements in Keweenaw lavas, Michigan: Geochimica et Cosmochimica Acta, v. 12, p. 209-224.
- Cornwall, H. R., Runner, J. J., Stromquist, A. A., Swanson, R. W., and White, W. S., 1949, Detailed geologic maps of recently active copper mines, Houghton and Keweenaw Counties, Michigan: U.S. Geological Survey Strategic Mineral Investigations, p. 1-43.
- Cornwall, H. R., and White, W. S., 1955, Bedrock geology of the Manitou Island Quadrangle, Michigan, scale 1:24,000.
- Cornwall, H. R., and Wright, J. C., 1954a, Bedrock geology of the Brunneau Creek quadrangle, Michigan.
- , 1954b, Bedrock geology of the Eagle Harbor quadrangle, Michigan.
- , 1956, Bedrock geology of the Laurium quadrangle, Michigan.
- Courter, E. W., 1990, Michigan's Copper Country: Contribution to Michigan Geology Report, v. 92-1.
- Cowpland, C. C., 1936, A resume of the early history of the explosives industry in Marquette County: Proceedings of the Lake Superior Mining Institute, v. 29, p. 21-28.
- Craddock, C., 1973, Structural Evolution of the Keweenaw Province: Geology, v. 1, no. 4, p. 190-190.
- Craddock, J. P., Anziano, J., Wirth, K., Vervoort, J. D., Singer, B., and Zhang, X. F., 2007, Structure, geochemistry and geochronology of a Penokean lamprophyre dike swarm,

- Archean Wawa Terrane, Little Presque Isle, Michigan, USA: *Precambrian Research*, v. 157, no. 1-4, p. 50-70.
- Craddock, J. P., Konstantinou, A., Vervoort, J. D., Wirth, K. R., Davidson, C., Finley-Blasi, L., Juda, N. A., and Walker, E., 2013, Detrital Zircon Provenance of the Mesoproterozoic Midcontinent Rift, Lake Superior Region, U.S.A: *Journal of Geology*, v. 121, no. 1, p. 57-73.
- Crane, W. R., 1906, Ore breaking at Lake Superior: *Engineering Mining Journal* v. 82, no. 17, p. 767-770.
- , 1929, Mining methods and practice in the Michigan copper mines: U. S. Bureau of Mines Bulletin, v. 306, p. 1-192.
- Credner, H., 1869a, Beschreibung einiger charakterischer Vorkommen des gediegenen Kupfers aus Keweenaw Point am Oberen See Nord Amerika's: *Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie*, p. 1-14.
- , 1869b, Die vorsilurischen Gebilde der "Oberen Halbinsel von Michigan" in Nord Amerika: *Deutsche geologische Gesellschaft, Zeitschrift*, v. 21, p. 516-554.
- , 1870a, Gewaltige Kupfermassen an Lake Superior: *Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie*, p. 86-86.
- , 1870b, Über nordamerikanische Schieferporphyroide: *Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie*, no. 970-984.
- Cregger, D. M., 1977, Flow of acid mine water in the abandoned Hiawatha-Dober-Isabella mine complex, Iron River district, Michigan, MS: Michigan Technological University, 104 p.
- Creveling, J. G., 1926, The peridotite of Presque Isle, Michigan: a study in serpentinization: *American Journal of Science*, v. 212, p. 515-521.
- Crichton, D. G., 1924, Thesis on recent developments in Lake Superior copper smelting, ME: Michigan College of Mines, 26 p.
- Crisman, D. P., 1982, Groundwater geochemistry in the Portage Lake Volcanics, Hancock, Michigan and implications for native copper stability, MS: Michigan Technological University, 138 p.
- Crissman, S. E., 1988, Controls on element distributions: Negaunee Iron-Formation, Empire Mine, Palmer, Michigan, MS: Michigan State University, 90 p.
- Cromwell, B., 1912, Methods of sampling at Lake Superior iron mines: *Proceedings of the Lake Superior Mining Institute*, v. 17, p. 76-93.
- Crowell, and Murray, G. E., 1914, The iron ores of Lake Superior: Containing facts of interest relating to mining, beneficiation and shipping of the ore and the location of principal mines, Cleveland, Prentiss Press Co., 270 p.
- , 1930, The iron ores of Lake Superior: Containing facts of interest relating to mining, beneficiation and shipping of the ore and the location of principal mines, Cleveland, Prentiss Press Co., 332.
- Crump, R. M., 1948, Origin of hard iron ores of the Marquette district, PhD: University of Wisconsin, 87 p.
- Cullers, R. L., and Berendsen, P., 1998, The provenance and chemical variation of sandstones associated with the Mid-continent Rift System, USA: *European Journal of Mineralogy*, v. 10, no. 5, p. 987-1002.
- Cumberlidge, J. T., and Stone, J. G., 1964, The Vulcan iron formation at the Groveland Mine, Iron Mountain, Michigan: *Economic Geology*, v. 59, no. 6, p. 1094-1106.
- Cumming, V. M., Poulton, S. W., Rooney, A. D., and Selby, D., 2013, Anoxia in the terrestrial environment during the late Mesoproterozoic: *Geology*, v. 41, no. 5, p. 583-586.
- Dalziel, I. W. D., Dott, R. H., Black, R. F., and Zimmerman, J. H., 1970, Geology of the Baraboo District, Wisconsin: *Information Circular*, v. 14, p. 1-164.
- Dana, E. S., 1886, On the crystallization of native copper: *American Journal of Science*, v. 132, no. 192, p. 413-429.

- Dana, J. D., 1854, Apophyllite from the Cliff mine, Lake Superior region: *American Journal of Science*, v. 68, no. 54, p. 419-419.
- Daniels, P. A., Jr., 1982, Upper Precambrian sedimentary rocks; Oronto Group, Michigan-Wisconsin: *Memoir - Geological Society of America*, v. 156, p. 107-133.
- , 1999, Stratigraphy and lithology of Keweenaw sedimentary rocks penetrated by the Terra-Patrick #7-22 borehole, Bayfield County, Wisconsin: *Miscellaneous Paper - Wisconsin Geological and Natural History Survey*, p. 75-85.
- Daniels, P. A., Jr., and Elmore, R. D., 1988a, Overview - Upper Keweenaw Rift-Fill Sequence, Mid-Continent Rift System, Michigan; Road Log; and Outcrop Descriptions - Stops 1-16, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., *Upper Keweenaw Rift-Fill Sequence, Mid-Continent Rift System, Michigan*, Michigan Basin Geological Society, p. 1-74.
- , 1988b, Upper Keweenaw Rift-Fill Sequence, Mid-Continent Rift System, Michigan, *Michigan Basin Geological Society*, p. 150.
- Dann, J. C., 1978, Major-element variation within the Emperor Igneous Complex and the Hemlock and Badwater volcanic formations, MS: Michigan Technological University.
- Darbyshire, F. A., Eaton, D. W., Frederiksen, A. W., and Ertolahti, L., 2007, New insights into the lithosphere beneath the Superior Province from Rayleigh wave dispersion and receiver function analysis: *Geophysical Journal International*, v. 169, no. 3, p. 1043-1068.
- Davidson, D. M., 1982, Geological Evidence relating to interpretation of the Lake Superior Basin structure, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 5-14.
- Davidson, D. M., Jr., and Mudrey, M. G., Jr., 1986, Resource evaluation; Petroleum exploration potential of the Midcontinent Rift, U.S.A: *Geoscience Wisconsin*, v. 11, p. 1-63.
- Davidson, E. S., Espenshade, G. H., White, W. S., and Wright, J. C., 1955, Bedrock geology of the Mohawk Quadrangle, Michigan.
- Davis, D. W., and Green, J. C., 1997, Geochronology of the North American midcontinent rift in western Lake Superior and implications for its geodynamic evolution: *Canadian Journal of Earth Sciences*, v. 34, p. 476-488.
- Davis, D. W., and Paces, J. B., 1990, Time resolution of geologic events on the Keweenaw Peninsula and implications for development of the Midcontinent rift system: *Earth and Planetary Science Letters*, v. 97, no. 1-2, p. 54-64.
- Davis, D. W., and Sutcliffe, R., 1985, U-Pb ages from the Nipigon plate and northern Lake Superior: *Geological Society of America Bulletin*, v. 96, p. 1572-1579.
- Davis, J. F., 1965, A petrologic examination of iron-formation and associated graywackes and pyroclastic breccias within the Negaunee Formation of the Palmer Area, Marquette District, Michigan, PhD: The University of Wisconsin - Madison, 205 p.
- DeGraff, J. M., 1976, Structural and age relationships of rocks associated with the Lac La Belle magnetic anomaly Keweenaw County, Michigan, MS: Michigan Technological University, 130 p.
- Dell, C. I., 1975, Relationships of till to bed rock in the Lake Superior region: *Geology*, v. 3, no. 10, p. 563-564.
- Demark, R. S., 2000, Mines and Minerals of Michigan's Iron Country: *Rocks & Minerals*, v. 75, no. 2, p. 92-101.
- DeMarte, D. L., 1961, A spectrographic analysis of the dikes of the Gogebic range, Michigan, MS: Michigan State University.
- Denning, R. M., 1948, Geology of the Ishpeming Gold range: Michigan Geological Survey Open File Report, v. 80-1, p. 1-17.
- , 1949, The Petrology of the Jacobsville Sandstone, Lake Superior, MS: Michigan College of Mining and Technology, 71 p.

- Denton, F. W., 1922, Development and extraction methods for Lake Superior Copper deposits [with discussion]: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 46-62.
- Derby, E. L., Jr., 1929, Geology of ores on the Marquette Range: *Mining Congress Journal*, v. 15, no. 10, p. 731-733.
- Deroux, H., 1861a, Die Kupfergruben des Oberen See's: *Allgemeine berg- und hüttenmännische Zeitung*, v. 20, p. 305-307.
- , 1861b, Die Kupfergruben des Oberen See's: *Allgemeine berg- und hüttenmännische Zeitung*, v. 20, p. 329-331.
- Desollar, T. C., 1912, Rockhouse practice of the Quincy Mining Company: *Proceedings of the Lake Superior Mining Institute*, v. 17, p. 217-226.
- , 1922, Handling underground waste rock through underground skip dump, Quincy Mining Company: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 42-45.
- Di Prisco, G., and Springer, J. S., 1991, The Precambrian-Paleozoic unconformity and related mineralization in southeastern Ontario: *Ontario Geological Survey Open File Report*, v. S751, p. 1-122.
- Diallo, M. S. T., 1987, Point-load testing on irregular lumps of peridotite and greenstone found in Ropes Mine, Ishpeming, Michigan, MS: Michigan Technological University.
- Dickas, A. B., 1984, Midcontinent Rift System: Precambrian hydrocarbon target: *Oil and Gas Journal*, p. 151-159.
- Dickas, A. B., 1986a, Comparative Precambrian stratigraphy and structure along the Mid-Continent Rift: *American Association of Petroleum Geologists Bulletin*, v. 70, no. 3, p. 225-238.
- Dickas, A. B., 1986b, Extent of Oronto Group: *Geoscience Wisconsin*, v. 11, p. 32-38.
- , 1986c, Local geologic issues impacting exploration; Interpretation of the western Lake Superior gravity low: *Geoscience Wisconsin*, v. 11, p. 53-58.
- , 1986d, Seismologic evidence of arrested stage development of the Midcontinent Rift: *Geoscience Wisconsin*, v. 11, p. 45-52.
- , 1986e, Setting and evolution of the Midcontinent Rift; Midcontinent rift as a frontier hydrocarbon target: *Geoscience Wisconsin*, v. 11, p. 15-19.
- Dickas, A. B., 1986f, Upper Keeweenawan stratigraphy; Extent of Oronto Group: *Geoscience Wisconsin*, v. 11, p. 32-38.
- Dickas, A. B., 1986g, Worldwide distribution of Precambrian hydrocarbon deposits: *Geoscience Wisconsin*, v. 11, p. 8-13.
- , 1988, The Control of Extrusion and Sedimentary Patterns within Keweenawan Age Structures of the Lake Superior Basin by Taphrogenesis, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., *Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan, Michigan Basin Geological Society*, p. 81-94.
- , 1995a, The association of hydrocarbon with basement rock of pre-Phanerozoic age, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., *Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers*, p. 283-295.
- , 1995b, Structural geometry of the Superior Zone, Midcontinent Rift System, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., *Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers*, p. 29-34.
- Dickas, A. B., Bornhorst, T. J., Ojakangas, R. W., Green, J. C., Mudrey, M. G., Jr., Kalliokoski, G. J., and Paces, J. B., 1989, Lake Superior basin segment of the Midcontinent rift system, Metamorphism and tectonics of eastern and central North America, *American Geophysical Union*, p. T344:341-T344:362.
- Dickas, A. B., and Mudrey, M. G., Jr., 1992, Keweenawan Sedimentary Rock of the South Shore, Lake Superior, *in* Dickas, A. B., and Brown, B. A., eds., *38th Annual Meeting of the Institute on Lake Superior Geology, Volume 38*, p. 42-74.

- , 1997, Segmented structure of the middle Proterozoic Midcontinent Rift System, North America: Special Paper - Geological Society of America, v. 312, p. 37-46.
- Dickas, A. B., and Mudrey, M. G., Jr., 1999, Terra-Patrick #7-22 deep hydrocarbon test, Bayfield County, Wisconsin; investigations and final report: Miscellaneous Paper - Wisconsin Geological and Natural History Survey, p. 1-4.
- Dickas, A. B., Surkov, V. S., and Mezhelovsky, N. V., 1991, The midcontinent rift system of the central United States of America: A model Precambrian (Proterozoic) extension structure: Soviet Geology, Ministry of Geology, USSR, p. 42-56.
- Dickey, R. M., 1936a, The Granitic Sequence in the Southern Complex of Upper Michigan: Journal of Geology, v. 44, p. 317-340.
- Dickey, R. M., 1936b, The granitic sequence in the Southern Complex of Upper Michigan, PhD: The University of Wisconsin - Madison.
- Dickey, R. M., 1938a, The Ford River Granite of the Southern Complex of Upper Michigan: Journal of Geology, v. 46, p. 321-335.
- , 1938b, Present Trends in Studies of the Michigan Huronian: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 419-426.
- Dickey, R. M., and Young, D. S., 1939, Relations Between Granite and Slate in the Eureka Mine, Ramsay, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 24, no. 4, p. 43-49.
- Diehl, J. F., and Haig, T. D., 1994, A paleomagnetic study of the lava flows within the Copper Harbor Conglomerate, Michigan; new results and implications: Canadian Journal of Earth Sciences, v. 31, no. 2, p. 369-380.
- Ding, X., 2010, Mineralogic, petrological and isotopic studies of the Eagle Ni-Cu Sulfide Deposit, Michigan, PhD: Indiana University, 142 p.
- Ding, X., Li, C., Ripley, E. M., Rossell, D., and Kamo, S., 2010, The Eagle and East Eagle sulfide ore-bearing mafic-ultramafic intrusions in the Midcontinent Rift System, upper Michigan: Geochronology and petrologic evolution: Geochemistry, Geophysics, Geosystems, v. 11, no. 3, p. Q03003.
- Ding, X., Ripley, E., and Li, C., 2012a, PGE geochemistry of the Eagle Ni-Cu-(PGE) deposit, Upper Michigan: constraints on ore genesis in a dynamic magma conduit: Mineralium Deposita, v. 47, no. 1, p. 89-104.
- Ding, X., Ripley, E. M., Shirey, S. B., and Li, C., 2012b, Os, Nd, O and S isotope constraints on country rock contamination in the conduit-related Eagle Cu-Ni-(PGE) deposit, Midcontinent Rift System, Upper Michigan: Geochimica et Cosmochimica Acta, v. 89, p. 10-30.
- Doane, V. L., 1956, Petrography of Nonesuch shales, White Pine, Michigan, MS: Michigan Technological University.
- Donoghue, K. A., 2012, Sulfur isotope and mineralogical studies of the ni-cu sulfide mineralization in the bovine igneous complex (BIC intrusion) Baraga Basin, Northern Michigan, MS: Indiana University, 58 p.
- Donoghue, K. A., Ripley, E. M., and Li, C., 2014, Sulfur isotope and mineralogical studies of Ni-Cu sulfide mineralization in the Bovine igneous complex intrusion, Baraga Basin, northern Michigan: Economic Geology, v. 109, no. 2, p. 325-341.
- Doonan, C. J., and Byerlay, J. R., 1973, Ground water and geology of Baraga County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 11, p. 1-26.
- Doonan, C. J., Hendrickson, G. E., and Byerlay, J. R., 1970, Ground water and geology of Keweenaw Peninsula, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 10, p. 1-41.

- Doonan, C. J., and Van Alstine, J. L., 1979, Ground water and geology of Marquette County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 12, p. 1-57.
- Dott, R. H., 1983, The Proterozoic red quartzite enigma in the north-central United States: Resolved by plate collision? : Geological Society of America Memoirs, v. 160, p. 129-141.
- Dott, R. H., and Dalziel, I. W. D., 1972, Age and correlation of the Precambrian Baraboo Quartzite of Wisconsin: Journal of Geology, v. 80, p. 552-568.
- Douglas, J., 1874a, The native copper mines of Lake Superior: Quarterly Journal of Science, v. 11, p. 162-180.
- , 1874b, The native copper mines of Lake Superior: Canadian Naturalist and Geologist and Proceedings of the Natural History Society of Montreal, v. 7, p. 318-336.
- , 1891, The copper resources of the United States: American Institute of Mining Engineers Transactions, v. 19, p. 678-704.
- Drier, R. W., and Du Temple, O. J., 1961, Prehistoric Copper Mining in the Lake Superior Region, Drier, 214 p..
- Driscoll, E. G., 1956, An environmental and heavy mineral study of the "eastern sandstones" between Marquette and Grand Marais, Michigan, MS: University of Nebraska.
- Dryden, D. A., 1962, Petrology and petrofabrics of the Randville Dolomite in the Felch Mountain trough, Dickinson County, Michigan, MS: Michigan State University.
- DuBois, P. M., 1955, Paleomagnetic measurements of the Keweenaw: Nature, v. 176, no. 4480, p. 506-507.
- , 1959, Correlation of Keweenaw rocks of the Lake Superior district by paleomagnetic methods: Proceedings of the Geological Association of Canada, v. 11, p. 37-66.
- , 1961, Palaeomagnetism and Correlation of Keweenaw Rocks: Geological Survey of Canada Bulletin, v. 71, p. 1-75.
- Dunlop Matthew, I., 2013, The eagle Nickel-Copper-PGE Magmatic sulfide deposit and surrounding mafic dikes and intrusions in the baraga basin, upper Michigan: Relationships, petrogenesis, and implications for magmatic sulfide exploration, MS: Indiana University, 106 p.
- Duparc, L., 1900, Note sur la region cuprifere de l'extrémité nord-est de la peninsule de Keweenaw (Lac Supérieur): Archives des sciences physiques et naturelles, v. 4, no. 10, p. 518-538.
- Dupee, J. A., 1856, On copper deposits of Keweenaw Point, Lake Superior: Boston Society of Natural History Proceedings, v. 5, p. 279-280.
- Duskin, D. J., and Quigley, T. O., 1999, Shear Zones and Gold Mineralization in the South Half of the Ishpeming Greenstone Belt, Michigan, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 57-96.
- Dustin, F., 1932, The Gems of Isle Royale, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 16, p. 383-398.
- , 1935, The gems of Isle Royale, Michigan: the chlorastrolite: The Mineralogist, v. 3, no. 2, p. 5-6.
- , 1936, Agates of the Lake Superior region: Rocks and Minerals, v. 11, no. 9, p. 152-155.
- Dutton, C. E., 1939, Recent geological work in Dickinson County: Proceedings of the Lake Superior Mining Institute, v. 30, p. 119-126.
- , 1942, Economic geology of part of the Menominee range, Dickinson County: Michigan Geological Survey Progress Report, v. 9, p. 1-27.
- , 1949, Geology of the central part of the Iron River district, Iron County, Michigan: U.S. Geological Survey Circular, v. 43, p. 1-9.
- , 1950, Progress of geologic work in Iron and Dickinson counties, Michigan: U.S. Geological Survey Circular, v. 84, p. 1-7.

- , 1958, Precambrian geology of parts of Dickinson and Iron Counties, Michigan, Michigan Basin Geological Society, Michigan Basin Geological Society Annual Geological Excursion, 40 p.
- , 1969, Geology and magnetic data for the central Iron River area, Michigan: Michigan Geological Survey Report of Investigation, v. 5, p. 1-17.
- , 1971, Geology of the Florence area, Wisconsin and Michigan: U.S. Geological Survey Professional Paper, v. 633, p. 1-51.
- Dutton, C. E., and Lamey, C. A., 1939, Geology of the Menominee range, Dickinson County: Michigan Geological Survey Progress Report, v. 5, p. 1-10.
- Dutton, C. E., Park, C. F., Jr., and Balsley, J. R., Jr., 1945, General character and succession of tentative divisions in the stratigraphy of Mineral Hills district, Iron County, Michigan: U.S. Geological Survey Preliminary Report, p. 1-4.
- Dyke, G. A., 1988, Structure and stratigraphy of the Silver River area, Baraga County, Michigan ,MS: Michigan Technological University.
- Eaton, L., 1914, Methods of stocking ore on the Marquette Range: Proceedings of the Lake Superior Mining Institute, v. 19, p. 72-99.
- , 1917, Equipping and sinking the No. 1 shaft at the Holmes mine: Proceedings of the Lake Superior Mining Institute, v. 21, p. 106-124.
- , 1922, Mechanical ventilation at Lake mine: Proceedings of the Lake Superior Mining Institute, v. 22, p. 106-112.
- , 1925, Present scraping practice at the Cliffs Shaft mine: Proceedings of the Lake Superior Mining Institute, v. 24, p. 121-125.
- , 1929a, Method and cost of mining hard specular hematite on the Marquette range, Michigan: Proceedings of the Lake Superior Mining Institute, v. 27, p. 190-209.
- , 1929b, Method and cost of mining hard specular hematite on the Marquette range, Michigan: U.S. Bureau of Mines Information Circular, v. 6138, p. 1-14.
- , 1929c, Mining soft hematite at Mine No. 2 of the Marquette range, Mich.: U.S. Bureau of Mines Information Circular, v. 6179, p. 1-15.
- , 1929d, Mining soft hematite by open stopes at Mine No. 1, Menominee Range, Mich.: U.S. Bureau of Mines Information Circular, v. 6180, p. 1-10.
- Eberle, H. R., 1929, Iron ores and iron ore beneficiation, MS: Michigan College of Mining and Technology, 1-26 p.
- Eddy, G. E., 1933, Magnetic surveying of the copper country of northern Michigan: Compass, v. 13, no. 3, p. 117-119.
- Edwards, R. M., and Parnall, W. E., Jr., 1905, The Keweenaw Above the Calumet and Hecla Conglomerate, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 253-270.
- Egleston, T., 1879, Copper mining on Lake Superior: American Institute of Mining Engineers Transactions, v. 6, p. 275-312.
- , 1881, Copper refining in the United States: American Institute of Mining Engineers Transactions, v. 9, p. 678-730.
- Eglinton, G., Scott, P. M., Belsky, T., Burlingame, A. L., and Calvin, M., 1964, Hydrocarbons of Biological Origin from a One-Billion-Year-Old Sediment: Science, v. 145, p. 263-264.
- , 1974, Hydrocarbons of biological origin from a one-billion-year-old sediment, *in* Kvenholden, K. A., ed., Geochemistry and the Origin of Life, Volume 14, John Wiley and Sons, p. 280-280.
- Eglinton, G., Scott, P. M., Belsky, T., Burlingame, A. L., Richter, W., and Calvin, M., 1966, Occurrence of isoprenoid alkanes in a Precambrian sediment, Advances in Organic Geochemistry, Volume 24: Oxford, Pergamon Press, p. 41-74.

- Eights, J., 1846, Outlines of the geological structure of Lake Superior mineral region belonging to the New York and Lake Superior Mining Company, p. 1-21.
- El-Khalidi, H. H., 1950, A field and petrographic study of the sandstones and conglomerates of the Porcupine Mountains, Ontonagon County, Michigan, MS: Michigan State University, 69 p.
- Élie de Beaumont, L., 1850, [On the age of the Lake Superior sandstone]: *societe geologie de France Bulletin*, v. 2, no. 7, p. 209-209.
- Elkington, R. B., 1952, The structure of the Michigamme Slate along the Huron River, Baraga County, Michigan, MS: Wayne State University, 17 p.
- Ellard, H. F., 1903, Sinking and equipping No. 9 shaft, Ashland mine: *Proceedings of the Lake Superior Mining Institute*, v. 9, p. 24-38.
- Elliott, S. R., 1912, Method of raising, sinking and concreting No. 3 shaft, Negaunee mine: *Proceedings of the Lake Superior Mining Institute*, v. 17.
- , 1922a, Spies open-stope system of mining: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 113-118.
- , 1922b, Spies open-stope system of mining: *American Institute of Mining Engineers Transactions*, v. 68, p. 282-286.
- Elliott, S. R., Jopling, J. E., Chenneour, B. J., and Derby, E. L., Jr., 1925, Mining methods of Marquette District, *Michigan American Institute of Mining Engineers Transactions*, v. 72, p. 122-138.
- Ells, G. D., 1969, Architecture of the Michigan Basin, *in* Stonehouse, H. B., ed., *Studies of the Precambrian of the Michigan Basin*, Michigan Basin Geological Society, p. 60-88.
- Elmore, R. D., 1981, The Copper Harbor Conglomerate and Nonesuch Shale: Sedimentation in a Precambrian Intracontinental rift, Upper Michigan, PhD: University of Michigan, 201 p.
- , 1983, Precambrian Non-Marine Stromatolites in Alluvial-Fan Deposits, the Copper Harbor Conglomerate, Upper Michigan: *Sedimentology*, v. 30, no. 6, p. 829-842.
- , 1984, The Copper Harbor Conglomerate - a Late Precambrian fining-upward alluvial fan sequence in Northern Michigan: *Geological Society of America Bulletin*, v. 95, no. 5, p. 610-617.
- Elmore, R. D., Engel, M. H., and Daniels, P. A., Jr., 1988, The Nonesuch Formation: Lacustrine Sedimentation in a Precambrian Mid-Continent Rift Basin, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., *Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan*, Michigan Basin Geological Society, p. 103-126.
- Elmore, R. D., Milavec, G. J., Imbus, S. W., and Engel, M. H., 1989, The Precambrian Nonesuch Formation of the North American mid-continent rift, sedimentology and organic geochemical aspects of lacustrine deposition: *Precambrian Research*, v. 43, p. 191-213.
- Elmore, R. D., and Van der Voo, R., 1982, Origin of hematite and its associated remanence in the Copper Harbor Conglomerate (Keweenawan), upper Michigan: *Journal of Geophysical Research*, v. 87, no. B13, p. 10,918-928.
- Engel, T., 1954, The Stratigraphy and petrography of the Holyoke Meta-Sediments of the Dead River Basin, Marquette County, Michigan, MS: Michigan State College of Agriculture and Applied Science, 74 p.
- Ensign, C. O., Jr., 1964, Ore dilution control increases earnings at White Pine: *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 229, p. 184-191.
- Ensign, C. O., Jr., and Patrick, J. L., 1968, Ore reserve computation and ore dilution control at the White Pine Mine, White Pine, Michigan, Ore reserve estimation and grade control-Canadian centennial conference, Volume 9, Canadian Institute of Mining and Metallurgy, p. 308-318.
- Ensign, C. O., Jr., White, W. S., Wright, J. C., Patrick, J. L., Leone, R. J., Hathaway, D. J., Trammell, J. W., Fritts, J. J., and Wright, T. L., 1968, Copper deposits in the Nonesuch

- Shale, White Pine, Michigan, *in* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967 (Graton-Sales Volume), Volume 1: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, p. 460-488.
- Ensign, P. S., 1981, Input electromagnetic investigation of the southern margin of the Jacobsville Sandstone, Upper Peninsula of Michigan, MS: Michigan Technological University, 68 p.
- , 1982, Electromagnetic geophysics of Jacobsville basin, northern Michigan: U. S. Geological Survey Professional Paper, p. 36-37.
- Epili, D., and Mereu, R. F., 1989, The GLIMPCE seismic experiment: Onshore refraction and wide-angle reflection observations from a fan line over the Lake Superior Midcontinent Rift System, *in* Mereu, R. F., Mueller, S., and Fountain, D. M., eds., Properties and processes of Earth's lower crust, Volume 51, American Geophysical Union, p. 93-101.
- Erdosh, G., 1975, Geology and Exploration of Southern Province of Canadian Shield in Wisconsin-Michigan: CIM Bulletin, v. 68, p. 130-132.
- Everhart, H. A., 1946, A trip to Michigan's Upper Peninsula: Rocks and Minerals, v. 21, no. 9, p. 570-570.
- Fackler, W. C., 1940, Clastic dikes in the Keweenaw lavas of Lake Superior, MS: University of Cincinnati.
- Fairbairn, H. W., 1941, Deformation lamellae in quartz from the Ajibik Formation, Michigan Geological Society of America Bulletin, v. 52, no. 8, p. 1265-1277.
- Fallacaro, A., 2003, Spectral and geochemical characteristics of Lake Superior type banded iron formation: Analog to the Martian hematite outcrops, MS: University of Nevada, Reno, 137 p.
- Fan, C.-M., 1989, Shallow seismic reflection study along the Bear Lake road, Hancock, Michigan, MS: Michigan Technological University.
- Farley, K. A., and McKeon, R., 2015, Radiometric dating and temperature history of banded iron formation-associated hematite, Gogebic iron range, Michigan, USA: *Geology*, v. 43, no. 12, p. 1083-1086.
- Faul, H., 1949, Fossil burrows from the Pre-cambrian Ajibik Quartzite of Michigan: *Nature*, v. 164, no. 4157, p. 32-32.
- , 1950, Fossil burrows from the Precambrian Ajibik Quartzite of Michigan: *Journal of Paleontology*, v. 24, p. 102-106.
- Faure, G., and Kovach, J., 1969, The age of the Gunflint Iron Formation of the Animikie Series in Ontario, Canada: *Geological Society of America Bulletin*, v. 80, p. 1725-1736.
- Fay, A. H., 1917, Mine accidents classified by mining methods, for Lake Superior district, 1915: *Proceedings of the Lake Superior Mining Institute*, v. 21, p. 65-70.
- Fedorchuk, N. D., 2014, Evaluating the biogenicity of fluvial-lacustrine stromatolites from the Mesoproterozoic Copper Harbor Conglomerate, Upper Peninsula of Michigan, USA, MS: The University of Wisconsin.
- Feighner, M. A., 1983, Three-dimensional inversion of P-wave travel time residuals and other related studies at the Upper Michigan-Northern Wisconsin Seismic Network, MS: Michigan Technological University.
- Finlay, J. R., 1913, Valuation of iron-mines: *American Institute of Mining Engineers Transactions*, v. 45, p. 282-326.
- Finley-Blasi, L., 2006, U-Pb dating of detrital zircons from the Fond du Lac and Hinckley Formations of Northern Minnesota, BS: Carleton College.
- Fisher, J., 1929, Historical sketch of the Lake Superior copper district: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 54-67.
- Fisher, J., 1934a, Recent geothermal measurements in the Michigan copper district: *American Institute of Mining Engineers Transactions*, v. 110, p. 528-545.

- , 1934b, Recent geothermal measurements in the Michigan copper district: American Institute of Mining Engineers Technical Publication, v. 481, p. 1-11.
- , 1939, Geophysical prospecting and some its applications in the Lake Superior District: Proceedings of the Lake Superior Mining Institute, v. 30, p. 47-60.
- Fleener, F., 1953, Silver Islet-Bonanza: Earth Science Digest, v. 6, no. 5, p. 20-25.
- Floran, R. J., and Papike, J. J., 1975, Petrology of the low-grade rocks of the Gunflint iron-formation, Ontario-Minnesota: Geological Society of America Bulletin, v. 86, p. 1169-1190.
- Foose, M. P., 1978, Preliminary geologic map of the Ned Lake Quadrangle, Michigan, scale 1:62,500.
- Foshag, W. F., 1922, Eakleite from Isle Royale, Michigan: American Mineralogist, v. 7, no. 2, p. 23-24.
- Foss, A. L., and Flanagan, J. M., 1926, Shaft sinking at the Eureka mine: Proceedings of the Lake Superior Mining Institute, v. 25, p. 39-51.
- Foster, J. W., 1865, Geology and metallurgy of the iron ores of Lake Superior, New York, Iron Cliffs Company, 98 p.
- Foster, J. W., and Whitney, J. D., 1850a, Report on the Geology and Topography of a Portion of the Lake Superior Land District, Part 1. Copper Lands.: 31st Congress, 1st Session. House of Representatives Executive Document, v. 69.
- , 1850b, Report on the Geology and Topography of a Portion of the Lake Superior Land District, Part 2. Iron Lands.: 31st Congress, 1st Session. House of Representatives Executive Document, v. 69.
- , 1851, On the age of the sandstone of Lake Superior, with a description of the phenomena of association of igneous rocks: American Association for the Advancement of Science Proceedings, v. 5, p. 22-38.
- Fourgani, A. I., 2012, Organic geochemistry of Mesoproterozoic Nonesuch Formation at White Pine, Michigan, USA, MS: Colorado State University, 161 p.
- Fowle, J. C., 1890, Magnetic concentrations at the Michigamme iron-mine, Lake Superior: American Institute of Mining Engineers Transactions, v. 19, p. 62-70.
- Fowler, J. H., 1979, Analysis and interpretation of the 5,000 ft (1,538 m) red-bed sequence encountered in the Sparks et al. #1-8 (Michigan Basin deep borehole), MS: Western Michigan University, 173 p.
- Fowler, J. H., and Kuenzi, W. D., 1978, Keweenaw turbidites in Michigan (deep borehole red beds): a founded basin sequence developed during evolution of a proto-oceanic rift system: Journal of Geophysical Research, v. 83, no. 12, p. 5833-5843.
- Fox, A. J., 1988, An integrated geophysical study of the southeastern extension of the Midcontinent Rift System, MS: Purdue University, 112 p.
- Fox, T. P., 1983, Geochemistry of the Hemlock metabasalt and Kiernan Sills, Iron County, Michigan, MS: Michigan State University, 88 p.
- Fralick, P., Davis, D. W., and Kissin, S. A., 2002, The age of the Gunflint Formation, Ontario, Canada: single zircon U-Pb age determinations from reworked volcanic ash: Canadian Journal of Earth Sciences, v. 39, no. 7, p. 1085-1091.
- Frantti, G. E., 1954, Geophysical investigations in Upper Peninsula of Michigan, MS: Michigan College of Mining and Technology, 75 p.
- Frederiksen, A. W., Bollmann, T., Darbyshire, F., and van der Lee, S., 2013a, Modification of continental lithosphere by tectonic processes: A tomographic image of central North America: Journal of Geophysical Research: Solid Earth, v. 118, no. 3, p. 1051-1066.
- Frederiksen, A. W., Deniset, I., Ola, O., and Toni, D., 2013b, Lithospheric fabric variations in central North America: Influence of rifting and Archean tectonic styles: Geophysical Research Letters, v. 40, no. 17, p. 4583-4587.

- Fritts, C. C., Jr., 1931, Carbonaceous matter of the Nonesuch Shale (northeastern Wisconsin), MS: University of Wisconsin, 20 p.
- Fritts, C. E., 1952, A petrologic study of the Mount Houghton Felsite, Keweenaw Peninsula, MS: Michigan College of Mining and Technology, 42 p.
- , 1969, Bedrock geologic map of the Marenisco-Watersmeet area, Gogebic and Ontonogan Counties, Michigan, scale 1:48,000.
- Fulton, J., 1887, Mode of deposition of the iron ores of the Menominee range, Michigan: American Institute of Mining Engineers Transactions, v. 16, p. 525-536.
- Fulton, J., 1888, Methods of mining in the Menominee Range, Michigan: American Institute of Mining Engineers Transactions, v. 16, p. 891-905.
- Fults, M. E., 1987, A trace element geochemical analysis of the Lake Ellen Kimberlite, Crystal Falls, Michigan, U.S.A., MS: Western Michigan University.
- Futa, K., 1981, Sm-Nd systematics of a tonalitic augen gneiss and its constituent minerals from northern Michigan: *Geochimica et Cosmochimica Acta*, v. 45, p. 1245-1249.
- Gair, J. E., 1964, United States Geological Survey Field Trip Marquette Iron-Mining District and Republic Trough, *in* Boyum, B. H., ed., Institute of Lake Superior Geology Guidebook, Volume 10, p. 1-14.
- , 1975, Bedrock geologic map and sections of the Palmer Quadrangle, Marquette County, Michigan: U.S. Geological Survey Professional Paper, v. 769, p. 1-159.
- , 1981, Lower Proterozoic glacial deposits of northern Michigan, U.S.A., *in* Hambrey, M. J., and Harland, W. B., eds., *Earth's pre-Pleistocene Glacial Record*: Cambridge, Cambridge University Press, p. 803-806.
- Gair, J. E., and Thaden, R. E., 1968, Geology of the Marquette and Sands Quadrangles, Marquette County, Michigan: U.S. Geological Survey Professional Paper, v. 397, p. 1-73.
- Gair, J. E., and Wier, K. L., 1956, Geology of the Kiernan Quadrangle, Iron County, Michigan: U.S. Geological Survey Bulletin, v. 1044, p. 1-84.
- Gardner, E. D., Johnson, C. H., and Butler, B. S., 1938, Copper mining in North America: U.S. Bureau of Mines Bulletin, v. 405, p. 1-300.
- Geijer, P., 1914, Lake-Superior-området's prekambiska järnformationer: *Geologiska Föreningens i Stockholm, Förhandlingar*, v. 35, p. 439-483.
- Genth, F. A., 1859a, Contributions to mineralogy: Whitneyite, a new species: *American Journal of Science*, v. 77, no. 81, p. 400-400.
- , 1859b, Whitneyite: *American Journal of Science*, v. 78, no. 83, p. 247-247.
- , 1862, Arsenides of Copper: *American Journal of Science*, v. 83, no. 98, p. 191-194.
- Gibbons, M. G., 1975, Low frequency microseismic investigation of roof stability in the White Pine Mine, MS: Michigan Technological University.
- Gill, J. E., 1927, Origin of the Gunflint Iron-bearing Formation: *Economic Geology*, v. 22, p. 687-728.
- Goetz, G. W., 1890, Analyses of Lake Superior iron ores: American Institute of Mining Engineers Transactions, v. 19, p. 59-61.
- Gomez, J. d. J., 1970, On the origin of the black pyritic slates from the iron mineral deposits of Iron River district of Michigan, MS: University of Michigan, 44 p.
- Good, S. E., and Pettijohn, F. J., 1949, Magnetic survey and geology of the Stager area, Iron County, Michigan: U.S. Geological Survey Circular, v. 55, p. 1-4.
- Gooden, J. J., 1974, Sedimentological aspects of underwater copper exploration in Lake Superior, MS: University of Wisconsin.
- Goodman, R. J., 1951, The Future of Iron Mining on the Marquette Range, Marquette County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 35, no. 3, p. 189-195.

- Goodwin, A. M., 1956, Facies Relations in the Gunflint Iron Formation: *Economic Geology*, v. 51, p. 565-595.
- Gordon, M. B., and Hempton, M. R., 1986, Collision-induced rifting: The Grenville orogeny and the Keweenawan rift of North America: *Tectonophysics*, v. 127, p. 1-25.
- Gordon, W. C., 1905, The Black River section near Bessemer: Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 188-195.
- , 1907, A geological section from Bessemer down Black River: Michigan Geological Survey Annual Report, v. 1906, p. 397-507.
- Graff, C. W., 1988, Iron-enriched, brecciated volcanic rocks of the Hemlock Formation, Iron County, Michigan, MS: Michigan Technological University.
- Graff, W. W., 1930a, Mining practices, methods, and costs at Mine No. 4 of the Marquette range, Mich.: U.S. Bureau of Mines Information Circular, v. 6390, no. 1-8.
- , 1930b, Mining practices, methods, and costs at Mine No. 5 of the Marquette range, Mich.: U.S. Bureau of Mines Information Circular, v. 6380, no. 1-10.
- Graham, J. W., 1953, Changes of ferromagnetic minerals and their bearing on magnetic properties of rocks: *Journal of Geophysical Research*, v. 58, p. 243-260.
- Grant, U. S., 1895, The name of the copper-bearing rocks of Lake Superior: *American Geologist*, v. 15, no. 3, p. 192-194.
- , 1904, Investigations on the Lake Superior iron-ore deposits: *Mining Magazine*, v. 10, p. 175-183.
- Grass, R. I., 1965, Photoelastic stress orientation analysis of the Nonesuch Formation Ontonagon County, Michigan, MS: Michigan Technological University.
- Green, A. G., Cannon, W. F., Milkereit, B., Hutchinson, D. R., Davidson, A., Behrendt, J. C., Spencer, C., Lee, M. W., Morel-a-l'Huissier, P., and Agena, W. F., 1989, A "GLIMPCE" of the deep crust beneath the Great Lakes: *Geophysical Monograph*, v. 51, p. 65-80.
- Green, A. G., Milkereit, B., Davidson, A., Spencer, C., Hutchinson, D. R., Cannon, W. F., Lee, M. W., Agena, W. F., Behrendt, J. C., and Hinze, W. J., 1988, Crustal structure of the Grenville front and adjacent terranes: *Geology*, v. 16, no. 9, p. 788-792.
- Green, J. C., 1977, Keweenawan plateau volcanism in the Lake Superior region, *in* Baragar, W. R. A., Coleman, L. C., and Hall, J. M., eds., *Volcanic Regimes in Canada*, Volume 16, Geological Association of Canada, p. 407-422.
- , 1981, Pre-Tertiary plateau basalts, Basaltic volcanism on the terrestrial planets: New York, Pergamon Press, p. 30-77.
- , 1982, Geology of Keweenawan extrusive rocks, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 47-55.
- , 1983, Geologic and geochemical evidence for the nature and development of the middle Proterozoic (Keweenawan) midcontinent rift of North America: *Tectonophysics*, v. 94, p. 413-437.
- , 1989, Physical volcanology of mid-Proterozoic plateau lavas: *Geological Society of America Bulletin*, v. 101, p. 486-500.
- , 1993, Proterozoic Rifts, *in* Condie, K. C., ed., *Proterozoic Crustal Evolution*: Amsterdam, Elsevier, p. 97-149.
- Green, J. C., Bornhorst, T. J., Chandler, V. W., Mudrey, M. G., Jr., Myers, P. E., Pesonen, L. J., and Wilband, J. T., 1987, Keweenawan dykes of the Lake Superior region: Evidence for evolution of the Middle Proterozoic Midcontinent Rift of North America, *in* Halls, H. C., and Fahrig, W. F., eds., *Mafic Dyke Swarms*, Volume 34, Geological Association of Canada, p. 289-302.

- Greenberg, J. K., and Brown, B. A., 1983, Lower Proterozoic volcanic rocks and their setting in the southern Lake Superior district, *in* Medaris, L. G., ed., *Early Proterozoic Geology of the Great Lakes Region*, Volume 160: Boulder, Geological Society of America, p. 67-84.
- , 1984, Cratonic sedimentation during the Proterozoic: an orogenic connection in Wisconsin and the Upper Midwest: *Journal of Geology*, v. 92, p. 159-171.
- Greenman, N. N., 1951, The origin of the Randville Dolomite of Dickinson and Iron counties, Michigan, PhD: University of Chicago.
- Gregg, W. J., 1993, Structural geology of parautochthonous and allochthonous terranes of the Penokean orogeny in Upper Michigan – Comparisons with Northern Appalachian Tectonics: *U. S. Geological Survey Bulletin*, v. 1904-Q, p. 1-28.
- Gresley, W. S., 1896a, Organic markings in Lake Superior iron ores: *Science*, v. 3, no. 69, p. 622-623.
- , 1896b, Traces of organic remains from the Huronian (?) series at Iron Mountain, Michigan, etc.: *American Institute of Mining Engineers Transactions*, v. 26, p. 527-534.
- Griffin, J. B., 1961, Lake Superior copper and the Indians, *Miscellaneous studies of the Great Lakes prehistory*, Volume 17: Ann Arbor, University of Michigan, Museum of Anthropology, p. 1-189.
- Grigorita, A., 2001, Reevaluation du contexte géologique de la formation nonesuch et sa minéralisation cupro-argentifère, la région ouest du Lac Supérieur, MSA: Ecole Polytechnique, Montreal (Canada), 193 p.
- Grimes, J. G., 1977, Geochemistry and petrology of Keweenaw rhyolites and associated rocks, *Portage Lake Volcanics*, Michigan, MS: Michigan Technological University, 80 p.
- Grout, F. F., 1910a, Contribution to the petrography of the Keweenaw: *Journal of Geology*, v. 18, no. 7, p. 633-657.
- , 1910b, Keweenaw copper deposits: *Economic Geology*, v. 5, no. 5, p. 471-476.
- , 1933, Duluth rocks and structure, *in* Hotchkiss, W. O., ed., *Lake Superior Region*, Volume 23: Washington, D. C., U.S. Government, p. 67-72.
- , 1946, Acmite occurrences of the Cuyuna Range, Minnesota: *American Mineralogist*, v. 31, p. 125-130.
- Gruner, J. W., 1922, The origin of sedimentary iron formations: The Biwabik Formation of the Mesabi Range: *Geological Society of America Bulletin*, v. 17, p. 407-460.
- Gruner, J. W., 1930a, Hydrothermal oxidation and leaching experiments: their bearing on the origin of Lake Superior hematite-limonite ores: *Economic Geology*, v. 25, no. 7, p. 697-719.
- , 1930b, Hydrothermal oxidation and leaching experiments: their bearing on the origin of Lake Superior hematite-limonite ores: *Economic Geology*, v. 25, no. 8, p. 837-867.
- , 1932a, Additional notes on secondary concentration of Lake Superior iron ores: *Economic Geology*, v. 27, no. 2, p. 189-205.
- , 1932b, Magnesiosussexite, a new mineral from a Michigan iron mine, isomorphous with sussexite and camsellite: *American Mineralogist*, v. 17, no. 11, p. 509-513.
- , 1933, The Mesabi Range, *in* Hotchkiss, W. O., ed., *Lake Superior Region*, Volume 23: Washington, D. C., U.S. Government, p. 88-101.
- , 1937, Hydrothermal leaching of iron ores of the Lake Superior type: a modified theory: *Economic Geology*, v. 32, no. 2, p. 121-130.
- Guck, H., 1919, Geology of the Michigan copper district: *Engineering Mining Journal*, v. 108, no. 23, p. 948-949.
- Haase, C. S., 1979, Metamorphic petrology of the Negaunee iron-formation, Marquette District, northern Michigan, PhD: Indiana University.
- , 1982, Metamorphic petrology of the Negaunee Iron Formation, Marquette District, Northern Michigan - Mineralogy, metamorphic reactions, and phase equilibria: *Economic Geology*, v. 77, no. 1, p. 60-81.

- Hagni, R. D., 1954, Petrology and origin of the Kitchi conglomerate, Marquette County, Michigan, MS: Michigan State University, 45 p.
- Hahnenberg, J. J., 1981, The petrology and geochemistry of Keweenaw diabase dikes in Ontonagon, Gogebic, Iron and Dickinson Counties, Michigan, MS: Western Michigan University, 99 p.
- Haig, T. D., 1986, New paleomagnetic pole position for the interbedded lava flows within the Copper Harbor conglomerate of Michigan's Keweenaw Peninsula, MS: Michigan Technological University, 46 p.
- Hall, C. E., 1985, Precambrian phosphorites of Northern Michigan : mode and environment of deposition, MS: Michigan Technological University.
- Haller, F. J., 1939, Wire netting in top slicing operations in the Cleveland Cliffs Iron Company's Negaunee District: Proceedings of the Lake Superior Mining Institute, v. 30, p. 160-167.
- Halls, H. C., 1966, A review of the Keweenaw geology of Lake Superior, Volume 10, American Geophysical Union, p. 3-27.
- , 1969, Compressional wave velocities of Keweenaw rock specimens from the Lake Superior Region: Canadian Journal of Earth Sciences, v. 6, p. 555-568.
- , 1974, A paleomagnetic reversal in the Osler Volcanic Group, Northern Lake Superior: Canadian Journal of Earth Sciences, v. 11, p. 1200-1207.
- , 1978a, The late Precambrian central North American rift system--a survey of recent geological and geophysical investigations, *in* Ramberg, I. B., and Neumann, E. R., eds., Tectonics and geophysics of continental rifts, Volume 2: Dordrecht, NATO Advanced Study Institute, p. 111-123.
- , 1978b, The use of converging remagnetization circles in palaeomagnetism: Physics of the Earth and Planetary Interiors, v. 16, no. 1, p. 1-11.
- , 1982, Crustal thickness in the Lake Superior region, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Region, Volume 156: Boulder, Geological Society of America, p. 239-243.
- Halls, H. C., and Palmer, H. C., 1981, Remagnetization in Keweenaw rocks; Part II, Lava flows within the Copper Harbor Conglomerate, Michigan: Canadian Journal of Earth Sciences, v. 18, no. 9, p. 1395-1408.
- Halls, H. C., and Pesonen, L. J., 1982, Paleomagnetism of Keweenaw rocks, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 173-201.
- Hamblin, W. K., 1961a, Micro-cross-lamination in Upper Keweenaw sediments of northern Michigan: Journal of Sedimentary Research, v. 31, no. 3, p. 390-401.
- , 1961b, Paleogeographic evolution of the Lake Superior region from Late Keweenaw to Late Cambrian time: Geological Society of America Bulletin, v. 72, p. 1-18.
- Hamblin, W. K., 1965, Basement control of Keweenaw and Cambrian sedimentation in Lake Superior region: American Association of Petroleum Geologists Bulletin, v. 49, no. 7, p. 950-958.
- Hamblin, W. K., and Horner, W. J., 1961, Sources of the Keweenaw conglomerates of northern Michigan: Journal of Geology, v. 69, no. 2, p. 204-211.
- Hamilton, D. A., and Mereu, R. F., 1993, 2-D tomographic imaging across the North American Mid-Continent Rift System: Geophysical Journal International, v. 112, p. 344-358.
- Hamilton, S. K., 1965, Copper mineralization in the upper part of the Copper Harbor Conglomerate at White Pine, Michigan, MS: University of Wisconsin.
- , 1967, Copper mineralization in the upper part of the Copper Harbor Conglomerate at White Pine, Michigan: Economic Geology, v. 62, no. 7, p. 885-904.
- , 1969, Copper mineralization in the upper part of the Copper Harbor conglomerate at White Pine, Michigan; reply: Economic Geology, v. 64, no. 4, p. 462-464.

- Han, T.-M., and Runnegar, B., 1992, Megascopic Eukaryotic algae from the 2.1 billion-year-old Negaunee Iron-formation, Michigan: *Science*, v. 257, no. 5067, p. 232-235.
- Hanly, A. J., Kyser, T. K., Hiatt, E. E., Marlatt, J., and Foster, S., 2006, The Uranium mineralization potential of the Paleoproterozoic Sioux basin and its relationship to other basins in the southern Lake Superior region: *Precambrian Research*, v. 148, no. 1-2, p. 125-144.
- Hanninen, C. C., and Sipola, J. W., 1973, Thermomechanized mining system at White Pine, Symposium on Rock Mechanics, Volume 14, p. 623-648.
- Hansen, E., Reimink, J., and Harlov, D., 2010, Titaniferous accessory minerals in very low-grade metamorphic rocks, Keweenaw Peninsula Michigan, USA: *Lithos*, v. 116, no. 1-2, p. 167-174.
- Hanson, G. N., 1975, $^{40}\text{Ar}/^{39}\text{Ar}$ spectrum ages on Logan intrusions, a lower Keweenawan flow, and mafic dikes in northeastern Minnesota – Northwestern Ontario: *Canadian Journal of Earth Sciences*, v. 12, p. 821-835.
- Hardenburgh, L. M., 1900, The Pewabic concentrating works: *Proceedings of the Lake Superior Mining Institute*, v. 6, p. 23-26.
- Harder, E. C., 1910, Manganese deposits of the United States with sections on foreign deposits, chemistry, and uses: *U.S. Geological Survey Bulletin*, v. 427, p. 1-298.
- Harger, C., 1917, Electrical power in minning on the Menominee Range: *Proceedings of the Lake Superior Mining Institute*, v. 21, p. 79-91.
- Harris, R. D., 1972, Investigation of a possible mineralogical control of roof failure at the White Pine Copper Mine, MS: Michigan Technological University.
- Harrison, W., Edgar, D., Van Luik, A., Hinze, W. J., Braile, L., Kalliokoski, G. J., Pfannkuch, H., Wright, H., Jr., Tissue, M., and Sood, M., 1983, Geology, hydrology, and mineral resources of crystalline rock areas of the Lake Superior region, United States: Argonne National Laboratory.
- Harrison, W. J., 1971, Clay mineral assemblages and chlorite polytypes in the basal Nonesuch Shale, White Pine, Michigan, MS: Northern Illinois University, 84 p.
- Hart, S. R., Steinhart, J. S., and Smith, T. J., 1994, Terrestrial heat flow in Lake Superior: *Canadian Journal of Earth Sciences*, v. 31, p. 698-708.
- Hart, W. C., 1915, The opening of the Wakefield mine: *Proceedings of the Lake Superior Mining Institute*, v. 20, p. 103-113.
- Hase, D. H., 1955, Upper Huronian sedimentation in a portion of the Marquette Trough, Michigan, PhD: The University of Wisconsin - Madison, 96 p.
- Hauck, S. A., 1995, Midcontinent Rift System Bibliography: Natural Resources Research Institute, NRRI/TR-95/33, 267 p.
- Hawes, C. C., 1939, Vitiated air in the Spies-Virgil mine-Iron River District: *Proceedings of the Lake Superior Mining Institute*, v. 30, p. 109-113.
- Hawes, E. L., 1930, The development of the rock drill and its relation to the Lake Superior mining district: *Proceedings of the Lake Superior Mining Institute*, v. 28, p. 171-191.
- Hawes, G. W., 1875, On zonochlorite and chlorastrolite; contributions from the Sheffield Laboratory of Yale: *American Journal of Science*, v. 110, no. 55, p. 24-26.
- Haxby, W. F., Turcotte, D. L., and Bird, J. M., 1976, Thermal and Mechanical Evolution of the Michigan Basin, *in* M.H.P., B., ed., *Developments in Geotectonics*, Volume Volume 12, Elsevier, p. 57-75.
- Hay, R. D., 1964, The geology of Sault Ste. Marie area, Ontario, PhD: McGill University.
- Hayden, J. E., 1915, Rock drifting in the Morris-Lloyd mine, The Cleveland Cliffs Iron Co.: *Proceedings of the Lake Superior Mining Institute*, v. 20, p. 142-147.
- Hayden, J. E., and Eaton, L., 1922, Building reinforced-concrete shaft houses: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 124-134.

- Hayes, A. A., 1862, On the occurrence of massive datolite in the mines of Lake Superior: Boston Society of Natural History Proceedings, v. 8, p. 62-64.
- Hayes, C. W., Bell, R., Adams, F. D., Van Hise, C. R., Lane, A. C., Leith, C. K., and Miller, G., 1905, Report of the special committee for the Lake Superior region pre-Cambrian nomenclature: Journal of Geology, v. 13, no. 2, p. 89-104.
- Hearding, J. H., 1911, Reminiscences of the early days on the Gogebic range Proceedings of the Lake Superior Mining Institute, v. 16, p. 251-257.
- , 1936, Early methods of transporting iron ore in the Lake Superior region: Proceedings of the Lake Superior Mining Institute, v. 29, p. 174-179.
- Heath, G. L., 1901, The testing and control of the product in a modern copper refinery: Proceedings of the Lake Superior Mining Institute, v. 7, p. 68-82.
- Hedgman, C. A., 1992, Provenance and tectonic setting of the Jacobsville Sandstone, from Ironwood to Keweenaw Bay, Michigan, MS: University of Cincinnati, 158 p.
- Hedlund, D. C., 1953, An algal limestone in the Keweenawan of upper Michigan, MS: University of Wisconsin.
- Hegarty, K. A., Folang, S. S., Cook, A. C., Green, P. F., and Duddy, I. R., 2007, Direct measurement of timing: Underpinning a reliable petroleum system model for the Mid-Continent rift system: American Association of Petroleum Geologists Bulletin, v. 91, no. 7, p. 959-979.
- Henderson, F. A., 1971, Petrofabrics of the Nonesuch formation and its relationship to primitive stress directions in the White Pine ore body, MS: Michigan Technological University.
- Henderson, M. A., 2010, A morphological and Geochemical investigation of *Grypania spiralis*: Implications for Early Earth Evolution, MS: The University of Tennessee, 78 p.
- Henrickson, E. L., 1956, A study of the metamorphism of the Upper Huronian rocks of the Western portion of the Marquette District, Northern Peninsula, Michigan, PhD: University of Minnesota, 206 p.
- Henry, S. G., 1976, Paleomagnetism of the upper Keweenawan sediments, the Nonesuch Shale and Freda Sandstone, MS: University of Michigan.
- , 1979, Chemical demagnetization; methods, procedures, and applications through vector analysis: Canadian Journal of Earth Sciences, v. 16, no. 9, p. 1832-1841.
- Henry, S. G., Mauk, F. J., and Van der Voo, R., 1977, Paleomagnetism of the upper Keweenawan sediments; the Nonesuch Shale and Freda Sandstone: Canadian Journal of Earth Sciences, v. 14, no. 5, p. 1128-1138.
- Henwood, W. J., 1871, On the native copper of Lake Superior: Royal Geological Society of Cornwall Transactions, v. 8, p. 385-489.
- Heran, W. D., and Smith, B. D., 1980, Description and preliminary map, airborne electromagnetic survey of parts of Iron, Baraga, and Dickson counties, Michigan: U.S. Geological Survey Open-File Report, v. 80-297.
- Hewitt, D. F., 1965, Precambrian-Paleozoic Contact Relationships in Eastern Ontario, in Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., Guidebook: Geology of Central Ontario, Michigan Basin Geological Society, p. 9-14.
- Hiatt, E. E., Pufahl, P. K., and Edwards, C. T., 2015, Sedimentary phosphate and associated fossil bacteria in a Paleoproterozoic tidal flat in the 1.85 Ga Michigamme Formation, Michigan, USA: Sedimentary Geology, v. 319, no. 0, p. 24-39.
- Hieshima, G. B., 1992, Organic and isotopic geochemical study of the middle Proterozoic Nonesuch Formation, North American Midcontinent Rift, PhD: University of Indiana, 187 p.
- Hieshima, G. B., and Pratt, L. M., 1991, Sulfur/carbon ratios and extractable organic matter of the middle Proterozoic Nonesuch Formation, North American Midcontinent Rift: Precambrian Research, v. 54, no. 1, p. 65-79.

- Higgins, E., 1914a, The safety movement in the Lake Superior iron region: American Institute of Mining Engineers Transactions, v. 50, p. 755-770.
- Higgins, E., 1914b, Ventilation in the iron mines in the Lake Superior district: Proceedings of the Lake Superior Mining Institute, v. 19, p. 154-176.
- Higgins, J. W., 1947, Structural petrology of the Pine Creek Area, Dickinson County, Michigan: Journal of Geology, v. 60, p. 476-489.
- Higgins, J. W., 1948, Structural petrology of the Pine Creek Area, Dickinson County, Michigan, PhD: The University of Chicago, 64 p.
- Hinze, W. J., 1963, Regional gravity and magnetic anomaly maps of the Southern Peninsula of Michigan: Michigan Geological Survey Report of Investigation, v. 1, p. 1-26.
- Hinze, W. J., Allen, D. J., Braile, L. W., and Mariano, J., 1995, The Midcontinent Rift System: An overview, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers, p. 3-5.
- Hinze, W. J., Allen, D. J., Fox, A. J., Sunwood, D., Woelk, T., and Green, A. G., 1992, Geophysical investigations and crustal structure of the North American midcontinent rift system: Tectonophysics, v. 213, p. 17-32.
- Hinze, W. J., Bradley, J. W., and Brown, A. R., 1978, Gravimeter survey in the Michigan Basin deep borehole: Journal of Geophysical Research, v. 83, no. B12, p. 5864-5868.
- Hinze, W. J., Braile, L. W., and Chandler, V. W., 1990, A geophysical profile of the Southern Margin of the midcontinent rift system in Western Lake Superior: Tectonics, v. 9, no. 2, p. 303-310.
- Hinze, W. J., Kellogg, R. L., and Merritt, D. W., 1971, Gravity and Aeromagnetic Anomaly Maps of the Southern Peninsula of Michigan Report of Investigation, v. 14, p. 1-16.
- Hinze, W. J., Kellogg, R. L., and O'Hara, N. W., 1975, Geophysical studies of basement geology of Southern Peninsula of Michigan: American Association of Petroleum Geologists Bulletin, v. 59, no. 9, p. 1562-1584.
- Hinze, W. J., and Kelly, W. C., 1988, Scientific drilling into the Midcontinent Rift System: Eos, Transactions American Geophysical Union, v. 69, no. 51, p. 1649-1657.
- Hinze, W. J., and Merritt, D. W., 1969, Basement Rocks of the Southern Peninsula of Michigan, *in* Stonehouse, H. B., ed., Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society, p. 28-59.
- Hinze, W. J., O'Hara, N. W., Trow, J. W., and Secor, G. B., 1966, Aeromagnetic studies of eastern Lake Superior, The earth beneath the continents, Volume 10, American Geophysical Union, p. 45-110.
- Hinze, W. J., and Wold, R. J., 1982, Lake Superior Geology and tectonics - overview and major unsolved problems, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 273-280.
- Hinze, W. J., Wold, R. J., and O'Hara, N. W., 1982, Gravity and magnetic anomaly studies of Lake Superior, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 203-221.
- Hite, D. M., 1967, Re-examination of the Jacobsville, *in* Ostrom, M. E., and Slaughter, A. E., eds., Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 79-81.
- , 1968, Sedimentology of the Upper Keweenawan sequence of Northern Wisconsin and adjacent Michigan, PhD: The University of Wisconsin - Madison, 236 p.
- Hnat, J. S., van der Pluijm, B. A., and van der Voo, R., 2006, Primary curvature in the Midcontinent Rift: Paleomagnetism of the Portage Lake Volcanics (northern Michigan, USA): Tectonophysics, v. 425, p. 71-82.
- Ho, E. S., and Mauk, J. L., 1996, Relationship between organic matter and copper mineralization in the Proterozoic Nonesuch Formation, northern Michigan: Ore Geology Reviews, v. 11, no. 1-3, p. 71-87.

- Ho, E. S., Meyers, P. A., and Mauk, J. L., 1990, Organic geochemical study of mineralization in the Keweenawan Nonesuch Formation at White Pine, Michigan: *Organic Geochemistry*, v. 16, no. 1-3, p. 229-234.
- Ho, N.-C., Van der Pluijm, B. A., and Peacor, D. R., 2001, Static recrystallization of phyllosilicates: Michigamme Formation, northern Michigan, U.S.A.: *Journal of Structural Geology*, v. 23, p. 887-893.
- Hobbs, W. H., 1895, Mineralogical Notes: *American Journal of Science*, v. 150, no. 296, p. 121-128.
- Hodge, J. T., 1850, On the mineral region of Lake Superior: *American Association for the Advancement of Science Proceedings*, v. 2, p. 301-308.
- Hoering, T. C., 1964, Chemicals from the Nonesuch Shale of Michigan, *Year Book 63, 1963-64: Washington D.C., Carnegie Institute*, p. 262-264.
- , 1976, Molecular fossils from the Precambrian Nonesuch Shale, *Year Book 75, 1975-76: Washington D.C., Carnegie Institute*, p. 806-813.
- Hoffman, G. A., 1950, The correlation by petrographic methods of dikes designated as numbers five and six in the Newport Mine, Ironwood, Michigan, MS: Michigan State University, 44 p.
- Hoffman, M. A., 1987a, The Southern Complex: Geology, geochemistry, mineralogy and mineral chemistry of selected uranium- and thorium-rich granites, PhD: Michigan Technological University, 541 p.
- Hoffman, P. F., 1987b, Early Proterozoic Foredeeps, Foredeep Magmatism, and Superior-Type Iron-Formations of the Canadian Shield, *Proterozoic Lithospheric Evolution, American Geophysical Union*, p. 85-98.
- Hoffman, P. F., 2013, The Great Oxidation Event and a Siderian Snowball Earth: MIF based correlation of paleoproterozoic glaciations: *Chemical Geology*, v. 262, p. 143-156.
- Hoffman, S. M., 1998, Characterization of Heavy Minerals in the Superior, Green Bay, and Lake Michigan Glacial Lobes and reconnaissance Kimberlitic garnet search in Northern Wisconsin, PhD: The Ohio State University, 143 p.
- Holcomb, F. W., 1975, Urban geological map of the eastern half of the City of Houghton, Michigan, MS: Michigan Technological University, 43 p.
- Holden, E. F., 1926, Hematite Inclusions in the Lake Superior Amethyst: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 5, p. 283-285.
- Holm, D. K., Holst, T. B., and Ellis, M., 1988, Oblique subduction, footwall deformation, and imbrication: A model for the Penokean orogeny in east-central Minnesota: *Geological Society of America Bulletin*, v. 100, p. 1811-1818.
- Holm, D. K., Schneider, D., and Coath, C. D., 1998, Age and deformation of Early Proterozoic quartzites in the southern Lake Superior region: Implications for extent of foreland deformation during final assembly of Laurentia: *Geology*, v. 26, p. 907-910.
- Holm, D. K., Schneider, D. A., Rose, S., Mancuso, C., McKenzie, M., Foland, K. A., and Hodges, K. V., 2007, Proterozoic metamorphism and cooling in the southern Lake Superior region, North America and its bearing on crustal evolution: *Precambrian Research*, v. 157, no. 1-4, p. 106-126.
- Holm, D. K., Van Schmus, W. R., MacNeill, L. C., Boerboom, T. J., Schweitzer, D., and Schneider, D., 2005, U-Pb zircon geochronology of Paleoproterozoic plutons from the northern Midcontinent, USA: Evidence for subduction flip and continued convergence after geon 18 Penokean orogenesis: *Geological Society of America Bulletin*, v. 117, p. 259-275.
- Holway, W., 1952, The origin and occurrence of specular hematite (specularite) in the Lower Huronian of the Marquette District, Michigan, MS: Michigan State University, 46 p.
- Hong, S.-M., 1992, Alteration of the Portage Lake Volcanics in the St. Louis mine area near Calumet, Michigan, MS: Michigan Technological University.

- Honnorez, J. J., 1979, Preliminary results of a petrological and geochemical study of the lower metagabbro from the basement of the Michigan Basin: *Journal of Geophysical Research*, v. 84, no. B7, p. 3664-3670.
- Hore, R. E., 1909, In the Michigan Copper Country: *Canadian Mining Journal*, v. 30, p. 421-422.
- , 1912a, The copper-mining industry of Michigan: *Mining World*, v. 36, p. 601-603.
- , 1912b, The copper-mining industry of Michigan: *Mining World*, v. 36, p. 656-658.
- , 1912c, The copper-mining industry of Michigan: *Mining World*, v. 36, p. 707-710.
- , 1912d, The copper-mining industry of Michigan: *Mining World*, v. 36, p. 763-767.
- Horner, W. J., 1958, Paleocurrent studies of the middle and upper Keweenaw conglomerates of Michigan, MS: University of Kansas, 38 p.
- Hornstein, O. M., 1950, A field and petrographic study of some extrusive and sedimentary rocks along the Carp and Little Carp rivers in Ontonagon and Gogebic counties, Michigan, MS: Michigan State University, 55 p.
- Hotchkiss, W. O., 1919a, Geology of the Gogebic range and its relation to recent mining developments: *Engineering Mining Journal*, v. 108, no. 11, p. 443-452.
- , 1919b, Geology of the Gogebic range and its relation to recent mining developments: *Engineering Mining Journal*, v. 108, no. 12, p. 501-507.
- , 1919c, Geology of the Gogebic range and its relation to recent mining developments: *Engineering Mining Journal*, v. 108, no. 13, p. 537-541.
- , 1919d, Geology of the Gogebic range and its relation to recent mining developments: *Engineering Mining Journal*, v. 108, no. 14, p. 577-582.
- , 1923a, Exploration methods on the Gogebic Range: *American Institute of Mining Engineers Transactions*, v. 68, p. 287-293.
- , 1923b, The Lake Superior Geosyncline: *Geological Society of America Bulletin*, v. 34, p. 669-678.
- , 1923c, Recent developments in the geology of the Gogebic range: *Proceedings of the Lake Superior Mining Institute*, v. 23, p. 47-55.
- , 1925, The Lake Superior Geosyncline: *Proceedings of the Lake Superior Mining Institute*, v. 24, p. 140-148.
- , 1933a, The Gogebic Range, *in* Hotchkiss, W. O., ed., *Lake Superior Region, Volume 23*: Washington, D. C., U.S. Government, p. 49-59.
- , 1933b, Lake Superior Region prepared under direction of W. O. Hotchkiss: *International Geological Congress, 16th Session Guidebook*, v. 27, 101 p.
- Hotchkiss, W. O., Fisher, J., and Rooney, W. J., 1929, Earth-resistivity measurements in the Lake Superior copper country: *American Institute of Mining Engineers Transactions*, v. 82, p. 51-67.
- Hotchkiss, W. O., and Ingersoll, L. R., 1934, Post-glacial time calculations from recent geothermal measurements in the Calumet copper mines: *Journal of Geology*, v. 42, no. 2, p. 113-122.
- Houghton, D., 1841, Remarks on the metalliferous veins of the Northern Peninsula of Michigan, presented before the Assoc. Am. Geol., 1841: *American Journal of Science*, v. 41, p. 183-186.
- , 1843a, Remarks on the metalliferous veins of the Northern Peninsula of Michigan, presented before the Assoc. Am. Geol., 1841: *Association of American Geologists and Naturalists Report*, p. 35-38.
- , 1843b, *Sixth Annual Report of the State Geologist 1843*: Senate, v. 8.
- Houghton, J., Jr., 1846, *The mineral region of Lake Superior*, Buffalo, Oliver G. Steele, 191 p.:
- , 1879, The ancient copper mines of Lake Superior: *Wisconsin State Historical Society Collections*, v. 8, p. 140-151.
- Hovey, E. O., 1893, An analcite copper boulder from the Keweenaw Range, Michigan: *Science*, v. 22, p. 93-93.

- Hoy, L. D., and Ohmoto, H., 1989, Constraints for the genesis of redbed-associated stratiform Cu deposits from sulphur and carbon mass-balance relations, *in* Boyle, R. W., Brown, A. C., Jefferson, C. W., Jowett, E. C., and Kirkham, R. V., eds., Sediment-hosted stratiform copper deposits, Volume 36, Geological Association of Canada, p. 135-149.
- Hubbard, H. A., 1971a, Bedrock geology of the Porcupine Mountains, Michigan, scale 1:62,500.
- , 1972, Sources of pebbles of volcanic rocks in the middle and upper Keweenaw conglomerate of northern Michigan: *Journal of Geology*, v. 80, p. 627-629.
- , 1975a, Geologic map and section of the Little Girl Point, North Ironwood and the northern part of the Ironwood Quadrangles, Michigan, scale 1:62,500.
- , 1975b, Geology of Porcupine Mountains in Carp River and White Pine Quadrangles, Michigan: *U. S. Geological Survey Journal of Research*, v. 3, p. 519-528.
- , 1975c, Keweenaw geology of the North Ironwood, Ironwood and Little Girls Point quadrangles, Gogebic County, Michigan: *U.S. Geological Survey Open-File Report*, v. 75-152, p. 1-23.
- , 1975d, Lower Keweenaw Volcanic rocks of Michigan and Wisconsin: *U. S. Geological Survey Journal of Research*, v. 3, p. 529-541.
- Hubbard, L., 1894, Two new geological cross-sections of Keweenaw Point: *Proceedings of the Lake Superior Mining Institute*, v. 2, p. 79-96.
- , 1895, The relation of vein at the Central Mine, Keweenaw Point to the Kearsarge Conglomerate: *Proceedings of the Lake Superior Mining Institute*, v. 3, p. 74-83.
- , 1898, Keweenaw Point, with particular reference to the felsites and their associated rocks: *Michigan Geological Survey*, v. 6, no. II, p. 1-155.
- , 1901, Work of the Geological Survey in the Upper Peninsula: *Michigan Miner*, v. 3, no. 3, p. 9-9.
- , 1912a, Foot wall shafts in Lake Superior Mines: *Proceedings of the Lake Superior Mining Institute*, v. 17, p. 144-161.
- , 1912b, In the Lake Superior area what influence, if any, did the thickness and contour of foot wall beds have upon the subsequent deposition and distribution of copper in overlying beds?: *Proceedings of the Lake Superior Mining Institute*, v. 17, p. 227-237.
- Hubbard, T. P., 1971b, An investigation of the Keweenaw magnetic field intensity using regionally hydrothermally altered lavas, PhD: University of Liverpool.
- Huber, N. K., 1956, The environmental control of sedimentary iron minerals and its relation to the origin of the Ironwood iron formation, PhD: Northwestern University.
- , 1959, Some aspects of the origin of the Ironwood iron-formation of Michigan and Wisconsin: *Economic Geology*, v. 54, no. 1, p. 82-118.
- Huber, N. K., 1969, Pink copper-bearing prehnite from Isle Royale National Park, Michigan: *U.S. Geological Survey Professional Paper*, v. 650-D, p. D63-D68.
- , 1971, Pink copper-bearing prehnite from Isle Royale National Park, Michigan: *Earth Science*, v. 24, no. 1, p. 9-14.
- , 1973a, Geologic map of Isle Royale National Park, Keweenaw County, Michigan, scale 1:62,500.
- , 1973b, The Portage Lake Volcanics (middle Keweenaw) on Isle Royale, Michigan: *U.S. Geological Survey Professional Paper*, v. 754-C, p. 1-32.
- , 1975, The geologic story of Isle Royale National Park: *U.S. Geological Survey Bulletin*, v. 1309, p. 1-66.
- Hulst, H. T., 1936, Brief history of some of the abandoned mines of the Marquette iron range: *Proceedings of the Lake Superior Mining Institute*, v. 29, p. 168-173.
- Hulst, H. T., Jackson, G. R., and Siebenthal, W. A., 1914, Mining methods on the Marquette range: *Proceedings of the Lake Superior Mining Institute*, v. 19, p. 131-141.
- Hulst, N. P., 1893, The geology of that portion of the Menominee Range east of Menominee River: *Proceedings of the Lake Superior Mining Institute*, v. 1, p. 19-29.

- , 1894, President's address: Proceedings of the Lake Superior Mining Institute, v. 2, p. 11-22.
- , 1902, Moisture in Lake Superior iron ores: Proceedings of the Lake Superior Mining Institute, v. 8, p. 21-32.
- Hultman, J. R., 1953, The Cambrian Sandstone, Marquette Quadrangle, Michigan, MS: University of Michigan, 27 p.
- Hunt, H. B., 1952, A regional magnetometer survey of the Pinckney area, Michigan, MS: University of Michigan.
- Hunt, T. S., 1873, The geognostical history of metals: Transactions of the Institute of Mining Engineers, v. 1, p. 33-345.
- Hutchinson, D. R., Lee, M. W., Behrendt, J., Cannon, W. F., and Green, A. G., 1992, Variations in the reflectivity of the moho transition zone beneath the Midcontinent Rift System of North America: Results from true amplitude analysis of GLIMPCE data: Journal of Geophysical Research: Solid Earth, v. 97, no. B4, p. 4721-4737.
- Hutchinson, D. R., White, R. S., Cannon, W. F., and Schulz, K. J., 1990, Keweenaw hot spot: Geophysical evidence for a 1.1 GA mantle plume beneath the midcontinent rift system: Journal of Geophysical Research, v. 95, no. B7, p. 10869-10884.
- Imbus, S. W., 1990, Organic petrologic and geochemical studies on the Oronto Group Nonesuch Formation (middle Proterozoic) of the Midcontinent Rift system, northern Wisconsin and Upper Peninsula Michigan, PhD: University of Oklahoma, 393 p.
- Imbus, S. W., Engel, M. H., and Elmore, R. D., 1990, Organic geochemistry and sedimentology of middle Proterozoic Nonesuch Formation; hydrocarbon source rock assessment of a lacustrine rift deposit, *in* Katz, B. J., ed., AAPG Memoir, Volume 50: Tulsa, OK, United States (USA), American Association of Petroleum Geologists, Tulsa, OK, p. 197-208.
- Imbus, S. W., Engel, M. H., Elmore, R. D., and Zumberge, J. E., 1988, The origin, distribution and hydrocarbon generation potential of organic-rich facies in the Nonesuch Formation, central North American Rift system; a regional study: Organic Geochemistry, v. 13, no. 1-3, p. 207-219.
- Imbus, S. W., Macko, S. A., Elmore, R. D., and Engel, M. H., 1992, Stable isotope (C, S, N) and molecular studies on the Precambrian Nonesuch Shale (Wisconsin-Michigan, U.S.A.): Evidence for differential preservation rates, depositional environment and hydrothermal influence: Chemical Geology, v. 101, p. 255-281.
- Irving, R. D., 1874, On the age of copper-bearing rocks of Lake Superior and on the westward continuation of the Lake Superior synclinal: American Journal of Science, v. 108, no. 43, p. 46-56.
- , 1879, Notes on the stratigraphy of the Huronian series of northern Wisconsin and on the equivalency of the Huronian of the Marquette and Penokee districts: American Journal of Science, v. 117, no. 101, p. 393-398.
- , 1883, The copper-bearing rocks of Lake Superior: U.S. Geological Survey Monograph, v. 5, p. 1-464.
- , 1885a, Divisibility of the Archean in the northwest: American Journal of Science, v. 129, no. 171, p. 237-249.
- , 1885b, Preliminary paper on an investigation of Archean formations of the Northwestern States: U.S. Geological Survey, Annual Report, v. 5, p. 175-242.
- , 1886a, Origin of the ferruginous schists and iron ores of the Lake Superior region: Engineering Mining Journal, v. 42, p. 347-349.
- , 1886b, Origin of the ferruginous schists and iron ores of the Lake Superior region: American Journal of Science, v. 132, no. 190, p. 255-272.
- , 1887a, Is there a Huronian Group?: American Journal of Science, v. 134, no. 201, p. 204-216.
- , 1887b, Is there a Huronian Group?: American Journal of Science, v. 134, no. 202, p. 249-263.
- , 1887c, Is there a Huronian Group?: American Journal of Science, v. 134, no. 203, p. 365-374.

- Irving, R. D., Chamberlin, R. T., and Van Hise, C. R., 1888, The Crystalline Schists of the Lake Superior District, *Congres Geologique International: Londres*, p. 92-105.
- Irving, R. D., and Chamberlin, T. C., 1885, Observations on the junction between the eastern sandstone and the Keweenaw series on Keweenaw Point, Lake Superior: U.S. Geological Survey Bulletin, v. 23, p. 1-124.
- , 1888, Observations on the junction between the eastern sandstone and the Keweenaw series on Keweenaw Point, Lake Superior: *American Geologist*, v. 1, no. 1, p. 44-57.
- , 1891, The crystalline schists of the Lake Superior District: *Comptes rendus*, p. 156-170.
- Irving, R. D., and Van Hise, C. R., 1892, The Penokee iron-bearing series of Michigan and Wisconsin: U.S. Geological Survey Monograph, v. 19, p. 1-534.
- Ives, R. E., 1915, Finding the Judson Ore body iron deposits near Crystal Falls: *Engineering Mining Journal*, v. 99, p. 443-445.
- Jackson, C. T., 1844, On minerals from Keweenaw Point, Lake Superior: *Proceedings of the Boston Society of Natural History*, v. 1, p. 203-203.
- , 1845a, On the copper and silver of Keweenaw Point, Lake Superior: *American Journal of Science*, v. 49, no. 1, p. 81-93.
- , 1845b, On the copper and silver of Keweenaw Point, Lake Superior: *Association of American Geologists and Naturalists Report*, v. 6, p. 53-61.
- , 1845c, Sur le gisement de cuivre et d'argent natifs des bords du lac Supérieur: *Academie des sciences, Comptes rendus*, v. 20, p. 593-595.
- , 1846, Ores and minerals of Lake Superior: *American Journal of Science*, v. 52, no. 4, p. 118-119.
- , 1848, On the copper and silver ores of the Lake Superior region: *Boston Society of Natural History Proceedings*, v. 2, p. 57-58.
- , 1849, Copper of the Lake Superior region: *American Journal of Science*, v. 57, no. 20, p. 286-287.
- , 1850a, On the geological structure of Keweenaw Point: *American Journal of Science*, v. 60, no. 28, p. 65-77.
- , 1850b, On the geological structure of Keweenaw Point: *Annales des mines, Paris*, v. 4, no. 17, p. 103-115.
- , 1850c, On the geological structure of Keweenaw Point: *American Association for the Advancement of Science Proceedings*, v. 2, p. 288-301.
- , 1850d, Remarks on the geology, mineralogy and mines of Lake Superior: *American Association for the Advancement of Science Proceedings*, v. 2, p. 283-287.
- , 1850e, Remarks on the geology, mineralogy and mines of Lake Superior: *Societe geologique de France Bulletin*, v. 2, no. 7, p. 667-673.
- , 1851a, Analyses of pitchstone porphyry from Isle Royale and a crystal of phosphate of lime from Hurdstown, New Jersey: *American Journal of Science*, v. 61, no. 33, p. 401-403.
- , 1851b, Notes on the Lake Superior Region: *Boston Society of Natural History Proceedings*, v. 3, p. 76-77, 228.
- , 1853, Über der Metall-führenden Distrikt am Oberen See in Staate Michigan: *Archiv für Mineralogie, Geognosie, Bergbau, und Hüttenkunde*, v. 25, p. 656-667.
- , 1854a, Analyses of pitchstone porphyry from Isle Royale and a crystal of phosphate of lime from Hurdstown, New Jersey: *Boston Society of Natural History Proceedings*, v. 4, p. 39-41.
- , 1854b, Observations sur quelques mines des États-Unis et sur le grès rouge du lac Supérieur: *Academie des sciences, Comptes rendus*, v. 39, p. 803-807.
- , 1856, On copper deposits, Lake Superior region: *Boston Society of Natural History Proceedings*, v. 5, p. 280-281.
- , 1861a, A discussion, on the age of the red sandstones of Perry, Maine, Nova Scotia, and Keweenaw Point: *Boston Society of Natural History Proceedings*, v. 7, p. 396-398.

- , 1861b, On the genesis of the native copper and silver of Lake Superior: Boston Society of Natural History Proceedings, v. 7, p. 31-31.
- , 1862, A communication, On domeykite from the vicinity of Portage Lake, Lake Superior Region: Boston Society of Natural History Proceedings, v. 8, p. 258-258.
- , 1869, Sur les mine de cuivre du lac Supérieur et sur un nouveau gisement d'étain dans l'État du Maine: Academie des sciences, Comptes rendus, v. 69, p. 1082-1083.
- Jackson, J. F., 1903, Copper mining in Upper Michigan: a description of the region, mines and some methods and machinery used: Mines and Minerals, v. 23, p. 535-540.
- , 1907, Five years of progress in the Lake Superior copper country: Proceedings of the Lake Superior Mining Institute, v. 12, p. 143-153.
- Jackson, K. C., 1950, A heavy mineral study of the Ajibik and Mesnard quartzites of Marquette County, Michigan, MS: Michigan College of Mining and Technology, 11 p.
- Jacobsen, S. I., 1978, Geochemistry of peat bogs over different bedrock types Houghton County, Michigan, MS: Michigan Technological University.
- James, H. L., 1951, Iron formation and associated rocks in the Iron River District, Michigan: Geological Society of America Bulletin, v. 62, p. 251-266.
- James, H. L., 1953, Origin of the soft iron ores of Michigan: Economic Geology, v. 48, no. 8, p. 726-728.
- James, H. L., 1954, Sedimentary Facies of Iron-formation: Economic Geology, v. 49, p. 235-293.
- , 1955, Zones of regional metamorphism in the Precambrian of Northern Michigan: Geological Society of America Bulletin, v. 66, p. 1455-1488.
- , 1958, Stratigraphy of pre-Keweenaw rocks in parts of Northern Michigan: U.S. Geological Survey Professional Paper, v. 314-C, p. 27-44.
- James, H. L., Clark, L. D., Lamey, C. A., and Pettijohn, F. J., 1961, Geology of central Dickinson County, Michigan: U.S. Geological Survey Professional Paper, v. 310, p. 1-171.
- James, H. L., Clark, L. D., and Smith, L. E., 1947, Magnetic Survey and geology of the Ice Lake-Chicagon Creek area, Iron County, Michigan: U.S. Geological Survey, Strategic Mineral Investigations, Preliminary Report, v. 3-213, p. 1-11.
- James, H. L., and Dutton, C. E., 1951, Geology of the northern part of the Iron River district, Iron County, Michigan: U.S. Geological Survey Circular, v. 120, p. 1-12.
- James, H. L., Dutton, C. E., Pettijohn, F. J., and Wier, K. L., 1968, Geology and ore deposits of the Iron River-Crystal Falls district, Iron County, Michigan: U.S. Geological Survey Professional Paper, v. 510, p. 1-127.
- James, H. L., Dutton, C. E., and Wier, K. L., 1967, Geologic and Magnetic Data for Northern Iron River Area, Michigan, Michigan Geological Survey Report of Investigation, v. 4, 46 p.
- , 1970, Geologic and Magnetic Data between Iron River and Crystal Falls, Michigan.
- James, H. L., and Wier, K. L., 1948, Magnetic survey and geology of the eastern and southeastern parts of the Iron River district, Iron County, Michigan: U.S. Geological Survey Circular, v. 26, 18 p.
- , 1969, Geologic and Magnetic Data for southeastern Iron River Area, Michigan, Michigan Geological Survey Report of Investigation, v. 6, 30 p.
- Jamison, K., 1947, Mines of the Porcupine Mountains: Michigan Conservation, v. 16, no. 3, p. 6, 13.
- Janke, N. C., 1970, Intrusive sandstone dykes in the Siamo slate near Negaunee, Michigan; discussion: Geological Society of America Bulletin, v. 81, no. 10, p. 3179-3180.
- Johns, R. B., Belsky, T., McGarthy, E. D., Burlingame, A. L., Haug, P., Schoes, H. K., Richter, W., and Calvin, M., 1966, The organic geochemistry of ancient sediments - Part II: Geochimica et Cosmochimica Acta, v. 30, p. 1191-1222.

- Johnson, A. M., 1967, Some chemical and physical-chemical properties of Michigan cherts, MS: Michigan Technological University.
- , 1994, Part 5 - Lessons from mining case histories, West Menominee Range, Michigan, 40th Annual Meeting of the Institute on Lake Superior Geology, 68 p.:
- Johnson, C. A., 1977a, Uranium and thorium occurrences in Precambrian rocks, Upper Peninsula of Michigan, MS: Michigan Technological University.
- Johnson, D. J., 1975, Petrology of a portion of the Hemlock Formation, Iron County, Michigan, MS: Michigan Technological University.
- Johnson, D. L., 1988, Geotechnical characterization of Keweenaw copper sulfides for in-situ solution mining, MS: Michigan Technological University.
- Johnson, D. W., 1977b, Geophysical investigations of subsidence in mines near Iron River, Michigan, MS: Michigan Technological University.
- Johnson, R. C., 1987, Geology and Precious Metal Mineralization of the Silver Creek to Island Lake Area, Marquette County, Michigan, MS: Michigan Technological University.
- , 1993, Stratigraphic, structural, tectonic and economic studies of the Archean Ishpeming greenstone belt, Marquette County, Michigan, PhD: Michigan Technological University, 133 p.
- Johnson, R. C., and Bornhorst, T. J., 1999, Geologic Field Excursion to the Ishpeming Greenstone Belt, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 45-56.
- Johnson, R. C., Bornhorst, T. J., and Van Alstine, J. L., 1987, Geologic Setting of precious metal mineralization in the Silver Creek to Island Lake Area, Marquette County, Michigan: Michigan Geological Survey Open File Report, v. 87-4.
- Johnson, R. C., Scott, G. W., Kangas, W., and Brozdowski, R. A., 1991, Guidebook to the Precambrian Geology and Metallogeny of the Central Upper Peninsula of Michigan, Michigan Basin Geological Society.
- Johnson, R. F., 1968, Bedrock geology of the Matchwood Quadrangle, Michigan, scale 1:62,500.
- Johnson, R. F., and White, W. S., 1969, Preliminary report on the bedrock geology and copper deposits of the Matchwood quadrangle, Ontonagon County, Michigan: U.S. Geological Survey Open-File Report, p. 1-29.
- Johnson, R. L., 1973a, Petrology, pebble morphology and origin of the Outer Conglomerate (Upper Member), Copper Harbor Conglomerate, Keweenaw Peninsula, Michigan, MS: Michigan Technological University.
- Johnson, W. J., 1973b, Application of geophysical exploration techniques to a site investigation at the Houghton County Memorial Airport, Houghton, Michigan, MS: Michigan Technological University.
- Johnston, R. H., and Bornhorst, T. J., 1991, Archean geology of the northern block of the Ishpeming greenstone belt, Marquette County, Michigan: U. S. Geological Survey Bulletin, v. 1904-F, p. 1-20.
- Jolly, W. T., 1974, Behavior of Cu, Zn, and Ni during prehnite-pumpellyite rank metamorphism of the Keweenawan basalts, Northern Michigan: Economic Geology, v. 69, p. 1118-1125.
- Jolly, W. T., and Smith, R. E., 1972, Degradation and metamorphic differentiation of the Keweenawan tholeiitic lavas of Northern Michigan, U.S.A.: Journal of Petrology, v. 13, p. 273-309.
- Jones, J. T., 1905, Unwatering the Hamilton Mine: Engineering Mining Journal, v. 80, p. 867-868.
- , 1906, Unwatering the Hamilton Mine and Ludington Mines: Proceedings of the Lake Superior Mining Institute, v. 11, p. 139-145.

- Joplin, J. E., 1926, Charcoal furnaces of Michigan: Proceedings of the Lake Superior Mining Institute, v. 25, p. 249-251.
- Jopling, J. E., 1898, The Marquette Range - its discovery, development and resources: American Institute of Mining Engineers Transactions, v. 27, p. 541-555.
- , 1925, Personal experiences as mining engineer in the Marquette district: Proceedings of the Lake Superior Mining Institute, v. 24, p. 335-342.
- Joralemon, I. B., 1959, The White Pine copper deposit; discussion: Economic Geology, v. 54, no. 6, p. 1127-1127.
- , 1963, Vein-wall rock relationships, White Pine Mine: Economic Geology, v. 59, p. 160-161.
- , 1968, Environment of generation of some base metal ore deposits: Economic Geology, v. 63, p. 846-847.
- Jost, M., 1968a, Microfossils of problematic systematic position from Precambrian rocks at White Pine, Michigan: Micropaleontology, v. 14, no. 3, p. 365-368.
- , 1968b, The White Pine copper district: Mineralogical investigation and genetic interpretation, PhD: Johannes Gutenberg University, 78 p.
- Joy, C. A., 1867, Examination of a few American minerals: Lyceum of Natural History of New York. Proceedings, v. 8, p. 120-125.
- Juillard, J. D., 1965, Mineralization of the Mount Bohemia intrusive, Keweenaw County, Michigan, MS: Michigan Technological University.
- Julien, A. A., 1900, Note on a feldspar from the Calumet copper mine, Keweenaw Point, Michigan: New York Academy of Science Annals, v. 12, no. 15, p. 650-654.
- Kalliokoski, G. J., 1988a, Jacobsville Sandstone, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan, Michigan Basin Geological Society, p. 127-136.
- , 1988b, Keweenawan-age Caliche and Vadose Carbonate in Rocks of Michigan's Upper Peninsula, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan, Michigan Basin Geological Society, p. 75-76.
- Kalliokoski, G. J., and Lynott, J. S., 1987, Huron River: Precambrian unconformities and alteration at and near Big Eric's Crossing, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 273-276.
- Kalliokoski, J., 1975, Chemistry and mineralogy of Precambrian paleosols in Northern Michigan: Geological Society of America Bulletin, v. 86, no. 3, p. 371-376.
- , 1976, Uranium and Thorium Occurrences in Precambrian Rocks, Upper Peninsula of Michigan and Northern Wisconsin, With thoughts on Other Possible Settings: U.S. Energy Research and Development Administration, AT(05-1)-1651.
- , 1978, The unconformity-type Proterozoic pitchblende ore body model and its application to northern Michigan, 1977 NURE Uranium Geology Symposium: Grand Junction, Bendix Field Engineering Corporation, p. 231-236.
- , 1979, Paleogeography of the Jacobsville Sandstone, Michigan: U.S. Geological Survey Professional Paper, v. 1150, p. 1-38.
- , 1982, Jacobsville Sandstone, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 147-155.
- , 1986, Calcium carbonate cement (caliche) in Keweenawan sedimentary rocks (~1.1 Ga), Upper Peninsula of Michigan: Precambrian Research, v. 32, no. 2-3, p. 243-259.
- Kalliokoski, J., and Welch, E. J., 1985, Keweenawan age caliche paleosol in the Lower part of the Calumet and Hecla Conglomerate, Centennial Mine, Calumet, Michigan: Geological Society of America Bulletin, v. 96, no. 9, p. 1188-1193.

- Kaminski, E., and Jaupart, C., 2000, Lithosphere structure beneath the Phanerozoic intracratonic basins of North America: *Earth and Planetary Science Letters*, v. 178, no. 1–2, p. 139-149.
- Kantor, J. A., 1969, Assimilation and dike swarms in the Sugarloaf Mountain area, Marquette County, Michigan, MS: Michigan Technological University, 83 p.
- Kappmeyer, J., 1982, Quartz deformation in the Marquette and Republic Troughs, Upper Peninsula of Michigan, MS: University of Michigan.
- Kappmeyer, J., and Wiltchko, D. V., 1984, Quartz deformation in the Marquette and Republic troughs, Upper Peninsula of Michigan: *Canadian Journal of Earth Sciences*, v. 21, no. 7, p. 793-801.
- Karpiak, S., 1978, The Establishment of the Porcupine Mountains State Park: *Michigan Academician*, v. 11, no. 1, p. 75-83.
- Keys, R. R., and Lightfoot, P. C., 2015, Geochemical Stratigraphy of the Keweenaw Midcontinent Rift Volcanic Rocks with Regional Implications for the Genesis of Associated Ni, Cu, Co, and Platinum Group Element Sulfide Mineralization: *Economic Geology*, v. 110, p. 1235-1267.
- Keck, W. E., Eggleston, G. C., and Lowery, W. W., 1939, A study of the floatative properties of Hematite: *American Institute of Mining Engineers Transactions*, v. 134, p. 102-128.
- Keck, W. E., and Jasberg, P., 1939, A study of the floatative properties of magnetite: *American Institute of Mining Engineers Transactions*, v. 134, p. 129-145.
- Keller, G. R., Lidiak, E. G., Hinze, W. J., and Braile, L. W., 1983, The role of rifting in the tectonic development of the midcontinent, U.S.A.: *Tectonophysics*, v. 94, p. 391-412.
- Kelley, G. M., 1974, Audio-frequency magnetotelluric survey in Marquette County and Baraga County, Michigan, MS: Michigan Technological University.
- Kellogg, R. L., 1971, An aeromagnetic investigation of the Southern Peninsula of Michigan, PhD: Michigan State University, 172 p.
- Kelly, W., 1898, A mine-dam: *American Institute of Mining Engineers Transactions*, v. 27, p. 400-404.
- , 1900, Address of President William Kelly [a discussion of the mining industry]: *Proceedings of the Lake Superior Mining Institute*, v. 6, p. 13-22.
- Kelly, W., and Armstrong, F. U., 1914, Use of electricity at the Penn and Republic Iron Mines: *American Institute of Mining Engineers Transactions*, v. 48, p. 262-294.
- Kelly, W. C., and Nishioka, G. K., 1985, Precambrian oil inclusions in late veins and the role of hydrocarbons in copper mineralization at White Pine, Michigan: *Geology*, v. 13, no. 5, p. 334-337.
- Kelly, W. C., Rye, R. O., and Livnat, A., 1986, Saline minewaters of the Keweenaw Peninsula, northern Michigan: Their nature, origin, and relation to similar deep waters in Precambrian crystalline rocks of the Canadian Shield: *American Journal of Science*, v. 286, p. 281-308.
- Kemp, C. E., 1949, Geiger counter reconnaissance in Upper Michigan, 1948, Conference on Radioactive Ores, May 6, 1949, p. 25-26.
- , 1966, Regional Geology of the Sault Ste. Marie Area, *Proceedings of the Twelfth Annual Institute on Lake Superior Geology Guidebook*, Institute on Lake Superior Geology, p. 1-11.
- Kennedy, A. D., 1951, Study of the amenability of certain iron ores of the Marquette range to concentration by froth flotation with petroleum sulfonate and fuel oil, MS: Michigan College of Mining and Technology.
- Kennedy, B. E., 1949, A guide to Uranium prospectors in Michigan [revised]: *Geological Survey Division*, p. 1-20.
- Kerman, C. E., 1962, The application of the radio field intensity methods to mapping precambrian structures in the Lake Superior region, MS: Michigan State University.

- Keyes, C. R., 1923, American copper mining in the Stone Age: *The Pan American Geologist*, v. 40, no. 2, p. 158-160.
- Kim, K., and Smith, C. C., 1980, Hydraulic fracturing stress measurements near the Keweenaw Fault in upper Michigan, *in* De Lory, F. A., ed., 13th Canadian rock mechanics symposium (the H. R. Rice memorial symposium), Volume 22: Toronto, Canadian Institute of Mining and Metallurgy, p. 24-30.
- Kimball, J. P., 1865, On the iron ores of Marquette, Michigan: *American Journal of Science*, v. 89, no. 117, p. 290-303.
- King, E. R., 1975, A typical cross section based on magnetic data of Lower and Middle Keweenawan Volcanic Rocks, Ironwood Area, Michigan: *Journal of Research of the US Geological Survey*, v. 3, no. 5, p. 543-546.
- Kinny, P. D., Compston, W., and Williams, I. S., 1991, A reconnaissance ion-probe study of hafnium isotopes in zircons: *Geochimica et Cosmochimica Acta*, v. 55, no. 3, p. 849-859.
- Klasner, J. S., 1972, Style and sequence of deformation and associated metamorphism due the Penokean orogeny in the Western Marquette Range, Northern Michigan, PhD: Michigan Technological University, 196 p.
- Klasner, J. S., 1978, Penokean deformation and associated metamorphism in Western Marquette Range, Northern Michigan: *Geological Society of America Bulletin*, v. 89, no. 5, p. 711-722.
- Klasner, J. S., Cannon, W. F., and Brock, M., 1979a, Bedrock geologic map of parts of the Baraga, Dead River, and Clark Basins, Marquette County Michigan, scale 1:62,500.
- Klasner, J. S., Cannon, W. F., and Van Schmus, W. R., 1982, The pre-Keweenawan tectonic history of southern Canadian Shield and its influence on formation of the Midcontinent Rift, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 27-46.
- Klasner, J. S., and Jones, W. J., 1979, Simple Bouguer gravity anomaly map and geologic interpretation; Iron River 1° by 2° quadrangle, northern Michigan and Wisconsin: U.S. Geological Survey Open-File Report, v. OFR 79-1564.
- Klasner, J. S., King, E. R., and Jones, W. J., 1985, Geologic interpretation of gravity and magnetic data for northern Michigan and Wisconsin, *in* Hinze, W. J., ed., *The utility of regional gravity and magnetic anomaly maps*, Society of Exploration Geophysicists, p. 267-286.
- Klasner, J. S., Sims, P. K., Gregg, W. J., and Gallup, C., 1988, A structural traverse across a part of the Penokean Orogen illustrating Early Proterozoic overthrusting in Northern Michigan: Text and Field Guide, *in* Schulz, K. J., ed., 34th Annual Institute on Lake Superior Geology Field Trip Guidebook, Volume 34, p. C1-C35.
- Klasner, J. S., Snider, D. W., Cannon, W. F., and Slack, J. F., 1979b, The Yellow Dog Peridotite and a possible buried igneous complex of Lower Keweenawan age in the northern Peninsula of Michigan: State of Michigan Geological Survey Division Report of Investigation, v. 24, p. 1-31.
- Klein, C., 2005, Some Precambrian banded iron-formations (BIFs) from around the world; their age, geologic setting, mineralogy, metamorphism, geochemistry, and origins: *American Mineralogist*, v. 90, no. 10, p. 1473-1499.
- Klein, I., 1939, Microcline in the Native Copper Deposits of Michigan: *American Mineralogist*, v. 24, p. 643-650.
- Klewin, K. W., 1989, Polybaric fractionation in an evolving continental rift: Evidence from the Keweenawan mid-continent rift: *Journal of Geology*, v. 97, p. 65-76.
- Klewin, K. W., and Berg, J. H., 1991, Petrology of the Keweenawan Mamainse Point lavas, Ontario: Petrogenesis and continental rift evolution: *Journal of Geophysical Research*, v. 96, no. B1, p. 457-474.

- Klewin, K. W., and Shirey, S. B., 1992, The igneous petrology and magmatic evolution of the Midcontinent rift system: *Tectonophysics*, v. 213, p. 33-40.
- Knoll, W. A., 1940, Shaft sinking on the Gogebic iron range: *American Institute of Mining Engineers Transactions*, v. 141, p. 128-145.
- Knowlton, F. G., 1946, Drift or float copper: *Rocks and Minerals*, v. 21, no. 8, p. 491-492.
- Koch, F. K. L., 1851a, Copper and iron ores near Lake Superior: *Deutsche geologische Gesellschaft, Zeitschrift*, v. 3, p. 355-358.
- , 1851b, Die Mineralgegenden der Vereinigten Staaten Nord-Amerikas am Lake Superior, Göttingen, 72 p.:
- , 1852, Die Mineral-Regionen der obern Halbinsel Michigan's am Lake Superior und die Isle Royale, Göttingen, Göttingischer Verein bergmannischer Freunde, Studien, 248 p.:
- Koenig, G. A., 1900, On mohawkite, stibio-domeykite, domeykite, algodonite and some artificial copper-arsenides: *American Journal of Science*, v. 160, no. 60, p. 439-448.
- , 1901a, The crystallization of mohawkite, domeykite and other similar arsenides: *Proceedings of the Lake Superior Mining Institute*, v. 7, p. 62-64.
- , 1901b, On mohawkite, stibio-domeykite, domeykite, algodonite and some artificial copper-arsenides: *Zeitschrift fuer Krystallographie*, v. 34, p. 67-77.
- , 1902, On the new species melanochaleite and kweenawite; with notes on some other known species: *American Journal of Science*, v. 164, no. 84, p. 404-416.
- Koenig, G. A., and Hubbard, L. L., 1893, On powellite from a new locality: *American Journal of Science*, v. 146, no. 275, p. 356-358.
- , 1894, On powellite from a new locality: *Zeitschrift fuer Krystallographie und Mineralogie*, v. 34, p. 463-466.
- Koepel, E., 1929a, The annual production of copper and the yearly average price of copper: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 147-149.
- Koepel, E., 1929b, Copper concentrating practice on amygdaloid rock at the Champion Copper Company's stamp mill: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 112-130.
- Koepel, E., 1930, The annual production of copper and the yearly average price of copper: *Proceedings of the Lake Superior Mining Institute*, v. 28, p. 220-222.
- Kohn, C. F., and Specht, R. E., 1958, The mining of taconite, Lake Superior Iron Mining District: *Geographical Review*, v. 48, p. 528-539.
- Kopydlowski, P. J., 1983, Oak Bluff Volcanics : a middle Keweenawan Central volcano; Porcupine Mountains Region, Michigan, MS: Michigan Technological University, 88 p.
- Kraskovsky, S. A., 1935, Geotermicheskie ezmereniya v mednykh rudnikakh u verhnego Ozera: *Priroda Akademii Nauk, USSR*, v. 5, p. 18-21.
- Kraus, E. H., 1924, Some unusual specimens of "float" copper: *American Mineralogist*, v. 9, no. 2, p. 23-26.
- Kraus, E. H., Seaman, W. A., and Slawson, C. B., 1930, Seamanite, a new manganese phosphoborate from Iron County, Michigan: *American Mineralogist*, v. 15, no. 6, p. 220-225.
- Krause, D. J., 1992, The making of a mining district: Keweenawan Native Copper 1500-1870, Detroit, Wayne State University Press, 297 p.:
- Krimmel, C. P., 1941, The serpentinite of Presque Isle, Marquette County, Michigan, MS: Northwestern University, 62 p.
- Kulakov, E., 2013, Field Trip 3: Geology of Silver Mountain, Houghton County, Michigan, *in* Bornhorst, T. J., and Barron, R. J., eds., 59th Annual Meeting of the Institute on Lake Superior Geology, Volume 59, p. 59-67.
- Kulakov, E. V., 2014, Properties of the proterozoic geomagnetic field and geological applications of paleomagnetic data from rocks of the North American Midcontinent rift, PhD: Michigan Technological University.

- Kuroda, P. K., and Sandell, E. B., 1954, Geochemistry of molybdenum: *Geochimica et Cosmochimica Acta*, v. 6, no. 1, p. 35-63.
- Kustra, C. R., 1961, Manganese-bearing minerals at the Cannon mine, Iron River, Michigan, MS: Michigan College of Mining and Technology.
- La Point, R. S., 1965, A mineralogical study of certain ores from four mines of the Iron River district, Michigan, MS: Michigan Technological University.
- LaBerge, G. L., 1964, Development of magnetite in iron-formations of the Lake Superior Region: *Economic Geology*, v. 59, p. 1313-1342.
- , 1994, *Geology of the Lake Superior Region*, Tucson, Geoscience Press, Inc., 313 p.:
- LaBerge, G. L., Cannon, W. F., Schulz, K. J., Klasner, J. S., and Ojakangas, R. W., 2003a, Paleoproterozoic Stratigraphy and Tectonics along the Niagara Suture Zone, Michigan and Wisconsin, *in* Cannon, W. F., ed., 49th Annual Meeting of the Institute on Lake Superior Geology, Volume 49, p. 1-32.
- LaBerge, G. L., Klasner, J. S., Cannon, W. F., and Ojakangas, R. W., 2003b, Field Trip 2: Menominee Iron District, *in* Cannon, W. F., ed., 49th Annual Meeting of the Institute on Lake Superior Geology, Volume 49, p. 47-63.
- LaBerge, G. L., and Mudrey, M. G., Jr., 1979, Stratigraphic framework of the Wisconsin middle Precambrian: *Miscellaneous Paper - Wisconsin Geological and Natural History Survey*, v. 79-1, p. 22-22.
- LaBerge, G. L., and Myers, P. E., 1984, Two early Proterozoic successions in central Wisconsin and their tectonic significance: *Geological Society of America Bulletin*, v. 95, no. 2, p. 246-253.
- LaBerge, G. L., Ojakangas, R. W., and Licht, K., 1992, Archean and Early Proterozoic Geology of the Gogebic District, Northern Michigan and Wisconsin, *in* Dickas, A. B., and Brown, B. A., eds., 38th Annual Meeting of the Institute on Lake Superior Geology, Volume 38, p. 1-40.
- LaFountain, L. J., 1966, A deformed differentiate at Crystal Falls, Michigan, MS: University of Wisconsin.
- Lake, M. C., 1925, The future of the Lake Superior district: *Proceedings of the Lake Superior Mining Institute*, v. 24, p. 48-67.
- Lamey, C. A., 1931, Granite intrusions in the Huronian formations of Northern Michigan: *Journal of Geology*, v. 39, p. 288-295.
- , 1933a, The intrusive relations of the Republic Granite: *Journal of Geology*, v. 41, no. 5, p. 487-500.
- , 1933b, The intrusive relationship and metamorphic effects of the Republic Granite, PhD: Northwestern University, 238 p.
- , 1934, Some Metamorphic Effects of the Republic Granite: *Journal of Geology*, v. 42, p. 248-263.
- , 1935a, Gold in Michigan: Michigan Geological Survey Open File Report, v. 80-1, p. 1-78.
- , 1935b, Lead-Silver veins of Michigan, Federal Emergency Relief Administration Project: Houghton.
- , 1935c, The Palmer Gneiss: *Geological Society of America Bulletin*, v. 46, p. 1137-1162.
- , 1937, Republic granite or basement complex?: *Journal of Geology*, v. 45, no. 5, p. 487-510.
- , 1938, A dip-needle survey of the Toivola-Challenge mine area, Michigan: *Economic Geology*, v. 33, no. 6, p. 635-646.
- , 1939, Recent geological surveying in the Michigan copper district: *Proceedings of the Lake Superior Mining Institute*, v. 30, p. 90-94.
- , 1946, Geology of an area southwest of Randville, Dickinson County, Michigan: U.S. Geological Survey Open-File Report, p. 1-8.
- , 1949, Geology of a part of the Felch Mountain iron range, Michigan: U.S. Geological Survey Open-File Report, p. 1-19.

- Lamey, C. A., and Dutton, C. E., 1941, Geology of the Menominee Range, vicinity of Iron Mountain: Michigan Geological Survey Progress Report, v. 6, p. 1-14.
- , 1942, Geology of the Menominee Range, Norway to Waucedah: Michigan Geological Survey Progress Report, v. 8, p. 1-20.
- Lane, A. C., 1898, Geological Report on Isle Royale, Michigan: Michigan Geological Survey, v. 6, no. 1, p. 1-281.
- , 1899a, Isle Royale; what has been accomplished in unearthing its mineral wealth: Michigan Miner, v. 1, no. 11, p. 18-21.
- , 1899b, Isle Royale; what has been accomplished in unearthing its mineral wealth: Michigan Miner, v. 1, no. 12, p. 14-18.
- , 1899c, Magmatic Differentiation in Rocks of the Copper-bearing Series: Geological Society of America Bulletin, v. 10, p. 15-18.
- , 1900, The geothermal gradient in Michigan: American Journal of Science, v. 159, no. 54, p. 434-438.
- , 1903, Studies of the grain of igneous intrusives: Geological Society of America Bulletin, v. 14, p. 369-384.
- , 1904, Magnetic Phenomena Around Deep Borings: Fourth Report of the Michigan Academy of Science 1902, v. 4, p. 166-167.
- , 1905a, The coarseness of igneous rocks and its meaning: American Geologist, v. 35, no. 2, p. 65-72.
- , 1905b, The Theory of Copper Deposition, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 239-249.
- , 1905c, Transmission of heat into the earth, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 195-237.
- , 1907a, The geology of Keweenaw Point: a brief description: Proceedings of the Lake Superior Mining Institute, v. 12, p. 81-104.
- , 1907b, Salt water in the Lake mines: Proceedings of the Lake Superior Mining Institute, v. 12, p. 154-163.
- , 1908a, Genetic relations of some granitic dikes: Geological Society of America Bulletin, v. 18, p. 644-648.
- , 1908b, Mine waters: Proceedings of the Lake Superior Mining Institute, v. 13, p. 63-152.
- , 1909a, The decomposition of a boulder in the Calumet and Hecla conglomerate, and its bearing on the distribution of copper in the Lake Superior copper lodes as indicating the trend and characters of waters forming the chute: Economic Geology, v. 4, no. 2, p. 158-173.
- , 1909b, Geology of the Porcupine Mountains, Michigan: Mining World, v. 30, p. 1115-1117.
- , 1909c, Michigan iron mines and their mine waters: Mining World, v. 31, p. 413-416.
- , 1910, Michigan iron mines and their mine waters: Canadian Mining Institute Journal, v. 12, p. 114-129.
- , 1911a, The Keweenaw series of Michigan: Michigan Geological and Biological Survey, Publication, v. 6, no. 4, p. 1-983.
- , 1911b, Native Copper Deposits, *in* Bain, H. F., ed., Types of Ore Deposits, p. 133-139.
- , 1911c, Native Copper Deposits: Canadian Mining Institute, Quarterly Bulletin, v. 13, p. 81-87.
- , 1912a, The Age of the Keweenaw Series: Fourteenth Report of the Michigan Academy of Science 1912, v. 14, p. 107-108.
- , 1912b, Native Copper deposits: Canadian Mining Institute Journal, v. 14, p. 316-322.
- , 1912c, Unexplored parts of the copper range of Keweenaw Point: Proceedings of the Lake Superior Mining Institute, v. 17, p. 127-143.

- , 1914, Mine water composition an index to the course of ore-bearing currents: *Economic Geology*, v. 9, no. 3, p. 239-263.
- , 1916, Keweenaw Fault: *Geological Society of America Bulletin*, v. 27, p. 93-100.
- , 1917a, Lawson's correlation of the pre-Cambrian era: *American Journal of Science*, v. 193, no. 53, p. 42-48.
- , 1917b, The origin of mirabilite from the Isle Royale mine: *American Mineralogist*, v. 2, no. 5, p. 63-64.
- , 1923, Geotherms of Lake Superior copper country: *Geological Society of America Bulletin*, v. 34, no. 4, p. 703-720.
- , 1935, Discussion of "Differentiation in traps and ore deposition": *Economic Geology*, v. 30, p. 927-927.
- Lane, A. C., and Fernekcs, G., 1907, The formation of Lake Superior copper: *Science*, v. 25, p. 589-589.
- Lane, A. C., and Keller, H. F., 1891, Chloritoid von Champion, Michigan, U.S.A.: *Zeitschrift fuer Krystallographie und Mineralogie*, v. 19, p. 383-385.
- Lane, A. C., Keller, H. F., and Sharpless, F. F., 1891, Notes on Michigan Minerals: *American Journal of Science*, v. 142, no. 252, p. 499-508.
- , 1894, Notizen über Mineralien aus Michigan: *Zeitschrift für Krystallographie und Mineralogie*, v. 34, p. 574-575.
- Lane, A. C., and Urry, W. D., 1935, Ages by the Helium method: pt. 1 Keweenawan, *Geological Society of America Bulletin*, v. 46, no. 7, p. 1101-1120.
- Lang, S. S., 1919, Porphyry intrusions of the Michigan copper district: *Engineering Mining Journal*, v. 107, p. 452-452.
- , 1920, Copper deposits of Lake Superior: *Mining and Scientific Press*, v. 121, p. 407-408.
- Langill, R. F., 1964, Properties of some Michigan cherts as used in concrete aggregate, MS: Michigan Technological University.
- Lapoint, R. S., 1964, Mineralogical study of certain iron ores from four mines of the Iron River District, Michigan, MS: Michigan Technological University.
- Larson, R. J., 1968, Mott Island Conglomerate, Isle Royale National Park, Michigan, MS: Michigan Technological University, 74 p.
- Larsson, P., 1887a, The Chapin iron mine, Lake Superior: *American Institute of Mining Engineers Transactions*, v. 16, p. 119-128.
- , 1887b, The Chapin iron mine, Lake Superior: *Engineering Mining Journal*, v. 44, p. 346-347, 394-395.
- , 1893, Soft ore mining on Lake Superior: *Proceedings of the Lake Superior Mining Institute*, v. 1, p. 13-18.
- Larue, D. K., 1979, Sedimentary history prior to chemical iron sedimentation of the precambrian X Chocoy and Menominee Groups (Lake Superior Region), PhD: Northwestern University.
- , 1981a, The Chocoy Group, Lake Superior region, U.S.A.; sedimentologic evidence for deposition in basinal and platform settings on an early Proterozoic craton: *Geological Society of America Bulletin*, v. 92, no. 7, p. 417-435.
- , 1981b, The Early Proterozoic Pre-iron-formation Menominee Group siliciclastic sediments of the southern Lake Superior region: evidence for sedimentation in platform and basinal settings: *Journal of Sedimentary Petrology*, v. 51, p. 397-414.
- , 1983, Early Proterozoic tectonics of the Lake Superior Region: Tectonostratigraphic terranes near the purported collision zone, *in* Medaris, L. G., ed., *Early Proterozoic Geology of the Great Lakes Region*, Volume 160: Boulder, Geological Society of America, p. 33-47.
- Larue, D. K., and Sloss, L. L., 1980, Early Proterozoic sedimentary basins of the Lake Superior region: *Geological Society of America Bulletin*, v. 91, no. 8, p. 450-452, 1836-1874.

- Lawrence, C. E., 1915, Drag-line stripping and mining, Balkan mine, Alpha, Michigan, Menominee range, Mastodon district: Proceedings of the Lake Superior Mining Institute, v. 20, p. 174-180.
- , 1917, Progress of mining in Lake Superior district: 1894 to 1917: Proceedings of the Lake Superior Mining Institute, v. 21, p. 276-279.
- Lawson, A. C., 1888, The Archaean Geology of the Region North-west of Lake Superior, Congres Geologique International: Londres, p. 66-88.
- , 1889, A reply to an article, Foliation and Sedimentation: American Geologist, v. 3, no. 31, p. 169-178.
- , 1916, The correlation of pre-Cambrian rocks of the region of the Great Lakes: University of California, Department of Geology Bulletin, v. 10, p. 1-19.
- Lawton, C. D., 1899a, The Great Chapin Mine: Michigan Miner, v. 1, no. 12, p. 9-10.
- , 1899b, The Upper Peninsula: Michigan Miner, v. 2, no. 1, p. 19-20.
- Lee, C. K., and Kerr, S. D., 1984, Midcontinent rift - a frontier oil province: Oil and Gas Journal, p. 145-150.
- Leedy, F., 1930, The Clarksburg Intrusives and their significance, MS: Michigan College of Mining and Technology, 20 p.
- Lehner, F., 1951, A study of part of the gneissic complex north of the Felch Mountain district, Michigan, MS: Ohio State University, 74 p.
- Leith, C. K., 1898, Summaries of current North American pre-Cambrian literature: Journal of Geology, v. 6, no. 7, p. 739-753.
- , 1902, A comparison of the origin and development of the iron ores of the Mesabi and Gogebic iron ranges: Proceedings of the Lake Superior Mining Institute, v. 8, p. 75-81.
- , 1905, Genesis of Lake Superior iron ores: Economic Geology, v. 1, p. 47-66.
- , 1906a, A summary of Lake Superior geology with special reference to recent studies of the iron-bearing series: American Institute of Mining Engineers Bi-monthly Bulletin, v. 3, p. 453-507.
- , 1906b, A summary of Lake Superior geology with special reference to recent studies of the iron-bearing series: American Institute of Mining Engineers Transactions, v. 36, p. 101-153.
- , 1910, An Algonkian basin in Hudson Bay: a comparison with the Lake Superior basin: Economic Geology, v. 5, no. 3, p. 227-246.
- , 1911, Lake Superior type of iron-ore deposits, *in* Bain, H. F., ed., Types of Ore Deposits, p. 53-76.
- , 1912a, Iron-ore reserves of Michigan: U.S. Geological Survey Mineral Resources, v. 1911, no. 1, p. 175-190.
- , 1912b, The use of geology in iron ore exploration: Economic Geology, v. 7, no. 7, p. 662-675.
- , 1914a, Notes on conservation of Lake Superior Iron Ores: American Institute of Mining Engineers Bulletin, v. 86, p. 247-250.
- , 1914b, Pre-Cambrian correlation from a Lake Superior standpoint: Comptes rendus de la XII Session, Congres Geol. Intern., Canada, p. 409-421.
- , 1915, Notes on conservation of Lake Superior Iron Ores: American Institute of Mining Engineers Transactions, v. 50, p. 231-235.
- , 1931, Secondary concentration of Lake Superior iron ores: Economic Geology, v. 26, no. 3, p. 274-288.
- , 1933, Introduction, *in* Hotchkiss, W. O., ed., Lake Superior Region, Volume 23: Washington, D. C., U.S. Government, p. 1-10.
- , 1934, The pre-Cambrian: Geological Society of America Proceedings, v. 1933, p. 151-180.
- Leith, C. K., and Harder, E. C., 1911, Hematite ores of Brazil and a comparison with hematite ores of Lake Superior: Economic Geology, v. 6, no. 7, p. 670-686.

- Leith, C. K., Lund, R. J., and Leith, A., 1935, Pre-Cambrian rocks of the Lake Superior Region: A review of newly discovered geologic features with a revised geologic map: U. S. Geological Survey Professional Paper, v. 184, p. 1-34.
- Leonardson, R. W., 1966, Petrology of the Bergland Rhyolite, the Firetower Rhyolite, and associated rocks, Ontonagon County, Michigan, MS: Michigan Technological University, 121 p.
- Leone, R. J., Seacor, R. W., and Rohrbacher, T. J., 1971, Geology of the White Pine area, *in* White, W. S., ed., Field conference of the Michigan copper district: Houghton, Michigan Technological University Press, p. 44-64.
- Levandowski, W., Boyd, O. S., Briggs, R. W., and Gold, R. D., 2015, A random-walk algorithm for modeling lithospheric density and the role of body forces in the evolution of the Midcontinent Rift: *Geochemistry, Geophysics, Geosystems*, v. 16, no. 12, p. 4084-4107.
- Lewan, M. D., 1972, Metasomatism and weathering of the Presque Isle serpentinized peridotite, Marquette, Michigan, MS: Michigan Technological University.
- Lewan, M. D., and Kalliokoski, J., 1977, Chemistry and mineralogy of Precambrian paleosols in Northern Michigan - Reply: *Geological Society of America Bulletin*, v. 88, no. 9, p. 1375-1376.
- Lewis, J. V., 1914, Origin of pillow lavas: *Geological Society of America Bulletin*, v. 25, p. 591-654.
- Li, G. J., Mauk, J. L., and Peacor, D. R., 1995, Preservation of clay minerals in the Precambrian (1.1 Ga) Nonesuch Formation in the vicinity of the White Pine Copper Mine, Michigan: *Clays and Clay Minerals*, v. 43, no. 3, p. 361-376.
- Li, H., 1987, Remagnetization of the Allouez Conglomerate in the Portage Lake Volcanics in Michigan, MS: Michigan Technological University, 45 p.
- Li, H., and Beske-Diehl, S., 1993, Low-temperature metamorphism and secondary components in the Portage Lake Volcanics; a reassessment: *Canadian Journal of Earth Sciences*, v. 30, no. 7, p. 1404-1414.
- Liang, C., and Langston, C. A., 2008, Ambient seismic noise tomography and structure of eastern North America: *Journal of Geophysical Research: Solid Earth*, v. 113, no. B3, p. B03309.
- Liberty, B. A., and Votaw, R. B., 1980, Paleozoic stratigraphic studies on the Michigan Basin's northern rim, MI, United States (USA), *in* Votaw, R. B. ed., Ordovician and Silurian geology of the northern peninsula of Michigan. Michigan Basin Geological Society, p. 33-40.
- Lifshin, A., 1964, A study of the relationship between the metamorphically recrystallized cherts of the Negaunee Iron Formation and metamorphic grade, MS: Michigan State University.
- Lightfoot, P. C., Sutcliffe, R. H., and Doherty, W., 1991, Crustal contamination identified in Keweenaw Osler Group tholeiites, Ontario: A trace element perspective: *Journal of Geology*, v. 99, p. 739-760.
- Lindsay, D. A., 1969, Glacial Sedimentology of the Precambrian Gowganda Formation, Ontario, Canada: *Geological Society of America Bulletin*, v. 80, p. 1685-1702.
- Lindsay, D. W., 1986, The provenance of the Jacobsville Formation of the Upper Peninsula of Michigan through a petrographic study, MS: Western Michigan University, 113 p.
- Lippus, C. S., 1988, The seismic properties of mafic volcanic rocks of the Keweenaw Supergroup and their implications, MS: Purdue University, 160 p.
- Little, K. S., Mancuso, J. J., and Frizado, J. P., 1994, Oxidation and goethite deposition, Negaunee Iron Formation, Tilden Mine, Ishpeming, Michigan: *The Compass of Sigma Gamma Epsilon*, v. 71, no. 1, p. 35-48.
- Liu, J. Z., Hay, R. L., Deino, A., and Kyser, T. K., 2003, Age and origin of authigenic K-feldspar in uppermost Precambrian rocks in the North American Midcontinent: *Geological Society of America Bulletin*, v. 115, no. 4, p. 422-433.

- Livnat, A., 1983, Metamorphism and Copper Mineralization of the Portage Lake Lava Series, Northern Michigan, PhD: University of Michigan, 292 p.
- Long, D. G. F., and Young, G. M., 1978, Dispersion of cross-stratification as a potential tool in the interpretation of Proterozoic arenites: *Journal of Sedimentary Petrology*, v. 48, no. 3, p. 857-862.
- Long, R. A., 1959, Origin and petrology of a portion of the Southern Complex near Palmer, Marquette County, Michigan, MS: Michigan State University.
- Long, R. A., Vehrs, R. A., and Sahakian, A., 1960, An Examination of Parts of the Southern Complex Near Palmer, Marquette, County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 45, no. 1, p. 119-124.
- Longacre, T. L., 1957, Geophysical investigations in the Cornell area, Michigan, MS: Michigan College of Mining and Technology.
- Longo, A. A., 1984, Correlation for a middle Keweenaw flood basalt : the Greenstone flow, Isle Royale and Keweenaw Peninsula, Michigan, MS: Michigan Technological University, 198 p.
- Longyear, J. M., 1917, Reminiscences of the development of the Lake Superior iron districts: *Proceedings of the Lake Superior Mining Institute*, v. 21, p. 92-105.
- Lougheed, M. S., 1983, Origin of Precambrian iron-formations in the Lake Superior region: *Geological Society of America Bulletin*, v. 94, no. 3, p. 325-340.
- Lougheed, M. S., and Mancuso, J. J., 1973, Hematite Framboids in the Negaunee Iron Formation, Michigan; evidence for Their Biogenic Origin: *Economic Geology*, v. 68, no. 2, p. 202-209.
- Louma, H. L., 1945a, Description and occurrence of Keweenaw agate: *The Mineralogist*, v. 13, no. 7, p. 269-271.
- , 1945b, Did nature wield a soldering iron?: *The Mineralogist*, v. 13, no. 10, p. 377-378.
- , 1946a, New chlorastrolite find: *The Mineralogist*, v. 14, no. 8, p. 399-400.
- , 1947, Chrysocola in conglomerate, Michigan: *The Mineralogist*, v. 15, no. 6, p. 286-288.
- Louma, W. E., 1946b, Mineral collecting in northern Michigan: *Rocks and Minerals*, v. 21, no. 10, p. 664-665.
- Luetgert, J. H., and Meyer, R. P., 1982, Structure of the western basin of Lake Superior from cross structure refraction profiles, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 245-255.
- Lundquist, R., 2006, Provenance analysis of the Marquette Range Supergroup sedimentary rocks from northwestern Wisconsin and western Michigan using U-Pb isotopic geochemistry on detrital zircons by LA-ICP-MS, BS: Carleton College.
- Lutter, W. J., Trehu, A. M., and Nowack, R. L., 1993, Application of 2-D travel-time inversion of seismic refraction data to the Mid-continent rift beneath Lake Superior: *Geophysical Research Letters*, v. 20, no. 7, p. 615-618.
- Lynott, J. S., 1992, Nature and origin of alteration along overlapping unconformities in Baraga county, northern Michigan, MS: Michigan Technological University.
- Maass, R. S., 1983, Early Proterozoic tectonic style in central Wisconsin, *in* Medaris, L. G., ed., *Early Proterozoic Geology of the Great Lakes Region*, Volume 160: Boulder, Geological Society of America, p. 85-95.
- Macco, A., 1904, Die Eisenerzlagerstätten am Lake Superior: *Zeitschrift für praktische Geologie*, v. 12, p. 48-53.
- Macfarlane, T., 1866, On the rocks and cupriferous beds of Portage Lake, Michigan: *Canadian Geological Survey, Report of Progress*, v. III, no. 1, p. 149-164.
- , 1868a, On the geological formations of Lake Superior: *Canadian Naturalist and Geologist and Proceedings of the Natural History Society of Montreal*, v. 3, p. 177-201, 241-256.

- , 1868b, On the rocks and cupriferous beds of Portage Lake, Michigan: Canadian Naturalist and Geologist and Proceedings of the Natural History Society of Montreal, v. 3, p. 1-18.
- Macintosh, A. N., 1929, Stratigraphy of the Negaunee Iron Formation, MS: Michigan College of Mines.
- MacLaren, A. S., and Charbonneau, B. W., 1968, Aeromagnetic Map - Manitoulin Island, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 77-78.
- MacLellan, M. L., 1988, Geology of the Reany Lake Area, Marquette County, Michigan, MS: Michigan Technological University.
- MacLellan, M. L., and Bornhorst, T. J., 1989, Bedrock geology of the Reany Lake Area, Marquette County, Michigan: Michigan Geological Survey Open File Report, v. 89-2.
- Mahajan, A. K., 1970, Mineral and sedimentary facies of the Pewabic West Conglomerate, MS: Michigan Technological University, 68 p.
- Mahin, R. A., and Beach, S., 2013, Field Trip 3: Eagle Ni-Cu-PGE Mine and Humboldt Processing Plant, Marquette County, Michigan, *in* Miller, J., ed., Field Guide to the Copper-Nickel-Platinum Group Element Deposits of the Lake Superior Region, Precambrian Research Center University of Minnesota Duluth, p. 83-93.
- Maki, J. C., 1999, Gratiot chalcocite deposit, Keweenaw Peninsula, Michigan, MS: Michigan Technological University.
- Mancuso, J. J., 1975, Carbonate-Apatite in Precambrian cherty iron formation, Baraga County, Michigan: Economic Geology, v. 70, no. 3, p. 583-586.
- , 1989, Precambrian vein pyrobitumen: Evidence for petroleum generation and migration 2 Ga ago: Precambrian Research, v. 44, p. 137-146.
- Mancuso, J. J., Loughheed, M. S., and Wygant, T., 1971, Possible biogenic structures from the Precambrian Negaunee (Iron) Formation, Marquette Range, Michigan: American Journal of Science, v. 271, no. 2, p. 181-186.
- Mandarino, J. A., 1950, The minerals of the Champion, Michigan Area: Rocks and Minerals, v. 25, p. 563-565.
- Mann, V. I., 1953, The relation of oxidation to the origin of soft iron ores of Michigan: Economic Geology, v. 48, p. 251-281.
- , 1954, Origin of soft iron ores of Michigan; reply: Economic Geology, v. 49, no. 4, p. 439-440.
- Manson, M. L., 1989, A submersible investigation of the Superior Shoals, Lake Superior, MS: University of Toronto.
- Manson, M. L., 1996, Post-Keweenawan compressive tectonism in the Midcontinent Rift of eastern Lake Superior, PhD: University of Toronto, 299 p.
- Manson, M. L., and Halls, H. C., 1991, An investigation of Superior Shoal, Central Lake Superior with a manned submersible: Canadian Journal of Earth Sciences, v. 28, no. 1, p. 145-150.
- , 1994, Post-Keweenawan compressional faults in the Eastern Lake Superior region and their tectonic significance: Canadian Journal of Earth Sciences, v. 31, no. 4, p. 640-651.
- , 1997, Proterozoic reactivation of the southern Superior Province and its role in the evolution of the midcontinent rift: Canadian Journal of Earth Sciences, v. 34, p. 562-575.
- Marcou, J., 1851, Reponse à la lettre de MM. Foster et Whitney sur le lac Supérieur: Societe Geologique de France Bulletin, v. 2, no. 8, p. 101-105.
- Mariano, J., 1992, Geophysical investigations of the Midcontinent rift in eastern Lake Superior, PhD: Purdue University.
- Mariano, J., and Hinze, W. J., 1994a, Gravity and magnetic models of the Midcontinent Rift in eastern Lake Superior: Canadian Journal of Earth Sciences, v. 31, no. 4, p. 661-674.
- , 1994b, Structural interpretation of the Midcontinent rift in eastern Lake Superior from seismic reflection and potential-field studies: Canadian Journal of Earth Sciences, v. 30, no. 4, p. 619-628.

- , 1995, Integrated potential-field and seismic reflection studies of the Midcontinent Rift in eastern Lake Superior, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers, p. 11-14.
- Marshall, L. P., and Lidiak, E. G., 1996, Geochemistry and paleomagnetism of Keweenawan basalt in the subsurface of Nebraska: *Precambrian Research*, v. 76, p. 47-65.
- Martin, H. M., 1939, Ne-Saw-Je-Won, a tale of the waters that run down from Lake Superior to the Sea, Cleveland, William Feather Company, 82 p.
- , 1943, Magnesium ore: *Michigan Conservation*, v. 12, no. 1.
- , 1944a, Michigan's Iron: *Michigan Conservation*, v. 13, no. 6, p. 6-7, 10.
- , 1944b, Michigan's Iron: *Michigan Conservation*, v. 13, no. 5, p. 4-5, 8.
- , 1944c, The romance of copper: *Michigan Conservation*, v. 13, no. 2, p. 7, 10-11.
- , 1944d, The romance of copper: *Michigan Conservation*, v. 13, no. 1, p. 4-5.
- Massey, N. W. D., 1983, Magma genesis in a late Proterozoic proto-oceanic rift: REE and other trace-element data from the Keweenawan Mamainse Point Formation, Ontario, Canada: *Precambrian Research*, v. 21, p. 81-100.
- Mather, W. G., 1903, Charcoal iron industry of the Upper Peninsula of Michigan: *Proceedings of the Lake Superior Mining Institute*, v. 9, p. 63-93.
- Mathias, D. L., Jr., 1959, Petrography and structural significance of the mafic igneous rocks in the Ishpeming-Negaunee area, Marquette Iron Range, Michigan, PhD: Columbia University, 124 p.
- Matson, R. C., 1928, Scraping practice in the Michigan iron mines of the Lake Superior district: *Proceedings of the Lake Superior Mining Institute*, v. 26, p. 198-270.
- Matthews, A. W., 1941, Safety practices and their development in the iron mines of the Lake Superior district, MS: Michigan College of Mining and Technology, 26 p.
- Mauk, J. L., 1993, Geologic and geochemical investigations of the White Pine sediment-hosted stratiform copper deposit, Ontonagon County, Michigan, PhD: University of Michigan, 211 p.
- Mauk, J. L., Brown, A. C., Seasor, R. W., and Eldridge, C. S., 1992a, Geology and stable isotope and organic geochemistry of the White Pine sediment-hosted stratiform copper deposit, Volume 13, *Society of Economic Geologists*, p. 63-98.
- Mauk, J. L., and Hieshima, G. B., 1992, Organic matter and copper mineralization at White Pine, Michigan, U.S.A.: *Chemical Geology*, v. 99, no. 1-3, p. 189-211.
- Mauk, J. L., Kelly, W. C., Vanderpluijm, B. A., and Seasor, R. W., 1992b, Relations between deformation and sediment-hosted copper mineralization -- evidence from the White Pine part of the midcontinent rift system: *Geology*, v. 20, no. 5, p. 427-430.
- Maynard, J. B., and Klein, G. D., 1995, Tectonic subsidence analysis in the characterization of sedimentary ore deposits; examples from the Witwatersrand (Au), White Pine (Cu), and Molango (Mn): *Economic Geology*, v. 90, no. 1, p. 37-50.
- McCallister, R. H., Boctor, N. Z., and Hinze, W. J., 1978, Petrology of the spilitic rocks of the Michigan Basin deep drill hole: *Journal of Geophysical Research*, v. 83, p. 5825-5831.
- McChesney, R. D. R., 1956, Stress investigation conducted on the shaft pillar Ahmeek Mine, Number Three Shaft, Calumet and Hecla Incorporated, Ahmeek, Michigan, MS: Michigan College of Mining and Technology, 73 p.
- McConnell, D., and Pondrom, W. L., Jr., 1941, X-ray crystallography of seamanite: *American Mineralogist*, v. 26, no. 7, p. 446-447.
- McDermott, M. P., 1990, Geochemistry of the Unnamed Formation: A central volcanic complex of Keweenawan Age, MS: Michigan State University, 79 p.
- McDermott, W., 1877, The Silver Islet vein, Lake Superior: *Engineering Mining Journal*, v. 23, p. 54-55, 70-71.

- , 1909a, The Silver Islet vein, Lake Superior: Canadian Mining Journal, v. 30, p. 135-138.
- , 1909b, The Silver Islet vein, Lake Superior: Institute of Mining and Metallurgy Transactions, v. 18, p. 220-231.
- McDonald, P. B., 1912, History of the Cascade iron range of Michigan: Mining World, v. 37, p. 902-905.
- , 1913, Applied Geology, Michigan iron ranges: Engineering Mining Journal, v. 96, p. 208-210.
- McEachern, W. A., 1911, Top slicing at the Caspian mine: Proceedings of the Lake Superior Mining Institute, v. 16, p. 239-243.
- McGee, E. S., 1988, Potential for diamonds in Kimberlites from Michigan and Montana as indicated by garnet xenocryst compositions: Economic Geology, v. 83, no. 2, p. 428-432.
- McGinnis, L. D., 1970, Tectonics and gravity field in the continental interior: Journal of Geophysical Research, v. 75, p. 317-331.
- Meads, A., 1900, The copper district on Lake Superior: Engineering Mining Journal, v. 70, p. 694-694.
- Meek, B. W., 1935, The heavy accessory minerals of the Palms quartz slates of the Penokee-Gogebic range, MS: University of Wisconsin.
- Meinschein, W. G., Schopf, J. W., and Barghoorn, E. S., 1964, Biological remnants in Precambrian sediment: Science, v. 145, no. 362, p. 262-263.
- Mendelsohn, A., 1931, Mining methods and costs at the Champion copper mine, Painesdale Michigan: U.S. Bureau of Mines Information Circular, v. 6515, p. 1-16.
- Mendelsohn, A., and Jackson, C. F., 1932, The sublevel inclined cut-and-fill stoping system: American Institute of Mining Engineers Transactions, v. 102, p. 43-58.
- Mengel, J. T., Jr., 1956, The relationship of clastic sediments to iron formation in the vicinity of Palmer, Michigan, MS: University of Wisconsin.
- , 1963, The cherts of the Lake Superior iron-bearing formations, PhD: University of Wisconsin.
- Mercer, H. T., 1912, Rockhouse practice of the Copper Range Consolidated Company: Proceedings of the Lake Superior Mining Institute, v. 17, p. 283-289.
- Mereu, R. F., Epili, D., and Green, A. G., 1990, Pg shingles: Preliminary results from the onshore GLIMPCE refraction experiment: Tectonophysics, v. 173, p. 617-626.
- Merino, M., 2014, Tectonics and Seismicity of Rifts Past and Present, PhD: Northwestern University.
- Merino, M., Keller, G. R., Stein, S., and Stein, C., 2013, Variations in Mid-Continent Rift magma volumes consistent with microplate evolution: Geophysical Research Letters, v. 40, no. 8, p. 1513-1516.
- Merk, G. P., 1988, Provenance and Tectonic Significance of the Keweenaw and Interflow Sedimentary Rocks Located on the South Side of Lake Superior, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., Upper Keweenaw Rift-Fill Sequence, Mid-Continent Rift System, Michigan, Michigan Basin Geological Society, p. 95-102.
- , 1996, The Genesis of Michigan's Iron Ore: A Tale of Mistaken Identity: Michigan Academician, v. 28, no. 2, p. 165-180.
- Merk, G. P., and Jirsa, M. A., 1982, Provenance and tectonic significance of the Keweenaw interflow sedimentary rocks, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 97-105.
- Meshref, W. M., 1968, Aeromagnetic study of the regional geology of the western half of the northern peninsula of Michigan, PhD: Michigan State University.
- Meshref, W. M., and Hinze, W. J., 1970, Geological Interpretation of Aeromagnetic data in Western Upper Peninsula of Michigan: State of Michigan Dept. of Natural Resources, Geological Survey.
- Michels, A. C., 2013, Paleomagnetic study of the Portage Lake Volcanics exposed in the Quincy Mine, PhD: Michigan Technological University, 92 p.

- Milavec, G. J., 1986, The Nonesuch Formation: Precambrian Sedimentation in an Intracratonic Rift, MS: University of Oklahoma, 142 p.
- Miller, J., and Nicholson, S. W., 2013, Geology and Mineral Deposits of the 1.1 Ga Midcontinent Rift in the Lake Superior Region - An Overview, *in* Miller, J., ed., Field Guide to the Copper-Nickel-Platinum Group Element Deposits of the Lake Superior Region, Precambrian Research Center University of Minnesota Duluth, p. 1-49.
- Miller, J. D., Jr., Chandler, V. W., Green, J. C., and Witthuhn, K., 1995, The Finland tectono-magmatic discontinuity-A growth fault marking the western margin of the Portage Lake volcanic basin of the Midcontinent Rift System, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., Tenth International Conference on Basement Tectonics, Volume 4, Kluwer Academic Publishers, p. 35-40.
- Miller, T. J., 1989, Evaluation of bioextraction techniques for in-situ mining of copper sulfide ores in Michigan, MS: Michigan Technological University.
- Mitchell, R. L., 2010, Palaeoenvironmental implications of 1.1 Ga palaeosols, PhD: University of London.
- Mitchell, R. L., and Sheldon, N. D., 2010, The ~1100 Ma Sturgeon Falls paleosol revisited: Implications for Mesoproterozoic weathering environments and atmospheric CO₂ levels: *Precambrian Research*, v. 183, no. 4, p. 738-748.
- , 2016, Sedimentary provenance and weathering processes in the 1.1 Ga Midcontinental Rift of the Keweenaw Peninsula, Michigan, USA: *Precambrian Research*, v. 275, p. 225-240.
- Mixer, C. T., 1896, Methods of sampling iron ore: *Proceedings of the Lake Superior Mining Institute*, v. 4, p. 27-33.
- Montgomery, W. W., 1977, Deformation of the Tyler Slate (Middle Precambrian), northern Wisconsin and western Upper Michigan, MS: University of Wisconsin.
- Moore, C., 1895, The Ontonagon copper boulder in the U.S. National Museum: U.S. National Museum Report, p. 1023-1030.
- Moore, L. R., Moore, J. R. M., and Spinner, E., 1969, A geomicrobiological study of the pre-Cambrian Nonesuch Shale: *Proceedings of the Yorkshire Geological Society*, v. 37, Part 3, p. 351-394.
- Moore, P. B., 1971, Copper-nickel arsenides of the Mohawk No. 2 mine, Mohawk, Keweenaw Co., Michigan: *American Mineralogist*, v. 56, p. 341-344.
- Moore, P. B., Ito, J., and Steele, I. M., 1979, MacFallite and orientite: calcium manganese (III) silicates from Upper Michigan: *Mineralogical Magazine*, v. 43, p. 325-331.
- Morey, G. B., 1967, Stratigraphy and sedimentology of the middle Precambrian Rove Formation in northeastern Minnesota: *Journal of Sedimentary Petrology*, v. 37, p. 1154-1162.
- , 1983, Lower Proterozoic stratified rocks and the Penokean orogeny in east-central Minnesota, *in* Medaris, L. G., ed., *Early Proterozoic Geology of the Great Lakes Region*, Volume 160: Boulder, Geological Society of America, p. 97-112.
- Morey, G. B., and Green, J. C., 1982, Status of the Keweenawan as a stratigraphic unit in the Lake Superior region, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 15-25.
- Morey, G. B., and Ojakangas, R. W., 1982, Keweenawan sedimentary rocks of eastern Minnesota and northwestern Wisconsin, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 135-146.
- Morey, G. B., and Southwick, D. L., 1993, Stratigraphic and sedimentological factors controlling the distribution of epigenetic manganese deposits in iron-formation of the Emily District, Cuyuna Iron Range, east-central Minnesota: *Economic Geology*, v. 88, p. 104-122.
- , 1995, Allostratigraphic relationships of early Proterozoic iron-formations in the Lake Superior region: *Economic Geology*, v. 90, p. 1983-1993.

- Morgan, P. J., and DeCristoforo, D. T., 1980, Geological evolution of the Ishpeming greenstone belt, Michigan, U.S.A: Precambrian Research, v. 11, no. 1, p. 23-41.
- Morton, J. P., and Long, L. E., 1982, Rb-Sr ages of Precambrian sedimentary rocks in the U.S.A: Precambrian Research, v. 18, no. 1-2, p. 133-138.
- Mosler, C., 1877, Der kupferbergbau am Obern See in Nord-Amerika: Zeitschrift für das Berg-, Hütten-und Salinen-Wesin, v. 25, p. 203-221.
- , 1880, Der kupferbergbau am Obern See in Nord-Amerika: Zeitschrift für das Berg-, Hütten-und Salinen-Wesin, v. 28, p. 210-236.
- Moss, M. J., 1975, Some pegmatites near Gwinn, Michigan, MS: Western Michigan University, 64 p.
- Mudrey, M. G., Jr., and Ostrom, M. E., 1986, Upper Keeweenawan stratigraphy; Summary stratigraphy: Geoscience Wisconsin, v. 11, p. 23-25.
- Mueller, A., 1857, Über die Kupferminen am Obern See im Staate Michigan, Nordamerika: Naturforschende Gesellschaft zur Leipzig, v. 1, p. 411-438.
- Munroe, H. S., 1879, The losses in copper dressing at Lake Superior: American Institute of Mining Engineers Transactions, v. 8, p. 409-451.
- Murray, R. C., 1955, Late Keweenawan or early Cambrian glaciation in Upper Michigan: Geological Society of America Bulletin, v. 66, p. 341-344.
- , 1956, Late Keweenawan or Early Cambrian ice shove in Upper Michigan -- a reply: Geological Society of America Bulletin, v. 67, p. 237-238.
- Musgrove, G. H., 1983, A geophysical investigation of the Mid-Michigan Gravity High, MS: University of Michigan.
- Muvi-Tjikalepo, M. H., 2007, Stratigraphy and trace element distribution in the Lower Nonesuch Formation of the Michigan Segment of the North American Mid-continent Rift System, Gogebic-Ontonagon Counties, Michigan, MS: Michigan Technological University.
- Myers, G. A., 1984, Structural analysis of foliated Proterozoic metadiabase dikes in the Marquette-Republic region of Northern Michigan, MS: Michigan State University, 88 p.
- Nachatilo, S. A., and Bauer, R. L., 1993, Structural analysis of Archean rocks in the Negaunee area, Michigan – Constraints on Archean versus early Proterozoic deformation: U. S. Geological Survey Bulletin, v. 1904-O, no. 1-29.
- Naegeli, F. I., 1959, Petrofabrics at the falls of the Sturgeon, Dickinson County, Michigan, MS: Michigan State University.
- Nebrija, E. L., Welkie, C. J., and Meyer, R. P., 1977, Exploration for copper mineralization in an extension of the Nonesuch Shale under Lake Superior: Marine Minerals, v. 1, no. 1-2, p. 149-170.
- Nelson, G. J., 2008, Paleooceanographic constraints on paleoproterozoic phosphorite and iron formation accumulation, Baraga Group, Michigan, USA, MS: Acadia University, 108 p.
- Nelson, G. J., Pufahl, P. K., and Hiatt, E. E., 2010, Paleooceanographic constraints on Precambrian phosphorite accumulation, Baraga Group, Michigan, USA: Sedimentary Geology, v. 226, no. 1-4, p. 9-21.
- Newell, K. D., Burruss, R. C., and Palacas, J. G., 1993, Thermal Maturation and Organic Richness of Potential Petroleum Source Rocks in Proterozoic Rice Formation, North American Mid-Continent Rift System, Northeastern Kansas: American Association of Petroleum Geologists Bulletin, v. 77, no. 11, p. 1922-1941.
- Newett, G. A., 1896, The Marquette iron range of Michigan: Proceedings of the Lake Superior Mining Institute, v. 4, p. 87-108.
- , 1909, The Marquette iron range: Proceedings of the Lake Superior Mining Institute, v. 14, p. 19-26.
- , 1914, The early history of the Marquette iron ore range: Proceedings of the Lake Superior Mining Institute, v. 19, p. 297-304.

- , 1925, The Marquette iron ore range: Proceedings of the Lake Superior Mining Institute, v. 24, p. 209-233.
- Newitt, G. A., 1921, The Ropes gold mine: Michigan Geological Survey Open File Report, v. 80-1.
- Nichols, J. B., 1942, Michigan copper arsenides and historical mineralogy: *The Mineralogist*, v. 10, no. 4, p. 113-114, 128-129.
- Nicholson, C. W., 1923, Guniting in the Athens mine shaft, at Negaunee, Michigan: Proceedings of the Lake Superior Mining Institute, v. 23, p. 103-110.
- , 1925, Mine ventilation - Marquette range: Proceedings of the Lake Superior Mining Institute, v. 24, p. 293-301.
- Nicholson, S. W., 1990, Portage Lake rhyolites of the Midcontinent Rift System, Keweenaw Peninsula, Michigan: Geology, petrogenesis and implications for rift magmatism and mineralization, PhD: University of Minnesota, 268 p.
- , 1992, Geochemistry, petrography, and volcanology of rhyolites of the Portage Lake Volcanics, Keweenaw Peninsula, Michigan: U.S. Geological Survey Bulletin, v. 1970-A,B, p. 1-57.
- Nicholson, S. W., Cannon, W. F., and Schulz, K. J., 1992, Metallogeny of the Midcontinent rift system of North America: *Precambrian Research*, v. 58, p. 355-386.
- Nicholson, S. W., and Shirey, S. B., 1990, Midcontinent rift volcanism in the Lake Superior region: Sr, Nd, and Pb isotopic evidence for a mantle plume origin: *Journal of Geophysical Research*, v. 95, no. B7, p. 10851-10868.
- Nicholson, S. W., Shirey, S. B., Schulz, K. J., and Green, J. C., 1997, Rift-wide correlation of 1.1 Ga midcontinent rift system basalts: implications for multiple mantle sources during rift development: *Canadian Journal of Earth Sciences*, v. 34, p. 504-520.
- Nilsen, N. E., and Foss, A. L., 1929, Rapid crosscutting at the Eureka mine: Proceedings of the Lake Superior Mining Institute, v. 27, p. 284-292.
- Nishio, K., 1919, Native copper and silver in the Nonesuch Formation, Michigan: *Economic Geology*, v. 14, no. 4, p. 324-334.
- Nishioka, G. K., 1983, Origin of late veins in the White Pine copper deposit, northern Michigan MS: University of Michigan.
- Nishioka, G. K., Kelly, W. C., and Elmore, R. D., 1984, Copper occurrences in Stromatolites of the Copper Harbor Conglomerate, Keweenaw Peninsula, Northern Michigan: *Economic Geology*, v. 79, no. 6, p. 1393-1399.
- Noble, J. A., 1948, Evidence for a steepening of geothermal gradients in some deep mines and drill holes: *American Journal of Science*, v. 246, no. 7, p. 426-440.
- Noble, J. H., 1966, Petrology of the conglomerate zone of the Freda Formation (Precambrian) of northern Michigan, MS: Miami University.
- Noggerath, J. J., 1848, Gediegen Kupfer und Silber von Lake Superior: *Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie*, p. 555-555.
- Nordeng, S. C., 1963, Precambrian stromatolites as indicators of polar shift, *in* Munyan, A. C., ed., *Polar wandering and continental drift*, Volume 10, Society of Economic Paleontologists and Mineralogists, p. 131-139.
- Nordstrom, P. M., 1999, Geologic Field Trip to the Empire Mine, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 129-134.
- North, J. W., 1993, Iron ores of the pre-penokean, superior-type Riverton Iron Formation, Michigan: Keweenawan supergene oxidation, iron enrichment, and paucity of other metals, PhD: The University of Western Ontario, 372 p.
- Notman, A., 1932, The outlook for copper: *Economic Geology*, v. 27, no. 3, p. 219-230.
- Nwachukwu, S. O. O., 1964, The geologic significance of geomagnetic measurements over the Lake Huron basin and adjacent areas, PhD: University of Toronto.

- Nyquist, J. E., 1986, Thermal and mechanical models of the Mid-Continent Rift, PhD: University of Wisconsin, 193 p.
- Nyquist, J. E., and Wang, H. F., 1988, Flexural modeling of the Midcontinent Rift: *Journal of Geophysical Research*, v. 93, p. 8852-8868.
- O'Hara, N. W., 1983, Regional Basement Geology of Lake-Michigan: *Geophysics*, v. 48, p. 452-452.
- O'Hara, N. W., and Hinze, W. J., 1972, Basement Geology of the Lake Michigan Area from Aeromagnetic Studies: *Geological Society of America Bulletin*, v. 83, p. 1771-1786.
- O'Neil, F. W., 1903, The Champion mill intake tunnel: *Proceedings of the Lake Superior Mining Institute*, v. 9, p. 127-139.
- Odendall, L., 1909, Die Kupferlagerstaetten in Nord-Amerika, PhD: Universitaet Bonn, 63 p.
- Oehler, E. T., 1947, Geology of the Black Creek Area, Dickinson County, Michigan, MS: The University of Chicago, 52 p.
- Ohle, E. L., 1962, Thoughts on epigenetic vs. syngenetic origin for certain copper deposits: *Economic Geology*, v. 57, p. 831-836.
- , 1968, Copper mineralization in upper part of the Copper Harbor Conglomerate at White Pine Michigan - discussion: *Economic Geology*, v. 63, no. 2, p. 190-191.
- Ohr, M., 1993, U-Pb, Rb-Sr, and Sm-Nd dating of diagenesis and mineralization in the Late Proterozoic Nonesuch Formation, northern Michigan, PhD: University of Michigan.
- Ojakangas, R. W., 1983, Tidal deposits in the early Proterozoic basin of the Lake Superior region; the Palms and the Pokegama formations; evidence for subtidal-shelf deposition of superior-type banded iron-formation: *Memoir - Geological Society of America*, v. 160, p. 49-66.
- , 1986, Upper Keweenawan stratigraphy; Reservoir characteristics of the Keweenawan Supergroup, Lake Superior region: *Geoscience Wisconsin*, v. 11, p. 25-31.
- Ojakangas, R. W., 1988, Middle Proterozoic (Keweenawan) Sedimentary Rocks, Lake Superior Region, *in* Daniels, P. A., Jr., and Elmore, R. D., eds., *Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan*, Michigan Basin Geological Society, p. 77-80.
- , 1994, Sedimentology and Provenance of the Early Proterozoic Michigamme Formation and Goodrich Quartzite, Northern Michigan – Regional Stratigraphic Implications and Suggested Correlations: *U. S. Geological Survey Bulletin*, v. 1904-R, p. 1-31.
- Ojakangas, R. W., 1995a, Sedimentary fill of the 1100 Ma (Keweenawan) Midcontinent Rift System in the Lake Superior region: *Proceedings of the Tenth International Conference on Basement Tectonics*, Kluwer Academic Publishers, v. 4, p. 69-72.
- Ojakangas, R. W., and Dickas, A. B., 2002, The 1.1-Ga Midcontinent Rift System, central North America: sedimentology of two deep boreholes, Lake Superior region: *Sedimentary Geology*, v. 147, no. 1-2, p. 13-36.
- Ojakangas, R. W., Dickas, A. B., and Green, J. C., 1997, Middle Proterozoic to Cambrian Rifting, Central North America, *Geological Society of America Special Paper, Volume 312*: Boulder, Geological Society of America, p. 322.
- Ojakangas, R. W., and Morey, G. B., 1982a, Keweenawan pre-volcanic quartz sandstones and related rocks of the Lake Superior region, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin, Volume 156*: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 85-96.
- , 1982b, Keweenawan sedimentary rocks of the Lake Superior region; a summary, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin, Volume 156*: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 157-164.

- , 1982c, Proterozoic sedimentary rocks, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 83-84.
- Ojakangas, R. W., Morey, G. B., and Green, J. C., 2001a, The Mesoproterozoic Midcontinent Rift System, Lake Superior Region, USA: *Sedimentary Geology*, v. 141, p. 421-442.
- Ojakangas, R. W., Morey, G. B., and Southwick, D. L., 2001b, Paleoproterozoic basin development and sedimentation in the Lake Superior region, North America: *Sedimentary Geology*, v. 141, p. 319-341.
- Olmsted, J. F., 1962, A study of graphitic slates from northern Michigan, MS: Michigan State University.
- Olson, D. J., 1977, Subsidence in the Iron River Mining District, Iron County, Michigan, MS: Michigan Technological University.
- Olson, O. E., Schaus, O. M., and Blackwell, F., 1915, Mining methods on the Gogebic range: *Proceedings of the Lake Superior Mining Institute*, v. 20, p. 54-64.
- Orajaka, S. O., 1951, A geological, geochemical and radiometric investigation of the Huron River and part of the Huron Mountain area, Baraga and Marquette Counties, Michigan, MS: Michigan College of Mining and Technology, 82 p.
- Oray, E., 1971, Regional gravity investigation of the Eastern portion of the Northern Peninsula of Michigan, PhD: Michigan State University, 95 p.
- Oray, E., Hinze, W. J., and O'Hara, N. W., 1973, Gravity and Magnetic evidence for the Eastern Termination of the Lake Superior Syncline: *Geological Society of America Bulletin*, v. 84, p. 2763-2780.
- Orbison, T. W., and Armstrong, F. H., 1908, The hydroelectric plant of Penn Iron Mining Co., at Vulcan, Michigan: *Proceedings of the Lake Superior Mining Institute*, v. 13, p. 153-181.
- Owens, E. O., 1986, Precambrian geology and precious metal mineralization of the Fire Center area, Marquette County, Michigan, MS: Michigan Technological University, 152 p.
- Owens, E. O., and Bornhorst, T. J., 1985, Geology and precious metal mineralization of the Fire Center and Holyoke Mines Area, Marquette County, Michigan: Michigan Geological Survey Open File Report, v. 85-2.
- Paces, J. B., 1988, Magmatic processes, evolution and mantle source characteristics contributing to the petrogenesis of midcontinent rift basalts: Portage Lake Volcanics, Keweenaw Peninsula, Michigan, PhD: Michigan Technological University, 432 p.
- Paces, J. B., and Bell, K., 1989, Non-depleted sub-continental mantle beneath the Superior Province of the Canadian Shield; Nd-Sr isotopic and trace element evidence from Midcontinent Rift basalts: *Geochimica et Cosmochimica Acta*, v. 53, no. 8, p. 2023-2035.
- Page, G. W., 1971, Occurrence, mineralogy, and geochemistry of barite in the Keweenaw Peninsula, Michigan, MS: Michigan Technological University, 41 p.
- Page, L. R., 1938, The deposition of native copper under hydrothermal conditions: *Economic Geology*, v. 33, no. 5, p. 522-541.
- Palacas, J. G., 1992, Source rock potential of Precambrian rocks in selected basins of the U.S, *in* Dyman, T. S., ed., *Geologic controls and resource potential of natural gas in deep sedimentary basins of the United States*, U.S. Geological Survey, p. 161-172.
- Palache, C., 1898, The crystallization of the calcite from the copper mines of Lake Superior: Michigan Geological Survey, v. 6, no. II, p. 161-184.
- , 1899a, Powellite crystals from Michigan: *Zeitschrift fuer Krystallographie*, v. 31, p. 529-531.
- , 1899b, Powellite crystals from Michigan: *American Journal of Science*, v. 157, no. 41, p. 367-369.
- , 1944, Crystallography of calcite from Lake Superior copper mines: *American Mineralogist*, v. 29, no. 1-2, p. 35-48.

- Palache, C., and Vassar, H. E., 1925, Some minerals of the Keweenawan copper deposits: pumpellyite, a new mineral sericite; saponite: *American Mineralogist*, v. 10, no. 11, p. 412-418.
- Palmer, D. E., 1930, Treatment and use of drill steel in copper and iron mines of the Lake Superior districts, MS: Michigan College of Mining and Technology, 26 p.
- Palmer, H. C., 1970, Paleomagnetism and correlation of some Middle Keweenawan rocks, Lake Superior: *Canadian Journal of Earth Sciences*, v. 7, p. 1410-1436.
- Palmer, H. C., and Davis, D. W., 1987, Paleomagnetism and U-Pb geochronology of volcanic rocks from Michipicoten Island, Lake Superior, Canada: precise calibration of the Keweenawan Polar Wander Track: *Precambrian Research*, v. 37, p. 157-171.
- Palmer, H. C., and Halls, H. C., 1986, Paleomagnetism of the Powder Mill Group, Michigan and Wisconsin: A reassessment of the Logan Loop: *Journal of Geophysical Research*, v. 91, no. B11, p. 11571-11580.
- Palmer, H. C., Halls, H. C., and Pesonen, L. J., 1981, Remagnetization in Keweenawan rocks 1: Conglomerates: *Canadian Journal of Earth Sciences*, v. 18, no. 3, p. 599-618.
- Papadakis, J., 1954, Geology of part of the Bete Grise area, Keweenaw Peninsula, Michigan, MS: Michigan College of Mining and Technology.
- Pardee, F. G., 1928, Michigan iron mining industry: *Proceedings of the Lake Superior Mining Institute*, v. 26, p. 182-195.
- , 1929, Recent work of the state geological surveys in Huronian and Keweenawan areas: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 166-172.
- , 1933a, Mining on the Gogebic Range, *in* Hotchkiss, W. O., ed., *Lake Superior Region*, Volume 23: Washington, D. C., U.S. Government, p. 60-65.
- , 1933b, Mining on the Marquette Range, *in* Hotchkiss, W. O., ed., *Lake Superior Region*, Volume 23: Washington, D. C., U.S. Government, p. 21-29.
- , 1945, Michigan's mythical gold mines: *Michigan Conservation*, v. 14, no. 11, p. 5, 9-10.
- , 1948a, Iron ore reserves in Michigan: *Michigan Conservation*, v. 17, no. 9, p. 10-11.
- , 1948b, Iron ore reserves in Michigan: *Mining and Metallurgy*, v. 29, no. 503, p. 613-614.
- Parker, B. K., 1981, Rare earth and related elements in the Goodrich Quartzite: Michigan Geological Survey Open File Report, v. 81-2.
- Parker, D. C., 1959, A petrologic investigation of the Greenstone flow at Tamarack Location, Houghton County, Michigan, MS: Michigan College of Mining and Technology, 95 p.
- Parker, R. A., 1888, The new Michigan gold fields: *Engineering Mining Journal*, v. 46, p. 238-239.
- , 1893, The iron ore region of Lake Superior: *Engineering Magazine*, v. 6, p. 152-175.
- Parks, R. D., 1928, Recent developments in methods of mining in the Michigan iron mines: *Proceedings of the Lake Superior Mining Institute*, v. 26, p. 115-152.
- Parnall, W. E., Jr., 1901, No. 5 shaft at the Tamarack mine: *Proceedings of the Lake Superior Mining Institute*, v. 7, p. 50-61.
- Parsons, W. H., 1947, Michigan mineral localities: *Midwest Geology*, v. 1, no. 2, p. 8-9.
- Pascoe, C. F., 2001, Three dimensional geologic model and gypsum distribution of the Cascade taconite deposit near Palmer, Marquette County, Michigan, MS: Michigan Technological University.
- Patenaude, R. W., 1962, Results of a regional aeromagnetic survey of a part of upper and lower Michigan, MS: University of Wisconsin.
- Paull, R. A., 1986, Resource evaluation; Oil and gas potential of Keweenawan Midcontinent Rift System in northwestern Wisconsin: *Geoscience Wisconsin*, v. 11, p. 64-73.
- Peach, P. A., 1965, The Clare River (Precambrian) Syncline, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., *Guidebook: Geology of Central Ontario*, Michigan Basin Geological Society, p. 4-8.

- Pearl, H. I., 1930, A new aid to exploration in the Lake Superior district: Proceedings of the Lake Superior Mining Institute, v. 28, p. 85-98.
- Peck, A. B., 1917, Mirabilite from the Isle Royale copper mine, Houghton, Michigan: American Mineralogist, v. 2, no. 5, p. 62-63.
- Penfield, S. L., 1885, Crystals of analcite from the Phoenix mine, Lake Superior copper region: American Journal of Science, v. 130, no. 176, p. 112-113.
- Penfield, S. L., and Sperry, F. L., 1886, Pseudomorphs of garnet from Lake Superior and Salida, California: American Journal of Science, v. 132, no. 190, p. 307-311.
- Persons, H. C., 1954, Besser celebrates Golden Anniversary: Rock Products, v. 57, no. 7, p. 119-122.
- Pesonen, L. J., and Halls, H. C., 1979, Paleomagnetism of Keweenawan dikes from Baraga and Marquette Counties, Northern Michigan: Canadian Journal of Earth Sciences, v. 16, no. 11, p. 2136-2149.
- Peterman, Z. E., and Day, W., 1989, Early Proterozoic activity on Archean faults in the western Superior province – Evidence from pseudotachylite: Geology, v. 17, p. 1089-1092.
- Peterson, W. L., 1982, Preliminary surficial geologic map of the Iron River 1° x 2° quadrangle, Michigan and Wisconsin: U.S. Geological Survey Open-File Report, v. 82-301.
- Pettijohn, F. J., 1943, Basal Huronian conglomerates of Menominee and Calumet Districts, Michigan: Journal of Geology, v. 51, p. 387-397.
- , 1946, Geology of the Crystal Falls-Alpha iron-bearing district, Iron County, Michigan, scale 1:12,000.
- , 1951, Geology and magnetic anomalies of T. 42 N., R. 30 W., Dickinson County, Michigan: Michigan Geological Survey Open-file Report, p. 1-30.
- , 1952, Precambrian tillite, Menominee District, Michigan: Geological Society of America Bulletin, v. 63, p. 1289-1289.
- , 1957, Paleocurrents of Lake Superior Precambrian Quartzites: Geological Society of America Bulletin, v. 68, p. 469-480.
- , 1958, Geology of the Northern Crystal Falls area, Iron County, Michigan: U. S. Geological Survey Circular, v. 153, p. 1-17.
- , 1962, Dimensional Fabric and Ice Flow, Precambrian (Huronian) Glaciation: Science, v. 135, p. 442-442.
- , 1970, Geology and magnetic data for the northern Crystal Falls area, Michigan: Michigan Geological Survey Report of Investigation, v. 8, p. 1-23.
- , 1972, Geology and magnetic data for southern Crystal Falls area, Michigan: Michigan Geological Survey Report of Investigation, v. 9, p. 1-31.
- Pettijohn, F. J., and Bastron, H., 1959, Chemical composition of argillites of the Cobalt Series (Precambrian) and the problem of soda-rich sediments: Geological Society of America Bulletin, v. 70, p. 593-600.
- Pettijohn, F. J., Gair, J. E., Wier, K. L., and Prinz, W. C., 1969, Geology and magnetic data for Alpha-Brule River and Panola Plains areas: Michigan Geological Survey Report of Investigation, v. 10, p. 1-12.
- Pettijohn, F. J., and Hildebrand, F. A., 1941, Archean-Huronian unconformity on the Menominee Iron Range, Michigan: Geological Society of America Bulletin, v. 52, p. 1927-1927.
- Pettit, W., 1847, Remarks respecting the copper district of Lake Superior: Franklin Inst. Jour., v. 43, no. 5, p. 338-344.
- Phelps, F. B., 1892, The copper region of Michigan: Engineering Magazine, v. 4, p. 47-63.
- Philip, L. R., and Van De Meent, D., 1983, Characterization of Precambrian kerogens by analytical pyrolysis: Precambrian Research, v. 20, p. 3-16.
- Philips, G. R., 1974, Shallow resistivity survey of the north-central portion of Michigan's Upper Peninsula, MS: Michigan Technological University.

- Phillion, G. W., 1962, Fracture pattern analysis of the Keweenaw Peninsula, MS: Michigan College of Mining and Technology, 87 p.
- Phillips, W. M., 1979, The Michigamme intrusion, a case study of the importance of remanent magnetization interpretations, Marquette County, Michigan, MS: Michigan State University, 90 p.
- Phillips, W. S., Pearson, D. C., Edwards, C. L., and Stump, B. W., 1997, Microseismicity induced by a controlled, mine collapse at White Pine, Michigan: *International Journal of Rock Mechanics and Mining Sciences*, v. 34, no. 3–4, p. 246.e241-246.e214.
- Pietrzak-Renaud, N., and Davis, D., 2014, U–Pb geochronology of baddeleyite from the Belleview metadiabase: Age and geotectonic implications for the Negaunee Iron Formation, Michigan: *Precambrian Research*, v. 250, no. 0, p. 1-5.
- Pietrzak, N., 2011, The Complex Paragenetic History of Basal Negaunee Iron Formation Iron Ores, Tilden Mine, Marquette District, Upper Michigan, PhD: The University of Western Ontario, 104 p.
- Piggot, A. S., 1858, History of the copper region of Lake Superior: *Mining Magazine*, v. 10, p. 124-142.
- Pollock, J. P., Schillinger, A. W., and Bur, T., 1960, A geochemical anomaly associated with a glacially transported boulder train, Mt. Bohemia, Keweenaw County, Michigan, 21st International Geological Congress, Volume 21, p. 20-27.
- Pollock, J. P., and Weege, R. J., 1966, Exploration methods in the Copper Country, Keweenaw Peninsula, Michigan: Nevada Bureau of Mines, Report, v. 13, no. C, p. 51-61.
- Pope, G., 1901, Some early mining days at Portage Lake: *Proceedings of the Lake Superior Mining Institute*, v. 7, p. 17-31.
- Porturas, P. A., 1945, Granitization in the Lake Pelesier area, formerly known as Lake Mary, Marquette County, Michigan, MS: Michigan College of Mining and Technology, 65 p.
- Posselt, C., 1856, Die Kupfer-Distrikte des Obersee's Neues Jahrbuch für Mineralogie, Geologie, und Palaeontologie, p. 1-10.
- Powell, C. M., 1969, Intrusive Sandstone Dykes in the Siamo Slate near Negaunee, Michigan: *Geological Society of America Bulletin*, v. 80, p. 2585-2594.
- , 1970, Intrusive sandstone dykes in the Siamo Slate near Negaunee, Michigan: reply: *Geological Society of America Bulletin*, v. 81, p. 3181-3184.
- , 1972, Tectonic Dewatering and Strain in the Michigamme Slate, Michigan: *Geological Society of America Bulletin*, v. 83, p. 2149-2158.
- Powers, S., and Lane, A. C., 1916, Magnetic differentiation in effusive rocks: *American Institute of Mining Engineers Bulletin*, v. 110, p. 535-548.
- , 1917, Magnetic differentiation in effusive rocks: *American Institute of Mining Engineers Transactions*, v. 54, p. 442-455.
- Pratt, L. M., Summons, R. E., and Hieshima, G. B., 1991, Sterane and triterpane biomarkers in the Precambrian Nonesuch Formation, North American Midcontinent Rift: *Geochimica et Cosmochimica Acta*, v. 55, no. 3, p. 911-916.
- Price, K. I., Huntoon, J. E., and McDowell, S. D., 1996, Thermal history of the 1.1-Ga Nonesuch Formation, North American Mid-continent Rift, White Pine, Michigan: *American Association of Petroleum Geologists Bulletin*, v. 80, no. 1, p. 1-15.
- Price, K. L., 1993, Thermal history of the Oronto Group: Midcontinent Rift System, Michigan : Illite-smectite geothermometry as a limiting parameter for numerical simulations MS: Michigan Technological University.
- Price, K. L., and McDowell, S. D., 1993, Illite/smectite geothermometry of the Proterozoic Oronto Group, Midcontinent Rift system: *Clays and Clay Minerals*, v. 41, no. 2, p. 134-147.
- Price, M. L., 1977, Trace element distribution in the Native Copper from the Centennial Number 3 Mine, Houghton County, Michigan, MS: Michigan State University, 116 p.

- Prinz, W., 1952, The geology of a portion of the Quinnesec igneous complex south of Iron Mountain, Michigan, MS: Ohio State University, 1-90 p.
- Prinz, W. C., 1959, Geology of the Southern Part of the Menominee District, Michigan and Wisconsin, PhD: Yale University.
- Prinz, W. C., Gair, J. E., and Cannon, W. F., 1975, Greenstone, *in* Earney, F. C. F., and Hughes, J. O., eds., Twenty-first Annual Institute on Lake Superior Geology Proceedings, p. 41-86.
- Prugger, A. F., and Woods, D. V., 1984, The pattern of anomalous geomagnetic variation fields over the midcontinent gravity high: *Journal of Geophysical Research: Solid Earth*, v. 89, no. B9, p. 7773-7782.
- Pufahl, P. K., Hiatt, E. E., and Kyser, T. K., 2010, Does the Paleoproterozoic Animikie Basin record the sulfidic ocean transition?: *Geology*, v. 38, no. 7, p. 659-662.
- Pufahl, P. K., Hiatt, E. E., Stanley, C. R., Morrow, J. R., Nelson, G. J., and Edwards, C. T., 2007, Physical and chemical evidence of the 1850 Ma Sudbury impact event in the Baraga Group, Michigan: *Geology*, v. 35, no. 9, p. 827-830.
- Puffer, J. G., 1965, The petrology of a portion of the Mellon gabbro complex and its relationship to the Keweenawan basalts and the Tyler Formation, MS: Michigan State University.
- Puffett, W. P., 1969, The Reany Creek Formation, Marquette County, Michigan: U. S. Geological Survey Bulletin, v. 1274-F, p. 1-25.
- , 1974, Geology of the Negaunee Quadrangle, Marquette County, Michigan: U. S. Geological Survey Professional Paper, v. 788, p. 1-51.
- Pumpelly, R., 1871a, The paragenesis and derivation of copper and its associates on Lake Superior: *American Journal of Science*, v. 102, no. 9, p. 188-198.
- , 1871b, The paragenesis and derivation of copper and its associates on Lake Superior: *American Journal of Science*, v. 102, no. 10, p. 243-258.
- , 1871c, The paragenesis and derivation of copper and its associates on Lake Superior: *American Journal of Science*, v. 102, no. 11, p. 347-355.
- , 1873, Upper Peninsula, pt. II: Copper District: Michigan Geological Survey, v. 1, p. 1-143.
- , 1875, On pseudomorphs of chlorite after garnet at the Spurr Mountain iron mine, Lake Superior: *American Journal of Science*, v. 110, no. 55, p. 17-21.
- , 1876, The iron district of Michigan, centennial Committee: American Institute of Mining Engineers Transactions, p. 1-5.
- , 1878a, Metasomatic development of the copper-bearing rocks of Lake Superior: *American Academy of Arts and Sciences Proceedings*, v. 13, p. 253-309.
- , 1878b, Metasomatic development of the copper-bearing rocks of Lake Superior; discussion, entitled Eruptive copper-bearing rocks of Lake Superior: *American Journal of Science*, v. 116, no. 92, p. 143-144.
- , 1880, Lithology of the Keweenawan or copper-bearing system, *Geology of Wisconsin*, Volume 3, p. 27-49.
- Qualye, S. E., 1930, Some gases encountered in the iron mines of the Lake Superior district: *Proceedings of the Lake Superior Mining Institute*, v. 28, p. 199-204.
- Quigley, T. O., and Mahin, R. A., 1999, Examples of Gold Mineralization in the Northern Block of the Ishpeming Greenstone Belt, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 97-106.
- , 2008, Field Trip 3: Geology of the Back Forty Project, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 65-85.
- Quine, J. T., 1909, Mine accidents: *Proceedings of the Lake Superior Mining Institute*, v. 14, p. 71-81.
- Quirke, T. T., Jr., 1953, A preliminary investigation of the geology of the north Michigamme area of the Marquette range, Michigan, MS: University of Minnesota, 76 p.

- Raasch, G. O., 1950, Current evaluation of the Cambrian-Keweenawan boundary [Wisconsin]: Transactions of the Illinois State Academy of Science, v. 43, p. 137-150.
- Rakestraw, L., 1965, Historic mining on Isle Royale, *in* Huber, N. K., ed., The Geologic story of Isle Royale National Park, Volume 1309, U.S. Geological Survey, p. 1-66.
- Ramsdell, L. S., 1929, An x-ray study of the domeykite group: American Mineralogist, v. 14, no. 5, p. 188-196.
- Ramsey, R. H., 1953, White Pine copper: Engineering and Mining Journal, v. 154, p. 72-87.
- Rand, J. R., 1957, Copper Mineralization at the White Pine Mine, Ontonagon County, Michigan, *in* Snelgrove, A. K., ed., Institute of Lake Superior Geology Geological Exploration, p. 17-17.
- , 1963, Vein-wall rock relationships, White Pine Mine: Economic Geology, v. 59, p. 160-161.
- Rantsey, R. H., 1953, White Pine copper: mine, mill and smelter construction stepped up as new Michigan project nears production stage: Engineering Mining Journal v. 154, no. 1, p. 72-87.
- Raza, S. N., 1953, Part of the geology of Bete Grise Bay area, Keweenaw Peninsula, Michigan, MS: Michigan Tech.
- Read, T. T., 1915, Copper mining in Michigan: Mining Magazine, v. 12, p. 220-224.
- Reddi, U. B. C., 1981, Feasibility study of different haulage systems in Republic underground mine, MS: Michigan Technological University.
- Reed, R. C., 1957, Michigan Iron Mines: Michigan Geological Survey Division, p. 1-28.
- Reed, R. C., 1965, Copper mineralization in Animikie sediments of the eastern Marquette iron range, Michigan, MS: Michigan State University.
- Reed, R. C., 1979, Michigan Precambrian - Geology and Minerals: Mining Congress Journal, v. 65, p. 46-51.
- , 1987, Porcupine Mountains Wilderness State Park: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 269-272.
- Reed, R. C., 1991, Economic geology and history of metallic minerals in the Northern Peninsula of Michigan, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 13-51.
- Repasky, T. R., 1984, Magnetotelluric profile of the Jacobsville Sandstone, MS: Michigan Technological University, 132 p.
- Reuss, R. J., 1962, An investigation of the use of seismic methods to track meteorological disturbances over Lake Superior and to locate strain releases taking place in the Houghton-Hancock areas, MS: Michigan College of Mining and Technology.
- Rho, J. H., Bauman, A. J., Boettger, H. G., and Yen, T. F., 1973, Search for porphyrin biomarkers in Nonesuch Shale and extraterrestrial samples: Space Life Sciences, v. 4, no. 1, p. 69-77.
- Rice, C. T., 1912, Copper mining at Lake Superior: Engineering Mining Journal, v. 94, p. 119-124.
- Rice, G. S., 1934, Ground movement from mining in Brier Hill mine, Norway, Michigan: American Institute of Mining Engineers Transactions, v. 109, p. 118-152.
- Richard, B. H., Wolfe, P. J., and Potter, P. E., 1997, Pre-Mount Simon Basins of Western Ohio, *in* Ojakangas, R. W., Dickas, A. B., and Green, J. C., eds., Middle Proterozoic to Cambrian Rifting, Central North America, Volume 312: Boulder, Geological Society of America, p. 243-252.
- Richards, F. B., 1930, Some aspects of the iron ore situation: Proceedings of the Lake Superior Mining Institute, v. 28, p. 35-38.
- Richards, J. W., 1901, Mohawkite: American Journal of Science, v. 161, no. 66, p. 457-458.
- Richardson, E. S., Jr., 1949, Some Lower Huronian stromatolites of northern Michigan: Fieldiana: Geology (New Series), v. 10, no. 8, p. 47-62.

- Richarz, S., 1927a, The amphibole grunerite of the Lake Superior region: *American Journal of Science*, v. 214, p. 150-154.
- , 1927b, Grunerite rocks of the Lake Superior region and their origin: *Journal of Geology*, v. 35, no. 8, p. 690-707.
- , 1932, Note on grunerite from the Lake Superior region: *American Mineralogist*, v. 17, no. 9, p. 437-442.
- Rickard, T. A., 1905, The copper mines of Lake Superior, New York, *The Engineering and Mining Journal*, 164 p.
- Riedel, R. W., 1957, Geophysical investigation of the Sturgeon River-Indian Lake area, Delta and Schoolcraft counties, Michigan, MS: University of Wisconsin.
- Ringler, J. R., 1971, Subsurface analysis of an area south of the intersecting runways at the Houghton County Memorial Airport, MS: Michigan Technological University.
- Ripley, E. M., 2014, Ni-Cu-PGE mineralization in the Partridge River, South Kawishiwi, and Eagle Intrusions; a review of contrasting styles of sulfide-rich occurrences in the Midcontinent Rift System: *Economic Geology*, v. 109, no. 2, p. 309-324.
- Rivot, L. E., 1855a, Mémoire sur le grisement du cuivre natif au lac Supérieur, Etats-Unis d'Amérique: *Academie des sciences, Comptes rendus*, v. 40, p. 1306-1309.
- , 1855b, Voyage au lac Supérieur: *Annales des Mines*, v. 5, no. 7, p. 173-328.
- , 1856a, Notice sur le lac Supérieur: *Annales des Mines*, v. 5, no. 10, p. 365-474.
- , 1856b, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 277-279.
- , 1856c, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 293-295.
- , 1856d, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 314-315.
- , 1856e, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 317-318.
- , 1856f, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 325-328.
- , 1856g, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 333-334.
- , 1856h, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 341-343.
- , 1856i, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 349-351.
- , 1856j, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 357-359.
- , 1856k, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 365-367.
- , 1856l, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 381-382.
- , 1856m, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 261-263.
- , 1856n, Über die Kupfererz-Lagerstätten am Obern See in dem Nordamerikanishcen Freistaaten: *Allegemeine berg- und hüttenmännische Zeitung*, v. 15, no. 269-271.
- Roberts, E., 1940, Geology of the Alston district, Houghton and Baraga Counties, Michigan MS: California Institute of Technology, 42 p.
- Roberts, F. C., 1911, Block carving and sub-stope system at the Tobin mine, Crystal Falls, Michigan: *Proceedings of the Lake Superior Mining Institute*, v. 16, p. 218-226.
- Roberts, H. M., and Bartley, M. W., 1943, Hydrothermal replacement in deep seated iron ore deposits of the Lake Superior region: *Economic Geology*, v. 38, no. 1, p. 1-24.

- Robertson, J. M., 1972, Geology and mineralogy of some copper-sulfide deposits, Keweenaw County, Michigan, PhD: University of Michigan, 125 p.
- , 1975, Geology and mineralogy of some copper sulfide deposits near Mount Bohemia, Keweenaw County, Michigan: *Economic Geology*, v. 70, no. 7, p. 1202-1224.
- Rogers, H. D., 1848, On the geology and mineralogy of the southern shore of Lake Superior: *Boston Society of Natural History Proceedings*, v. 2, p. 124-125.
- Rognerud, W. N., 1974, Geophysical investigation of a gravity anomaly in the central portions of Rockland and Rousseau Quadrangles, Michigan, MS: Michigan Technological University.
- Rohrbacher, T. J., 1968, Selected trace elements, copper, and iron distributions in the Copper Harbor Conglomerate (Precambrian), White Pine, Michigan, MS: University of Toledo.
- Rolker, C. M., 1877, The Allouez mine and ore dressing, as practiced in the Lake Superior copper district: *American Institute of Mining Engineers Transactions*, v. 5, p. 585-611.
- Rollo, C. C., 1967, Relation between sample spacing and error of grade estimation at the White Pine Mine, MS: Michigan Technological University.
- Romano, D., Holm, D. K., and Foland, K. A., 2000, Determining the extent and nature of Mazatzal-related overprinting of the Penokean orogenic belt in the southern Lake Superior region, north-central USA: *Precambrian Research*, v. 104, p. 25-46.
- Rominger, C. L., 1881a, Upper Peninsula, Pt. I. Marquette Iron region: *Michigan Geological Survey*, v. 4, no. 1, p. 1-154.
- , 1881b, Upper Peninsula, Pt. II. Menominee Iron region: *Michigan Geological Survey*, v. 4, no. II, p. 155-241.
- , 1895, Geological report on the Upper Peninsula of Michigan: iron and copper regions: *Michigan Geological Survey*, v. 5, no. I, p. 1-179.
- Rose, R. S., 1904, The geology of some of the lands in the Upper Peninsula: *Proceedings of the Lake Superior Mining Institute*, v. 10, p. 88-102.
- Rose, S. R., 2004, Timing constraints and significance of Paleoproterozoic metamorphism within the Penokean orogen, Northern Wisconsin and Michigan (USA), MS: Ohio University, 84 p.
- Rose, W., and Olson, J., 2013, Isle Royale: Keweenaw Rift Geology, *Institute on Lake Superior Geology*, 88 p.
- Rose, W. I., 1994, Part 3 - Volcanic Geology of Eastern Isle Royale, Michigan, 40th Annual Meeting of the Institute on Lake Superior Geology, 51 p.:
- Roseboom, E., 1951, Geology of part of the granitic complex south of the Felch Mountain range, Michigan, MS: Ohio State University, 74 p.
- Rosemeyer, T., 1999, The history, geology, and mineralogy of the White Pine Mine, Ontonagon County, Michigan: *Rocks and Minerals*, v. 74, no. 3, p. 160-176.
- , 2001, The copper-bearing conglomerate lodes of the Michigan copper country; sixth in a series of articles on the mines and minerals of Michigan's copper country: *Rocks and Minerals*, v. 76, no. 3, p. 156-188.
- , 2005, The Occurrence of Porcelaneous Datolite in Michigan's Lake Superior Copper District: *Rocks & Minerals*, v. 80, no. 3, p. 154-177.
- , 2007, The Kearsarge: Copper-bearing Amygdaloidal Lode Houghton and Keweenaw Counties, Michigan: *Rocks & Minerals*, v. 82, no. 4, p. 276-297.
- , 2009, Copper-bearing Fissure Veins, Keweenaw County, Michigan, Lake Superior Native Copper District (Part 1): *Rocks & Minerals*, v. 84, no. 4, p. 298-306.
- , 2010, The Pewabic Copper-bearing Amygdaloidal Lode, Houghton County, Michigan Lake Superior Native Copper District: *Rocks & Minerals*, v. 85, no. 4, p. 300-316.
- , 2012, Copper-banded Agates from the Kearsarge Copper-bearing Amygdaloidal Lode, Houghton County, Michigan: *Rocks & Minerals*, v. 87, no. 4, p. 352-365.

- , 2013, History and Mineralogy of the St. Louis Mine, Houghton County, Michigan: Rocks & Minerals, v. 88, no. 5, p. 404-417.
- Rosemeyer, T., and Carlson, S. M., 2000, Mineralogy of Point Prospect Keweenaw County, Michigan: Rocks & Minerals, v. 75, no. 4, p. 222-228.
- Rosenberger, E. J., 1961, The relationships of Huronian sediments to associated igneous rocks in sections 22 and 23, T47N, R26W, Marquette County, Michigan, MS: Michigan State University.
- Rossell, D., 2008, Field Trip 7: Geology of the Keweenawan BIC Intrusion, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 181-199.
- Rossell, D. M., 1983, Alteration of the Deer Lake Peridotite in the vicinity of the Ropes Mine, Marquette County, Michigan, MS: Michigan Technological University.
- Rothwell, R. P., 1888, Systems of minning in large ore bodies of soft ore: American Institute of Mining Engineers Transactions, v. 16, p. 862-870.
- Rowley, P. D., 1964, Geological investigation of a portion of the southern complex, Northern Peninsula, Michigan, BS: Carleton College.
- , 1965, Precambrian Geology in Humboldt Township, Marquette County, Michigan: Journal of the Minnesota Academy of Science, v. 32, no. 3, p. 197-200.
- Roy, J. L., and Robertson, W. A., 1978, Paleomagnetism of the Jacobsville Formation and the Apparent polar path for the interval -1100 to -670 m.y. for North America: Journal of Geophysical Research, v. 83, no. B3, p. 1289-1304.
- Roy, R. F., 1963, Heat flow measurements in the United States, PhD: Harvard University.
- Royce, S., 1915, General description of the Gogebic range: Proceedings of the Lake Superior Mining Institute, v. 20, p. 22-30.
- , 1932, Additional notes on secondary concentration of Lake Superior iron ores: discussion: Economic Geology, v. 27, no. 5, p. 487-491.
- , 1933, Additional notes on secondary concentration of Lake Superior iron ores: discussion: Economic Geology, v. 28, no. 3, p. 293-293.
- , 1936a, Geology of Lake Superior iron deposits: Mining Congress Journal, v. 22, no. 3, p. 16-30.
- , 1936b, Geology of Lake Superior iron deposits: Proceedings of the Lake Superior Mining Institute, v. 29, p. 68-107.
- , 1936c, Geology of the Negaunee Quadrangle, Marquette County, Michigan: Proceedings of the Lake Superior Mining Institute, v. 29, p. 68-107.
- , 1937, Hydrothermal leaching of iron ores of the Lake Superior type: a modified theory: discussion: Economic Geology, v. 32, no. 3, p. 389-392.
- , 1938, Geology of the iron ranges: the influence of geological conditions on mining practice, Lake Superior iron ores: Cleveland, Lake Superior Iron Ore Association, p. 27-61.
- , 1942, Iron ranges of the Lake Superior district, *in* Newhouse, W. H., ed., Ore deposits as related to structural features: Princeton, Princeton University Press, p. 54-63.
- Rudman, A. J., Summerson, C. H., and Hinze, W. J., 1965, Geology of basement in Midwestern United States: American Association of Petroleum Geologists Bulletin, v. 49, no. 7, p. 894-904.
- Ruggles, D., 1845, Considerations respecting the copper mines of Lake Superior: American Journal of Science, v. 49, no. 1, p. 64-72.
- Ruiz, J., Jones, L. M., and Kelly, W. C., 1984, Rubidium-strontium dating of ore deposits hosted by Rb-rich rocks, using calcite and other common Sr-bearing minerals: Geology, v. 12, p. 259-262.
- Ruotsala, A. P., and Wilson, M. L., 1977, Kinoite from Calumet, Michigan: American Mineralogist, v. 62, no. 9-10, p. 1032-1033.

- Rush, R. J., 1984, Geophysical and geotechnical investigations near Dupee Shaft, Hancock Mine, Hancock, Michigan, MS: Michigan Technological University.
- Russell, D. J., 1982, Paleozoic geology of the Sault Ste. Marie-St. Joseph island area: Ontario Geological Survey Miscellaneous Paper, v. 106, p. 112-114.
- Russell, I. C., 1907, The surface geology of portions of Menominee, Dickinson and Iron Counties, Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 7-91.
- Sahakian, A. S., 1959, A petrographic and structural study of a portion of the Palmer gneiss area, Marquette district, Michigan, MS: Michigan State University.
- Saja, D. B., 1991, Structure and strain in the Proterozoic metapelites of the north-central Huron River Parautochthon, Northern Michigan, MS: Michigan Technological University.
- Sales, R. H., 1959, Discussions - The White Pine copper deposit: *Economic Geology*, v. 54, p. 947-951.
- Sampson, J., 1926, Transportation of Lake Superior iron ores from mines to furnaces: *Proceedings of the Lake Superior Mining Institute*, v. 25, p. 160-169.
- Samson, C., and West, G. F., 1994, Detailed basin structure and tectonic evolution of the Midcontinent Rift System in eastern Lake Superior from reprocessing of GLIMPCE deep reflection seismic data: *Canadian Journal of Earth Sciences*, v. 31, p. 629-639.
- Santos, J. O. S., Hartmann, L. A., McNaughton, N. J., Easton, R. M., Rea, R. G., and Potter, P. E., 2002, Sensitive high resolution ion microprobe (SHRIMP) detrital zircon geochronology provides new evidence for a hidden Neoproterozoic foreland basin to the Grenville Orogen in the eastern Midwest, USA: *Canadian Journal of Earth Sciences*, v. 39, no. 10, p. 1505-1515.
- Sauck, W. A., Parker, B. K., and Hoin, S. J., 1981, Report Accompanying Ground Magnetic Map of Horner and Spring Arbor: Michigan Geological Survey Open File Report, v. 81-1.
- Sauvage, E., 1875, Notice sur les mineraux de fer du Lac Supérieur: *Annales des Mines*, v. 7, no. 8, p. 1-35.
- Savicki, W. V., 1901, Geological Survey of Michigan: Report of field work for 1900: *Michigan Miner*, v. 3, no. 3, p. 9-11.
- Schacht, W. H., 1922, The mining methods of the Copper Range Company, Houghton, Michigan: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 76-99.
- , 1925, Mining method of the Copper Range Co.: *American Institute of Mining Engineers Transactions*, v. 72, p. 346-370.
- Schaller, W. T., 1915, The supposed vanadic acid from Lake Superior is copper oxide: *American Journal of Science*, v. 189, no. 232, p. 404-406.
- Schapiro, N., 1952, The geology of a part of the Quinnesec greenstone complex, Dickinson County, Michigan, MS: Ohio State University, 78 p.
- Schaus, O. M., 1930, Method and cost of mining hematite at the Eureka-Asteroid mine on the Gogebic range, Gogebic County, Michigan: U.S. Bureau of Mines Information Circular, v. 6348, p. 1-13.
- Scheiner, S. W., 2012, Refining Paleoproterozoic sedimentary sequence boundaries in east-central Minnesota, Carlton County implications for source, age, correlations, and tectonic histories, MS: Kent State University, 59 p.
- Schleiss, W. A., 1986, Study of vein mineralization and wall rock alteration at the Delaware Mine, Keweenaw County, Michigan, MS: Michigan Technological University, 86 p.
- Schmidt, P. W., and Williams, G. E., 2003, Reversal asymmetry in Mesoproterozoic overprinting of the 1.88 Ga Gunflint Formation, Ontario, Canada; non-dipole effects or apparent polar wander?: *Tectonophysics*, v. 377, no. 1-2, p. 7-32.
- Schmidt, R. G., 1976, Geology of the Precambrian W (Lower Precambrian) Rocks in Western Gogebic County, Michigan: U.S. Geological Survey Bulletin, v. 1407, p. 1-40.

- , 1980, The Marquette Range Supergroup in the Gogebic Iron District, Michigan and Wisconsin: U. S. Geological Survey Bulletin, v. 1460, p. 1-96.
- Schmidt, S. T., and Green, J. C., 1992, Low grade metamorphism of the Keweenaw sequence in Minnesota and Michigan, International Geological Correlation Programme, Project 294, Very Low Grade Metamorphism, Guidebook for Post-meeting field trip, 16-20 Sept., 1992, 77 p.
- Schneider, D., Holm, D., and Lux, D., 1996, On the origin of Early Proterozoic gneiss domes and metamorphic nodes, northern Michigan: Canadian Journal of Earth Sciences, v. 33, no. 7, p. 1053-1063.
- Schneider, D. A., Bickford, M. E., Cannon, W. F., Schulz, K. J., and Hamilton, M. A., 2002, Age of volcanic rocks and syn depositional iron formations, Marquette Range Supergroup: implications for the tectonic setting of Paleoproterozoic, iron formations of the Lake Superior region: Canadian Journal of Earth Sciences, v. 39, no. 6, p. 999-1012.
- Schoolcraft, H. R., 1821, Account of the native copper on the southern shore of Lake Superior with historical citations and miscellaneous remarks in a report to the Department of War: American Journal of Science, v. 3, p. 201-216.
- , 1822, Bericht über das gediegene Kupfer das sich an der Südküste des Ober-Sees in Nord-Amerika in grossen Massen findet: Annalen der Physik und Chemie, v. 70, p. 337-348.
- , 1824a, Notice of a recently discovered copper mine on Lake Superior with several other localities of minerals: American Journal of Science, v. 7, p. 43-49.
- , 1824b, Remarks on native silver from Michigan: Lyceum of Natural History of New York. Annals, v. 1, p. 247-248.
- Schroeder, M. J., 1928, Development of the pumping at the West Vulcan mine: Proceedings of the Lake Superior Mining Institute, v. 27, p. 231-247.
- Schulz, K. J., and Cannon, W. F., 2007, The Penokean Orogeny in the Lake Superior region: Precambrian Research, v. 157, no. 1-4, p. 4-25.
- Schwartz, G. M., and Forsyth, C. A., 1937, Natural versus artificial textures of copper arsenides: Economic Geology, v. 32, no. 7, p. 896-905.
- Scofield, N., 1976, Mineral chemistry applied to interrelated albitization, pumpellyitization, and native copper redistribution in some Portage Lake basalts, Michigan, MS: Michigan Technological University, 144 p.
- Scott, G., Lukey, H. M., and Strandlie, A., 2008, Field Trip 6: Sustainable recovery of iron from the Marquette District, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 127-180.
- Scott, G. W., 1971, Investigation of possible fissure copper mineralization east of Gratiot mine, Keweenaw County, Michigan, MS: Michigan Technological University, 46 p.
- Scott, G. W., and Lukey, H. M., 1999, Geologic Field Trip to the Tilden Mine, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 114-128.
- Scott, G. W., Nordstrom, P. M., and Lukey, H. M., 1999, Field Trip 3: Tilden and Empire Mines of the Marquette Iron Range, Michigan, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 107-113.
- Seaman, A. E., and Seaman, W. A., 1944, Geological column Lake Superior region in general: Michigan Geological Survey Progress Report, v. 10.
- Seaman, W. A., 1929, Geological and magnetic field work in the Keweenaw of the Michigan copper country: Proceedings of the Lake Superior Mining Institute, v. 27, p. 155-159.
- , 1944, Summary of the geology of the Marquette iron range: Michigan Geological Survey Progress Report, v. 10, p. 11-17.
- , 1945, Geology of the Spruce River and Peshekee River area, Baraga and Marquette counties, 1944: Michigan Geological Survey Progress Report, v. 11, p. 1-12.

- , 1947, Geology of the Lake Michigamme area, Baraga and Marquette Counties: Michigan Geological Survey Open File Report, v. 69, p. 1-119.
- Seasor, R. W., and Brown, A. C., 1986, Syngenetic and diagenetic concepts at White Pine, Michigan: *Canadian Mineralogist*, v. 24, p. 205-206.
- , 1989, Syngenetic and diagenetic concepts at the White Pine copper deposit, Michigan, *in* Boyle, R. W., Brown, R. W., Jefferson, A. C., Jowett, C. W., and Kirkham, R. V., eds., *Sediment-hosted stratiform copper deposits*, Volume 36, Geological Association of Canada, p. 257-267.
- Seeber, R. R., 1913, Winona stamp-mill Proceedings of the Lake Superior Mining Institute, v. 18, p. 43-62.
- Seeland, D. A., 1973, A geochemical reconnaissance for gold in the sedimentary rocks in the Great Lakes region, Minnesota to New York: *U.S. Geological Survey Bulletin*, v. 305, p. 1-16.
- Separk, E. A., 1904, Some aspects of the analyzing and grading of iron ores of the Gogebic Range: *Proceedings of the Lake Superior Mining Institute*, v. 10, p. 103-126.
- Sexton, J. L., and Henson, H., 1994, Interpretation of seismic reflection and gravity profile data in western Lake Superior: *Canadian Journal of Earth Sciences*, v. 31, p. 652-660.
- Sharpless, F. F., 1894, Ore dressing on Lake Superior: *Proceedings of the Lake Superior Mining Institute*, v. 2, p. 97-104.
- Sheldon, N. D., 2012, Microbially Induced Sedimentary Structures in the ca. 1100 ma Terrestrial Midcontinent Rift of North America, *in* Noffke, N., and Chafetz, H., eds., *Microbial Mats in Siliciclastic Depositional Systems through Time*, Volume 101: Tulsa, Society for Sedimentary Geology, p. 153-162.
- Shen, W., Ritzwoller, M. H., and Schulte-Pelkum, V., 2013, Crustal and uppermost mantle structure in the central U.S. encompassing the Midcontinent Rift: *Journal of Geophysical Research: Solid Earth*, v. 118, no. 8, p. 4325-4344.
- Shepeck, A. W., 1985, Characterization of the ore host rock and hydrothermal system at the Ropes Gold Mine, Ishpeming, Michigan, MS: Michigan Technological University.
- Shepherd, F., 1847, Remarks on a boulder mass of native copper from the southern shore of Lake Superior: *American Journal of Science*, v. 54, no. 10, p. 115-116.
- Sherman, H. M., 2004, Hydrogeochemical controls on uranium in aquifers of the Jacobsville Sandstone, PhD: Michigan Technological University, 132 p.
- Sherman, H. M., Gierke, J. S., and Anderson, C. P., 2007, Controls on spatial variability of uranium in sandstone aquifers: *Ground Water Monitoring and Remediation*, v. 27, no. 2, p. 106-118.
- Shields, R. H., 1922, Organization, reorganization and consolidation of the Arcadian mine: *Proceedings of the Lake Superior Mining Institute*, v. 22, p. 100-105.
- Shirey, S. B., 1997, Re-Os isotopic compositions of midcontinent rift system picrites: implications for plume-lithosphere interaction and enriched mantle sources: *Canadian Journal of Earth Sciences*, v. 34, p. 489-503.
- Shirey, S. B., Klewin, K. W., Berg, J. H., and Carlson, R. W., 1994, Temporal changes in the sources of flood basalts: Isotopic and trace element evidence from the 1100 Ma old Keweenaw Mamainse Point Formation, Ontario, Canada: *Geochimica et Cosmochimica Acta*, v. 58, p. 4475-4490.
- Shoja-Taheri, J., 1970, Geophysical investigation along National Forest Highway 16, Houghton and Ontonagon Counties, Michigan, MS: Michigan Technological University.
- Shrake, D. L., 1991, The Middle Run Formation - a subsurface stratigraphic unit in Southwestern Ohio: *Ohio Journal of Science*, v. 91, no. 1, p. 49-55.
- Shrake, D. L., Carlton, R. W., Wickstrom, L. H., Potter, P. E., Richard, B. H., Wolfe, P. J., and Sittler, G. W., 1991, Pre-Mount Simon Basin under the Cincinnati Arch: *Geology*, v. 19, no. 2, p. 139-142.

- Shumway, W. A., 1882, The Marquette iron region: School of Mines Quarterly, Columbia University, v. 3, p. 35-48, 103-117, 197-207, 243-253.
- Sibley, D. F., 1978, K-Feldspar Cement in Jacobsville Sandstone: Journal of Sedimentary Petrology, v. 48, no. 3, p. 983-985.
- Siebenthal, W. A., 1906, Methods of iron ore analysis used in the laboratories of the iron mining companies of the Lake Superior mining region: Proceedings of the Lake Superior Mining Institute, v. 11, p. 71-138.
- Sigsby, R. M., 1960, A study of the pyritic-carbonaceous slate from the Sherwood mine, Iron River, Michigan, MS: Michigan College of Mining and Technology.
- Sikkila, K. M., 1987, Structural Analysis of Proterozoic Metasediments, Northern Falls River, Baraga County, Michigan, MS: Michigan Technological University.
- Simmons, G. C., 1974, Bedrock geologic map of the Ishpeming Quadrangle, Marquette County, Michigan, scale 1:24,000.
- Simonds, C. H., 1971, Recrystallization and grain growth of quartz and hematite in a metamorphic gradient, Negaunee Iron Formation, Upper Peninsula, Michigan, PhD: University of Illinois at Urbana-Champaign, 102 p.
- Simonson, B. M., 1987, Early silica cementation and subsequent diagenesis in arenites from four early Proterozoic iron formations of North America: Journal of Sedimentary Petrology, v. 57, p. 494-511.
- Sims, P. K., 1976, Precambrian tectonics and mineral deposits, Lake Superior Region: Economic Geology, v. 71, p. 1092-1127.
- Sims, P. K., Anderson, J. L., Bauer, R. L., Chandler, V. W., Hanson, G. N., Kalliokoski, J., Morey, G. B., Mudrey, M. G., Jr., Ojakangas, R. W., Peterman, Z. E., Schulz, K. J., Shirey, S. B., Smith, E. I., Southwick, D. L., Van Schmus, W. R., and Weiblen, P. W., 1993, The Lake Superior Region and Trans-Hudson orogen, *in* Sims, P. K., ed., The Geology of North America, Volume C2: Boulder, Geological Society of America, p. 11-115.
- Sims, P. K., Card, K. D., Morey, G. B., and Peterman, Z. E., 1980, The Great Lakes Tectonic Zone – A major crustal structure in central North America: Geological Society of America Bulletin, v. 91, p. 690-698.
- Sims, P. K., and Day, W. C., 1992, A regional structural model for gold mineralization in the southern part of the Archean Superior province, United States: U. S. Geological Survey Bulletin, v. 1904-M, p. 1-19.
- Sims, P. K., and Peterman, Z. E., 1976, Geology and Rb-Sr ages of Reactivated Precambrian Gneisses and Granites in the Marenisco-Watersmeet Area, Northern Michigan: Journal of Research of the U.S. Geological Survey, v. 4, no. 4, p. 405-414.
- , 1981, Marenisco-Watersmeet area, *in* Kalliokoski, J. O., Mudrey, M. G., Jr., Peterman, J. F., and Sims, P. K., eds., 1981 Archean geochemistry field conference: International Geologic Correlation Program Project 092, p. 6-36.
- Sims, P. K., and Peterman, Z. E., 1983, Evolution of Penokean foldbelt, Lake Superior region, and its tectonic environment: Geological Society of America Memoirs, v. 160, p. 3-14.
- Sims, P. K., and Peterman, Z. E., 1992, Geology of the Great Lakes Tectonic Zone in the Marquette Area, Michigan -- A Late Archean Paleosuture, *in* Dickas, A. B., and Brown, B. A., eds., 38th Annual Meeting of the Institute on Lake Superior Geology, Volume 38, p. 104-135.
- Sims, P. K., Peterman, Z. E., and Prinz, W. C., 1977, Geology and Rb-Sr age of Precambrian W Puritan Quartz Monzonite, Northern Michigan: Journal of Research of the U.S. Geological Survey, v. 5, no. 2, p. 185-192.
- Sims, P. K., Van Schmus, W. R., Schulz, K. J., and Peterman, Z. E., 1989, Tectono-stratigraphic evolution of the early Proterozoic Wisconsin magmatic terranes of the Penokean orogen: Canadian Journal of Earth Sciences, v. 26, p. 2145-2158.

- Singewald, J. T., Jr., 1928, A genetic comparison of the Michigan and Bolivian, copper deposits: *Economic Geology*, v. 23, no. 1, p. 55-61.
- Slawson, C. B., 1933, The Jasper Conglomerate, an Index of Drift Dispersion: *Journal of Geology*, v. 41, no. 5, p. 546-552.
- Slawson, C. B., 1934, Sussexite from Iron County, Michigan: *American Mineralogist*, v. 19, no. 12, p. 575-578.
- Sleep, N. H., and Sloss, L. L., 1978, A deep borehole in the Michigan Basin: *Journal of Geophysical Research*, v. 83, p. 5815-5819.
- Sliney, R. E., 1988, Comparative mineralogy and geochemistry of a stratigraphic unit within the upper shale member of the Nonesuch Formation, White Pine, Michigan, MS: University of Michigan.
- Slitor, T. W., and Kulbieda, G., 1975, The Empire Mine and Mill, Palmer, Michigan, *in* Earney, F. C. F., and Hughes, J. O., eds., *Twenty-first Annual Institute on Lake Superior Geology Proceedings*, p. 175-185.
- Sloss, L. L., 1982, The Michigan Basin, *in* Proctor, P. D., and Koenig, J. W., eds., *Selected structural basins of Midcontinent, USA, Volume 3*, University of Missouri-Rolla, p. 25-29.
- Smale, G. R., 1958, A field and petrographic study of the Freda Formation along the Montreal River, Gogebic County, Michigan, MS: Michigan State University.
- Small, J. R., and Bornhorst, T. J., 1990, Precambrian Geology of the Penny Lake Area, Marquette Greenstone Belt, Michigan: *Contribution to Michigan Geology Report*, v. 90-1, p. 1-25.
- Smith, C. C., 1980, Underground hydrofracturing in-situ stress measurements near the Keweenaw Fault in Upper Michigan, MS: Michigan Technological University.
- Smith, E. I., 1983, Geochemistry and evolution of the early Proterozoic, post-penokean rhyolites, granites, and related rocks of south-central Wisconsin, U. S. A., *in* Medaris, L. G., ed., *Early Proterozoic Geology of the Great Lakes Region, Volume 160: Boulder*, Geological Society of America, p. 113-128.
- Smith, R. R., 1950, Effects of compression and impact on the rocks of the Marquette, Gogebic, and Menominee Ranges, MS: Michigan College of Mining and Technology.
- Smith, T. J., Steinhart, J. S., and Aldrich, L. T., 1966a, Crustal structure under Lake Superior, *in* Steinhart, J. S., and Smith, T. J., eds., *The Earth beneath the continents, Volume 10: Washington D.C., American Geophysical Union*, p. 181-197.
- , 1966b, Lake Superior Crustal Structure: *Journal of Geophysical Research*, v. 71, p. 1141-1172.
- Smyth, H. L., 1893, A contact between the Lower Huronian and the underlying granite in the Republic trough, near Republic, Michigan: *Journal of Geology*, v. 1, no. 3, p. 268-274.
- , 1894a, The quartzite tongue at Republic, Michigan: *Journal of Geology*, v. 2, no. 7, p. 680-691.
- , 1894b, Relations of the Lower Menominee and Lower Marquette Series in Michigan (preliminary): *American Journal of Science*, v. 147, p. 216-223.
- , 1897, Magnetic observations in geological mapping: *American Institute of Mining Engineers Transactions*, v. 26, p. 640-709.
- Snelgrove, A. K., 1942, Upper Peninsula of Michigan Mineral Industries Conference: Houghton, Michigan Tech, p. 21.
- Snelgrove, A. K., Seaman, W. A., and Ayres, V. L., 1944, Strategic Minerals Investigations in Marquette and Baraga Counties, 1943: *Michigan Geological Survey Progress Report*, v. 10, p. 1-42.
- Snider, D. W., 1977a, A ground investigation of an aeromagnetic anomaly in north-central Dickinson County, Michigan: *Michigan Geological Survey Report of Investigation*, v. 16, p. 1-18.

- , 1977b, Investigation of a reported copper-silver showing in section 30, T50N, R26W, Marquette County, Michigan: Michigan Geological Survey Open-file Report, v. 77-2, p. 1-8.
- Soholt, D. E., 1964, Metamorphic facies of the Groveland mine, northern Michigan, MS: University of Minnesota.
- Solberg, R. A., 1958, Petrology and petrofabrics of the Felch metronite quarry, Dickinson County, Michigan, MS: Michigan State University.
- Sondergaard, D. A., 2000, Structural geology of the Broken Bluffs Marquette County, Michigan, MS: Michigan Technological University.
- Southwick, D. L., 1995, The nature of the Foreland margin of the Penokean orogen in the Great Lakes region of the U.S.A.: *Canadian Mineralogist*, v. 33, p. 937-938.
- Southwick, D. L., Morey, G. B., and Mossler, J. H., 1986, Fluvial origin of the lower Proterozoic Sioux Quartzite, southwestern Minnesota: *Geological Society of America Bulletin*, v. 97, p. 1432-1441.
- Spencer, J. W. W., 1876, On the Nipigon or copper-bearing rocks of Lake Superior: *Canadian Naturalist and Geologist and Proceedings of the Natural History Society of Montreal*, v. 8, p. 55-81.
- Sperr, F. W., 1912, Failures of the rule of following the hanging, in the development of Lake Superior copper mines: *Proceedings of the Lake Superior Mining Institute*, v. 17, p. 238-246.
- Spinks, S. C., Parnell, J., Bowden, S. A., Taylor, R. A. D., and Maclean, M. E., 2014, Enhanced organic carbon burial in large Proterozoic lakes: Implications for atmospheric oxygenation: *Precambrian Research*, v. 255, Part 1, no. 0, p. 202-215.
- Spiroff, K., 1938, A mineralogical trip through the Michigan copper country: *Rocks and Minerals*, v. 13, no. 5, p. 133-143.
- , 1940, A mineralogical trip through the Michigan iron range: *Rocks and Minerals*, v. 15, no. 9, p. 291-297.
- , 1941, Dip-needle survey of Wyandotte-Winona area, Houghton County, and Cherokee area, Ontonagon County, : Michigan Geological Survey Progress Report, v. 7, p. 1-17.
- , 1950, Seneca Calcite: *Rocks and Minerals*, v. 25, no. 9-10, p. 466-466.
- , 1951, Geology of the copper country and its history: *Midwest Geology*, v. 5, no. 1, p. 1-6.
- Spiroff, K., and Broderick, T. M., 1947, Michigan Copper Country, Michigan Academy of Sciences, Arts and Letters and Michigan Geological Society, Annual Field Trip of the Michigan Academy of Sciences, Arts and Letters and Michigan Geological Society, 27 p.
- Spiroff, K., and Slaughter, A. E., 1961, Geologic Features of parts of Houghton, Keweenaw, Baraga, and Ontonagon Counties, Michigan: Michigan Basin Geological Society Fieldtrip, 50 p.
- Spurr, J. E., 1902, The original source of the Lake Superior iron ore: *American Geologist*, v. 29, no. 6, p. 335-349.
- , 1920, The copper ores of Lake Superior: *Engineering Mining Journal*, v. 110, no. 8, p. 355-357.
- Stadnik, P. M., 1983, Trace element characterization of pyrite in the Michigamme formation Upper Peninsula, Michigan, MS: Michigan Technological University.
- Stakes, D. S., 1978, Mineralogy and geochemistry of the Michigan deep hole metagabbro compared to seawater hydrothermal alteration: *Journal of Geophysical Research*, v. 83, no. B12, p. 5820-5824.
- Star, C., 1959, A paleocurrent study of the Outer Conglomerate along the Montreal River, Gogebic County, Michigan, MS: Michigan State University.
- Stead, F. W., 1950, Airborne radioactivity survey of parts of Marquette, Dickinson and Baraga counties, Michigan: U.S. Geological Survey and U.S. Atomic Energy Commission, scale 1" = 2 miles.

- Steder, R. M., 1958, A field and petrographic study of Millie pit and adjacent area, Dickinson County, Michigan, MS: Michigan State University.
- Steidtmann, E., 1915, Summaries of pre-Cambrian literature of North America for 1908, 1910, 1911 and part of 1912, pt. III, Lake Superior region and isolated Pre-cambrian areas of the Mississippi: *Journal of Geology*, v. 23, no. 3, p. 261-271.
- , 1920a, Summaries of pre-Cambrian literature of North America: *Journal of Geology*, v. 28, no. 6, p. 558-568.
- , 1920b, Summaries of pre-Cambrian literature of North America: *Journal of Geology*, v. 28, no. 7, p. 643-658.
- , 1920c, Summaries of pre-Cambrian literature of North America: *Journal of Geology*, v. 28, no. 8, p. 743-751.
- , 1921a, Summaries of pre-Cambrian literature of North America: *Journal of Geology*, v. 29, no. 1, p. 81-86.
- , 1921b, Summaries of pre-Cambrian literature of North America: *Journal of Geology*, v. 29, no. 2, p. 173-187.
- Stein, C. A., Kley, J., Stein, S., Hindle, D., and Keller, G. R., 2015, North America's Midcontinent Rift: When rift met LIP: *Geosphere*, v. 11, no. 5, p. 1607-1616.
- Stein, C. A., Stein, S., Merino, M., Randy Keller, G., Flesch, L. M., and Jurdy, D. M., 2014, Was the Midcontinent Rift part of a successful seafloor-spreading episode?: *Geophysical Research Letters*, v. 41, no. 5, p. 1465-1470.
- Steinhart, J. S., Meyer, R. P., and Woollard, G. P., 1961, Wisconsin-upper Michigan, 1958-1959, *in* Steinhart, J. S., and Meyer, R. P., eds., *Explosion studies of continental structure*, Volume 622: Washington D.C., Carnegie Institute, p. 248-304.
- Steinhart, J. S., and Smith, T. J., 1966, Time term and structure in the western Lake Superior region, *in* Steinhart, J. S., and Smith, T. J., eds., *The Earth beneath the continents*, Volume 10: Washington D.C., American Geophysical Union, p. 198-240.
- Stevens, H. J., 1902, Eighth annual review of the Lake Superior copper industry: *Michigan Miner*, v. 4, no. 3, p. 16-18.
- , 1905, General information of the geology and mines of the Lake Superior copper district: *American Institute of Mining Engineers Bi-monthly Bulletin*, v. 1, p. 208-222.
- , 1907, Mines of the Lake Superior copper district: *Proceedings of the Lake Superior Mining Institute*, v. 12, p. 8-24.
- , 1911, *The copper handbook: a manual for the copper industry of the world*, Volume 10: Houghton.
- Stevens, H. J., and Seaman, A. E., 1899, First annual review of the copper mining industry of Lake Superior, Marquette, Min. Jour. Co., Ltd, 189 p.
- Stevens, W. H., 1854, The prospects of the Lake Superior mining region: *Mining Magazine*, v. 2, p. 149-153.
- Stevenson, R. K., and Patchett, P. J., 1990, Implications for the evolution of continental crust from Hf isotope systematics of Archean detrital zircons: *Geochimica et Cosmochimica Acta*, v. 54, no. 6, p. 1683-1697.
- Stille, P., and Clauer, N., 1986, Sm-Nd isochron-age and provenance of the argillites of the Gunflint Iron Formation in Ontario, Canada: *Geochimica et Cosmochimica Acta*, v. 50, p. 1141-1146.
- Stoek, H. H., 1909, Marquette range caving method: *Mines and Minerals*, v. 30, p. 193-200.
- Stoiber, R. E., and Davidson, E. S., 1959a, Amygdule mineral zoning in the Portage Lake lava series, Michigan copper district: *Economic Geology*, v. 54, p. 1444-1460.
- , 1959b, Amygdule mineral zoning in the Portage Lake lava series, Michigan copper district: *Economic Geology*, v. 54, p. 1250-1277.
- Stonehouse, H. B., 1969a, Itinerary, *in* Stonehouse, H. B., ed., *Studies of the Precambrian of the Michigan Basin*, Michigan Basin Geological Society, p. 6-14.

- , 1969b, The Precambrian Around and Under the Michigan Basin, *in* Stonehouse, H. B., ed., Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society, p. 15-27.
- , 1969c, Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, p. 92.
- , 1970a, Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of America: North-central Section, p. 177.
- , 1970b, Precambrian of the Marquette Area, Michigan, *in* Stonehouse, H. B., ed., Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of North America: North-central Section, p. 159-177.
- Stratton, E. F., and Joyce, J. W., 1932, A magnetic study of some iron deposits: U.S. Bureau of Mines Technical Paper, v. 528, p. 1-32.
- Street, R. L., 1971, Variations in high frequency [sic] seismic noise spectrums near Houghton, Michigan, MS: Michigan Technological University.
- Strother, P. K., and Wellman, C. H., 2016, Palaeoecology of a billion-year-old non-marine cyanobacterium from the Torridon Group and Nonesuch Formation: *Palaeontology*, v. 59, no. 1, p. 89-108.
- Stuart, W. T., 1953, Progress report on ground-water conditions at the Cayia mine, near Crystal Falls, Michigan: U.S. Geological Survey Open-File Report, p. 1-27.
- Stuckless, J. S., 1980, Preliminary investigations of radioelement distribution in archean granite gneiss, Republic Area, Michigan: U.S. Geological Survey Open-File Report, v. OFR 80-1081.
- Sullivan, J. C., 1939, Sinking a new mine shaft half a mile deep: *Proceedings of the Lake Superior Mining Institute*, v. 30, p. 181-198.
- Sundeen, S. P., 1968, The petrology of a magnetite-rich portion of the Negaunee Iron Formation in the southeast part of the Marquette Range, Michigan, PhD: The University of Wisconsin - Madison, 102 p.
- Sundius, N., 1931, The optical properties of manganese-poor grunerites and cummintonites compared with those of manganese-rich members: *American Journal of Science*, v. 221, no. 124, p. 330-344.
- , 1934, The grunerite from Mount Humboldt, Michigan: *Geologiska Föreningen i Stockholm Förhandlingar*, v. 56, no. 1, p. 98-100.
- Supina, R. D., 1974, A geological-geophysical ground water study for Negaunee Township, Marquette County, Michigan, MS: Michigan Tech, 56 p.
- Suszek, T., 1991, Petrography and sedimentology of the Middle Proterozoic (Keweenaw) Nonesuch Formation, western Lake Superior region, Midcontinent Rift System, MS: University of Minnesota, 209 p.
- , 1995, Petrography and sedimentation of the middle Proterozoic (Keweenaw) Nonesuch Formation, western Lake Superior region; Midcontinent Rift System: *Proceedings of the International Conference on Basement Tectonics*, v. 10, p. 25-28.
- , 1997, Petrography and sedimentation of the middle Proterozoic (Keweenaw) Nonesuch Formation, western Lake Superior region, Midcontinent Rift System: *Special Paper - Geological Society of America*, v. 312, p. 195-210.
- Sutcliffe, R. H., 1987, Petrology of the Middle Proterozoic diabases and picrites from Lake Nipigon, Canada: *Contributions to Mineralogy and Petrology*, v. 96, p. 201-211.
- Sutton, W. J., 1898, Geology of the Penoquee-Gogebic iron-bearing district, EM: Michigan College of Mines, 1-26 p.
- Swanson-Hysell, N. L., Maloof, A. C., Weiss, B. P., and Evans, D. A. D., 2009, No asymmetry in geomagnetic reversals recorded by 1.1-billion-year-old Keweenaw basalts: *Nature Geoscience*, v. 2, p. 713-717.

- Swanson-Hysell, N. L., Maloof, A. C., Weiss, B. P., and Evans, D. A. D., 2010, No asymmetry in geomagnetic reversals recorded by 1.1-billion-year-old Keweenawan basalts (vol 2, pg 713, 2009): *Nature Geoscience*, v. 3, no. 5, p. 369-369.
- Swanson, C. O., 1930, Report on the portion of the Marquette range covered by the Michigan Geological Survey in 1929, p. 1-15.
- , 1933, Geology of the Marquette Range, *in* Hotchkiss, W. O., ed., Lake Superior Region, Volume 23: Washington, D. C., U.S. Government, p. 10-21.
- , 1934, Use of magnetic data in Michigan iron mines: *American Institute of Mining Engineers Transactions*, v. 110, p. 290-312.
- , 1937, Hydrothermal leaching of iron ores of the Lake Superior type: a modified theory: discussion: *Economic Geology*, v. 32, no. 6, p. 855-857.
- Sweet, A. T., 1930, The year's research on iron ore beneficiation at the Michigan College of Mining and Technology: *Proceedings of the Lake Superior Mining Institute*, v. 28, p. 74-84.
- Swenson, J. B., and Person, M., 2000, The role of basin-scale transgression and sediment compaction in stratiform copper mineralization: implications from White Pine, Michigan, USA: *Journal of Geochemical Exploration*, v. 69-70, p. 239-243.
- Swenson, J. B., Person, M., Raffensperger, J. P., Cannon, W. F., Woodruff, L. G., and Berndt, M. E., 2004, A hydrogeologic model of stratiform copper mineralization in the midcontinent rift system, Northern Michigan, USA: *Geofluids*, v. 4, p. 1-22.
- Swineford, A. P., 1871, Swineford's history of the Lake Superior iron district: its mines and furnaces, Marquette, Mining Journal Office, 98 p.
- , 1872a, Appendix to Swineford's history of the Lake Superior iron district, being a review of its mines and furnaces for 1871, Marquette, Mining Journal Office, 33 p.
- , 1872b, Appendix to Swineford's history of the Lake Superior iron district, being a review of its mines and furnaces for 1872, Marquette, Mining Journal Office, 71 p.
- , 1873, Appendix to Swineford's history of the Lake Superior iron district, being a review of its mines and furnaces for 1873, Marquette, Mining Journal Office, 80 p.
- , 1875, History of the discovery and workings of the silver mines in the Iron River district, Ontonagon County: *Ontonagon Miner Office*, p. 1-13.
- , 1876, History and review of the copper, iron, silver, slate, and other material interests of the south shore of Lake Superior, Marquette, Michigan, 1-280 p.
- , 1880, The Menominee iron range: history of its mines, when and by whom discovered, their present conditions and future prospects: *Mining Journal*, p. 1-44.
- , 1881, Annual review of the iron mining and other industries of the Upper Peninsula for the year ending Dec. 31, 1880: *Mining Journal*, p. 1-177.
- , 1882, Annual review of the iron mining and other industries of the Upper Peninsula for the year ending Dec. 31, 1881: *Mining Journal*, p. 1-193.
- Symons, D. T. A., 1965, Paleomagnetic studies of Lake Superior iron ore deposits, PhD: University of Toronto.
- Symons, D. T. A., Kawasaki, K., and Diehl, J. F., 2013, Age and genesis of the White Pine stratiform copper mineralization, northern Michigan, USA, from paleomagnetism: *Geofluids*, v. 13, no. 2, p. 112-126.
- Tara, M. E., 1950, The geology and petrography of Little Presque Isle, Marquette County, Michigan, MS: Michigan State University, 31 p.
- Taranovic, V., Ripley, E. M., Li, C., and Rossell, D., 2015, Petrogenesis of the Ni–Cu–PGE sulfide-bearing Tamarack Intrusive Complex, Midcontinent Rift System, Minnesota: *Lithos*, v. 212–215, p. 16-31.
- Tauxe, L., and Kodama, K. P., 2009, Paleosecular variation models for ancient times: Clues from Keweenawan lava flows: *Physics of the Earth and Planetary Interiors*, v. 177, no. 1-2, p. 31-45.

- Taylor, C. C., 1926, The Gogebic iron ore range: Proceedings of the Lake Superior Mining Institute, v. 25, p. 30-38.
- Taylor, G. L., 1972, Stratigraphy, Sedimentology and Sulphide Mineralization of the Kona Dolomite, PhD: Michigan Technological University, 112 p.
- Taylor, I. E., 1989, Middle and upper Keweenawan siliciclastics of the Lake Superior basin, PhD: McMaster University, 319 p.
- Taylor, I. E., and Middleton, G. V., 1990, Aeolian sandstones in the Copper Harbor Formation, late Proterozoic, Lake Superior basin: Canadian Journal of Earth Sciences, v. 27, no. 10, p. 1339-1347.
- Teschemacher, J. E., 1851, On the vanadium minerals from Lake Superior: American Journal of Science, v. 61, no. 32, p. 233-234.
- Teskey, D. J., and Thomas, M. D., 1994, Three-dimensional modeling of the Midcontinent Rift beneath central Lake Superior: Canadian Journal of Earth Sciences, v. 31, p. 675-681.
- Thaden, R. E., 1950, The Porcupine Mountain "Red Rock", MS: Michigan State University, 104 p.
- Theodosis, S. D., 1948, Metamorphism of the Randville Dolomite in the Felch Mountain range, Michigan, MS: Northwestern University, 68 p.
- Thiel, E. C., 1955, The structural geology of the Lake Superior syncline as revealed by gravity measurements, PhD: University of Wisconsin.
- Thiruvathukal, J. T., 1963, A regional gravity study of basement and crustal structures in the Southern Peninsula of Michigan, MS: Michigan State University.
- Thomas, M. D., and Teskey, D. J., 1994, An interpretation of gravity anomalies over the mid-continent rift, Lake Superior, constrained by GLIMPCE seismic and aeromagnetic data: Canadian Journal of Earth Sciences, v. 31, p. 682-697.
- Thompson-Rizer, C. L., 1993, Optical description of amorphous kerogen in both thin sections and isolated kerogen preparations of Precambrian to Eocene shale samples: Precambrian Research, v. 61, no. 3-4, p. 181-190.
- Thompson, J. R., 1904, The hoisting problem: Proceedings of the Lake Superior Mining Institute, v. 10, p. 72-87.
- Thompson, R. C. L., 1993, Optical description of amorphous kerogen in both thin sections and isolated kerogen preparations of Precambrian to Eocene shale samples: Precambrian Research, v. 61, no. 3-4, p. 181-190.
- Thompson, R. J., 1962, The structure and stratigraphy of a portion of the southern edge of the Dead River basin, Marquette County, Michigan, MS: Michigan State University.
- Tituskin, S. E., 1983, Rare earth elements distribution in the Negaunee iron formation, Marquette District, Michigan, MS: Michigan State University, 110 p.
- Tohver, E., Holm, D. K., van der Pluijm, B. A., Essene, E. J., and Cambray, F. W., 2007, Late Paleoproterozoic (geon 18 and 17) reactivation of the Neoproterozoic Great Lakes tectonic zone, northern Michigan, USA; evidence from kinematic analysis, thermobarometry and $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology: Precambrian Research, v. 157, no. 1-4, p. 144-168.
- Tolonen, F. J., 1939, Gravity concentration of Ironwood Formation: Proceedings of the Lake Superior Mining Institute, v. 30, p. 199-244.
- Tolunay, A., 1970, Sedimentological study of the Jacobsville Sandstone, MS: Michigan Technological University.
- Tourshou, S. I., 1930, Analysis of the electrical equipment used in the copper and iron mines of Michigan and special electrical engineering laboratory report, MS: Michigan College of Mining and Technology, 26 p.
- Townsend, J. B., 1864, Large mass of native copper: American Journal of Science, v. 87, no. III, p. 431-431.
- Trammell, J. W., and Ensign, C. O., Jr., 1964a, Ancient stream channels affect White Pine's mining techniques: Mining Engineering, v. 16, no. 12, p. 75-78.

- , 1964b, Ancient stream channels and their effect on mine planning and grade control at the White Pine mine, Michigan: Society of Mining Engineers Transactions, v. 229, p. 401-409.
- Trengrove, S. R., 1893, Description of the Calumet & Hecla stamp mills and the method of concentration in use, EM: Michigan Mining School.
- Treves, S. B., 1959, Geology of the Carney Lake Complex, Dickinson County, Michigan, PhD: The Ohio State University, 167 p.
- Trow, J., 1978, Preliminary geologic data diamond-drilling for geologic information in the Middle Precambrian basins in the western portion of Northern Michigan: U.S. Department of Energy Open File Report, v. OFR 78-1 - OFR 78-6, 123 p.
- , 1979, Appendix of analytical chemical data for final report diamond drilling for geologic information in the Middle Precambrian basins in the western portion of Northern Michigan: U.S. Department of Energy Open File Report, v. UDOE OFR GJBX-162(79) A, p. 1-78.
- Trow, J. W., 1948, The Sturgeon Quartzite of the Menominee district, Michigan, PhD: University of Chicago, 60 p.
- , 1951, Pre-Huronian glaciation and early Huronian weathering and sedimentation in the Menominee District, Michigan: Geological Society of America Bulletin, v. 62, p. 1486-1486.
- Trowbridge, C. A., 1854, Iron in the Upper Peninsula of Michigan: Transactions of the State Agricultural Society, v. 5, p. 222-225.
- Turner, T. R., 1973, Geology of the northern complex near Herman, Michigan, MS: Michigan Technological University.
- Twenhofel, W. H., 1919, Pre-Cambrian and Carboniferous algal deposits: American Journal of Science, v. 198, no. 287, p. 339-352.
- Tyler, S. A., 1949, Development of Lake Superior soft iron ores from metamorphosed Iron Formations: Geological Society of America Bulletin, v. 60, p. 1101-1124.
- Tyler, S. A., and Barghoorn, E. S., 1954, Occurrence of structurally preserved plants in Pre-Cambrian rocks of the Canadian Shield: Science, v. 119, p. 606-608.
- Tyler, S. A., Barghoorn, E. S., and Barrett, L. P., 1957, Anthracitic coal from Precambrian Upper Huronian black shales of the Iron River District, Northern Michigan: Geological Society of America Bulletin, v. 68, p. 1293-1304.
- Tyler, S. A., Marsden, R. W., Grout, F. F., and Thiel, G. A., 1940, Studies of the Lake Superior Pre-Cambrian by Accessory-Mineral Methods: Geological Society of America Bulletin, v. 51, p. 1429-1538.
- Tyler, S. A., and Twenhofel, W. H., 1952a, Sedimentation and Stratigraphy of the Huronian of Upper Michigan, Part I: American Journal of Science, v. 250, p. 1-27.
- , 1952b, Sedimentation and Stratigraphy of the Huronian of Upper Michigan, Part II: American Journal of Science, v. 250, p. 118-151.
- Ueng, W. C., Fox, T. P., Larue, D. K., and Wilband, J. T., 1988, Geochemistry and petrogenesis of the early Proterozoic Hemlock volcanic rocks and the Kiernan sills, southern Lake Superior region: Canadian Journal of Earth Sciences, v. 25, p. 528-546.
- Upham, W. E., and Martin, N. J., 1895, Variations in the detail of copper milling as practiced in the Lake Superior region, ME: Michigan Mining School, 35 p.
- Urry, W. D., 1933, The radium content of the Keweenaw basalts and some accessory minerals: American Academy of Arts and Sciences Proceedings, v. 68, no. 4, p. 125-136.
- Vallat, B. W., 1912a, The Newport iron mine: American Institute of Mining Engineers Transactions, v. 42, p. 676-694.
- , 1912b, The Newport iron mine: American Institute of Mining Engineers Bulletin, v. 59, p. 903-921.

- Vallini, D. A., 2006, The formation of authigenic xenotime in Proterozoic sedimentary basins: petrography, age and geochemistry, PhD, University of Western Australia, 59 p.
- Vallini, D. A., Cannon, W. F., and Schulz, K. J., 2006, Age constraints for Paleoproterozoic glaciation in the Lake Superior Region: detrital zircon and hydrothermal xenotime ages for the Chocolay Group, Marquette Range Supergroup: *Canadian Journal of Earth Sciences*, v. 43, no. 5, p. 571-591.
- Vallini, D. A., Cannon, W. F., Schulz, K. J., and McNaughton, N. J., 2007, Thermal history of low metamorphic grade Paleoproterozoic sedimentary rocks of the Penokean orogen, Lake Superior region: Evidence for a widespread 1786 Ma overprint based on xenotime geochronology: *Precambrian Research*, v. 157, no. 1-4, p. 169-187.
- Van Altna, P. J., 1951, Some Keweenawan sediments of Ontonagon County, Michigan, MS: Michigan College of Mining and Technology, 47 p.
- Van Der Voo, R., Henry, S. G., and Pollack, H. N., 1978, On the significance and utilization of secondary magnetizations in red beds: *Physics of the Earth and Planetary Interiors*, v. 16, no. 1, p. 12-19.
- Van der Voo, R., and Watts, D. R., 1978, Paleomagnetic results from igneous and sedimentary rocks from the Michigan Basin borehole: *Journal of Geophysical Research*, v. 83, no. B12, p. 5844-5848.
- Van Hise, C. R., 1884, On secondary enlargements of feldspar fragments in certain Keweenawan sandstones: *American Journal of Science*, v. 127, p. 399-403.
- , 1886, Upon the origin of the mica schists and black mica slates of the Penokee-Gogebic iron-bearing series: *American Journal of Science*, v. 131, no. 186, p. 453-459.
- , 1887, Note on the enlargement of hornblendes and augites in fragmental and eruptive rocks: *American Journal of Science*, v. 133, no. 197, p. 385-388.
- , 1889, The iron ores of the Penokee-Gogebic series of Michigan and Wisconsin: *American Journal of Science*, v. 137, no. 127, p. 32-48.
- , 1891a, An attempt to harmonize some apparently conflicting views of Lake Superior stratigraphy: *American Journal of Science*, v. 141, no. 242, p. 117-137.
- , 1891b, An attempt to harmonize some apparently conflicting views of Lake Superior stratigraphy: discussion: *American Geologist*, v. 7, no. 5, p. 320-327.
- , 1891c, An attempt to harmonize some apparently conflicting views of Lake Superior stratigraphy: discussion: *American Geologist*, v. 7, no. 6, p. 383-386.
- , 1892a, Correlation papers - Archean and Algonkian: *U.S. Geological Survey Bulletin*, v. 86, p. 1-549.
- , 1892b, The iron ores of the Lake Superior region: *Wisconsin Academy of Sciences Transactions*, v. 8, p. 219-227.
- , 1892c, The iron ores of the Marquette district of Michigan: *American Journal of Science*, v. 143, no. 254, p. 116-132.
- Van Hise, C. R., 1892d, The Penokee iron-bearing series of Northern Wisconsin and Michigan, PhD: The University of Wisconsin - Madison.
- Van Hise, C. R., 1893a, An historical sketch of the Lake Superior region to Cambrian time: *Journal of Geology*, v. 1, no. 2, p. 113-128.
- , 1893b, Sketch of the pre-Cambrian geology south of Lake Superior with references to illustrative localities, 5th International Geological Congress: Washington, p. 489-512.
- , 1900, Some principles controlling the deposition of ores: *American Institute of Mining Engineers Transactions*, v. 30, p. 27-177.
- , 1901a, Fundamental Changes in the Archean and Algonkian, as understood by Prof. Van Hise of the United States Geological Survey: *American Geologist*, v. 28, no. 6, p. 385-388.
- , 1901b, The iron ore deposits of the Lake Superior Region: *U.S. Geological Survey, Annual Report*, v. 21, no. III, p. 305-434.

- , 1901c, Some principles controlling the deposition of ores: American Institute of Mining Engineers Transactions, v. 31, p. 284-302.
- , 1902a, Geological work in the Lake Superior region: Proceedings of the Lake Superior Mining Institute, v. 8, p. 62-69.
- , 1902b, The iron ore deposits of the Lake Superior Region: American Geologist, v. 29, no. 1, p. 47-51.
- , 1905a, Report of the special committee for the Lake Superior region pre-Cambrian nomenclature: Michigan Geological Survey Annual Report, p. 133-143.
- , 1905b, Report of the special committee for the Lake Superior region pre-Cambrian nomenclature: Ontario Bureau of Mines Report, v. 14, no. 1, p. 269-277.
- , 1908, The problem of the pre-Cambrian: Geological Society of America Bulletin, v. 19, p. 1-28.
- Van Hise, C. R., and Bayley, W. S., 1897, The Marquette iron-bearing district of Michigan: U. S. Geological Survey Monograph, p. 1-608.
- , 1900, Menominee special, Michigan: U.S. Geological Survey, Geological Atlas Folio, v. 62, p. 1-13.
- Van Hise, C. R., Bayley, W. S., and Smyth, H. L., 1895, Preliminary Report on the Marquette iron-bearing district of Michigan, with a chapter on the Republic Trough by H.L. Smyth: U. S. Geological Survey Annual Report, v. 15, p. 477-650.
- Van Hise, C. R., and Leith, C. K., 1909, Pre-Cambrian geology of North America: U.S. Geological Survey Bulletin, v. 360, p. 1-939.
- , 1911, The Geology of the Lake Superior Region: U. S. Geological Survey Monograph, v. 52, p. 1-641.
- Van Horn, J. E., 1980, Seismotectonic study of the southwestern Lake Superior region utilizing the Upper Michigan-northern Wisconsin seismic network, MS: Michigan Technological University, 146 p.
- Van Lewen, M. C., 1957, Geology of St. Ignace Island, Ontario, and a correlation of the Keweenawan series of the Lake Superior region, MS: Michigan College of Mining and Technology.
- Van Rosendaal, D. J., 1985, Analysis of rock structures and strain in cleaved pelitic rocks, East Branch of the Huron River, Baraga County, Michigan, MS: Michigan Technological University.
- Van Schmus, W. R., 1976, Early and Middle Proterozoic history of the Great Lakes area, North America: Philosophical Transactions of the Royal Society of London, v. 280, p. 605-628.
- , 1978, Rb-Sr geochronologic analysis of metagabbro at the bottom of the Michigan basin deep drill holes: Journal of Geophysical Research, v. 83, p. 5832-5832.
- , 1980, Chronology of igneous rocks associated with the Penokean orogeny in Wisconsin, *in* Morey, G. B., and Hanson, G. N., eds., Selected Studies of Archean Gneisses and Lower Proterozoic rocks, Southern Canadian Shield, Volume 18: Boulder, Geological Society of America, p. 159-168.
- , 1992, Tectonic setting of the Midcontinent rift system: Tectonophysics, v. 213, no. 1-2, p. 1-15.
- Van Schmus, W. R., Green, J. C., and Halls, H. C., 1982, Geochronology of Keweenawan rocks of the Lake Superior region: A summary, *in* Wold, R. J., and Hinze, W. J., eds., Geology and Tectonics of the Lake Superior Basin, Volume 156: Boulder, Geological Society of America, p. 165-171.
- Van Schmus, W. R., and Hinze, W. J., 1985, The Midcontinent Rift System: Annual Reviews in Earth and Planetary Sciences, v. 13, p. 345-383.
- Van Schmus, W. R., Schneider, D. A., Holm, D. K., Dodson, S., and Nelson, B. K., 2007, New insights into the southern margin of the Archean-Proterozoic boundary in the north-

- central United States based on U-Pb, Sm-Nd, and Ar-Ar geochronology: *Precambrian Research*, v. 157, no. 1-4, p. 80-105.
- Van Schmus, W. R., and Woolsey, L. L., 1975, Rb-Sr geochronology of Republic Area, Marquette County, Michigan: *Canadian Journal of Earth Sciences*, v. 12, no. 10, p. 1723-1733.
- Van Wyck, N., and Norman, M., 2004, Detrital zircon ages from early Proterozoic quartzites, Wisconsin, Support rapid weathering and deposition of mature quartz arenites: *Journal of Geology*, v. 112, p. 305-315.
- Vehrs, R. A., 1959, On an occurrence of "quartzite" in the southern complex near Palmer, Marquette County, Michigan, MS: Michigan State University.
- Vervoort, J. D., and Green, J. C., 1997, Origin of evolved magmas in the Midcontinent rift system, northeast Minnesota: Nd-Isotope evidence for melting of Archean crust: *Canadian Journal of Earth Sciences*, v. 34, p. 521-535.
- Vickers, R. C., 1955, Geology of the Huron River pitchblende occurrence, Baraga County, Michigan: U.S. Geological Survey Trace Elements Investigations Report, v. 303, p. 1-20.
- , 1956, Geology and Monazite content of the Goodrich Quartzite, Palmer Area, Marquette County, Michigan: U. S. Geological Survey Bulletin, v. 1030-F, no. 171-185.
- , 1957, Origin and Occurrence of Uranium in Northern Michigan, PhD: The University of Wisconsin Madison, 82 p.
- Vietzke, W. J., 1950, Uranium in upper Michigan: *The Mineralogist*, v. 18, no. 6, p. 298, 300, 302.
- Villar, J. W., 1965, Metamorphic petrology of the Animikie Series in the Republic Trough Area, Marquette County, Michigan, PhD: Michigan State University, 221 p.
- Vincenz, S. A., 1968, Phenomenon of Partial Self-Reversal in Keweenaw Rocks, 1. Magnetization of Portage Lake Lavas: *Journal of Geophysical Research*, v. 73, p. 2729-2752.
- Vincenz, S. A., and Yaskawa, K., 1968, Phenomenon of partial self-reversal in Keweenaw rocks. 2, Magnetization of upper Keweenaw lavas and sediments and of lower Keweenaw dikes: *Journal of Geophysical Research*, v. 73, no. 8, p. 2753-2767.
- Vivian, H., 1929, The Calumet and Hecla 81st level project: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 92-97.
- , 1931, Deep mining methods, Conglomerate mine of the Calumet and Hecla Consolidated Co.: U.S. Bureau of Mines Information Circular, v. 6526, p. 1-20.
- Volin, M. E., 1957, Geological Factors Affecting Beneficiation of Lake Superior Iron Ores, *in* Snelgrove, A. K., ed., *Institute of Lake Superior Geology Geological Exploration*, p. 59-60.
- von Rath, G., 1874, Ein ausgezeichnete Kalkspathkrystall vom Oberen See in Nordamerika: *Annalen der Physik und Chemie*, v. 152, p. 17-21.
- Vorhies, S., 2006, Provenance and tectonic setting of the Paleoproterozoic Denham Formation in east-central Minnesota, BS: Smith College, 59 p.
- Wadsworth, M. E., 1880, Notes on the geology of the iron and copper districts of Lake Superior: *Harvard College Museum of Comparative Zoology Bulletin*, v. 7, no. geol. ser. 1, p. 1-157.
- , 1881a, On the jasper and iron ore of the Marquette region: *American Journal of Science*, v. 122, no. 130-131, p. 403-408.
- , 1881b, On the origin of the iron ores of the Marquette district, Lake Superior: *Boston Society of Natural History Proceedings*, v. 20, p. 470-479.
- , 1881c, On the origin of the iron ores of the Marquette district, Lake Superior: Discussion: *American Journal of Science*, v. 122, no. 130-131, p. 320-321, 402-403.
- , 1883a, Keweenaw Point geology: *Science*, v. 1, no. 9, p. 249-249.

- , 1883b, On the filling of amygdaloidal cavities and veins in the Keweenaw Point district of Lake Superior, a reply to Prof. James D. Dana: Boston Society of Natural History Proceedings, v. 21, p. 91-103.
- , 1883c, United States geologists, sandstones, and the Keweenaw Series: Science, v. 1, no. 307-307.
- , 1885, On the relation of the "Keweenaw series" to the eastern sandstone in the vicinity of Torch Lake: Boston Society of Natural History Proceedings, v. 23, p. 172-180.
- , 1887, The Keweenaw system: Science, v. 10, no. 166-166.
- , 1888a, On a supposed fossil from the copper-bearing rocks of Lake Superior: Boston Society of Natural History Proceedings, v. 23, p. 208-212.
- , 1888b, The Theory of Ore Deposits: Boston Society of Natural History Proceedings, v. 23, p. 197-208.
- , 1891a, The relation of the eastern sandstone of Keweenaw Point to the Lower Silurian limestones: Science, v. 18, no. 25-25.
- , 1891b, The relation of the eastern sandstone of Keweenaw Point to the Lower Silurian limestones: American Journal of Science, v. 142, no. 248, p. 170-171.
- , 1891c, A sketch of the geology of the Marquette and Keweenaw districts *in* Ralph, J., ed., Along the bowstring or south shore of Lake Superior: Duluth, C. B. Hibbard and Duluth, South Shore and Atlantic Railway, p. 77-99.
- , 1891d, The south trap range of the Keweenaw series: American Journal of Science, v. 142, no. 251, p. 417-419.
- , 1892a, Sandstone in the Copper Region: Engineering Magazine, v. 4, p. 643-643.
- , 1892b, Subdivisions of the Azoic or Archean in northern Michigan: Science, v. 20, p. 355-355.
- , 1893, Subdivisions of the Azoic or Archean in northern Michigan: American Journal of Science, v. 145, no. 265, p. 72-73.
- , 1896, The copper deposits of Michigan: Geological Magazine, v. 3, no. 1, p. 20-23.
- , 1898, The origin and mode of occurrence of the Lake Superior copper districts: American Institute of Mining Engineers Transactions, v. 27, p. 669-696.
- Wadsworth, M. E., Hubbard, L. L., Lane, A. C., and Patton, H. B., 1893, A sketch of the geology of the iron, gold, and copper districts of Michigan: State Board of Geological Survey Report, v. 1891-1892, p. 75-186.
- Waggoner, T. D., 1967, A method of differentiating carbonate and silicate facies of the Negaunee iron formation by spectrochemical analysis, MS: Michigan State University.
- , 2008, Field Trip 1: Banded Iron Formation of the Marquette District, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 1-43.
- Walcott, C. D., 1891, The North American continent during Cambrian time: U.S. Geological Survey Annual Report, v. 12, no. 1, p. 523-568.
- , 1899, Pre-cambrian fossiliferous formations: Geological Society of America Bulletin, v. 10, p. 199-244.
- Walker, R. D., 1956, Structural petrology of the Crystal Falls municipal dam, Iron County, Michigan, MS: Michigan State University.
- Wang, H. F., and Simmons, G., 1978, Microcracks in crystalline rock from 5.3-km depth in the Michigan Basin: Journal of Geophysical Research, v. 83, no. B12, p. 5849-5856.
- Ware, A., Cherry, J., and Ding, X., 2008, Field Trips 4 and 8: Geology of the Eagle Project, *in* Bornhorst, T. J., and Klasner, J. S., eds., 54th Annual Meeting of the Institute on Lake Superior Geology Guide Book, Volume 54, p. 87-114.
- Warren, E. J., 1981, Keweenaw Peninsula of Michigan - Elevation of bedrock above sea level, MS: Michigan Technological University.

- , 1982, The bedrock topography of the Keweenaw Peninsula, Michigan, PhD: Michigan Technological University, 213 p.
- Wasuwanich, P., 1979, Models of basalt petrogenesis: a study of Lower Keweenawan diabase dikes and Middle Keweenawan Portage Lake Lavas, Michigan, MS: Michigan State University, 78 p.
- Waters, A. L., 1893, Thesis on the modern methods of prospecting for iron ores in the Lake Superior region, EM: Michigan Mining School.
- Watson, T. L., 1923, Native copper deposits of the South Atlantic States compared with those of Michigan: *Economic Geology*, v. 18, no. 8, p. 732-752.
- Weaver, T. L., 1994, The role of volume loss in the development of deformation fabrics in Proterozoic metadiabase dikes in the Marquette-Republic region of northern Michigan, MS: Michigan State University, 135 p.
- Webster, C. L., 1999, Structural analysis of a ductile shear zone within the Marquette iron range, Upper Peninsula, Michigan, MS: Michigan State University, 92 p.
- Wee, S. M., 1989, Geochemical investigation of early Proterozoic igneous rocks in northern Michigan and the northeast portion of Wisconsin, U.S.A., PhD: Michigan State University, 194 p.
- Weed, W. H., 1906, The copper mines of the United States in 1905: U.S. Geological Survey Bulletin, v. 285, p. 93-124.
- , 1914, The Copper handbook: a manual of the copper mining industry of the world, v. 11, p. 1-1413.
- , 1918, The mines handbook, an enlargement of the copper handbook: a manual of the mining industry of North America, v. 13, p. 1699.
- Weege, R. J., and Pollock, J. P., 1971, Recent developments in the native-copper district of Michigan, Guidebook for field conference of Society of Economic Geologists, Michigan Copper District, Sept. 30-Oct. 2, 1971, Society of Economic Geologists, p. 18-43.
- , 1972, Geology of Two New Mines in Native Copper District of Michigan: *Economic Geology*, v. 67, no. 5, p. 622-633.
- Weege, R. J., and Schillinger, A. W., 1962, Footwall mineralization in Osceola Amygdaloid, Michigan native copper district: *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 223, p. 344-350.
- Weeks, V. L., 1987, Gravity and Magnetic Investigations in the south-central part of the Ishpeming Greenstone Belt, Marquette County, MS: Michigan Technological University.
- Weiblen, P. W., 1982, Keweenawan intrusive igneous rocks, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 57-82.
- Weinert, F., 1933, Formation of Martite and other iron oxides in sideritic ore of the Marquette District, Michigan: *Economic Geology*, v. 28, p. 68-74.
- Welch, E. J., 1977, Origin of the caliche-bearing mudstone at the base of the Calumet and Hecla Conglomerate, Centennial Mine, Houghton County, Michigan, MS: Michigan Technological University, 53 p.
- Wells, R. C., 1925, Chemistry of deposition of native copper from ascending solutions: U.S. Geological Survey Bulletin, v. 778, p. 1-71.
- Wesley, R. H., 1952, Geophysical exploration in Michigan *Economic Geology*, no. 47, p. 1.
- West, G. A., 1929, Copper, its mining and use by the aborigines of the Lake Superior region; report of the McDonald-Massee Isle Expedition, 1928: *Milwaukee Public Museum, Bulletin*, v. 10, no. 1, p. 1-182.
- Westjohn, D. B., 1978, Finite strain in the Precambrian Kona Formation, Marquette County, Michigan, MS: Michigan State University, 80 p.
- Wheeler, H. A., 1886, Temperature observations at the Lake Superior copper mines: *American Journal of Science*, v. 132, no. 188, p. 125-129.

- Whitaker, J. T., 1966, Ultrasonic velocity measurements of Precambrian metamorphic rocks and their correlation with field measurements, MS: Michigan State University.
- White, D. E., 1968, Environments of generation of some base-metal ore deposits: *Economic Geology*, v. 63, p. 301-335.
- White, E. F., 1916, Analysis of slate and dike: *Engineering Mining Journal*, v. 101, p. 433-434.
- White, P., 1886, The iron region of Lake Superior: Michigan Pioneer Collection, v. 8, p. 145-161.
- White, P., 1900, A brief attempt at the history of the mining industry of northern Michigan: Publications of the Michigan Political Science Association, v. 3, p. 143-162.
- White, R. S., 1997, Mantle temperature and lithospheric thinning beneath the Midcontinent rift system: evidence from magmatism and subsidence: *Canadian Journal of Earth Sciences*, v. 34, p. 464-474.
- White, W. S., 1952, Imbrication and initial dip in a Keweenaw conglomerate bed [Michigan]: *Journal of Sedimentary Research*, v. 22, no. 4, p. 189-199.
- White, W. S., 1956, Geologic map of the Chassell Quadrangle, Michigan, scale 1:24,000.
- , 1957, Regional structural Setting of the Michigan Native Copper District, in Snelgrove, A. K., ed., Institute of Lake Superior Geology Geological Exploration, p. 3-16.
- , 1960a, The Keweenaw lavas of Lake Superior, and example of flood basalts: *American Journal of Science*, v. 258-A, p. 367-374.
- White, W. S., 1960b, The White Pine copper deposit: *Economic Geology*, v. 55, no. 2, p. 402-410.
- White, W. S., 1966, Geologic evidence for crustal structure in the western Lake Superior Basin, in Steinhart, J. S., and Smith, T. J., eds., *The Earth beneath the continents*, Volume 10: Washington D.C., American Geophysical Union, p. 28-41.
- White, W. S., 1971, A paleohydrologic model for mineralization of the White Pine copper deposit, northern Michigan: *Economic Geology*, v. 66, no. 1, p. 1-13.
- White, W. S., 1972, The base of the Upper Keweenaw, Michigan and Wisconsin: U. S. Geological Survey Bulletin, v. 1345-F, p. 1-23.
- White, W. S., Cornwall, H. R., and Swanson, R. W., 1953, Bedrock geology of the Ahmeek Quadrangle, Michigan, scale 1:24,000.
- White, W. S., and Wright, J. C., 1953, Stratigraphic sections in the vicinity of the White Pine copper mine, Ontonagon County, Michigan: U.S. Geological Survey Preliminary Report.
- White, W. S., and Wright, J. C., 1954, The White Pine copper deposit, Ontonagon County, Michigan: *Economic Geology*, v. 49, no. 7, p. 675-716.
- White, W. S., and Wright, J. C., 1966, Sulfide-mineral zoning in the basal Nonesuch Shale, northern Michigan: *Economic Geology*, v. 61, no. 7, p. 1171-1190.
- White, W. S., and Wright, J. C., 1968, The Native Copper Deposits of Northern Michigan, in Ridge, J. D., ed., *Ore Deposits of the United States, 1933-1967*: New York, American Institute of Mining, Metallurgical, and Petroleum Engineering, p. 303-325.
- Whitney, J. D., 1847, Description and analysis of three minerals from Lake Superior: *Boston Journal of Natural History*, v. 5, p. 486-489.
- , 1848, Description and analysis of three minerals from Lake Superior: *American Journal of Science*, v. 56, no. 17, p. 269-270.
- , 1849, Black oxyd of copper of Lake Superior: *American Journal of Science*, v. 58, no. 23, p. 273-274.
- , 1851a, On a black oxide of copper from Copper Harbor, Lake Superior: *Boston Society of Natural History Proceedings*, v. 3, p. 100-103.
- , 1851b, On jacksonite, a new mineral from the Lake Superior region: *Boston Society of Natural History Proceedings*, v. 3, p. 5-6.
- , 1851c, On the mineral lands of the Lake Superior region: *Boston Society of Natural History Proceedings*, v. 3, p. 210-212.

- , 1856a, On the occurrence of the ores of iron in the Azoic system: American Association for the Advancement of Science Proceedings, v. 9, p. 209-216.
- , 1856b, Remarks on some points connected with the geology of the north shore of Lake Superior: American Association for the Advancement of Science Proceedings, v. 9, p. 204-209.
- , 1857, Remarks on the Huronian and Laurentian systems of the Canada Geological Survey: American Journal of Science, v. 73, no. 69, p. 305-314.
- , 1859a, Notice of new localities and interesting varieties of minerals in the Lake Superior region: American Journal of Science, v. 78, no. 82, p. 8-20.
- , 1859b, Notice of new localities and interesting varieties of minerals in the Lake Superior region: Mining Magazine, v. 2, no. 1, p. 32-47.
- , 1860, Note on the geological position of the Lake Superior Sandstone: Mining Magazine, v. 2, no. 1, p. 435-446.
- Whitney, J. D., and Foster, J. W., 1851a, Geological map of the district between Keweenaw Bay and Chocolate River, Lake Superior, Michigan, scale 3 miles to an inch.
- , 1851b, Sur les terrains siluriens due district metallifere du lac Supérieur: Societe geologie de France Bulletin, v. 2, no. 8, p. 89-100.
- Whittlesey, C., 1846, Copper regions of Lake Superior, 64 p.
- , 1860, On the origin of the azoic rocks of Michigan and Wisconsin: American Association for the Advancement of Science Proceedings, v. 13, p. 301-308.
- , 1863, Ancient mining on the shores of Lake Superior: Smithsonian Contributions to Knowledge, v. 13, no. article 4, p. 1-29.
- , 1876, Physical geology of Lake Superior: American Association for the Advancement of Science Proceedings, v. 24, no. B, p. 60-72.
- , 1877, Iron River silver district, south shore of Lake Superior: Engineering Mining Journal, v. 23, p. 254, 278-279.
- Wichman, A., 1879, A microscopical study of some Huronian clay slates: Geological Society, London, Quarterly Journal, v. 35, p. 156-164.
- , 1880, Microscopical observations of the iron-bearing (Huronian) rocks from the region south of Lake Superior: Wisconsin Geological Survey Publication, v. 3, p. 600-656.
- Wienert, F., 1933, Formation of martite and other iron oxides in sideritic ore of the Marquette district, Michigan: Economic Geology, v. 28, no. 1, p. 68-74.
- Wier, K. L., 1950, Comparisons on some aeromagnetic profiles with ground magnetic profiles: American Geophysical Union Transactions, v. 31, no. 2, p. 191-195.
- , 1967, Geology of the Kelso Junction Quadrangle Iron County, Michigan: U.S. Geological Survey Bulletin, v. 1226, p. 1-45.
- , 1971, Geology and Magnetic Data for Northeastern Crystal Falls Area, Michigan: Michigan Geological Survey Report of Investigation, v. 11, p. 1-14.
- Wier, K. L., Balsley, J. R., Jr., and Pratt, W. P., 1953, Aeromagnetic survey of part of Dickinson County, Michigan, with preliminary geologic interpretation: U.S. Geological Survey, Geophysical Prospecting, Map, v. 115.
- Wier, K. L., and Kennedy, B. E., 1951, Geologic and magnetic data of the Sholdeis-Doane and Red Rock explorations, Iron County, Michigan: U.S. Geological Survey Open-File Report, p. 1-19.
- Wiese, R. G., 1973, Mineralogy and Geochemistry of the Parting Shale, White Pine, Michigan: Economic Geology, v. 68, p. 317-331.
- Wiese, R. G., Jr., 1961, Petrology and geochemistry of a copper-bearing Precambrian Shale, White Pine, Michigan, PhD: Harvard University.
- Wilband, J. T., 1978, The Copper Resources of Northern Michigan: U.S. Bureau of Mines Open File Report.

- Wilband, J. T., Rohrbacher, T. J., and Luppens, J. A., 1972, Petrochemical investigations of rocks above and below the ore zone at the White Pine mine, Michigan: *Compass*, v. 49, no. 3, p. 107-114.
- Wilband, J. T., and Wasuwanich, P., 1980, Models of basalt petrogenesis - Lower Keweenaw diabase dikes and Middle Keweenaw Portage Lake Lavas, Upper Michigan: *Contributions to Mineralogy and Petrology*, v. 75, no. 4, p. 395-406.
- Wilkin, R. T., 1991, Geologic investigations of Precambrian rocks in the Negaunee NW quadrangle, Marquette County, Michigan and Archean granitoids in the Northern Complex, Michigan, MS: Michigan Technological University.
- Wilkin, R. T., and Bornhorst, T. J., 1990, Geology of the Boise Creek Area, Marquette Greenstone Belt, Michigan: *Contribution to Michigan Geology Report*, v. 90-3, p. 1-16.
- , 1992, Geology and Geochemistry of Granitoid rocks in the Archean Northern Complex, Michigan, USA: *Canadian Journal of Earth Sciences*, v. 29, no. 8, p. 1674-1685.
- , 1993, Archean Appinites from the Northern Complex, Michigan: *Journal of Geology*, v. 101, no. 1, p. 107-114.
- Williams, C. P., and Blandy, J. P., 1862, Some contributions to a knowledge of the constitution of the copper range of Lake Superior: *American Journal of Science*, v. 84, no. 100, p. 112-120.
- Williams, C. P., Stevens, W. H., and Hill, S. W., 1863, Geological map of the trap range of Keweenaw Point, Lake Superior.
- Williams, G. E., and Schmidt, P. w., 1997, Paleomagnetism of the Paleoproterozoic Gowganda and Lorrain Formations, Ontario: Low paleolatitude for Huronian glaciation: *Earth and Planetary Science Letters*, v. 153, p. 157-169.
- Williams, G. H., and Irving, R. D., 1890, The greenstone schists areas of the Menominee and Marquette regions of Michigan; a contribution to the subject of dynamic metamorphism in eruptive rocks with an introduction by R. D. Irving: *U.S. Geological Survey Bulletin*, v. 62, p. 1-241.
- Williams, P. S., 1910, Underground methods of mining used on the Gogebic range: *Proceedings of the Lake Superior Mining Institute*, v. 15, p. 179-194.
- Williams, S. A., 1957, Study of chlorastrolite, MS: Michigan College of Mining and Technology.
- Willmott, A. B., 1902, The nomenclature of the Lake Superior formations: *Journal of Geology*, v. 10, no. 1, p. 67-76.
- Wilmeth, D. T., Dornbos, S. Q., Isbell, J. L., and Czaja, A. D., 2014, Putative domal microbial structures in fluvial siliciclastic facies of the Mesoproterozoic (1.09 Ga) Copper Harbor Conglomerate, Upper Peninsula of Michigan, USA: *Geobiology*, v. 12, no. 1, p. 99-108.
- Wilson, C. H., 1967, Petrology of the Algoma mine area, Ontonagon County, Michigan, MS: Michigan State University.
- , 1975, A detailed petrographic and chemical study of differentiation in Keweenaw lava flows of Michigan, PhD: Michigan State University, 85 p.
- Wilson, G. C., 1991, Late Archean structural evolution and Keweenaw and Cambrian structure and sedimentation in the Huron Mountains, Marquette County, Michigan, PhD: The University of Wisconsin - Madison, 455 p.
- Wilson, J. G., 1952, Geophysical investigations of Perkins area, Michigan, MS: Michigan College of Mining and Technology, 1-20 p.
- Wilson, M. L., and Dyl, S. J., II, 1992, The Michigan copper country; history and geology: *The Mineralogical Record*, v. 23, no. 2, p. 7-16, 24-72.
- Winchell, A., 1889a, Field studies in the Archean rocks of Minnesota, with accessory observations in Ontario, Michigan and Wisconsin, Ann Arbor, 504 p.
- , 1889b, Foliation and sedimentation in the Lake Superior region: *American Geologist*, v. 3, p. 193-195.
- , 1891, A last word with the Huronian: *Geological Society of America Bulletin*, v. 2, p. 85-124.

- Winchell, A. N., 1908, Review of the nomenclature of Keweenawan igneous rocks: *Journal of Geology*, v. 16, no. 8, p. 765-774.
- , 1920, Handbook of mining in the Lake Superior region prepared for the Lake Superior Meeting, Minneapolis, American Institute of Mining Engineers, 260 p.
- , 1924, Isotropic quartz: *American Mineralogist*, v. 9, no. 12, p. 235-237.
- Winchell, H. V., 1894a, A bit of iron range history: *American Geologist*, v. 13, no. 3, p. 164-170.
- , 1894b, Historical sketch of the discovery of mineral deposits in the Lake Superior Region: *Proceedings of the Lake Superior Mining Institute*, v. 2, p. 33-70.
- , 1894c, Historical sketch of the discovery of mineral deposits in the Lake Superior Region: *Minnesota Geological Survey Annual Report*, v. 23, p. 116-155.
- , 1894d, Partial Bibliography of the History of Mining on Lake Superior: *Proceedings of the Lake Superior Mining Institute*, v. 2, p. 71-78.
- , 1898a, The Lake Superior iron-ore region: *Federated Institute of Mining Engineers Transactions*, v. 13, p. 493-562.
- Winchell, N. H., 1885, The crystalline rocks of the Northwest: *American Association for the Advancement of Science Proceedings*, v. 33, p. 363-379.
- , 1889c, Methods of stratigraphy in studying the Huronian: *The Pan-American Geologist*, v. 4, no. 6, p. 342-357.
- , 1893, Frondescant hematite: *American Geologist*, v. 11, no. 1, p. 20-21.
- , 1895a, Comparative taxonomy of the rocks of the Lake Superior region: *American Geologist*, v. 16, no. 6, p. 331-337.
- , 1895b, The Keweenawan according to the Wisconsin geologists: *American Geologist*, v. 16, no. 2, p. 75-86.
- , 1895c, The latest eruptives of the Lake Superior region: *American Geologist*, v. 16, no. 5, p. 269-274.
- , 1895d, A rational view of the Keweenawan: *American Geologist*, v. 16, no. 3, p. 150-162.
- , 1895e, Steps of progressive research in the geology of the Lake Superior region prior to the late Wisconsin survey: *American Geologist*, v. 16, no. 1, p. 12-20.
- , 1895f, The synchronism of the Lake Superior region with other portions of the North American Continent: *American Geologist*, v. 16, no. 4, p. 205-213.
- , 1898b, Thompsonite and lintonite from the north shore of Lake Superior: *American Geologist*, v. 22, no. 6, p. 347-349.
- , 1899a, Adularia and other secondary minerals of the copper-bearing rocks: *American Geologist*, v. 23, no. 5, p. 317-318.
- , 1899b, Chlorastrolite and zonochlorite from Isle Royale: *American Geologist*, v. 23, no. 2, p. 116-118.
- , 1899c, The optical characters of Jacksonite: *American Geologist*, v. 23, no. 4, p. 250-251.
- , 1912, Progress of opinion as to the origin of the Lake Superior iron ores: *Geological Society of America Bulletin*, v. 23, p. 317-328.
- Winchell, R. E., 1959, Description and mineralogy of some pegmatites in Dickinson County, Michigan, MS: Michigan College of Mining and Technology.
- Wingquist, C. F., and Lund, R. A., 1976, Electrothermal fracture of copper shale: U.S. Bureau of Mines, Report of Investigations, v. 8106, p. 1-15.
- Wirth, K. R., Vervoort, J. D., and Naiman, Z. J., 1997, The Chengwatana Volcanics, Wisconsin and Minnesota: petrogenesis of the southernmost volcanic rocks exposed in the Midcontinent rift: *Canadian Journal of Earth Sciences*, v. 34, p. 536-548.
- Witthuhn, K., 1993, A structural analysis of the Midcontinent rift in Michigan based on a fault array analysis utilizing slickenslides, MS: University of Minnesota, 129 p.
- Wohlabaugh, N., and Mancuso, J. J., 1990, Depositional and diagenetic history of the Big Cusp algal dolomite, Kona Formation, Marquette Range, Michigan: *The Compass*, v. 67, no. 2, p. 84-93.

- Wold, R., 1966, Development of digital recording magnetometer system and its application to the western Lake Superior region, PhD: University of Wisconsin.
- Wold, R. J., Hutchinson, D. R., and Johnson, t. C., 1982, Topography and surficial structure of Lake Superior bedrock as based on seismic reflection profiles, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 257-272.
- Wolff, J. F., 1925a, Estimating on the Gogebic range: American Institute of Mining Engineers Transactions, v. 72, p. 653-656.
- , 1925b, Ore estimation on the Menominee range, including Iron River, Crystal Falls, and Florence districts: American Institute of Mining Engineers Transactions, v. 72, p. 659-660.
- Wolff, R. G., 1969, Upper Keweenawan sedimentary rocks on Isle Royale, Lake Superior, MS: University of Wisconsin.
- Wolff, R. G., and Huber, N. K., 1973, The Copper Harbor Conglomerate (middle Keweenawan) on Isle Royale, Michigan, and its regional implications: U.S. Geological Survey Professional Paper, v. 754-B, p. 1-15.
- Wood, A. B., 1907, The ancient copper mines of Lake Superior: American Institute of Mining Engineers Bi-monthly Bulletin, v. 37, p. 288-296.
- Wood, T. S., 1919, The porphyry intrusions of the Michigan copper district: Engineering Mining Journal, v. 107, p. 299-302.
- Wood, W. W., 1962, Distribution and stratigraphic position of Late Precambrian diabase dikes in parts of northern Michigan, MS: Michigan State University.
- Woodruff, L. G., Cannon, W. F., Nicholson, S. W., Schulz, K. J., and Wild, R., 2013, Geology of the Keweenawan Supergroup, Porcupine Mountains, Ontonagon and Gogebic Counties, Michigan, *in* Bornhorst, T. J., and Barron, R. J., eds., 59th Annual Meeting of the Institute on Lake Superior Geology, Volume 59.
- Wortey, R. B., 1928, Method of sub-level stoping at the Carpenter mine, Crystal Falls, Michigan: Proceedings of the Lake Superior Mining Institute, v. 26, p. 48-53.
- Woznessensky, B., 1967, Structural analysis of the fracture pattern at White Pine Mine, Ontonagon County, Michigan, MS: Michigan Technological University.
- Wright, F. E., 1905, Report on progress made in Porcupine Mountains, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 35-.
- , 1909, The intrusive rocks of Mount Bohemia, Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist.
- Wright, J. C., 1951, A magnetic anomaly near Bear Lake, Houghton County, Michigan: U.S. Geological Survey, Open File Report, p. 1-7.
- Wright, J. C., and Cornwall, H. R., 1954, Bedrock geology of the Bruneau Creek quadrangle, Michigan: U.S. Geological Survey, Geological Quadrangle, v. GQ 35.
- Wright, J. N., 1899, The development of the copper industry of northern Michigan: Publications of the Michigan Political Science Association, v. 3, no. 5, p. 1-15.
- Wunderman, R., 1988, Crustal structure across the exposed axis of the midcontinent rift and adjacent flanks, based on magnetotelluric data, central Minnesota-Wisconsin : a case for crustal inhomogeneity and possible reactivation tectonics, PhD: Michigan Technological University.
- Wyble, D. O., 1950, A study of regional gravity of southwestern end of the Iron River, Michigan, MS: Michigan College of Mining and Technology, 30 p.
- Wyrembelski, S. A., 2003, Sedimentology and stratigraphy of the Reany Creek Formation, Marquette County Michigan : evidence for a non-glacial origin, MS: Michigan Technological University.

- Yang, B., Egbert, G. D., Kelbert, A., and Meqbel, N. M., 2015, Three-dimensional electrical resistivity of the north-central USA from EarthScope long period magnetotelluric data: *Earth and Planetary Science Letters*, v. 422, p. 87-93.
- Young, C. T., and Repasky, T. R., 1986, A magnetotelluric transect of the Jacobsville Sandstone in northern Michigan: *Geological Society of America Bulletin*, v. 97, p. 711-716.
- Young, C. T., and Rogers, J. C., 1985, Resistivity models of the Bell Creek Granite, Michigan, determined by the magnetotelluric method: *Journal of Geophysical Research*, v. 90, no. B14, p. 12-12,562.
- Young, G. M., 1966, Huronian Stratigraphy of the McGregor Bay Area, Ontario: Relevance to the Paleogeography of the Lake Superior Region: *Canadian Journal of Earth Sciences*, v. 3, p. 203-210.
- , 1968, Precambrian Geology of the Region North of Manitoulin Island, Ontario, *in* Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island, Michigan Basin* Geological Society, p. 18-24.
- Young, G. M., 1970, An extensive early proterozoic glaciation in North America?: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 7, no. 2, p. 85-101.
- Young, G. M., 1981a, Diamictites of the Early Proterozoic Ramsay Lake and Bruce Formations, north shore of Lake Huron, Ontario, Canada, *in* Earth's pre-Pleistocene Glacial Record, *in* Hambrey, M. J., and Harland, W. B., eds., *Earth's pre-Pleistocene Glacial Record*: Cambridge, Cambridge University Press, p. 813-816.
- , 1981b, The Early Proterozoic Gowganda Formation, Ontario, Canada, *in* Hambrey, M. J., and Harland, W. B., eds., *Earth's pre-Pleistocene Glacial Record*: Cambridge, Cambridge University Press, p. 807-812.
- Young, G. M., 1983, Tectono-sedimentary history of early Proterozoic rocks of the northern Great Lakes region: *Memoir - Geological Society of America*, v. 160, p. 15-32.
- Young, G. M., 2002, Stratigraphic and tectonic settings of Proterozoic glaciogenic rocks and banded iron-formations: relevance to the snowball Earth debate: *Journal of African Earth Sciences*, v. 35, no. 4, p. 451-466.
- Young, G. M., and Nesbitt, H. W., 1999, Paleoclimatology and provenance of the glaciogenic Gowganda Formation (Paleoproterozoic), Ontario, Canada: A chemostratigraphic approach: *Geological Society of America Bulletin*, v. 111, p. 264-274.
- Young, O., H., 1909, The tariff on iron ore: *Proceedings of the Lake Superior Mining Institute*, v. 14, p. 179-193.
- Zainuddin, S. M., 1971, Petrology of the granitic rocks in the vicinity of Republic Trough in the Upper Peninsula of Michigan, PhD: Michigan State University, 115 p.
- Zapffe, C., 1927, Reserves of Lake Superior manganiferous iron ores: *American Institute of Mining Engineers Transactions*, v. 75, p. 346-371.
- , 1933, The Cuyuna iron-ore district, *in* Hotchkiss, W. O., ed., *Lake Superior Region, Volume 23*: Washington, D. C., U.S. Government, p. 72-88.
- , 1938, Discovery and early development of the iron ranges, *Lake Superior Iron Ores*: Cleveland, Lake Superior Iron Ore Association, p. 13-26.
- Zartman, R. E., Nicholson, S. W., Cannon, W. F., and Morey, G. B., 1997, U-Th-Pb zircon ages of some Keweenawan Supergroup rocks from the south shore of Lake Superior: *Canadian Journal of Earth Sciences*, v. 34, p. 549-561.
- Zbinden, E. A., Holland, H. D., and Feakes, C. R., 1988, The Sturgeon Falls Paleosol and the composition of the atmosphere 1.1 Ga BP: *Precambrian Research*, v. 42, no. 1-2, p. 141-163.
- Zhao, G. C., Cawood, P. A., Wilde, S. A., and Sun, M., 2002, Review of global 2.1-1.8 Ga orogens: implications for a pre-Rodinia supercontinent: *Earth-Science Reviews*, v. 59, no. 1-4, p. 125-162.

- Zhao, G. M., Peacor, D. R., and McDowell, S. D., 1999, "Retrograde diagenesis" of clay minerals in the Precambrian Freda Sandstone, Wisconsin: *Clays and Clay Minerals*, v. 47, no. 2, p. 119-130.
- Zhu, T., 1986, Deep Structures beneath the Michigan Basin from Reprocessed COCORP data: Seismic Ray Theory and its Application in Reflection Seismology (Velocity Inversion, Inhomogeneous Media), PhD: Cornell University, 203 p.
- Zhu, T., and Brown, L. D., 1986, Consortium for continental reflection profiling Michigan surveys: Reprocessing and results: *Journal of Geophysical Research*, v. 91, no. B11, p. 11477-11495.
- Zimmerman, M. J., 1997, Mechanical analysis of natural fractures in the wall rock of the Quincy Mine, Keweenaw Peninsula, Michigan, MS: Michigan Technological University.
- Zinn, J., 1930a, Petrography of the Keweenaw lava flows of Michigan, MS: Michigan College of Mining and Technology, 26 p.
- , 1930b, Report on the portion of the Marquette range between Humboldt and Lake Michigan covered by Michigan Geological Survey in 1930: Michigan Geological Survey, p. 1-18.
- , 1933a, Correlation of the Upper Huronian of the Marquette and Crystal Falls Districts: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 18, p. 437-456.
- , 1933b, The Upper Huronian of the Marquette District of Michigan, PhD: The University of Wisconsin - Madison.
- , 1942a, The Adventure Mining Property, 1942: Michigan Geological Survey Open File Report.
- , 1942b, Graphite deposits of the Taylor mine area, Baraga County: Michigan Geological Survey Open File Report.
- Zinn, J., and Dutton, C. E., 1939, Ninth Annual Field Excursion of the Michigan Academy of Science, Arts and Letters, Section of Geology and Mineralogy to Marquette and Menominee Districts, p. 20.
- Zinn, R. P., 1926, Sub-level mining practice at the Newport mine: *Proceedings of the Lake Superior Mining Institute*, v. 25, p. 149-153.
- Zinner, P., Holmberg, C. L., and Terry, O. W., 1949, Investigation of the iron-bearing formation of Iron County, Michigan, utilizing geophysical and other methods: U.S. Bureau of Mines Report of Investigation, v. 4583, p. 1-40.
- Zuidema, H. P., 1947, Michigan Minerals: *Earth Science Digest*, v. 1, no. 7, p. 3-6.
- Zumberge, J. H., and Gast, P., 1961, Geological investigations in Lake Superior: *Geotimes*, v. 6, no. 4, p. 10-13.

Michigan Paleozoic References

- Abdul-Razzaq, S., 1973a, Evolution of Middle Devonian Species of *Euglyphella* as indicated by Cladistic Analysis: Contributions from the Museum of Paleontology The University of Michigan, v. 24, no. 6, p. 47-64.
- , 1973b, Evolution of Middle Devonian Species of *Euglyphella* as indicated by Cladistic Analysis, MS: University of Michigan.
- Abduslam, A., 2012, Reservoir characterization and enhanced oil recovery potential in Middle Devonian Dundee Limestone Reservoirs, Michigan Basin, USA, MS: Western Michigan University, 228 p.
- Abubakr, S. M., 1982, Characteristics and Potential of Antrim Shale for *in situ* Energy production, PhD: Michigan State University, 194 p.
- Adam, R. B., 1992, Use of geology and petrophysics in the characterization of St. Peter Sandstone reservoirs, MS: Western Michigan University, 140 p.
- Adams, A. R., 1969, Ray Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 143-148.
- Adams, A. R., Johnson, M. A., Kiddoo, J. G., McDonald, J. T., Sleight, G. C., Segall, R. T., and Burgess, R. J., 1969, Oil and Gas Fields Symposium, Volume 1, Michigan Basin Geological Society.
- Adams, F. D., 1892, On the Geology of the St. Clair Tunnel: Transactions of the Royal Society of Canada, v. 9, no. 4, p. 67-73.
- Addison, C. C., 1940, Buckeye oil field, Gladwin County, Michigan: American Association of Petroleum Geologists Bulletin, v. 24, no. 11, p. 1950-1982.
- Adducci, J. G., 2015, Geological controls on Stratigraphy and Sedimentation of the Mississippian Marshall Formation, Michigan Basin, U.S.A., MS: Western Michigan University, 166 p.
- Aguirre, S. L., 1962, Some Geologic and Economic Aspects of Niagaran Reefs in Eastern Michigan, *in* Fisher, J. H., ed., Silurian Rocks of the Southern Lake Michigan Area, Michigan Basin Geological Society, p. 30-38.
- Aguirre, S. L., and Liberty, B. A., 1968, Itinerary, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 6-17.
- Al-Muneef, N. S., 1973, Productivity and characteristics of the Niagaran Pinnacle reefs in Northern Michigan, MS: University of Michigan, 44 p.
- Albright, J. C., 1937, Separation and disposal of salt water in Michigan Fields: The Petroleum Engineer, v. 8, no. 6, p. 47-49.
- Algeo, T. J., and Woods, A. D., 1994, Microstratigraphy of the Lower Mississippian Sunbury Shale - A record of Solar-modulated climatic cyclicity: *Geology*, v. 22, no. 9, p. 795-798.
- Alling, H. L., and Briggs, L. I., 1961, Stratigraphy of Upper Silurian Cayugan evaporites: American Association of Petroleum Geologists Bulletin, v. 45, no. 4, p. 515-547.
- Alty, S. W., 1933a, Report of an Investigation of Sylvania Rocks in Oil Wells of the Michigan Basin: Papers of the Michigan Academy of Science, Arts and Letters, v. 18, p. 289-300.
- , 1933b, Some properties of authigenic tourmaline from Lower Devonian Sediments: American Mineralogist, v. 18, no. 8, p. 351-355.
- Amaral, E. J., and Pryor, W. A., 1977, Depositional Environment of St Peter Sandstone Deduced by Textural Analysis: *Journal of Sedimentary Petrology*, v. 47, no. 1, p. 32-52.
- Aminian, K., 1982, The Synergetic Study of Silurian-Niagaran Pinnacle Reef Belt around the Michigan Basin for Exploration and Production of Oil and Gas (Volumes 1 and 2), PhD: University of Michigan, 568 p.
- Aminian, K., Ameri, S., and Bomar, R. M., 1987, Evaluation of Silurian-Niagaran Reef Belt in Northeastern Michigan: SPE Formation Evaluation, v. 2, no. 4, p. 428-434.

- Aminian, K., and Bomar, R. M., 1984, Silurian-Niagaran Reef Belt of the Michigan Basin: An Update: Society of Petroleum Engineers of the AIME Papers, v. 13370, p. 149-158.
- Ammann, O. H., Steinman, D. B., and Woodruff, G. B., 1951, Proposed Mackinac Straits Bridge Preliminary Report: State of Michigan Mackinac Bridge Authority Report, p. 1-28.
- Amoruso, J. J., 1957, A Structural study of the Northville oil field, Washtenaw, and Oakland counties, MA: University of Michigan, 25 p.
- Anastas, A. S., 1992, Sedimentology and stratigraphy of the Manitoulin Formation (Lower Silurian), southern Ontario, MS: University of Waterloo 288 p.
- Anastas, A. S., and Coniglio, M., 1993, Sedimentology of an Early Silurian carbonate ramp - The Manitoulin Formation, Southern Ontario: Canadian Journal of Earth Sciences, v. 30, no. 12, p. 2453-2464.
- Anderson, R. J., and Egleson, G. C., 1970, Discovery of potash in the A-1 Salina Salt in Michigan, *in* Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor, Michigan Geological Survey, p. 15-19.
- Anderson, R. J., Egleson, G. C., Matthews, R. D., and Majeske, E. C., 1972, The Recent Discovery and Probable Distribution of Extensive Deposits of Potash in the Silurian of Michigan, *in* Campbell, F. A., and Wilson, H. D. B., eds., Report of the 24th Session of the International Geological Congress, Volume 24: Montreal, International Geological Congress, p. 445-452.
- Anderson, R. J., and Majeske, E. C., 1970, Detection of potash zones by drilling fluid analysis, *in* Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor, Michigan Geological Survey, p. 34-36.
- Anderson, T. W., 1978, South Bay, Manitoulin Island -- A Preliminary Report, *in* Sanford, J. T., ed., Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society, p. 93-94.
- Angold, D. W., 1955, Manitoulin Formation in the Hamilton Area, Ontario, BS: McMaster University.
- Anisgard, H. W., and Campau, D. E., 1963, *Paramillerella thompsoni*, n. sp., from Michigan and a redefinition of *Paramillerella*: Contributions from the Cushman Foundation for Foraminiferal Research, v. 14, no. 3, p. 99-108.
- Anonymous, 1951, The Devonian and Silurian rocks of parts of Ontario, Canada and Western New York, Michigan Geological Survey and Michigan Geological Society, Guidebook, The Annual Geological Excursion of the Michigan Geological Society.
- Anovitz, L. M., Cole, D. R., Rother, G., Allard, L. F., Jackson, A. J., and Littrell, K. C., 2013, Diagenetic changes in macro- to nano-scale porosity in the St. Peter Sandstone: An (ultra) small angle neutron scattering and backscattered electron imaging analysis: *Geochimica et Cosmochimica Acta*, v. 102, p. 280-305.
- Apak, S. N., 1985, Subsurface Stratigraphy and Sedimentologic Control on the Productive Middle Devonian Age Richfield Member of the Lucas Formation in The Michigan Basin, MS: Western Michigan University, 96 p.
- Apotria, T. G., Kaiser, C. J., and Cain, B. A., 1994, Fracturing and stress history of the Antrim Shale, Michigan basin, *in* Nelson, R. A., and Laubach, S. E., eds., Rock Mechanics in Petroleum Engineering (EUROCK '94): Rotterdam, A. A. Balkeman, p. 9-16.
- Apotria, T. G., Kaiser, C. J., Cain, B. A., and Lancaster, D. E., 1996, Fracturing and stress history of the Devonian Antrim Shale, Michigan Basin: SPE Reprint Series, v. 45, p. 9-17.
- Archer, A. W., Bottjer, D. J., Droste, J. B., Horowitz, A. S., Kelly, S. M., Krisher, D. L., and Shaver, R. H., 1980, Stratigraphy, structure, and zonation of large Silurian reef at Delphi, Indiana: American Association of Petroleum Geologists Bulletin, v. 64, no. 1, p. 115-131.
- Ardey, R. H., 1978, Diagenesis of the Middle Ordovician Trenton Formation in southern Michigan, MA: University of Michigan, 52 p.

- Armstrong, D. K., 1988, Paleozoic geology of the central Bruce Peninsula: Ontario Geological Survey Miscellaneous Paper, p. 446-453.
- Armstrong, H. S., 1955, The Silurian section in the vicinity of Hamilton, Ontario, *in* Mozola, A. J., ed., The Niagara Escarpment of Peninsular Ontario, Canada, Michigan Geological Survey and Michigan Geological Society, p. 43-44.
- Arndt, B. P., 1991a, Deerfield Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 295-302.
- , 1991b, Lime Lake Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 485-492.
- Arnold, C. A., 1930, A petrified lepidophyte cone from the Pennsylvanian of Michigan: American Journal of Botany, v. 17, no. 10, p. 1028-1032.
- , 1931a, Cordaites wood from the Pennsylvanian of Michigan and Ohio: Botanical Gazette, v. 91, no. 1, p. 77-87.
- , 1931b, On *Callixylon newberryi* (Dawson) Elkins et Wieland: Contributions from the Museum of Paleontology The University of Michigan, v. 3, no. 12, p. 207-232.
- , 1933, A sphenopterid fructification from the Pennsylvanian of Michigan: Botanical Gazette, v. 94, no. 4, p. 821-825.
- , 1934, A preliminary study of the fossil flora of the Michigan coal Basin: Contributions from the Museum of Paleontology The University of Michigan, v. 4, no. 11, p. 177-204.
- , 1937, Paleobotanical Studies In Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 95-99.
- , 1944, A heterosporous species of *Bowmanites* from the Michigan Coal Basin: American Journal of Botany, v. 31, no. 8, p. 466-469.
- , 1949, Fossil Flora of the Michigan Coal Basin: Contributions from the Museum of Paleontology The University of Michigan, v. 7, p. 131-269.
- , 1950, Megaspores from the Michigan Coal Basin: Contributions from the Museum of Paleontology The University of Michigan, v. 8, p. 59-111.
- Arnold, C. A., and Stanley, G. M., 1945, Pennsylvanian Plants from the Glacial Drift Near Jackson, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 31, no. 3, p. 247-250.
- Ashley, G. H., and Fisher, C. A., 1910, The valuation of public coal lands: U. S. Geological Survey Bulletin, v. 424, p. 1-75.
- Asseez, L. O., 1964, A chemical and petrographic analysis of Wooden No. 6, Middle Ordovician from Hillsdale County, Michigan, MS: Michigan State University.
- Asseez, L. O., 1967, Stratigraphy and paleogeography of the Lower Mississippian sediments of the Michigan Basin, PhD: Michigan State University, 347 p.
- Asseez, L. O., 1969a, Lower Mississippian 'radial structures' in the Michigan Basin: Compass of Sigma Gamma Epsilon, 1915-84, v. 47, no. 1, p. 26-29.
- , 1969b, Paleogeography of Lower Mississippian rocks of Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 53, no. 1, p. 127-135.
- Atkins, J. E., and Sharaf, A., 1991, Pennfield 35 Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 263-270.
- Attanasi, E. D., Coburn, T. C., and Freeman, P. A., 2014, A Further Investigation of Local Nonparametric Estimation Techniques in Shale Gas Resource Assessment, *in* Pardo-Igúzquiza, E., Guardiola-Albert, C., Heredia, J., Moreno-Merino, L., Durán, J. J., and Vargas-Guzmán, A. J., eds., Mathematics of Planet Earth: Proceedings of the 15th Annual Conference of the International Association for Mathematical Geosciences: Berlin, Heidelberg, Springer Berlin Heidelberg, p. 621-624.
- Autra, M. D., 1977, A regional study of the Niagaran and lower Salina of the Michigan Basin, MS: Michigan State University, 96 p.

- Ayrton, W. G., Berry, W. B. N., Boucot, A. J., Lajoie, J., Lesperance, P. J., Pavlides, L., and Skidmore, W. B., 1969, Lower Llandovery of the Northern Appalachians and adjacent regions: Geological Society of America Bulletin, v. 80, no. 3, p. 459-484.
- Babb, C. S., 1969, Geologic interpretative study and data resource evaluation of the St. Clair and Macomb Counties, Michigan: Subsurface, MS: Michigan State University.
- Babcock, L. E., 1994, Biostratigraphic significance and paleogeographic implications of Cambrian fossils from a deep core, Warren County, Ohio: Journal of Paleontology, v. 68, no. 1, p. 24-30.
- Bacon, D. J., 1971, Chert genesis in a Mississippian sabkha environment, MS: Michigan State University, 47 p.
- Bacon, L. R., 1946, Minerals in the dolomite at Monroe, Michigan: Michigan Mineralogical Society Yearbook, v. 1946, p. 10-11.
- Bailey, S. M. B., and Cochran, R. O., 1991a, Chatham A Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 187-196.
- , 1991b, Oil Springs Pool, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 75-84.
- Bailey, T. C., III, 1968, A geochemical and petrologic study of core MQ-63-1 penetrating the Columbus Limestone (Middle Devonian) and Detroit River Group (Middle Devonian) at Marblehead, Ohio, MS: Bowling Green State University, 140 p.
- Baird, J., 1912, 43rd Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1911.
- , 1913, 44th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1912.
- Balakrishna, T. S., 1972, Petrography of some Silurian rocks from northern Michigan, MS: Wayne State University, 87 p.
- Ball, M. W., Weaver, T. J., Crider, H. D., and Ball, D. S., 1941, Shoestring gas fields of Michigan, *in* Levorsen, A. I., ed., Stratigraphic Type Oil Fields: Tulsa, American Association of Petroleum Geologists, p. 237-266.
- Balogh, R. J., 1981, A study of the middle Silurian Belle River Mills, Peters, and Ray Pinnacle Reefs from the Michigan Basin, MS: Bowling Green State University, 178 p.
- Balombin, M. T., 1974, The St. Peter Sandstone in Michigan, MS: Michigan State University, 127 p.
- Balthazor, D. A., 1991a, Sedimentology of the Bedford-Berea Sequence (Early Mississippian), Williams Field, Michigan, MS: Western Michigan University, 133 p.
- , 1991b, Williams Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 15-28.
- Baltrusaitis, E. J., 1974, Middle Devonian Bentonite in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 58, no. 7, p. 1323-1330.
- , 1975, Middle Devonian Bentonite in Michigan Basin: Reply: American Association of Petroleum Geologists Bulletin, v. 59, p. 1221-1223.
- Baltrusaitis, E. J., Clark, C. K., Cohee, G. V., Grant, R. P., Kelly, W. A., Landes, K. K., Lindberg, G. D., and Newcombe, R. B., 1948, A Summary of the Stratigraphy of the Southern Peninsula of Michigan: Michigan Geological Survey Open File Report, v. 76, p. 1-17.
- Banas, R. M., 2011, A geophysical and geological analysis of the Collingwood Member of the Trenton Formation, MS: Michigan Technological University, 74 p.
- Barbour, R. F., and Hill, F. E., 1969, Wayland Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 181-190.
- Barcas, K., 1980, Examination of Lower Silurian clastic deposits along the Niagara Escarpment, Bruce Peninsula, Ontario, MS: Wayne State University.

- Barker, J. F., Macqueen, R. W., and Waldron, J., 1986, Source, correlation and thermal maturation history of hydrocarbon deposits of southern Ontario: Open File Report - Ontario Geological Survey, p. 49-49.
- Barnes, C. R., and Bolton, T. E., 1988, The Ordovician-Silurian Boundary on Manitoulin Island, Ontario, Canada: Bulletin of the British Museum of Natural History (Geology), v. 43, p. 247-253.
- Barnes, C. R., Telford, P. G., and Tarrant, G. A., 1978, Ordovician and Silurian Conodont Biostratigraphy, Manitoulin Island and Bruce Peninsula, Ontario, *in* Sanford, J. T., ed., Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society, p. 63-72.
- Barnes, D. A., Girard, J.-P., and Aronson, J. L., 1992a, K-Ar dating of illite diagenesis in the Middle Ordovician St. Peter Sandstone, Central Michigan Basin, USA: Implications for thermal history, Origin, Diagenesis and Petrophysics of Clay Minerals in Sandstones, Volume 47: Tulsa, Society for Sedimentary Geology (SEPM), p. 35-48.
- Barnes, D. A., Harrison III, W. B., and Wahr, A., 2008, Assessment of Regional Geological Carbon Sequestration Potential in Upper Silurian to Middle Devonian Strata of the Michigan Basin, *in* Grobe, M., Pashin, J. C., and Dodge, R. L., eds., Carbon dioxide sequestration in geological media -- State of the Science, Volume 59: Tulsa, American Association of Petroleum Geologists, p. 99-123.
- Barnes, D. A., Harrison, W. B., III, Lundgren, C. E., and Wieczorek, L. M., 1988, The Lower Paleozoic of the Michigan Basin: A Core Workshop, Kalamazoo, Western Michigan University, Core Research Laboratory, 65 p.
- Barnes, D. A., Harrison, W. B., III, and Shaw, T. H., 1996, Lower-Middle Ordovician lithofacies and interregional correlation, Michigan Basin, U.S.A: Special Paper - Geological Society of America, v. 306, p. 35-54.
- Barnes, D. A., Lundgren, C. E., and Longman, M. W., 1992b, Sedimentology and Diagenesis of the St. Peter Sandstone, Central Michigan Basin, United States: American Association of Petroleum Geologists Bulletin, v. 76, no. 10, p. 1507-1532.
- Barnett, J. M., 1983, Sedimentation rate of salt determined by micrometeorite analysis, MS: Western Michigan University, 98 p.
- Barratt, M. W., 1981, Recent Exploration Activity in Michigan, Ontario Petroleum Institute Annual Conference Technical Papers, Volume 20, p. 1-31.
- , 1991, Falmouth Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 371-380.
- Barringer, J. E., 2008, Analysis of the occurrence of microconchids on Middle Devonian brachiopods from the Michigan Basin: Implications for microconchid and brachiopod autecology, MS: Michigan State University, 127 p.
- Barris, W. H., 1883, Description of some new blastoids from the Hamilton Group: Illinois Geological Survey Report, v. 7, p. 357-364.
- , 1884a, Description of some new blastoids from the Hamilton Group: Davenport Academy Science Proceedings, v. 4, p. 88-94.
- , 1884b, Description of some new crinoids from the Hamilton Group: Davenport Academy Science Proceedings, v. 4, p. 98-101.
- , 1884c, *Stereocrinus* Barris. (Revised): Davenport Academy Science Proceedings, v. 4, p. 102-104.
- Bartholomew, A. J., 2006, Middle Devonian faunas of the Michigan and Appalachian Basins: Comparing patterns of biotic stability and turnover between two paleobiogeographic subprovinces, PhD: University of Cincinnati, 300 p.
- Bartholomew, A. J., and Brett, C. E., 2007, Correlation of Middle Devonian Hamilton Group-equivalent strata in east-central North America: Implications for eustasy, tectonics and faunal provinciality, *in* Becker, R. T., and Kirchgasser, W. T., eds., Devonian Events and Correlations, Volume 278, Geological Society, p. 105-131.

- Bartholomew, A. J., Brett, C. E., DeSantis, M., Baird, G. C., and Tsujita, C., 2006, Sequence stratigraphy of the Middle Devonian at the border of the Michigan Basin: Correlations with New York and implications for sea-level change and paleogeography: *Northeastern Geology and Environmental Sciences*, v. 28, no. 1, p. 2-33.
- Barton, G. J., Mandel, R. J., and Baltusis, M. A., 1996, Predevelopment Freshwater Heads in the Glaciofluvial, Saginaw, and Marshall Aquifers in the Michigan Basin: U.S. Geological Survey Open-File Report, v. 95-319, p. 1-15.
- Basinski, P. M., and Kapadia, S., 1991, Woodville Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 459-474.
- Bassett, C. F., 1933, Stratigraphy and paleontology of the Dundee Limestone of Southeastern Michigan, PhD: University of Michigan.
- Bassett, C. F., 1935, Stratigraphy and paleontology of the Dundee Limestone of Southeastern Michigan: *Geological Society of America Bulletin*, v. 46, p. 425-462.
- Bassett, J. L., and Hasenmueller, N. R., 1977, New Albany Shale and correlative strata in Indiana, Morgantown, WV, United States (USA), U. S. Energy Res. Dev. Adm., Morgantown Energy Res. Cent., Morgantown, WV.
- Bates, E. R., 1970, The Niagaran reefs and overlying evaporite sequence in southeastern Michigan, MS: Michigan State University.
- Bates, R. L., and Calvert, W. L., 1975, Sub-Trenton structure of Ohio, with views on isopach maps and stratigraphic sections as basis for structural myths in Ohio, Illinois, New York, Pennsylvania, West Virginia, and Michigan [discussion and reply]: *American Association of Petroleum Geologists Bulletin*, v. 59, no. 5, p. 878-880.
- Bay, J. W., 1946, Minerals in the sandstone at Rockwood, Michigan: *Michigan Mineralogical Society Yearbook*, v. 1946, p. 8-9.
- Bay, T. A., 1983, The Silurian of the northern Michigan Basin, *in* Harris, P. M., ed., *SEPM Core Workshop, Volume 4: United States (USA)*, Society of Economic Paleontologists and Mineralogists, p. 53-72.
- Beach, P. G., 1989, Organic and inorganic chemical variations of the Antrim Shale, Michigan Basin; implications for changing oxygen levels in the depositional environment, MS: University of Tulsa, 141 p.
- Beauclair, W. A., 1951, Paleontology and stratigraphy of two well cores in the Middle Devonian rocks of Clare County, Michigan, MS: University of Michigan.
- Beauheim, R. L., Roberts, R. M., and Avis, J. D., 2014, Hydraulic testing of low-permeability Silurian and Ordovician strata, Michigan Basin, southwestern Ontario: *Journal of Hydrology*, v. 509, p. 163-178.
- Beaumont, C., Quinlan, G., and Hamilton, J., 1988, Orogeny and stratigraphy: Numerical models of the Paleozoic in the eastern interior of North America: *Tectonics*, v. 7, no. 3, p. 389-416.
- Becker, H., 1931, A study of the heavy minerals of the pre-Cambrian and Paleozoic rocks of Baraboo Range, Wisconsin: *Journal of Sedimentary Research*, v. 1, no. 2, p. 91-95.
- Becker, R. E., 1940, Chemical variations in Dundee brine and their relation to structure, MS: University of Michigan.
- Beers, R. F., 1945, Radioactivity and organic content of some Paleozoic shales: *American Association of Petroleum Geologists Bulletin*, v. 29, no. 1, p. 1-22.
- Beever, F. K., 1982, The depositional environment of the Lucas Formation, Amherst Quarry, Amherstburg, Ontario, Canada, MS: Wayne State University, 200 p.
- Behrens, E. W., 1958, An extension and reinterpretation of a regional magnetometer survey of part of southeastern Michigan, MS: University of Michigan.
- Bell, R., 1894, Notes on a visit to Michigan, U.S.A. regarding geological nomenclature: *Geological Survey of Canada Publication*, v. 353.

- Belsky, T., Johns, R. B., McCarthy, E. D., Burlingame, A. L., Richter, W., and Calvin, M., 1965, Evidence of Life Processes in a Sediment Two and a Half Billion Years Old: *Nature*, v. 206, no. 4983, p. 446-447.
- Benincasa, A. J., 1996, Sedimentology and stratigraphy of the Lower Silurian Grimsby Formation, in subsurface, Lake Erie and southwestern Ontario, MS: Brock University, 218-218 p.
- Benison, K. C., Knapp, J. P., and Dannenhoffer, J. M., 2011, The Pennsylvanian Pewamo Formation and Associated Haybridge Strata: Toward the Resolution of the Jurassic Ionia Red Bed Problem in the Michigan Basin, U.S.A: *Journal of Sedimentary Research*, v. 81, no. 7, p. 459-478.
- Bennett, G. H., 1978, Sedimentology of the Antrim Shale from five drill sites in the Michigan Basin, MS: Michigan Technological University, 75 p.
- Bensinger, H. S., 1961, Joint patterns in quarries in southeastern Michigan, MS: University of Michigan.
- Berg, R. R., 1954, Franconia Formation of Minnesota and Wisconsin: *Geological Society of America Bulletin*, v. 65, no. 9, p. 857-882.
- Bergquist, S. C., and Ehlers, G. M., 1938, Michigan Academy of Science, Arts and Letters, Section of Geology and Mineralogy, Eighth Annual Field Excursion: Devonian of Antrim, Charlevoix and Emmet Counties, Michigan, p. 1-15.
- Bergquist, S. G., 1930, The Occurrence of Glauconite in the Hermansville Formation of Alger County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 12, p. 231-237.
- , 1931, Surface Geology of Luce County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 14, p. 437-452.
- , 1937, The Cambrian-Ozarkian Contact in Alger County, Michigan: *Papers of the Michigan Academy of Sciences, Arts and Letters*, v. 22, p. 421-435.
- , 1939, The occurrence of spore coal in the Williamston Basin, Michigan: *Journal of Sedimentary Research*, v. 9, no. 1, p. 14-19.
- Bergström, S. M., Kleffner, M., Schmitz, B., and Cramer, B. D., 2011, Revision of the position of the Ordovician-Silurian boundary in southern Ontario; regional chronostratigraphic implications of $\delta^{13}\text{C}$ chemostratigraphy of the Manitoulin Formation and associated strata: *Canadian Journal of Earth Sciences*, v. 48, no. 11, p. 1447-1470.
- Berkey, C. P., 1906, Paleogeography of Saint Peter time: *Geological Society of America Bulletin*, v. 17, p. 229-250.
- Berkley, J. L., and Baird, G. C., 2002, Calcareous K-bentonite deposits in the Utica Shale and Trenton Group (Middle Ordovician), of the Mohawk Valley, New York State: *Physics and Chemistry of the Earth*, v. 27, p. 265-278.
- Bernardon, M. A., 1957, A mechanical and statistical analysis of the Middle Devonian, Rogers City-Dundee Formations in Michigan, MS: Michigan State University.
- Berner, R. E., 1930, New species of favosites from the Niagaran series of Michigan, PhD: University of Michigan.
- Berry, W. B. N., 1970, Late Ordovician graptolites from northern Michigan: *Journal of Paleontology*, v. 44, no. 2, p. 270-275.
- Berry, W. B. N., and Boucot, A. J., 1970, Correlation of the North American Silurian Rocks, *Geological Society of America Special Paper*, Volume 301: Boulder, Geological Society of America, p. 276.
- Best, B., 1991a, Eaton Rapids 7 Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 197-204.
- Best, B., 1991b, Lyon 34 Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 247-254.

- Bielicki, J. M., Peters, C. A., Fitts, J. P., and Wilson, E. J., 2015, An examination of geologic carbon sequestration policies in the context of leakage potential: *International Journal of Greenhouse Gas Control*, v. 37, p. 61-75.
- Bielicki, J. M., Pollak, M. F., Fitts, J. P., Peters, C. A., and Wilson, E. J., 2014, Causes and financial consequences of geologic CO₂ storage reservoir leakage and interference with other subsurface resources: *International Journal of Greenhouse Gas Control*, v. 20, p. 272-284.
- Bignell, L. G. E., 1937, Michigan Limestone Formations suited for salt water disposal: *Oil and Gas Journal*, v. 36, no. 30, p. 55-57.
- Bigsby, J. J., 1821, Geological and Mineralogical observations along northwest portion of Lake Huron: *American Journal of Science*, v. 3, p. 254-272.
- , 1824, Notes on the geography and geology of Lake Huron: *Geological Society of London Transactions*, v. 2, no. 1, p. 175-209.
- Bihn, J. L., 1997, A sedimentologic and geochemical study of the early Llandoveryian reefal formations of central Manitoulin Island, Ontario, Canada, MS: Northeastern Illinois University, 220 p.
- Billingham, A., 1991, Winterfield Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 95-102.
- Birchard, M. C., 1993, Stratigraphy and facies of the Middle Devonian Dundee Formation, southwestern Ontario, Lambeth, ON, Canada (CAN), Ontario Petroleum Institute, Lambeth, ON, 156 p.
- Birchard, M. C., Rutka, M. A., and Brunton, F. R., 2004, Lithofacies and geochemistry of the Lucas Formation in the subsurface of southwestern Ontario; a high-purity limestone and potential high-purity dolostone resources: Open File Report - Ontario Geological Survey, p. 180-180.
- Bishop, M. S., 1940, Isopachous studies of Ellsworth to Traverse Limestone section of southwestern Michigan: *American Association of Petroleum Geologists Bulletin*, v. 24, no. 12, p. 2150-2162.
- Bishop, W. C., 1967, Study of the Albion-Scipio Field of Michigan, MS: Michigan State University, 51 p.
- Black, T., 2012, Deep karst system research, Michigan, USA: *Carbonates and Evaporites*, v. 27, no. 2, p. 119-122.
- Black, T. J., 1980, Known and suspected karst features in northern Lower Michigan, scale 1:23,400.
- , 1983, Tectonics, Structure and karst in Northern Lower Michigan, Michigan Basin Geological Society, 143 p.
- , 1995, 1995 Field Conference Road Log, *in* Black, T. J., ed., *Karst Geology of the Northeast Lower Peninsula, Michigan*, Michigan Basin Geological Society, p. 1-34.
- , 1997, Evaporite karst of northern lower Michigan: *Carbonates and Evaporites*, v. 12, no. 1, p. 81-83.
- Black, T. J., 2003a, Evaporite karst in Michigan: Circular - Oklahoma Geological Survey, v. 109, p. 315-320.
- Black, T. J., 2003b, Evaporite karst in Michigan, *in* Beck, B. F., and LaMoreaux, P. E., eds., *Sinkholes and the Engineering and Environmental Impacts of Karst*, p. 141-149.
- , 2004, Thunder Bay Marine Sanctuary Sink Hole Investigations, *in* Black, T. J., and Wollensak, M. S., eds., *Northeast Lower Peninsula, Michigan Geological Field Conference*, Michigan Basin Geological Society, p. 55-56.
- Black, T. J., Gregory, D., Boothman, D., Priddy, C., and Farrand, W. R., 1995, *Karst Geology of the Northeast Lower Peninsula, Michigan*, Michigan Basin Geological Society, 89 p.
- Black, T. J., and Wollensak, M. S., 2004a, Northeast Lower Peninsula Michigan Field Conference Road Log, *in* Black, T. J., and Wollensak, M. S., eds., *Northeast Lower*

- Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 3-38.
- , 2004b, Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 133.
- Blaisdell, G. L., 1979, Influence of the weak bedding plane in Michigan Antrim Shale on laboratory hydraulic fracture orientation, MS: Michigan Technological University, 98 p.
- Blake, D. B., 1962, The stratigraphy of the Au Train Formation at Au Train Falls and Wagner Falls, Alger County, northern Michigan, MS: Michigan State University, 98 p.
- Blättler, C. L., and Higgins, J. A., 2014, Calcium isotopes in evaporites record variations in Phanerozoic seawater SO₄ and Ca: *Geology*, v. 42, no. 8, p. 711-714.
- Blodgett, R. B., and Boucot, A. J., 1998, *Geniculigypa*, a new gypidulid (Brachiopoda) genus from the Middle Devonian of Michigan: *Journal of Paleontology*, v. 72, no. 3, p. 454-457.
- Blodgett, R. B., Boucot, A. J., and Koch, W. F., 1988, New occurrences of color patterns in Devonian articulate brachiopods: *Journal of Paleontology*, v. 62, no. 1, p. 46-51.
- Bloomer, A. T., 1969, A regional study of the Middle Devonian Dundee Dolomite in the Michigan Basin, MS: Michigan State University, 67 p.
- Bolton, T. E., 1953, Silurian formations of the Niagara escarpment in Ontario (preliminary account): Paper - Geological Survey of Canada, 19 p.
- Bolton, T. E., 1954, Silurian of Manitoulin Island, *in* Sanford, J. T., and Moseley, J. R., eds., *The Stratigraphy of Manitoulin Island, Ontario, Canada*, Michigan Geological Society, p. 18-20.
- , 1957, Silurian Stratigraphy and Palaeontology of the Niagara Escarpment in Ontario: Geological Survey of Canada Memoir, v. 289, p. 1-145.
- , 1965, Pre-Guelph, Silurian Formations of the Niagara Peninsula, Ontario, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., *Guidebook: Geology of Central Ontario*, Michigan Basin Geological Society, p. 55-80.
- , 1966, Illustrations of Canadian Fossils: Silurian Faunas of Ontario: Geological Survey of Canada Paper, v. 66, no. 5, p. 1-46.
- , 1968, Silurian Faunal Assemblages, Manitoulin Island, Ontario, *in* Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island*, Michigan Basin Geological Society, p. 38-49.
- , 1994, *Sphenothallus angustifolius* Hall, 1847 from the lower Upper Ordovician of Ontario and Quebec: Bulletin - Geological Survey of Canada, p. 1-11.
- Bolton, T. E., and Liberty, B. A., 1954, Description of Stops, *in* Sanford, J. T., and Moseley, J. R., eds., *The Stratigraphy of Manitoulin Island, Ontario, Canada*, Michigan Geological Society, p. 27-30.
- , 1955a, Detailed Description of Stops, *in* Mozola, A. J., ed., *The Niagara Escarpment of Peninsular Ontario, Canada*, Michigan Geological Survey and Michigan Geological Society, p. 39-42.
- , 1955b, Silurian Stratigraphy of the Niagara Escarpment, Ontario, *in* Mozola, A. J., ed., *The Niagara Escarpment of Peninsular Ontario, Canada*, Michigan Geological Survey and Michigan Geological Society, p. 19-38.
- Bond, G. C., and Kominz, M. A., 1991, Disentangling Middle Paleozoic sea level and tectonic events in cratonic margins and cratonic basins of North America: *Journal of Geophysical Research: Solid Earth*, v. 96, no. B4, p. 6619-6639.
- Boneham, R. F., 1965, Occurrence of *Tasmanites*, plant spores, and Chitinozoa in Middle and Upper Devonian formations of Michigan, Ohio, and Ontario, MS: Wayne State University, 31 p.
- , 1967, Devonian *Tasmanites* from Michigan, Ontario, and Northern Ohio: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 52, no. 1, p. 163-173.

- Bonem, R. M., 1982, Morphology and paleoecology of the Devonian rostroconch genus *Bigalea*: *Journal of Paleontology*, v. 56, no. 6, p. 1362-1374.
- Boothman, D., and Priddy, C., 1995, Oil and Gas Potential of Northeast Michigan, *in* Black, T. J., ed., *Karst Geology of the Northeast Lower Peninsula, Michigan, Michigan Basin Geological Society*, p. 55-70.
- Boothroyd, J., 2012, Carboniferous provenance trends from clastic strata of the Michigan Basin, MS: Michigan State University, 198 p.
- Bose, R., 2006, Epibionts on brachiopods from the Devonian Dundee Formation of Ohio, MS: Bowling Green State University, 74 p.
- Bose, R., and Bartholomew, A. J., 2013, Comparative Trends in Evolution Across Correlated Geological Strata, *Macroevolution in Deep Time: New York, NY, Springer New York*, p. 43-54.
- Bose, R., Schneider, C., Polly, P. D., and Yacobucci, M. M., 2010, Ecological Interactions between *Rhipidomella* (Orthises, Brachiopoda) and Its Endoskeletobionts and Predators from the Middle Devonian Dundee Formation of Ohio, United States: *Palaios*, v. 25, no. 3-4, p. 196-208.
- Bose, R., Schneider, C. L., Leighton, L. R., and Polly, P., 2011, Influence of atrypid morphological shape on Devonian episkeletobiont assemblages from the lower Genshaw formation of the Traverse Group of Michigan: A geometric morphometric approach: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 310, no. 3-4, p. 427-441.
- Bottoms, K. D., 1959, Middle Devonian strata based on a core from Grosse Ile, Michigan, MS: University of Michigan.
- Boucot, A. J., 1972, Correlation of the New York, Ontario and Northern Michigan Silurian, by means of fossils, with European standards, *in* Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., *Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society*, p. 66-67.
- Boucot, A. J., and Ehlers, G. M., 1963, Two new genera of Stricklandid Brachiopods: *Contributions from the Museum of Paleontology The University of Michigan*, v. 18, no. 4, p. 47-66.
- Boucot, A. J., and Johnson, J. G., 1968, Brachiopods of the Bois Blanc Formation in New York: U. S. Geological Survey Professional Paper, p. B1-B27.
- Boudouris, J., 1955, A lithofacies analysis of the Bass Island and Salina formations in the Michigan Basin, MS: University of Michigan.
- Bowers, T. L., 1987, Upper Niagara-lower Salina (Mid-Silurian) sedimentology, and conodont-based biostratigraphy and thermal maturity of the Southeast Michigan Basin, MS: Wayne State University, 120 p.
- Brady, B., and DeHaas, R., 1988a, The "deep" (pre-Glenwood) formations of the Michigan basin, part 1-the Goodwell unit: *Michigan Oil and Gas News*, v. 94, no. 9, p. 32-38.
- , 1988b, The "deep" (pre-Glenwood) formations of the Michigan Basin, part 4 - The Umlor Formation: *Michigan Oil and Gas News*, v. 94, no. 22, p. 35-43.
- Braitenberg, C., and Ebbing, J., 2009, The GRACE-satellite gravity and geoid fields in analysing large-scale, cratonic or intracratonic basins: *Geophysical Prospecting*, v. 57, no. 4, p. 559-571.
- Brandt, D., Anderson, E., and Larcinese, E., Petrography and depositional environments of the Upper Ordovician formations of northern Michigan, *in* *Proceedings The Geological Society of America, North-Central Section, 21st Annual Meeting 1987, Volume 19, Geological Society of America*, p. 190-190.
- Brandt, D., Larcinese, E., and Anderson, E., An Upper Ordovician onshore/offshore dolomitization gradient, *in* *Proceedings Geological Society of America, 22nd annual meeting, North-Central Section, with the North-Central Section of the Paleontological*

- Society, Pander Society, Great Lakes Section of the Society of Economic Paleontologists and Mineralogists and the East-Central Section of the National Association of Geology Teachers 1988, Volume 20, Geological Society of America, p. 336-337.
- Brandt, D., Seitz, M., McCoy, V., Csonka, J., Barringer, J., Holmquist, E., Kraig, S., Morgan, R., Myers, J., and Paquette, L., 2010, A New Ichnospecies of *Arthropycus* from the Late Carboniferous (Pennsylvanian) of Michigan, USA: *Ichnos*, v. 17, no. 1, p. 12-19.
- Brannigan, J. H., Burgess, D. M., Jr., Pinner, F. R., Simon, G. D., and Talpt, A. R., 1960, Trenton Trend – Engineering Committee Report, Michigan Oil and Gas Operators Committee, Michigan Department of Conservation, Oil and Gas Advisory Board, 25 p.
- Branson, E. B., 1915, Origin of thick gypsum and salt deposits: *Geological Society of America Bulletin*, v. 26, p. 231-242.
- Breining, K. A., 1985, Stable isotopic and cathodoluminescence study of a Silurian shelf reef, MS: University of Michigan.
- Brennan, S. T., and Lowenstein, T. K., 2002, The major-ion composition of Silurian seawater: *Geochimica et Cosmochimica Acta*, v. 66, no. 15, p. 2683-2700.
- Brett, C. E., Allison, P. A., Tsujita, C. J., Soldani, D., and Moffat, H. A., 2006, Sedimentology, taphonomy, and paleoecology of meter-scale cycles from the Upper Ordovician of Ontario: *Palaios*, v. 21, no. 6, p. 530-547.
- Brett, C. E., Baird, G. C., Bartholomew, A. J., DeSantis, M. K., and Ver Straeten, C. A., 2011, Sequence stratigraphy and a revised sea-level curve for the Middle Devonian of eastern North America: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 304, no. 1-2, p. 21-53.
- Brett, C. E., Goodman, W. M., Loduca, S. T., Pratt, B., and Tetreault, D., 1998, Silurian-Early Devonian sequence stratigraphy, cycles and paleoenvironments of the Niagara Peninsula area of Ontario, Canada: *Geological Society of America, Annual Meeting, Field Trip Guidebook*, v. 16, p. 32.
- Brett, J. W., 1960, A vertical magnetic intensity survey of a portion of south-central Michigan, MS: Michigan State University.
- Bricker, D. M., 1980, Michigan's Oil and Gas Fields 1979: *Annual Statistical Summary*, v. 32, p. 1-65.
- , 1982a, Michigan's Oil and Gas Fields 1980: *Annual Statistical Summary*, v. 34, p. 1-65.
- Bricker, D. M., 1982b, Oil and gas developments in Michigan in 1981: *American Association of Petroleum Geologists Bulletin*, v. 66, no. 11, p. 1827-1832.
- Bricker, D. M., 1983a, Michigan's Oil and Gas Fields 1981: *Annual Statistical Summary*, v. 36, p. 1-49.
- Bricker, D. M., 1983b, Oil and gas developments in Michigan in 1982: *American Association of Petroleum Geologists Bulletin*, v. 67, no. 10, p. 1550-1553.
- Bricker, D. M., 1984a, Michigan's Oil and Gas Fields 1983: *Annual Statistical Summary*, v. 38, p. 1-52.
- Bricker, D. M., 1984b, Oil and gas developments in Michigan in 1983: *American Association of Petroleum Geologists Bulletin*, v. 68, no. 10, p. 1315-1318.
- Bricker, D. M., 1987, Michigan's Oil and Gas Fields 1983-1984: *Annual Statistical Summary*, v. 84.
- Bricker, D. M., and Henderson, W. L., 1985, Oil and gas developments in Michigan in 1984: *American Association of Petroleum Geologists Bulletin*, v. 69, no. 10, p. 1543-1547.
- , 1986, Oil and gas developments in Michigan in 1985: *American Association of Petroleum Geologists Bulletin*, v. 70, no. 10, p. 1280-1284.
- Bricker, D. M., and Henderson, W. L., 1987, Oil and Gas Developments in Michigan in 1986: *American Association of Petroleum Geologists Bulletin*, v. 71, no. 10B, p. 83-87.

- , 1988, Oil and Gas Developments in Michigan in 1987: American Association of Petroleum Geologists Bulletin, v. 72, no. 10B, p. 82-87.
- , 1989, Oil and Gas Developments in Michigan in 1988: American Association of Petroleum Geologists Bulletin, v. 73, no. 10B, p. 81-86.
- , 1990, Oil and Gas Developments in Michigan in 1989: American Association of Petroleum Geologists Bulletin, v. 74, no. 10B, p. 84-88.
- Bricker, D. M., and Lilienthal, R. T., 1975a, Grand Traverse County bedrock topography.
- , 1975b, Manistee County bedrock topography.
- Bricker, D. M., Milstein, R. L., and Reszka, C. R., 1983, Selected studies of Cambro-Ordovician sediments within the Michigan Basin: Michigan Geological Survey Division Report of investigation, v. 26, p. 1-54.
- Briggs, D., 1959, Physical Stratigraphy of Lower Middle Devonian Rocks in the Michigan Basin, *in* Sheldon, F. D., ed., Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society, p. 39-58.
- Briggs, L. I., 1957, Quantitative Aspects of Evaporite Deposition: Papers of the Michigan Academy of Science, Arts and Letters, v. 42, no. 1, p. 115-123.
- , 1958, Evaporitic facies: Journal of Sedimentary Petrology, v. 28, p. 46-56.
- , 1962, Niagaran-Cayugan sedimentation in the Michigan Basin, Silurian rocks of the southern Lake Michigan area, Michigan Basin Geological Society, p. 58-60.
- , 1970, Geology of Gypsum in the Lower Peninsula, Michigan, *in* Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals Michigan, State of Michigan, Department of Natural Resources, Geological Survey Division, p. 66-76.
- Briggs, L. I., and Briggs, D., 1974, Niagara-Salina relationships in the Michigan Basin, Mich., United States (USA), Mich. Basin Geol. Soc., Mich., Silurian reef-evaporite relationships.
- Briggs, L. I., Briggs, D. Z., Elmore, R. D., and Gill, D., 1978, Stratigraphic Facies of Carbonate Platform and Basinal Deposits, Late Middle Silurian, Michigan Basin, Geological Society of America North-Central Section Field trip Guidebook: Boulder, Geological Society of America, p. 117-131.
- Briggs, L. I., Gill, D., Briggs, D. Z., and Elmore, R. D., 1977, Transition from Open Marine to Evaporite Deposition in the Silurian Michigan Basin, Hypersaline Brines and Evaporitic Environments: Proceedings of the Bat Sheva Seminar on Saline Lakes and Natural Brines, Volume 28: Amsterdam, Elsevier, p. 253-270.
- Briggs, L. I., and Pollack, H. N., 1967, Digital model of evaporite sedimentation: Science, v. 155, no. 3761, p. 453-456.
- Brigham, R. J., 1971, Structural Geology of Southwestern Ontario and Southeastern Michigan, PhD: The University of Western Ontario, 218 p.
- Brintnell, C., 2012, Architecture and stratigraphy of the Lower Silurian Guelph Formation, Lockport Group, southern Ontario and Michigan, MS: The University of Western Ontario, 248 p.
- Brintnell, C., Brunton, F. R., Brett, C. E., and Jin, J. E., 2009, 26. Project Unit 09-026. Characterization of the Fossil Hill-Cabot Head Formational Disconformity between Tobermory and Guelph, Niagara Escarpment Region, Southern Ontario: Ontario Geological Survey, Open File Report, v. 6240, p. 26-21 to 26-10.
- Bristol, H. M., and Buschbach, T. C., 1973, Ordovician Galena Group (Trenton) of Illinois -- Structure and Oil Fields: Illinois State Geological Survey Illinois Petroleum 99, p. 1--38.
- Brock, T., Elenbaas, D., and Schmidt, G., 1995, Secondary recovery in Michigan reefs summary results, recovery achieved, Engineering Applications for Michigan: Society of Petroleum Engineers, Continuing Education Seminar Notes, Mt. Pleasant, MI, April 11 and 12, 1995, p. 1-30.
- Brogly, P. J., 1990, The depositional environments of the Queenston Formation (Upper Ordovician) in Southern Ontario, MS: University of Guelph (Canada), 187-187 p. p.

- Brogly, P. J., Martini, I. P., and Middleton, G. V., 1998, The Queenston Formation: shale-dominated, mixed terrigenous-carbonate deposits of Upper Ordovician, semiarid, muddy shores in Ontario, Canada: *Canadian Journal of Earth Sciences*, v. 35, no. 6, p. 702-719.
- Brookfield, M. E., 1988, A mid-Ordovician temperate carbonate shelf -- the Black River and Trenton Limestone Groups of southern Ontario, Canada: *Sedimentary Geology*, v. 60, p. 137-153.
- Brookfield, M. E., and Brett, C. E., 1988, Paleoenvironments of the Mid-Ordovician (Upper Caradocian) Trenton limestones of southern Ontario, Canada: Storm sedimentation on a shoal-basin shelf model: *Sedimentary Geology*, v. 57, p. 75-105.
- Brooks, A. J., 1978, Stratigraphy and sedimentology of the Byron Formation, Silurian, east-central Wisconsin, MS: University of Wisconsin, Madison, 193 p.
- Brown, A., 2011, Identification of source carbon for microbial methane in unconventional gas reservoirs: *American Association of Petroleum Geologists Bulletin*, v. 95, no. 8, p. 1321-1338.
- Brown, G. G., 1924, Clays and shales of Michigan and their uses: Michigan Geological and Biological Survey, Publication, v. 36, no. 30, p. 1-444.
- Brown, L. M., Leach, M. A., Rexroad, C. B., Ribant, M., Lieurance, S., and Smith, C. B., 2000, Bedrock geology of Mackinac County, Michigan: *Michigan Academician*, v. 32, no. 1, p. 1-8.
- Brown, T. C., 2003, Molecular Fossils in Devonian Black Shales of Laurentia, MS: University of Illinois at Chicago, 120 p.
- Brown, T. C., and Kenig, F., 2004, Water column structure during deposition of Middle Devonian Lower Mississippian black and green/gray shales of the Illinois and Michigan Basins: a biomarker approach: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 215, p. 59-85.
- Brown, T. E., 1998, Base-metal concentrations in oilfield brines of the Silurian "Clinton" Sandstone of eastern Ohio, MS: Ohio State University, 224 p.
- Bruno, P. W., Larson, G. J., and Coleman, S. M., 1989, Great Lakes Section SEPM mid-year field conference guide.
- Brunton, F. R., and Brintnell, C., 2011, 30. Project Unit 08-004. Final Update of Early Silurian Stratigraphy of the Niagara Escarpment and Correlation with Subsurface Units Across Southwestern Ontario and the Great Lakes Basin: Ontario Geological Survey Open File Report, v. 6270, p. 30-31 to 30-11.
- Brunton, F. R., Brintnell, C., Jin, J., and Bancroft, A., 2012, Stratigraphic Architecture of the Lockport Group in Ontario and Michigan - A new interpretation of Early Silurian "Basin Geometries" and "Guelph Pinnacle Reefs": Ontario Petroleum Institute.
- Brunton, F. R., and Dodge, J. E. P., 2008, Karst of southern Ontario and Manitoulin Island: Ontario Geological Survey, Groundwater Resources Study, v. 5, p. 1-99.
- Brunton, F. R., Turner, E., and Armstrong, D., 2009, A Guide to the Paleozoic Geology and Fossils of Manitoulin Island and northern Bruce Peninsula, Ontario, Canada, Canadian Paleontology Conference, Volume 14: Sudbury, ONT, p. 1-77.
- Budai, J. M., Martini, A. M., Walter, L. M., and Ku, T. C. W., 2002, Fracture-fill calcite as a record of microbial methanogenesis and fluid migration: a case study from the Devonian Antrim Shale, Michigan Basin: *Geofluids*, v. 2, no. 3, p. 163-183.
- Budai, J. M., and Wilson, J. L., 1991, Diagenetic history of the Trenton and Black River Formations in the Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., eds., Early sedimentary evolution of the Michigan Basin, Volume 256: Boulder, Geological Society of America, p. 73-88.
- Budros, R., and Briggs, L. I., 1977, Depositional environment of Ruff Formation (Upper Silurian) in southeastern Michigan: *Studies in Geology (Tulsa)*, no. 5, p. 53-71.

- Budros, R. C., 1974, The stratigraphy and petrogenesis of the Ruff Formation, Salina Group in Southeast Michigan MS: University of Michigan, 178 p.
- Buehler, A. D., 1983, Collecting Alpena crinoids: *Fossils Quarterly*, v. 2, no. 1-2, p. 27-33.
- Buehner, J. H., and Davis, S. H., Jr., 1969, Albion-Pulaski-Scipio-Trend Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 37-48.
- Bultynck, P. L., 1976, Comparative study of middle Devonian conodonts from North Michigan (U.S.A.) and the Ardennes (Belgium-France): Special Paper - Geological Association of Canada, no. 15, p. 119-141.
- Burdick, D. G., and Koval, E. D., 1991, Leroy Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 415-422.
- Burgess, C. W., 1950, Devonian stratigraphy and faunas of two cores from Antrim and Crawford counties, Michigan, MS: University of Michigan.
- Burns, J. W., 1962, Regional study of the Upper Silurian Salina evaporites in the Michigan Basin, MS: Michigan State University, 196 p.
- Buschbach, T. C., 1965, Deep Stratigraphic Test Well near Rock Island, Illinois: Illinois State Geological Survey Circular, v. 394, p. 1-11.
- Bush, C. V., 1983, Dundee Fields in the Central Michigan Basin, MS: Michigan State University, 200 p.
- Busson, G., 1991, Relationship between different types of evaporitic deposits, and the occurrence of organic-rich layers (potential source-rocks): *Carbonates and Evaporites*, v. 6, no. 2, p. 177-192.
- Buxton, T. M., 1983, Lithologic control of pressure solution; Alpena Limestone, Alpena, Michigan, MS: Michigan State University, 70 p.
- Buxton, T. M., and Sibley, D. F., 1981, Pressure Solution Features in a Shallow Buried Limestone: *Journal of Sedimentary Petrology*, v. 51, no. 1, p. 19-26.
- Byerley, M. C., 1992, Sedimentology of the Late Ordovician Georgian Bay Formation, Manitoulin Island and Bruce Peninsula, Ontario, MS: University of Waterloo, 257 p.
- Byers, C. W., Dott, R. H., and Smith, G., 1990, Lower Ordovician and Upper Cambrian of Wisconsin, Michigan Basin Geological Society, 37 p.
- Cadorette, S., 1997, Stratigraphy and sedimentology of the Lower Silurian Thorold Formation in subsurface Lake Erie, Maitland Field, BS: Brock University, 106 p.
- Cady, G. H., 1916, The New Richmond sandstone of northern Illinois: *Transactions of the Illinois State Academy of Science*, v. 9., p. 210-210.
- Cain, B. A., 1991, Fracture intensity in the Latuszak B1-32 well, Stratigraphy, gas, occurrence [sic], formation evaluation and fracture characterization of the Antrim Shale, Michigan basin: Gas Research Institute Topical Report GRI-92/0258, 91 p.
- Caldwell, M. S., 1991, Structural, depositional, and diagenetic controls on reservoir development: St. Peter Sandstone, Newaygo County, Michigan, MS: Western Michigan University, 97 p.
- Calvert, W. L., 1974, Sub-Trenton structure of Ohio, with views on isopach maps and stratigraphic sections as basis for structural myths in Ohio, Illinois, New York, Pennsylvania, West Virginia, and Michigan American Association of Petroleum Geologists Bulletin, v. 58, no. 6, p. 957-972.
- Cameron, J. A., 1975, Hydrocarbon content of the Manitoulin Dolomite on Manitoulin Island, BS: McMaster University, 78 p.
- Camp, M. J., and Hatfield, C. B., 1991, Middle Devonian (Givetian) Silica Formation of Northwest Ohio; description and road log: *The Ohio Journal of Science*, v. 91, no. 1, p. 27-34.

- Campau, D. E., 1950, The stratigraphic distribution of Ostracoda within the Traverse Formation of the Michigan Basin, MS: Michigan State College, 1-50 p.
- Campbell, M. R., and Bownocker, J. A., 1917, The coal fields of the United States: U.S. Geological Survey Professional Paper, v. 100, p. 1-101.
- Caramanica, F., 1993, Natural fracture identification and implications for production: Gas Research Institute Antrim Shale workshop no. 1-17.
- Carlson, C. G., 1927, Geology of the Saginaw oil field, Michigan, and discussion of Michigan's oil prospects: American Association of Petroleum Geologists Bulletin, v. 11, no. 9, p. 959-965.
- , 1929, Geology of the Saginaw oil field, Michigan, and discussion of Michigan's oil prospects, Structure of typical American Oil Fields, Volume 1, American Association of Petroleum Geologists, p. 105-111.
- , 1933, Important Michigan Production: World Petroleum, p. 211-214.
- Carlson, E. H., 1987, Celestite replacements of evaporites in the Salina Group: Sedimentary Geology, v. 54, no. 1-2, p. 93-112.
- Carlton, R. R., 1982, Models of Dolomitization from Petrographic and Selected Trace Element Data within the Middle Devonian Carbonates of the Reed City Storage Field, Lake, and Osceola Counties, Michigan, MS: Michigan State University, 153 p.
- Carman, J. E., 1936, Sylvania sandstone of northwestern Ohio: Geological Society of America Bulletin, v. 47, p. 253-265.
- Carman, J. E., 1960, The stratigraphy of the Devonian Holland Quarry shale of Ohio: Fieldiana: Geology (New Series), v. 14, no. 1, p. 1-5.
- Carozzi, A. V., 1962, Petrography of Wabash Reef, Wabash, Indiana, in Fisher, J. H., ed., Silurian Rocks of the Southern Lake Michigan Area, Michigan Basin Geological Society, p. 50-57.
- Carozzi, A. V., 1971, Geochemical data on back-reef carbonates: Traverse group (Givetian) of the northern part of the Southern Peninsula of Michigan: Bulletin du Centre de recherches de Pau - SNPA, v. 5, p. 213-222.
- Carr, R. K., and Jackson, G. L., 2005, *Diplognathus lafargei* sp. nov. from the Antrim Shale (Upper Devonian) of the Michigan Basin, Michigan, USA: Revista Brasileira de Paleontologia, v. 8, no. 2, p. 109-116.
- Carroll, J. F., 1963, A resistivity survey of the Saginaw Formation in the Lansing, Michigan, area, MS: Michigan State University, 59 p.
- Carroll, S. A., McNab, W. W., Dai, Z., and Torres, S. C., 2013, Reactivity of Mount Simon Sandstone and the Eau Claire Shale Under CO₂ Storage Conditions: Environmental Science & Technology, v. 47, no. 1, p. 252-261.
- Case, E. C., 1927, The coral seas of Michigan: Natural History, v. 27, no. 5, p. 420-429.
- , 1931, Arthropod remains from the Devonian of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 3, p. 163-181.
- Case, E. C., and Robinson, W. I., 1915a, The Geology of Limestone Mountain and Sherman Hill in Houghton County: Michigan Geological and Biological Survey, p. 167-181.
- , 1915b, The Geology of Limestone Mountain and Sherman Hill in Houghton County, Michigan: Journal of Geology, v. 23, no. 3, p. 256-260.
- Case, L. C., 1945, Exceptional Silurian brine near Bay City, Michigan: American Association of Petroleum Geologists Bulletin, v. 29, no. 5, p. 567-570.
- Cassa, M. R., and Kissling, D. L., 1982, Carbonate facies of the Onondaga and Bois Blanc formations, Niagara Peninsula, Ontario: Guidebook - New York State Geological Association, Meeting, v. 54, p. 65-97.
- Castro, M. C., Warrior, R. B., Hall, C. M., and Lohmann, K. C., 2012, A late Pleistocene–Mid-Holocene noble gas and stable isotope climate and subglacial record in southern Michigan: Geophysical Research Letters, v. 39, no. 19, p. L19709.

- Caswell, R. H., and Trak, B., 1985, Some geotechnical characteristics of fragmented Queenston Shale: *Canadian Geotechnical Journal*, v. 22, no. 3, p. 403-408.
- Catacosinos, P. A., 1972, Cambrian stratigraphy of the Lower Peninsula of Michigan, PhD: Michigan State University, 251 p.
- , 1973, Cambrian Lithostratigraphy of Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 57, no. 12, p. 2404-2418.
- Catacosinos, P. A., and Daniels, P. A., Jr., 1991, Early Sedimentary Evolution of the Michigan Basin, *Geological Society of America Special Publication, Volume 256*: Boulder, Geological Society of America, p. 248.
- Catacosinos, P. A., Harrison III, W. B., Reynolds, R. F., Westjohn, D. B., and Wollensak, M. S., 2000, Stratigraphic nomenclature for Michigan, Michigan Department of Environmental Quality, Geological Survey Division.
- Catacosinos, P. A., Harrison, W. B., and Daniels, P. A., 1991, Structure, Stratigraphy, and Petroleum Geology of the Michigan Basin, *in* Leighton, M. W., Kolata, D. R., Olitz, D. F., and Eidel, J., eds., *Interior Cratonic Basins, Volume 51*: Houston, American Association of Petroleum Geologists, p. 561-602.
- Catacosinos, P. A., Harrison, W. B., III, Reynolds, R. F., Westjohn, D. B., and Wollensak, M. S., 2001, Stratigraphic Lexicon for Michigan, Lansing, Geological Survey Division, Department of Environmental Quality and Michigan Basin Geological Society, Bulletin.
- Caughlin, W. G., Lucia, F. J., and McIver, N. L., 1976, The detection and development of Silurian reefs in northern Michigan: *Geophysics*, v. 41, p. 646-658.
- Cave, L., Al, T., Xiang, Y., and Vilks, P., 2009, A technique for estimating one-dimensional diffusion coefficients in low-permeability sedimentary rock using X-ray radiography: Comparison with through-diffusion measurements: *Journal of Contaminant Hydrology*, v. 103, no. 1-2, p. 1-12.
- Cercone, K. R., 1984a, Diagenesis of Niagaran (middle Silurian) Pinnacle Reefs, Northwest Michigan, PhD: University of Michigan, 367 p.
- , 1984b, Thermal history of Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 68, no. 2, p. 130-136.
- , 1988, Evaporative sea-level drawdown in the Silurian Michigan Basin: *Geology*, v. 16, no. 5, p. 387-390.
- Cercone, K. R., and Budai, J. M., 1985, Ordovician and Silurian Rocks of the Michigan Basin and its Margins, *Michigan Basin Geological Society Special Paper Volume 4*, Michigan Basin Geological Society, p. 196.
- Cercone, K. R., and Lohmann, K. C., 1985, Early diagenesis of middle Silurian pinnacle reefs, northern Michigan, *in* Cercone, K. R., and Budai, J. M., eds., *Ordovician and Silurian Rocks of the Michigan basin and its margins, Volume 4*, Michigan Basin Geological Society, p. 109-130.
- , 1986, Diagenetic History of the Union 8 Pinnacle Reef (Middle Silurian), Northern Michigan, USA, *in* Schroeder, J. H., and Purser, B. H., eds., *Reef Diagenesis*: Berlin, Springer, p. 382-388.
- Cercone, K. R., and Lohmann, K. C., 1987, Late burial diagenesis of Niagaran (Middle Silurian) pinnacle reefs in Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 71, no. 2, p. 156-166.
- Cercone, K. R., and Pollack, H. N., 1991, Thermal Maturity of the Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., *Early Sedimentary Evolution of the Michigan Basin, Volume 256*: Boulder, Geological Society of America, p. 1-11.
- Chaivre, K. R., 1991a, Peacock Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2*: Lansing, Michigan Basin Geological Society, p. 53-64.
- , 1991b, Sauble Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2*: Lansing, Michigan Basin Geological Society, p. 65-74.

- Chaloner, W. G., 1954, Mississippian Megaspores from Michigan and Adjacent States: Contributions from the Museum of Paleontology The University of Michigan, v. 12, p. 23-35.
- Chamberlain, L. C., Jr., and Fitzgerald, P. E., 1938, Acidizing in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 409-417.
- Chamberlin, T. C., 1877, Geology of Eastern Wisconsin: Wisconsin Geological Survey Publication, v. 2, p. 93-405.
- Champion, B. L., 1969, Oil and Gas Producing Zones in Michigan, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 17-36.
- Chapel, J. D., 1975, Petrology and depositional history of Devonian carbonates in Ohio, PhD: Ohio State University, 558 p.
- Charbonneau, S. L., 1990a, Subaerial Exposure and Meteoric Diagenesis in Middle Silurian Guelph Formation (Niagaran) Pinnacle Reef Bioherms of the Michigan Basin, Southwestern Ontario, MS: Queen's University, 168 p.
- , 1990b, Subaerial Exposure of Middle Silurian Guelph Formation Pinnacle Reefs of the Michigan Basin, Southwestern Ontario: Ontario Petroleum Institute, v. 29, p. 1-22.
- Charpentier, R. R., 1989, A statistical analysis of the larger Silurian reefs in the northern part of the Lower Peninsula of Michigan: US Geological Survey Open-File Report, v. 89, no. 216, p. 4-34.
- Checkley, W. G., 1969a, Northville Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 115-122.
- , 1969b, Overisel Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 123-130.
- , 1969c, Salem Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 161-168.
- , 1969d, Winterfield Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 191-199.
- Cheek, W. M., 1991, West Branch Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 453-458.
- Chen, C., 1957, The subsurface geology and oil and gas fields of southeastern Michigan, MS: Wayne State University, 57 p.
- Chen, P.-H., 1969, An x-ray diffraction study of Silurian carbonate rocks from the subsurface of Grand Traverse County, Michigan, MS: Wayne State University, 59 p.
- Chen, Z., 2001, Diagenesis of Upper Cambrian Mount Simon Sandstone in the Illinois basin: Microscale investigation of basinal fluid migration and mass transfer, PhD: The University of Tennessee, 170 p.
- Chen, Z., Riciputi, L. R., Mora, C. I., and Fishman, N. S., 2001, Regional fluid migration in the Illinois basin: Evidence from in situ oxygen isotope analysis of authigenic K-feldspar and quartz from the Mount Simon Sandstone: *Geology*, v. 29, no. 12, p. 1067-1070.
- Chittick, S., 1995, Characterization of the Dundee Formation, Winterfield field, Clare County, Michigan, MS: Michigan Technological University, 150 p.
- Chittrayanont, S., 1978, A geohydrologic study of the Garfield Township coal basin area, Bay County, Michigan, MS: Michigan Technological University, 183 p.
- Chrow, J. K., 1958, A paleogeologic study of the Michigan Basin, MS: University of Michigan.
- Chung, P. K., 1973, Mississippian Coldwater Formation of the Michigan Basin, PhD: Michigan State University, 166 p.
- Churcher, P. L., 1985, Geology and Geochemistry of the Collingwood member, Lindsay Formation, southern Ontario, BS: University of Waterloo, 46 p.
- Churcher, P. L., Johnson, M. D., Telford, P. G., and Barker, J. F., 1991, Stratigraphy and oil shale resource potential of the Upper Ordovician Collingwood Member, Lindsay

- Formation, southwestern Ontario: Open File Report - Ontario Geological Survey, p. 98-98.
- Ciner, A. T., 1988, Stratigraphy and depositional environment of the Bayport Limestone of the southern Michigan Basin, MS: University of Toledo, 112 p.
- Clark, D. L., 1971, Conodonts and Biostratigraphy of the Wisconsin Paleozoic, Information Circular, Volume 19, Wisconsin Geological and Natural History Survey, p. 151.
- Clark, I. D., Al, T., Jensen, M., Kennell, L., Mazurek, M., Mohapatra, R., and Raven, K. G., 2013, Paleozoic-aged brine and authigenic helium preserved in an Ordovician shale aquiclude: *Geology*, v. 41, no. 9, p. 951-954.
- Clark, I. D., Ilin, D., Jackson, R. E., Jensen, M., Kennell, L., Mohammadzadeh, H., Poulain, A., Xing, Y. P., and Raven, K. G., 2015, Paleozoic-aged microbial methane in an Ordovician shale and carbonate aquiclude of the Michigan Basin, southwestern Ontario: *Organic Geochemistry*, v. 83-84, p. 118-126.
- Clark, I. M., 1934, Two New Paleobotanical Records for the Antrim Shale of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 19, p. 59-64.
- Claypole, E. W., 1895, On the Salina Group in northeastern Ohio: *The Ohio Journal of Science*, p. 12-13.
- Clayton, R. N., Friedman, I., Graf, D. L., Mayeda, T. K., Meents, W. F., and Shimp, N. F., 1966, The origin of saline formation waters: 1. Isotopic composition: *Journal of Geophysical Research*, v. 71, no. 16, p. 3869-3882.
- Coakley, B. J., and Gurnis, M., 1995, Far-field tilting of Laurentia during the Ordovician and constraints on the evolution of a slab under an ancient continent: *Journal of Geophysical Research*, v. 100, no. B4, p. 6313-6327.
- Coakley, B. J., Nadon, G. C., and Wang, H. F., 1994, Spatial variations in tectonic subsidence during Tippecanoe I in the Michigan Basin: *Basin Research*, v. 6, no. 2-3, p. 131-140.
- Coburn, T. C., Freeman, P. A., and Attanasi, E. D., 2012, Empirical Methods for Detecting Regional Trends and Other Spatial Expressions in Antrim Shale Gas Productivity, with Implications for Improving Resource Projections Using Local Nonparametric Estimation Techniques: *Natural Resources Research*, v. 21, no. 1, p. 1-21.
- Cody, B. M., Baù, D., and González-Nicolás, A., 2015, Stochastic injection-strategy optimization for the preliminary assessment of candidate geological storage sites: *Hydrogeology Journal*, v. 23, no. 6, p. 1229-1245.
- Cohee, G. V., 1944a, Geology and oil and gas possibilities of south-central Michigan: U.S. Geological Survey, Oil and Gas Investigation Preliminary Map, v. 11.
- , 1944b, Thickness and character of the Traverse Group and Dundee Formation in southwestern Michigan: U. S. Geological Survey Oil and Gas Investigation Chart, v. 4.
- , 1945a, Geology and oil and gas possibilities of Trenton and Black River limestones of the Michigan basin, Michigan and adjacent areas: U.S. Geological Survey, Oil and Gas Investigation Preliminary Map.
- , 1945b, Stratigraphy of Lower Ordovician and Cambrian rocks in the Michigan Basin.
- Cohee, G. V., 1947a, Cambrian and Ordovician rocks in recent wells in southeastern Michigan: *American Association of Petroleum Geologists Bulletin*, v. 31, no. 2, p. 293-307.
- Cohee, G. V., 1947b, Lithology and thickness of the Traverse Group in the Michigan Basin: U.S. Geological Survey, Oil and Gas Investigation Preliminary Map, v. 28.
- Cohee, G. V., 1948a, Cambrian and Ordovician rocks in Michigan Basin and adjoining areas: *American Association of Petroleum Geologists Bulletin*, v. 32, no. 8, p. 1417-1448.
- Cohee, G. V., 1948b, Thickness and lithology of Upper Ordovician and Lower and Middle Silurian rocks in the Michigan Basin: U. S. Geological Survey Oil and Gas Investigation Chart, v. 33.
- , 1965, Geologic History of the Michigan Basin: *Journal of the Washington Academy of Sciences*, v. 55, p. 211-223.

- , 1979, Michigan Basin Region, *in* Craig, L. C., and Connor, C. W., eds., Paleotectonic investigations of the Mississippian System in the United States: Part I, Volume 1010, U.S. Geological Survey, p. 49-58.
- Cohee, G. V., Burns, R. N., Brown, A., Brant, R. A., and Wright, D., 1950, Coal Resources of Michigan: U. S. Geological Survey Circular, v. 77, p. 1-55.
- Cohee, G. V., and Landes, K. K., 1958, Oil in the Michigan Basin, Habitat of Oil -- a Symposium, p. 473-493.
- Cohee, G. V., Macha, C., and Halk, M., 1951, Thickness and lithology of Upper Devonian and Carboniferous rocks in Michigan: U.S. Geological Survey Oil and Gas Investigation Chart, v. OC 41.
- Cohee, G. V., and Underwood, L. B., 1944, Maps and sections of the Berea Sandstone in eastern Michigan, 1944: Reston, VA, United States (USA), U. S. Geological Survey, Reston, VA.
- Cohee, G. V., and Underwood, L. B., 1945, Lithology and thickness of the Dundee Formation and the Rogers City Limestone in the Michigan Basin: U.S. Geological Survey, Oil and Gas Investigation Preliminary Map, v. 38.
- Coley, T. B., 1950, The stratigraphic distribution and correlation of some Middle Devonian ostracoda, MS: Wayne State University.
- , 1954, The stratigraphic distribution and correlation of some Middle Devonian ostracoda: *Journal of Paleontology*, v. 28, no. 4, p. 452-464.
- Collins, G. A., 1974, Saline ground waters produced with oil and gas: U.S. Environmental Protection Agency, Research and Development Series, v. EPA-660/2-74-010, p. 1-68.
- Colquhoun, S., 1991a, Ordovician Period, Trenton-Black River, *in* Wollensak, M. S., ed., Oil and Gas Manual of the Michigan Basin, Volume 2, Michigan Basin Geological Society, p. 293-294.
- , 1991b, Ordovician Period: Trenton-Black River, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 293-294.
- , 1991c, Paragenetic History of the Ordovician Trenton Group Carbonates, Southwestern Ontario MS: Brock University, 250 p.
- Colville, V. T., 1983, Ordovician-Silurian Eustatic Sea Level Changes at Limestone Mountain, Houghton County, Michigan, MS: University of Wisconsin, 143 p.
- Coniglio, M., Frizzell, R., and Pratt, B. R., 2004, Reef-capping laminites in the Upper Silurian carbonate-to-evaporite transition, Michigan Basin, south-western Ontario: *Sedimentology*, v. 51, no. 3, p. 653-668.
- Coniglio, M., Sherlock, R., Williams-Jones, A. E., Middleton, K., and Frape, S. K., 1994, Burial and hydrothermal diagenesis of Ordovician carbonates from the Michigan Basin, Ontario, Canada: Special Publication of the International Association of Sedimentologists, v. 21, p. 231-254.
- Coniglio, M., and Williamsjones, A. E., 1992, Diagenesis of Ordovician Carbonates from the North-East Michigan Basin, Manitoulin Island Area, Ontario - Evidence from Petrography, Stable Isotopes and Fluid Inclusions: *Sedimentology*, v. 39, no. 5, p. 813-836.
- Coniglio, M., Zheng, Q., and Carter, T. R., 2003, Dolomitization and recrystallization of middle Silurian reefs and platformal carbonates of the Guelph Formation, Michigan Basin, southwestern Ontario: *Bulletin of Canadian Petroleum Geology*, v. 51, no. 2, p. 177-199.
- Conkin, J. E., Conkin, B. M., and McDonald, D., 1963, Mississippian smaller foraminifera from the southern peninsula of Michigan: *Micropaleontology*, v. 9, no. 2, p. 215-227.
- Cook, C. W., 1911, Preliminary Report on the Salt Industry of Michigan: Thirteenth Report of the Michigan Academy of Science 1911, v. 13, p. 81-86.

- , 1914, The brine and salt deposits of Michigan: their origin, distribution and exploitation: State of Michigan Geological and Biological Survey Publication, v. 15, no. 12, p. 1-188.
- , 1926, The Influence of Joints in the Formation of the Islands at the Western End of Lake Erie: Papers of the Michigan Academy of Science, Arts and Letters, v. 5, p. 243-251.
- Cook, C. W., 1933, A petrographic study of the Marshall Formation and its relation to the sand of the Michigan series formation, MS: University of Michigan.
- Cooke, L. S., 1956, A quantitative sedimentary analysis of the Michigan Basin, MS: Michigan State University.
- Cookman, C. W., 1976, Petrology of the Rockport Quarry Limestone (Middle Devonian Traverse Group) Alpena, Presque Isle and Montmorency Counties, Michigan, MS: Western Michigan University, 171 p.
- Cooley, G. A., 1947, Insoluble residues of Detroit River and Dundee Formations, MS: University of Michigan, 56 p.
- Cooper, C. L., 1942, Occurrence and stratigraphic distribution of Paleozoic Ostracodes: Journal of Paleontology, v. 16, no. 6, p. 764-776.
- Cooper, G. A., and Warthin, A. S., 1936, New correlations of Hamilton rocks: Geological Society of America Proceedings, v. 1935, p. 376-377.
- , 1942, New Middle Devonian (Hamilton) correlations: Geological Society of America Bulletin, v. 53, no. 6, p. 873-888.
- Cooper, G. A., and Warthin, A. S., Jr., 1941, New Middle Devonian Stratigraphic Names: Washington Academy of Sciences Journal, v. 31, no. 6, p. 259-260.
- Cooper, J. R., 1943, Flow structures in the Berea Sandstone and Bedford Shale of central Ohio: Journal of Geology, v. 51, no. 3, p. 190-203.
- Cooper, W. F., 1905, The coal formations of Bay County: Michigan Miner, v. 7, no. 9-12.
- , 1906, Geological Report of Bay County: Geological Survey of Michigan Annual Report, v. 1905, p. 1-283.
- Copley, D. L., Gill, B., and Authier, J. W., 1983, The Akron Dolomite (Bass Islands) oil trend in western New York: Annual Conference - Ontario Petroleum Institute, v. 22, p. 7.1-7.18.
- Copper, P., 1978, Paleoenvironments and Paleocommunities in the Ordovician-Silurian sequence of Manitoulin Island, *in* Sanford, J. T., ed., Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society, p. 47-62.
- , 1982, Early Silurian atrypoids from Manitoulin Island and Bruce Peninsula, Ontario: Journal of Paleontology, v. 56, no. 3, p. 680-702.
- Copper, P., and Brunton, F. R., 1991, A Global Review of Silurian Reefs: Special Papers in Palaeontology, v. 44, p. 225-259.
- Copper, P., and Grawbarger, D. J., 1978, Paleoecological succession leading to a late Ordovician biostrome on Manitoulin Island, Ontario: Canadian Journal of Earth Sciences, v. 15, no. 12, p. 1987-2005.
- Corcoran, P. L., 2008, Ordovician paleotopography as evidenced from original dips and differential compaction of dolostone and shale unconformably overlying Precambrian basement on Manitoulin Island, Canada: Sedimentary Geology, v. 207, no. 1-4, p. 22-33.
- Corden, B. B., 1969, Columbus Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 55-60.
- Cottingham, J. T., 1990, Cambrian-early Ordovician sequence stratigraphy and Mount Simon Sandstone petrology - Michigan Basin, MS: Western Michigan University, 95 p.
- Coulter, R. S., 1991, Kimball-Colinville Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 239-246.
- Coupal, F. E., 1954, Stratigraphy and paleontology of a well core from Sharon township, Washtenaw County, Michigan, MS: University of Michigan.

- Cowen, R., 1968, A new type of delthyrial cover in the Devonian brachiopod *Mucrospirifer*: *Palaeontology*, v. 11, no. 2, p. 317-327.
- Cowen, T. M., 1991, South Vienna 30 Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 165-174.
- Cox, K., 2015, *Anomalous Thermal Indicators from Authigenic Minerals in Upper Paleozoic Strata of the Michigan Basin*, MS: Western Michigan University, 104 p.
- Craddock, J. P., and Van der Pluijm, B. A., 1989, Late Paleozoic deformation of the cratonic carbonate cover of eastern North America: *Geology*, v. 17, no. 5, p. 416-419.
- Cramer, B. D., Brett, C. E., Melchin, M. J., MaeNik, P., Kleffner, M. A., McLaughlin, P. I., Loydell, D. K., Munnecke, A., Jeppsson, L., Corradini, C., Brunton, F. R., and Saltzman, M. R., 2011, Revised correlation of Silurian Provincial Series of North America with global and regional chronostratigraphic units and $\delta^{13}\text{C}_{\text{carb}}$ chemostratigraphy: *Lethaia*, v. 44, no. 2, p. 185-202.
- Crane, M. J., 1955, *A new occurrence of Mississippian Ostracoda in Michigan*, MS: Michigan State University.
- Criss, C. R., and McCormick, R. L., 1954, History and performance of the Coldwater Oil Field, Michigan: *Petroleum Transactions, AIME*, v. 201, no. 3748, p. 22-28.
- Crooks, H. F., 1918, *On the Lower Paleozoic stratigraphy of the Northern Peninsula of Michigan* MS: University of Illinois.
- Crowe, R., 2010, *The Roles of Far Field Stress and Mantle Downwelling in Intraplate Deformation: The Michigan Basin*, PhD: The University of Toronto, 196 p.
- Crowl, D. A., and Piccirelli, R. A., 1979, Transport processes in pyrolysis of Antrim oil shale: *Energy Communications*, v. 5, no. 6, p. 425-470.
- , 1982, Model studies of ignition and retort strategies for true *in situ* retorting of Antrim oil shale: *In Situ*, v. 6, no. 2, p. 77-106.
- Crowley, K. D., 1991, Thermal history of Michigan Basin and Southern Canadian Shield from apatite fission track analysis: *Journal of Geophysical Research: Solid Earth*, v. 96, no. B1, p. 697-711.
- Cuffey, R. J., 1988, Drummond Island bryozoan reefs, Lower Silurian, Michigan: *Memoir - Canadian Society of Petroleum Geologists*, v. 13, p. 283-284.
- Cuffey, R. J., and Copper, P., 1988, Honora Bay bryozoan bioherms, Lower Silurian, Manitoulin Island, Ontario: *Memoir - Canadian Society of Petroleum Geologists*, v. 13, p. 290-292.
- Cumings, E. R., 1930, Two Fort Wayne Wells in the Silurian, and their bearing on the Niagaran of the Michigan Basin: *Proceedings of the Indiana Academy of Science*, v. 39, p. 183-199.
- Cumings, E. R., and Shrock, R. R., 1928a, *The geology of the silurian rocks of northern Indiana*: Indiana Department of Conservation, Geological Survey Division, Publication, v. 75, p. 1-226.
- , 1928b, *Niagaran coral reefs of Indiana and adjacent states and their stratigraphic relations*: Geological Society of America Bulletin, v. 39, no. 2, p. 579-616.
- Cunningham, F. F., Jr., 1972, *Stratigraphy and petrology of the Columbus Limestone (Devonian) and Detroit River Group (Devonian) in north-central Ohio*, MS: Bowling Green State University, 85 p.
- Curran, B. C., 1990, *Reservoir geology of The Dundee Limestone West Branch field, Michigan*, MS: Western Michigan University, 158 p.
- Curran, B. C., and Hurley, N. F., 1992, *Geology of the Devonian Dundee Reservoir, West Branch Field, Michigan*: American Association of Petroleum Geologists Bulletin, v. 76, no. 9, p. 1363-1383.
- Curren, R. F., 1953, *An investigation of some methods of chemical precipitation in the artificial growth of calcite*, MS: Michigan State University.

- Curtis, J. B., 2002, Fractured shale-gas systems: American Association of Petroleum Geologists Bulletin, v. 86, no. 11, p. 1921-1938.
- da Silva Jr, G. P., Franco, D. R., Stael, G. C., da Costa de Oliveira Lima, M., Sant'Anna Martins, R., de Moraes França, O., and Azeredo, R. B. V., 2015, Petrophysical studies of north American carbonate rock samples and evaluation of pore-volume compressibility models: Journal of Applied Geophysics, v. 123, p. 256-266.
- Dahlern, R. D., 1959, Stratigraphy and paleontology of the Hibbard No. 1 well core, Barry County, Michigan, MS: University of Michigan.
- Dali, A. H., 1975, Depositional environment of the upper Silurian of the Michigan Basin, MS: Michigan State University, 45 p.
- Daly, A. R., Lilly, D. H., Nunn, J. A., Sleep, N. H., and Moore, W. E., 1985, Thermal subsidence and generation of hydrocarbons in Michigan Basin; discussion and reply: American Association of Petroleum Geologists Bulletin, v. 69, no. 7, p. 1181-1187.
- Damberger, H. H., 1974, Coalification patterns of Pennsylvanian Coal Basins of the Eastern United States, *in* Dutcher, R. R., Hacquebard, P. A., Schopf, J. M., and Simon, J. A., eds., Carbonaceous Materials as Indicators of Metamorphism, Volume 153: Boulder, Geological Society of America, p. 53-74.
- Dana, J. D., 1863, Manual of Geology, Theodore Bliss and Co., 798 p.
- Daniels, J. E., and Kinnicutt, P., 2009, Arsenic in Michigan Soil: Spatial Stratification for Environmental Regulatory Purposes: Soil & Sediment Contamination, v. 18, no. 6, p. 715-724.
- Daniels, P. A., 1991, Ordovician Period: Glenwood and Pre-Glenwood, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 319-320.
- Danyluk, W., 1990, Port Huron Study: Historical development of Hydrocarbons and Subsequent Problems: Contribution to Michigan Geology Report, v. 90-4, p. 1-19.
- Dapples, E. C., 1955, General lithofacies relationship of St. Peter Sandstone and Simpson Group: American Association of Petroleum Geologists Bulletin, v. 39, no. 4, p. 444-467.
- Darner, R. A., Sheets, R. A., and Anonymous, 2012, Using existing data to estimate aquifer properties, Great Lakes region, USA: Ground Water, v. 50, no. 3, p. 477-484.
- Das, N., Horita, J., and Holland, H. D., 1990, Chemistry of fluid inclusions in halite from the Salina Group of the Michigan Basin: Implications for Late Silurian seawater and the origin of sedimentary brines: Geochimica et Cosmochimica Acta, v. 54, p. 319-327.
- Davidheiser, C. E., 1980, Bryozoans and bryozoan-like corals: affinities and variability of *Diplotrypa*, *Monotrypa*, *Labryrinthites*, and *Cladopora* (Trepostomata and Tabulata) from selected Ordovician-Silurian Reefs in Eastern North America (Newfoundland, Pennsylvania, Michigan), EdD: The Pennsylvania State University, 674 p.
- Davidson, R. H., 1981, Petrology of pinnacle reefs in the Guelph Formation (Niagaran), Northern Michigan, MS: Stephen F. Austin State University, 103 p.
- Davies, W. E., 1941, Stratigraphic significance of crinoidal columns of the Traverse of Michigan, MS: Michigan State University, 45 p.
- Davis, C. A., 1909, Report on the geology of Tuscola County, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist.
- Davis, D. W., 1952, Oil production from Traverse Group of southwestern Michigan: American Association of Petroleum Geologists Bulletin, v. 36, no. 8, p. 1642-1644.
- Davis, R. A., Jr., 1966, Revision of Lower Ordovician nomenclature in the upper Mississippi Valley: Journal of Geology, v. 74, no. 3, p. 361-365.
- de Witt, W., Jr., 1970, Age of the Bedford Shale, Berea Sandstone, and Sunbury Shale in the Appalachian and Michigan Basins, Pennsylvania, Ohio, and Michigan: U. S. Geological Survey Bulletin, p. G1-G11.

- Deans, B. D., 1988, Petroleum geology and hydrodynamic analysis of the Stoney Point Field, Trenton-Black River Group, Ordovician, Michigan Basin, MS: Michigan Technological University.
- Decker, A. D., 1992a, Log-based gas content and resource estimates for the Antrim Shale, Michigan Basin: *Gas Shales Technology Review*, v. 8, no. 1, p. 1-10.
- Decker, A. D., Hill, D. G., Wicks, D. E., and Anonymous, 1993, Log-based gas content and resource estimates for the Antrim Shale, Michigan Basin, Rocky Mountain regional meeting/low permeability reservoirs symposium (USA), Soc. Pet. Eng., Richardson, TX.
- Decker, C. E., 1950, Ordovician graptolites from well-core, Calhoun County, Michigan: *American Association of Petroleum Geologists Bulletin*, v. 34, no. 9, p. 1903-1909.
- Decker, D., 1992b, Fracture identification, Gas Research Institute Report, v. 92/0555, 11 p.
- Decker, D., Coates, J.-M. P., and Wicks, D., 1992, Stratigraphy, gas, occurrence [sic], formation evaluation and fracture characterization of the Antrim Shale, Michigan basin, Gas Research Institute Topical Report, v. GRI-92/0258, 101 p.
- DeHaas, R. J., and Jones, M. W., 1988, Cave levels of the Trenton-Black River Formations in Central Southern Michigan, in Keith, B. D., ed., *The Trenton Group (Upper Ordovician Series) of Eastern North America*, Volume 29: Tulsa, AAPG, p. 237-266.
- Deiss, C. F., 1928, A description and stratigraphic correlation of the Fenestellidae from the Devonian of Michigan, PhD: University of Michigan, 43 p.
- Deiss, C. F., 1932, A description and stratigraphic correlation of the Fenestellidae from the Devonian of Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 3, p. 233-275.
- Dekeyser, L.-K., 2006, *The Silurian Amabel and Guelph Formations of the Bruce Peninsula: Insights into stratigraphy and diagenesis from petrography and ground-penetrating radar*, MS: University of Waterloo, 213 p.
- Dekeyser, L., Brunton, F. R., Endres, A. L., Armstrong, D. K., Coniglio, M., and Tetreault, D. K., 2007, Groundpenetrating radar as a resource assessment tool for Silurian-age carbonate building stone quarries on the Bruce Peninsula, southern Ontario: *Ontario Geological Survey Open File Report*, v. 6212, p. 1-54.
- Delgao, D. J., 1983, Ordovician Galena Group of the Upper Mississippi Valley -- Deposition, Diagenesis and paleoecology, *Guidebook for the 13th Annual Field Conference, Great Lakes Section, Society of Economic Paleontologists and Mineralogists*.
- Dellapenna, T. M., 1987, The geology of the Niagara Escarpment, Fayette, Michigan: *Geological Society of America Centennial Field Guide*, p. 289-292.
- , 1991, Sedimentological, structural, and organic geochemical controls on natural gas occurrences in the Antrim Formation in Otsego County, Michigan, MS: Western Michigan University, 147 p.
- Dellapenna, T. M., and Harrison III, W. B., 1993, Mineralogic, petrophysical, and organic properties, Antrim Shale, Michigan, Gas Research Institute Report, v. GRI-9310485, 34 p.
- Dellwig, L. F., 1953, Origin of the Salina Salt of Michigan, PhD: University of Michigan, 94 p.
- Dellwig, L. F., 1955, Origin of the Salina salt of Michigan: *Journal of Sedimentary Research*, v. 25, no. 2, p. 83-110.
- Dellwig, L. F., and Evans, R., 1969, Depositional processes in Salina Salt of Michigan, Ohio, and New York: *American Association of Petroleum Geologists Bulletin*, v. 53, no. 4, p. 949-956.
- DeSantis, M. K., and Brett, C. E., 2011, Late Eifelian (Middle Devonian) biocrises: Timing and signature of the pre-Kačák Bakoven and Stony Hollow Events in eastern North America: *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 304, no. 1-2, p. 113-135.
- Dewey, D. E., 1958, A mechanical and chemical analysis of the Middle Devonian Detroit River Group above the Sylvania in the Michigan Basin, MS: Michigan State University, 104 p.

- DeWitt, W., Jr., 1960, Geology of the Michigan Basin with reference to subsurface disposal of radioactive wastes: U.S. Geological Survey Trace Elements Investigations Report, v. 771, p. 1-100.
- , 1970, Age of the Bedford Shale, Berea Sandstone, and Sunbury Shale in the Appalachian and Michigan Basins, Pennsylvania, Ohio, and Michigan: U.S. Geological Survey Bulletin, v. 1294-G, p. 1-11.
- Di Prisco, G., and Springer, J. S., 1991, The Precambrian-Paleozoic unconformity and related mineralization in southeastern Ontario: Ontario Geological Survey Open File Report, v. S751, p. 1-122.
- Dibble, E. T., 1956, Stratigraphy and paleontology of a core from Silurian and Devonian strata of Wayne County, Michigan, MS: University of Michigan.
- Dibble, O. A., 1932, Clay-mining methods and costs at the Corunna (Mich.) pit of the Aetna Portland Cement, Co.: U.S. Bureau of Mines Information Circular, v. 6657, p. 1-7.
- Dice, B. B., 1955, A quantitative study of composite Devonian lithofacies in the Michigan Basin, MS: Michigan State University.
- Dickinson, W. R., Gehrels, G., and Marszolf, J. E., 2010, Detrital zircons from fluvial Jurassic strata of the Michigan Basin: Implications for the transcontinental Jurassic Paleoriver hypothesis: *Geology*, v. 38, no. 6, p. 499-502.
- Diehl, O. C., 1904, Gypsum in Michigan and Utah: *Michigan Miner*, v. 6, no. 6, p. 21-24.
- Din, M., 1950, Microfossils of the Middle and Upper Ordovician Formations in Deep Wells of Alpena, Ogemaw, Bay, and Ingham Counties of Michigan, MS: Michigan State University, 118 p.
- Dittes, M., and Labuz, J. F., 2002, Field and laboratory testing of St. Peter Sandstone: *Journal of Geotechnical and Geoenvironmental Engineering*, v. 128, no. 5, p. 372-380.
- Dixon, R. A., 1961, Lithologic Study of a Cambro-Ordovician core. Delta County, Michigan, MS: Michigan State University.
- Doheny, E. J., 1967, Petrology and subsurface stratigraphy of the Detroit River Formation (Middle Devonian) in northern Indiana, PhD: Indiana University, 240 p.
- Dollar, P., Frape, S. K., McNutt, R. H., Fritz, P., and Macqueen, R. W., 1988, Grant 249; Geochemical studies of formation waters, southwestern Ontario, Canada, and southern Michigan, U.S.A: Ontario Geological Survey Miscellaneous Paper, p. 14-28.
- Dolton, G. L., 1995, Michigan basin province (063), *in* Gautier, D. L., Dolton, G. L., Takahashi, K. I., and Varnes, K. L., eds., 1995 national assessment of United States oil and gas resources--Results, methodology, and supporting data, Volume DDS-30, US Geological Survey, p. 1-62.
- Dolton, G. L., and Quinn, J. C., 1996, An initial resource assessment of the Upper Devonian Antrim Shale in the Michigan Basin: Open-File Report - U. S. Geological Survey, p. 23-23.
- Dombkowski, F. S., 1978, The Silurian depositional environments and importance of the Maumee Quarry (Ohio) and Capac Gas Field (Michigan) carbonates, MS: Wayne State University, 65 p.
- Donnan, B. C., 1961, Offshore exploration in Great Lakes region: *American Association of Petroleum Geologists Bulletin*, v. 45, no. 11, p. 1847-1858.
- Dorr, J. A., Jr., 1957, A pleuracanth shark spine from the early Pennsylvanian, Saginaw Formation, of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 42, p. 99-104.
- Dorr, J. A., and Kauffman, E. G., 1963, Rippled toroids from the Napoleon Sandstone Member (Mississippian) of southern Michigan: *Journal of Sedimentary Research*, v. 33, no. 3, p. 751-758.
- Dorr, J. A., and Moser, F., 1964, Ctenacanth Sharks from the Mid-Mississippian of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 49, no. 1, p. 105-113.

- Dorr, L. L., 1981, The upper Devonian and lower Mississippian of St. Clair and northeastern Macomb counties, MS: Wayne State University, 108 p.
- Dott, R. H., 2003, The importance of eolian abrasion in supermature quartz sandstones and the paradox of weathering on vegetation-free landscapes: *Journal of Geology*, v. 111, no. 4, p. 387-405.
- Dott, R. H., Byers, C. W., Fielder, G. W., Stenzel, S. R., and Winfree, K. E., 1986, Aeolian to Marine Transition in Cambro Ordovician Cratonic Sheet Sandstones of the Northern Mississippi Valley, USA: *Sedimentology*, v. 33, no. 3, p. 345-367.
- Dott, R. H., and Haddox, C. A., 1991, *Geology of the Pictured Rocks, Upper Peninsula, Michigan*, Michigan Basin Geological Society.
- Dott, R. H., and Murray, G. E., 1954, *Geologic Cross Sections of Paleozoic Rocks: Central Mississippi to Northern Michigan*: Tulsa, AAPG, p. 32.
- Dott, R. H., and Roshardt, M. A., 1972, Analysis of cross-stratification orientation in St. Peter Sandstone in Southwestern Wisconsin: *Geological Society of America Bulletin*, v. 83, no. 9, p. 2589-2596.
- Douglass, C. C., 1840, Report [on Jackson, Calhoun, Kalamazoo, Earton, Ionia, Kent, Ottawa, Van Buren, and Allegan Counties]: *Michigan State Geologists Annual Report*, v. 3, p. 53-75.
- , 1841, Report [on the northern portion of the Southern Peninsula]: *Michigan State Geologists Annual Report*, v. 4, p. 97-111.
- , 1854a, Remarks on the general character of the northern portion of the Lower Peninsula: *Michigan State Agricultural Society Transactions*, v. 6, p. 290-303.
- , 1854b, Report [on Ingham County, and parts of Eaton and Jackson Counties]: *Michigan State Agricultural Society Transactions*, v. 6, p. 261-271.
- , 1854c, Report [on Jackson, Calhoun, Kalamazoo, Earton, Ionia, Kent, Ottawa, Van Buren, and Allegan Counties]: *Michigan State Agricultural Society Transactions*, v. 6, p. 271-290.
- Dozier, G. C., and Sutton, T. W., 2000, Real-time pressure diagnostics used to improve pretreatment frac design: Case studies in the Antrim Shale: *SPE Production & Facilities*, v. 15, no. 1, p. 20-26.
- Driese, S. G., Byers, C. W., and Dott, R. W., 1981, Tidal deposition in the Basal Upper Cambrian Mt. Simon formation in Wisconsin: *Journal of Sedimentary Petrology*, v. 51, p. 367-381.
- Driscoll, E. E., and Mitchell, S. W., 1969, Stratigraphy and Tetracoral Fauna of the Lower Arkona Formation, Middle Devonian, Ontario and Michigan: *Michigan Academician*, v. 1, no. 1-2, p. 117-141.
- Driscoll, E. G., 1956, An environmental and heavy mineral study of the "eastern sandstones" between Marquette and Grand Marais, Michigan, MS: University of Nebraska.
- Driscoll, E. G., 1959, Evidence of transgressive-regressive Cambrian sandstones bordering Lake Superior *Journal of Sedimentary Petrology*, v. 29, no. 1, p. 5-15.
- Driscoll, E. G., 1963, *Paraconularia newberryi* (Winchell) and Other Lower Mississippian Conulariids from Michigan, Ohio, Indiana, and Iowa: *Contributions from the Museum of Paleontology The University of Michigan*, v. 18, p. 33-46.
- Driscoll, E. G., 1965, Dimyarian pelecypods of the Mississippian Marshall sandstone of Michigan: *Palaeontographica Americana*, v. 5, no. 35, p. 67-128.
- , 1969, Animal-sediment relationships of the Coldwater and Marshall formations of Michigan, Canberra, Australia, Australian National University Press, Canberra, *Stratigraphy and palaeontology; essays in honour of Dorothy Hill*, p. 337-352.
- Driscoll, E. G., Hall, D. D., and Nussmann, D. G., 1965, Morphology and paleoecology of the brachiopod *Leiorhynchus kelloggi* Hall, Middle Devonian, Ohio, Michigan, Ontario: *Journal of Paleontology*, v. 39, no. 5, p. 916-933.

- Driscoll, E. G., Jr., 1961, Dimyarian lamellibranchs of the Mississippian Marshall Sandstone of Michigan, PhD: University of Michigan, 216 p.
- Droste, J. B., Abdulkareem, T. F., and Patton, J. B., 1982, Stratigraphy of the Ancell and Black River Groups (Ordovician) in Indiana: Department of Natural Resources Geological Survey Occasional Paper, v. 36, p. 1-15.
- Droste, J. B., and Shaver, R. H., 1977, Synchronization of deposition; Silurian reef-bearing rocks on Wabash Platform with cyclic evaporites of Michigan Basin: Studies in Geology (Tulsa), no. 5, p. 93-109.
- , 1982, The Salina Group (Middle and Upper Silurian) of Indiana: Department of Natural Resources Geological Survey Special Report, v. 24, p. 1-41.
- , 1983, Atlas of Early and Middle Paleozoic Paleogeography of the Southern Great Lakes Area: Department of Natural Resources Geological Survey Special Report, v. 32, p. 1-32.
- , 1987, Paleooceanography of Silurian Seaways in the Midwestern Basins and Arches Region: Paleooceanography, v. 2, no. 2, p. 213-227.
- Droste, J. B., Shaver, R. H., and Baltrusaitis, E. J., 1975a, Middle Devonian bentonite in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 59, no. 7, p. 1217-1223.
- Droste, J. B., Shaver, R. H., and Lazor, J. D., 1975b, Middle Devonian paleogeography of the Wabash platform, Indiana, Illinois and Ohio: Geology, v. 3, no. 5, p. 269-272.
- Droste, J. B., Shaver, R. H., and Wilson, J. L., 1985, Comparative stratigraphic framework for Silurian reefs; Michigan Basin to surrounding platforms: Special Papers - Michigan Basin Geological Society, v. 4, p. 73-93.
- Duey, R., 1996, Old logs teach some new tricks in Michigan's Antrim Shale play: Hart's Oil and Gas World, v. 88, no. 4, p. 40-41.
- Duncan, H. M., 1939, Trepostomatous Bryozoa from the Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 5, no. 10, p. 171-270.
- Dunham, K. W., 1993, Petroleum Evolution in the Michigan Basin: An Organic Geochemical Examination, PhD: University of Michigan, 105 p.
- Dunham, K. W., Meyers, P. A., and Rullkoetter, J., 1988, Biomarker comparisons of Michigan Basin oils, *in* Teh, F. Y., and Moldowan, J. M., eds., Geochemical Biomarkers: Chur, Harwood Academic Publishers, p. 181-202.
- Dunn, D. L., and Miller, T. H., 1964, A distinctive Chitinozoan from the Alpena Limestone (Middle Devonian) of Michigan: Journal of Paleontology, v. 38, no. 4, p. 725-&.
- Dustin, F., 1935, A Study of the Bayport Chert: Papers of the Michigan Academy of Science, Arts and Letters, v. 20, p. 465-475.
- Dusynski, J., 1991, New Lothrop Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 7-14.
- Eames, L. E., 1974, Palynology of the Berea Sandstone and Cuyahoga Group of northeastern Ohio, PhD: Michigan State University, 253 p.
- Eckert, J. D., 1976, Stratigraphy and paleontology of the Bertie Formation, BS: Brock University.
- Eckert, J. D., 1984, Early Llandovery crinoids and stelleroids from the Cataract Group (Lower Silurian) southern Ontario, Canada, Royal Ontario Museum, 82 p.
- Eddy, G. E., 1932, A Study of the Insoluble Residues of the Lower Traverse, Bell, and Upper Dundee Formations of Michigan, MS: University of Michigan.
- , 1933, A Study of the Insoluble Residues of the Lower Traverse, Bell, and Upper Dundee Formations of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 18, p. 345-361.
- , 1936, Geology of the Crystal Oil & Gas Field Montcalm County, Michigan: Michigan Geological Survey Progress Report, v. 1, p. 1-8.

- Edinger, E. N., Copper, P., Risk, M. J., and Atmojo, W., 2002, Oceanography and reefs of recent and Paleozoic tropical epeiric seas: *Facies*, v. 47, p. 127-149.
- Ege, J. R., 1979, Surface Subsidence and Collapse in Relation to Extraction of Saalt and Other Soluble Evaporites: U.S. Geological Survey Open-File Report, v. 79-1666, p. 1-34.
- , 1984, Formation of Solution-Subsidence Sinkholes above Salt Beds: U.S. Geological Survey Circular, v. 897, p. 1-11.
- Egemen, Y., 2015, Petrophysical analysis and rock-physics based prediction of sonic velocities in carbonates, MS: Michigan Technological University.
- Egleston, D. L., 1958, Relationship of the magnesium-calcium ratio to the structure of the Reynolds and Winfield oil fields, MS: Michigan State University.
- Ehlers, G. M., 1918, An interesting illustration of a process of destruction of a glaciated surface: *Twentieth Annual Report of the Michigan Academy of Science 1918*, v. 20, p. 59-63.
- , 1919, *Heterolasma foerstei*, a new genus and species of tetracoralla from the Niagaran of Michigan: *American Journal of Science*, v. 48, no. 288, p. 461-467.
- , 1920, Notes on the Stratigraphy of the Racine Formation of the Northern Peninsula of Michigan: *Twenty-first Annual Report of the Michigan Academy of Science 1919*, v. 21, p. 87-90.
- , 1921, Niagaran Rocks of the Northern Peninsula of Michigan: *Geological Society of America Bulletin*, v. 32, p. 129-130.
- , 1924, The Presence of Cataract Strata in Michigan Supported by Fossil Evidence: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 3, p. 281-283.
- , 1925a, An Ordovician Reef on Sulphur Island, Lake Huron: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 4, no. 1, p. 425-430.
- , 1925b, Two new crinoids from the Devonian of Michigan: *Contributions from the Museum of Geology The University of Michigan*, v. 2, no. 6, p. 99-104.
- , 1930, Stratigraphy of the Niagaran Series of the Northern Peninsula of Michigan, PhD: University of Michigan.
- , 1936, Guide to the Sixth Annual Field Trip of the Section of Geology and Mineralogy of the Michigan Academy of Science: A Study of the Fort Wayne Outlet of the Early Glacial Lakes and the Niagaran Strata of Northern Indiana.
- , 1963, Locations of outcrops, for the most part with areas mapped as Marshall: Michigan Geological Survey Open File Report, v. 75.
- , 1973, Stratigraphy of the Niagaran Series of the Northern Peninsula of Michigan: *Museum of Paleontology, The University of Michigan Papers on Paleontology*, v. 3, p. 1-200.
- Ehlers, G. M., and Cooley, M. E., 1927, Discovery of a Hamilton Fauna in Southeastern Michigan: *Contributions from the Museum of Geology The University of Michigan*, v. 2, no. 13, p. 231-236.
- Ehlers, G. M., and Humphrey, W. E., 1944, Revision of E. A. Strong's species from the Mississippian Point au Gres Limestone of Grand Rapids, Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 6, p. 113-130.
- Ehlers, G. M., and Hussey, R. C., 1923, A New Gastropod and a New Cephalopod from the Devonian of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 1, p. 248-252.
- Ehlers, G. M., Kelley, R. W., Kesling, R. V., Lamb, G. E., and Sorensen, H. O., 1979, Middle Devonian stratigraphy along French Road, Alpena County, Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 25, no. 8, p. 155-168.
- Ehlers, G. M., Kelley, W. A., Scott, I. D., Smith, R. A., and Thomas, W. A., 1935, Guide to Fifth Annual Field Trip of the Section of Geology and Mineralogy of the Michigan Academy of Science: A Study of the Lucas County, Ohio-Monroe County, Michigan monocline and Stratigraphy of Northwestern Ohio and Southeastern Michigan, p. 1-7.

- Ehlers, G. M., and Kesling, R. V., 1957, Silurian rocks of the northern peninsula of Michigan, Michigan Basin Geological Society, 62 p.
- , 1962a, Silurian Rocks of Michigan and their Correlation, *in* Fisher, J. H., ed., Silurian Rocks of the Southern Lake Michigan Area, Michigan Basin Geological Society, p. 1-20.
- , 1962b, Silurian rocks of Michigan and their correlation: Museum of Paleontology, The University of Michigan Miscellaneous Papers, v. 32, p. 1-20.
- , 1970, Devonian strata of Alpena and Presque Isle Counties, Michigan, *in* Stonehouse, H. B., ed., Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of North America: North-central Section, p. 1-130.
- Ehlers, G. M., Kesling, R. V., Rulison, J. G., Stumm, E. C., and Winston, G., 1952, Stratigraphy and Structure of the Devonian Rocks in Southeastern Michigan and Northwestern Ohio, Geological Excursion of the Michigan Geological Society.
- Ehlers, G. M., Kesling, R. V., and Slaughter, A. E., 1967, Ordovician and Silurian strata from well core in Schoolcraft County, Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 21, no. 10, p. 219-229.
- Ehlers, G. M., and Kline, V., 1934, Revision of Alexander Winchell's types of brachiopods from the Middle Devonian Traverse Group of rocks of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 4, no. 10, p. 143-176.
- Ehlers, G. M., and Leighly, J. B., 1922, *Lipsanocystis traversensis*, a new cystoid from the Devonian of Michigan: Miscellaneous Papers of the Museum of Paleontology, University of Michigan, v. 1, p. 155-160.
- Ehlers, G. M., and Radabaugh, R. E., 1938, The Rogers City Limestone, a New Middle Devonian Formation in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 441-446.
- Ehlers, G. M., Smith, J. E., and Shelden, F. D., 1959, Surface Stratigraphy of the Mackinac Straits Region, *in* Shelden, F. D., ed., Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society, p. 13-18.
- Ehlers, G. M., Stanley, G. M., Kelly, W. A., and Poindexter, O. F., 1941, Guidebook for Eleventh Annual Geological Excursion to St. Ignace and Mackinac Island, Geological Survey Division and Michigan Academy of Science, Arts and Letters, 23 p.
- Ehlers, G. M., and Stumm, E. C., 1949a, Corals of the Devonian Traverse Group of Michigan. Part II, *Cylindrophyllum*, *Disphyllum*, *Eridophyllum*, and *Synaptophyllum*: Contributions from the Museum of Paleontology The University of Michigan, v. 8, no. 3, p. 21-41.
- Ehlers, G. M., and Stumm, E. C., 1949b, Corals of the Devonian Traverse Group of Michigan; Part I, *Spongophyllum*: Contributions from the Museum of Paleontology The University of Michigan, v. 7, no. 8, p. 123-130.
- Ehlers, G. M., and Stumm, E. C., 1951, Corals of the Devonian Traverse Group of Michigan. Part IV, *Billingsastraea*: Contributions from the Museum of Paleontology The University of Michigan, v. 9, no. 3, p. 83-92.
- Ehlers, G. M., Stumm, E. C., and Kesling, R. V., 1951, Devonian rocks of southeastern Michigan and northwestern Ohio, 40 p.
- Ehlers, G. M., and White, T. E., 1932, *Cylindrophyllum panicum* (Winchell) and *Cylindrophyllum hindshawi* sp. nov., Tetracoralla from the Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 4, no. 4, p. 93-100.
- Ehman, D. A., 1964, Stratigraphic analysis of the Detroit River Group (Devonian) in the Michigan Basin, MS: University of Michigan.
- El Gadi, M. S., 2001, Sedimentology and sequence stratigraphy of the Ordovician Black River and lower Trenton Groups, Lake Simcoe area, Ontario, PhD: University of Guelph (Canada), 427-427 p. p.
- Eley, B. E., 1977, Chert in the Fossil Hill Member of the Lockport Formation (Middle Silurian), Manitoulin Island, Ontario, MS: University of Windsor, 150 p.

- Eley, B. E., and Legault, J. A., 1988, Palynomorphs from the Manitoulin Formation (Early Llandovery) of Southern Ontario: *Palynology*, v. 12, p. 49-63.
- Elias, M. K., 1950, *Fenestella deissi* (new name) from the Middle Devonian of Michigan and related forms: *Journal of Paleontology*, v. 24, no. 3, p. 390-392.
- Eliuk, L., and Cercone, K. R., 1989, Comment and reply on "Evaporative sea-level drawdown in the Silurian Michigan Basin": *Geology*, v. 17, no. 2, p. 195-196.
- Eller, E. R., 1938, Scolecodonts from the Potter Farm Formation of the Devonian of Michigan: *Carnegie Museum Annals*, v. 27, p. 275-286.
- , 1944, Scolecodonts of the Silurian Manitoulin Dolomite of New York and Ontario: *American Midland Naturalist*, v. 32, no. 3, p. 732-755.
- Eller, E. R., 1961, Scolecodonts from well samples of the Dundee, Devonian of Michigan: *Annals of Carnegie Museum*, v. 36, p. 29-48.
- , 1963, Scolecodonts from the Dundee, Devonian of Michigan: *Annals of Carnegie Museum*, v. 36, p. 173-180.
- Ellis, B., 2013, Hydraulic Fracturing in the State of Michigan - Geology/Hydrogeology Technical Report, Graham Sustainability Institute Integrated Assessment Report Series, v. II, doc. 3, 25 p.
- Ellis, B., Peters, C., Fitts, J., Bromhal, G., McIntyre, D., Warzinski, R., and Rosenbaum, E., 2011, Deterioration of a fractured carbonate caprock exposed to CO₂-acidified brine flow: *Greenhouse Gases-Science and Technology*, v. 1, no. 3, p. 248-260.
- Ells, G. D., 1958, Notes on the Devonian-Silurian in the Subsurface of Southwest Michigan: *Michigan Geological Survey Progress Report*, v. 18, p. 1-55.
- , 1960, Silurian oil and gas developments in Michigan, p. 1-11.
- , 1962a, Silurian rocks in the subsurface of southern Michigan, Silurian rocks of the southern Lake Michigan area, Michigan Basin Geological Society Annual Field Conference, Michigan Basin Geological Society, p. 39-49.
- , 1962b, Structures associated with the Albion-Scipio Oil Field Trend: Geological Survey Division Open File Report, p. 1-86.
- , 1963, Information on Michigan Silurian oil and gas pools, p. 1-34.
- , 1965, Michigan's Oil and Gas Fields, 1964: Annual Statistical Summary, v. 2, p. 1-58.
- , 1966, Michigan's Oil and Gas Fields, 1965: Annual Statistical Summary, v. 4, p. 1-66.
- , 1967a, Correlation of Cambro-Ordovician rocks in Michigan, *in* Ostrom, M. E., and Slaughter, A. E., eds., Correlation Problems of the Cambrian and Ordovician outcrop areas, Northern Peninsula of Michigan: Lansing, Michigan Basin Geological Society, p. 42-57.
- , 1967b, Michigan's Oil and Gas Fields, 1966: Annual Statistical Summary, v. 6, p. 1-64.
- , 1967c, Michigan's Silurian Oil and Gas Pools: Michigan Geological Survey Report of Investigation, v. 2, p. 1-49.
- , 1968, Michigan's Oil and Gas Fields, 1967: Annual Statistical Summary, v. 8, p. 1-72.
- , 1969a, Architecture of the Michigan Basin, *in* Stonehouse, H. B., ed., Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society, p. 60-88.
- , 1969b, Michigan's Oil and Gas Fields, 1968: Annual Statistical Summary, v. 10, p. 1-72.
- , 1970, Michigan's Oil and Gas Fields, 1969: Annual Statistical Summary, v. 12, p. 1-72.
- Ells, G. D., 1971a, Developments in Michigan in 1970: *American Association of Petroleum Geologists Bulletin*, v. 55, no. 7, p. 997-1011.
- Ells, G. D., 1971b, Future oil and gas possibilities in Michigan Basin, Volume 2, AAPG, p. 1124-1162.
- , 1971c, Michigan's Oil and Gas Fields, 1970: Annual Statistical Summary, v. 14, p. 1-76.
- , 1972, Michigan's Oil and Gas Fields, 1971: Annual Statistical Summary, v. 16, p. 1-44.
- , 1973, Michigan's Oil and Gas Fields, 1972: Annual Statistical Summary, v. 18, p. 1-48.
- , 1974, Michigan's Oil and Gas Fields, 1973: Annual Statistical Summary, v. 20, p. 1-52.
- , 1975, Michigan's Oil and Gas Fields, 1974: Annual Statistical Summary, v. 22, p. 1-60.

- , 1976, Michigan's Oil and Gas Fields, 1975: Annual Statistical Summary, v. 24, p. 1-64.
- , 1977a, Developments in Michigan in 1976: American Association of Petroleum Geologists Bulletin, v. 61, no. 8, p. 1173-1182.
- , 1977b, Michigan's Oil and Gas Fields, 1976: Annual Statistical Summary, v. 26, p. 1-64.
- , 1978a, Developments in Michigan in 1977: American Association of Petroleum Geologists Bulletin, v. 62, no. 8, p. 1330-1339.
- , 1978b, Michigan's Oil and Gas Fields: Annual Statistical Summary, v. 28, p. 1-69.
- , 1979a, Developments in Michigan in 1978: American Association of Petroleum Geologists Bulletin, v. 63, no. 8, p. 1278-1285.
- , 1979b, The Mississippian and Pennsylvanian (Carboniferous) Systems in the United States -- Michigan: Geological Survey Professional Paper, v. 1110-J, p. 1-17.
- , 1979c, Stratigraphic cross sections extending from Devonian Antrim Shale to Mississippian Sunbury Shale in the Michigan Basin: State of Michigan Progress Report, v. 22, p. 1-27.
- Ells, G. D., 1980, Developments in Michigan in 1979: American Association of Petroleum Geologists Bulletin, v. 64, no. 9, p. 1377-1386.
- Ells, G. D., and Anonymous, 1978, An appraisal of known Antrim Shale and Berea oil and gas pools in Michigan: DOE/METC (Morgantown Energy Technology Center), p. 280-290.
- Ells, G. D., Bricker, D. M., Elowski, R. C., Ostrander, A. G., and Morris, M. A., 1979, Michigan's Oil and Gas Fields, 1978: Michigan Geological Survey Division, Annual Statistical Summary, v. 30, p. 1-68.
- Ells, G. D., and Champion, B. L., 1972, Developments in Michigan in 1971: American Association of Petroleum Geologists Bulletin, v. 56, no. 7, p. 1223-1235.
- , 1973, Developments in Michigan in 1972: American Association of Petroleum Geologists Bulletin, v. 57, no. 8, p. 1456-1467.
- Ells, G. D., and Champion, B. L., 1974, Developments in Michigan in 1973: American Association of Petroleum Geologists Bulletin, v. 58, no. 8, p. 1556-1564.
- , 1975, Developments in Michigan in 1974: American Association of Petroleum Geologists Bulletin, v. 59, no. 8, p. 1364-1370.
- Ells, G. D., and Champion, B. L., 1976, Developments in Michigan in 1975: American Association of Petroleum Geologists Bulletin, v. 60, no. 8, p. 1215-1221.
- Ells, G. D., and Layton, F., 1968, Developments in Michigan in 1967: American Association of Petroleum Geologists Bulletin, v. 52, no. 6, p. 976-980.
- , 1969, Developments in Michigan in 1968: American Association of Petroleum Geologists Bulletin, v. 53, no. 6, p. 1230-1235.
- , 1970, Developments in Michigan in 1969: American Association of Petroleum Geologists Bulletin, v. 54, no. 6, p. 974-984.
- Elowski, R. C., 1980, Potassium salts (Potash) of the Salina A-1 Evaporite in the Michigan Basin: Geological Survey Division Report of Investigation, v. 25, p. 1-14.
- Elowski, R. C., and Bricker, D. M., 1976a, Kalkaska County bedrock topography, scale 1:62,500.
- , 1976b, Otsego County bedrock topography, scale 1:62,500.
- Elowski, R. C., and Ostrander, A. G., 1977, Gypsum karst and related features in the Michigan Basin: 1977 Guidebook Alpena, Michigan: National Speleological Society, p. 31-39.
- Emery, T., 1908, 39th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1907.
- , 1909, 40th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1908.
- , 1910, 41st Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1909.
- , 1911, 42nd Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1910.

- Emrich, G. H., 1966, Ironton and Galesville (Cambrian) Sandstones in Illinois and Adjacent Areas: Illinois State Geological Survey Circular, v. 403, p. 1-55.
- Engelmann, G., 1847, Remarks on the St. Louis Limestone: American Journal of Science, v. 53, p. 119-120.
- Enyert, R. L., 1950, Middle Devonian Sandstones of the Michigan Basin, PhD: University of Michigan, 104 p.
- Ernst, W. G., 1954, The St. Peter Sandstone-Glenwood Shale contact: American Mineralogist, v. 39, no. 11-1, p. 1025-1031.
- Esarey, R. E., 1947, Silurian and Devonian Formations in Southeastern Indiana, Guide Book Indiana Geologic Field Conference, p. 22.
- , 1948, Upper and Middle Mississippian Formations of Southern Indiana: Indiana Geologic Field Conference Guidebook, v. 2, p. 26.
- Ettensohn, F. R., and Brett, C. E., 2002, Stratigraphic evidence from the Appalachian Basin for continuation of the Taconian Orogeny into Early Silurian time: Physics and Chemistry of the Earth, v. 27, no. 1-3, p. 279-288.
- Evans, C. S., 1950, Underground hunting in the Silurian of southwestern Ontario: Proceedings of the Geological Association of Canada, v. 3, p. 55-85.
- Everham, W. D., 1998, Modeling the Thermal History of the Michigan Basin: Implications for a Complex Burial History, MS: Michigan Technological University, 117 p.
- , 2004, Thermal History of the Michigan Basin, PhD: Michigan Technological University.
- Everham, W. D., and Huntoon, J. E., 1999, Thermal History of a Deep Well in the Michigan Basin: Implications for a Complex Burial History, *in* Förster, A., and Merriam, D. F., eds., Geothermics in Basin Analysis: Boston, Springer, p. 177-202.
- Exworthy, A., 1935, Enormous salt deposits in Michigan: The Mineralogist, v. 3, no. 4, p. 22-22.
- Fagerstrom, J. A., 1961a, Age and stratigraphic relations of the Formosa reef limestone (Middle Devonian) of southwestern Ontario, Canada: Geological Society of America Bulletin, v. 72, no. 3, p. 341-349.
- , 1961b, The fauna of the Middle Devonian Formosa reef limestone of southwestern Ontario: Journal of Paleontology, v. 35, no. 1, p. 1-48.
- Fagerstrom, J. A., 1962, Middle Devonian stromatoporoids from southeastern Michigan: Journal of Paleontology, v. 36, no. 3, p. 424-430.
- , 1966, Biostratigraphic significance of rhipidomellid brachiopods in the Detroit River Group (Devonian): Journal of Paleontology, v. 40, no. 5, p. 1236-1238.
- , 1970, Cryptalgal structures in the Detroit River Group (Devonian), southwestern Ontario: Canadian Journal of Earth Sciences, v. 7, no. 2, p. 548-550.
- , 1971, Brachiopods of the Detroit River Group (Devonian) from southwestern Ontario and adjacent areas of Michigan and Ohio: Bulletin - Geological Survey of Canada, v. 204, p. 112-112.
- , 1977, The stromatoporoid genus *Stictostroma* Parks, 1936; its type species, type specimens and type locality: Journal of Paleontology, v. 51, no. 2, p. 416-419.
- , 1978, Modes of evolution and their chronostratigraphic significance; evidence from Devonian invertebrates in the Michigan Basin: Paleobiology, v. 4, no. 4, p. 381-393.
- , 1982, Stromatoporoids of the Detroit River Group and adjacent rocks (Devonian) in the vicinity of the Michigan Basin: Bulletin - Geological Survey of Canada, no. 339, p. 81-81.
- , 1983a, Diversity, speciation, endemism and extinction in Devonian reef and level-bottom communities, eastern North America: Coral Reefs, v. 2, no. 2, p. 65-70.
- , 1983b, Petrology and Regional Significance of a Devonian Carbonate Evaporite Complex, Eastern Michigan Basin: Journal of Sedimentary Petrology, v. 53, no. 1, p. 295-317.
- Fagerstrom, J. A., and Saxena, K. M. L., 1973, Intracoenosteal variation in a Devonian stromatoporoid: Lethaia, v. 6, no. 2, p. 155-162.

- Farmerie, R. L., 1989, Subsurface geology of the Lockport and Salina Groups (Middle to Upper Silurian) of northeastern Ohio, MS: Kent State University, 338 p.
- Farmerie, R. L., and Coogan, A. H., 1995, Silurian Salina salt strata terminations in northeastern Ohio: *Northeastern Geology*, v. 17, no. 4, p. 383-393.
- Faul, H., 1942, *Prismatophyllum* in the Traverse Group of north central Michigan, MS: Michigan State University, 46 p.
- , 1943, Growth-rate of a Devonian reef-coral (*Prismatophyllum*): *American Journal of Science*, v. 241, no. 9, p. 579-582.
- Fausser, W. B., Jr., 1951, Paleontology and stratigraphy of well cores from Garfield Twp., Newaygo County, Michigan, MS: University of Michigan.
- Fay, A. H., 1911, Shaft of the Detroit Salt Company: *Engineering Mining Journal*, v. 91, p. 565-569.
- Felber, B. E., 1964, Silurian reefs of Southeastern Michigan, PhD: Northwestern University, 133 p.
- Feldman, H. R., 1985, Brachiopods of the Onondaga Limestone in Central and Southeastern New York: *Bulletin of the American Museum of Natural History*, v. 179, no. 3, p. 289-377.
- Fellows, L. D., 1957, Stratigraphy and paleontology of a core of upper Silurian strata from Monroe County, Michigan, MS: University of Michigan.
- Fenton, C. L., 1931a, Niagaran stromatoporoid reefs of the Chicago region: *American Midland Naturalist*, v. 12, no. 7, p. 203-212.
- Fenton, C. L., and Fenton, M. A., 1930, Studies on the genus *Atrypa*: *American Midland Naturalist*, v. 12, no. 1, p. 1-18.
- , 1931, Some snail borings of Paleozoic age: *American Midland Naturalist*, v. 12, no. 12, p. 522-528.
- Fenton, M. A., 1931b, A Devonian Stromatoporoid Reef: *American Midland Naturalist*, v. 12, no. 7, p. 195-202.
- , 1937a, *Aulopora*, a form-genus of tabulate corals and byrozoans: *American Midland Naturalist*, v. 18, no. 1, p. 109-115.
- , 1937b, Species of *Aulopora* from the Traverse and Hamilton Groups: *American Midland Naturalist*, v. 18, no. 1, p. 115-119.
- Ferrigno, K. F., 1970, Holothurian sclerites from the Dundee Limestone in southwestern Ontario: *Compass of Sigma Gamma Epsilon*, 1915-84, v. 47, no. 2, p. 81-83.
- , 1971, Environmental influences on the distribution and abundance of conodonts from the Dundee Limestone (Devonian), Saint Mary's, Ontario: *Canadian Journal of Earth Sciences*, v. 8, no. 3, p. 378-386.
- Feutz, P. J., 2012, Evaluating the effects of lithofacies and thin shales on the lateral distribution of hydrothermal dolomite reservoirs in the Michigan Basin MS: Western Michigan University, 269 p.
- Fici, H. A., 1988, Definition of the B salt edge of southern limb of the Michigan Basin using seismic techniques, MS: Western Michigan University, 70 p.
- Fieldner, A. C., 1948, Analyses of Michigan, North Dakota, South Dakota, and Texas coals: U.S. Bureau of Mines Technical Paper, v. 700, p. 1-106.
- Fincham, W. J., 1975, The Salina Group of the southern part of the Michigan Basin, MS: Michigan State University, 57 p.
- Fini, J. M., 1973, Observations on evolution of calycine appendages in the crinoid *Gilbertsocrinus*: *Papers on Paleontology*, no. 6, p. 51-53.
- Firouzian, A., 1963, Hydrological studies of the Saginaw Formation in the Lansing, Michigan area, MS: Michigan State University, 53 p.
- Fischietto, N. E., 2009, Lithofacies and depositional environments of the Cambrian Mount Simon Sandstone in the northern Illinois Basin: Implications for carbon dioxide sequestration, MS: Purdue University, 128 p.

- Fisher, J., 1973a, Stratigraphy of the Northwestern Portion of the Lower Peninsula, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment, Michigan Basin Geological Society*, p. 26-31.
- Fisher, J. A., 1981, *Fault patterns in southeastern Michigan*, MS: Michigan State University, 80 p.
- Fisher, J. C., 1969a, *The distribution and characteristics of the Traverse Formation of Michigan*, MS: Michigan State University.
- Fisher, J. H., 1962, Silurian rocks of the southern Lake Michigan area, annual field conference, 1962, Silurian rocks of the southern Lake Michigan area, annual field conference, 1962: United States (USA), 96 p.
- , 1969b, Early Paleozoic History of the Michigan Basin, *in* Stonehouse, H. B., ed., *Studies of the Precambrian of the Michigan Basin*, Michigan Basin Geological Society, p. 89-93.
- , 1973b, Petroleum Occurrence in the Silurian Reefs of Michigan, Ontario Petroleum Institute Twelfth Annual Conference Technical Volume, p. 1-10.
- , 1980a, Antrim Structure, Plate 3, scale 1:1,000,000.
- , 1980b, Dundee Structure, Plate 5, scale 1:1,000,000.
- , 1980c, Stratigraphy of the Upper Devonian-Lower Mississippian of Michigan.
- , 1980d, Structure map on Berea Sandstone, Plate 2, scale 1:1,000,000.
- , 1980e, Structure map on Sunbury Shale, Plate 1, scale 1:1,000,000.
- , 1980f, Thickness of Antrim Shale, Plate 12, scale 1:1,000,000.
- , 1980g, Thickness of Bedford Shale, Plate 10, scale 1:1,000,000.
- , 1980h, Thickness of Berea Sandstone, Plate 9, scale 1:1,000,000.
- , 1980i, Thickness of Ellsworth Shale, Plate 11, scale 1:1,000,000.
- , 1980j, Thickness of Sunbury Shale, Plate 8, scale 1:1,000,000.
- , 1980k, Traverse Formation Isopach, Plate 13, scale 1:1,000,000.
- , 1980l, Traverse Limestone Structure, Plate 4, scale 1:1,000,000.
- , 1980m, Trenton structure, Plate 6, scale 1:1,000,000.
- Fisher, J. H., Barbour, R. F., Ells, G. D., Fugate, R. J., Helmboldt, D. E., Lundy, C. L., and Mantek, W. E., 1969, *Stratigraphic Cross-Sections, Michigan Basin*, Michigan Basin Geological Society, 22 p.:
- Fisher, J. H., and Barratt, M. W., 1985, Exploration in Ordovician of central Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 69, no. 12, p. 2065-2076.
- Fisher, J. H., Barratt, M. W., Droste, J. B., and Shaver, R. H., 1988, Michigan Basin, *in* Sloss, L. L., ed., *Sedimentary cover--North American craton: U.S.:* , Volume D-2: Boulder, Geological Society of America, p. 361-382.
- Fitterman, D. V., Graves, B. J., Lehr, J. H., Butcher, K., Owen, T. E., and Mathews, M., 1986, Transient electromagnetic sounding in the Michigan Basin for ground water evaluation, Dublin, OH, United States (USA), *Natl. Water Well Assoc.*, Dublin, OH.
- Fitzgerald, P. E., and Thomas, W. A., 1932a, Occurrence of fluorite in Monroe Formation of Vernon Township pool near Mount Pleasant, Michigan: *Geological Society of America Bulletin*, v. 16, no. 1, p. 91-92.
- , 1932b, The Occurrence of Fluorite in the Monroe Formation of the Mt. Pleasant Oil Pool: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 16, p. 415-420.
- Flores, C., and Bailey, R. C., 1987, Geomagnetic induction soundings over the Michigan Basin: *Physics of the Earth and Planetary Interiors*, v. 48, p. 142-152.
- Foerste, A. F., 1917, The Richmond Faunas of Little Bay de Noquette, in Northern Michigan: *The Ottawa Naturalist*, v. 31, no. 9, p. 97-103.
- , 1918, The Richmond Faunas of Little Bay de Noquette, in Northern Michigan: *The Ottawa Naturalist*, v. 31, no. 10, p. 121-127.
- , 1924, Silurian Cephalopods of Northern Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 2, p. 19-86.

- , 1927, Devonian cephalopods from Alpena in Michigan: Contributions from the Museum of Geology The University of Michigan, v. 2, no. 9, p. 189-208.
- , 1930a, Additional notes on the Nephriticerina: Contributions from the Museum of Paleontology The University of Michigan, v. 3, no. 7, p. 151-154.
- , 1930b, The color patterns of fossil cephalopods and brachiopods with notes on gastropods and pelecypods: Contributions from the Museum of Paleontology The University of Michigan, v. 3, no. 6, p. 109-150.
- , 1932, Black River and other cephalopods from Minnesota, Wisconsin, Michigan and Ontario, Pt. 1: Denison University Bulletin, v. 27, p. 47-136.
- , 1933, Black River and other cephalopods from Minnesota, Wisconsin, Michigan and Ontario, Pt. 2: Denison University Bulletin, v. 28, p. 1-146.
- Foote, M., 1994, Morphology of Ordovician-Devonian Crinoids: Contributions from the Museum of Paleontology The University of Michigan, v. 29, no. 1, p. 1-39.
- Formolo, M. J., Riedinger, N., and Gill, B. C., 2014, Geochemical evidence for euxinia during the Late Devonian extinction events in the Michigan Basin (U.S.A.): Palaeogeography, Palaeoclimatology, Palaeoecology, v. 414, no. 0, p. 146-154.
- Fortin, J. L., 1969, Stony Lake Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 173-180.
- Forysth, J. L., 1971a, Geology of the Lake Erie Islands and Adjacent Shores, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, p. 63.
- , 1971b, Road Log, *in* Forysth, J. L., ed., Geology of the Lake Erie Islands and Adjacent Shores, Michigan Basin Geological Society, p. 5-18.
- Fowler, J. H., and Schaefer, S. F., 1991a, Burdell Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 343-352.
- , 1991b, Goodwell Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 389-396.
- Frank, G. W., 1963, Salt intrusion in northeastern Ohio: The Ohio Journal of Science, v. 63, no. 2, p. 55-59.
- Frank, T. D., Wilkinson, B. H., and Lohmann, K. C., 1993, Origin of Submarine Pisoliths and the Sedimentology of Midwestern Silurian Reefs: Journal of Sedimentary Petrology, v. 63, no. 6, p. 1070-1077.
- Fraser, L., 1907, Coal mining in Michigan: Engineering Mining Journal, v. 48, p. 594-595.
- Frew, W. M., 1955, Stratigraphy and paleontology of a well core through the Middle Ordovician in Salem Township, Washtenaw County, Michigan, MS: University of Michigan.
- Friedman, G. M., and Kopaska-Merkel, D. C., 1991, Late Silurian Pinnacle Reefs of the Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, Geological Society of America, p. 89-100.
- Friend, J. E., 1963, Insoluble residues and Silurian stratigraphy of two exploratory tests in Michigan, MS: Wayne State University, 74 p.
- Fritz, M. A., 1939, Devonian fossil zones in wells from southwestern Ontario: Geological Society of America Bulletin, v. 50, no. 1, p. 79-88.
- Fritz, P., Lapcevic, P. A., Miles, M. C., Frape, S. K., Lawson, D. E., and O'Shea, K. J., 1988, Stable isotopes in sulphate minerals from the Salina Formation in southwestern Ontario: Canadian Journal of Earth Sciences, v. 25, no. 2, p. 195-205.
- Fry, W. H., 1913a, Log of well of Pennsylvania Salt Company, Detroit, Michigan: Journal of Geology, v. 21, no. 7, p. 671-671.
- , 1913b, Sections of two Michigan salt wells: Journal of Geology, v. 21, no. 4, p. 320-322.
- Fugate, R. J., 1953, Developments in Michigan in 1952: American Association of Petroleum Geologists Bulletin, v. 37, no. 6, p. 1315-1328.

- , 1969, The East Norwich Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 69-86.
- Fugate, R. J., and Sleight, G. C., 1954, Developments in Michigan in 1953: American Association of Petroleum Geologists Bulletin, v. 38, no. 6, p. 1091-1106.
- Furnish, W. M., 1938, Conodonts from the Prairie du Chien (Lower Ordovician) beds of the upper Mississippi Valley: *Journal of Paleontology*, v. 12, no. 4, p. 318-340.
- Galloway, J. J., and Ehlers, G. M., 1960, Some Middle Devonian stromatoporoids from Michigan and Southwestern Ontario, including the types described by Alexander Winchell and A. W. Grabau: *Contributions from the Museum of Paleontology The University of Michigan*, v. 15, no. 4, p. 39-120.
- Gardner, W. C., 1971, Environmental analysis of the Middle Devonian of the Michigan Basin, PhD: Northwestern University, 260 p.
- Gardner, W. C., 1974, Middle Devonian stratigraphy and depositional environments in the Michigan Basin: *Special Papers - Michigan Basin Geological Society*, v. 1, p. 138.
- Gardner, W. C., and Bray, E. E., 1984, Oils and Source Rocks of Niagaran Reefs (Silurian) in the Michigan Basin, *in* Palacas, J. G., ed., *Petroleum Geochemistry and Source Rock Potential of Carbonate Rocks*, Volume 18, AAPG, p. 33-44.
- Garner, H. F., 1951, Lower Mississippian orthoconic nautiloid cephalopods of Michigan, MS: State University of Iowa, 72 p.
- , 1953, Lower Mississippian cephalopods of Michigan, coiled nautiloids and ammonoids, PhD: State University of Iowa, 201 p.
- Garton, E. L., 1937, Analyses of crude oils from some fields of Michigan: U.S. Bureau of Mines Report of Investigation, v. 3346, p. 1-28.
- Gaudette, H. E., 1965, Illite from Fond du Lac County, Wisconsin: *American Mineralogist*, v. 50, p. 411-417.
- Geyer, R. A., 1962, Uses and Abuses of Gravity Surveys in Reef Exploration, *in* Fisher, J. H., ed., *Silurian Rocks of the Southern Lake Michigan Area*, Michigan Basin Geological Society, p. 69-73.
- Ghahremani, D. T., 1978, Paleocology of the Spiriferid brachiopods of The Silica Shale Formation (middle Devonian), S.E. Michigan and N.W. Ohio, MS: Western Michigan University, 82 p.
- Ghatge, S. L., 1984, A geophysical investigation of a possible astrobleme in southwestern Michigan, MS: Western Michigan University, 74 p.
- Gibbs, C. J., 1939, The influence of sub-surface geology upon the propagation of electromagnetic waves, MS: Michigan State University, 55 p.
- Giles, G. S., 1991, Carbonate concretions of the Antrim Shale: An applied test of the zonal model for the diagenesis of argillaceous marine sediments, MS: Michigan State University, 190 p.
- Gill, D., 1970, Application of a statistical zonation method to Reservoir Evaluation and Digitized-Log Analysis: *American Association of Petroleum Geologists Bulletin*, v. 54, no. 5, p. 719-729.
- Gill, D., 1973, Stratigraphy, facies, evolution and diagenesis of productive Niagaran Guelph Reefs and Cayugan sabkha deposits, The Belle River Mills Gas Field, Michigan Basin, PhD: University of Michigan, 284 p.
- Gill, D., 1977a, The Belle River Mills gas field; productive Niagaran reefs encased by sabkha deposits, *Michigan Basin: Special Papers - Michigan Basin Geological Society*, no. 2, 187 p.
- , 1977b, Salina A-1 Sabkha Cycles and Late Silurian Paleogeography of Michigan Basin: *Journal of Sedimentary Petrology*, v. 47, no. 3, p. 979-1017.

- , 1979, Differential entrapment of oil and gas in Niagaran pinnacle-reef belt of northern Michigan: American Association of Petroleum Geologists Bulletin, v. 63, no. 4, p. 608-620.
- , 1985, Depositional Facies of Middle Silurian (Niagaran) Pinnacle Reefs, Belle River Mills Gas Field, Michigan Basin, Southeastern Michigan, Carbonate Petroleum Reservoirs: Casebooks in earth sciences: New York, Springer, p. 121-139.
- , 1994a, Niagaran Reefs of Northern Michigan, Part I: Exploration Portrait: Journal of Petroleum Geology, v. 17, p. 99-110.
- , 1994b, Niagaran Reefs of Northern Michigan, part II: Resource appraisal: Journal of Petroleum Geology, v. 17, no. 2, p. 231-242.
- Gill, D., Mesolella, K. J., Robinson, J. D., McCormick, L. M., and Ormiston, A. R., 1975, Cyclic deposition of Silurian carbonates and evaporites in Michigan Basin [discussion and reply]: American Association of Petroleum Geologists Bulletin, v. 59, no. 3, p. 535-542.
- Gilpin, A. R., 1912, Geology of Cheboygan County (Michigan), MS: The University of Chicago, 38 p.
- Ging, P. B., Long, D. T., and Lee, R. W., 1996, Selected Geochemical Characteristics of Ground Water from the Marshall Aquifer in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4220, p. 1-19.
- Girard, J.-P., and Barnes, D. A., 1995, Illitization and paleothermal regimes in the Middle Ordovician St. Peter Sandstone, central Michigan Basin; K-Ar, oxygen isotope, and fluid inclusion data: American Association of Petroleum Geologists Bulletin, v. 79, no. 1, p. 49-69.
- Girrell, B. I., Greenberg, M. L., and Worthington, P. F., 1985, Application of the gamma spectroscopy service to Illinois and Michigan basin carbonates: Transactions of the SPWLA Annual Logging Symposium, v. 26, no. 1, p. X1-X12.
- Gishler, C. A., 1977, Upper Ordovician Chitinozoa from Manitoulin Island and Bruce Peninsula, Ontario, MS: University of Western Ontario, 156 p.
- Goldman, A. L., Jr., 1976, A field guide and sourcebook to geology of the eastern Upper Peninsula of Michigan; intended primarily for secondary earth science teachers, Kalamazoo, Mich., United States (USA), West. Mich. Univ., Dep. Geol., Kalamazoo, Mich., A field guide and sourcebook to geology of the eastern Upper Peninsula of Michigan; intended primarily for secondary earth science teachers, 88 p.
- Goldman, D., and Bergstrom, S. M., 1997, Late Ordovician Graptolites from the North American Midcontinent: Palaeontology, v. 40, no. 4, p. 965-1010.
- Gonzales, B. R., 1981, Facies analysis of Pinnacle reefs of the Guelph Formation (Middle Silurian), Northern Michigan, MS: Stephen F. Austin State University, 165 p.
- González-Nicolás, A., Baù, D., Cody, B. M., and Alzraiee, A., 2015, Stochastic and global sensitivity analyses of uncertain parameters affecting the safety of geological carbon storage in saline aquifers of the Michigan Basin: International Journal of Greenhouse Gas Control, v. 37, p. 99-114.
- Goodman, W. R., 1991, Silurian Period: Northern and Western Niagaran, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 103-106.
- Goodrich, D. L., 1957, A sedimentary analysis of the Lower Devonian Bois Blanc Formation in Michigan, MS: Michigan State University, 78 p.
- Gordon, C. H., 1900, Geological report on Sanilac County, Michigan: Michigan Geological and Biological Survey, Publication, v. 7, no. III, p. 1-34.
- , 1902, The Port Huron oil field, Wave cutting on west shore of Lake Huron, Sanilac County, Michigan, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, p. 269-291.

- Gordon, L. A., 1980, Stratigraphy and Paleocology of The Brassfield Formation (Llandoveryian) in East-Central Kentucky, MS: University of Kentucky, 113 p.
- Gorton, K. A., 1935, The structural geology of Wayne County and its bearings on possible oil accumulation, MS: University of Michigan.
- Grabau, A. W., 1901, A preliminary geologic section in Alpena and Presque Isle counties, Michigan: *American Geologist*, v. 28, no. 3, p. 177-189.
- Grabau, A. W., 1902a, Stratigraphy of the Traverse Group of Michigan: Michigan State Board of Geological Survey, Report, p. 163-210.
- Grabau, A. W., 1902b, The Traverse Group of Michigan: Contributions from the Geological Department of Columbia University, v. 10, no. 82, p. 163-210.
- , 1906, Types of Sedimentary Onlap: *Geological Society of America Bulletin*, v. 17, p. 567-636.
- Grabau, A. W., 1908, Notes on the Traverse Group of Michigan: *Science*, v. 27, p. 726-726.
- Grabau, A. W., 1913a, Early Paleozoic delta deposits of North America: *Geological Society of America Bulletin*, v. 24, p. 399-528.
- Grabau, A. W., 1913b, Preliminary report on the fauna of the Dundee Limestone of southern Michigan: Publication - State of Michigan, Department of Conservation, Geological Survey Division, p. 327-378.
- Grabau, A. W., and Sherzer, W. H., 1910, The Monroe Formation of Southern Michigan and Adjoining regions: State of Michigan Geological and Biological Survey Publication, v. 2, p. 1-93.
- Grabau, W. E., 1950, The significance of oriented coral sections, MS: Michigan State University, 53 p.
- Graham, C. M., Valley, J. W., and Winter, B. L., 1996, Ion microprobe analysis of $^{18}\text{O}/^{16}\text{O}$ in authigenic and detrital quartz in the St. Peter Sandstone, Michigan Basin and Wisconsin Arch, USA: Contrasting diagenetic histories: *Geochimica et Cosmochimica Acta*, v. 60, no. 24, p. 5101-5116.
- Graham, W. A. P., 1932, Solution phenomena in the basal Oneota dolomite: *The Ohio Journal of Science*, v. 32, no. 6, p. 527-532.
- Grammer, G. M., Barnes, D. A., Harrison III, W. B., Sandomierski, A. E., and Mannes, R. G., 2008, Practical synergies for increasing domestic oil production and geological sequestration of anthropogenic CO_2 : An example from the Michigan Basin, *in* Grobe, M., Pashin, J. C., and Dodge, R. L., eds., Carbon dioxide sequestration in geological media - State of the Science, Volume 59: Tulsa, AAPG, p. 689-706.
- Grant, R. E., 1962, Trilobite distribution, Upper Franconia Formation (Upper Cambrian), Southeastern Minnesota: *Journal of Paleontology*, v. 36, no. 5, p. 965-&.
- Grant, R. P., 1941, Oil and Gas developments in Michigan during 1940: *American Association of Petroleum Geologists Bulletin*, v. 25, no. 6, p. 1125-1134.
- , 1942, Oil and Gas developments in Michigan during 1941: *American Association of Petroleum Geologists Bulletin*, v. 26, no. 6, p. 1097-1109.
- , 1945, Michigan Geological Field Trip 1945, p. 1-5.
- , 1948a, Michigan's petroleum-producing industry: *Michigan Conservation*, v. 17, no. 4, p. 8-9, 14-15.
- , 1948b, The petroleum producing industry in Michigan: *Compass*, v. 25, no. 3, p. 113-120.
- , 1953, Liquid gas is stored in "Tailor-made" caves: *Michigan Conservation*, v. 22, no. 3, p. 24-27.
- Grathoff, G. H., Moore, D. M., Hay, R. L., and Wemmer, K., 2001, Origin of illite in the lower Paleozoic of the Illinois basin: Evidence for brine migrations: *Geological Society of America Bulletin*, v. 113, no. 8, p. 1092-1104.
- Grawbarger, D. J., 1978, The Manitowaning Bioherm: An Early Silurian Patch Reef, *in* Sanford, J. T., ed., *Geology of the Manitowaning Area*, Volume 3, Michigan Basin Geological Society, p. 85-86.

- Gray, H. H., 1972, Lithostratigraphy of the Maquoketa Group (Ordovician) in Indiana: Department of Natural Resources Geological Survey Special Report, v. 7, p. 1-31.
- Green, D. A., 1957, Trenton Structure in Ohio, Indiana, and Northern Illinois: American Association of Petroleum Geologists Bulletin, v. 41, no. 4, p. 627-642.
- Gregg, J. M., 1982, The origin of xenotopic dolomite texture (Texas, Wisconsin, Michigan), PhD: Michigan State University, 169 p.
- Gregory, W. M., 1912, Geological report on Arenac County: Michigan Geological and Biological Survey, Publication, v. 11, no. 8, p. 1-146.
- Griest, S. D., and Shaver, R. H., 1981, Geometric and paleoecologic analysis of Silurian reefs near Celina, Ohio: Proceedings of the Indiana Academy of Science, v. 91, p. 373-390.
- Grieve, R. O., 1951, Subsurface study of the Detroit River Group in southwestern Ontario, MS: University of Michigan, 16 p.
- Griffin, W. D., 1991a, Blue Lake 18 Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 117-124.
- , 1991b, South Buckeye Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 441-452.
- Griffith, W. D., 1991, Clayton Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 353-362.
- Grimsley, G. P., 1903, The Gypsum of Michigan and the Plaster Industry, *in* Lane, A. C., ed., Annual Report of the Geological Survey of Michigan, Volume 2.
- , 1904a, Gypsum Deposits in Michigan, *in* Adams, G. I. e. a., ed., Gypsum Deposits in the United States, Volume 223, U.S. Geological Survey, p. 45-47.
- , 1904b, A theory of origin for the Michigan Gypsum deposits: American Geologist, v. 34, no. 6, p. 378-387.
- , 1905, Origin of gypsum, with special reference to the origin of the Michigan deposits: Kansas Academy of Sciences Transactions, v. 19, p. 110-117.
- Gross, M. R., and Engelder, T., 1991, A case for neotectonic joints along the Niagara Escarpment: Tectonics, v. 10, no. 3, p. 631-641.
- Grutzeck, M., 1989, St-Peter Sandstone - a Closer Look - Reply: Journal of Sedimentary Petrology, v. 59, no. 3, p. 498-501.
- Grutzeck, M. W., 1986, St-Peter Sandstone - a Closer Look: Journal of Sedimentary Petrology, v. 56, no. 5, p. 669-673.
- Guldenzopf, E. C., 1967, Conodonts from the Prairie du Chien of Northern Peninsula of Michigan, Preliminary Report, *in* Ostrom, M. E., and Slaughter, A. E., eds., Correlation Problems of the Cambrian and Ordovician outcrop areas, Northern Peninsula of Michigan: Lansing, Michigan Basin Geological Society, p. 58-64.
- , 1968, Champlainian Biostratigraphy in Northern Michigan, PhD: Iowa State University.
- Gulley, M. G., 1932, Petroleum developments in Michigan and the "Trenton Rock" fields of northwestern Ohio and northern Indiana: American Institute of Mining Engineers Transactions, v. 98, p. 208-215.
- Gunn, G. R., 1988, Michigan fields; 1, Stratigraphy, reservoir characteristics of Berea Sandstone: Oil & Gas Journal, v. 86, no. 10, p. 57-60.
- Gupta, N., and Bair, E. S., 1997, Variable-density flow in the midcontinent basins and arches region of the United States: Water Resources Research, v. 33, no. 8, p. 1785-1802.
- Gustafson, L. A., 1960, Structure and stratigraphy of the Traverse Group in the Lansing Area, Michigan, MS: Michigan State University.
- Gutaj, M. J., 1994, The relationship between basement structure and overlying sediments in the Michigan Basin: A detailed Gravity Investigation, MS: Western Michigan University, 123 p.

- Gutschick, R. C., 1976, Geology of the Kentland Structural Anomaly, Northwestern Indiana, Field Trip Guidebook, North-Central section of the Geological Society of America and Western Michigan University, 58 p.
- , 1987, Devonian shelf-basin, Michigan Basin, Alpena, Michigan: Geological Society of America Centennial Field Guide—North-Central Section, 1987, p. 297-302.
- Gutschick, R. C., and Sandberg, C. A., 1991a, Late Devonian history of Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 181-202.
- , 1991b, Upper Devonian biostratigraphy of Michigan Basin, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 155-179.
- Haddox, C. A., 1982, Sedimentology of the Munising Formation, MS: University of Wisconsin-Madison, 168 p.
- Haddox, C. A., and Dott, R. H., 1990, Cambrian Shoreline Deposits in Northern Michigan: *Journal of Sedimentary Petrology*, v. 60, no. 5, p. 697-716.
- Haeri-Ardakani, O., Al-Aasm, I., and Coniglio, M., 2013a, Fracture mineralization and fluid flow evolution: an example from Ordovician-Devonian carbonates, southwestern Ontario, Canada: *Geofluids*, v. 13, no. 1, p. 1-20.
- Haeri-Ardakani, O., Al-Aasm, I., and Coniglio, M., 2013b, Petrologic and geochemical attributes of fracture-related dolomitization in Ordovician carbonates and their spatial distribution in southwestern Ontario, Canada: *Marine and Petroleum Geology*, v. 43, p. 409-422.
- Haeri-Ardakani, O., Al-Aasm, I., Coniglio, M., Samson, I., and Pope, M. C., 2013c, Diagenetic evolution and associated mineralization in Middle Devonian carbonates, southwestern Ontario, Canada: *Bulletin of Canadian Petroleum Geology*, v. 61, no. 1, p. 41-58.
- Hagadorn, J. W., Dott, R. H., and Damrow, D., 2002, Stranded on a Late Cambrian shoreline: Medusae from central Wisconsin: *Geology*, v. 30, p. 147-150.
- Hagar, D., 1949, Tectonics of North Central States: *American Association of Petroleum Geologists Bulletin*, v. 33, no. 7, p. 1198-1205.
- Haimson, B. C., 1978, Crustal stress in the Michigan Basin: *Journal of Geophysical Research*, v. 83, no. 12, p. 5857-5863.
- Hake, B. F., 1938, Geologic occurrence of oil and gas in Michigan: *American Association of Petroleum Geologists Bulletin*, v. 22, no. 4, p. 393-415.
- Hake, B. F., and Maebius, J. B., 1938, Lithology of the Traverse Group of central Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 23, p. 447-461.
- Hale, L., 1941, Study of sedimentation and stratigraphy of Lower Mississippian in western Michigan: *American Association of Petroleum Geologists Bulletin*, v. 25, no. 4, p. 713-723.
- Hall, J., 1842, Notes upon the Geology of the Western States: *American Journal of Science*, v. 42, p. 51-62.
- Hamberg, L. R., 1953, Paleontology and stratigraphy of two well cores in the Devonian rocks of Bay and Arenace counties in Michigan, MS: University of Michigan, 1-22 p.
- Hamblin, A. P., 1998, Devonian sandstones of southwestern Ontario; summary of literature: Open-File Report - Geological Survey of Canada, 9 p.
- , 1999, Upper Ordovician strata of southwestern Ontario; synthesis of literature and concepts: Open-File Report - Geological Survey of Canada, 33 p.
- Hamblin, W. K., 1958, The Cambrian Sandstones of Northern Michigan: State of Michigan Geological Survey Division Publication, v. 51, p. 1-146.

- Hamblin, W. K., 1961, Paleogeographic evolution of the Lake Superior region from Late Keweenawan to Late Cambrian time: *Geological Society of America Bulletin*, v. 72, p. 1-18.
- Hamdani, Y., Mareschal, J.-C., and Arkani-Hamed, J., 1991, Phase changes and thermal subsidence in intracontinental sedimentary basins: *Geophysical Journal International*, v. 106, no. 3, p. 657-665.
- Hamilton, D. E., and Henize, S. K., 1992, Computer mapping of pinnacle reefs, evaporites, and carbonates; northern trend, Michigan Basin: *AAPG Computer Applications in Geology*, v. 1, p. 47-60.
- Hamilton, G. D., 1991, Styles of reservoir development in Middle Devonian carbonates of southwestern Ontario, MS: University of Waterloo (Canada), 245-245 p. p.
- Hamrick, R. J., 1978, Dolomitization patterns in the Walker Oil Field, Kent and Ottawa Counties, Michigan, MS: Michigan State University, 94 p.
- Handy, A. H., 1982, Water quality of coal deposits and abandoned mines, Saginaw County, Michigan: Open-File Report - U. S. Geological Survey, p. 50-50.
- Haney, W. D., and Briggs, L. I., 1964, Cyclicity of Textures in Evaporite Rocks of the Lucas Formation: *Kansas Geological Survey, Bulletin*, v. 169, p. 191-197.
- Hannigan, R., Brookfield, M. E., and Basu, A. R., 2010, A detailed $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic curve for the mid-Cincinnatian (Upper Katian-Lower Hirnantian, Upper Ordovician), NE North American Shelf (Ontario, Canada) transition to the Hirnantian glaciation: *Chemical Geology*, v. 277, no. 3-4, p. 336-344.
- Hanor, J. S., and McIntosh, J. C., 2006, Are secular variations in seawater chemistry reflected in the compositions of basinal brines?: *Journal of Geochemical Exploration*, v. 89, no. 1-3, p. 153-156.
- Hard, E. W., 1938a, Mississippian gas sands of central Michigan area: *American Association of Petroleum Geologists Bulletin*, v. 22, no. 2, p. 129-174.
- , 1938b, Mississippian gas sands of central Michigan area, PhD: University of Michigan.
- Hardenberg, H. J., 1943, Developments in Oil and Gas in Michigan in 1942: *American Association of Petroleum Geologists Bulletin*, v. 27, no. 6, p. 822-834.
- , 1944, Developments in Oil and Gas in Michigan in 1943: *American Association of Petroleum Geologists Bulletin*, v. 28, no. 6, p. 760-766.
- , 1945, Developments in Oil and Gas in Michigan in 1944: *American Association of Petroleum Geologists Bulletin*, v. 29, no. 6, p. 693-700.
- , 1946a, Developments in Oil and Gas in Michigan in 1945: *American Association of Petroleum Geologists Bulletin*, v. 30, no. 6, p. 886-894.
- , 1946b, Michigan's Oil and Gas Industry, Michigan Manufacturer & Financial Record, Annual Book of Michigan Industry.
- , 1947, Developments in Oil and Gas in Michigan in 1946: *American Association of Petroleum Geologists Bulletin*, v. 31, no. 6, p. 988-998.
- Harper, R. M., 1985, Bass Islands production in northwestern Pennsylvania: *Pennsylvania Geology*, v. 16, no. 1, p. 7-13.
- Harrell, J. A., Hatfield, C. B., and Gunn, G. R., 1991, Mississippian System of the Michigan Basin; stratigraphy, sedimentology, and economic geology, *in* Caticosinos, P. A., and Daniels, P. A., Jr., eds., *Early Sedimentary Evolution of the Michigan Basin*, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 203-219.
- Harris, D., 1985, Graphic logs of oil shale intervals; Ordovician Collingwood Member and the Devonian Kettle Point and Marcellus Formations: Open File Report - Ontario Geological Survey, p. 225-225.
- Harris, M. T., Kuglitsch, J. J., Watkins, R., Hegrenes, D. P., and Waldhuetter, K. R., 1998, Early Silurian stratigraphic sequences of eastern Wisconsin, *in* Landing, E., and Johnson, M.

- E., eds., *Silurian Cycles - Linkages of Dynamic Stratigraphy with Atmospheric, Oceanic, and Tectonic Changes*, Volume 491: Albany, University of the State of New York, State Education Department and New York State Museum, p. 39-49.
- Harris, M. T., and Waldhuetter, K. R., 1996, *Silurian of the Great Lakes Region, Part 3: Llandoverly Strata of the Door Peninsula, Wisconsin: Contributions in Biology and Geology*, v. 90, p. 1-162.
- Harrison, W. B., III, 1985, Lithofacies and depositional environments of the Burnt Bluff group in the Michigan Basin, *in* Cercone, K. R., and Budai, J. M., eds., *Ordovician and Silurian rocks of the Michigan Basin and its Margins*, Volume 4: Ann Arbor, Michigan Basin Geological Society, p. 95-108.
- , 1987, Michigan's "deep" St. Peter gas play continues to expand: *World Oil Magazine*, p. 56-61.
- , 1991a, Devonian Period: Introduction, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 29-30.
- , 1991b, South Buckeye Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 85-94.
- , 2013, Detroit Salt Mine field trip, Michigan, USA, *Geological Society of America Field Guide*, Volume 31.
- Harrison, W. B., III, and Budai, J. M., 1986, Selected Cored Intervals in Paleozoic Formations of the Michigan Subsurface: Michigan Basin Core Workshop.
- Harrison, W. B., III, and Grammer, G. M., 2012, The Great American Carbonate Bank in the Central Michigan Basin, *in* Derby, J. R., Fritz, R. D., Longacre, S. A., Morgan, W. A., and Stembach, C. A., eds., *The great American carbonate bank: The geology and economic resources of the Cambrian-Ordovician Sauk megasequence of Laurentia*, Volume 98: Houston, AAPG, p. 1049-1062.
- Harrison, W. B., III, Grammer, G. M., and Barnes, D. A., 2009, Reservoir characteristics of the Bass Islands dolomite in Otsego County, Michigan: Results for a saline reservoir CO₂ sequestration demonstration: *Environmental Geosciences*, v. 16, no. 3, p. 139-151.
- Hartig, K., 2000, Early Tidal Flat Dolomitization in the Silurian Byron Formation of the Michigan Basin, BS: Central Michigan University, 53 p.
- Hartig, K., and Benison, K. C., 2001, Early tidal flat dolomitization in the Silurian Byron Formation of the Michigan Basin, *in* Greenstein, B. J., and Carney, C. K., eds., *10th Symposium on the Geology of the Bahamas and Other Carbonate Regions*, p. 78-92.
- Hartsell, M. Y., 1982, Niagara pinnacle reefs of Western Michigan, MS: Michigan State University, 279 p.
- Hasenmueller, N. R., Kepferle, R. C., Matthews, R. D., Pollock, D., and Vyas, K. C., 1983, *Foerstia (Protosalvinia)* in the Devonian shales of the Appalachian, Illinois, and Michigan basins, Eastern United States: *Proceedings - Eastern Oil Shale Symposium*, v. 1983, p. 41-58.
- Hatfield, C. B., 1988, Middle Devonian carbonate rocks and shales of north-central Ohio: *The Ohio Journal of Science*, v. 88, no. 1, p. 18-22.
- Hatfield, C. B., Rohrbacher, T. J., and Floyd, J. C., 1968, Directional properties, paleoslope, and source of the Sylvania Sandstone (Middle Devonian) of southeastern Michigan and northwestern Ohio: *Journal of Sedimentary Research*, v. 38, no. 1, p. 224-228.
- Hathon, C. P., 1979, Origin of Quartz in the Antrim Shale, MS: Michigan State University, 66 p.
- Hautau, G. H., 1952, The Richfield Challenge: Geological Survey Division Progress Report, v. 15, p. 1-7.
- , 1954, Richfield is a major oil zone for Michigan: *World Oil Magazine*, v. 139, no. 7, p. 100, 102-104.
- Hautau, G. H., and Miller, L. S., 1960, Oil and Gas Conservation in Michigan, Supplement to Publication 47: Michigan Geological Survey Division, Publication, v. 47, p. 1-23.

- Haxby, W. F., Turcotte, D. L., and Bird, J. M., 1976a, Thermal and mechanical evolution of the Michigan Basin: *Tectonophysics*, v. 36, p. 57-75.
- , 1976b, Thermal and Mechanical Evolution of the Michigan Basin, *in* Bott, M. H. P., ed., *Developments in Geotectonics*, Volume Volume 12, Elsevier, p. 57-75.
- Hay, R. L., Lee, M. C., Kolata, D. R., Matthews, J. C., and Morton, J. P., 1988, Episodic potassic diagenesis of Ordovician tuffs in the Mississippi Valley area: *Geology*, v. 16, no. 8, p. 743-747.
- Hayden, A., 2012, A localized investigation of high resolution groundwater flow properties of the Saginaw Aquifer Mason, Michigan, MS: Western Michigan University, 73 p.
- Haynes, S. J., 1990, Stratigraphy and depositional environment of the Salina A and B units, Domtar and Westroc gypsum deposits, Algonquin Arch-Niagara Peninsula, Lambeth, ON, Canada (CAN), Ontario Petroleum Institute, Lambeth, ON.
- Haynes, S. J., and Gilbert, D. W., 1999, Vertical and lateral evaporitic facies changes within the Salina Formation: *Annual Conference - Ontario Petroleum Institute*, v. 38, p. 1-15.
- Haynes, S. J., and Hughes-Pearl, J., 1990, Gypsum deposits and stratigraphy of the Salina A and B units, Algonquin Arch; Niagara Peninsula, southwestern Ontario, Lambeth, ON, Canada (CAN), Ontario Petroleum Institute, Lambeth, ON, 31 p.
- Haynes, S. J., and Mostaghel, M. A., 1979, Formation temperature of fluorite in the Lockport Dolomite in Upper New York State as indicated by fluid inclusion studies with a discussion of heat sources - discussion: *Economic Geology*, v. 74, no. 1, p. 154-159.
- Haynes, S. J., and Parkins, W. G., 1992, Stratigraphy of the Cayugan Series; lithofacies of the Bertie and Bass Islands formations; Onondaga Escarpment: *Ontario Geological Survey Miscellaneous Paper*, p. 22-37.
- Haynie, J. M., 2009, Characterization and modeling of petrofacies and pore-volume distribution within a gas-storage reservoir, Ray Reef Field, Southern Michigan Basin, Michigan, MS: University of Colorado, 184 p.
- Hefner, J. H., 1957, A rapid method for the correlation of fine-grained sediments with the aid of the spectrograph as applied to the Mississippian-Devonian sequence in Ogemaw County, Michigan, MS: Michigan State University.
- Heinz, D. R., 1991, Ensley Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 363-370.
- Heller, F. K., 1936, *Geology and economics of the Crystal-Ferris oil and gas field*, MS: University of Michigan.
- Helmboldt, D. E., 1969, Porter Field, *in* Burgess, R. J., ed., *Oil and Gas Fields Symposium*, Volume 1: Lansing, Michigan Basin Geological Society, p. 137-142.
- Henderson, J., 1951, *Ostracod fauna of the Bell Shale Formation of Michigan*, MS: University of Michigan.
- Henderson, W. C., 1988, *A seismic analysis of reefs in the Traverse Limestone of Allegan County, Michigan*, MS: Western Michigan University.
- Henry, W. W., 1949, *An investigation of sub-surface reef conditions in the Traverse Group of Michigan*, MS: Michigan State University, 22 p.
- Herndon, T., 1951, *Niagaran Reefs*, MS: University of Michigan.
- Herringshaw, D. E., and McGowan, D., 1947, *Burying gas in Michigan*: *Public Utilities Fortnightly*, v. 40, p. 471-475.
- Hewitt, D. F., 1960, *Detroit River limestone of the Beachville area, showing drift thickness*: Sudbury, ON, Canada (CAN), Ministry of Northern Development, Mines and Forestry, Sudbury, ON, 1 p.
- , 1962, *Salt in Ontario*: *Industrial Mineral Report*, v. 6, p. 1-38.
- , 1965, *Precambrian-Paleozoic Contact Relationships in Eastern Ontario*, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., *Guidebook: Geology of Central Ontario*, Michigan Basin Geological Society, p. 9-14.

- Hewitt, R. A., and Birker, I., 1986, The *Thallograptus* and *Diplospirograptus* from the Silurian Eramosa Member in Hamilton (Ontario, Canada): Canadian Journal of Earth Sciences, v. 23, no. 6, p. 849-853.
- Hiatt, C. R., 1985, A petrographic, geochemical, and well log analysis of the Utica Shale-Trenton Limestone transition in the northern Michigan Basin, MS: Michigan Technological University, 292 p.
- Hiatt, C. R., Nordeng, S., and Wilson, J. L., 1985, A petrographic and well log analysis of five wells in the Trenton-Utica transition in the northern Michigan Basin: Special Papers - Michigan Basin Geological Society, v. 4, p. 33-43.
- Hickel, P. H., and O'Brien, G. D., 1975, Silurian Reefs of the Great Lakes Region of North America, American Association of Petroleum Geologists Reprint Series, Volume 14: Houston, American Association of Petroleum Geologists, p. 243.
- Hicks, L. E., 1878, The Waverly Group in central Ohio: American Journal of Science, v. 116, p. 216-224.
- Higgins, S. G., 1900, The salt industry in Michigan: Publications of the Michigan Political Science Association, v. 4, p. 1-12.
- Hill, J., 1948, A report on unusual limonite forms from Van Buren County, Michigan: Rocks and Minerals, v. 23, no. 9-10, p. 802-806.
- Hill, J., and Franz, H., 1949, A second report on unusual limonite forms from Van Buren County, Michigan: Rocks and Minerals, v. 24, no. 9-10, p. 458-461.
- Hinze, W. J., 1963, Regional gravity and magnetic anomaly maps of the Southern Peninsula of Michigan: Michigan Geological Survey Report of Investigation, v. 1, p. 1-26.
- Hinze, W. J., Kellogg, R. L., and Merritt, D. W., 1971, Gravity and Aeromagnetic Anomaly Maps of the Southern Peninsula of Michigan Report of Investigation, v. 14, p. 1-16.
- Hinze, W. J., Kellogg, R. L., and O'Hara, N. W., 1975, Geophysical studies of basement geology of Southern Peninsula of Michigan: American Association of Petroleum Geologists Bulletin, v. 59, no. 9, p. 1562-1584.
- Hixon, S. B., 1964, Petrography of the Middle Devonian Bois Blanc Formation of Michigan and Ontario, PhD: University of Michigan, 118 p.
- Hoare, R. D., 1989, Taxonomy and paleoecology of Devonian rostroconch mollusks from Ohio: Journal of Paleontology, v. 63, no. 6, p. 838-846.
- Hoare, R. D., and Steller, D. L., 1969, Inarticulate Brachiopods of the Silica Formation (Devonian), Ohio and Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 22, p. 263-272.
- Hobbs, M. Y., Frape, S. K., Shouakar-stash, O., and McNutt, R. H., 2006, Geochemical evolution of groundwaters in the Michigan and Appalachian basins, southwestern Ontario: Geochimica et Cosmochimica Acta, v. 70, no. 18, Supplement, p. A254.
- Hobbs, R. A., 1949, The application of roundness and sphericity measurements to subsurface samples of the Marshall formation of Western Michigan, MS: Michigan State University, 36 p.
- Hody, H. M., 1954, Bouguer gravity anomalies of southeastern Michigan and the vertical gradient of gravity at Ann Arbor, Michigan, MS: University of Michigan.
- Hoehl, E. J., 1981, Geophysical investigation of the Limestone Mountain Area of Baraga and Houghton Counties, Michigan, MS: Michigan Technological University.
- Hoffmaster, P. J., 1946, Michigan's oil and gas: Michigan Conservation, v. 15, no. 9, p. 6, 14.
- Hofstra, W. E., 1949, The effects of washing oil well cuttings from rotary and cable tool wells as related to sample losses, MS: Michigan State University, 84 p.
- Hogarth, C. G., 1985, Conodont Color Alteration, Organic Metamorphism, and thermal history of the "Trenton Formation," Michigan Basin, MS: Michigan State University, 60 p.
- Hogarth, C. G., and Sibley, D. F., 1985, Thermal history of the Michigan Basin: evidence from conodont coloration index, in Cercone, K. R., and Budai, J. M., eds., Ordovician and

- Silurian Rocks of the Michigan Basin, Volume 4, Michigan Basin Geological Society, p. 45-58.
- Hoholick, J. D., Metarko, T., and Potter, P. E., 1984, Regional variations of porosity and cement; St. Peter and Mount Simon sandstones in Illinois Basin: American Association of Petroleum Geologists Bulletin, v. 68, no. 6, p. 753-764.
- Hoin, S. J., 1983, A high resolution ground magnetic study of part of the Albion-Scipio trend, MS: Western Michigan University, 89 p.
- Holder, C. E., 1948, Salt at Detroit: Michigan Mineralogical Society Publication, v. 2, p. 14-16.
- Holmes, C., 1899, Coal and coal mining in Michigan: Engineering Mining Journal, v. 68, p. 335-336.
- Holmes, J. C., and Douglass, C. C., 1855, Geological Survey: Michigan State Agricultural Society Transactions, v. 6, p. 251-303.
- Holmes, J. C., and Hubbard, B., 1854, Geological Report: Transactions of the State Agricultural Society, v. 5, p. 278-339.
- Holmquest, H. J., Jr., 1952, A statistical morphologic classification of the Paleozoic ostracoda, MS: Michigan State University, 32 p.
- Holst, T. B., 1982, Regional jointing in the northern Michigan Basin: Geology, v. 10, no. 5, p. 273-277.
- Holst, T. B., and Foote, G. R., 1981, Joint orientation in Devonian rocks in the Northern Portion of the Lower Peninsula of Michigan: Geological Society of America Bulletin, v. 92, no. 2, p. 85-93.
- Horowitz, M., 1961, The St. Peter-Glenwood Problem in Michigan, MS: Michigan State University.
- Horton, P. D., 1987, A seismic reflection survey over the Wayne-25 oil field in Cass County, Michigan, MS: Western Michigan University.
- Horvath, A. L., 1957, Stratigraphy and paleontology of the Middle Devonian strata penetrated by core H-2A in Wayne County, Michigan, MS: University of Michigan.
- Houghton, D., 1838, Report of the State Geologist 1838: House, v. 14.
- , 1839, Second Annual Report of the State Geologist 1839: House, v. 23.
- , 1840, Third Annual Report of the State Geologist 1840: House, v. 8.
- , 1841a, Fourth Annual Report of the State Geologist 1841: Joint Documents, v. 11.
- , 1841b, Fourth Annual Report of the State Geologist 1841: House, v. 27.
- Hover, V. C., Peacor, D. R., and Walter, L. M., 1996, Relationship between organic matter and authigenic illite/smectite in Devonian black shales, Michigan and Illinois basins, USA: Special Publication - Society for Sedimentary Geology, v. 55, p. 73-83.
- Howell, P. D., 1993, Styles of Subsidence in the Michigan Basin, PhD: University of Michigan, 276 p.
- Howell, P. D., and Van der Pluijm, B. A., 1990, Early history of the Michigan Basin: Subsidence and Appalachian tectonics: Geology, v. 18, p. 1195-1198.
- , 1999, Structural sequences and styles of subsidence in the Michigan basin: Geological Society of America Bulletin, v. 111, no. 7, p. 974-991.
- Hrabar, S. V., and Potter, P. E., 1969, Lower West Baden (Mississippian) sandstone body of Owen and Greene counties, Indiana: American Association of Petroleum Geologists Bulletin, v. 53, no. 10, p. 2150-2160.
- Huang, R., 2008, Shale-derived dissolved organic matter as a substrate for subsurface methanogenic communities in the Antrim Shale, Michigan Basin, USA, MS: University of Massachusetts, 118 p.
- Hubbard, L. L., 1895, Introduction, on the origin of salt, gypsum and petroleum: American Journal of Science, v. 150, no. 295, p. 71-72.
- Hudson, R. J., 1957, Genesis and depositional history of the Eaton Sandstone, Grand Ledge, Michigan, MS: Michigan State University, 49 p.

- Huff, W. D., and Kolata, D. R., 1990, Correlation of the Ordovician Deicke and Millbrig K-bentonites between the Mississippi Valley and the Southern Appalachians: American Association of Petroleum Geologists Bulletin, v. 74, no. 11, p. 1736-1747.
- Hughes, J., and Wells, J., 1991, Fletcher Pond Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 381-388.
- Hughes, N. C., Gunderson, G. O., and Weedon, M. J., 1997, Circumocular suture and visual surface of "*Cedaria*" *woosteri* (Trilobita, late Cambrian) from the Eau Claire Formation, Wisconsin: Journal of Paleontology, v. 71, no. 1, p. 103-107.
- Huh, J., 1974, Core Examination in Subsurface Laboratory, Mich., United States (USA), Michigan Basin Geological Society, Silurian reef-evaporite relationships, p. 24-30.
- Huh, J. M., 1973, Geology and diagenesis of the Niagaran Pinnacle Reefs in the Northern Shelf of the Michigan Basin PhD: University of Michigan, 253 p.
- Huh, J. M., Briggs, L. I., and Gill, D., 1977, Depositional environments of pinnacle reefs, Niagara and Salina groups, northern shelf, Michigan Basin: Studies in Geology (Tulsa), no. 5, p. 1-21.
- Hull, D. A., 1980, Stratigraphy and petrology of the Newton Creek and Alpena limestones (Middle Devonian) in the Huron Portland Quarry, Alpena, Michigan, MS: Bowling Green State University, 176 p.
- Humphrey, W. E., 1940, Revision of A. E. Strong's types from the Mississippian Point au Gres Limestone at Grand Rapids, MS: University of Michigan.
- Hunt, A. S., 1957, Species of the tabulate coral *Trachypora* from Middle Devonian Traverse Group of Michigan, MS: University of Michigan.
- Hunt, T. S., 1868, Notes on the geology of southwestern Ontario: American Journal of Science, v. 96, no. 138, p. 355-362.
- Hupp, B., 2015, High resolution Conodont biostratigraphy of the Dundee Limestone, Michigan Basin, BS: Ohio Wesleyan University, 25 p.
- Hurley, N. F., and Budros, R., 1990, Albion-Scipio and Stoney Point fields, U.S.A., Michigan Basin *in* Beaumont, E. A., and Foster, N. H., eds., Stratigraphic Traps I, AAPG, p. 1-37.
- Husband, P. M., 1958, A sedimentary and chemical analysis of the Niagara series in Michigan, MS: Michigan State University.
- Hussey, R. C., 1925, The Richmond Formation of Michigan, PhD: University of Michigan, 75 p.
- , 1926, The Richmond Formation of Michigan: Contributions from the Museum of Geology The University of Michigan, v. 2, no. 8, p. 118-187.
- , 1928, Cystoids from the Trenton Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 3, p. 77-79.
- , 1936, The Trenton and Black River rocks of Michigan: Occasional Papers on the geology of Michigan, v. 40, no. 34, pt. III, p. 227-260.
- , 1941, New Species of Fossils from the Middle Ordovician of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 26, no. 3, p. 445-448.
- , 1950, The Ordovician Rocks of the Escanaba-Stonington Area, Michigan Basin Geological Society, Guidebook, The Annual Geological Excursion of the Michigan Geological Society, 41 p.
- , 1952, The Middle and Upper Ordovician rocks of Michigan: Geological Survey Division Publication, v. 46, no. 39, p. 1-89.
- Hutchinson, T. W., 1964, Upper Devonian and Lower Mississippian pectinoid pelecypods from Michigan, Ohio, Indiana, Iowa and Missouri, MS: University of Michigan.
- Hutchinson, T. W., and Stumm, E. C., 1965, Upper Devonian and Lower Mississippian Pectinoid Pelecypods from Michigan, Ohio, Indiana, Iowa and Missouri: Contributions from the Museum of Paleontology The University of Michigan, v. 20, no. 1, p. 1-48.

- Hyde, M. K., 1979, A study of the dolomite/calcite ratios relative to the structures and producing zones of the Kawkawlin Oil Field Bay County, Michigan, MS: Michigan State University, 126 p.
- Ibrahim, A., 1970, The application of the gravity method to mapping bedrock topography in Kalamazoo County, Michigan, MS: Michigan State University.
- Ibrahim, M. S., 2013, Amplitude-versus-angle analysis and wide-angle-inversion of crosswell seismic data in a carbonate reservoir, PhD: Michigan Technological University, 129 p.
- Ilin, D., 2012, Characterization of bacterial community structure in deep subsurface sedimentary core samples from Michigan Basin, Ontario, MS: University of Ottawa (Canada), 89 p.
- Illich, H. A., and Grizzle, P. L., 1983, Comment on "Comparison of Michigan Basin crude oils" by Vogler et al.: *Geochimica et Cosmochimica Acta*, v. 47, p. 1157-1159.
- , 1985, Thermal subsidence and generation of hydrocarbons in Michigan Basin; discussion: *American Association of Petroleum Geologists Bulletin*, v. 69, no. 9, p. 1401-1403.
- Imbrie, J., 1951, Protremate Brachiopods of the Traverse Group "Devonian" of Michigan, PhD: Yale University.
- , 1955, New species of brachiopods from the Traverse Group (Devonian) of Michigan: *American Museum Novitates*, v. 1754, p. 1-7.
- , 1959, Dalmanellacea, Pentameracea, Strophomenacea, Orthotetacea, Chonetacea, and Productacea, Part 1 of Brachiopods of the Traverse Group (Devonian) of Michigan: *Bulletin of the American Museum of Natural History*, v. 116, p. 345-409.
- Imlay, R. W., 1932, *Gypidula petroskeyensis* sp. nov., a new brachiopod from the Traverse Group of Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 4, no. 5, p. 101-104.
- Ingels, J. J. C., 1963, Geometry, paleontology, and petrography of Thornton Reef Complex, Silurian of northeastern Illinois: *American Association of Petroleum Geologists Bulletin*, v. 47, no. 3, p. 405-440.
- Islam, N., 2011, Sonic Log Prediction in Carbonates, MS: Michigan Technological University, 80 p.
- Ives, R. E., 1960, Trenton-Black River Formation developments in Michigan, p. 1-4.
- Ives, R. E., and Ells, G. D., 1962, Developments in Michigan in 1961: *American Association of Petroleum Geologists Bulletin*, v. 46, no. 6, p. 829-841.
- , 1963, Developments in Michigan in 1962: *American Association of Petroleum Geologists Bulletin*, v. 47, no. 6, p. 995-1006.
- , 1964, Developments in Michigan in 1963: *American Association of Petroleum Geologists Bulletin*, v. 48, no. 6, p. 836-845.
- Jackson, D. S., 1985, The Petrology, Porosity and Permeability of the Berea Sandstone (Mississippian) Perry Township, Ashland County, Ohio MS: University of Cincinnati, 112 p.
- Jackson, M., and Van der Voo, R., 1985, A Lower Ordovician paleomagnetic pole from the Oneota Dolomite, Upper Mississippi River valley: *Journal of Geophysical Research*, v. 90, no. B12, p. 10-10,461.
- Jackson, R. P., 1958, Dolomitization and structural relations of the Deep River, North Adams, and Pinconning oil fields, Michigan, MS: Michigan Technological University.
- Jacobson, R. C., 1951, Stratigraphy and fauna of two cores penetrating Middle Devonian formations of Missaukee County, Michigan, MS: University of Michigan.
- Jacoby, C. H., 1969, Correlation, faulting, and metamorphism of Michigan and Appalachian basin salt: *American Association of Petroleum Geologists Bulletin*, v. 53, no. 1, p. 136-154.
- Janssens, A., 1968, Stratigraphy of Silurian and pre-Olenangy Devonian rocks of the South Birmingham Pool area, Erie and Lorain counties, Ohio: *Report of Investigations - Ohio, Division of Geological Survey*, p. 1-20.

- , 1971, Preliminary Report on the Stratigraphy of Upper Silurian Rocks of Western Ohio, *in* Forysth, J. L., ed., *Geology of the Lake Erie Islands and Adjacent Shores*, Michigan Basin Geological Society, p. 30-36.
- , 1974, The evidence for Lockport-Salina facies changes in the subsurface of northwestern Ohio, Mich., United States (USA), Michigan Basin Geological Society, Silurian reef-evaporite relationships, 79-88.
- Janssens, A., 1997, Stratigraphy of post-Salina "Big Lime" (Silurian-Devonian) in Northeast Ohio with emphasis on distribution of sandstone; a progress report: Ohio Geological Society Annual Technical Symposium, v. 5, p. 27-47.
- Jeffs, B. G., 1993, Stratigraphic and petrographic investigation of the Sylvania Sandstone (Middle Devonian) in the subsurface of the Michigan Basin, MS: Bowling Green State University, 158 p.
- Jenny, W. P., 1934, Magnetic vector study of Kentucky and southern Michigan: American Association of Petroleum Geologists Bulletin, v. 18, no. 1, p. 97-105.
- Jensen, K., and Wicander, R., 2011, *Pseudoatrypa keslingi*, a new Middle Devonian brachiopod from the Long Lake Limestone, Alpena County, Michigan, USA: Contributions from the Museum of Paleontology The University of Michigan, v. 32, no. 4, p. 49-58.
- Jin, J., and Caldwell, W. G. E., 1990, Early Silurian pentameracean distribution in Canada, *in* MacKinnon, D. I., Lee, D., and Dixon, J., eds., *Brachiopods through time*: Balkema, p. 311-318.
- Jodry, R. L., 1954, A rapid method for determining the magnesium/calcium ratios of well samples and its use as an aid in predicting structure and secondary porosity in calcareous formations, MS: Michigan State University.
- , 1955, Rapid method for determining magnesium-calcium ratios of well samples and its use in predicting structure and secondary porosity in calcareous formations: American Association of Petroleum Geologists Bulletin, v. 39, no. 4, p. 493-511.
- Jodry, R. L., 1957, Reflection of possible deep structure by Traverse Group facies changes in western Michigan: American Association of Petroleum Geologists Bulletin, v. 41, no. 12, p. 2677-2694.
- Jodry, R. L., 1969, Growth and dolomitization of Silurian reefs, Saint Clair County, Michigan: American Association of Petroleum Geologists Bulletin, v. 53, no. 4, p. 957-981.
- Johnson, A., and Sorensen, H., 1978, Drill core investigation of the Fiborn Limestone Member in Schoolcraft County, Mackinac and Chippewa counties, Michigan: Report of Investigation - Geological Survey Division, no. 18, 51 p.
- Johnson, A. M., Kesling, R. V., Lilienthal, R. T., and Sorensen, H. O., 1979, The Maple Block Knoll Reef in the Bush Bay Dolostone (Silurian, Engadine Group), Northern Peninsula of Michigan, Ann Arbor, University of Michigan, Museum of Paleontology Papers on Paleontology, 33 p.
- Johnson, A. M., and Sorensen, H. O., 1981, Evaluation of high-purity limestones and dolostones in Northern Michigan: Geological Society of America Bulletin, v. 92, no. 9, p. 634-640.
- Johnson, C. B., Marshall, J. R., and Mazzullo, J. M., 1989, St-Peter Sandstone - a Closer Look - Discussion: Journal of Sedimentary Petrology, v. 59, no. 3, p. 494-497.
- Johnson, C. L., and Simo, J. A., 2002, Sedimentology and sequence stratigraphy of a Lower Ordovician mixed siliciclastic-carbonate system, Shakopee Formation, Fox River Valley of East-Central Wisconsin: Geoscience Wisconsin, v. 17, no. 3, p. 21-33.
- Johnson, C. M., and Winter, B. L., 1999, Provenance analysis of lower Paleozoic cratonic quartz arenites of the North American midcontinent region: U-Pb and Sm-Nd isotope geochemistry: Geological Society of America Bulletin, v. 111, no. 11, p. 1723-1738.
- Johnson, H., 1934, Stratigraphy and Paleontology of the Cataract Formation in Ontario, PhD: University of Toronto, 29 p.

- Johnson, K. F., 1971, The interrelationship of the lower Salina Group and Niagaran reefs in Saint Clair and Macomb counties, Michigan, MS: Michigan State University, 68 p.
- Johnson, K. S., 2002, Karst in evaporite rocks of the United States: Carbonates and Evaporites, v. 17, no. 2, p. 90-97.
- , 2005, Subsidence hazards due to evaporite dissolution in the United States: Environmental Geology, v. 48, no. 3, p. 395-409.
- Johnson, K. S., and Gonzales, S., 1976, Geology and Salt Deposits of the Michigan Basin: Office of Waste Isolation, 60 p..
- Johnson, K. S., and Gonzales, S., 1978, Michigan Basin, Salt Deposits in the United States and regional geologic characteristics important for storage of radioactive waste, Union Carbide Corporation Nuclear Division and the Office of Waste Isolation, U.S. Department of Energy, p. 13-38.
- Johnson, M. E., 1980, Paleogeological structure in early Silurian platform seas of the North American midcontinent: Palaeogeography Palaeoclimatology Palaeoecology, v. 30, p. 191-216.
- , 1981, Correlation of Lower Silurian strata from the Michigan Upper Peninsula to Manitoulin Island: Canadian Journal of Earth Sciences, v. 18, no. 5, p. 869-883.
- Johnson, M. E., 1987, Extent and bathymetry of North American Platform Seas in the Early Silurian: Paleooceanography, v. 2, no. 2, p. 185-211.
- Johnson, M. E., and Campbell, G. T., 1980, Recurrent carbonate environments in the Lower Silurian of northern Michigan and their inter-regional correlation: Journal of Paleontology, v. 54, p. 1041-1057.
- Johnson, M. E., and Colville, V. R., 1982, Regional integration of evidence for evolution in the Silurian *Pentamerus-Pentameroides* lineage: Lethaia, v. 15, p. 41-54.
- Johnson, M. F., 1998, The sedimentology of the lower Silurian Whirlpool Sandstone in subsurface Lake Erie, Ontario, MS: Brock University, 186 p.
- Johnson, R. L., 1974, Geology and environmental interpretation of the Upper Cayugan Bass Islands Dolomite, southeastern Michigan, MS: University of Michigan, 1-89 p.
- Kahle, C. F., 1974, Nature and significance of Silurian Rocks at Maumee Quarry, Ohio, Mich., United States (USA), Michigan Basin Geological Society, Silurian reef-evaporite relationships, p. 31-54.
- , 1978, Patch reef development and effects of repeated subaerial exposure in Silurian shelf carbonates, Maumee, Ohio: Field Excursions from the University of Michigan, v. 5.
- Kahle, C. F., 1994, Facies and evolution of Silurian coral-microbialite reef complex, Maumee, Ohio, USA: Journal of Sedimentary Research, v. 64, no. 4a, p. 711-725.
- Kahle, C. F., 2001, Biosedimentology of a Silurian thrombolite reef with meter-scale growth framework cavities: Journal of Sedimentary Research, v. 71, no. 3, p. 410-422.
- , 2002, Seismogenic deformation structures in microbialites and mudstones, Silurian Lockport Dolomite, northwestern Ohio, USA: Journal of Sedimentary Research, v. 72, no. 1, p. 201-216.
- Kahle, C. F., and Floyd, J. C., 1972, Geology of Silurian Rocks, Northwestern Ohio, United States (USA), Ohio Geol. Soc., Field Trip Guideb., Geology of Silurian Rocks, Northwestern Ohio, 91 p.
- Kahle, C. F. J., 2009, Subaerial Gutter Marks. Raindrop Impressions, Scour Marks and Other Sedimentary Structures, Silurian Tymochtee Dolomite, Waterville, Ohio: Carbonates and Evaporites, v. 24, no. 1, p. 33-44.
- , 2012, Scanning electron microscopy of pulverulite in the Silurian Lockport Dolomite near Rocky Ridge, OH: Carbonates & Evaporites, v. 27, no. 1, p. 3-8.
- Kalliokoski, J., and Welch, E. J., 1976, Magnitude and Quality of Michigan's Coal Reserves: U.S. Bureau of Mines Open File Report, v. OFR-102-76.

- , 1977, Magnitude and quality of Michigan's coal reserves: U.S. Bureau of Mines Open File Report, v. OFR-102-76, p. 1-21.
- Kamin, T. C., and Campbell, W. M., 1991, Akron Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 321-342.
- Kaminski, E., and Jaupart, C., 2000, Lithosphere structure beneath the Phanerozoic intracratonic basins of North America: Earth and Planetary Science Letters, v. 178, no. 1-2, p. 139-149.
- Katz, D. L., and Lundy, C. L., 1982, Absence of connate water in Michigan reef gas reservoirs; an analysis: American Association of Petroleum Geologists Bulletin, v. 66, no. 1, p. 91-98.
- Kauffman, E. G., 1956, The stratigraphy and paleontology of the Buss-Halb unit no. 1 well core, Freedom Twp., Washtenaw County, Michigan, MS: University of Michigan.
- Kaufmann, D. W., and Slawson, C. B., 1950, Ripple mark in Rock Salt of the Salina Formation: Journal of Geology, v. 58, no. 1, p. 24-29.
- Kaufmann, R. S., Frape, S. K., McNutt, R., and Eastoe, C., 1993, Chlorine stable isotope distribution of Michigan Basin formation waters: Applied Geochemistry, v. 8, no. 4, p. 403-407.
- Kavary, E., 1959, Study of the two new species of ostracods of the Middle-Devonian genus *Glyptapleura* from Michigan and Ohio, MS: University of Michigan.
- Kay, G. M., 1937, Stratigraphy of the Trenton Group: Geological Society of America Bulletin, v. 48, p. 233-302.
- , 1944, Distribution of *Escharopora hogbeni* Fritz: Journal of Paleontology, v. 18, no. 6, p. 560-561.
- Keck, W. E., and Jasberg, P., 1938, A study of the floatative properties of gypsum: American Institute of Mining Engineers Transactions, v. 129, p. 218-234.
- Keck, W. G., 1938, Geophysical Measurements in Livingston County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 463-476.
- Keith, B. D., 1985, Facies, diagenesis and the upper contact of the Trenton Limestone of northern Indiana, *in* Cercone, K. R., and Budai, J. M., eds., Ordovician and Silurian Rocks of the Michigan Basin, Volume 4, Michigan Basin Geological Society, p. 15-32.
- , 1986, Reservoirs resulting from facies-independent dolomitization: case histories from the Trenton and Black River carbonate rocks of the Great Lakes Area: Carbonates & Evaporites, v. 1, no. 1, p. 74-82.
- , 1988, Reservoirs resulting from facies-independent dolomitization: Case histories from the Trenton and Black River Carbonate rocks of the Great Lakes area, *in* Keith, B. D., ed., The Trenton Group (Upper Ordovician Series) of Eastern North America, Volume 29, AAPG, p. 267-276.
- Keller, P. H., 1965, Middle Devonian stromatoporoids of northwestern Ohio, MA: Bowling Green State University.
- Kelley, R. W., 1949, Silurian stratigraphy of Cockburn Island, Ontario, MS Wayne State university, 97 p.
- Kelley, S. R., 2010, Geological controls on reservoir quality for carbon sequestration in the Mount Simon Sandstone, Michigan Basin, USA, MS: Western Michigan University, 160 p.
- Kelley, W. A., 1933, Michigan Academy Field Excursion for 1933, p. 1-7.
- , 1954, Notes on the correlation of the Silurian of Manitoulin with the Silurian of Michigan, *in* Sanford, J. T., and Moseley, J. R., eds., The Stratigraphy of Manitoulin Island, Ontario, Canada, Michigan Geological Society, p. 21-22.
- Kellogg, R. L., 1971, An aeromagnetic investigation of the Southern Peninsula of Michigan, PhD: Michigan State University, 172 p.

- Kellum, L. B., 1958, The Dundee limestone in Manistee County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 43, p. 39-49.
- Kelly, J., 1992, Improved techniques boost Antrim Formation wells: Northeast Oil World, v. 12, no. 9, p. 16-18, 20.
- Kelly, J. L., Fu, B., Kita, N. T., and Valley, J. W., 2007, Optically continuous silcrete quartz cements of the St. Peter Sandstone: High precision oxygen isotope analysis by ion microprobe: Geochimica et Cosmochimica Acta, v. 71, p. 3812-3832.
- Kelly, W. A., 1928, The Carboniferous Fauna of Grand Ledge: Papers of the Michigan Academy of Science, Arts and Letters, v. 8, p. 293-295.
- , 1930, Lower Pennsylvanian Faunas from Michigan: Journal of Paleontology, v. 4, no. 2, p. 129-151.
- Kelly, W. A., 1931, A review of the stratigraphy of the Saginaw Formation: Papers of the Michigan Academy of Science, Arts and Letters, v. 14, p. 453-469.
- Kelly, W. A., 1933, Pennsylvanian stratigraphy near Grand Ledge, Michigan: Journal of Geology, v. 41, no. 1, p. 77-88.
- , 1936, The Pennsylvanian System in Michigan: Occasional Papers on the geology of Michigan, v. 40, no. 34, part II, p. 149-226.
- , 1940, Michigan Academy of Science, Arts and Letters, Section of Geology and Mineralogy Guidebook: 10th Annual Excursion to Afton-Onaway District, p. 1-13.
- , 1949, The Traverse Group of the Northern Part of the Southern Peninsula of Michigan, Guidebook, The Annual Geological Excursion of the Michigan Geological Society, Michigan Basin Geological Society, 39 p.
- Kelly, W. A., and Beutner, E. L., 1931, Heavy minerals from some Pennsylvanian Sandstones of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 14, p. 471-474.
- Kelly, W. A., and Smith, G. W., 1947, Stratigraphy and structure of Traverse Group in Afton-Onaway area, Michigan: American Association of Petroleum Geologists Bulletin, v. 31, no. 3, p. 447-469.
- Kenaga, S. G., and Sellepack, S. M., 1995, Fossils from the gypsum mines under Grand Rapids, Michigan: Michigan Academician, v. 27, p. 272-272.
- Kendall, A., Kesler, S. E., and Keoleian, G. A., 2008, Geologic vs. geographic constraints on cement resources: Resources Policy, v. 33, p. 160-167.
- Kersting, C. C., 1953, Stratigraphy of the Delray core, Wayne County, Michigan, MS: University of Michigan.
- Kesling, R. V., 1951, A new genus and species of Primitiopsis Ostracod from the Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 8, p. 221-230.
- Kesling, R. V., 1952a, Ostracods of the families Leperditellidae, Primitiidae, Drepanellidae, Aechminidae, and Kirkbyidae from the Middle Devonian Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 2, p. 21-44.
- , 1952b, Ostracods of the family Hollinidae from the Ferron Point Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 3, p. 45-57.
- , 1953, A new beyrichiid ostracod from the Middle Devonian Rockport Quarry Limestone of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 10, p. 221-229.
- , 1954a, A new species of *Phlyctiscapha* from the Middle Devonian Ferron Point Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 11, no. 9, p. 187-192.

- , 1954b, Ostracods from the Middle Devonian Dundee Limestone in northwestern Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 11, no. 8, p. 167-186.
- , 1958a, A Middle Devonian species of the ostracod genus *Antiparaparchites*: Contributions from the Museum of Paleontology The University of Michigan, v. 14, no. 12, p. 191-200.
- Kesling, R. V., 1958b, A new and unusual species of the Ostracod genus *Herrmannina* from the Middle Silurian Hendricks Dolomite of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 14, p. 143-148.
- , 1960a, Middle Ordovician Black River Ostracods from Michigan Part II, *Levisulculus* and *Eurychilina*: Contributions from the Museum of Paleontology The University of Michigan, v. 15, no. 15, p. 349-363.
- , 1960b, Middle Ordovician Black River Ostracods from Michigan Part III, *Platybolbina*: Contributions from the Museum of Paleontology The University of Michigan, v. 15, no. 16, p. 365-385.
- , 1961a, A new *Glyptocystites* from the Middle Ordovician Strata of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 17, p. 59-76.
- Kesling, R. V., 1961b, A new species of *Billingsites*, an ascoceratid cephalopod, from the Upper Ordovician Ogontz Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 3, p. 77-121.
- , 1963, Occurrence and variations of *Botryocrinus thomasi* Laudon in the Thunder Bay Limestone of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 18, no. 15, p. 231-244.
- , 1964a, A new species of *Melocrinites* from the Middle Devonian Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 19, no. 7, p. 89-103.
- , 1964b, Two new crinoids of the family Periechocrinitidae from the Middle Devonian Thunder Bay Limestone of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 19, no. 11, p. 143-155.
- , 1965, Nature and occurrence of *Gennaeocrinus goldringae* Ehlers: Contributions from the Museum of Paleontology The University of Michigan, v. 19, no. 16, p. 265-280.
- , 1966, *Trochiliscus bellatulus* Peck from the Middle Devonian Dundee Limestone of northwestern Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 20, no. 7, p. 179-194.
- Kesling, R. V., 1968a, *Ameliacrinus benderi*, a new dicyclic camerate crinoid from the Middle Devonian Silica Formation in Northwestern Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 22, p. 155-162.
- , 1968b, *Gennaeocrinus chilmanae*, a new crinoid from the Middle Devonian Silica Formation in Southeastern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 22, p. 127-131.
- Kesling, R. V., 1968c, *Logocrinus conicus*, a simple new Middle Devonian inadunate crinoid from Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 22, no. 12, p. 163-167.
- Kesling, R. V., 1971a, *Dolatocrinus kutasii*, a new crinoid from the Middle Devonian Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 23, p. 201-211.
- , 1971b, *Michiganaster inexpectatus*, a new many-armed starfish from the Middle Devonian Rogers City Limestone of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 23, p. 247-262.
- , 1973a, *Euglyphella bellensis*, a new Middle Devonian ostracod from Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 24, p. 65-67.

- , 1973b, *New botryocrinus* and *glossocrinus* from the Middle Devonian Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 24, no. 5, p. 31-46.
- , 1974a, Itinerary, Mich., United States (USA), Michigan Basin Geological Society, Silurian reef-evaporite relationships, p. 89-111.
- , 1974b, Silurian Reef-Evaporite Relationships, Michigan Basin Geological Society, 111 p.
- , 1975, Revision of Upper Ordovician and Silurian rocks of the Northern Peninsula of Michigan: Papers on Paleontology, no. 9, p. 32-32.
- , 1978, Strata of the middle Devonian Silica Formation: Field Excursions from the University of Michigan, p. 3-33.
- Kesling, R. V., Abdul-Razzaq, S., Devore, C. H., Lattanzi, R. D., and Fini, J. M., 1973a, Growth in Two Populations of the Crinoid *Eucalyptocrinites crassus*; Observations on Evolution of Calycine Appendages in the Crinoid *Gilbertsocrinus*; A Cystoid Plate from the Lower Part of the Petoskey Formation: Papers on Paleontology, v. 6, p. 1-59.
- Kesling, R. V., Chase, T. L., Devore, C. H., and Lattanzi, R. D., 1973b, A new species of *Fletcheria* from the middle Silurian Fiborn Limestone of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 24, no. 9, p. 85-99.
- Kesling, R. V., and Chilman, R. B., 1975, Strata and Megafossils of the Middle Devonian Silica Formation: Museum of Paleontology, Papers on Paleontology, v. 8, p. 1-408.
- , 1978, Ostracods of the Middle Devonian Silica Formation Museum of Paleontology, Papers on Paleontology, v. 1 and 2.
- , 1987, Dimorphic Middle Devonian Paleocopan Ostracoda of the Great Lakes Region: Papers on Paleontology, v. 25, p. 1-226.
- Kesling, R. V., Crafts, F. S., Darby, D. G., Shubak, K. E., and Smith, R. N., 1960, Middle Ordovician Black River Ostracods from Michigan, Introduction and Part I. The nature of *Macronotella*: Contributions from the Museum of Paleontology The University of Michigan, v. 15, p. 293-314.
- Kesling, R. V., and Ehlers, G. M., 1958, The Edriosteroid *Lepidodiscus squamosus* (Meek & Worthen); *Timeischytes*, A New Genus of Hemicystitid Edriosteroid from the Middle Devonian Four Mile Dam Limestone of Michigan: Miscellaneous Papers of the Museum of Paleontology, University of Michigan, v. 21, p. 923-936.
- Kesling, R. V., and Graham, A., 1962, *Ischadites* is a dasycladacean alga: Journal of Paleontology, v. 36, no. 5, p. 943-952.
- Kesling, R. V., Hall, D. D., and Melik, J. C., 1962, Middle Ordovician Black River ostracods from Michigan Part IV. Species of *Colacchilina* (New Genus), *Laccochilina*, and *Hesperidella*: Contributions from the Museum of Paleontology The University of Michigan, v. 17, p. 205-213.
- Kesling, R. V., and Hussey, R. C., 1953, A new family and genus of ostracod from the Ordovician Bill's Creek Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 11, no. 4, p. 77-95.
- Kesling, R. V., Johnson, A. M., and Sorensen, H. O., 1976, Devonian Strata of the Afton-Onaway Area, Michigan: Museum of Paleontology, Papers on Paleontology, v. 17, p. 1-149.
- Kesling, R. V., and Kilgore, J. E., 1952, Ostracods of the families Leperditellidae, drepanellidae, Glyptopleuridae, Kloedenellidae, Bairdiidae, Barychilinidae, and Thlipsuridae from the Genshaw Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 1, p. 1-19.
- Kesling, R. V., and McMillan, G. W., 1951, Ostracods of the family Hollinidae from the Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 9, no. 2, p. 45-81.

- Kesling, R. V., and Meyer, D. L., 1963, The crinoid *Opsiocrinus mariae* Kier in the Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 18, no. 10, p. 177-184.
- Kesling, R. V., and Mintz, L. W., 1963, Species of the crinoid *Dolatocrinus* from the Middle Devonian Dock Street Clay: Contributions from the Museum of Paleontology The University of Michigan, v. 18, p. 67-100.
- Kesling, R. V., Segall, R. T., and Sorensen, H. O., 1974, Devonian strata of Emmet and Charlevoix Counties, Michigan: Papers on Paleontology, v. 7, p. 1-187.
- Kesling, R. V., and Smith, R. N., 1962, *Gennaeocrinus variabilis*, a new species of crinoid from the Middle Devonian Bell Shale of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 6, p. 173-194.
- , 1963, The crinoid *Synbathocrinus* in the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 18, no. 11, p. 185-196.
- Kesling, R. V., and Soronen, G. C., 1957, The ontogeny and ecology of *Welleria aftonensis* Warthin, a Middle Devonian Ostracod from the Gravel Point Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 14, p. 41-55.
- Kesling, R. V., and Tabor, N. R., 1952, Two new species of ostracods from the Genshaw Formation (Middle Devonian) of Michigan: Journal of Paleontology, v. 26, no. 5, p. 761-763.
- , 1953, Ostracods of the family Hollinidae from the Genshaw Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 5, p. 83-100.
- Kesling, R. V., and Weiss, M., 1953, Ostracods from the Norway Point Formation of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 11, p. 33-76.
- Keyes, S. W., and Pitrat, C. W., 1978, Spiriferid brachiopods from the Traverse Group of Michigan; Cyrtinacea: Journal of Paleontology, v. 52, no. 2, p. 221-233.
- Kiddoo, J. G., 1969, Peters Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 131-136.
- Kier, P. M., 1951, Echinoderms of the Middle Devonian Silica Formation of Ohio, MS: University of Michigan.
- , 1952, Echinoderms of the Middle Devonian Silica Formation of Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 10, p. 59-81.
- Kilbourne, D. E., 1948a, The Origin and development of the Howell Anticline in Michigan, MS: Michigan State University, 120 p.
- , 1948b, Origin of the Howell Anticline: Compass, v. 25, no. 3, p. 132-138.
- Kilgore, J. E., 1951, Ostracods of the families Leperditellidae, Drepanellidae, Glyptopleuridae, Kloedenellidae, Bairdiidae, Barychilinidae, and Thlipsuridae from the Genshaw formation of Michigan, MS: University of Michigan.
- Kilgour, W. J., 1963, Lower Clinton (Silurian) relationships in western New York and Ontario: Geological Society of America Bulletin, v. 74, no. 9, p. 1127-1141.
- , 1972, Late Lower and Early Upper Silurian Relationships of Western New York and Ontario, *in* Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society, p. 68-78.
- Kim, K., and Blaisdell, G. L., 1979, Influence of the weak bedding plane in Michigan Antrim Shale on Laboratory Hydraulic fracture orientation: Topical Report Department of Energy, 79 p.
- Kim, K., and Istvan, L. B., 1978, Environmental monitoring and analysis in support of Antrim Oil Shale research: U.S. Department of Energy Topical Report, p. 1-101.

- Kim, K. H., 1992, A microfacies study of the sedimentology and diagenesis of the Formosa Reef Limestone (Middle Devonian), southwestern Ontario, MS: University of Toronto (Canada), 376 p.
- Kinder, A. S., 1954, A regional vertical magnetometer survey of Livingston County, Michigan, MS: University of Michigan.
- Kinsland, G. L., 1977, Formation temperature of fluorite in Lockport Dolomite in Upper New York State as indicated by fluid inclusion studies with a discussion of heat sources: *Economic Geology*, v. 72, no. 5, p. 849-854.
- , 1979, Formation temperature of fluorite in Lockport Dolomite in Upper New York State as indicated by fluid inclusion studies with a discussion of heat sources - reply: *Economic Geology*, v. 74, no. 1, p. 159-164.
- Kirk, E., 1945, Four new genera of camerate crinoids from the Devonian: *American Journal of Science*, v. 243, no. 6, p. 341-355.
- , 1946, A new species of *Dolatocrinus* from the Traverse (Middle Devonian) of Michigan: *Journal of Paleontology*, v. 20, no. 3, p. 267-268.
- , 1948, Two new inadunate crinoids genera from the Middle Devonian: *American Journal of Science*, v. 246, no. 11, p. 701-710.
- Kirk, M. F., Martini, A. M., Breecker, D. O., Colman, D. R., Takacs-Vesbach, C., and Petsch, S. T., 2012, Impact of commercial natural gas production on geochemistry and microbiology in a shale-gas reservoir: *Chemical Geology*, v. 332, p. 15-25.
- Kirschner, J. P., and Barnes, D. A., 2009, Geological sequestration capacity of the Dundee Limestone, Michigan Basin, United States: *Environmental Geosciences*, v. 16, no. 3, p. 127-138.
- Kirshke, W. H., 1962, A petrographic core analysis of the Lower and Middle Ordovician rocks, Pulaski field, Jackson County, of Michigan, MS: Michigan State University.
- Kitchin, S. L., 1993, Groundwater chemistry analysis of the Saginaw Formation in Delhi Township, Michigan, MS: Western Michigan University, 135 p.
- Klapper, G., and Oliver, W. A., 1995, The Detroit River Group is Middle Devonian - discussion on early Devonian age of the Detroit River Group, inferred from Arctic stromatoporoids: *Canadian Journal of Earth Sciences*, v. 32, no. 7, p. 1070-1073.
- Klima, J. S., and Ewbank, G. M., 1991, Onondaga 21A Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society*, p. 255-262.
- Kline, V. H., 1933, Revision of Alexander Winchell's types of brachiopods from the Middle Devonian Traverse Group rocks of Michigan, MS: University of Michigan.
- , 1935, Stratigraphy and paleontology of the Silica Formation of Southeastern Michigan, PhD: University of Michigan.
- Kluessendorf, J. J., Mikulic, D. G., and Carman, M. R., 1988, Distribution and depositional environments of the westernmost Devonian rocks in the Michigan Basin: *Memoir - Canadian Society of Petroleum Geologists*, v. 14, Vol. 1, p. 251-264.
- Knapp, T. S., 1947, A Theory of Rogers City and Dundee Relationships in Central Michigan: *Sohio Petroleum Company*, 9 p.
- Knight, J. B., 1947, Bellerophont muscle scars: *Journal of Paleontology*, v. 21, no. 3, p. 264-267.
- Knowles, S. P., 1991, Stoney Point Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society*, p. 311-318.
- Koch II, W. F., 1978, Brachiopod paleoecology, paleobiogeography, and biostratigraphy in the Upper Middle Devonian of Eastern North America: An ecofacies model for the Appalachian, Michigan and Illinois Basins, PhD: Oregon State University, 295 p.

- Koch, W. F., II, 1981, Brachiopod community paleoecology, paleobiography and depositional topography of the Devonian Onondaga Limestone and correlative strata in Eastern North America: *Lethaia*, v. 14, no. 2, p. 83-103.
- Kolata, D. R., Huff, W. D., and Bergstrom, S. M., 1996, Ordovician K-bentonites of Eastern North America, Boulder, Geological Society of America, Geological Society of America Special Paper, 84 p.
- , 2001, The Ordovician Sebree Trough: An oceanic passage to the Midcontinent United States: *Geological Society of America Bulletin*, v. 113, no. 8, p. 1067-1078.
- Komar, C. A., 1981, Evaluation of Devonian shale potential in the Michigan Basin, DOE/METC Report, v. 123, 26 p.
- Konstantinou, A., Wirth, K. R., Vervoort, J. D., Malone, D. H., Cameron, D., and Craddock, J. P., 2014, Provenance of Quartz Arenites of the Early Paleozoic Midcontinent Region, USA: *Journal of Geology*, v. 122, no. 2, p. 201-216.
- Kor, P. S. G., and Cowell, D. W., 1998, Evidence for catastrophic subglacial meltwater sheetflood events on the Bruce Peninsula, Ontario: *Canadian Journal of Earth Sciences*, v. 35, no. 10, p. 1180-1202.
- Kowalski, J. J., 1967, Cambro-Ordovician Exposures in the Eastern Upper Peninsula of Michigan, in Ostrom, M. E., and Slaughter, A. E., eds., *Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan*, Michigan Basin Geological Society, p. 67-78.
- Kramer, J. R., 1954, The spectrochemical analysis of limestone and dolomite, MS: University of Michigan.
- Kramer, J. R., 1965, History of sea water. Constant temperature-pressure equilibrium models compared to liquid inclusion analyses: *Geochimica et Cosmochimica Acta*, v. 29, no. 8, p. 921-945.
- Kraus, E. H., 1905a, On the Occurrence and Distribution of Celestite-Bearing Rocks: *American Journal of Science*, v. 169, no. 112, p. 286-293.
- , 1905b, On the Occurrence and Distribution of Celestite-Bearing Rocks: Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 29-29.
- , 1905c, On the Origin of the Sulphur Deposits at the Woolmuth Quarry, Monroe Co., Michigan: Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 26-29.
- Kraus, E. H., and Hunt, W. F., 1906a, The occurrence of sulphur and celestite at Maybee, Michigan: *American Journal of Science*, v. 171, no. 123, p. 237-244.
- , 1906b, The occurrence of sulphur and celestite at Maybee, Michigan: *Zeitschrift für Kristallographie und Mineralogie*, v. 42, p. 1-12.
- Kropschot, R. E., 1953, A quantitative sedimentary analysis of the Mississippian deposits in the Michigan Basin, MS: Michigan State University, 57 p.
- Krushensky, R. D., 1956, Insoluble residues and stratigraphy of a Trenton-Black River section from the Northville pool, Michigan, MS: Wayne State University, 69 p.
- Kuglitsch, J. J., 2000, Correlation of the Silurian rocks of southeastern and northeastern Wisconsin using conodonts and conodont strontium isotope ratios and proposed conodont and ostracode biofacies models for the environs of the Middle Aeronian Michigan Basin, PhD: University of Wisconsin - Madison, 349 p.
- Kunasz, I. A., 1968, Significance of laminations in the upper Silurian evaporite deposit of the Michigan Basin, MS: Pennsylvania State University.
- Kunert, R., Coniglio, M., and Jowett, E. C., 1998, Controls and age of cavernous porosity in Middle Silurian dolomite, southern Ontario: *Canadian Journal of Earth Sciences*, v. 35, no. 9, p. 1044-1053.
- KunleDare, M. A., 2005, Petrographic investigation into the development of secondary porosity in sandstones: A case study of the Cambrian Mount Simon and Galesville Sandstones, Illinois Basin, PhD: University of Missouri - Rolla, 199-199 p. p.

- Kyle, D. H., 1958, Possible source rocks for oils in the Michigan basin, MS: University of Wisconsin.
- La Fortune, I. A., 1982, An investigation of the Cabot Head Formation of southeastern Ontario along the Niagara Escarpment, MS: Wayne State University, 132 p.
- La Rocque, A., 1946, New genera and species of Mollusca from the Middle Devonian of Michigan and Manitoba, MS: University of Michigan.
- , 1948, Pre-Traverse Devonian Pelecypods of Michigan, PhD: University of Michigan.
- , 1949, New uncoiled gastropods from the Middle Devonian of Michigan and Manitoba: Contributions from the Museum of Paleontology The University of Michigan, v. 7, p. 113-122.
- , 1950, Pre-Traverse Devonian Pelecypods of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 7, p. 271-366.
- Labotka, D. M., Panno, S. V., Locke, R. A., and Freiburg, J. T., 2015, Isotopic and geochemical characterization of fossil brines of the Cambrian Mt. Simon Sandstone and Ironton–Galesville Formation from the Illinois Basin, USA: *Geochimica et Cosmochimica Acta*, v. 165, p. 342-360.
- Lahee, F. H., 1938, Further data on wildcat drilling in 1937: *American Association of Petroleum Geologists Bulletin*, v. 22, no. 9, p. 1231-1235.
- , 1939, Wildcat drilling in 1938: *American Association of Petroleum Geologists Bulletin*, v. 23, no. 6, p. 789-794.
- , 1940, Wildcat drilling in 1939: *American Association of Petroleum Geologists Bulletin*, v. 24, no. 6, p. 953-958.
- , 1941, Wildcat drilling in 1940: *American Association of Petroleum Geologists Bulletin*, v. 25, no. 6, p. 997-1003.
- , 1942, Wildcat drilling in 1941 with comments on discovery rate: *American Association of Petroleum Geologists Bulletin*, v. 26, no. 6, p. 969-982.
- , 1943, Wildcat drilling in 1942: *American Association of Petroleum Geologists Bulletin*, v. 27, no. 6, p. 715-729.
- , 1944, Exploratory drilling in 1943: *American Association of Petroleum Geologists Bulletin*, v. 28, no. 6, p. 701-721.
- , 1945a, Exploratory drilling in 1944: *American Association of Petroleum Geologists Bulletin*, v. 29, no. 6, p. 629-645.
- , 1945b, Review of exploratory drilling statistics, 1938-1944: *American Association of Petroleum Geologists Bulletin*, v. 29, no. 11, p. 1581-1592.
- , 1946, Exploratory drilling in 1945: *American Association of Petroleum Geologists Bulletin*, v. 30, no. 6, p. 813-828.
- , 1947, Exploratory drilling in 1946: *American Association of Petroleum Geologists Bulletin*, v. 31, no. 6, p. 917-930.
- , 1948, Exploratory drilling in 1947: *American Association of Petroleum Geologists Bulletin*, v. 32, no. 6, p. 851-868.
- , 1949, Exploratory drilling in 1948: *American Association of Petroleum Geologists Bulletin*, v. 33, no. 6, p. 783-804.
- , 1950, Exploratory drilling in 1949: *American Association of Petroleum Geologists Bulletin*, v. 34, no. 6, p. 995-1013.
- , 1951, Exploratory drilling in 1950: *American Association of Petroleum Geologists Bulletin*, v. 35, no. 6, p. 1123-1141.
- , 1952, Exploratory drilling in 1951: *American Association of Petroleum Geologists Bulletin*, v. 36, no. 6, p. 977-995.
- , 1953, Exploratory drilling in 1952: *American Association of Petroleum Geologists Bulletin*, v. 37, no. 6, p. 1193-1210.

- , 1954, Exploratory drilling in 1953: American Association of Petroleum Geologists Bulletin, v. 38, no. 6, p. 971-987.
- Lammers, L. J., 1956, Analysis of the core from drill hole no. 2, Wayne County Airport, Detroit, Michigan, MS: University of Michigan.
- Landes, K. K., 1944, Porter oil field, Midland County, Michigan: American Association of Petroleum Geologists Bulletin, v. 28, no. 2, p. 173-196.
- Landes, K. K., 1945a, Geology and oil and gas possibilities of Sylvania and Bois Blanc Formations of Michigan: U.S. Geological Survey, Oil and Gas Investigations., Preliminary Map, v. 28.
- , 1945b, The Salina and Bass Island Rocks in the Michigan Basin: U. S. Geological Survey Oil and Gas Investigations Preliminary Map, v. 40.
- , 1946, Porosity through dolomitization: American Association of Petroleum Geologists Bulletin, v. 30, no. 3, p. 305-318.
- , 1948, Deep River Oil Field, Arenac County, Michigan, Structure of typical American Oil Fields, Volume 3, American Association of Petroleum Geologists, p. 299-304.
- , 1951, Detroit River Group in the Michigan Basin: U.S. Geological Survey Circular, v. 133, p. 1-23.
- , 1959, The Mackinac Breccia, *in* Shelden, F. D., ed., Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society, p. 19-24.
- Landes, K. K., and Ehlers, G. M., 1944, Mackinac Straits Field Conference, Michigan Geological Society, 1944, p. 1-4.
- Landes, K. K., Ehlers, G. M., and Stanley, G. M., 1945, Geology of the Mackinac Straits Region and Sub-surface geology of Northern Southern Peninsula: Geological Survey Division Publication, v. 44, no. 37, p. 1-204.
- Landing, E., and Wardlaw, B. R., 1981, Atokan conodonts from the Pennsylvanian outlier of the Michigan Basin: Journal of Paleontology, v. 55, no. 6, p. 1251-1269.
- Lane, A. C., 1895, The geology of lower Michigan with reference to deep borings: Michigan Geological Survey, v. 5, no. II, p. 1-100.
- , 1899a, Coal in lower Michigan: Michigan Miner, v. 1, no. 9, p. 9-12.
- , 1899b, Coal in lower Michigan: Michigan Miner, v. 1, no. 3, p. 9-13.
- , 1899c, Coal in lower Michigan: Michigan Miner, v. 1, no. 4, p. 9-16.
- , 1899d, Coal in lower Michigan: Michigan Miner, v. 1, no. 5, p. 9-12.
- , 1899e, Coal in lower Michigan: Michigan Miner, v. 1, no. 6, p. 9-12.
- , 1899f, Coal in lower Michigan: Michigan Miner, v. 1, no. 7, p. 9-12.
- , 1899g, Coal in lower Michigan: Michigan Miner, v. 1, no. 8, p. 9-12.
- , 1899h, Coal in lower Michigan: Michigan Miner, v. 1, no. 10, p. 9-12.
- , 1900a, The coal basin of Michigan: Engineering Mining Journal, v. 70, p. 12-12.
- , 1900b, The coal basin of Michigan: Engineering Mining Journal, v. 69, p. 767-768.
- , 1900c, Geological Report on Huron County, Michigan: Michigan Geological Survey, v. 7, no. II, p. 1-329.
- , 1901a, Michigan limestones and their uses: Engineering Mining Journal, v. 71, p. 662-663, 693-694, 725.
- , 1901b, The northern interior coal field: U.S. Geological Survey, Annual Report, v. 22, no. III, p. 307-331.
- , 1901c, Suggested changes in nomenclature of Michigan: Michigan Miner, v. 3, no. 10, p. 9-9.
- , 1902a, Asphalt in Delta County, Michigan: Engineering Mining Journal, v. 73, p. 50-50.
- , 1902b, Coal of Michigan; its mode of occurrence and quality: Michigan Geological Survey, v. 8, no. II, p. 1-233.

- , 1902c, Report on Alcona County: Subsurface Geology, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, p. 64-78.
- , 1910, Notes on the geological section of Michigan Part II From the St Peter sandstone up: *Journal of Geology*, v. 18, no. 5, p. 393-429.
- , 1927, Calcium chloride waters, connate and diagenetic: *American Association of Petroleum Geologists Bulletin*, v. 11, no. 12, p. 1283-1305.
- Lane, A. C., Prosser, C. S., Sherzer, W. H., and Grabau, A. W., 1908, Nomenclature and Subdivision of the Upper Siluric strata of Michigan, Ohio, and Western New York: *Geological Society of America Bulletin*, v. 19, p. 553-556.
- Lang, T. P., 1967, A study of the subsurface geology of Oceana County, Michigan, MS: University of Michigan.
- Langenbahn, W. E., 1960, Amherstburg facies of central Wayne County, Michigan, MS: University of Michigan.
- Lansing, R. R., 1854, Exposition Relating to the Coal Fields of Michigan: *Transactions of the State Agricultural Society*, v. 5, p. 228-246.
- Larcinese, E., Brandt, D., and Anderson, E., Diagenesis of the Stonington and Big Hill Formations (Upper Ordovician), Northern Michigan, *in Proceedings Geological Society of America, North-Central Section, 21st annual meeting 1987, Volume 19, Geological Society of America*, p. 230-230.
- LaRowe, M., 2000, Conodont biostratigraphy of the Ordovician Bills Creek, Stonington, and Big Hill Formations in the Upper Peninsula of Michigan, BS: The Ohio State University, 36 p.
- Larsen, E. M., 2005, Resistivity, Induced Polarization, and Spontaneous Potential Study of Part of the Calvin 28 Oil Field, Cass County Michigan, MS: Western Michigan University, 102 p.
- Larson, G. J., 1979, Groundwater recharge potential to the Saginaw Formation, Ingham and Clinton Counties, Michigan, p. 1-5.
- Larson, G. J., and Long, D., 1980, An investigation of the hydrogeochemical controls affecting groundwater quality of the Saginaw Formation, South-central Michigan, East Lansing, MI, United States (USA), Michigan State University, Institute of Water Research, 1980 annual report, 13 p.
- Lasemi, Y., 1975, Subsurface geology and stratigraphic analysis of the Bayport Formation in the Michigan Basin, MS: Michigan State University, 50 p.
- Lasky, B. H., 1953, Surface minerals reveal Michigan structures: *World Oil Magazine*, v. 137, no. 7, p. 100-106.
- Laub, R. S., 1983, The Silurian coral biostratigraphy of New York, Binghamton, NY, United States (USA), State Univ. New York, Binghamton, NY.
- Lazar, O. R., 2007, Redefinition of the New Albany Shale of the Illinois basin: An integrated, stratigraphic, sedimentologic, and geochemical study, PhD: Indiana University, 362 p.
- Le, M. A., 2004, Application of well log tomography to the Dundee and Rogers City Limestones, Michigan Basin, USA, MS: Michigan Technological University.
- Leddy, D. G., Sandel, V. R., Swartz, G. L., Kenny, D. H., Gulick, W. M., and El Khadem, H. S., 1980, Chemical Composition of Antrim Shale in the Michigan Basin, 231 p.
- Leffert, C. B., and Schroeder, R. R., 1980, Fischer Assay Analyses of the Antrim Oil Shale of the Michigan Basin.
- Legault, R. Z., 1959, Study of the Frank J. & Barbara Kammer number 1 well in the Peters Reef St. Clair County, Michigan, MS: University of Michigan.
- Leggitt, S. M., 1985, A study of the diagenetic history and proposed depositional environment of the Manitoulin Formation in southern Ontario, BS: McMaster University, 93 p.
- Lehle, P. F., 1980, Deposition and development of Lockport and Salina (Silurian) rocks at west Millgrove, Ohio, MS: Bowling Green State University, 105 p.

- Lehman, D. D., 1991, Small But Significant Production, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 475-476.
- Lehmann, D., Brett, C. E., and Cole, R., 1994, Tectonic and eustatic influences upon the sedimentary environments of the Upper Ordovician strata of New York and Ontario, *in* Dennison, J. M., and Ettensohn, F. R., eds., Concepts in Sedimentology and Paleontology, Volume 4: Tulsa, OK, United States (USA), SEPM (Society for Sedimentary Geology), Tulsa, OK, p. 181-201.
- Lehmann, D. F., 1993, High resolution stratigraphy of the Upper Ordovician siliciclastic wedge and the underlying limestones of northcentral New York and southern Ontario, PhD: University of Rochester, 506 p.
- Leibold, A. W., 1992, Sedimentological and geochemical constraints on Niagara/Salina deposition, Michigan Basin, PhD: University of Michigan, 280 p.
- Lemone, D. V., 1964, The Upper Devonian and Lower Mississippian sediments of the Michigan Basin and Bay County, Michigan, PhD: Michigan State University, 488 p.
- Leney, G. W., 1955, Preliminary investigations of rock conductivity and terrestrial heat flow in southeastern Michigan, MS: University of Michigan.
- Leonard, B. J., 1983, Environment of Deposition of the A-1 carbonate, Salina Group, Michigan Basin, MS: Western Michigan University, 83 p.
- Lesperance, P. J., 1957, Drill hole No. 8, Wayne County Major Airport, Wayne County, Michigan, MS: University of Michigan.
- Leutze, W., 1950, The stratigraphy and paleontology of the (Silurian) middle Salina in central New York, MS: Syracuse University.
- Lewallen, N. F., II, 1984, Structural Geology of the Northwestern Portion of the Michigan Basin, MS: Michigan State University, 250 p.
- Liberty, B. A., 1954, Ordovician of Manitoulin Island, *in* Sanford, J. T., and Moseley, J. R., eds., The Stratigraphy of Manitoulin Island, Ontario, Canada, Michigan Geological Society, p. 7-17.
- , 1965a, Middle Ordovician Stratigraphy of the Lake Simcoe Area, Ontario, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., Guidebook: Geology of Central Ontario, Michigan Basin Geological Society, p. 15-36.
- , 1965b, Upper Ordovician Stratigraphy of the Toronto Area, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., Guidebook: Geology of Central Ontario, Michigan Basin Geological Society, p. 43-54.
- , 1968, Ordovician and Silurian Stratigraphy of Manitoulin, Ontario, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 25-37.
- , 1978, Ordovician Nomenclature of Manitoulin Island, *in* Sanford, J. T., ed., Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society, p. 43-46.
- , 1980, Paleozoic Stratigraphic Studies on the Michigan Basin's Northern Rim, *in* Votaw, R. B., ed., Ordovician and Silurian Geology of the Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 33-40.
- Liberty, B. A., and Bolton, T. E., 1956, Early Silurian Stratigraphy of Ontario, Canada: American Association of Petroleum Geologists Bulletin, v. 40, p. 162-173.
- Liberty, B. A., and Shelden, F. D., 1968, The Geology of Manitoulin Island, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, p. 101.
- Lilienthal, R. T., 1972, A trace element analysis of Silurian carbonate rocks, MS: Wayne State University, 71 p.
- , 1974, Subsurface Geology of Barry County, Michigan: State of Michigan Geological Survey Division Report, v. 15, p. 1-36.

- , 1978, Stratigraphic Cross-sections of the Michigan Basin: Michigan Geological Survey Division Report of Investigation, v. 19, p. 1-36.
- Lindberg, G. D., 1948, Deerfield Oil Field, Monroe County, Michigan, Structure of typical American oil fields, Volume 3, American Association of Petroleum Geologists, p. 305-318.
- Lindgren, W., 1913, Contributions to Economic Geology, 1911; pt. I, Metals and non-metals except fuels: U.S. Geological Survey Bulletin, v. 530, p. 1-400.
- Lineback, J. A., 1964, Stratigraphy and depositional environment of the New Albany Shale (Upper Devonian and Lower Mississippian) in Indiana, PhD: Indiana University.
- , 1968, Subdivisions and depositional environments of New Albany Shale (Devonian-Mississippian) in Indiana: American Association of Petroleum Geologists Bulletin, v. 52, no. 7, p. 1291-1303.
- Linsley, R. M., 1953, New gastropods from the Middle Devonian Anderdon Limestone of Michigan, Ohio and Ontario, MS: University of Michigan, 37 p.
- , 1960, Gastropods of the Middle Devonian Anderdon Limestone, PhD: University of Michigan.
- , 1973, Paleocological interpretation of the Rogers City Limestone (Middle Devonian, Northeastern Michigan): Contributions from the Museum of Paleontology The University of Michigan, v. 24, no. 11, p. 119-123.
- Linsley, R. M., and Kesling, R. V., 1982, A Detroit River (Middle Devonian) fauna from the subsurface of Illinois: Journal of Paleontology, v. 56, no. 5, p. 1079-1092.
- Little, A. C., 1986, Hydrodynamic character of the Dundee Limestone in the Central Michigan Basin, MS: Western Michigan University, 89 p.
- Liu, E., Queen, J. H., and Cox, V. D., 2000, Anisotropy and attenuation of crosshole channel waves from the Antrim Shale gas play, Michigan Basin: Journal of Applied Geophysics, v. 44, p. 47-61.
- Liu, F., Lu, P., Griffith, C., Hedges, S. W., Soong, Y., Hellevang, H., and Zhu, C., 2012, CO₂-brine-caprock interaction: Reactivity experiments on Eau Claire shale and a review of relevant literature: International Journal of Greenhouse Gas Control, v. 7, p. 153-167.
- Liu, H. P., McKay, R. M., Young, J. N., Witzke, B. J., McVey, K. J., and Liu, K., 2006, A new Lagerstätte from the Middle Ordovician St. Peter Formation in northeast Iowa, USA: Geology, v. 34, no. 11, p. 969-972.
- Lizotte, M., 1962, Structural and lithological controls on oil and gas producing zones in Trenton limestone, MS: University of Michigan, 53 p.
- Lo, K. Y., and Lee, Y. N., 1990, Time-dependent deformation of Queenston Shale: Canadian Geotechnical Journal, v. 27, no. 4, p. 461-471.
- Lockett, J. R., 1947, Development of structures in basin areas of northeastern United States: American Association of Petroleum Geologists Bulletin, v. 31, no. 3, p. 429-446.
- Long, J. B., 1952, The paleogeology of central Michigan, MS: Michigan State University, 1-17 p.
- Loomer, D. B., Scott, L., Al, T. A., Mayer, K. U., and Bea, S., 2013, Diffusion-reaction studies in low permeability shale using X-ray radiography with cesium: Applied Geochemistry, v. 39, p. 49-58.
- Lorenz, J. S., and Culver, T. L., 1966, Outline of procedures for determining gas-oil ratios and subsurface pressures: Michigan Geological Survey Circular, v. 4, p. 1-47.
- Losey, A. B., and Benison, K. C., 2000, Silurian paleoclimate data from fluid inclusions in the Salina Group halite, Michigan Basin: Carbonates and Evaporites, v. 15, no. 1, p. 28-36.
- Lovato, J., 1979, The geohydrologic characteristics of the glacial drift within the Water Quality Management Project Site, Michigan State University, MS: University of Michigan, 136 p.
- Love, J. D., and Hoover, L., 1960, A summary of the geology of sedimentary basins of the United States, with reference to the disposal of radioactive waste: U.S. Geological Survey Trace Elements Investigations Report, v. 768.

- Love, W. W., and Fitzgerald, P. E., 1937, Importance of geological data in acidizing of wells: American Association of Petroleum Geologists Bulletin, v. 21, no. 5, p. 616-626.
- Loveland, M. W., 1986, Geophysics of the Michigan Basin-an overview of the seismology and geology of the northern Michigan reef trend and center basin gas play: Interstate Oil Compact Commission Committee Bulletin, v. 28, no. 2, p. 82-95.
- Lovell, T. R., and Bowen, B. B., 2013, Fluctuations in Sedimentary Provenance of the Upper Cambrian Mount Simon Sandstone, Illinois Basin, United States: Journal of Geology, v. 121, no. 2, p. 129-154.
- Lowden, J. E., 1965, A combined geologic and gravity analysis of the Walker field, Michigan, MS: Michigan State University.
- Lowenstam, H. A., 1950, Niagaran Reefs in the Great Lakes Area: Journal of Geology, v. 58, p. 430-487.
- Lowenstein, T. K., and Timofeeff, M. N., 2008, Secular variations in seawater chemistry as a control on the chemistry of basinal brines: test of the hypothesis: Geofluids, v. 8, no. 2, p. 77-92.
- Lucas, P. T., 1954, Environment of Salina salt deposition, MS: University of Michigan, 53 p.
- Luczaj, J. A., 2000, Epigenetic dolomitization and sulfide mineralization in Paleozoic rocks of Eastern Wisconsin: Implications for fluid flow out of the Michigan Basin, U.S.A., PhD: John Hopkins University, 443 p.
- , 2013, Geology of the Niagara Escarpment in Wisconsin: Geoscience Wisconsin, v. 22, no. 1, p. 1-34.
- Luczaj, J. A., Harrison, W. B., and Williams, N. S., 2006, Fractured hydrothermal dolomite reservoirs in the Devonian Dundee Formation of the central Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 90, no. 11, p. 1787-1801.
- Ludvigsen, G. A., 1978, Towards an Ordovician Trilobite Biostratigraphy of Southern Ontario, *in* Sanford, J. T., ed., Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society, p. 73-84.
- Ludvigsen, R., 1987, Reef trilobites from the Formosa Limestone (Lower Devonian) of Southern Ontario: Canadian Journal of Earth Sciences, v. 24, no. 4, p. 676-688.
- Luebking, G. A., 1991, Mississippian Period: Introduction, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 5-6.
- Lukens, P. S., 1971, Petrology and Depositional Environments of The Au Train Formation Alger County, Michigan, MS: Western Michigan University.
- Lundgren, C. E., Jr., 1991, Diagenesis in the St. Peter Sandstone, Michigan Basin, MS: Western Michigan University, 181 p.
- Lundy, C. L., 1965, Report on the 1965 Michigan Basin Geological Society Field Trip to Peterborough, Ontario, p. 1-7.
- Lundy, C. L., 1969a, Belle River Mills Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 49-54.
- , 1969b, Deep River Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 61-68.
- , 1991a, Fowlerville Niagaran Gas Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 205-210.
- , 1991b, Shaver Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 493-500.
- Lusk, L. D., 1958, Genesis of chert in the Middle Devonian Bois Blanc Formation of Michigan and southwestern Ontario, MS: University of Michigan, 31 p.
- Luukkonen, C. L., Grannemann, N. G., and Holtschlag, D. J., 1997a, Ground-Water Flow in the Saginaw Aquifer in the Vicinity of the North Lansing Well Field, Lansing, Michigan--

- Part2, Simulations with a Regional Model Using a Reduced Cell Size: U.S. Geological Survey Open-File Report, v. 97-570, p. 1-25.
- , 1997b, Ground-Water Flow in the Saginaw Aquifer in the Vicinity of the North Lansing Well Field, Lansing, Michigan--Part 1, Simulations with a Regional Model: U.S. Geological Survey Open-File Report, v. 97-569, p. 1-13.
- Lynch, E. A., 1992, Early Ordovician sedimentation in North America: Evidence from the Shakopee Dolomite, Michigan Basin, MS: Michigan State University, 311 p.
- Lynch, E. A., and Grannemann, N. G., 1997, Geohydrology and Simulations of Ground-water flow at Verona Well Field, Battle Creek, Michigan, 1988: U.S. Geological Survey Water-Resources Investigations Report, v. 97-4068, p. 1-45.
- Ma, L., 2009, Noble gases dissolved in groundwaters of the Michigan Basin: Implications for paleoclimatology, hydrogeology, tectonics and mantle geochemistry, PhD: University of Michigan, 245 p.
- Ma, L., Castro, M. C., and Hall, C. M., 2009a, Atmospheric noble gas signatures in deep Michigan Basin brines as indicators of a past thermal event: *Earth and Planetary Science Letters*, v. 277, no. 1-2.
- Ma, L., Castro, M. C., and Hall, C. M., 2009b, Crustal noble gases in deep brines as natural tracers of vertical transport processes in the Michigan Basin: *Geochemistry, Geophysics, Geosystems*, v. 10, no. 6, p. Q06001.
- Ma, L., Castro, M. C., Hall, C. M., and Walter, L. M., 2005, Cross-formational flow and salinity sources inferred from a combined study of helium concentrations, isotopic ratios, and major elements in the Marshall aquifer, southern Michigan: *Geochemistry, Geophysics, Geosystems*, v. 6, no. 10, p. Q10004.
- Macauley, G., 1987, Organic geochemistry of Ordovician Collingwood oil shales on Manitoulin, Cockburn, Drummond and St. Joseph Islands, southern Ontario: Open-File Report - Geological Survey of Canada, 30 p.
- Macauley, G., Fowler, M. G., Goodarzi, F., Snowdon, L. R., and Stasiuk, L. D., 1990, Ordovician oil shale; source rock sediments in the Central and Eastern Canada mainland and eastern Arctic areas, and their significance for frontier exploration: Paper - Geological Survey of Canada, 51 p.
- Macauley, G., and Snowdon, L. R., 1984, A Rock-Eval appraisal of the Ordovician Collingwood oil shales, southern Ontario: Open-File Report - Geological Survey of Canada, 12 p.
- MacLaren, A. S., and Charbonneau, B. W., 1968, Aeromagnetic Map - Manitoulin Island, *in* Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island, Michigan Basin Geological Society*, p. 77-78.
- Mai, H., and Dott, R. H., Jr., 1985, A subsurface study of the St. Peter Sandstone in southern and eastern Wisconsin: *Wisconsin Geological and Natural History Survey Information Circular*, v. 47, p. 1-27.
- Mainville, A., and Craymer, M. R., 2005, Present-day tilting of the Great Lakes region based on water level gauges: *Geological Society of America Bulletin*, v. 117, p. 1070-1080.
- Majedi, M., 1969, Subsurface study of the Detroit River Group (middle Devonian) of southeast Michigan, MS: Michigan State University, 74 p.
- Makowitz, A., Lander, R. H., and Milliken, K. L., 2006, Diagenetic modeling to assess the relative timing of quartz cementation and brittle grain process during compaction: *American Association of Petroleum Geologists Bulletin*, v. 90, no. 6, p. 873-885.
- Makowitz, A., and Milliken, K. L., 2003, Quantification of brittle deformation in burial compaction, Frio and Mount Simon Formation sandstones: *Journal of Sedimentary Research*, v. 73, no. 6, p. 1007-1021.
- Makowitz, A., and Sibley, D., 2001, Crystal growth mechanisms of quartz overgrowths in a Cambrian quartz arenite: *Journal of Sedimentary Research*, v. 71, no. 5, p. 809-816.

- Mandle, R. J., 1986, Plan of study for the regional aquifer systems analysis of the Michigan Basin: Open-File Report - U. S. Geological Survey, p. 23-23.
- Manger, K. C., and Curtis, J. B., 1991, Geologic influences on location and production of Antrim Shale gas: Devonian Gas Shales Technology Review, v. 7, no. 2, p. 5-16.
- Manger, K. C., Oliver, S. J. P., Curtis, J. B., and Scheper, R. J., 1992, Structure map on the Lachine in the four township study area, *in* Decker, D., Coates, J.-M. P., and Wicks, D., eds., Stratigraphy, gas, occurrence [sic], formation evaluation and fracture characterization of the Antrim Shale, Michigan Basin, p. 1-74.
- Manger, K. C., Oliver, S. J. P., Curtis, J. B., Scheper, R. J., and Crafton, J. W., 1991, Geologic influences on the location and production of Antrim Shale gas, Michigan Basin, United States (USA), Soc. Pet. Eng., Denver Res. Sect.
- Manley, T. R., 1964, The Niagaran rocks of Drummond Island, Michigan and the related rocks of the Michigan Basin, PhD: Michigan State University, 130 p.
- Mantek, W., 1973a, Niagaran pinnacle reefs in Michigan, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 35-46.
- , 1973b, Niagaran Pinnacle Reefs in Michigan, Ontario Petroleum Institute Twelfth Annual Conference Technical Volume, p. 1-32.
- Manulik, A. J., 1950, The paleontology and stratigraphy of the Devonian section of a well core from Newaygo County, Michigan, MS: University of Michigan.
- Mareschal, J.-C., 1991, Determination of Past Heat Flow from Subsidence Data in Intracontinental Basins and Passive Margins, *in* Čermák, V., and Rybach, L., eds., Terrestrial Heat Flow and the Lithosphere Structure: Berlin, Heidelberg, Springer Berlin Heidelberg, p. 70-85.
- Mareschal, J.-C., and Lee, C.-K., 1983, Initiation of subsidence in a sedimentary basin underlain by a phase change: Geophysical Journal of the Royal Astronomical Society, v. 74, no. 3, p. 689-712.
- Martin, H. M., 1942, Have we enough oil?: Michigan Conservation, v. 11, no. 8.
- , 1943, From Michigan's coral seas: Michigan Conservation, v. 12, no. 8.
- , 1944, Salt for a million years: Michigan Conservation, v. 13, no. 11, p. 4-5, 11.
- , 1955, Map of the surface formations of the Southern Peninsula of Michigan: Michigan Geological Survey Division Publication, v. 49.
- Martin, H. M., Ehlers, G. M., Kelly, W. A., Hussey, R. C., and Bergquist, S. G., 1948, Pleistocene and Early Paleozoic of the Eastern Part of the Northern Peninsula of Michigan, Michigan Academy of Arts, Sciences, and Letters and Michigan Geological Society, Guidebook, Annual Geological Excursion of the Michigan Academy of Arts, Sciences, and Letters and the Michigan Geological Society, 28 p.
- Martin, J. R., 1982, Pennsylvanian Deltaic Sedimentation in Grand Ledge, Michigan, MS: Western Michigan University.
- Martini, A. M., Budai, J. M., Walter, L. M., and Schoell, M., 1996, Microbial generation of economic accumulations of methane within a shallow organic-rich shale: Nature, v. 383, p. 155-158.
- Martini, A. M., Walter, L. M., and McIntosh, J. C., 2008, Identification of microbial and thermogenic gas components from Upper Devonian black shale cores, Illinois and Michigan basins: American Association of Petroleum Geologists Bulletin, v. 92, no. 3, p. 327-339.
- Martini, A. M., Walter, L. M., T.C.W., K., Budai, J. M., McIntosh, J. C., and Schoell, M., 2003, Microbial production and modification of gases in sedimentary basins: A geochemical case study from a Devonian shale gas play, Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 87, no. 8, p. 1355-1375.
- Martini, A. M. W., L. M., Budai, J. M., Ku, T. C. W., Kaiser, C. J., and Schoell, M., 1998, Genetic and temporal relations between formation waters and biogenic methane: Upper

- Devonian Antrim Shale, Michigan Basin, USA: *Geochimica et Cosmochimica Acta*, v. 62, no. 10, p. 1699-1720.
- Martini, I. P., 1972, Selected facies of the Alexandrian rocks exposed along the Niagaran Escarpment, in Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., *Niagaran Stratigraphy: Hamilton, Ontario*, Michigan Basin Geological Society, p. 57-65.
- Martinson, T. P., 1987, St. Peter sandstone exploration in the Michigan Basin, Ontario Petroleum Institute, 26th Annual Conference, p. 1-26.
- Maslowski, A., 1983, New interest in Clinton and Trenton Formations takes hold: *Northeast Oil Reporter*, v. 3, no. 3, p. 34-35.
- Mason, D., 1962, Pyritized microfossils from the Upper Devonian black shale of Southwestern Ontario and Southern Michigan, MS: The University of Western Ontario, 59 p.
- Matelski, A. L., 2002, Characterization of limestone and dolomite aggregates in Michigan, Northern Ohio, and Ontario, Canada, MS: Michigan Technological University.
- Mater, K. S., 1991, Facies analysis and diagenesis of the lower Engadine Group and the Manistique Group in Manistee, Mason and Oceana counties, Michigan, MS: Western Michigan University, 178 p.
- Matson, M. M., 1991a, Handy 27 Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 211-218.
- , 1991b, Iosco 20 Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 219-226.
- , 1991c, Iosco 24 Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 227-238.
- , 1991d, Silurian Period: Southern Niagaran, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 175-176.
- , 1991e, Unadilla 2 Field, in Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 277-284.
- Matthews, A. A., 1936, The gypsum industry of Grand Rapids, Michigan: *Mining and Metallurgy*, v. 17, no. 357, p. 427-430.
- Matthews, R. D., 1970, Distribution of Silurian potash in the Michigan Basin, in Kneller, W. A., ed., *Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor*, Michigan Geological Survey, p. 20-33.
- , 1977, Evaporite cycles and lithofacies in Lucas Formation, Detroit River Group, Devonian, Midland, Michigan: *Studies in Geology (Tulsa)*, no. 5, p. 73-91.
- , 1983, *Foerstia* from the Antrim Shale (Devonian) of Michigan: *Geology*, v. 11, p. 327-330.
- Matthews, R. D., 1993, Review and revision of the Devonian-Mississippian stratigraphy in the Michigan Basin: *U. S. Geological Survey Bulletin*, p. D1-D85.
- Matthews, R. D., and Egleson, G. C., 1973, The Origin and Implications of A Mid-Basin Potash Facies in the Salina Salt of Michigan: *International Symposium on Salt [Proceedings]*, v. 4, p. 15-34.
- Matthews, R. D., and Humphrey, J. P., 1972, A search for energy from the Antrim: *SPE Paper*, v. 6494.
- Matzkanin, A. D., Layton, F., Lorenz, J. S., Pollom, R. J., and Tefertiller, R. A., 1977a, Aurelius 35 Unit Enhanced Oil and Gas recovery in Michigan: *Secondary Recovery Report*, v. 6, p. 1-12.
- Matzkanin, A. D., Layton, F. L., Lorenz, J. S., Pollom, R. J., and Tefertiller, R. A., 1977b, Enterprise Field Enhanced Oil and Gas Recovery in Michigan: *Secondary Recovery Report*, v. 4, p. 1-10.
- , 1978, Columbus 3 Unit enhanced Oil and Gas Recovery in Michigan: *Secondary Recovery Report*, v. 7, p. 1-17.

- Mazzullo, J. M., and Ehrlich, R., 1980, A Vertical Pattern of Variation in the St Peter Sandstone - Fourier Grain Shape-Analysis: *Journal of Sedimentary Petrology*, v. 50, no. 1, p. 63-70.
- , 1983, Grain-Shape Variation in the St-Peter Sandstone - a Record of Eolian and Fluvial Sedimentation of an Early Paleozoic Cratonic Sheet Sand: *Journal of Sedimentary Petrology*, v. 53, no. 1, p. 105-119.
- , 1987, The St. Peter Sandstone of southeastern Minnesota: mode of deposition, *in* Sloan, R. E., ed., Middle and Late Ordovician lithostratigraphy and biostratigraphy of the upper Mississippi Valley, Volume 35, Minnesota Geological Survey, p. 44-50.
- McCammon, R. B., 1956, Stratigraphy and paleontology of a core penetrating Upper Silurian and Middle Devonian strata in Wayne County, Michigan, MS: University of Michigan.
- McCann, S., Brown, L. M., Ribant, M., Lieurance, S., Chenier, F. J., Gere, M. A., Jr., and Rexroad, C. B., 1995, Bedrock geology of Chippewa County, Michigan: *Michigan Academician*, v. 27, no. 1, p. 81-93.
- McCloskey, S. M., 2012, 3-D reservoir characterization of the South Buckeye Field, Dundee Formation (Devonian), Michigan Basin, USA, MS: Western Michigan University, 366 p.
- McCormac, M. P., Mychkovsky, G. O., Opritza, S. T., Riley, R. A., Wolfe, M. E., Berg, T. M., and Baranoski, M. T., 1994, Lower Silurian Cataract/Medina Group sandstone natural gas play in the Appalachian Basin: Ohio Geological Society Annual Technical Symposium, v. 2, p. 50-68.
- McCormac, M. P., Mychkovsky, G. O., Opritza, S. T., Riley, R. A., Wolfe, M. E., Larsen, G. E., and Baranoski, M. T., 1996, Play Scm; Lower Silurian Cataract/Medina Group ("Clinton") sandstone play: Publication - West Virginia Geological and Economic Survey, p. 156-163.
- McGovney, J. E. E., 1978, Deposition, Porosity Evolution and Diagenesis of the Thornton Reef (Silurian), Northeastern Illinois, PhD: The University of Wisconsin - Madison, 531-531 p. p.
- McGregor, D. J., 1953, Stratigraphic analysis of Upper Devonian and Mississippian rocks in the Michigan Basin, PhD: University of Michigan, 91 p.
- , 1954, Stratigraphic analysis of Upper Devonian and Mississippian rocks in Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 38, no. 11, p. 2324-2356.
- McGuire, D. R., 1991, Charlton 19 Project, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin*, Volume 2: Lansing, Michigan Basin Geological Society, p. 31-44.
- McIntosh, G. C., and Schreiber, R. L., 1971, Morphology and taxonomy of the Middle Devonian crinoid *Ancyrocrinus bulbosus* Hall 1862: *Contributions from the Museum of Paleontology The University of Michigan*, v. 23, no. 25, p. 381-403.
- McIntosh, J. C., 2004, Impact of Pleistocene glaciation on midcontinent sedimentary basin fluids: Reorganization of salinity structure and generation of microbial gas, PhD: University of Michigan.
- McIntosh, J. C., and Walter, L. M., 2006, Paleowaters in Silurian-Devonian carbonate aquifers: Geochemical evolution of groundwater in the Great Lakes region since the Late Pleistocene: *Geochimica et Cosmochimica Acta*, v. 70, p. 2454-2479.
- McIntosh, J. C., Walter, L. M., and Martini, A. M., 2002, Pleistocene recharge to midcontinent basins: Effects on salinity structure and microbial gas generation: *Geochimica et Cosmochimica Acta*, v. 66, no. 10, p. 1681-1700.
- , 2004, Extensive microbial modification of formation water geochemistry: Case study from a Midcontinent sedimentary basin, United States: *Geological Society of America Bulletin*, v. 116, no. 5-6, p. 743-759.
- McLaughlin, P. I., Mikulic, D. G., and Kluessendorf, J., 2013, Age and correlation of Silurian rocks in Sheboygan Wisconsin, using integrated stable carbon isotope stratigraphy and facies analysis: *Geoscience Wisconsin*, v. 21, no. 2, p. 15-38.

- McMillan, G. W., 1949, Ostracods of the family Hollinidae from the Bell Shale of Michigan, MS: University of Michigan.
- McNair, A. H., 1935, Cryptostomatous bryozoa from the Middle Devonian Traverse Group of Michigan, PhD: University of Michigan.
- , 1937, Cryptostomatous bryozoa from the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 5, no. 9, p. 103-170.
- McNair, A. H., Jr., 1933, Some cryptostomatous Bryozoa from the Traverse Group of Michigan, MA: Montana State University.
- McNutt, R. H., Frape, S. K., and Dollar, P., 1987, A strontium, oxygen and hydrogen isotopic composition of brines, Michigan and Appalachian basins, Ontario and Michigan: Applied Geochemistry, v. 2, p. 495-505.
- Medina, C. R., Rupp, J. A., and Barnes, D. A., 2011, Effects of reduction in porosity and permeability with depth on storage capacity and injectivity in deep saline aquifers: A case study from the Mount Simon Sandstone aquifer: International Journal of Greenhouse Gas Control, v. 5, no. 1, p. 146-156.
- Meissner, B. D., 1993, The geochemistry and source for solutes in ground water from the Pennsylvanian bedrock sequence in the Michigan Basin, MS: Michigan State University, 126 p.
- Melhorn, W. N., 1951, A quantitative analysis of Silurian sediments in the Michigan Basin, MS: Michigan State University, 58 p.
- , 1958, Stratigraphic analysis of Silurian rocks in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 42, no. 4, p. 816-838.
- Melik, J. C., 1963, The hingement and contract margin structure of palaeocopid ostracodes from some Middle Devonian Formations of Michigan, Southwestern Ontario, and Western New York, PhD: University of Michigan, 144 p.
- Melik, J. C., 1966, Hingement and Contact Margin structure of Palaeocopid Ostracodes from some Middle Devonian Formations of Michigan, Southwestern Ontario and Western New York: Contributions from the Museum of Paleontology The University of Michigan, v. 20, p. 1-24.
- Meloy, D. U., 1974, Depositional History of the (Silurian) Northern Carbonate Bank of the Michigan Basin, MS: University of Michigan, 78 p.
- Melvin, J. L., 1989, The Richfield Member of the Lucas Formation of the Detroit River Group (Lower Middle Devonian), Michigan Basin, Michigan, USA: Carbonates & Evaporites, v. 4, no. 1, p. 9-43.
- Melvin, N. W., 1963, Supposed medusoid molds from the Mississippian Napoleon: Michigan Geological Survey Open File Report, v. 74.
- Mencenberg, F. E., 1963, Groundwater geology of the (Pennsylvanian) Saginaw Group in the Lansing area, Michigan, MS: Michigan State University, 38 p.
- Merritt, D. W., 1968, A gravitational investigation of the Scipio oil field in Hillsdale County, Michigan, with a related study for obtaining a variable elevation factor, PhD: Michigan State University.
- Mescher, P. K., 1980, Structural evolution of Southeastern Michigan - Middle Ordovician to Middle Silurian, MS: Michigan State University, 120 p.
- Mesoella, K. J., 1973, Reciprocal deposition within Niagara and early Cayugan (Silurian) carbonates and evaporites, Northern Michigan Basin: Ontario Petroleum Institute, v. 8, p. 1-33.
- , 1978, Paleogeography of some Silurian and Devonian reef trends, central Appalachian Basin: American Association of Petroleum Geologists Bulletin, v. 62, no. 9, p. 1607-1644.

- Mesoella, K. J., Robinson, J. D., McCormick, L. M., and Ormiston, A. R., 1974, Cyclic Deposition of Silurian Carbonates and Evaporites in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 58, no. 1, p. 34-62.
- Mesoella, K. J., and Weaver, O. W., 1975, What is the effect of salt-collapse structures on finds in Michigan basin arena?: The Oil and Gas Journal, p. 166-168.
- Metarko, T., 1980, Porosity, Water Chemistry, Cement and Grain Fabric With Depth in the Upper Cambrian Mount Simon and Lamotte Sandstones of the Illinois Basin, MS: University of Cincinnati, 88 p.
- Meyer, F. O., 1979, Middle Devonian lagoon patch reef complex of Michigan: Stratigraphy and physical and biological determinants of reef structure, PhD: University of Michigan.
- , 1989, Stromatoporoid-coral patch reefs of Givetian Age, Michigan, *in* Geldsetzer, H. H. J., James, N. P., and Tebbutt, G. E., eds., Reefs, Canada and Adjacent Areas, Volume 13, Canadian Society of Petroleum Geologists, p. 492-496.
- Meyer, H. J., 1963, A combined magnetic and gravity analysis of the Sauble anomaly, Lake County, Michigan, MS: Michigan State University.
- Meyers, P. A., and Moore, W. E., 1983, Comparison of Michigan Basin crude oils (reply to comments by Illich and Grizzle and by Pruitt): *Geochimica et Cosmochimica Acta*, v. 47, p. 1161-1162.
- Michigan Geological and Biological Survey Division, 1946, Summary of Operations, Michigan Oil and Gas Fields, 1946: Michigan Geological and Biological Survey, Summary of Operations.
- , 1947, Summary of Operations, Michigan Oil and Gas Fields, 1947: Michigan Geological and Biological Survey, Summary of Operations, p. 1-21.
- , 1949, Summary of Operations, Michigan Oil and Gas Fields, 1948: Michigan Geological and Biological Survey, Summary of Operations, p. 1-28.
- , 1950, Summary of Operations, Michigan Oil and Gas Fields, 1949: Michigan Geological and Biological Survey, Summary of Operations, p. 1-21.
- , 1951, Summary of Operations, Michigan Oil and Gas Fields, 1950: Michigan Geological and Biological Survey, Summary of Operations.
- , 1952, Summary of Operations, Michigan Oil and Gas Fields, 1951: Michigan Geological and Biological Survey, Summary of Operations.
- , 1953, Summary of Operations, Michigan Oil and Gas Fields, 1952: Michigan Geological and Biological Survey, Summary of Operations.
- , 1954a, Summary of Operations, Michigan Oil and Gas Fields, 1953: Michigan Geological and Biological Survey, Summary of Operations.
- , 1955, Summary of Operations, Michigan Oil and Gas Fields, 1954: Michigan Geological and Biological Survey, Summary of Operations.
- Michigan Geological Survey Division, 1954b, Occasional Papers for 1954 on the Geology of Michigan: Michigan Geological and Biological Survey, Publication, v. 48, p. 1-348.
- , 1972, General rules governing oil and gas operations in the state of Michigan: Michigan Geological Survey Circular, v. 9, p. 1-37.
- , 1977, Michigan's Oil and Gas Regulations: Michigan Geological Survey Circular, v. 15, p. 1-73.
- Michelson, P. C., and Dott, R. H., 1973, Orientation analysis of trough cross stratification in Upper Cambrian sandstones of western Wisconsin: *Journal of Sedimentary Petrology*, v. 43, p. 784-794.
- Mickelson, R. W., and Rostamabadi, M., 1985, The reactivity of retorted Michigan Antrim oil shale in O₂/N₂ atmosphere: *In Situ*, v. 9, no. 4, p. 365-388.
- Mielczarek, W., 1987, The Early Silurian Reefs at Leask Point and Charlton Bay, Manitoulin Island, Ontario, MS: Laurentian University, 132 p.

- Mikulic, D. G., and Kluessendorf, J., 1988, Classic Silurian Reefs of the Chicago Area, Michigan Basin Geological Society, 49 p.
- , 1998, The Classic Silurian Reefs of the Chicago Area, Michigan Basin Geological Society, 51 p.
- Miles, M. C., 1985, Paleoenvironmental interpretations in the Salina Formation using isotopes (southwestern Ontario and Michigan), MS: University of Waterloo, 190 p.
- Miles, M. C., Appleyard, E. C., Fritz, P., Frape, S. K., Lawson, D. E., O'Shea, K., and Lapcevic, P., 1986, Geochemical study of the Salina Group of southern Ontario, isotopes and major and minor elements: Open File Report - Ontario Geological Survey, p. 93-93.
- Miles, R. S., 1966, *Protitanichthys* and some other coccosteomorph arthrodiere from the Devonian of North America: Kungliga Svenska Vetenskapsakademiens Handlingar, 4th ser., v. 10, no. 3, p. 1-49.
- Millard, F. S., and King, R. B., 1962, Well Log Evaluation of the Trenton-Black River Carbonate in the Scipio-Albion Trend, 3rd Annual Logging Symposium, SPWLA, p. 1-8.
- Miller, A. K., and Garner, H. F., 1953a, Lower Mississippian cephalopods of Michigan; Part 1, Orthoconic nautiloids: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 7, p. 159-192.
- , 1953b, Lower Mississippian cephalopods of Michigan; Part 2, Coiled nautiloids: Contributions from the Museum of Paleontology The University of Michigan, v. 11, p. 111-151.
- , 1953c, Lower Mississippian cephalopods of Michigan; Part 3, Ammonoids and Summary: Contributions from the Museum of Paleontology The University of Michigan, v. 12, no. 8, p. 113-173.
- Miller, J. F., Ethington, R. L., and Rose, R., 2006, Stratigraphic Implications of Lower Ordovician Conodonts from the Munising and Au Train Formations at Pictured Rocks National Lakeshore, Upper Peninsula of Michigan: *Palaios*, v. 21, p. 227-237.
- Miller, L. S., 1943, Why oil proration?: Michigan Conservation, v. 12, no. 9, p. 4-5, 11.
- , 1953, A shot in the arm for oil fields Michigan Conservation, v. 22, no. 2, p. 22-25.
- , 1954a, Michigan basin holds development promise: The Petroleum Engineer, v. 26, no. 1, p. a35-a45.
- , 1954b, Michigan hopes rise with three 1954 discoveries: Oil and Gas Journal, v. 53, no. 22, p. 204-205, 207.
- , 1954c, Oil and Gas Conservation in Michigan: Michigan Geological Survey Division, Publication, v. 47, p. 1-29.
- , 1954d, Why oil proration?: Michigan Conservation, v. 23, no. 3, p. 27-30.
- Miller, M. A., 1988, Dolomitization and porosity evolution, PhD: Michigan State University, 168 p.
- Miller, M. A., Playford, G., and Le Hérisse, A., 1997, *Clypeolus*, A new acritarch genus from the Ordovician and Silurian: Review of Palaeobotany and Palynology, v. 98, no. 1-2, p. 95-103.
- Miller, R. T., 1984, Anisotropy in the Ironton and Galesville sandstones near a thermal-energy storage well, St. Paul, Minnesota: Ground Water, v. 22, no. 5, p. 532-537.
- Milstein, R. L., 1987a, Anomalous Paleozoic outliers near Limestone Mountain, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, no. 3, p. 263-268.
- , 1987b, The Calvin 28 cryptoexplosive disturbance, Cass County, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 315-320.
- , 1987c, The Ledges of the Grand River, Michigan: Geological Society of America Centennial Field Guide—North-Central Section, 1987.
- , 1987d, Mackinaw Island State Park, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 285-288.

- , 1987e, Middle Devonian Traverse Group in Charlevoix and Emmet Counties, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 293-296.
- , 1987f, Middle Silurian paleoecology: The Raber fossil beds, Chippewa County, Michigan: Geological Society of America Centennial Field Guide, v. North-Central, p. 281-284.
- , 1987g, Mississippian Marshall Formation of the Pointe Aux Barques region, eastern Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 307-310.
- , 1987h, Picture Rocks National Lakeshore, northern Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 277-280.
- , 1988, Impact origin of the Calvin 28 cryptoexplosive disturbance, Cass County, Michigan: Geological Survey Division Report of Investigation, v. 28, p. 1-33.
- , 1989, Subsurface Stratigraphy of Cambrian rocks in the Southern Peninsula of Michigan, Michigan Basin: Geological Survey Division Bulletin, v. 7, p. 1-29.
- , 1991, Calvin 28 Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 477-484.
- , 1994, The Calvin Impact Crater, Cass County, Michigan: Identification and Analysis of a Subsurface Ordovician Astrobleme, PhD: Oregon State University, 86 p.
- Mintz, L. W., 1962, The species of the crinoid *Dolatocrinus* from the Middle Devonian Dock Street Clay of Michigan, MS: University of Michigan.
- Mitchell, C. E., Adhya, S., Bergstrom, S. M., Joy, M. P., and Delano, J. W., 2004, Discovery of the Ordovician Millbrig K-bentonite bed in the Trenton Group of New York State: Implications for regional correlation and sequence stratigraphy in eastern North America: *Palaeogeography Palaeoclimatology Palaeoecology*, v. 210, p. 331-346.
- Mitchell, S. W., 1967, Stratigraphy of the Silica Formation of Ohio and the Hungry Hollow Formation of Ontario, with Paleogeographic Interpretations: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 52, no. 1, p. 175-196.
- Mitten, H. T., 1957, Some aspects of differential thermal analysis experiments applied to the Antrim and Bedford-Berea Shales (Devonian-Mississippian) from Oakland County, Michigan, MS: Michigan State University, 86 p.
- Moline, G. R., 1992, A multivariate statistical approach to mapping spatial heterogeneity with an application to the investigation of pressure compartments within the St. Peter Sandstone, Michigan Basin, PhD: The University of Wisconsin - Madison, 264-264 p. p.
- Moline, G. R., and Bahr, J. M., 1995, Estimating spatial distributions of heterogeneous subsurface characteristics by regionalized classification of electrofacies: *Mathematical Geology*, v. 27, no. 1, p. 3-22.
- Monaghan, T. G., 1998, Geostatistical analysis of Pennsylvanian sediments in the eastern Michigan Basin, MS: Michigan State University, 55 p.
- Monnett, V. B., 1947, Mississippian Marshall Formation of Michigan, PhD: University of Michigan.
- , 1948, Mississippian Marshall Formation of Michigan: *American Association of Petroleum Geologists Bulletin*, v. 32, no. 4, p. 629-688.
- Montgomery, E. L., 1986, Facies development and porosity relationships in the Dundee Limestone of Gladwin County, Michigan, MS: Western Michigan University, 82 p.
- Montgomery, S., 1984, Michigan Basin: Expanding the Deep Frontier: *Petroleum Frontiers*, v. 1, p. 2-76.
- Montgomery, S. L., Wood, J. R., and Harrison, W. B., 1998, Devonian Dundee Formation, Crystal Field, Michigan Basin; recovery of bypassed oil through horizontal drilling: *American Association of Petroleum Geologists Bulletin*, v. 82, no. 8, p. 1445-1462.
- Moore, D. J., 1962, Ordovician and Cambrian Fossils from a Well Core, Delta County, Michigan, MS: Michigan State University, 52 p.

- Moretti, G., 1971, Reference Section for Paleozoic Rocks in Eastern Wisconsin: Van Driest No 1, Sheboygan County, MS: University of Wisconsin Milwaukee, 120 p.
- Morrison, P. C., 1942a, Michigan limestone in the Great Lakes stone trade: *Economic Geography*, v. 18, no. 4, p. 413-427.
- , 1942b, The Michigan Limestone Industry: *Economic Geography*, v. 18, no. 3, p. 259-274.
- , 1944, Cement production and trade on the Great Lakes: *Economic Geography*, v. 20, no. 1, p. 37-53.
- , 1945, Cement plant migration in Michigan: *Economic Geography*, v. 21, no. 1, p. 1-16.
- Morse, M. L., 1938, Conodonts from the (Devonian) Norwood and Antrim Shales of Michigan, PhD: University of Michigan.
- Moser, F., 1963, The Michigan Formation; a study in the use of a computer oriented system in stratigraphic analysis, PhD: University of Michigan, 103 p.
- Mosher, R. E., 1972, Geochemical Stratigraphy from microsampling, *in* Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., *Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society*, p. 79-87.
- Mosher, R. E., Lilienthal, R. T., and Sanford, J. T., 1978, The Lithostratigraphy of the Warton Silurian Section, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society*, p. 101-106.
- Mosher, R. E., and Sanford, J. T., 1978, The Collection and Quantitative Analysis of Sedimentary Rocks for Stratigraphic Purposes, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3, Michigan Basin Geological Society*, p. 107-111.
- Motamedi, S., 1982, Celestite mineralization in the Lockport Dolomite (Niagaran) at Genoa, Ohio, MS: Bowling Green State University, 132 p.
- Moyer, R. B., 1982, Thermal Maturity and Organic Content of Selected Paleozoic Formations – Michigan Basin, MS: Michigan State University, 96 p.
- Mozola, A. J., 1955, The Niagara Escarpment of Peninsular Ontario, Canada, Michigan Geological Survey and Michigan Geological Society.
- , 1962, The Bedrock Topography of Wayne County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 47, no. 1, p. 19-27.
- Mudge, E. H., 1894, Drainage systems of the Carboniferous area of Michigan: *American Geologist*, v. 14, no. 5, p. 301-308.
- Mukherji, K. K., and Winder, C. G., 1970, Regional microfabric analysis and insoluble residues of Black River Group (Middle Ordovician) in southern Ontario: *Canadian Journal of Earth Sciences*, v. 7, p. 1437-1448.
- Muller, K. J., and Clark, D. L., 1967, Early Late Devonian conodonts from the Squaw Bay Limestone in Michigan: *Journal of Paleontology*, v. 41, no. 4, p. 902-919.
- Murray, A. N., 1930, Limestone oil reservoirs of the northwestern United States and of Ontario: *Economic Geology*, v. 25, no. 5, p. 452-469.
- Nadon, G. C., Simo, J. A., Dott, R. H., Jr., and Byers, C. W., 2000, High-Resolution Sequence Stratigraphic Analysis of the St. Peter Sandstone and Glenwood Formation (Middle Ordovician), Michigan Basin, U.S.A: *American Association of Petroleum Geologists Bulletin*, v. 84, no. 7, p. 975-996.
- Naimark, B. M., and Ismail-Zadeh, A. T., 1995, Numerical models of a subsidence mechanism in intracratonic basins: application to North American basins: *Geophysical Journal International*, v. 123, no. 1, p. 149-160.
- Nattress, T., 1907, The Geological Continuity of Essex and Kent Counties, Ontario and Monroe and Wayne Counties, Michigan: *Ninth Report of the Michigan Academy of Science 1907*, v. 9, p. 177-184.
- , 1910, The Contour of the Sylvania Sandrock and Related Strata in the Detroit River Area: *Twelfth Report of the Michigan Academy of Science 1910*, v. 12, p. 47-50.

- , 1911, The Extent of the Anderdon Beds of Essex County, Ontario, and Their Place in the Geologic Column: Thirteenth Report of the Michigan Academy of Science 1911, v. 13, p. 87-96.
- , 1912a, Additional Notes on the Geology of the Detroit River Area: Fourteenth Report of the Michigan Academy of Science 1912, v. 14, p. 109-113.
- , 1912b, Geology of the Detroit River area: Ontario Bureau of Mines Annual Report, v. 21, no. 1, p. 281-287.
- , 1917, On the Prospect of Oil Being Found Under the Ontario-Ohio-Michigan Section of Lake Erie: Nineteenth Annual Report of the Michigan Academy of Science 1917, v. 19, p. 87-94.
- Needham, C. E., 1931, A study of the New Richmond Sandstone from two localities in Wisconsin: Transactions of the Illinois State Academy of Science, v. 24, no. 2, p. 363-368.
- Neese, M. A., 1991, Chesaning 20 Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 45-52.
- Nellist, W. E., 1986, Stratigraphy, petrography, and depositional environment of the Kokomo Dolomite Member, Wabash Formation (Silurian, Ludlovian-Pridolian) of Cass, Howard, and Miami counties, Indiana, MS: Indiana University, 137 p.
- Nelson, J. R., 1989, The Lower Ordovician of the southern Michigan Basin -- hydrocarbon potential, MS: Michigan State University, 194 p.
- Newberry, J. S., 1889, The rock-salt deposits of the Salina Group in western New York: Transactions of the New York Academy of Sciences, p. 39-45.
- Newcombe, R. B., 1929a, Correlating Geological Markers in Michigan Section: Papers of the Michigan Academy of Science, Arts and Letters, v. 10, p. 205-208.
- , 1929b, Structural Influences on Recent Michigan Oil Development: Papers of the Michigan Academy of Science, Arts and Letters, v. 10, p. 209-215.
- , 1930a, Interpretation of Recent Discoveries in the Salt-Bearing Rocks of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 12, p. 239-250.
- , 1930b, Middle Devonian Unconformity in Michigan: Geological Society of America Bulletin, v. 41, p. 725-738.
- , 1931a, Petroleum production in middle western states, 1930: American Institute of Mining Engineers Transactions, v. 92, p. 386-392.
- , 1933, Oil and gas fields of Michigan: A discussion of depositional and structural features of the Michigan Basin: Michigan Geological and Biological Survey, Publication, v. 38, no. 32, p. 1-293.
- , 1934, Structure and Accumulation in the Michigan "Basin" and its relation to the Cincinnati Arch, *in* Wrather, W. E., and Lahee, F. H., eds., Problems of Petroleum Geology: Sidney Powers Memorial Volume, Volume 6: Tulsa, AAPG, p. 531-556.
- , 1935, Natural Gas Fields of Michigan, p. 1-12.
- , 1938a, Geology of Allegan County and the surrounding district in southwestern Michigan: Oil & Gas Journal, v. 37, no. 29, p. 32-34.
- , 1940, Developments in Michigan during 1939: American Association of Petroleum Geologists Bulletin, v. 24, no. 6, p. 974-993.
- Newcombe, R. J. B., 1931b, Depositional and structural features of the Michigan synclinal basin, PhD: University of Michigan.
- , 1932, Geology of Muskegon oil field, Muskegon, Michigan: American Association of Petroleum Geologists Bulletin, v. 16, no. 2, p. 153-168.
- Newcombe, R. J. B., 1938b, Geology of the Clare County field in Michigan: Oil and Gas Journal, v. 37, no. 21, p. 25-27.

- Newcombe, R. J. B., and Lindberg, G. D., 1935, Glacial expression of structural features in Michigan, preliminary study: American Association of Petroleum Geologists Bulletin, v. 19, no. 8, p. 1173-1191.
- Newhart, R. E., 1976, Carbonate facies of the Middle Ordovician Michigan Basin, MS: Michigan State University, 44 p.
- Newland, D. H., 1921, Geology of gypsum and anhydrite: Economic Geology, v. 16, no. 6, p. 393-404.
- Newman, E. A., 1936, Geology of Ogemaw County and West Branch Oil Field: Michigan Geological Survey Progress Report, v. 2, p. 1-17.
- Newman, E. A., 1938, Recent developments in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 22, no. 6, p. 659-665.
- Newman, F. G., 1955, Stratigraphy and paleontology of a core from Silurian and Devonian strata of Wayne County, Michigan, MS: University of Michigan.
- Nichols, H. W., 1906, New forms of concretions: Field Columbian Museum Publication, Geological Series, v. 3, no. 3, p. 25-54.
- Nickell, W. P., 1948, Gypsum at Grand Rapids and Alabaster: Michigan Mineralogical Society Publication, v. 2, p. 8-9.
- Noack, A. K., 2008, Analysis of pore architecture and correlation to sonic velocity values in Silurian (Niagaran) reefs of the Michigan Basin, MS: Western Michigan University, 98 p.
- Norris, S. E., 1978, Hydrologic Environment of the Silurian Salt Deposits in Parts of Michigan, Ohio, and New York: US Department of Energy.
- , 1979, Thickness of bedded salt in northeastern Ohio: U. S. Geological Survey Professional Paper, p. 265-265.
- Norris, S. E., and Anonymous, 1979, Summary of studies of deep formational water associated with the Salina Group, Ohio and New York: ONWI (Battelle Memorial Institute, Office of Nuclear Waste-Isolation), p. 67-70.
- Nowak, R. P., 1978, Clay mineralogy of pre-Coldwater (Mississippian) argillaceous sediments in the State Foster #1 well, Ogemaw County, Michigan, MS: Michigan State University, 73 p.
- Nunn, J. A., 1994, Free thermal convection beneath intracratonic basins: thermal and subsidence effects: Basin Research, v. 6, no. 2-3, p. 115-130.
- Nunn, J. A., and Sleep, N. H., 1984, Thermal contraction and flexure of intracratonic basins: a three-dimensional study of the Michigan Basin: The Geophysical Journal of the Royal Astronomical Society, v. 76, p. 587-635.
- Nunn, J. A., Sleep, N. H., and Moore, W. E., 1984, Thermal subsidence and generation of hydrocarbons in Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 68, no. 3, p. 296-315.
- Nunn, J. A., Sleep, N. H., and Moore, W. E., 1985, Thermal subsidence and generation of hydrocarbons in the Michigan Basin; reply: American Association of Petroleum Geologists Bulletin, v. 69, no. 9, p. 1404-.
- Nurmi, R. D., 1972, Upper Ordovician stratigraphy of the southern peninsula of Michigan, MS: Michigan State University.
- , 1974, The Lower Salina (Upper Silurian) Stratigraphy in a desiccated Deep Michigan Basin, Troy: Rensselaer Polytechnic Institute, Ontario Petroleum Institute Annual Conference Proceedings, 25 p.
- Nurmi, R. D., 1975, Stratigraphy and sedimentology of the lower Salina Group (upper Silurian) in the Michigan Basin, PhD: Rensselaer Polytechnic Institute, 261 p.
- Nurmi, R. D., and Friedman, G. M., 1977, Sedimentology and depositional environments of basin-center evaporites, lower Salina Group (Upper Silurian), Michigan Basin: Studies in Geology (Tulsa), no. 5, p. 23-53.

- Nussmann, D. G., 1965, Ecology and pyritization of the Silica Formation, middle Devonian, of Lucas County, Ohio, MS: University of Michigan.
- Nutter, N. H., 1958, The use of infra-red spectro-photometric analysis in the correlation of different units within Dundee Limestone, Devonian age, Rogers City, Michigan, MS: Michigan State University.
- O'Connell, J. F., 1952, Study of Ordovician rocks from deep wells in the Hillsdale, Northville and adjacent areas in southeast Michigan, MS: Michigan State University.
- O'Hara, N. W., 1954, A statistical and mechanical analysis of the Marshall Sandstone in western Michigan to determine the environmental pattern of the deposit, MS: East Lansing, 142 p.
- O'Shea, K. J., 1988, Diagenesis of the Lower Silurian Cataract Group sandstones of southern Ontario, MS: University of Waterloo, 251 p.
- O'Shea, K. J., and Frape, S. K., 1988, Authigenic illite in the Lower Silurian Cataract Group sandstones of southern Ontario: Bulletin of Canadian Petroleum Geology, v. 36, no. 2, p. 158-167.
- O'Shea, K. J., Miles, M. C., Fritz, P., Frape, S. K., and Lawson, D. E., 1988, Oxygen-18 and carbon-13 in the carbonates of the Salina Formation of southwestern Ontario: Canadian Journal of Earth Sciences, v. 25, no. 2, p. 182-194.
- Obermajer, M., 1997, Thermal maturity and petroleum potential of the Paleozoic strata in southwestern Ontario, PhD: University of Western Ontario.
- Obermajer, M., Fowler, M. G., and Snowdon, L. R., 1999, Depositional environment and oil generation in Ordovician source rocks from southwestern Ontario, Canada; organic geochemical and petrological approach: American Association of Petroleum Geologists Bulletin, v. 83, no. 9, p. 1426-1453.
- Obermajer, M., Fowler, M. G., Snowdon, L. R., and Macqueen, R. W., 2000, Compositional variability of crude oils and source kerogen in the Silurian carbonate-evaporite sequences of the eastern Michigan Basin, Ontario, Canada: Bulletin of Canadian Petroleum Geology, v. 48, no. 4, p. 307-322.
- Ochoa, R. I., 2010, Porosity characterization and diagenetic facies analysis of the Cambrian Mount Simon Sandstone: Implications for a regional carbon dioxide sequestration reservoir, MS: Purdue University, 152 p.
- Oden, A. L., 1952, The Occurrence of Mississippian Brachiopods in Michigan, MS: Michigan State University, 52 p.
- Odom, I. E., 1974, Syngenetic sanidine beds from Middle Ordovician St. Peter Sandstone, Wisconsin: a discussion Journal of Geology, v. 82, p. 112-116.
- Oetking, P. F., 1951, The relation of the lower Paleozoic rocks to the older rocks in the northern peninsula of Michigan, PhD: University of Wisconsin.
- Oinonen, R. L., 1965, A study of selected Salina salt beds in northeastern Ohio, MS: Ohio University, 60 p.
- Oliver, W. A., Jr., 1966a, Bois Blanc and Onondaga formations in western New York and adjacent Ontario, United States (USA), Geology of western New York--New York State Geol. Assoc., 38th Ann. Mtg., Buffalo, 1966, Guidebook.
- , 1966b, Bois Blanc Formation: U. S. Geological Survey Bulletin, p. A46-A48.
- , 1967, Stratigraphy of the Bois Blanc Formation in New York: U. S. Geological Survey Professional Paper, p. A1-A8.
- , 1981, The Middle Devonian rugose coral *Prismatophyllum conjunctum* (Davis) and the age of the "Columbus" Limestone at Ingersoll, Ontario: Geological Society of America Bulletin, v. 92, no. 11, p. 873-877.
- Olszewski, G. P., 1978, An interpretation of the sedimentary environments of the Michigan Formation (Mississippian) in Michigan, MS: Wayne State University.
- Orr, G. D., 1984, Niagaran Reefs, Northwestern Michigan, MS: Michigan State University, 57 p.

- Orr, R. W., 1967, Conodonts from Middle Devonian strata of the Michigan Basin, PhD: Indiana University, 174 p.
- Orr, R. W., 1971, Conodonts from Middle Devonian Strata of the Michigan Basin: Geological Survey Bulletin (Bloomington, Ind.), v. 45, p. 110-110.
- Osgood, M., Jr., 1949, Developments in Michigan in 1948: American Association of Petroleum Geologists Bulletin, v. 33, no. 6, p. 877-882.
- Osgood, W., 1929, Michigan oil and gas development and possibilities: Proceedings of the Lake Superior Mining Institute, v. 27, p. 160-165.
- Ostrander, A. G., 1978, Cheboygan County bedrock topography, Michigan Geological Survey Division, Map.
- Ostrom, M. E., 1965, Cambro-Ordovician Stratigraphy of Southwest Wisconsin: Information Circular, v. 6, p. 1-57.
- , 1966, Cambrian Stratigraphy of Western Wisconsin: Information Circular, v. 7, p. 1-79.
- , 1967a, Geologic Cross Section, Alger County, Michigan-Walworth County, Wisconsin, *in* Ostrom, M. E., and Slaughter, A. E., eds., Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 36-41.
- , 1967b, Paleozoic Stratigraphic Nomenclature for Wisconsin: Information Circular, v. 8, p. 1-4.
- Ostrom, M. E., and Davis, R. A., 1970, Cambrian-Ordovician Geology of Western Wisconsin: Information Circular, v. 11, p. 1-131.
- Ostrom, M. E., and Slaughter, A. E., 1967a, Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan, *in* Ostrom, M. E., and Slaughter, A. E., eds., Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 1-35.
- , 1967b, Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, 82 p.
- Over, D. J., 2002, The Frasnian/Famennian boundary in central and eastern United States: Palaeogeography Palaeoclimatology Palaeoecology, v. 181, no. 1-3, p. 153-169.
- Paige, D. S., 1952, A rapid method for the correlation of fine-grained sediments with the aid of the spectrograph as applied to the Mississippian-Devonian sequence in Clare County, Michigan, MS: Michigan State University, 34 p.
- Palmquist, R. C., 1969, The configuration of the Prairie du Chien-Saint Peter contact in southwestern Wisconsin; an example of an integrated geological-geophysical study: Journal of Geology, v. 77, no. 6, p. 694-702.
- Pandolfi, J. M., 1983, Distribution of tabulate corals in Devonian strata of New York State, Binghamton, NY, United States (USA), State Univ. New York, Binghamton, NY.
- Pangborn, T. C., 1983, The Michigan Niagaran reef trend still exciting and profitable, Ontario Petroleum Institute, 22nd Annual Conference, p. 1-23.
- Parham, W., and Austin, G., 1967, Clay mineralogy of Glenwood Formation Southeastern Minnesota and adjacent areas: Journal of Sedimentary Petrology, v. 37, no. 3, p. 863-&.
- Paris, R. M., 1977, Developmental history of the Howell Anticline, MS: Michigan State University.
- Park, S. G., 1987, Deposition, diagenesis, and porosity development of the Middle Devonian, Lucas Formation in the West Branch Oil Field, Ogemaw County, Michigan, MS: Western Michigan University, 102 p.
- Parker, B. K., and Lilienthal, R. T., 1979, Geochemical analyses of Niagaran outcrops, Chippewa and Mackinac counties, Michigan: Michigan Geological Survey Open-file Report, v. 78-1, p. 1-13.
- Parker, E. W., 1897, Salt: U.S. Geological Survey, Annual Report, v. 18, no. V, p. 1273-1313.

- Parsons, W. H., 1948, Geology of the Michigan gypsum deposits: Michigan Mineralogical Society Publication, v. 2, p. 4-7.
- Pashin, J. C., and Etensohn, F. R., 1992, Paleocology and sedimentology of the dysaerobic Bedford fauna (Late Devonian), Ohio and Kentucky (USA): *Palaeogeography Palaeoclimatology Palaeoecology*, v. 91, no. 1-2, p. 21-34.
- Patterson, K., 2011, Geologic controls on reservoir quality and geologic carbon sequestration potential in the Upper Cambrian Mount Simon Sandstone, MS: Western Michigan University, 128 p.
- Pauken, R. J., 1965, Paleocological study of the ostracoda of the Silica Formation, MA: Bowling Green State University.
- Paul, C. R. C., 1967, A redescription of the cystoid *Lipsanocystis traversensis* Ehlers and Leighley (Rhombifera: Callocystitidae): *Contributions from the Museum of Paleontology The University of Michigan*, v. 21, no. 9, p. 205-216.
- Paul, H. E., 1956, The Richfield Formation in the north central area of the Michigan Basin, MS: Wayne State University, 70 p.
- Pearce, L. A., Hewitt, C. M., and Corder, L. M., 2003, Horizontal drilling in the northern reef trend of the Michigan basin, *in* Carr, T. r., Mason, E. P., and Feazel, C. T., eds., *Horizontal wells: Focus on the reservoir*, Volume 14: Tulsa, AAPG, p. 193-213.
- Peebles, R. W., 1969, Gravity studies of buried bedrock topography in Northwest Oakland County, Michigan, MS: Michigan State University, 61 p.
- Pennington, E. K., 1967, A stratigraphic study of the Upper Cambrian of the Perry-Wooden No. 1 deep test well, Cass County, Michigan, MS: Michigan State University.
- Pepper, J. F., De Witt, W., Jr., and Demarest, D. F., 1954a, Geology of the Bedford Shale and Berea Sandstone in the Appalachian Basin, U.S. Geological Survey Professional Paper, v. 259, 111 p.
- Pepper, J. F., Dewitt, W., and Demarest, D. F., 1954b, Geology of the Bedford Shale and Berea Sandstone in the Appalachian Basin: *Science*, v. 119, no. 3094, p. 512-513.
- Person, M., Banerjee, A., Rupp, J., Medina, C., Lichtner, P., Gable, C., Pawar, R., Celia, M., McIntosh, J., and Bense, V., 2010, Assessment of basin-scale hydrologic impacts of CO₂ sequestration, Illinois basin: *International Journal of Greenhouse Gas Control*, v. 4, no. 5, p. 840-854.
- Peterson, R. M., 1961, Ostracods of the family Quasillitidae from the Middle Devonian strata of Michigan, Ohio, New York, and Ontario, PhD: University of Michigan, 193 p.
- Peterson, R. M., 1964, Ostracodes of the superfamilies Quasillitacea and Kloedenellacea from the Middle Devonian strata of Michigan, Ohio, New York, and Ontario: *Journal of Paleontology*, v. 38, no. 5, p. 836-865.
- Peterson, R. M., 1966, Ostracodes of genera *Bufina* and *Euglyphella* from the Middle Devonian of New York, Ohio, Michigan and Ontario: *Journal of Paleontology*, v. 40, no. 1, p. 1-20.
- Petta, T. J., 1980, Silurian pinnacle reef diagenesis- Northern Michigan: effects of Evaporites on pore space distribution, *in* Halley, R. B., and Loucks, R. G., eds., *Carbonate Reservoir Rocks SEPM Core Workshop*, Volume 1, SEPM, p. 32-42.
- Phalen, W. C., 1919, Salt resources of the United States: U.S. Geological Survey Bulletin, v. 669, p. 1-284.
- Phillips, A. R., Colquhoun, S. A., and Putnam, P. E., 1989, B. A. Liberty Memorial Core Workshop: Cores of the Trenton-Black River: *Core Workshop*, v. 1.
- Piotrowski, J. A., 1991, A study of the first row transition elements as a group in black shale, MS: Michigan State University, 138 p.
- Pirtle, G. W., 1932, Michigan structural basin and its relationship to surrounding areas: *American Association of Petroleum Geologists Bulletin*, v. 16, no. 2, p. 145-152.

- Pitman, J. K., Goldhaber, M. B., and Spoetl, C., 1997, Regional Diagenetic Patterns in the St. Peter Sandstone: Implications for Brine Migration in the Illinois Basin: U.S. Geological Survey Bulletin, v. 2094-A, p. A1-A17.
- Pitrat, C. W., 1977, Spiriferid brachiopods from the Traverse Group of Michigan; Orthospirifer: Journal of Paleontology, v. 51, no. 2, p. 330-342.
- Pitrat, C. W., and Rogers, F. S., 1978, *Spinocyrtia* and its epibionts in the Traverse Group (Devonian) of Michigan: Journal of Paleontology, v. 52, no. 6, p. 1315-1324.
- Pogue, J. E., 1939, Economic effects of oil discoveries in Illinois and Michigan: Oil and Gas Journal, v. 38, p. 59-59.
- Pohl, E. R., 1928, Geological explorations in Michigan: Smithsonian Institution Exploration and Field Work, p. 27-32.
- , 1930, The Middle Devonian Traverse Group of rocks in Michigan, a summary of existing knowledge: Proceedings of the United States National Museum, v. 76, p. 1-38.
- Poindexter, O. F., 1931a, Geology of Alpena County: Michigan Geological Survey Division, Unpublished Manuscript.
- , 1931b, The non-metallic mineral resources of Michigan: Pit and Quarry, v. 22, no. 11, p. 27-32, 34.
- , 1933, Geology of Schoolcraft County: Michigan Geological Survey Division, Unpublished Manuscript, p. 1-70.
- , 1936, Geology of Schoolcraft County: Michigan Geological Survey Open File Report, v. 79.
- Pojeta, J., Jr., and Zhang, R., 1986a, Devonian rocks and Lower and Middle Devonian pelecypods of Guangxi, China, and the Traverse Group of Michigan: U. S. Geological Survey Professional Paper, p. 3-4.
- , 1986b, Summary of the Traverse Group stratigraphy in Michigan, and comparison of faunas: U. S. Geological Survey Professional Paper, p. 51-55.
- Pojeta, J., Jr., Zhang, R., and Yang, Z., 1986, Systematic paleontology of Devonian pelecypods of Guangxi and Michigan: U. S. Geological Survey Professional Paper, p. 57-102.
- Pollard, K. A., 2013, Analysis of depositional facies and geological controls on reservoir quality in lower-middle Devonian Sylvania Sandstone, Midland County, Michigan, MS: Western Michigan University, 315 p.
- Pollington, A. D., Kozdon, R., and Valley, J. W., 2011, Evolution of quartz cementation during burial of the Cambrian Mount Simon Sandstone, Illinois Basin: In situ microanalysis of $\delta^{18}\text{O}$: Geology, v. 39, no. 12, p. 1119-1122.
- Pollock, C. A., Rexroad, C. B., and Nicoll, R. S., 1970, Lower Silurian conodonts from northern Michigan and Ontario: Journal of Paleontology, v. 44, p. 743-764.
- Pollom, R. J., Layton, F. L., Lorenz, J. S., Matzkanin, A. D., and Tefertiller, R. A., 1977, Onondaga 10 Unit Enhanced Oil and Gas Recovery in Michigan: Secondary Recovery Report, v. 5, p. 1-12.
- Pollom, R. J., Layton, F. L., Lorenz, J. S., Matzkanin, A. D., and Wilson, S. E., 1976, Beaver Creek Field Enhanced oil and gas recovery in Michigan: Secondary Recovery Report, v. 2, p. 1-10.
- Pope, M., and Read, J. F., 1998, Ordovician metre-scale cycles: Implications for climate and eustatic fluctuations in the central Appalachians during a global greenhouse, non-glacial to glacial transition: Palaeogeography Palaeoclimatology Palaeoecology, v. 138, p. 27-42.
- Porcher, E. N., 1985a, Lithofacies and Geochemistry of Interreef Carbonates, Middle Silurian, Michigan Basin, MS: Western Michigan University, 118 p.
- , 1985b, Lithofacies and geochemistry of selected interreef wells, middle Silurian, in Kalkaska County: Special Papers - Michigan Basin Geological Society, v. 4, p. 131-142.
- Porter, J. S., 1904, 35th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1903.

- Potter, D. L., 1975, The lower and lower middle Silurian of the Michigan Basin, MS: Michigan State University, 36 p.
- Potzger, J. E., 1932, Succession of forests as indicated by fossil pollen from a northern Michigan bog: *Science*, v. 75, p. 366-366.
- Powell, L. M., 1950, Calcium carbonate-magnesium ratios in the Rogers City and Dundee Formations of the Pinconning field, MS: University of Michigan.
- Powell, T. G., Macqueen, R. W., Barker, J. F., and Bree, D. G., 1984, Geochemical character and origin of Ontario oils: *Bulletin of Canadian Petroleum Geology*, v. 32, p. 289-312.
- Powers, S., 1931, Occurrence of petroleum in North America: *American Institute of Mining Engineers Transactions*, v. 96, p. 489-533.
- Pranschke, F. A., 1980, Stratigraphy of Lake Michigan Formation in Lake Michigan's Southern Basin, MS: Northeastern Illinois University, 246 p.
- Prasad, M., and Manghnani, M. H., 1997, Effects of pore and differential pressure on compressional wave velocity and quality factor in Berea and Michigan Sandstones: *Geophysics*, v. 62, no. 4, p. 1163-1176.
- Pratt, B. R., 1988, Lower Devonian stromatoporoid reefs, Formosa reef limestone (Detroit River Group) of southwestern Ontario: *Memoir - Canadian Society of Petroleum Geologists*, v. 13, p. 506-509.
- Preble, H. D., 1950, Paleontology and stratigraphy of a well core penetrating Middle Ordovician formations of Garfield Township, Newaygo County, Michigan, MS: University of Michigan, 35 p.
- Pressprich, O. C., 1940, Michigan crude production rose to an all time high in 1939: *Oil & Gas Journal*, v. 38, p. 184-185.
- Price, J. R., 1994a, Geochemical mass balance models of sandstone weathering in the Pennsylvanian recharge beds of south-central Michigan, MS: Michigan State University, 109 p.
- Price, J. R., and Velbel, M. A., 2000, Weathering of the Eaton Sandstone (Pennsylvanian), Grand Ledge, Michigan: Geochemical mass-balance and implications for reservoir properties beneath unconformities: *Journal of Sedimentary Research*, v. 70, no. 5, p. 1118-1128.
- Price, L. C., 1980, Utilization and documentation of vertical oil migration in deep basins: *Journal of Petroleum Geology*, v. 2, no. 4, p. 353-387.
- Price, L. C., 1994b, Basin richness and source rock disruption - a fundamental relationship?: *Journal of Petroleum Geology*, v. 17, no. 1, p. 5-38.
- Price, L. W., 1948, Developments in Michigan in 1947: *American Association of Petroleum Geologists Bulletin*, v. 32, no. 6, p. 931-939.
- , 1956, Summary of Operations, Michigan Oil and Gas Fields, 1955: Michigan Geological and Biological Survey, Summary of Operations, p. 1-37.
- , 1957, Summary of Operations, Michigan Oil and Gas Fields, 1956: Michigan Geological and Biological Survey, Summary of Operations, p. 1-31.
- , 1958, Summary of Operations, Michigan Oil and Gas Fields, 1957: Michigan Geological and Biological Survey, Summary of Operations, p. 1-41.
- , 1959, Summary of Operations, Michigan Oil and Gas Fields, 1958: Michigan Geological and Biological Survey, Summary of Operations, p. 1-41.
- , 1960, Summary of Operations, Michigan Oil and Gas Fields, 1959: Michigan Geological and Biological Survey, Summary of Operations, p. 1-44.
- , 1961, Summary of Operations, Michigan Oil and Gas Fields, 1960: Michigan Geological and Biological Survey, Summary of Operations, p. 1-44.
- , 1962, Summary of Operations, Michigan Oil and Gas Fields, 1961: Michigan Geological and Biological Survey, Summary of Operations, p. 1-44.

- , 1963, Summary of Operations, Michigan Oil and Gas Fields, 1962: Michigan Geological and Biological Survey, Summary of Operations, p. 1-44.
- , 1964, Michigan's Oil and Gas Fields, 1963: Annual Statistical Summary, p. 1-57.
- Pringle, G. H., 1937, Geology of Arenac County: Michigan Geological Survey Progress Report, v. 3, p. 1-31.
- Prosh, E. C., 1995, Early Devonian age of the Detroit River Group, inferred from Arctic stromatoporoids - reply: Canadian Journal of Earth Sciences, v. 32, no. 7, p. 1073-1077.
- Prosh, E. C., and Stearn, C. W., 1993, Early Devonian age of the Detroit River Group, inferred from Arctic stromatoporoids: Canadian Journal of Earth Sciences, v. 30, no. 12, p. 2465-2474.
- Prosser, C. S., 1903, The Nomenclature of the Ohio Geological Formations: Journal of Geology, v. 11, no. 6, p. 519-546.
- Prouty, C. E., 1971, Major fold axes and faults of the Lower Peninsula: Michigan State University.
- , 1983, The Tectonic Development of the Michigan Basin Intrastructures, in Tectonics, Structure and Karst in Northern Lower Michigan, *in* Black, T. J., and Kimmel, R. E., eds., p. 36-81.
- , 1988, Trenton exploration and wrenching tectonics -- Michigan Basin and environs, *in* Keith, B. D., ed., The Trenton Group (Upper Ordovician Series) of Eastern North America: Deposition, Diagenesis, and Petroleum, Volume 29: Tulsa, AAPG, p. 207-236.
- Prouty, C. E., Cline, L. M., Hough, J. L., and Black, R. F., 1960, Lower Paleozoic and Pleistocene Stratigraphy Across Central Wisconsin, Michigan Basin Geological Society, Michigan Basin Geological Society Annual Field Excursion, 34 p.
- Pruitt, J. D., 1983, Comment on "Comparison of Michigan Basin crude oils", by Vogler et al.: *Geochimica et Cosmochimica Acta*, v. 47, p. 1159-1161.
- Pryor, W. A., and Amaral, E. J., 1971, Large scale cross-stratification in St. Peter Sandstone: *Geological Society of America Bulletin*, v. 82, no. 1, p. 239-244.
- Purdy-Nielsen, A., 1989, Devonian conodont paleontology and sedimentology Lemcool #1 Core, Grand Traverse Co., Michigan, MS: Wayne State University, 101 p.
- Qualman, H. K., 2009, 3-D interpretation of reservoir property distribution in the Belle River Mills Silurian (Niagaran) Reef, St. Clair County, Michigan, MS: Western Michigan University, 104 p.
- Raasch, G. O., 1927, Fossil collecting in Michigan and Ontario: Milwaukee Public Museum, Yearbook, v. 7, p. 81-90.
- Radabaugh, R. E., 1937, The Dundee and Rogers City Limestones of the northern part of the Southern Peninsula of Michigan, MS: University of Michigan.
- Radabaugh, R. E., 1942, The Middle Devonian Rogers City Limestone and its Gastropod Fauna, PhD: University of Michigan, 166 p.
- Rancourt, C. C., 2009, "Collingwood" strata in south-central Ontario - a petrophysical chemostratigraphic approach to comparison and correlation using geophysical borehole logs, MS: University of Toronto, 35 p.
- Randall, C. B., 1929, New limestone quarry development of the Inland Steel Company at Manistique: *Proceedings of the Lake Superior Mining Institute*, v. 27, p. 150-154.
- Raup, O. B., and Hite, R. J., 1993, Preliminary data on the lithology, bromine distribution, and insoluble minerals from the A-1 Evaporite Formation, Salina Group, in the JEM Petroleum Corporation, Bruggers 3-7 Core, Missaukee County, Michigan: Open-File Report - U. S. Geological Survey, p. 15-15.
- Raven, K. G., Lafleur, D. W., and Swezey, R. A., 1990, Monitoring well into abandoned deep-well disposal formations at Sarnia, Ontario: *Canadian Geotechnical Journal*, v. 27, no. 1, p. 105-118.

- Rawlins, E. L., 1936, Extent and availability of natural-gas reserves in Michigan "stray" Sandstone horizon of central Michigan: U.S. Bureau of Mines Report of Investigation, v. 3313, p. 1-139.
- Read, W. F., 1986, Possible impact spherules from near the base of the Middle Ordovician in Northern Illinois: *Meteoritics*, v. 21, no. 3, p. 251-262.
- Reavely, G. H., and Winder, C. G., 1961, The Sylvania Sandstone in southwestern Ontario: *Canadian Mining and Metallurgical Bulletin*, v. 54, no. 586, p. 139-142.
- Reeves, S. R., and Hill, D. G., 1993, Insights into single vs. two-stage fracturing in the Antrim Shale; a case study: *Antrim Shale Workshop*, v. 1993, p. unpaginated.
- Regis, R. S., and Anderton, J., 1999, Field Trip 4: Paleozoic and Glacial Geology from Au Train to Grand Marais, Michigan, *in* Bornhorst, T. J., ed., 45th Annual Meeting of the Institute on Lake Superior Geology, Volume 45, p. 135-176.
- Rexroad, C. B., 1980, Stratigraphy and conodont paleontology of the Cataract Formation and the Salamonie Dolomite (Silurian) in northeastern Indiana: *Geological Survey Bulletin* (Bloomington, Ind.), no. 58, p. 1-83.
- Rexroad, C. B., and Richard, L. V., 1965, Zonal conodonts from the Silurian strata of the Niagara Gorge: *Journal of Paleontology*, v. 39, no. 6, p. 1217-1220.
- Reynolds, R. F., 1991, Capac Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 177-186.
- Richards, E. J., and Leighton, L. R., 2012, Size refugia from predation through time: A case-study of two Middle Devonian brachiopod genera: *Palaeogeography Palaeoclimatology Palaeoecology*, v. 363, p. 163-171.
- Richards, J. A., Walter, L. M., Budai, J. M., and Abriola, L. M., 1994, Large and small scale structural controls on fluid migration in the Antrim Shale, northern Michigan basin.
- Richardson, J. G., 2006a, Glacio-eustatic response recorded in the Lower Mississippian (Kinderhookian-Osagean; Middle Tournaisian) clastic environments of the Michigan Basin: *Stratigraphy*, v. 3, no. 1, p. 65-75.
- , 2006b, Miospore biostratigraphy of the Lower Mississippian clastics of the Michigan Basin, USA: *Review of Palaeobotany and Palynology*, v. 138, no. 1, p. 63-72.
- Richardson, J. G., and Bergstrom, S. M., 2003, Regional stratigraphic relations of the Trenton Limestone (Chatfieldian, Ordovician) in the Eastern North American Midcontinent: *Northeastern Geology and Environmental Sciences*, v. 18, no. 2, p. 93-115.
- Richey, R. G., 1980, Dolomitization in the North Adams Oil Field, Arenac County, Michigan, MS: Michigan State University, 85 p.
- Rickard, L. V., 1984, Correlation of the subsurface Lower and Middle Devonian of the Lake Erie region: *Geological Society of America Bulletin*, v. 95, no. 7, p. 814-828.
- Ries, H., 1899, The origins, properties, and use of shale: *Michigan Miner*, v. 1, no. 12, p. 11-13.
- , 1900a, Clays and shales of Michigan: their properties and uses: *Michigan Geological Survey*, v. 8, no. 1, p. 1-67.
- , 1900b, The origins, properties, and use of shale: *Michigan Miner*, v. 2, no. 3, p. 21-23.
- , 1900c, The origins, properties, and use of shale: *Michigan Miner*, v. 2, no. 1, p. 31-32.
- , 1900d, The shales of Michigan: *Stone*, v. 21, p. 20-24.
- Rigby, J. K., 1977, A new chlastoclonellid sponge from the Devonian of Michigan: *Journal of Paleontology*, v. 51, no. 6, p. 1215-1219.
- Riggs, C., 1955, Paleontology and stratigraphy of a well penetrating Devonian, Silurian, and Ordovician rocks from Weare Twp., Oceana Co., Michigan, MS: University of Michigan.
- Riggs, C. H., 1935, Geology of the Hart Oil Field: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 20, p. 485-496.
- , 1938, The Geology of Allegan County: *Michigan Geological Survey Progress Report*, v. 4, p. 1-29.
- , 1943, Oil man's nightmare: *Michigan Conservation*, v. 12, no. 1.

- Rimmer, S. M., Thompson, J. A., Goodnight, S. A., and Robl, T. L., 2004, Multiple controls on the preservation of organic matter in Devonian-Mississippian marine black shales: geochemical and petrographic evidence: *Palaeogeography Palaeoclimatology Palaeoecology*, v. 215, no. 1-2, p. 125-154.
- Rinke, G. C., 1990, Lithofacies and paleoenvironments of the Middle Ordovician Trenton and Black River Formations, Southeastern Michigan, MS: Wayne State University, 120 p.
- Risk, M. J., and Liberty, B. A., 1978, Paleocological Observations on Manitoulin Island, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area*, Volume 3, Michigan Basin Geological Society, p. 29-30.
- Ritter, A. L., 2008, Evaluating the controls on reservoir heterogeneity of Silurian Pinnacle Reefs, Michigan Basin, MS: Western Michigan University, 72 p.
- Ritter, M. H., 1980, The use of tritium for confirming areas of groundwater recharge, Meridian Township, Michigan, MS: Michigan State University, 144 p.
- Robazza, L., 1995, Stratigraphy and aggregate quality of the Dunnville Quarry, Dunnville, Ontario, BS: Brock University, 274 p.
- Robinson, G. W., and Reed, D., 2013, Pink Petoskey Stones from Northern Michigan: *Rocks & Minerals*, v. 88, no. 3, p. 244-249.
- Robinson, M. R., 2012, Integrating depositional facies and stratigraphy in characterizing hydrothermal dolomite reservoirs: Trenton Group of the Albion-Scipio Trend, Michigan Basin, MS: Western Michigan University, 508 p.
- Robinson, W. I., 1923, Folds resulting from vertically acting forces: *Journal of Geology*, v. 31, no. 4, p. 336-343.
- , 1930, Geological report on oil and gas possibilities in Delta, Schoolcraft, Mackinac and Chippewa Counties, Detroit, Hiawatha Development Company, 31 p.:
- Roche, J. E., 1969, Petrography of back-reef carbonates: Traverse Group (Givetian) of the Northern part of the Southern Peninsula of Michigan, PhD: University of Illinois at Urbana-Champaign, 85 p.
- Roche, J. E., and Carozzi, A. V., 1970, Petrography of back-reef carbonates; Traverse Group (Givetian) of the northern part of the southern peninsula of Michigan: *Centre de Recherches de Pau (Societe Nationale des Petroles d'Aquitaine)*, Bulletin., v. 4, no. 1, p. 137-173.
- Rockwood, D. N., 1938, Oil and gas occurrence in Gratiot County, Michigan, MA: University of Michigan.
- Rodriguez, J. A., 1975, Exploration model for the coal-bearing Saginaw Formation; Michigan Basin, MS: Michigan State University, 72 p.
- Rodwan, J. C., 1986, Stratigraphic and sedimentologic analysis of the Middle Devonian Filer Sandstone, MS: Western Michigan University, 94 p.
- Rogers, F. S., and Pitrat, C. W., 1987, Distribution of *Tylothyris* (Brachiopoda) and its occurrence in the Traverse Group (Middle Devonian) of Michigan: *Journal of Paleontology*, v. 61, no. 3, p. 494-507.
- Rohr, S. A., 1985, Stratigraphic analysis of the Prairie du Chien Group Lower Peninsula, Michigan, MS: Michigan State University, 168 p.
- Roliff, W. A., Evans, C. S., and Caley, J. F., 1946, Ontario Field Trip, Michigan Geological Society.
- Rominger, C. L., 1873, Upper Peninsula; pt. III, Paleozoic rocks: Michigan Geological Survey, v. 1, p. 1-105.
- , 1876a, Lower Peninsula, pt. I Geology: Michigan Geological Survey, v. 3, no. I, p. 1-225.
- , 1876b, Lower Peninsula, pt. II Paleontology: Michigan Geological Survey, v. 3, no. II, p. 1-161.

- Rooney, L. F., 1965, Evidence of Unconformity at top of Trenton Limestone in Indiana and Adjacent States: American Association of Petroleum Geologists Bulletin, v. 50, no. 3, p. 533-546.
- Rose, R., 1997, Overview of Cambrian Sandstone Environments of Deposition: Pictured Rocks Resource Report, v. PIRO 97-1, p. 1-4.
- Rosen, S., 1967, Stratigraphic distribution of red coloration in post-Michigan age rocks, MS: University of Michigan.
- Rosenau, J. C., 1956, Mackinac Bridge: Final Geological Report.
- , 1959, Core Drilling at the Mackinac Bridge Site, Michigan, in Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, *in* Sheldon, F. D., ed., Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society, p. 25-38.
- Ross, R. M., 1957, A quantitative sedimentary analysis of the Middle Devonian Traverse Group in the Michigan basin, MS: Michigan State University, 52 p.
- Rostam-Abadi, M., 1982, Kinetics Governing Michigan Antrim Oil Shale: I. Pyrolysis, II oxidation of Carbonaceous Residue, PhD: Wayne State University, 287-287 p. p.
- Rostamabadi, M., and Mickelson, R. W., 1982, Kinetics of oxidation of Antrim Oil Shale: *In Situ*, v. 6, no. 3, p. 266-266.
- , 1984, Reaction rate kinetics for *in situ* combustion retorting of Michigan Antrim Oil Shale: Abstracts of Papers of the American Chemical Society, v. 187, no. APR, p. 38-PETR.
- Roth, J. N., 1965, A gravitational investigation of fracture zones in Devonian rocks in portions of Arenac and Bay counties, Michigan, MS: Michigan State University.
- Rovey, C. W., II, 1990, Stratigraphy and sedimentology of Silurian and Devonian carbonates, eastern Wisconsin, with implications for groundwater discharge into Lake Michigan, PhD: University of Wisconsin Milwaukee, 461 p.
- Rowe, D. E., 1951, An isopachous and structural map study of the Allegan area of Southwestern Michigan, MS: Wayne State University, 37 p.
- Rowell, D. J., and Brunton, F. R., 2012, 22. Project Unit 12-012. The St. Edmund Formation—The Next Major Bedrock-Derived Aggregate Source in Ontario?: Ontario Geological Survey Open File Report, v. 6280, p. 22-21 to 22-11.
- Rudkin, D., Stott, C., Tetreault, D., and Rancourt, C., 1998, Ordovician and Silurian rocks and fossils of the southern Georgian Bay area, Ontario: Field Trip Guidebook (Canadian Paleontology Conference), v. 7, 38 p.
- Ruedemann, R., and Ehlers, G. M., 1924, Occurrence of the Collingwood Formation in Michigan: Contributions from the Museum of Geology The University of Michigan, v. 2, no. 2, p. 13-18.
- Rulli, V. G., 1973, Stratigraphy and taxonomy of the cryptostome bryozoan genus *Sulcoretepora* in the subsurface of lower Michigan, MS: Wayne State University, 63 p.
- Rullkötter, J., Marzi, R., and Meyers, P. A., 1992, Biological Markers in Paleozoic Sedimentary Rocks and Crude Oils from the Michigan Basin: Reassessment of Sources and Thermal History of Organic Matter, *in* Schidlowski, M., Golubic, S., Kimberley, M. M., McKirdy, D. M., and Trudinger, P. A., eds., Early Organic Evolution: Implications for Mineral and Energy Resources: Berlin, Heidelberg, Springer Berlin Heidelberg, p. 324-335.
- Rullkotter, J., Meyers, P. A., Schaefer, R. G., and Dunham, K. W., 1986, Oil generation in the Michigan Basin: A biological marker and carbon isotope approach: Advances in Organic Geochemistry, v. 10, no. 1-3, p. 359-375.
- Runkel, A. C., 1994, Deposition of the Uppermost Cambrian (Croixan) Jordan Sandstone, and the nature of the Cambrian-Ordovician boundary in the Upper Mississippi Valley: Geological Society of America Bulletin, v. 106, no. 4, p. 492-506.

- Runkel, A. C., McKay, R. M., and Palmer, A. R., 1998, Origin of a classic cratonic sheet sandstone: Stratigraphy across the Sauk II Sauk III boundary in the Upper Mississippi Valley: *Geological Society of America Bulletin*, v. 110, no. 2, p. 188-210.
- Runkel, A. C., Tipping, R. G., Alexander, E. C., and Alexander, S. C., 2006, Hydrostratigraphic characterization of intergranular and secondary porosity in part of the Cambrian sandstone aquifer system of the cratonic interior of North America: Improving predictability of hydrogeologic properties: *Sedimentary Geology*, v. 184, no. 3-4, p. 281-304.
- Runyon, S. L., 1976, *A Stratigraphic Analysis of the Traverse Group of Michigan*, MS: Michigan State University, 85 p.
- Russell, D. J., 1982, Paleozoic geology of the Sault Ste. Marie-St. Joseph island area: Ontario Geological Survey Miscellaneous Paper, v. 106, p. 112-114.
- Russell, D. J., and Telford, P. G., 1983, Revisions to the stratigraphy of the Upper Ordovician Collingwood beds of Ontario -- a potential oil shale: *Canadian Journal of Earth Sciences*, v. 20, p. 1780-1790.
- Russell, I. C., 1905, A geological reconnaissance along the north shores of lakes Huron and Michigan, in Lane, A. C., ed., *Report on the State Board of Geological Survey of Michigan for the year 1904, being the report of Alfred C. Lane, State Geologist*.
- Ryder, R. T., 1996, Fracture patterns and their origin in the Upper Devonian Antrim Shale gas reservoir of the Michigan basin: A review: U.S. Geological Survey Open-File Report, v. 96-23, p. 1-30.
- Sage, R. P., and Sage, V. L., 2006, Glacial Lake Algonquin and Nipissing Shoreline Bedrock Features: Mackinac Island, Michigan, 52nd Annual Meeting of the Institute on Lake Superior Geology Guide Book, 28 p.
- Sallman, J. B., 1996, The development of salt weathering and honeycomb weathering on carboniferous sandstones in the Mid-Western United States, MS: Michigan State University, 171 p.
- Salvino, J. F., 1986, Light and heavy mineral diagenesis in the Cambrian Munising Formation, MS: Michigan State University, 140 p.
- Salvino, J. F., and Velbel, M. A., 1989, Faceted Garnets from Sandstones of the Munising Formation (Cambrian), Northern Michigan - Petrographic Evidence for Their Origin by Intrastratal Dissolution: *Sedimentology*, v. 36, no. 2, p. 371-379.
- Sandberg, C. A., Hasenmueller, N. R., and Rexroad, C. B., 1994, Conodont biochronology, biostratigraphy, and biofacies of Upper Devonian part of New Albany Shale, Indiana: *Courier Forschungsinstitut Senckenberg*, v. 168, p. 227-253.
- Sandel, V. R., and Walcheski, P. J., 1981, An improved method of dissolving rock minerals - preparation of a kerogen concentrate from Antrim Shale: *Fuel*, v. 60, no. 7, p. 644-645.
- Sander, J. E., 1959, An analysis of the Permocarbiniferous "Red Beds" of Michigan, MS: Michigan State University, 37 p.
- Sanders, L. L., 1986, Geochemistry and paleotemperatures of formation waters from the Lower Silurian "Clinton" Formation, eastern Ohio, PhD: Kent State University, 141 p.
- Sanders, T. P., 1937, Salt-water disposal is serious problem in Michigan: *Oil and Gas Journal*, v. 35, no. 34, p. 47, 49.
- Sandy, M. R., Mielke, D., and Fabian, A., 2012, Fossil collecting from the Middle Devonian Silica Formation, Paulding, Paulding County, northwest Ohio: *Geological Society of America Field Guide*, v. 27, p. 121-130.
- Sanford, B. V., 1967, Devonian of Ontario and Michigan, *International Symposium on the Devonian System*, p. 973-999.
- Sanford, J. T., 1972, Niagaran-Alexandrian (Silurian) Stratigraphy and Tectonics, in Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., *Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society*, p. 42-56.

- , 1978, General Stratigraphy of the Manitoulin Area, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3*, Michigan Basin Geological Society, p. 31-42.
- Sanford, J. T., Martini, I. P., and Mosher, R. E., 1972, Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society, Michigan Basin Geological Society Annual Field Excursion, 89 p.
- Sanford, J. T., and Moseley, J. R., 1954a, Introduction, *in* Sanford, J. T., and Moseley, J. R., eds., *The Stratigraphy of Manitoulin Island, Ontario, Canada*, Michigan Geological Society, p. 1-3.
- , 1954b, Stratigraphic Notes, *in* Sanford, J. T., and Moseley, J. R., eds., *The Stratigraphy of Manitoulin Island, Ontario, Canada*, Michigan Geological Society, p. 23-26.
- , 1954c, *The Stratigraphy of Manitoulin Island, Ontario, Canada*, Michigan Geological Society Annual Field Trip, p. 30.
- Sanford, J. T., and Mosher, R. E., 1978a, General Introduction, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3*, Michigan Basin Geological Society, p. 1-1.
- , 1978b, *Geology of the Manitoulin Area, Volume 3*, Michigan Basin Geological Society, p. 111.
- , 1978c, Road Logs, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3*, Michigan Basin Geological Society, p. 3-28.
- Sanford, J. T., Mosher, R. E., and Friend, J. E., 1968, A quantitative study of Silurian Rocks from the Michigan Basin: The Geological Association of Canada, *Proceedings*, v. 19, p. 37-44.
- Sanford, J. T., Mosher, R. E., and Kennedy, J. W., 1978, The Ordovician-Silurian Boundary, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area, Volume 3*, Michigan Basin Geological Society, p. 95-100.
- Sanger, W. A., 1951, Developments in Michigan in 1950: American Association of Petroleum Geologists Bulletin, v. 35, no. 6, p. 1219-1226.
- , 1952, Developments in Michigan in 1951: American Association of Petroleum Geologists Bulletin, v. 36, no. 6, p. 1091-1097.
- Santmyers, R. M., 1929, Development of the gypsum industry by states U.S. Bureau of Mines Information Circular, v. 6173, no. 1-44.
- Sarg, J. F., Off-reef Salina deposition (Silurian), southern Michigan Basin -- implications for reef genesis, *in* *Proceedings Depositional and diagenetic spectra of evaporites: a core workshop*, Calgary, Canada, 1982, p. 354-384.
- Sarg, J. F., 2001, The sequence stratigraphy, sedimentology, and economic importance of evaporite-carbonate transitions: a review: *Sedimentary Geology*, v. 140, no. 1-2, p. 9-34.
- Satterfield, C. L., Lowenstein, T. K., Vreeland, R. H., and Rosenzweig, W. D., 2005a, Paleobrine temperatures, chemistries, and paleoenvironments of Silurian Salina Formation F-1 Salt, Michigan Basin, USA, from petrography and fluid inclusions in halite: *Journal of Sedimentary Research*, v. 75, no. 4, p. 534-546.
- , 2005b, Paleobrine temperatures, chemistries, and paleoenvironments of Silurian Salina Formation F-1 salt, Michigan Basin, USA, from petrography and fluid inclusions in halite (vol 75, pg 534, 2005): *Journal of Sedimentary Research*, v. 75, no. 5, p. 964-965.
- Sattler, F. R., 2015, Lithologic Properties of the Upper Ordovician Utica Formation, Michigan Basin, USA: A Geological Characterization and Assessment of Carbon Dioxide Confinement Potential, MS: Western Michigan University, 94 p.
- Saunders, J. M., 1949, Lithology and insoluble residues of a core from the (Lower Devonian) Detroit River Group, MS: University of Michigan.
- Savage, T. E., and Crooks, H. F., 1918, Early Silurian rocks of the Northern Peninsula of Michigan: *American Journal of Science*, v. 45, p. 59-64.
- Sawtelle, E. R., Jr., 1958, The origin of Berea Sandstone (Mississippian) in the Michigan Basin, MS: Michigan State University, 72 p.

- Sayegh, E. F., 1963, A reservoir engineering study of the performance of the Coldwater field, Michigan, MS: University of Texas.
- Scheiern, M. R., 1953, A study of species of the ostracod genus *Dizygopleura* from the Middle Devonian Traverse Group of Michigan, MS: University of Michigan.
- Schlegel, M. E., McIntosh, J. C., Petsch, S. T., Orem, W. H., Jones, E. J. P., and Martini, A. M., 2013, Extent and limits of biodegradation by in situ methanogenic consortia in shale and formation fluids: *Applied Geochemistry*, v. 28, p. 172-184.
- Schmalz, R. F., 1969, Deep-water environment deposition: a genetic model: *American Association of Petroleum Geologists Bulletin*, v. 53, p. 798-823.
- Schmidt, D. A., 2006, Paleontology and sedimentology of calcifying microbes in the Silurian of the Ohio-Indiana region; an expanded role of carbonate-forming microbial communities, PhD: Ohio State University, 276 p.
- Schmidt, E. A., 1991, White Oak 15 Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 285-292.
- Schmidt, G., 1982, Subsurface Pressure Report on the Southern Michigan Reef Development: Michigan Geological Survey Subsurface Pressure Report.
- , 1984a, Subsurface Pressure Report on the Northern Michigan Reef Development: Michigan Geological Survey Subsurface Pressure Report.
- , 1984b, Subsurface pressure report on the Southern Michigan reef development: Michigan Geological Survey Subsurface Pressure Report.
- , 1986, Subsurface Pressure Report on the Northern Michigan Reef Development: Michigan Geological Survey Subsurface Pressure Report.
- , 1990, Subsurface Pressure Report on the Northern Michigan Reef Development: Michigan Geological Survey Subsurface Pressure Report.
- Schmude, D. R., 1978, Recent Exploration Activity in Michigan, Ontario Petroleum Institute Annual Conference Technical Papers, Volume 17, p. 1-25.
- Schneider, J. J., Tinker, C. N., and Ching, P. D., 1991a, Kawkawlin Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 405-414.
- , 1991b, Manistee 24 Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 139-146.
- , 1991c, North Chester 18 Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 147-156.
- , 1991d, Rose City Field, *in* Wollensak, M. S., ed., *Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing*, Michigan Basin Geological Society, p. 431-440.
- Schoeneck, W. E., 1945, Injection of water into underground reservoirs in the state of Michigan: *Oil & Gas Journal*, v. 44, no. 28, p. 193-203.
- Schoofs, S., Trompert, R. A., and Hansen, U., 2000, Thermochemical convection in and beneath intracratonic basins: Onset and effects: *Journal of Geophysical Research: Solid Earth*, v. 105, no. B11, p. 25567-25585.
- Schott, S. E., 1997, Reef Flank Facies of Silurian Pinnacle Reefs of the Michigan Basin, BS: Lawrence University, 39 p.
- Schuchert, C., 1914, Medina and Cataract Formations of the Siluric of New York: *Geological Society of America Bulletin*, v. 25, p. 277-320.
- Schultze, H.-P., 1982, A dipterid dipnoan from the Middle Devonian of Michigan, U.S.A.: *Journal of Vertebrate Paleontology*, v. 2, no. 2, p. 155-162.
- Schulz, J. E., 2011, High resolution depositional analysis of the Black River Group (Ordovician), Michigan Basin, MS: Western Michigan University, 290 p.
- Scrutton, C. T., 1965, Periodicity in Devonian coral growth: *Palaeontology*, v. 7, no. 4, p. 552-558.

- Seaman, A. E., 1894, A new locality for Silurian limestone in northern Michigan: *American Journal of Science*, v. 148, no. 284, p. 173-173.
- Sears, S. O., and Lucia, F. J., 1979, Reef-growth model for Silurian pinnacle reefs, northern Michigan reef trend: *Geology*, v. 7, p. 299-302.
- , 1980, Dolomitization of northern Michigan Niagaran reefs by brine refluxion and freshwater/seawater mixing, *in* Zenger, D. H., Dunham, J. B., and Ethington, R. L., eds., *Concepts and Models of Dolomitization*, Volume 28, SEPM, p. 215-235.
- See, B. E., 1980, Palynology of the Mississippian Marshall Sandstone and Coldwater Shale of Michigan, MS: Bowling Green State University, 66 p.
- Seeland, D. A., 1973, A geochemical reconnaissance for gold in the sedimentary rocks in the Great Lakes region, Minnesota to New York: *U.S. Geological Survey Bulletin*, v. 305, p. 1-16.
- Segall, R. T., and Sorensen, H. O., 1973, Geological Significance of the Petoskey-Charlevoix Area -- its Economic and Environmental Impact, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 151-181.
- Sellers, D. L., 1982, Landstat vegetative anomalies and their use as hydrocarbon indicators in the northern Niagaran pinnacle reefs, MS: University of Michigan.
- Sengupta, A., 1984, Stratigraphic Analysis of the Trenton Limestone of Michigan, Indiana, Illinois, Ohio and Wisconsin, MS: University of Michigan, 63 p.
- Servos, G. G., 1965, A gravitational investigation of Niagaran Reefs in Southeastern Michigan, PhD: Michigan State University, 156 p.
- Seyler, D. J., 1974, Middle Ordovician of the Michigan Basin, MS: Michigan State University, 139 p.
- Shadrach, R. J., 1989, Subsurface geology of the Clinton section (Lower Silurian Albion Group) in Medina County, Ohio, MS: Kent State University, 94 p.
- Shaffer, B. L., 1969, Palynology of the Michigan "red beds" ,PhD: Michigan State University, 250 p.
- Sharma, G., 1961, Geology of the Peters Field, St. Clair County, Michigan, MS: University of Michigan, 132 p.
- Sharma, G. D., 1966, Geology of Peters Reef, Saint Clair County, Michigan: *American Association of Petroleum Geologists Bulletin*, v. 50, no. 2, p. 327-350.
- Sharma, S., 2004, Geochemistry and sedimentology of Upper Ordovician mudrocks and limestones, eastern Ontario: A new sedimentary framework for the distal Taconic foreland, PhD: Carleton University, 224 p.
- Sharma, S., Dix, G. R., and Riva, J. F. V., 2003, Late Ordovician platform foundering, its paleoceanography and burial, as preserved in separate (eastern Michigan Basin, Ottawa Embayment) basins, southern Ontario: *Canadian Journal of Earth Sciences*, v. 40, no. 2, p. 135-148.
- Shaver, R. B., 1974, Structural Evolution of Northern Indiana during Silurian Time, Mich., United States (USA), Michigan Basin Geological Society, Silurian reef-evaporite relationships, p. 55-78.
- Shaver, R. B., Doheny, E. J., Droste, J. B., Lazor, J. D., Orr, R. W., Pollock, C. A., and Rexroad, C. B., 1971a, Silurian and Middle Devonian Stratigraphy of the Michigan Basin: A view from the Southwest Flank, *in* Forysth, J. L., ed., *Geology of the Lake Erie Islands and Adjacent Shores*, Michigan Basin Geological Society, p. 37-59.
- Shaver, R. H., 1961, Stratigraphy of the Silurian Rocks of Northern Indiana, Field Conference Guidebook, Volume 10: Bloomington, Geological Survey, Indiana Department of Conservation, 62 p.
- , 1962, Silurian Rocks at the Southern Edge of the Michigan Basin in Indiana, *in* Fisher, J. H., ed., *Silurian Rocks of the Southern Lake Michigan Area*, Michigan Basin Geological Society, p. 21-29.

- , 1976, Silurian Reefs, Interreef Facies, and Faunal zones of Northern Indiana and Northeastern Illinois, Field Trip Guidebook, North-Central section of the Geological Society of America and Western Michigan University, 37 p.
- , 1991, A history of study of Silurian reefs in the Michigan Basin environs, *in* Catacosinos, P. A., and Daniels, P. A., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, Geological Society of America, p. 101-138.
- , 1996, Silurian sequence stratigraphy in the North American craton, Great Lakes area, *in* Witzke, B. J., Ludvigsen, G. A., and Day, J., eds., Silurian Sequence stratigraphy in the North American craton, Great Lakes area, Volume 306: Boulder, Geological Society of America, p. 193-202.
- Shaver, R. H., Doheny, E. J., Droste, J. B., Lazor, J. D., Orr, R. W., Pollack, C. A., and Rexroad, C. B., 1971b, Silurian and Middle Devonian Stratigraphy of the Michigan Basin: A View from the Southwest Flank, *in* Forsyth, J. L., ed., Geology of the Lake Erie islands and adjacent shores, p. 37-59.
- Shaw, B., 1975, Geology of the Albion-Scipio trend, southern Michigan, MA: University of Michigan, 64 p.
- Shaw, B. R., 1977, Evaluation of distortion of residuals in trend surface analysis by clustered data: Journal of the International Association for Mathematical Geology, v. 9, no. 5, p. 507-517.
- Shelden, F. D., 1959a, Description of Stops, *in* Shelden, F. D., ed., Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society, p. 1-12.
- , 1959b, Geology of Mackinaw Island and Lower and Middle Devonian South of the Straits of Mackinac, Michigan Basin Geological Society Annual Geological Excursion, 63 p.
- , 1961, Stratigraphy and sedimentary petrology of the Silurian formations of central Manitoulin Island, Ontario, MS: Wayne State University, 178 p.
- , 1963, Transgressive marginal lithotopes in Niagaran (Silurian) of northern Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 47, no. 1, p. 129-149.
- , 1968, Transgressive Facies Interpretation of the Niagaran, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 50-59.
- Sherrill, M. G., 1978, Geology and ground water in Door County, Wisconsin, with emphasis on contamination potential in the Silurian Dolomite: U.S. Geological Survey Water-Supply Paper, v. 2047, p. 1-38.
- Sherzer, W. H., 1889, New characters of *Diphyphyllum simcoense* (Bill.) Rom.: The Pan-American Geologist, v. 4, no. 2, p. 93-95.
- , 1895, Native sulphur in Michigan: American Journal of Science, v. 150, no. 297, p. 246-248.
- , 1900, Geological Report on Monroe County, Michigan: Michigan Geological Survey Division, v. 7, no. 1, p. 1-240.
- Sherzer, W. H., 1901, Geological report on Monroe County, Michigan, PhD: University of Michigan.
- Sherzer, W. H., 1910a, Criteria for the recognition of the various types of sand grains: Geological Society of America Bulletin, v. 21, p. 625-662.
- , 1910b, Criteria for the recognition of the various types of sand grains: discussion: Geological Society of America Bulletin, v. 21, p. 775-776.
- , 1913, Geological report on Wayne County, Michigan: Michigan Geological and Biological Survey, Publication, v. 12, no. 9, p. 1-388.
- Sherzer, W. H., and Grabau, A. W., 1908, New Upper Siluric fauna from southern Michigan: Geological Society of America Bulletin, v. 19, p. 540-553.
- , 1909, The Sylvania Sandstone, its distribution, nature and origin: Michigan Geological Survey Publication, v. 2, p. 61-86.

- Shideler, G. L., 1965, Pennsylvanian Sedimentational Patterns of the Michigan Basin, MS: University of Illinois, 74 p.
- , 1969, Dispersal patterns of Pennsylvanian sandstones in the Michigan Basin: *Journal of Sedimentary Research*, v. 39, no. 3, p. 1229-1237.
- Shirey, B. P., 1983, F-salts of the Salina Group of the Michigan Basin, MS: Michigan State University, 108 p.
- Shrock, R. R., 1939, Wisconsin Silurian Bioherms (Organic Reefs): *Geological Society of America Bulletin*, v. 50, p. 529-562.
- Shukla, V., 1980, Dolomitization in the Lockport Formation (Middle Silurian) in New York, PhD: Rensselaer Polytechnic Institute, 203 p.
- Siever, R., 1957, Pennsylvanian sandstones of the Eastern Interior Coal Basin: *Journal of Sedimentary Research*, v. 27, no. 3, p. 227-250.
- Simo, J. A., Johnson, C. M., Vandrey, M. R., Brown, P. E., Castrogiovanni, E., Drzewiecki, P. E., Valley, J. W., and Boyer, J., 1994, Burial dolomitization of the Middle Ordovician Glenwood Formation by evaporitic brines, *in* Purser, B. H., Tucker, M., and Zenger, D., eds., *Dolomites: A Volume in Honour of Dolomieu, Volume 21*: Oxford, Blackwell Publishing, p. 169-186.
- Simo, J. A., and Lehmann, P. J., 2000, Diagenetic history of Pipe Creek Jr. Reef, Silurian, north-central Indiana, USA: *Journal of Sedimentary Research*, v. 70, no. 4, p. 937-951.
- Simons, H. F., 1939a, Combination drilling method used at Van Horn, Michigan: *Oil & Gas Journal*, v. 37, p. 34-35.
- , 1939b, Low cost drilling for Michigan operators: *Oil and Gas Journal*, v. 38, p. 12-13.
- , 1939c, Revived interest in Michigan as new prospects open: *Oil & Gas Journal*, v. 38, p. 18-19.
- , 1941, Deep Michigan test uses new mud system and treatment: *Oil & Gas Journal*, v. 40, p. 34-35, 38.
- Simons, M. E., 1949, Insoluble residues of the Traverse Group in the Charlevoix-Petoskey area, Michigan, MS: Wayne State University.
- , 1952, Insoluble Residues of the Devonian Traverse Group, Michigan, PhD: The University of North Carolina, 1 p.
- Sinclair, G. W., 1965, Some Middle Ordovician Fossils from Central Ontario, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., *Guidebook: Geology of Central Ontario, Michigan Basin Geological Society*, p. 37-42.
- Singh, S. P., 1979, Laboratory investigation on changes of mechanical and physical properties of Michigan oil shale on retorting, MS: Michigan Technological University.
- Slaughter, A. E., 1950, The stratigraphic value of certain cryptostomatous Bryozoa of the Traverse Formation, Middle Devonian age of Michigan, MS: Michigan State University, 37 p.
- Slaughter, A. E., Shideler, W. H., and Sandefur, B. T., 1953, Ordovician Stratigraphy of the Cincinnati, Ohio and Richmond, Indiana areas, Michigan Geological Survey and Michigan Geological Society, *Guidebook, The Annual Geological Excursion of the Michigan Geological Society*, 14 p.
- Slayton, D. F., 1982, Field evidence for shale membrane filtration of groundwater, south-central Michigan, MS: Michigan State University, 80 p.
- Sleep, N. H., 1976a, Platform subsidence mechanisms and "eustatic" sea-level changes: *Tectonophysics*, v. 36, no. 1-3, p. 45-56.
- , 1976b, Platform Subsidence Mechanisms and "Eustatic" Sea-Level Changes, *in* Bott, M.H.P., ed., *Developments in Geotectonics, Volume Volume 12*, Elsevier, p. 45-56.
- , 2009, Stagnant lid convection and the thermal subsidence of sedimentary basins with reference to Michigan: *Geochemistry, Geophysics, Geosystems*, v. 10, no. 12, p. Q12015.

- Sleep, N. H., and Sloss, L. L., 1980, The Michigan Basin, Dynamics of Plate Interiors, American Geophysical Union, p. 93-98.
- Sleep, N. H., and Snell, N. S., 1976, Thermal Contraction and Flexure of Mid-Continent and Atlantic Marginal Basins: *Geophysical Journal of the Royal Astronomical Society*, v. 45, no. 1, p. 125-154.
- Sloss, L. L., 1937, Devonian rugose corals from the Traverse Beds of Michigan, PhD: University of Chicago.
- , 1939, Devonian rugose corals from the Traverse Beds of Michigan: *Journal of Paleontology*, v. 13, no. 1, p. 52-73.
- Smith-Williams, N., 2003, Inorganic Geochemical Techniques to Analyze the Dolomite of the Dundee Formation, MS: Western Michigan University.
- Smith, G. L., 1991, Sequence stratigraphy and diagenesis of the Lower Ordovician Prairie du Chien Group on the Wisconsin Arch and in the Michigan Basin, PhD: The University of Wisconsin Madison, 276 p.
- Smith, G. L., Byers, C. W., and Dott, R. H., Jr., 1993, Sequence Stratigraphy of the Lower Ordovician Prairie Du Chien Group on the Wisconsin Arch and in the Michigan Basin: *American Association of Petroleum Geologists Bulletin*, v. 77, no. 1, p. 49-67.
- Smith, G. L., Byers, C. W., and Dott, R. H., Jr., 1996, Sequence stratigraphy of the Prairie du Chien Group, Lower Ordovician, Midcontinent, U.S.A: *Special Paper - Geological Society of America*, v. 306, p. 23-33.
- Smith, G. L., and Clark, D. L., 1996, Conodonts of the Lower Ordovician Prairie du Chien Group of Wisconsin and Minnesota: *Micropaleontology*, v. 42, no. 4, p. 363-373.
- Smith, G. W., 1972, The Ferron Point and Genshaw Formations of Cheboygan and western Presque Isle Counties, Michigan, MS: Michigan State University.
- Smith, H. R., 1966, Solution features of the Traverse limestones in Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 51, p. 1-12.
- Smith, J. E. I., 1959, Ostracods from the Middle Devonian Traverse Group of Emmet and Charlevoix Counties of Michigan, PhD: University of Michigan, 224 p.
- Smith, L. B., Al-Tawil, A., and Read, J. F., 2001, High-resolution sequence stratigraphic setting of Mississippian eolianites, Appalachian and Illinois Basins, *Modern and Ancient Carbonate Eolianites: Sedimentology, Sequence Stratigraphy, and Diagenesis*, V. 71: Tulsa, SEPM, p. 167-181.
- Smith, L. B., and Read, J. F., 1999, Application of high-resolution sequence stratigraphy to tidally influenced Upper Mississippian carbonates, Illinois Basin, *Advances in carbonate Sequence Stratigraphy: Application to Reservoirs, Outcrops and Models*, V. 63: Tulsa, SEPM, p. 107-126.
- , 2001, Discrimination of local and global effects on Upper Mississippian Stratigraphy, Illinois Basin, U.S.A.: *Journal of Sedimentary Research*, v. 71, no. 6, p. 985-1002.
- Smith, L. R., 1977, Niagaran (Middle Silurian) Reef Trends of Southcentral Michigan, MS: University of Michigan, 97 p.
- Smith, P. E., Farquhar, R. M., and Hancock, R. G. V., 1991, Direct radiometric age determination of carbonate diagenesis using U-Pb in secondary calcite: *Earth and Planetary Science Letters*, v. 105, no. 4, p. 474-491.
- Smith, R. A., 1913, The Saginaw Oil Field: Fifteenth Report of the Michigan Academy of Science 1913, v. 13, p. 33-38.
- , 1914, The occurrence of oil and gas in Michigan: Michigan Geological and Biological Survey, Publication v. 14, no. 11, p. 1-218.
- , 1915a, Limestones of Michigan: Michigan Geological and Biological Survey, Publication, v. 21, no. 17, p. 101-311.
- , 1915b, The Saginaw Oil Field: Fifteenth Report of the Michigan Academy of Science 1913, v. 15, p. 33-38.

- , 1923, Oil Development in Michigan and the Anticline at Seul Choix Point: Papers of the Michigan Academy of Science, Arts and Letters, v. 1, p. 269-272.
- , 1931, Supplemental Report to Geological Report by W. I. Robinson on Oil and Gas Possibilities in Delta, Schoolcraft, Mackinac and Chippewa Counties.
- , 1937, Michigan Academy of Science, Arts, and Letters, Section of Geology and Mineralogy, Seventh Annual Field Excursion: Devonian of Alpena and Presque Isle counties, Michigan.
- , 1938, Certain newer aspects of the Michigan basin: Oil and Gas Journal, v. 36, no. 46, p. 65-66.
- Smith, R. N., 1961, *Gennaeocrinus variabilis*, a new crinoid species from the Middle Devonian Bell Shale of Michigan, MS: University of Michigan.
- Smosna, R., Conrad, J. M., and Maxwell, T., 1989, Stratigraphic Traps in Silurian Lockport Dolomite of Kentucky: American Association of Petroleum Geologists Bulletin, v. 73, no. 7, p. 874-886.
- Snowdon, L. R., 1984, A comparison of Rock-Eval pyrolysis and solvent extract results from the Collingwood and Kettle Point oil shales, Ontario: Bulletin of Canadian Petroleum Geology, v. 32, no. 3, p. 327-334.
- Soderman, J. G. W., 1962, Petrography of algal bioherms in the Burnt Bluff Group (Silurian), Wisconsin, PhD: University of Illinois, 114 p.
- Soderman, J. W., and Carozzi, A. V., 1963, Petrography of algal bioherms in Burnt Bluff Group (Silurian), Wisconsin: American Association of Petroleum Geologists Bulletin, v. 47, no. 9, p. 1682-1708.
- Sohrabi, A., 2013, The Trentonian (Late Ordovician) brachiopod fauna of Ontario: Evolution through a global warming event, PhD: The University of Western Ontario, 279 p.
- Sonnenfeld, P., 1985, Flow regimes in the Silurian of the Michigan Basin: Special Papers - Michigan Basin Geological Society, v. 4, p. 157-172.
- Sonnenfeld, P., and Al-Aasm, I. S., 1991, The Salina evaporites in the Michigan Basin, in Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, CO, United States (USA), Geological Society of America (GSA), Boulder, CO, p. 139-153.
- Sorauf, J. E., 1996, Geochemical signature of incremental growth: Rugose Corals from the Middle Devonian Traverse Group, Michigan: Palaios, v. 11, p. 64-70.
- Sorensen, H., 1970, Clay and Shale Resources of Michigan, in Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor, Michigan Geological Survey, p. 143-155.
- Sorensen, H. O., 1958, Natural Brine in Michigan: Michigan Department of Natural Resources, Geological Survey Division, p. 1-8.
- Sorensen, H. O., and Segall, R. T., 1974, Natural brines of the Detroit River Group, Michigan Basin, United States (USA), North. Ohio Geol. Soc., Inc., Cleveland, Ohio, Fourth Symposium on Salt, Volume one (edited by Coogan, Alan H.); General Geology of Salt and Other Evaporites.
- Soronen, G. C., 1956, A study of *Welleria aftonensis*, Warthin, from Gravel Point Formation of Michigan, MS: Michigan State University.
- Sorrwar, G., 1961, Middle Devonian ostracods from the Ferron Point Formation, Cheboygan and Presque Isle Counties, Michigan, MS: Michigan State University.
- , 1963, Ostracod fauna of the Middle Devonian Ferron Point Formation of Michigan: Compass of Sigma Gamma Epsilon, 1915-84, v. 41, no. 1, p. 52-60.
- Sparling, D. R., 1956, Occurrence of *prasopora* in a core from the Northville area, Michigan, MS: Wayne State University, 82 p.
- , 1964, *Prasopora* in a core from the Northville area, Michigan: Journal of Paleontology, v. 38, no. 6, p. 1072-1081.

- , 1970, The Bass Islands Formation in its Type Area: *The Ohio Journal of Science*, v. 70, no. 1, p. 1-33.
- , 1971, Bedrock geology of Ottawa County, Ohio, *in* Forysth, J. L., ed., *Geology of the Lake Erie Islands and Adjacent Shores*, Michigan Basin Geological Society, p. 19-29.
- , 1975, Middle Devonian paleogeography of the Wabash Platform, Indiana, Illinois, and Ohio: *Geology*, v. 3, no. 12, p. 677-678.
- Sparling, D. R., 1983, Conodont biostratigraphy and biofacies of lower Middle Devonian limestones, North-central Ohio: *Journal of Paleontology*, v. 57, no. 4, p. 825-864.
- Sparling, D. R., 1984, Paleoecologic and paleogeographic factors in the distribution of lower Middle Devonian conodonts from north-central Ohio: *Geological Society of America Special Paper*, v. 196, p. 113-125.
- Sparling, D. R., 1988, Middle Devonian stratigraphy and conodont biostratigraphy, north-central Ohio: *The Ohio Journal of Science*, v. 88, no. 1, p. 2-18.
- Speece, M. A., 1984, *Analysis of temperatures in sedimentary basins*, MS: University of Michigan.
- Speece, M. A., Bowen, T. D., Folcik, J. L., and Pollack, H. N., 1985, *Analysis of temperatures in sedimentary basins: the Michigan Basin: Geophysics*, v. 50, no. 8, p. 1318-1334.
- Spindle, J. E., Michigan natural gas storage project, *in* *Proceedings American Gas Association Proceedings*, 26th Ann. Mtg., May 11-13 1944, p. 121-121.
- Spiroff, K., 1937a, An unusual occurrence of halite: *American Mineralogist*, v. 22, no. 8, p. 931-933.
- , 1937b, An unusual occurrence of halite: *Rocks and Minerals*, v. 12, no. 6, p. 176-176.
- Spruit, J. D., 1981, The paleoecology of carbonaceous (algal) material in the Middle Devonian Rockport Quarry Limestone of the Northeastern portion of Michigan's Lower Peninsula, MS: Western Michigan University, 98 p.
- St Jean, J., 1986, Lower Middle Devonian Stromatoporoidea from Empire Beach, Southern Ontario, Canada: *Journal of Paleontology*, v. 60, no. 5, p. 1029-1055.
- Stanley, G. M., 1945, Prehistoric Mackinac Island: Michigan Geological and Biological Survey, Publication, v. 43, no. 36, p. 1-74.
- Stark, J. R., and McDonald, M. G., 1980, Ground water of coal deposits, Bay County, Michigan: Open-File Report - U. S. Geological Survey, p. 42-42.
- Stauffer, C. R., 1907, The Hamilton in Ohio: *Journal of Geology*, v. 15, no. 6, p. 590-596.
- , 1909a, The Middle Devonian of Ohio: *Ohio Geological Survey Bulletin*, v. 4, no. 10, p. 1-204.
- , 1909b, The Middle Devonian of Ohio, PhD: The University of Chicago, 204 p.
- , 1910, The Middle Devonian of Ohio: *Bulletin of the Geological Survey of Ohio*, v. 10, p. 341-532.
- , 1915, The Devonian of southwestern Ontario: *Canadian Geological Survey Memoir*, v. 34, p. 1-341.
- , 1916a, The Devonian of southwestern Ontario: *American Journal of Science*, v. 191, no. 242, p. 221-222.
- , 1916b, Relative age of the Detroit River series: *Geological Society of America Bulletin*, v. 27, p. 72-78.
- , 1918, Descriptions of some new species of Devonian fossils: *Journal of Geology*, v. 26, no. 6, p. 555-560.
- Stearn, C. W., 1991, A revision of *Anostylostroma*, *Atelodictyon*, and related genera (Paleozoic Stromatoporoidea): *Journal of Paleontology*, v. 65, no. 4, p. 611-622.
- , 1995, The type species of *Stictostroma* Parks, 1936 (Porifera, Stromatoporoidea): *Journal of Paleontology*, v. 69, no. 1, p. 20-27.
- Stearns, M. D., 1933a, The petrology of the Marshall Formation of Michigan: *Journal of Sedimentary Research*, v. 3, no. 3, p. 99-112.
- , 1933b, The Petrology of the Marshall Formation of Michigan, PhD: University of Michigan.

- Stearns, M. D., and Cook, C. W., 1932, A Petrographic Study of the Marshall Formation and Its Relation to the Sand of the Michigan Series Formation: Papers of the Michigan Academy of Science, Arts and Letters, v. 16, p. 429-437.
- Steinbrecher, L., 1980, Rockport sinkhole management study: Northeast Michigan Council of Government, p. 1-39.
- Steinfurth, C., 1972, The role of pre-existing grain surfaces in recrystallization of the Mississippian Bayport Limestone (Michigan), MS: Michigan State University, 48 p.
- Steinman, D. B., 1956, Mackinac Bridge final geologic report, p. 1-5.
- Stevens, M. S., 1964, Thoracic armor of a new arthropod (*Holonema*) from the Devonian of Presque Isle County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 49, p. 163-175.
- Stevens, R. P., 1858, Description of new Carboniferous fossils from the Appalachian, Illinois and Michigan coal fields: American Journal of Science, v. 75, no. 74, p. 258-265.
- Stevenson, J. C., 1964, A vertical magnetic intensity study of the Grand Rapids anomaly MS: Michigan State University, 30 p.
- Stewart, D., Jr., 1937, An occurrence of detrital authigenic feldspar: American Mineralogist, v. 22, no. 9, p. 1000-1003.
- Stewart, G. A., 1936, Ostracodes of the Silica Shale, Middle Devonian of Ohio: Journal of Paleontology, v. 10, no. 8, p. 739-763.
- Stewart, J. R., 1957, Secondary dolomitization in the Northville oil field, MS: University of Michigan.
- Stieglitz, R. D., 1975, Sparry white dolomite and porosity in Trenton Limestone (Middle Ordovician) of Northwestern Ohio: American Association of Petroleum Geologists Bulletin, v. 59, no. 3, p. 530-533.
- , 1981, Trenton Formation (Middle Ordovician) of Northwestern Ohio: Possible Target for Petroleum Mining: American Association of Petroleum Geologists Bulletin, v. 65, p. 526-530.
- Stith, D. A., 1972, High-calcium limestone facies of the Devonian Dundee Limestone, northwestern Ohio: Report of Investigations - Ohio, Division of Geological Survey, v. 86, p. 14-14.
- Stokes, C., 1840, On some species of Orthocerata, Lake Huron Region: Transactions of the Geological Society of London v. 15, p. 705-714.
- Stonehouse, H. B., 1969a, The Geology of Selected Areas on the North Shore of Lake Huron and their Relation to the Michigan Basin, *in* Stonehouse, H. B., ed., Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society, p. 1-5.
- , 1969b, The Precambrian Around and Under the Michigan Basin, *in* Stonehouse, H. B., ed., Studies of the Precambrian of the Michigan Basin, Michigan Basin Geological Society, p. 15-27.
- , 1970, Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of America: North-central Section, 177 p.
- Straw, W. T., and Wilson, J. L., 1985, Facies and depositional setting of the A-1 carbonate (Silurian) in the Michigan Basin: Special Papers - Michigan Basin Geological Society, v. 4, p. 143-156.
- Strong, E. A., 1872, Notes upon the fossil remains of the Lower Carboniferous limestone exposed at Grand Rapids, Michigan: Kent Scientific Institute Miscellaneous Papers, v. 3, p. 1-6.
- Strutz, T. A., 1979, A pre-Pennsylvanian paleogeologic study of Michigan, MS: Michigan State University, 68 p.
- Stumm, E., 1967a, *Planalveolitella*; a new genus of Devonian tabulate corals, with a redescription of *Planalveolites foughti* (Edwards and Haime): Contributions from the Museum of Paleontology The University of Michigan, v. 21, no. 2, p. 67-72.

- Stumm, E. C., 1948, Lower Middle Devonian Species of the Tetracoral Genus *Hexagonaria* of East-Central North America: Contributions from the Museum of Paleontology The University of Michigan, v. 7, p. 7-49.
- , 1949, Three new Devonian species of *Microcyclus* from Michigan and Ontario: Journal of Paleontology, v. 23, no. 5, p. 507-509.
- Stumm, E. C., 1950, Corals of the Devonian Traverse Group of Michigan; Part III, *Antholites*, *Pleurodictyum*, and *Procteria*: Contributions from the Museum of Paleontology The University of Michigan, v. 8, no. 8, p. 205-220.
- , 1951, Check list of fossil invertebrates described from the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 9, no. 1, p. 1-44.
- Stumm, E. C., 1952, Species of the Silurian rugose coral *Triplasma* from North America: Journal of Paleontology, v. 26, no. 5, p. 841-843.
- , 1953a, Lower Middle Devonian Proetid Trilobites from Michigan, Southwestern Ontario, and northern Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 11, p. 11-31.
- Stumm, E. C., 1953b, Trilobites of the Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 10, no. 6, p. 101-157.
- , 1954a, Four new species of rugose corals of the Middle Devonian genus *Eridophyllum*, from New York, Michigan, and Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 12, no. 1, p. 1-11.
- Stumm, E. C., 1954b, Lower Middle Devonian Phacopid Trilobites from Michigan, Southwestern Ontario, and the Ohio Valley: Contributions from the Museum of Paleontology The University of Michigan, v. 11, no. 11, p. 201-221.
- Stumm, E. C., 1955, Three new species of the cystid genus *Lipsanocystis* from the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 12, no. 6, p. 97-103.
- , 1956a, A revision of A. W. Grabau's species of *Mucrospirifer* from the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 13, no. 3, p. 81-94.
- Stumm, E. C., 1956b, Upper Cambrian trilobites from Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 13, p. 95-102.
- , 1960a, The holotype of *Favosites biloculi* Hall: Journal of Paleontology, v. 34, no. 3, p. 589-590.
- , 1960b, The type species of the Paleozoic tabulate coral genera *Cladopora* and *Coenites*: Contributions from the Museum of Paleontology The University of Michigan, v. 15, no. 7, p. 133-138.
- Stumm, E. C., 1961a, Addenda to the check list of fossil invertebrates described from the Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 5, p. 149-171.
- , 1961b, Corals of the Traverse Group of Michigan; Part 6, *Cladopora*, *Striatopora*, and *Thamnopora*: Contributions from the Museum of Paleontology The University of Michigan, v. 16, no. 4, p. 275-285.
- , 1962a, Corals of the Traverse Group of Michigan; Part 7, The *Digonophyllidae*: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 9, p. 215-231.
- , 1962b, Corals of the Traverse Group of Michigan; Part 8, *Stereolasma* and *Heterophrentis*: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 10, p. 233-240.
- , 1962c, Corals of the Traverse Group of Michigan; Part 10, *Tabulophyllum*: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 14, p. 291-297.

- , 1963a, Corals of the Traverse Group of Michigan; Part 11, *Tortophyllum*, *Bethanyphyllum*, *Aulacophyllum*, and *Hallia*: Contributions from the Museum of Paleontology The University of Michigan, v. 18, no. 8, p. 135-155.
- Stumm, E. C., 1963b, Ordovician Streptelasmid Rugose Corals from Michigan Contributions from the Museum of Paleontology The University of Michigan, v. 18, p. 23-31.
- Stumm, E. C., 1967b, Devonian trilobites from northwestern Ohio, northern Michigan, and western New York: Contributions from the Museum of Paleontology The University of Michigan, v. 21, no. 6, p. 109-122.
- , 1967c, Growth stages in the Middle Devonian rugose coral species *Hexagonaria anna* (Whitfield) from the Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 21, no. 5, p. 105-108.
- Stumm, E. C., 1967d, Tabulate corals of the Silica Shale (Middle Devonian) of Northwestern Ohio and Southeastern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 21, p. 86-104.
- , 1968a, The corals of the Middle Devonian Ten Mile Creek Dolomite of Northwestern Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 22, no. 3, p. 37-44.
- , 1968b, A redescription of the Middle Silurian compound rugose coral *Grabaephyllum Johnstoni* Foerste: Contributions from the Museum of Paleontology The University of Michigan, v. 22, no. 6, p. 71-73.
- , 1968c, Rugose corals of the Silica Formation (Middle Devonian) of Northwestern Ohio and Southeastern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 22, p. 61-70.
- Stumm, E. C., 1968d, Two unusually well-preserved trilobites from the Middle Devonian of Michigan and Ohio: Contributions from the Museum of Paleontology The University of Michigan, v. 22, no. 2, p. 33-35.
- Stumm, E. C., 1969a, Devonian Bioherms of the Michigan Basin: Contributions from the Museum of Paleontology The University of Michigan, v. 22, no. 18, p. 241-247.
- , 1969b, Revision of R. P. Whitfield's types of rugose and tabulate corals in the Museum of Paleontology, University of California, and in the United States National Museum: *Bulletins of American Paleontology*, v. 56, no. 250, p. 235-253.
- , 1970, Corals of the Traverse Group of Michigan Part 13, *Hexagonaria*: Contributions from the Museum of Paleontology The University of Michigan, v. 23, no. 5, p. 81-91.
- Stumm, E. C., and Chilman, R. B., 1967, Check list of fossil invertebrates described from the Middle Devonian Silica Formation of Northwestern Ohio and Southeastern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 21, no. 7, p. 123-137.
- , 1969, Phyllocarid crustaceans from the Middle Devonian Silica Shale of Northwestern Ohio and Southeastern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 23, p. 53-71.
- Stumm, E. C., and Hunt, A. S., 1958, Corals of the Devonian Traverse Group of Michigan. Part V, *Trachypora*: Contributions from the Museum of Paleontology The University of Michigan, v. 14, p. 167-189.
- Stumm, E. C., Kellum, L. B., and Wright, J. D., 1956, Devonian Strata of the London-Sarnia Area, Southwestern Ontario, Canada, Michigan Geological Society Annual Field Trip Guidebook, p. 21.
- Stumm, E. C., and Kjellesvig-Waering, E. N., 1962, A new Eurypterid from the Upper Silurian of Southern Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 7.

- Stumm, E. C., and Tyler, J. H., 1962, Corals of the Traverse Group of Michigan; Part 9, *Heliophyllum*: Contributions from the Museum of Paleontology The University of Michigan, v. 17, no. 12, p. 265-276.
- Stumm, E. C., and Tyler, J. H., 1964, Corals of the Traverse Group of Michigan Part XII, the small-celled species of *Favosites* and *Emmonsia*: Contributions from the Museum of Paleontology The University of Michigan, v. 19, no. 3, p. 23-36.
- Suffel, G. E., 1954, The North Shore of Lake Huron, in Sanford, J. T., and Moseley, J. R., eds., The Stratigraphy of Manitoulin Island, Ontario, Canada, Michigan Geological Society, p. 4-6.
- Suh, M., 1985, A seismic study of an impact feature in Cass County, Michigan, MS: Western Michigan University, 57 p.
- Suk, D., Vandervoo, R., Peacor, D. R., and Lohmann, K. C., 1993, Late Paleozoic Remagnetization and Its Carrier in the Trenton and Black River Carbonates from the Michigan Basin: Journal of Geology, v. 101, no. 6, p. 795-808.
- Sullivan, K. J., 1986, Petrography, diagenetic history, and development of porosity in the Richfield member of the Lower Middle Devonian Lucas Formation, Northeast Isabella County, Central Michigan Basin, MS: Western Michigan University, 85 p.
- , 1991, Claybanks 2 Field, in Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 125-138.
- Sullivan, K. J., 1991, Bear Lake 22 Field, in Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 107-116.
- Summerson, C. H., Forsyth, J. L., Hoover, K. V., and Ulteig, J. R., 1963, Stratigraphy of the Silurian Rocks in Western Ohio, Michigan Basin Geological Society, 71 p.
- Summerson, C. H., and Swann, D. H., 1970, Pattern of Devonian Sand on the North American Craton and their Interpretation: Geological Society of America Bulletin, v. 81, p. 469-490.
- Sunderman, J. A., 1988, Origin of Devonian clastics associated with the Silurian-Devonian unconformity in northern Indiana: Memoir - Canadian Society of Petroleum Geologists, v. 14, p. 225-233.
- Sutton, D. J., 1969, Headquarters Field, in Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 99-114.
- Swann, D. H., 1940, The *Favosites alpenensis* lineage in the Middle Devonian Traverse Group of Michigan, PhD: University of Michigan.
- Swann, D. H., 1947, The *Favosites alpenensis* lineage in the Middle Devonian Traverse Group of Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 6, no. 9, p. 235-318.
- Swanson, R. I., 1955, The extent of the Clare Dolomite, a marker horizon of Michigan, MS: Michigan State University.
- Swartz, C. K., Alcook, F. J., Butts, C., Chadwick, G. H., Cumings, E. R., Decker, C. E., Ehlers, G. M., Foerste, A. F., Gillette, T., Kindle, E. M., Kirk, E., Northrop, S. A., Prouty, W. F., Savage, T. E., Shrock, R. R., Swartz, F. M., Twenhofel, W. H., and Williams, M. Y., 1942, Correlation of the Silurian formations of North America: Geological Society of America Bulletin, v. 53, no. 4, p. 533-538.
- Swartz, D. H., 1951, The "Red Beds" of Michigan, MS: University of Michigan.
- Synowiec, K. A., 1981, Stratigraphy of the Neda Formation in Eastern Wisconsin, Northern Illinois and Eastern Iowa, MS: University of Wisconsin-Milwaukee, 115 p.
- Syrjamaki, R. M., 1977, The Prairie Du Chien Group of the Michigan Basin, MS: Michigan State University.
- Tabor, N. R., 1951, Ostracods of the family Hollinidae from the Genshaw Formation of Michigan, MS: University of Michigan.
- Taggart, R. E., and Parker, L. R., 1976, A new fossil alga from the Silurian of Michigan: American Journal of Botany, v. 63, no. 10, p. 1390-1392.

- Takacs, M. J., Long, D. T., Wilson, T. P., and Rezabek, D. H., 1988, The origin of near-surface saline ground waters; central Michigan Basin, First Annual Ground Water Geochemistry Conference: Dublin, OH, United States (USA), Natl. Water Well Assn., Dublin, OH, p. 77-101.
- Tanis, F. J., and Thomas, G. S., 1979, Environmental monitoring and analysis in support of Antrim oil shale research: U.S. Department of Energy Topical Report, p. 1-172.
- Tarbell, E., 1941, Antrim-Ellsworth-Coldwater Shale formations in Michigan: American Association of Petroleum Geologists Bulletin, v. 25, no. 4, p. 724-733.
- , 1945, The (Devonian) Antrim-(Mississippian) Ellsworth and Coldwater Formations in Michigan, MS: University of Michigan.
- Tatlock, D. B., 1955, Stratigraphy and paleontology of a well core through Upper and Middle Silurian strata in Oakland County, Michigan, MA: University of Michigan.
- Taylor, D. W., 1951, Stratigraphy and fauna of (Devonian) Detroit River Group (Michigan, Ontario, Ohio), MS: University of Michigan.
- Taylor, F. B., 1895, Niagara and the Great Lakes: American Journal of Science, v. 149, no. 292, p. 249-270.
- Taylor, T. R., 1982, Petrographic and Geochemical Characteristics of Dolomite Types and the Origin of Ferroan Dolomite in the Trenton Formation, Michigan, PhD: Michigan State University, 75 p.
- Taylor, T. R., and Sibley, D. F., 1986, Petrographic and Geochemical Characteristics of Dolomite Types and the Origin of Ferroan Dolomite in the Trenton Formation, Ordovician, Michigan Basin, USA: Sedimentology, v. 33, no. 1, p. 61-86.
- Telford, P. G., and Russell, D. J., 1981, Paleozoic geology of the Windsor-Essex and Pelee Island area, southern Ontario: Toronto, ON, Canada (CAN), Ontario Geological Survey, Toronto, ON, p. 0-1 sheet.
- Telford, P. G., Von Bitter, P. H., and Tarrant, G. A., 1977, Lower Middle Devonian conodont biostratigraphy and paleoecology Niagara Peninsula, Ontario, Canada: Royal Ontario Museum Life Sciences Occasional Paper, no. 30, p. 1-14.
- ten Have, L. E., 1979, Relationship of dolomite/limestone ratios to the structure and producing zones of the West Branch Oil Field, Ogemaw County, Michigan, MS: Michigan State University, 106 p.
- Terwilliger, F. W., 1951, Oil-gas drilling operations decline in 1951: Michigan Manufacturer & Financial Record, v. 89, no. 5.
- , 1953, Eight new oil fields opened during 1952: Michigan Manufacturer & Financial Record, v. 91, no. 5, p. 26, 32.
- , 1954, Nine new state oil fields opened in 1953: Michigan Manufacturer & Financial Record, v. 93, no. 5, p. 34, 63.
- Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., 1965, Guidebook: Geology of Central Ontario, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, 97 p.
- Textoris, D. A., and Carozzi, A. V., 1964, Petrography and evolution of Niagaran (Silurian) reefs, Indiana: American Association of Petroleum Geologists Bulletin, v. 48, no. 4, p. 397-426.
- Tharp, M., 1945, Subsurface studies of the (Lower Devonian) Detroit River series (Michigan, Ontario, Ohio), MS: University of Michigan.
- Thiel, G. A., 1935, Sedimentary and petrographic analysis of the St. Peter Sandstone: Geological Society of America Bulletin, v. 46, no. 1/4, p. 559-613.
- Thiruvathukal, J. T., 1963, A regional gravity study of basement and crustal structures in the Southern Peninsula of Michigan, MS: Michigan State University.
- Thomas, G. S., 1980, Environmental monitoring and analysis in support of Antrim Oil Shale research: U.S. Department of Energy Topical Report, p. 1-92.

- Thomas, W. A., 1931a, First Annual Excursion, Michigan Academy of Science Field Excursion to Saginaw Bay Region, p. 1-4.
- , 1931b, A Study of the Marshall Formation in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 14, no. 487-498.
- Thompson, S. L., 1963, Stratigraphic and structural relationships governing Mississippian gas occurrence in Mecosta County and the Falmouth gas field in Missaukee County, Michigan, MS: Michigan State University.
- Thornton, J. E., 2008, Stratigraphy and paleontology of the Middle Devonian Silica Formation of Northern Ohio, BS: Eastern Michigan University, 19 p.
- , 2011, Prediction of Petrophysical properties of Trenton-Black River (Ordovician) Reservoirs by comparing pore architecture and permeability to Sonic Velocity, MS: Western Michigan University, 414 p.
- Thwaites, F. T., 1912, Sandstones of the Wisconsin coast of Lake Superior: Wisconsin Geological and Natural History Survey Bulletin, v. 25, p. 1-109.
- , 1923, The Paleozoic rocks found in Deep Wells in Wisconsin and Northern Illinois: Journal of Geology, v. 31, no. 7, p. 529-555.
- , 1933, Well logs in the Northern Peninsula of Michigan showing the Cambrian Section: Michigan Academy of Science, Arts, and Letters, v. 19, p. 413-426.
- , 1943, Stratigraphic Work in Northern Michigan, 1933-1941: Papers of the Michigan Academy of Science, Arts and Letters, v. 28, no. 3, p. 487-502.
- Tillman, J. R., 1958, A study of the Middle Devonian species of the genera *Alveolites* and *Planalveolites* from the Traverse Group of Michigan, MS: University of Michigan.
- Tillman, J. R., 1962, Variation in species of *Mucrospirifer* from Middle Devonian rocks of Michigan, Ontario and Ohio, PhD: University of Michigan, 43 p.
- Tillman, J. R., 1964, Variation in species of *Mucrospirifer* from Middle Devonian rocks of Michigan, Ontario, and Ohio: Journal of Paleontology, v. 38, no. 5, p. 952-964.
- Tinklepaugh, B. M., 1957, A Chemical, Statistical and Structural Analysis of Secondary Dolomitization in the Rogers City - Dundee Formation of the Central Michigan Basin, PhD: Michigan State University, 125 p.
- Tipping, R. G., Runkel, A. C., Alexander, E. C., Alexander, S. C., and Green, J. A., 2006, Evidence for hydraulic heterogeneity and anisotropy in the mostly carbonate Prairie du Chien Group, southeastern Minnesota, USA: Sedimentary Geology, v. 184, no. 3-4, p. 305-330.
- Toelle, B. E., 2012, Use of 3D Seismic Azimuthal Iso-Frequency Volumes for the Detection and Characterization of High Porosity/Permeability Zones in Carbonate Reservoirs, PhD: West Virginia University.
- Tollefson, L. J. S., 1979, Paleoenvironmental analysis of the Kokomo and Kenneth Limestone Members of the Salina Formation in the vicinity of Logansport, Indiana, MS: University of Illinois, 173 p.
- Tomastik, T. E., 1997, The sedimentology of the Bass Islands and Salina Groups in Ohio and its effect on salt-solution mining and underground storage, USA: Carbonates and Evaporites, v. 12, no. 2, p. 236-253.
- Towne, S., 2013, Late Mississippian (Chesterian) Through Early Pennsylvanian (Atokan) Strata, Michigan Basin, U.S.A., MS: Western Michigan University, 267 p.
- Towne, S., Barnes, D., Westjohn, D. B., and Harrison, W. B., III, 2013, A core workshop; Late Mississippian (Chesterian) through Early Pennsylvanian (Atokan) strata, Michigan Basin, USA: Geological Society of America Field Guide, v. 31, p. 119-148.
- Trauffer, W. E., 1953, Unusual methods used to supply limestone for Michigan cement plant: Pit and Quarry, v. 46, no. 2, p. 78-90.

- Treesh, M., 1972, Sedimentology and stratigraphy of the Salina Group (upper Silurian) in East-central New York: Guidebook - New York State Geological Association, Meeting, no. 44, p. B1-B22.
- Treesh, M. I., and Friedman, G. M., 1973, A New Interpretation of the Salina Group (Upper Silurian) of New York; Sabkha Deposition: International Symposium on Salt [Proceedings], v. 4, p. 27-27.
- , 1974, Sabkha deposition of the Salina Group (upper Silurian) of New York State, United States (USA), North. Ohio Geol. Soc., Inc., Cleveland, Ohio, Fourth Symposium on Salt, Volume one (edited by Coogan, Alan H.); General Geology of Salt and Other Evaporites.
- Tremper, L. R., 1973, Lithofacies and stratigraphic analysis of the Salina Group of the "North Slope" of the Michigan Basin, MS: University of Michigan, 56 p.
- Trevail, R. A., 1991a, Hillman Pool, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 303-310.
- , 1991b, Petrolia East Pool, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 271-276.
- Trisch, S., 2006, Crosswell seismic amplitude variation with angle studies at a Niagaran reef, MS: Michigan Technological University.
- Trout, J. L., 2012, Relative abundance and general distribution of fauna in a Silurian (Wenlock) Pinnacle Reef Complex - Ray Reef, Macomb County, Michigan, MS: Western Michigan University, 300 p.
- Trowbridge, A. C., and Atwater, G. I., 1934, Stratigraphic problems in the Upper Mississippi Valley: Geological Society of America Bulletin, v. 45, p. 21-80.
- Tuffnell, P., and Ludvigsen, R., 1984, The trilobite *Triarthrus* in the Whitby Formation (Upper Ordovician) of southern Ontario and a biostratigraphic framework: Open File Report - Ontario Geological Survey, p. 58-58.
- Turner, S., Kuglitsch, J. J., and Clark, D. L., 1999, Llandoveryian thelodont scales from the Burnt Bluff Group of Wisconsin and Michigan: Journal of Paleontology, v. 73, no. 4, p. 667-676.
- Turner, W. S., 1977, A geochemical analysis of Upper Silurian dolomites of northwest Ohio, MS: University of Toledo, 82 p.
- Twenhofel, W. H., Raasch, G. O., and Thwaites, F. T., 1935, Cambrian Strata of Wisconsin: Geological Society of America Bulletin, v. 46, p. 1687-1744.
- Tyler, J. G., 1980, Subsurface geology and depositional systems of the Upper Mississippian-Lower Pennsylvanian Bayport and Saginaw Formations, central Michigan Basin, MS: Wayne State University, 133 p.
- , 1991, South Chester 21 Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 157-164.
- Tyler, J. H., 1963, Petrology, fauna, and paleoecology of the type Four Mile Dam Limestone, Alpena County, Michigan, PhD: University of Michigan, 162 p.
- Tyler, J. H., 1964, *Anostylostroma-Anacolumna* n. sp. from the Four Mile Dam Limestone (Hamilton), Alpena County, Michigan: Journal of Paleontology, v. 38, no. 5, p. 885-&.
- Tyler, J. H., 1965, Gastropods from the Middle Devonian Four Mile Dam Limestone (Hamilton) of Michigan: Journal of Paleontology, v. 39, no. 3, p. 341-349.
- , 1969, Genesis and environmental energy of a Devonian lagoonal bank near Alpena, Michigan: Journal of Sedimentary Research, v. 39, no. 2, p. 509-520.
- Tynan, E. J., 1959, Occurrence of *Cordaites michiganensis* in Oklahoma: Oklahoma Geology Notes, v. 19, no. 3, p. 43-46.
- Uhri, D. C., 1954, The correlation of Cincinnati environments by spectrographic analysis of associated fossils, MS: Michigan State University, 54 p.
- Ulteig, J. R., 1963, Upper Niagaran and Cayugan stratigraphy of northeastern Ohio and adjacent areas, MS: University of Wyoming, 112 p.

- U.S. Geological Survey Michigan Basin Province Assessment Team, 2015, Geologic assessment of undiscovered oil and gas resources of the U.S. portion of the Michigan Basin: U.S. Geological Survey Digital Data Series, v. DDS-69-T.
- Upp, J. E., Jr., 1969a, Reed City Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 149-160.
- , 1969b, Six Lakes Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 169-172.
- Utterback, D. D., 1936, A study of outcropping bituminous limestones and sandstones with reference to porosity and to the origin and migration of petroleum, PhD: University of Illinois.
- Uyeno, T. T., Telford, P. G., and Sanford, B. V., 1982, Devonian conodonts and stratigraphy of southwestern Ontario: Bulletin - Geological Survey of Canada, v. 332, p. 55-55.
- Van Loon, A. J., 1987, St-Peter Sandstone - a Still Closer Look Required - Discussion: Journal of Sedimentary Petrology, v. 57, no. 5, p. 939-939.
- Van Pelt, H. L., 1933, Some ostracodes from the Bell Shale, Middle Devonian, of Michigan: Journal of Paleontology, v. 7, no. 3, p. 325-342.
- Van Regenmorter, J., Videtich, P. E., and Neal, W. J., 2008, Coprolites, cololites, and fish fossils in the Mississippian Michigan Formation, western Michigan: Michigan Academician, v. 38, no. 1-2, p. 21-35.
- VanArsdalen, R. C., 1994, Fracture studies in Silurian carbonate rocks, South Bass Island, Lake Erie, BS: University of Toledo, 23 p.
- Vanderwilt, J. W., 1924, A Drill Core Section of the Salina Below the Salt Bed of The Detroit Rock Salt Company Mine: Papers of the Michigan Academy of Science, Arts and Letters, v. 3, p. 285-287.
- Vandrey, M. R., 1991, Stratigraphy, Diagenesis, and Geochemistry of The Middle Ordovician Glenwood Formation, Michigan Basin, MS: University of Wisconsin Madison, 239 p.
- Vanlier, K. E., and Wheeler, M. L., 1968a, Analog simulation of ground-water developments of the Saginaw Formation, Lansing Metropolitan Area, Michigan: Tri-County Planning Commission Ground-water Report, p. 1-40.
- , 1968b, Ground-water potential of the Saginaw Formation in the Lansing metropolitan area, Michigan: U.S. Geological Survey Open-File Report, p. 1-40.
- Vantuyl, D. E., and Thomson, W. J., 1986, Reaction kinetics of the gasification of Michigan Antrim Oil Shale char: Fuel, v. 65, no. 1, p. 58-62.
- Varga, L. L., 1981, Dolomitization of the Brassfield Formations (Lower Silurian) in Adams County, Ohio, MS: Western Michigan University, 74 p.
- Velbel, M. A., and Brandt, D., 1989, Sedimentology and Paleogeography of the Pennsylvanian Strata of Grand Ledge, Michigan, Michigan Basin Geological Society, 33 p.
- Velbel, M. A., Price, J. R., and Brandt, D., 1994, Sedimentology, Paleogeography, and Geochemical Weathering of the Pennsylvanian Strata of Grand Ledge, Michigan, Eastern Section AAPG/Great Lakes Section-SEPM, 58 p.
- Venable, N. B. H., 2006, Sedimentology and Stratigraphy of the Pennsylvanian Saginaw Aquifer, Central Lower Michigan, U.S.A., MS: Western Michigan University.
- Venable, N. B. H., Barnes, D. A., Westjohn, D. B., Ravn, R. L., and Walega, A., 2010, Pennsylvanian Fluvial-Deltaic Depositional Systems in Central Lower Michigan: Sedimentology, Stratigraphy, and Hydrogeology of the Saginaw Aquifer, Guidebook for the field trip held Sunday, September 26th, 2010 in conjunction with the AAPG Eastern Section Meeting, September 25-29th, 2010, Kalamazoo, Michigan, USA, 61 p.
- Venable, N. B. H., Barnes, D. A., Westjohn, D. B., and Voice, P. J., 2013, Pennsylvanian fluvial-deltaic depositional systems in central lower Michigan: Sedimentology, stratigraphy, and

- hydrogeology of the Saginaw Aquifer: Geological Society of America Field Guide, v. 31, p. 37-56.
- Venkatachala, B. S., and Salujha, S. K., 1971, Pollen and spores from the Pre-Verne cyclical Formation of the Saginaw Group, Grand Ledge, Michigan, U.S.A.: Contributions from the Museum of Paleontology The University of Michigan, v. 23, no. 17, p. 263-281.
- Ver Wiebe, W. A., 1927a, Geology of Chippewa County, Michigan: Michigan Geological Survey Open File Report, v. 65.
- , 1927b, The Stratigraphy of Alpena County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 181-192.
- , 1928, Stratigraphy of Chippewa County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 8, p. 309-331.
- Verhoeven, C. S., 1948, Possibility of determining restricted reef conditions from the areal distribution of the widely distributed contemporaneous detrital and lagunal facies MS: Michigan State University, 32 p.
- Verma, H. M., 1979, Geology and Fossils Craigeleith Area: Ontario Geological Survey Guidebook, v. 7, p. 61.
- Versical, R. T., 1991, Basement Control on the Development of Selected Michigan Basin Oil and Gas Fields as Constrained by Fabric Elements in Paleozoic Limestones, MS: Western Michigan University, 204 p.
- Vogler, E. A., Meyers, P. A., and Moore, W. A., 1981, Comparison of Michigan Basin crude oils: *Geochimica et Cosmochimica Acta*, v. 45, p. 2287-2293.
- Voice, P. J., and Harrison, W. B., III, 2014, Paleozoic Geology of the Central Upper Peninsula of Michigan, Michigan Basin Geological Society and Michigan Geological Survey, 111 p.
- Votaw, R. B., 1980a, Middle and Upper Ordovician Conodonts from the Upper Peninsula of Michigan, *in* Votaw, R. B., ed., Ordovician and Silurian Geology of the Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 18-22.
- , 1980b, Ordovician and Silurian Geology of the Northern Peninsula of Michigan, Michigan Basin Geological Society, 40 p.
- , 1980c, Ordovician and Silurian Road Log, *in* Votaw, R. B., ed., Ordovician and Silurian Geology of the Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 1-16.
- , 1980d, Ordovician Exposures in the central part of the Upper Peninsula of Michigan, *in* Votaw, R. B., ed., Ordovician and Silurian Geology of the Northern Peninsula of Michigan, Michigan Basin Geological Society, p. 23-32.
- , 1985, Conodont biostratigraphic correlations around the Michigan Basin, *in* Cercone, K. R., and Budai, J. M., eds., Ordovician and Silurian rocks of the Michigan Basin, Volume 4, Michigan Basin Geological Society, p. 59-72.
- Vrona, J. P., 1991, Hardwood Point Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 397-404.
- Vugrinovich, R., 1984, Lithostratigraphy and depositional environments of the Pennsylvanian rocks and the Bayport Formation of the Michigan Basin: Michigan Geological Survey Report of Investigation, v. 27, p. 1-22.
- , 1986, Patterns of regional subsurface fluid movement in the Michigan Basin: Michigan Geological Survey Division Open File Report, v. OFR 86-6, p. 1-17.
- , 1987, Regional heat flow variations in the Northern Michigan and Lake Superior region determined using the silica heat flow estimator: *Journal of Volcanology and Geothermal Research*, v. 34, p. 15-24.
- , 1988a, Relationships between regional hydrogeology and hydrocarbon occurrences in Michigan, USA: *Journal of Petroleum Geology*, v. 11, p. 429-442.

- Vugrinovich, R., 1988b, Shale compaction in the Michigan Basin; estimates of former depth of burial and implications for paleogeothermal gradients: *Bulletin of Canadian Petroleum Geology*, v. 36, no. 1, p. 1-8.
- Vugrinovich, R., 1989, Subsurface temperatures and surface heat flow in the Michigan Basin and their relationships to regional subsurface fluid movement: *Marine and Petroleum Geology*, v. 6, p. 60-70.
- Vugrinovich, R., and Matzkanin, A. D., 1981, West Branch Field Dundee Oil Pool Secondary Recovery Report, v. 8, p. 1-13.
- Wachsmuth, C., 1884a, Description of a new crinoid from the Hamilton Group of Michigan: *Davenport Academy Science Proceedings*, v. 4, p. 95-97.
- , 1884b, On a new genus and species of blastoids *Davenport Academy Science Proceedings*, v. 4, p. 76-87.
- Wadsworth, M. E., 1891a, The relation of the eastern sandstone of Keweenaw Point to the Lower Silurian limestones: *Science*, v. 18, no. 25-25.
- , 1891b, The relation of the eastern sandstone of Keweenaw Point to the Lower Silurian limestones: *American Journal of Science*, v. 142, no. 248, p. 170-171.
- Wagenvelt, K. A., 2015, Thermal history of the Michigan Basin: Results from thermal maturation data and geodynamic modelling, MS: Western Michigan University, 176 p.
- Wagner, W. R., 1976, Silurian reef complex, Rockford, Ohio; constitution, growth, and significance *American Association of Petroleum Geologists Bulletin*, v. 60, no. 3, p. 428-451.
- Walcott, C. D., 1914, *Dikelocephalus* and other genera of the Dikelocephalinae: *Smithsonian Miscellaneous Collections*, v. 57, p. 345-412.
- Walker, J. W., 1953, Stratigraphy and insoluble residues of the Inkster Junction core, Wayne County, Michigan, MS: University of Michigan.
- Walles, F. E., 1980, Niagaran Pinnacle Reefs of South Central Michigan, MS: Michigan State University, 325 p.
- Walsworth, K. G., 1950, General Information pertaining to Michigan's oil and gas industry: *Michigan Geological Survey*, p. 1-14.
- Walter, L. M., Budai, J. M., Richards, J. A., Martini, A. M., and Abriola, L. M., 1993, Regional hydrogeochemistry of the Antrim Shale.
- Wanenmacher, J. M., Twenhofel, W. H., and Raasch, G. O., 1934, The Paleozoic Strata of the Baraboo Area, Wisconsin: *American Journal of Science*, v. 228, p. 1-30.
- Wang, H. F., Crowley, K. D., and Nadon, G. C., 1994, Thermal History of the Michigan Basin from Apatite Fission-Track Analysis and Vitrinite Reflectance, *in* Ortoleva, P. J., ed., *Basin Compartments and Seals*, Volume 61, AAPG, p. 167-177.
- Wanless, H. R., and Shideler, G. L., 1975, Michigan Basin Region, *in* McKee, E. D., Crosby, E. J., Bachman, G. O., Bell, K. G., Dixon, G. H., Frezon, S. E., Glick, E. E., Irwin, W. P., Mallory, W. W., Mapel, W. J., Maughan, E. K., Prichard, G. E., Shideler, G. L., Stewart, G. F., Wanless, H. R., and Wilson, R. F., eds., *Paleotectonic Investigations of the Pennsylvanian System in the United States*, Volume 853, U.S. Geological Survey, p. 61-70.
- Wardlaw, M. S., 1981, Origin and Geochemistry of Carbonate Concretions, Antrim Shale (Devonian, Michigan Basin), MS: Michigan State University, 86 p.
- Warren, E., 1947, Deep drilling in Michigan: *Michigan Conservation*, v. 16, no. 6.
- Warrier, R. B., Castro, M. C., Hall, C. M., and Lohmann, K. C., 2013, Large atmospheric noble gas excesses in a shallow aquifer in the Michigan Basin as indicators of a past mantle thermal event: *Earth and Planetary Science Letters*, v. 375, p. 372-382.
- Warthin, A. S., 1939, The Bearing of the Detroit River Series on Devonian Correlations: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 24, no. 4, p. 75-78.

- Warthin, A. S., and Cooper, G. A., 1935a, Devonian studies in southwestern Ontario and Michigan: Smithsonian Institution Exploration and Field Work, v. 3300, p. 13-16.
- Warthin, A. S., and Cooper, G. A., 1943, Traverse rocks of Thunder Bay region, Michigan: American Association of Petroleum Geologists Bulletin, v. 27, no. 5, p. 571-595.
- Warthin, A. S., Jr., 1934, Common Ostracoda of the Traverse Group: Contributions from the Museum of Paleontology The University of Michigan, v. 4, no. 12, p. 205-226.
- Warthin, A. S., Jr., and Cooper, G. A., 1935b, New formation names in the Michigan Devonian: Journal of the Washington Academy of Sciences, v. 25, no. 12, p. 524-526.
- Wasson, T., 1933, Oil and gas developments in Michigan during 1932: American Institute of Mining Engineers Transactions, v. 103, p. 285-290.
- , 1934, Oil and gas developments in Michigan during 1933: American Institute of Mining Engineers Transactions, v. 107, p. 253-258.
- , 1935, Oil and gas developments in Michigan during 1934: American Institute of Mining Engineers Transactions, v. 114, p. 332-336.
- , 1936, Oil and gas developments in Michigan during 1935: American Institute of Mining Engineers Transactions, v. 118, p. 298-304.
- , 1937, Oil and gas developments in Michigan during 1936: American Institute of Mining Engineers Transactions, v. 123, p. 397-403.
- , 1938, Oil and gas developments in Michigan during 1937: American Institute of Mining Engineers Transactions, v. 127, p. 438-443.
- , 1939, Oil and gas developments in Michigan during 1938: American Institute of Mining Engineers Transactions, v. 132, p. 352-357.
- , 1940, Oil and gas developments in Michigan during 1939: American Institute of Mining Engineers Transactions, v. 136, p. 332-336.
- , 1941, Oil and gas developments in Michigan during 1940: American Institute of Mining Engineers Transactions, v. 142, p. 347-351.
- , 1942, Oil and gas developments in Michigan during 1941: American Institute of Mining Engineers Transactions, v. 146, p. 348-354.
- , 1943, Oil and gas developments in Michigan during 1942: American Institute of Mining Engineers Transactions, v. 151, p. 393-399.
- , 1944, Oil and gas developments in Michigan during 1943: American Institute of Mining Engineers Transactions, v. 155, p. 386-396.
- , 1945, Oil and gas developments in Michigan during 1944: American Institute of Mining Engineers Transactions, v. 160, p. 398-406.
- Watkins, J. L., 1958, Middle Devonian Auloporid Corals from the Traverse Group of Michigan, PhD: University of Michigan, 83 p.
- , 1959, Middle Devonian auloporid corals from the Traverse Group of Michigan: Journal of Paleontology, v. 33, no. 5, p. 793-808.
- Watkins, R., 1991, Guild Structure and Tiering in a High-Diversity Silurian Community, Milwaukee County, Wisconsin: Palaios, v. 6, p. 465-478.
- Watkins, R., 1993, Silurian of the Great Lakes region; Part 1: Wenlock *Rhipidum* community and conodont fauna from Limestone Mountain, Michigan: Contributions in Biology and Geology, v. 86, p. 1-19.
- Watkins, R., 1994, Evolution of Silurian Pentamerid Communities in Wisconsin: Palaios, v. 9, no. 5, p. 488-499.
- Watkins, R., 1998, Silurian reef-dwelling pentamerid brachiopods, Wisconsin and Illinois, USA: Paläontologische Zeitschrift, v. 72, no. 1-2, p. 99-109.
- , 1999, Silurian of the Great Lakes region; Part 4, Llandoverly (Aeronian) brachiopods of the Burnt Bluff Group, northeastern Wisconsin and northern Michigan: Contributions in Biology and Geology, v. 92, p. 29-29.

- Watkins, R., and Kuglitsch, J. J., 1997, Lower Silurian (Aeronian) megafaunal and conodont biofacies of the northwestern Michigan basin: *Canadian Journal of Earth Sciences*, v. 34, no. 6, p. 753-764.
- Watkins, R., Walsh, K. A., and Kuglitsch, J. J., 1999, Silurian (Llandovery/Wenlock) Foraminiferida in carbonate environments of southeastern Wisconsin: *Journal of Paleontology*, v. 73, no. 3, p. 540-546.
- Watson, J. K., 1972, Stratigraphic correlation of the Niagaran-lower Salina units, MS: University of Michigan, 24 p.
- Way, H. G., 1932, Stratigraphy of the Silurian section on Manitoulin Island, Ontario, MA: University of Toronto, 51 p.
- Weekes, A. F., 1981, Lithofacies and paleoenvironments of a Silurian core, Sandusky, Ohio, MS: State University of New York Fredonia, 87 p.
- Weiss, M., 1951, Ostracod fauna of the Norway Point Formation of Michigan, MS: University of Michigan.
- Wellman, D. C., 1937, Insoluble residues of Dundee and Detroit River (upper Monroe) Formations of central Michigan: *American Association of Petroleum Geologists Bulletin*, v. 21, no. 3, p. 317-332.
- Wells, N. A., Coogan, A. H., and Majoras, J. J., 1991, Field guide to Berea Sandstone outcrops in the Black River Valley at Elyria, Ohio -- Slumps, slides, mud diapirs and associated fracturing in Mississippian delta deposits: *Ohio Journal of Science*, v. 91, no. 1, p. 35-48.
- Wen, T., Castro, M. C., Ellis, B. R., Hall, C. M., and Lohmann, K. C., 2015, Assessing compositional variability and migration of natural gas in the Antrim Shale in the Michigan Basin using noble gas geochemistry: *Chemical Geology*, v. 417, p. 356-370.
- Wen, T., Castro, M. C., Hall, C. M., Pinti, D. L., and Lohmann, K. C., 2016, Constraining groundwater flow in the glacial drift and saginaw aquifers in the Michigan Basin through helium concentrations and isotopic ratios: *Geofluids*, v. 16, no. 1, p. 3-25.
- Wender, C., 1943, Speeding the search for oil: *Michigan Conservation*, v. 12, no. 1.
- West, N., Schreiber, M., and Gotkowitz, M., 2012, Arsenic release from chlorine-promoted alteration of a sulfide cement horizon: Evidence from batch studies on the St. Peter Sandstone, Wisconsin, USA: *Applied Geochemistry*, v. 27, no. 11, p. 2215-2224.
- Westbrook, J. R., 1991, Michigan Oil and Gas Story: County by County, Mt. Pleasant, Michigan Oil and Gas News, 208 p.
- Westjohn, D. B., 1994a, Geohydrology of Carboniferous Aquifers of the Michigan Basin, Great Lakes Section-SEPM Fall Field Conference, Great Lakes Section-SEPM.
- , 1994b, Michigan Basin solid-phase investigation, *in* Westjohn, D. B., ed., *Geohydrology of Carboniferous Aquifers of the Michigan Basin*, Great Lakes Section-SEPM, p. D1-D11.
- , 1994c, Road log and Description of Stops, *in* Westjohn, D. B., ed., *Geohydrology of Carboniferous Aquifers of the Michigan Basin*, Great Lakes Section-SEPM, p. A1-A9.
- Westjohn, D. B., and Hoard, C. J., 2006, Hydrogeology and ground-water quality, Chippewa Township, Isabella County, Michigan, 2002-05: Scientific Investigations Report, p. 27-27.
- Westjohn, D. B., Olsen, H. W., and Willden, A. T., 1990, Matrix-controlled hydraulic properties of Mississippian and Pennsylvanian sandstones from the Michigan Basin: Open-File Report - U. S. Geological Survey, 18 p.
- Westjohn, D. B., and Weaver, T. L., 1994, Geologic setting and hydrogeologic framework of Carboniferous rocks in the Michigan Basin, *in* Westjohn, D. B., ed., *Geohydrology of Carboniferous Aquifers of the Michigan Basin*, Great Lakes Section-SEPM, p. B1-B32.
- , 1996, Hydrogeologic Framework of Mississippian Rocks in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4246, p. 1-46.
- , 1998, Hydrogeologic framework of the Michigan Basin Regional Aquifer System: U. S. Geological Survey Professional Paper, v. 1418, p. 1-47.

- Weyer, D., 1972, On the age of the ammonoid fauna of the Marshall Sandstone (Lower Carboniferous) Michigan, USA): *Berichte der Deutschen Gesellschaft für Geologische Wissenschaften - Reihe A: Geologie und Paläontologie*, v. 17, no. 3, p. 325-350.
- Wheeler, M. L., 1967, Electric analog model study of the hydrology of the Saginaw Formation in the Lansing, Michigan area, MS: Michigan State University, 74 p.
- Wheeler, M. L., 1970, Electric analog model study of the hydrology of the Saginaw Formation in the Lansing, Michigan area; 1963: Technical Report - Institute of Water Research, Michigan State University, no. 10, p. 1-63.
- White, W. A., 1992, Displacement of salt by the Laurentide Ice Sheet: *Quaternary Research*, v. 38, no. 3, p. 305-315.
- Whittemore, C. A., 1900, The Sub-Carboniferous Limestone Exposure at Grand Rapids, Mich.: *First Report of the Michigan Academy of Science*, v. 1, p. 62-65.
- Whitten, E. H. T., 1970, Orthogonal polynomial trend surfaces for irregularly spaced data: *Journal of the International Association for Mathematical Geology*, v. 2, no. 2, p. 141-152.
- Whitten, E. H. T., and Beckman, W. A., 1969, Fold geometry within part of Michigan Basin, Michigan: *American Association of Petroleum Geologists Bulletin*, v. 53, no. 5, p. 1043-1057.
- Wicander, R., and Playford, G., 1999, Biostratigraphic and paleogeographic implications of an Upper Ordovician acritarch assemblage from the Bill's Creek and Stonington Formations, Michigan, USA: *Acta Universitatis Carolinae. Geologica*, v. 43, no. 1-2, p. 267-268.
- , 2008, Upper Ordovician microphytoplankton of the Bill's Creek Shale and Stonington Formation, Upper Peninsula of Michigan, U.S.A.: *Biostratigraphy and paleogeographic significance: Revue de Micropaleontologie*, v. 51, p. 39-66.
- Wild, R. C., 1958, Sedimentary analysis of the Middle Devonian Sylvania Sandstone in the Michigan Basin, MS: Michigan State University.
- Wildey, E. A., 1906, 37th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1905.
- , 1907, 38th Annual Report of the Inspector of Salt of the State of Michigan for the year ending November 30th, 1906.
- Wilkinson, B. H., 1987, Middle Devonian Cratonic Carbonates and Shales in Southwestern Ontario, Michigan Basin Geological Society, 11 p.:
- Wilkinson, B. H., Diedrich, N. W., Drummond, C. N., and Rothman, E. D., 1998, Michigan hockey, meteoric precipitation, and rhythmicity of accumulation on peritidal carbonate platforms: *Geological Society of America Bulletin*, v. 110, no. 8, p. 1075-1093.
- Williams, E. L., Szramek, K. J., Jin, L. X., Ku, T. C. W., and Walter, L. M., 2007, Carbonate system geochemistry of shallow groundwater-surface water systems in temperate glaciated watersheds (Michigan, USA): Significance of open-system dolomite weathering: *Geological Society of America Bulletin*, v. 119, no. 5-6, p. 515-528.
- Williams, M. Y., 1920, Silurian Geology and Faunas of Ontario Peninsula and Manitoulin and Adjacent Islands: *Geological Survey of Canada Memoir*, v. III, no. 91, p. 1-195.
- Willman, H. B., 1962, The Silurian Strata of Northeastern Illinois, *in* Fisher, J. H., ed., *Silurian Rocks of the Southern Lake Michigan Area*, Michigan Basin Geological Society, p. 61-68.
- Wilson, H. T., 1955, Paleontology and stratigraphy of a well core through Silurian and Ordovician strata in Oakland County, Michigan, MS: University of Michigan.
- Wilson, J. A., 1999, Petrologic constraints of possible reactions of saline formation water with sediments at equilibrium with fresh pore water, Saginaw Bay, MS: Michigan State University, 66-66 p. p.

- Wilson, J. L., and Sengupta, A., 1985, The Trenton Formation in the Michigan Basin and environs: Pertinent questions about its stratigraphy and diagenesis, *in* Cercone, K. R., and Budai, J. M., eds., Ordovician and Silurian Rocks of the Michigan Basin and its Margins, Volume 4, Michigan Basin Geological Society, p. 1-14.
- Wilson, S. E., 1983, Small gas fields in Michigan, The Future of small energy resources: an International conference, p. 62-66.
- Wilson, S. E., Layton, F., Lorenz, J. S., Matzkanin, A. D., and Pollom, R. J., 1976a, Cranberry Lake Field Richfield Oil Pool Enhanced Oil and Gas Recovery in Michigan: Secondary Recovery Report, v. 3, p. 1-10.
- Wilson, S. E., Layton, F. L., Lorenz, J. S., Matzkanin, A. D., and Pollom, R. J., 1976b, Hamilton Field Richfield Oil Pool Enhanced Oil and Gas Recovery in Michigan: Secondary Recovery Report, v. 1, p. 1-10.
- Wilson, T. P., 1989, Origin and geochemical evolution of the Michigan Basin brine, PhD: Michigan State University, 272 p.
- Wilson, T. P., and Long, D. T., 1992, Evolution of CaCl₂ brine in Silurian aged formations of the Michigan Basin, USA; the role of mineralogic reactions and evaporite diagenesis: Proceedings - International Symposium on Water-Rock Interaction, v. 7, p. 1213-1216.
- , 1993a, Geochemistry and isotope chemistry of Ca-Na-Cl brines in Silurian strata, Michigan Basin, U.S.A.: Applied Geochemistry, v. 8, p. 507-524.
- Wilson, T. P., and Long, D. T., 1993b, Geochemistry and isotope chemistry of Michigan Basin Brines: Devonian formations: Applied Geochemistry, v. 8, p. 81-100.
- Winchell, A., 1861, First biennial report of the progress of the geological survey of Michigan, embracing observations of the geology, zoology, and botany of the Lower Peninsula.
- , 1862a, Descriptions of fossils from the Marshall and Huron Groups of Michigan: Academy of Natural Sciences of Philadelphia Proceedings, p. 405-430.
- , 1862b, Notice of the rocks lying between the Carboniferous limestone of the Lower Peninsula of Michigan and the limestones of the Hamilton Group; with descriptions of some cephalopods supposed to be new to science: American Journal of Science, v. 83, no. 99, p. 352-366.
- , 1862c, On the saliferous rocks and salt springs of Michigan: American Journal of Science, v. 84, no. 102, p. 307-311.
- , 1862d, Salt manufacture of the Saginaw Valley, Michigan: Merchants Magazine and Commercial Review, v. 47, p. 209-223.
- , 1864, Notice of a small collection of fossils from the Potsdam Sandstone of Wisconsin and the Lake Superior Sandstone of Michigan: American Journal of Science, v. 87, no. 110, p. 226-232.
- , 1865a, Descriptions of new species of fossils from the Marshall Group, and its supposed equivalent in other states: Academy of Natural Sciences of Philadelphia Proceedings, v. 17, p. 109-133.
- , 1865b, On the oil formation in Michigan and elsewhere: American Journal of Science, v. 89, no. 117, p. 350-353.
- , 1866, The Grand Traverse region, a report on the geological and industrial resources of the counties of Antrim, Grand Traverse, Benzie, and Leelanau in the Lower Peninsula of Michigan, Ann Arbor, Michigan Geological Survey Open File Report, 97 p.:
- , 1869a, On the geological age and equivalents of the Marshall Group: Proceedings of the American Philosophical Society, v. 11, no. 81, p. 57-82.
- , 1869b, Outline of a proposed final report of a survey of the State of Michigan, Ann Arbor, 8 p.:
- , 1870, On the geological age and equivalents of the Marshall Group: Proceedings of the American Philosophical Society, v. 11, p. 385-418.
- , 1871, Notices and descriptions of fossils from the Marshall Group of the western states: Proceedings of the American Philosophical Society, v. 11, p. 245-260.

- , 1876a, Rectification of the geological map of Michigan American Association for the Advancement of Science Proceedings, v. 24, p. 27-43.
- , 1881, Geology of Washtenaw County, Michigan, History of Washtenaw County: Chicago, p. 141-172.
- Winchell, N. H., 1875, The economical geology of the region of Cheboygan and Old Mackinac in the counties of Presque Isle, Cheboygan and Emmet, State of Michigan: Michigan State Board of Agriculture, Annual Report, v. 1873, p. 103-107.
- , 1876b, On the parallelism of Devonian outcrops in Michigan and Ohio: American Association for the Advancement of Science Proceedings, v. 24, no. B, p. 57-59.
- Winder, C. G., 1968, Micropalaeontology of the Devonian in Ontario, Calgary, International Symposium on the Devonian System, v. 2, p. 711-719.
- Wines, H., 1997, Reservoir Characterization of Crystal Field and Analysis of The Tow #1-3 HD-1 Well, Montcalm County, Michigan, MS: Western Michigan University, 112 p.
- Winter, B. L., Johnson, C. M., Simo, J. A., and Valley, J. W., 1995a, Paleozoic fluid history of the Michigan Basin; evidence from dolomite geochemistry in the Middle Ordovician St. Peter Sandstone: Journal of Sedimentary Research, v. 65, no. 2a, p. 306-320.
- Winter, B. L., Valley, J. W., Simo, J. A., Nadon, G. C., and Johnson, C. M., 1995b, Hydraulic seals and their origin; evidence from the stable isotope geochemistry of dolomites in the Middle Ordovician St. Peter Sandstone, Michigan Basin: American Association of Petroleum Geologists Bulletin, v. 79, no. 1, p. 30-48.
- Wipf, R. A., 1991, Reed City Field, *in* Wollensak, M. S., ed., Oil and Gas Field Manual of the Michigan Basin, Volume 2: Lansing, Michigan Basin Geological Society, p. 423-430.
- Wirth, J. A., 1969, Enterprise Field, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 87-98.
- Witzke, B. J., and Metzger, R. A., 2005, Ordovician conodonts and stratigraphy of the St. Peter Sandstone and Glenwood Shale, central United States: Bulletins of American Paleontology, no. 369, p. 53-91.
- Wolcott, R. H., 1950, Developments in Michigan in 1949: American Association of Petroleum Geologists Bulletin, v. 34, no. 6, p. 1090-1096.
- Wold, J. L., 2008, Sequence stratigraphy and 3-D reservoir characterization of a Silurian (Niagaran) reef - Ray Gas Storage Field, Macomb County, Michigan, MS: Western Michigan University, 104 p.
- Wold, R., 1980, Review of Lake Michigan Seismic Reflection Data: U.S. Geological Survey Open-File Report, v. 80-902.
- Wolf, R. R., 2006, Paleozoic Geology of Cockburn Island, Manitoulin Area: Ontario Geological Survey Open File Report, v. 5424, p. 1-55.
- Wollensak, M. S., 1991, Oil and Gas Fields Symposium, Volume 2, Michigan Basin Geological Society.
- Wong, M. L., 1993, Gravity Modeling of a patch reef in Allegan County, Michigan, BS: Western Michigan University, 40 p.
- Wood, E., 1905, On new and old Middle Devonian crinoids: Smithsonian Miscellaneous Collections, v. 47, no. 1471, p. 56-84.
- Wood, J. R., Allan, J. R., Huntoon, J. E., Pennington, W. D., Harrison III, W. B., Taylor, E., and Tester, C., 1996, Horizontal well success spurs more Devonian work in Michigan: Oil and Gas Journal, no. Oct. 28, 1996, p. 86-89.
- Wood, W. W., 1969, Geochemistry of ground water of the Saginaw Formation in the upper Grand River basin, Michigan, PhD: Michigan State University, 104 p.
- Woodard, H. H., 1972, Syngenetic sandstone beds from Middle Ordovician Saint Peter Sandstone, Wisconsin: Journal of Geology, v. 80, p. 323-332.
- , 1974, Syngenetic sandstone beds from Middle Ordovician St. Peter Sandstone, Wisconsin: a reply: Journal of Geology, v. 82, p. 116-119.

- Woodruff, J. C., 1969, Proration of Michigan Gas Production, *in* Burgess, R. J., ed., Oil and Gas Fields Symposium, Volume 1: Lansing, Michigan Basin Geological Society, p. 1-16.
- Wooten, M. J., 1951, The (Mississippian) Coldwater Formation in the area of the type locality (Michigan), MS: Wayne State University, 52 p.
- Wright, J. D., 1955, The type species of *Spinocyrtia*, Fredericks, and two new species of this brachiopod genus from the Middle Devonian Hamilton Group, in the Thedford-Arkona region of southwestern Ontario, MS: University of Michigan.
- Wright, J. D., 1975, Two new species of a new brachiopod genus from Middle Devonian beds of Ontario and Michigan: Contributions from the Museum of Paleontology The University of Michigan, v. 24, p. 171-180.
- Wright, J. D., and Wright, E. P., 1961, A study of the Middle Devonian Widder Formation of Southwestern Ontario: Contributions from the Museum of Paleontology The University of Michigan, v. 16, no. 5, p. 287-300.
- Wright, R. P., 1980, Middle Devonian Chitinozoa of Indiana: Special Report - Indiana Geological Survey, no. 18, p. 24-24.
- Wuchter, C., Banning, E., Mincer, T. J., Drenzek, N. J., and Coolen, M. J. L., 2013, Microbial diversity and methanogenic activity of Antrim Shale formation waters from recently fractured wells: *Frontiers in Microbiology*, v. 4.
- Wuckert, A. E., 1950, Bioseries of the ostracode *Ponderodictya* in the Traverse Group of Michigan, MS: Michigan State University, 38 p.
- Wulfman, C. E., 1945, Anthraconite near Norwood, Michigan: *Rocks and Minerals*, v. 20, no. 10, p. 483-483.
- Wylie, A. S., 2002, Log curve amplitude slicing -- visualization of well log amplitudes for paleogeographic reconstruction of the Middle Devonian Traverse Group, Michigan Basin, PhD: Michigan Technological University, 166 p.
- , 2004a, Log Curve Amplitude Slicing of the Traverse Group in the Pentwater Field, Oceana County, Michigan, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 79-98.
- , 2004b, Traverse Group Stratigraphy in the Michigan Basin - A detailed Review, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 99-133.
- Wylie, A. S., Jr., and Huntoon, J. E., 2003, Log-curve amplitude slicing: visualization of log data and depositional trends in the Middle Devonian Traverse Group, Michigan Basin, United States: *American Association of Petroleum Geologists Bulletin*, v. 87, no. 4, p. 581-608.
- Wylie, A. S., and Wood, J. R., 2005, Well-log tomography and 3-D imaging of core and log-curve amplitudes in a Niagaran reef, Belle River Mills field, St. Clair County, Michigan, United States: *American Association of Petroleum Geologists Bulletin*, v. 89, no. 4, p. 409-433.
- Xiang, Y., Al, T., Scott, L., and Loomer, D., 2013, Diffusive anisotropy in low-permeability Ordovician sedimentary rocks from the Michigan Basin in southwest Ontario: *Journal of Contaminant Hydrology*, v. 155, p. 31-45.
- Yager, R. M., Kappel, W. M., and Plummer, L. N., 2007, Origin of halite brine in the Onondaga Trough near Syracuse, New York State, USA; modeling geochemistry and variable-density flow: *Hydrogeology Journal*, v. 15, no. 7, p. 1321-1339.
- Yang, L., 2015, A petrophysical evaluation of the Trenton-Black River Formation of the Michigan Basin, MS: Michigan Technological University.
- Yang, T.-Y., 1939, Molluscs of the Middle Devonian Traverse Group of Michigan, PhD: Yale University.
- Yokoyama, K. T., 1981, Geology of the Engadine Group (Silurian) in the subsurface of the northern peninsula of Michigan, MS: Bowling Green State University, 84 p.

- Yoo, C. M., Gregg, J. M., and Shelton, K. L., 2000, Dolomitization and dolomite neomorphism: Trenton and Black River Limestones (Middle Ordovician) northern Indiana, USA: *Journal of Sedimentary Research*, v. 70, no. 1, p. 265-274.
- Young, D. C., and Anonymous, 1978, Chemical and physical properties of Michigan Antrim Shale: DOE/METC (Morgantown Energy Technology Center), p. 129-137.
- Young, R. T., 1955, Significance of the magnesium/calcium ratio as related to structure in the Stony Lake oil field, Michigan, MS: Michigan State University.
- Zacharias, K. F., 1992, Clay mineral diagenesis in the Marshall Sandstone, Michigan Basin, MS: Michigan State University, 95 p.
- Zacharias, K. F., Sibley, D., and Long, D. T., 1994, Pore fluid evolution in an intracratonic basin setting, *in* Westjohn, D. B., ed., *Geohydrology of Carboniferous Aquifers of the Michigan Basin*, Great Lakes Section-SEPM, p. C1-C16.
- Zacharias, K. F., Sibley, D. F., Westjohn, D. B., and Weaver, T. L., 1993, Oxygen-isotope, X-ray-diffraction and scanning-electron-microscope examinations of authigenic-layer-silicate minerals from Mississippian and Pennsylvanian sandstones in the Michigan Basin: U.S. Geological Survey Open-File Report, v. 93-103, p. 1-15.
- Zaitzeff, J. B., 1962, Middle Ordovician Black River ostracods from a well core, Jackson County, Michigan, MS: Michigan State University.
- , 1967, Middle Ordovician Black River ostracods from a well core, Jackson County, Michigan: *Compass of Sigma Gamma Epsilon*, 1915-84, v. 45, no. 1, p. 26-32.
- Zaton, M., Wilson, M. A., and Vinn, O., 2012, Redescription and neotype designation of the Middle Devonian microconchid (Tentaculita) species "*Spirorbis*" *angulatus* Hall, 1861: *Journal of Paleontology*, v. 86, no. 3, p. 417-424.
- Zavoico, B. B., 1935, Geology and economic significance of central Michigan fields: *World Petroleum*, v. 6, no. 5, p. 309-324.
- Zenger, D. H., 1965, Calcite-dolomite ratios vs. insoluble content in Lockport Formation (Niagaran) in New York State: *Journal of Sedimentary Petrology*, v. 35, no. 1, p. 262-265.
- Zhang, L., Huang, D., and Liao, Z., 1999, High concentration retene and methylretene in Silurian carbonate of Michigan Basin: *Chinese Science Bulletin*, v. 44, no. 22, p. 2083-2086.
- Zhang, S., Tarrant, G. A., and Barnes, C. R., 2011, Upper Ordovician conodont biostratigraphy and the age of the Collingwood Member, southern Ontario, Canada: *Canadian Journal of Earth Sciences*, v. 48, no. 11, p. 1497-1522.
- Zheng, Q., 1999, Carbonate diagenesis and porosity evolution in the Guelph Formation, Southwestern Ontario, PhD: University of Waterloo, 265 p.
- Zhu, Z. Y., and Toksoz, M. N., 2013, Experimental measurements of the streaming potential and seismoelectric conversion in Berea Sandstone: *Geophysical Prospecting*, v. 61, no. 3, p. 688-700.
- Ziegler, A. M., Hansen, K. S., Johnson, M. E., Kelly, M. A., Scotese, C. R., and Van der Voo, R., 1977, Silurian continental distributions, paleogeography, climatology, and biogeography: *Tectonophysics*, v. 40, p. 13-51.
- Zodac, P., 1947, Trip to Detroit: *Rocks and Minerals*, v. 22, no. 11, p. 1011-1017.
- Zuber, M. D., Frantz, J. H., Jr., Gatens, J. M., III, and Lancaster, D. E., 1996, Reservoir characterization and production forecasting for Antrim Shale wells; an integrated reservoir analysis methodology: SPE Reprint Series, v. 45, p. 202-216.
- Zuo, L., Krevor, S., Falta, R. W., and Benson, S. M., 2012, An Experimental Study of CO₂ Exsolution and Relative Permeability Measurements During CO₂ Saturated Water Depressurization: *Transport in Porous Media*, v. 91, no. 2, p. 459-478.
- Zwicker, D. L., 1983, Cambro-Ordovician Sandstones of the Northern Michigan Basin, MS: Michigan State University, 145 p.

Michigan Quaternary References

- Abraczinskas, L. M., 1993, Pleistocene Proboscidean Sites in Michigan: New Records and an Update on Published Sites: *Michigan Academician*, v. 25, no. 4, p. 443-490.
- , 1995, The Distribution of Pleistocene Proboscidean Sites in Michigan: A Co-Occurrence Analysis of their Relation to Surface Saline Water: *Michigan Academician*, v. 27, no. 1, p. 65-80.
- Acomb, L. J., Mickelson, D. M., and Evenson, E. B., 1982, Till Stratigraphy and late glacial events in the Lake Michigan Lobe of Eastern Wisconsin: *Geological Society of America Bulletin*, v. 93, no. 4, p. 289-296.
- Adams, C. C., 1906, An ecological survey in northern Michigan (Porcupine Mountains and Isle Royale), *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1905, being the report of Alfred C. Lane, State Geologist.
- , 1909, An ecological survey of Isle Royale, Lake Superior, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist, p. 1-486.
- Agassiz, L., 1848, The terraces and the ancient river bars, drift, boulders and polished surfaces of Lake Superior: *American Association for the Advancement of Science Proceedings*, v. 1, p. 68-70.
- , 1851, The erratic phenomena about Lake Superior *American Journal of Science*, v. 60, p. 83-101.
- Aichele, S. S., 2000, Ground-Water Quality Atlas of Oakland County, Michigan U.S. Geological Survey Water-Resources Investigations Report, v. 00-4120, p. 1-53.
- , 2004a, Arsenic, Nitrate, and Chloride in Groundwater, Oakland County, Michigan: U.S. Geological Survey Fact Sheet, v. 2004-3120.
- , 2004b, Factors affecting ground-water quality in Oakland County, Michigan: U.S. Geological Survey Fact Sheet, v. 2004-3102, p. 1-4.
- , 2005a, Effects of Urban Land-Use Change on Streamflow and Water Quality in Oakland County, Michigan, 1970-2003, as Inferred from Urban Gradient and Temporal Analysis: U.S. Geological Survey Scientific Investigations Report, v. 2005-5016, p. 1-22.
- , 2005b, Water Resources in a Rapidly Growing Region — Oakland County, Michigan: U.S. Geological Survey Open-File Report, v. 2005-1269, p. 1-34.
- , 2009, The effects of suburban land-use change and climate on watershed hydrology in Oakland County, Michigan, 1975-2005, PhD: Michigan State University.
- Aichele, S. S., and Andresen, J. A., 2013, Spatial and temporal variations in land development and impervious surface creation in Oakland County, Michigan, 1945–2005: *Journal of Hydrology*, v. 485, p. 96-102.
- Aichele, S. S., Crowley, S. L., Taricska, C. K., and Stopar, J., 2005, Water Resources Data, Oakland County, Michigan 2001-2004: U.S. Geological Survey Open-File Report, v. 2004-1417, p. 1-75.
- Aichele, S. S., and Ellis, J. M., 2000, Effects of Wastewater-Lagoon Discharge through Wetlands on Water Quality in Bonifas Creek, Gogebic County, Michigan: U.S. Geological Survey Open-File Report, v. 00-1000, p. 1-12.
- Aichele, S. S., Hill-Rowley, r., and Malone, M., 1998, Arsenic, Nitrate and Chloride in Groundwater, Oakland County, Michigan: U.S. Geological Survey Fact Sheet, v. 135-98.
- Al-Agidi, W. K. H., 1970, A chronolithosequence of soils on Pleistocene terraces along Maple River in northeastern Clinton County, Michigan, USA (their morphologic, genetic and geomorphic interrelationship, PhD: Michigan State University.
- Al, T. A., Clark, I. D., Kennell, L., Jensen, M., and Raven, K. G., 2015, Geochemical evolution and residence time of porewater in low-permeability rocks of the Michigan Basin, Southwest Ontario: *Chemical Geology*, v. 404, p. 1-17.

- Albert, D., Comer, P., Cuthrell, D., Penskar, M., Rabe, M., and Reschke, C., 1994, Bedrock Shoreline Surveys of the Keweenaw Peninsula and Drummond Island in Michigan's Upper Peninsula: Land and Water Management Division.
- Albert, D. A., 1990, A regional landscape ecosystem classification of Michigan stressing physiographic, geologic, and soil factors, PhD: University of Michigan.
- Albert, D. A., Wilcox, D. A., Ingram, J. W., and Thompson, T. A., 2005, Hydrogeomorphic classification for Great Lakes Coastal Wetlands: *Journal of Great Lakes Research*, v. 31, no. Supplement 1, p. 129-146.
- Alessi, A. J., 1936, Hunting agates around Lake Superior: *Rocks and Minerals*, v. 11, no. 9, p. 139-139.
- Alfaifi, H. J., 2015, Comparing Slug Test Methods for Unconfined Aquifers, PhD: Western Michigan University, 161 p.
- Alfred, S. D., and Hyde, A. G., 1974, Soil Survey of Charlevoix County, Michigan, p. 1-120.
- Alfred, S. D., Hyde, A. G., and Larson, R. L., 1973, Soil Survey of Emmet County, Michigan, p. 1-97.
- Allemeier, K. A., 1973, Application of Pedological Soil Surveys to Highway Engineering in Michigan: *Geoderma*, v. 10, no. 1-2, p. 87-98.
- Allen, B. A., 1993, The effects of composting of yard wastes on the ground-water quality: WMU Farms site, Kalamazoo, Michigan, MS: Western Michigan University.
- Allen, D. J., Hinze, W. J., and Cannon, W. F., 1992, Drainage, topographic, and gravity anomalies in the Lake Superior Region: Evidence for a 1100 Ma mantle plume: *Geophysical Research Letters*, v. 19, no. 21, p. 2119-2122.
- Allen, W. B., 1977, Flowing Wells in Michigan, 1974: U.S. Geological Survey Water Information Series, v. 2, p. 1-27.
- Allen, W. B., Miller, J. B., and Wood, W. W., 1972, Availability of water in Kalamazoo County, Southwestern Michigan: U.S. Geological Survey Water Supply Paper, v. 1973, p. 1-129.
- Allender, J. H., and Ditmars, J. D., 1981, Field Measurements of longshore currents on a barred beach: *Coastal Engineering*, v. 5, p. 295-309.
- Alley, R. B., 1991, Deforming-bed Origin for Southern Laurentide Till Sheets: *Journal of Glaciology*, v. 37, p. 68-76.
- Amsterberg, R. J., Jr., 1973, Sand, wind, and grass - the healing of a dune, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 69-70.
- Andersen, S. T., 1952, A late-glacial pollen diagram from southern Michigan, U.S.A., MS: University of Michigan.
- Anderson, L. M., 1996, A study of the chemical and physical interactions between a wetland and a shallow aquifer in Cass County, Michigan, MS: Western Michigan University.
- , 2009, Low-level pharmaceuticals and personal care products in the waters of Michigan, PhD: Western Michigan University.
- Anderson, R. C., 1955, Pebbles and lithology of the major Wisconsin glacial lobes, PhD: University of Chicago.
- Anderson, T. W., 1978, South Bay, Manitoulin Island -- A Preliminary Report, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area*, Volume 3, Michigan Basin Geological Society, p. 93-94.
- Anderton, J. B., 1999, The soil-artifact context model: A geoarchaeological approach to paleoshoreline site dating in the Upper Peninsula of Michigan, USA: *Geoarchaeology*, v. 14, no. 3, p. 265-288.
- Anderton, J. B., and Loope, W. L., 1995, Buried Soils in a Perched Dunefield as Indicators of Late Holocene Lake-level Change in the Lake Superior Basin: *Quaternary Research*, v. 44, p. 190-199.

- Angel, J. R., 1995, Large-Scale Storm Damage on the U.S. Shores of the Great Lakes: *Journal of Great Lakes Research*, v. 21, no. 3, p. 287-293.
- Apple, B. A., and Howard, W. R., 2007, Summary of Hydrogeologic Conditions by County for the State of Michigan: U.S. Geological Survey Open-File Report, v. 2007-1236, p. 1-87.
- Arbogast, A. F., 2000, Estimating the time since final stabilization of a perched dune field along Lake Superior: *Professional Geographer*, v. 52, p. 594-606.
- Arbogast, A. F., Bigsby, M. E., DeVisser, M. H., Langley, S. A., Hanson, P. R., Daly, T. A., and Young, A. R., 2010, Reconstructing the age of coastal sand dunes along the northwestern shore of Lake Huron in Lower Michigan: Paleoenvironmental implications and regional comparisons: *Aeolian Research*, v. 2, no. 2-3, p. 83-92.
- Arbogast, A. F., Bookout, J. R., Schrotenboer, B. R., Lansdale, A., Rust, G. L., and Bato, V. A., 2008, Post-fluvial response and landform development in the Upper Muskegon River valley in North-Central Lower Michigan, USA: *Geomorphology*, v. 102, p. 615-623.
- Arbogast, A. F., Hansen, E. C., and Van Oort, M. D., 2002a, Reconstructing the geomorphic evolution of large coastal dunes along the southeastern shore of Lake Michigan: *Geomorphology*, v. 46, p. 241-255.
- Arbogast, A. F., and Jameson, T. P., 1998, Age estimates of inland dunes in east-central lower Michigan using soils data: *Physical Geography*, v. 19, no. 6, p. 485-501.
- Arbogast, A. F., and Loope, W. L., 1999, Maximum-limiting ages of Lake Michigan coastal dunes: their correlation with holocene lake level history: *Journal of Great Lakes Research*, v. 25, p. 372-382.
- Arbogast, A. F., Luehmann, M. D., Miller, B. A., Wernette, P. A., Adams, K. M., Waha, J. D., O'Neil, G. A., Tang, Y., Boothroyd, J. J., Babcock, C. R., Hanson, P. R., and Young, A. R., 2015, Late-Pleistocene paleowinds and aeolian sand mobilization in north-central Lower Michigan: *Aeolian Research*, v. 16, p. 109-116.
- Arbogast, A. F., and Packman, S. C., 2004, Middle-Holocene mobilization of aeolian sand in western upper Michigan and the potential relationship with climate and fire: *Holocene*, v. 14, p. 464-471.
- Arbogast, A. F., Schaetzel, R., Harrison, J., Jameson, T. P., and Crozier, S., 1997, Concurrent stabilization of some interior dune fields in Michigan: *Physical Geography*, v. 18, p. 63-79.
- Arbogast, A. F., Schaetzel, R. J., Hupy, J. P., and Hansen, E. C., 2004, The Holland Paleosol: an informal pedostratigraphic unit in the coastal dunes of southeastern Lake Michigan: *Canadian Journal of Earth Sciences*, v. 41, no. 11, p. 1385-1400.
- Arbogast, A. F., Shortridge, A. M., and Bigsby, M. E., 2009, Volumetric Estimates of Coastal Sand Dunes in Lower Michigan: Explaining The Geography of Dune Fields: *Physical Geography*, v. 30, no. 6, p. 479-500.
- Arbogast, A. F., Wintle, A. G., and Packman, S. C., 2002b, Widespread middle Holocene dune formation in the eastern Upper Peninsula of Michigan and the relationship to climate and outlet-controlled lake level: *Geology*, v. 30, p. 55-58.
- Argyilan, E. P., Avis, P. G., Krekeler, M. P. S., and Morris, C. C., 2015, The origin of collapse features appearing in a migrating parabolic dune along the southern coast of Lake Michigan: *Aeolian Research*, v. 19, Part A, p. 137-149.
- Argyilan, E. P., and Forman, S. L., 2003, Lake level response to seasonal climatic variability in the Lake Michigan-Huron system from 1920 to 1995: *Journal of Great Lakes Research*, v. 29, no. 3, p. 488-500.
- Argyilan, E. P., Forman, S. L., Johnston, J. W., and Wilcox, D. A., 2005, Optically stimulated luminescence dating of late Holocene raised strandplain sequences adjacent to Lakes Michigan and Superior, Upper Peninsula, Michigan, USA.: *Quaternary Research*, v. 63, p. 122-135.

- Argyilan, E. P., Forman, S. L., Johnston, J. W., and Wilcox, D. A., 2006, Corrigendum to “Optically stimulated luminescence dating of late Holocene raised strandplain sequences adjacent to Lakes Michigan and Superior, Upper Peninsula, Michigan, USA” [Quaternary Research 63 (2005) 122–135]: Quaternary Research, v. 65, no. 1, p. 187.
- Argyilan, E. P., Forman, S. L., and Thompson, T. A., 2010, Variability of Lake Michigan water level during the past 1000 years reconstructed through optical dating of a coastal strandplain: Holocene, v. 20, p. 723-731.
- Argyilan, E. P., Lepper, K., and Thompson, T. A., 2014, Late Holocene coastal development along the southern shore of Lake Michigan determined by strategic dating of stabilized parabolic dunes and wetlands of the Tolleston Beach, *in* Fisher, T. G., and Hansen, E. C., eds., Coastline and Dune Evolution along the Great Lakes, Volume 508: Boulder, Geological Society of America, p. 31-46.
- Arnold, C. A., and Stanley, G. M., 1945, Pennsylvanian Plants from the Glacial Drift Near Jackson, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 31, no. 3, p. 247-250.
- Aryal, N., and Reinhold, D. M., 2015, Reduction of metal leaching by poplars during soil treatment of wastewaters: Small-scale proof of concept studies: Ecological Engineering, v. 78, p. 53-61.
- Ash, A. D., 1958, Sloan-Deer Creek Basins--Report I, Hydrologic studies of small watersheds in agricultural areas of southern Michigan: Michigan Water Resources Commission, p. 1-77.
- Assel, R. A., Quinn, F. H., Leshkevich, G. A., and Bolsega, S. J., 1983, Great Lakes Ice Atlas, Great Lakes Environmental Research Laboratory.
- Atekwana, E., 1996, Hydrogeology and stable isotope investigations of a landfill impacted site in southwest Michigan, PhD: Western Michigan University.
- Atekwana, E., and Krishnamurthy, R. V., 1998, Investigations of inorganic carbon cycling of some natural waters using a modified gas evolution technique: Journal of Hydrology, v. 205, p. 265-278.
- Atekwana, E. A., Atekwana, E. A., Werkema, D., Allen, D. P., Smart, L. A., Duris, J. W., Cassidy, D. P., Sauck, W. A., and Rossbach, S., 2004a, Evidence for microbial enhanced electrical conductivity in hydrocarbon-contaminated sediments: Geophysical Research Letters, v. 31, no. L23501.
- Atekwana, E. A., Sauck, W. A., Aal, G. Z. A., and Werkema, D., 2002, Geophysical Investigation of Vadose Zone Conductivity Anomalies at a Hydrocarbon Contaminated Site: Implications for the Assessment of Intrinsic Bioremediation: Journal of Environmental and Engineering Geophysics, v. 7, no. 3, p. 103-110.
- Atekwana, E. A., Sauck, W. A., and Werkema, D., 2000, Investigations of Geoelectrical Signatures at a Hydrocarbon Contaminated Site: Journal of Applied Geophysics, v. 44, no. 2-3, p. 167-180.
- Atekwana, E. A., Werkema, D., Duris, J. W., Rossbach, S., Atekwana, E., Sauck, W. A., Cassidy, D. P., Means, J., and Legall, F. D., 2004b, In-situ apparent conductivity measurements and microbial population distribution at a hydrocarbon-contaminated site: Geophysics, v. 69, no. 1, p. 56-63.
- Austin, F. R., 1979, Soil Survey of Kalamazoo County, Michigan, p. 1-102.
- Aylsworth, R. L., Jr., 2008, A geophysical investigation of large-scale glaciotectionic deformation, Ludington Ridge, Michigan, MS: Michigan State University.
- Ayodelle, A. E., 2014, Changes in the lead concentration in air and soil during house deconstruction and demolition: Case study Springwells, Detroit, Michigan, MS: Wayne State University.
- Baas, D. G., 2009, Inferring dissolved phosphorous cycling in a TMDL watershed using biogeochemistry and mixed linear models, PhD: Michigan State University, 234 p.

- Baca, K., Fisher, T. G., and Gottgens, J. F., 2014, Temporally constrained eolian sand signals and their relationship to climate, Oxbow Lake, Saugatuck, Michigan, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 151-166.
- Badalamenti, L. S., 1992, *The geochemistry and isotopic chemistry of saline ground water derived from near-surface deposits of the Saginaw Lowland, Michigan Basin*, MS: Michigan State University, 126 p.
- Baedke, S. J., and Thompson, T. A., 2000, A 4,700-year record of lake level and isostasy for Lake Michigan: *International Association of Great Lakes Research*, v. 26, p. 416-426.
- Baharom, S. B., 1992, *Groundwater studies near the Dowagiac landfill area, Dowagiac, Michigan, using seismic resistivity methods*, MA: Western Michigan University.
- Bahner, E. W., and Naguib, A. M., 1998, Design and construction of a deep soil mix retaining wall for the Lake Parkway Freeway extension, *in* Maher, A., and Yang, D. S., eds., 1998 Annual Convention of the American-Society-of-Civil-Engineers (Geo-Congress 98), Boston, p. 41-58.
- Bai, X., Wang, J., Schwab, D. J., Yang, Y., Luo, L., Leshkevich, G. A., and Liu, S., 2013, Modeling 1993–2008 climatology of seasonal general circulation and thermal structure in the Great Lakes using FVCOM: *Ocean Modelling*, v. 65, p. 40-63.
- Bajcz, A. W., 2014a, Reproductive ecophysiology of *Rubus occidentalis* in southeastern Michigan I. A survey of tolerance ranges: *Rhodora*, v. 116, no. 967, p. 249-266.
- , 2014b, Reproductive ecophysiology of *Rubus occidentalis* in southeastern Michigan II. Variation in fruit characteristics relates to light and soil conditions: *Rhodora*, v. 116, no. 967, p. 267-282.
- Bajema, C. J., 1991, *The First Logging Railroads in the Great Lakes Region: Forest and Conservation History*, v. 35, p. 76-83.
- Baker, F. C., 1913, *Notes on postglacial Mollusca; I Emmet Co., Michigan*: *Nautilus*, v. 27, p. 7-8.
- Baker, M. E., and Wiley, M. J., 2004, Characterization of woody species distribution in riparian forests of Lower Michigan, USA using map-based models: *Wetlands*, v. 24, p. 550-561.
- Bakerblocker, A., Callender, E., and Josephson, P. D., 1975, Trace-element and organic carbon content of surface sediment from Grand Traverse Bay, Lake Michigan: *Geological Society of America Bulletin*, v. 86, no. 10, p. 1358-1362.
- Baldwin, D. C., 1951, *Late Pleistocene clays of the Sault Ste. Marie area and vicinity*, MS: University of Illinois, 60 p.
- Ballantyne, D. M., Hribljan, J. A., Pypker, T. G., and Chimner, R. A., 2014, Long-term water table manipulations alter peatland gaseous carbon fluxes in Northern Michigan: *Wetlands Ecology and Management*, v. 22, no. 1, p. 35-47.
- Ballard, J. P., 2009, *A lateglacial paleofire record for east-central Michigan*, MS: University of Cincinnati.
- Baltusis, M. A., Quigley, T. O., and Mandle, R. J., 1991, *Municipal ground-water development and withdrawals in the central Lower Peninsula of Michigan, 1870-1987*: U.S. Geological Survey Open-File Report, v. 91-215, p. 1-89.
- Bannister, E. N., 1979, *Impact of road networks on southeastern Michigan lakeshore drainage*: *Water Resources Research*, v. 15, no. 6, p. 1515-1520.
- Baptist, K. K., 1998, *Natural and experimental mineral weathering in glacial terrains of northern Michigan*, MS: University of Michigan.
- Baresse, P., 1991, *A hydrogeochemical characterization of a glacial-drift aquifer system in southwest Michigan*, MS: Western Michigan University.
- Barillis, W., 1989, *Michigan's Pioneers and the Destruction of the Hardwood Forest.: The Michigan Historical Review*, v. 15, p. 1-22.

- Barlage, M. J., Richards, P. L., Sousounis, P. J., and Brenner, A. J., 2002, Impacts of Climate Change and Land Use Change on Runoff from a Great Lakes Watershed: *Journal of Great Lakes Research*, v. 28, no. 4, p. 568-582.
- Barnes, D. A., Kovacich, M. S., and Limesz, S., 2004, Shore Protection and Coastal Change along the Lake Michigan Shore: Duck Lake, Orchard Beach State Park, and Onekama, Michigan: *Michigan Academician*, v. 35, no. 4, p. 387-424.
- Barnes, D. A., Kovacich, M. S., and Limesz, S., 2007, Shore-protection and coastal-change on the Eastern Lake Michigan Shore; Duck Lake, Orchard Beach State Park, and Onekama, MI: *Shore and Beach*, v. 75, no. 3, p. 21-37.
- Barnes, J. R., and Bowman, W. L., 1979, Soil Survey of Ingham County, Michigan, p. 1-142.
- Barnes, N. A., 2007, Stratigraphy and Organic Carbon Contents of Glacial Deposits in the City of Portage, Michigan, U.S.A., MS: Western Michigan University, 188 p.
- Barnes, N. A., Kehew, A. E., Krishnamurthy, R. V., and Koretsky, C. M., 2011, Redox evolution in glacial drift aquifers: role of diamictons in reduction of Fe(III): *Environmental Earth Sciences*, v. 62, p. 1027-1038.
- Barnes, P. W., Fleischer, G. W., Gardner, J. V., and Lee, K. M., 2002, Using laser technology to characterize substrate morphology and geology of selected lake trout spawning habitat in northern Lake Michigan, *in* Barnes, B. W., and Thomas, J. P., eds., *Symposium on Effects of Fishing Activities on Benthic Habitats*: Tampa, p. 165-169.
- , 2005, Using laser technology to characterize substrate morphology and geology of selected lake trout spawning habitat in northern Lake Michigan, *in* Barnes, B. W., and Thomas, J. P., eds., *Benthic Habitats and the Effects of Fishing*: Bethesda, American Fisheries Society, p. 165-169.
- Barnes, P. W., Kempema, E. W., Reimnitz, E., and McCormick, M., 1994, The Influence of Ice on Southern Lake Michigan Coastal Erosion: *Journal of Great Lakes Research*, v. 20, no. 1, p. 179-195.
- Barnhardt, W. A., Jaffe, B. E., and Kayen, R. E., 1999, Evaluation of landslide hazards with ground-penetrating radar, Lake Michigan coast, *Coastal Sediments '99*, 1153-1165 p.:
- Barnhardt, W. A., Jaffe, B. E., Kayen, R. E., and Cochrane, G. R., 2004, Influence of near-surface stratigraphy on coastal landslides at sleeping Bear Dunes National Lakeshore, Lake Michigan, USA: *Journal of Coastal Research*, v. 20, p. 510-522.
- Barnick, S. K., 1987, Feasibility of the proposed Garden Lane recharge basin in Portage, Michigan, MS: Western Michigan University.
- Barrett, L. R., 1997, Podzolization under forest and stump prairie vegetation in northern Michigan: *Geoderma*, v. 78, no. 1-2, p. 37-58.
- , 2001, A strand plain soil development sequence in Northern Michigan, USA: *Catena*, v. 44, no. 3, p. 163-186.
- Barrett, L. R., Liebens, J., Brown, D. G., Schaetzel, R., Zuwerink, P., Cate, T. W., and Nolan, D. S., 1995, Relationships Between Soils and Presettlement Forests in Baraga County, Michigan: *American Midland Naturalist*, v. 134, p. 264-285.
- Barrett, L. R., and Schaetzel, R., 1993, Soil development and spatial variability on geomorphic surfaces of different age: *Physical Geography*, v. 14, p. 39-55.
- Barrett, L. R., and Schaetzel, R. J., 1992, An examination of podzolization near Lake Michigan using chronofunctions: *Canadian Journal of Earth Sciences*, v. 72, no. 527-541.
- Barrett, T. R., 1993, Improved filter-pack design for hydrocarbon recovery wells in unconsolidated aquifers, MS: Western Michigan University.
- Bartlett, H. H., 1929, Fossils of the Carboniferous Coal Pebbles of the Glacial Drift at Ann Arbor: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 9, p. 11-28.
- Bartnik, P., 1995, Hydrogeochemical delineation of a groundwater flow system, Berrien County, Michigan, MS: Western Michigan University.

- Barton, G. J., 1984, Land Use Effects on Shallow Earth Resistivity, MS: Western Michigan University, 125 p.
- , 1995, Contributing Areas of Water-Supply Wells in Elkton and Pigeon, Huron County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4089, p. 1-10.
- Barton, G. J., Mandel, R. J., and Baltusis, M. A., 1996, Predevelopment Freshwater Heads in the Glaciofluvial, Saginaw, and Marshall Aquifers in the Michigan Basin: U.S. Geological Survey Open-File Report, v. 95-319, p. 1-15.
- Baskaran, M., Miller, C. J., Kumar, A., Andersen, E., Hui, J., Selegean, J. P., Creech, C. T., and Barkach, J., 2015, Sediment accumulation rates and sediment dynamics using five different methods in a well-constrained impoundment: Case study from Union Lake, Michigan: *Journal of Great Lakes Research*, v. 41, no. 2, p. 607-617.
- Baskaran, M., Novell, T., Nash, K., Ruberg, S. A., Johengen, T., Hawley, N., Klump, J. V., and Biddanda, B. A., 2016, Tracing the Seepage of Subsurface Sinkhole Vent Waters into Lake Huron Using Radium and Stable Isotopes of Oxygen and Hydrogen: *Aquatic Geochemistry*, p. 1-26.
- Batterson, T. R., and McNabb, C. D., 1983, Arsenic in Lake Lansing, Michigan: *Environmental Toxicology and Chemistry*, v. 2, no. 1, p. 1-17.
- Baxter, D. A., 2004, How Michigan Got Its Thumb, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 45-52.
- Bay, J. W., 1935, Abandoned Channels of the Lower Huron River, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 20, p. 435-438.
- , 1937, Glacial-Lake Levels Indicated by Terraces of the Huron, Rouge, and Clinton Rivers, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 22, p. 411-419.
- , 1938, Glacial history of the streams of southwestern Michigan: *Cranbrook Institute of Science Bulletin*, v. 12, p. 1-68.
- Bazzi, A., Lehman, J. T., Nriagu, J. O., Hollandsworth, D., Irish, N., and Noshier, T., 2002, Chemical Speciation of Dissolved Copper in Saginaw Bay, Lake Huron, with Square Wave Anodic Stripping Voltammetry: *Journal of Great Lakes Research*, v. 28, no. 3, p. 466-478.
- Bedell, D. J., 1982, Municipal water withdrawals in Michigan: Michigan Department of Natural Resources, Water Management Division, p. 1-43.
- Bedell, D. J., and Van Til, R. L., 1979, Irrigation in Michigan, 1977: Michigan Department of Natural Resources, Water Management Division, p. 1-37.
- Beget, J. E., 1986, Modeling the Influence of Till Rheology on the Flow and Profile of the Lake-Michigan Lobe, Southern Laurentide Ice-Sheet, USA: *Journal of Glaciology*, v. 32, p. 235-241.
- Beletsky, D., Schwab, D. J., Roebber, P. J., McCormick, M. J., Miller, G. S., and Saylor, J. H., 2003, Modeling wind-driven circulation during the March 1998 sediment resuspension event in Lake Michigan: *Journal of Geophysical Research: Oceans*, v. 108, no. C2, p. 3038.
- Belford, A., Kenbeek, S. D., VanHorn, J., and Van Dijk, D., 2014, Using remote sensing and geospatial analysis to understand changes to Lake Michigan dunes, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 217-228.
- Benedict, M. L., 2006, Lead isotopic chronologies from inland lakes : watershed vs. regional scale sources of lead in the great lakes region, MS: Michigan State University, 83 p.

- Benjakul, R., 2010, Simulating dioxane transport in a heterogeneous glacial aquifer system (Washtenaw County, Michigan) using publicly available models and data, MS: Michigan Technological University, 66 p.
- Benninghoff, W. S., and Hibbard, C. W., 1961, Fossil pollen associated with a late-glacial Woodland Musk Ox in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 46, p. 155-159.
- Bense, V. F., and Person, M. A., 2008, Transient hydrodynamics within intercratonic sedimentary basins during glacial cycles: Journal of Geophysical Research: Earth Surface, v. 113, no. F4, p. F04005.
- Bent, P. C., 1970, A proposed streamflow data program for Michigan: U.S. Geological Survey Open-File Report, v. 70-25, p. 1-44.
- , 1971, Influence of surface glacial deposits on streamflow characteristics: U.S. Geological Survey Open-File Report, v. 72-34, p. 1-37.
- Benton, S. E., 1991, An analysis of hydrogeologic factors affecting aquifer vulnerability in southwestern Michigan, MS: Western Michigan University.
- Berg, R. C., 1984, The origin and early genesis of clay bands in youthful sandy soils along lake Michigan, U.S.A.: Geoderma, v. 32, no. 1, p. 45-62.
- Berger, R. J., 1973, Compilation and interpretation of the geologic factors affecting land use planning, Chassell Quadrangle, Houghton County, Michigan, MS: Michigan Technological University.
- Bergquist, S. C., 1927, Report on marl deposits of Oceana County, MS: University of Michigan.
- , 1933a, The Pleistocene history of the Tahquamenon and Manistique drainage region of the Northern Peninsula of Michigan, PhD: University of Michigan.
- Bergquist, S. G., 1928, Some Aspects of Marl Deposits in Oceana County: Papers of the Michigan Academy of Science, Arts and Letters, v. 8, p. 279-284.
- , 1932, Glacial Geology of Iron County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 16, p. 363-372.
- , 1933b, Unconformities in the valley-train deposition cycle in northern Michigan: Geological Society of America Proceedings, v. 1933, p. 65-65.
- , 1935, Valley-Train Deposits in the Northern Peninsula of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 20, p. 439-448.
- , 1936a, The Grand Sable Dunes on Lake Superior, Alger County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 21, p. 429-438.
- , 1936b, The Pleistocene history of the Tahquamenon and Manistique drainage region of the Northern Peninsula of Michigan: Occasional Papers on the geology of Michigan, v. 40, no. 1, p. 7-148.
- , 1940, Surface Geology of Montmorency County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 25, no. 3, p. 453-463.
- , 1942, The Distribution of Drumlins in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 27, no. 3, p. 451-464.
- , 1943, New Drumlin Areas in Cheboygan and Presque Isle Counties, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 28, no. 3, p. 481-485.
- , 1952, An Unusual Occurrence of Varved Deposits in Southwestern Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 36, no. 3, p. 197-202.
- Bergquist, S. G., and MacLachlan, D. C., 1951, Guidebook to the study of Pleistocene features of the Huron-Saginaw Ice Lobe in Michigan: The Glacial Field Trip of the Geological Society of America Detroit Meeting, p. 1-36.
- Berkson, J. M., Lineback, J. A., and Gross, D. L., 1975, A Side-Scan Sonar Investigation of Small-Scale Features on the Floor of Southern Lake Michigan, Illinois State Geological Survey.

- Bermejo, J., Sauck, W. A., and Atekwana, E. A., 1997, Geophysical Discovery of an LNAPL Plume at Wurtsmith AFB: Groundwater Modeling and Remediation, v. 17, no. 4, p. 131-137.
- Berndt, L. W., 1977, Soil Survey of Delta County and Hiawatha National Forest of Alger and Schoolcraft Counties, Michigan.
- Besser, J. M., Giesy, J. P., Kubitz, J. A., Verbrugge, D. A., Coon, T. G., and Emmett Braselton, W., 1996, Assessment of Sediment Quality in Dredged and Undredged Areas of the Trenton Channel of the Detroit River, Michigan USA, using the Sediment Quality Triad: Journal of Great Lakes Research, v. 22, no. 3, p. 683-696.
- Bettarel, R. L., and Smith, H. G., 1973, Mocasin Bluff Site and Woodland Culture of Southwestern-Michigan: University of Michigan. Museum of Anthropology. Anthropological Papers, v. 49, p. 1-317.
- Beukema, S. P., 2003, Stratigraphy of Lake Michigan lobe deposits in Van Buren County, Michigan, MS: Western Michigan University.
- Bianchi, T. H., and Heinrich, P. V., 1992, Geoarchaeological evidence of the Lake Nipissing high lake phase in the Kalamazoo River Valley of southwestern Michigan: The Michigan Archaeologist, v. 38, p. 189-206.
- Biddanda, A. B., and Cotner, B. J., 2002, Love Handles in Aquatic Ecosystems: The Role of Dissolved Organic Carbon Drawdown, Resuspended Sediments, and Terrigenous Inputs in the Carbon Balance of Lake Michigan: Ecosystems, v. 5, no. 5, p. 431-445.
- Bigsby, J. J., 1826, Notes on the geography and geology of Lake Superior: Bulletin des sciences naturelles et de geologie, v. 7, p. 8-13.
- Bigsby, M. E., 2010, The characterization and possible origins of two loess sheets in the upper Great Lakes region, USA, MS: Michigan State University.
- Billings, N. F., 1946, Relation of geology to groundwater in Michigan: American Water Works Association Journal, v. 38, no. 12, p. 1373-1379.
- Binding, C. E., Greenberg, T. A., Watson, S. B., Rastin, S., and Gould, J., 2015, Long term water clarity changes in North America's Great Lakes from multi-sensor satellite observations: Limnology and Oceanography, v. 60, no. 6, p. 1976-1995.
- Bingham, M. T., 1945, Surface Formations of Oakland County: Cranbrook Institute of Science Bulletin, v. 22.
- Bingham, M. W., 1978, Investigation of local site amplification of ground motion in the Upper Peninsula of Michigan, MS: Michigan Technological University.
- Binkley, K. L., 1980, Carbonate and peat deposition in a Holocene paludal-lacustrine basin--Sucker Lake, Michigan, MS: University of Michigan.
- Binkley, K. L., Wilkinson, B. H., and Owen, R. M., 1980, Vadose Beachrock Cementation Along a Southeastern Michigan Marl Lake: Journal of Sedimentary Petrology, v. 50, no. 3, p. 953-962.
- Bird, B. C., 2005, Glacial stratigraphy and surficial geology of the Decatur, Lawrence, and Paw Paw U.S.G.S. 7.5 Minute Quadrangles in Van Buren County, Michigan, MS: Western Michigan University.
- , 2010, Glaciotectonic deformation along the Valparaiso Upland, Southwest Michigan, USA, PhD: Western Michigan University.
- Bishop, C. T., 1990, Historical Variation of Water Levels in Lakes Erie and Michigan-Huron: Journal of Great Lakes Research, v. 16, no. 3, p. 406-425.
- Bissell, E. G., and Aichele, S. S., 2004, Geostatistical analysis of effective vertical hydraulic conductivity and presence of confining layers in the shallow glacial drift aquifer, Oakland County, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2004-5167, p. 1-19.

- Biteman, S. E., 2002, Characterization of aquifer heterogeneity and tracer test simulations by incorporating geologic information in the form of outcrop analog and well core at a distal and medial outwash aquifer in Schoolcraft, Michigan, MS: Michigan State University.
- Black, R. F., 1966, Valdres glaciation in Wisconsin and Upper Michigan - a progress report: Great Lakes Research Division Publication, v. 15, p. 169-175.
- , 1980a, Valdres-Two Creeks, Wisconsin, revisited: The Valdres Till is most likely post-Twocreekan: Geological Society of America Bulletin, v. 91, p. 713-723.
- Black, T., 2012, Deep karst system research, Michigan, USA: Carbonates and Evaporites, v. 27, no. 2, p. 119-122.
- Black, T. J., 1980b, Known and suspected karst features in northern Lower Michigan, scale 1:23,400.
- , 1983, Tectonics, Structure and karst in Northern Lower Michigan, Michigan Basin Geological Society, 143 p.
- , 1995, 1995 Field Conference Road Log, *in* Black, T. J., ed., Karst Geology of the Northeast Lower Peninsula, Michigan, Michigan Basin Geological Society, p. 1-34.
- , 1997, Evaporite karst of northern lower Michigan: Carbonates and Evaporites, v. 12, no. 1, p. 81-83.
- , 2003, Evaporite karst in Michigan, *in* Beck, B. F., and LaMoreaux, P. E., eds., Sinkholes and the Engineering and Environmental Impacts of Karst.", p. 141-149.
- , 2004a, Methane Gas Venting at Hemlock Lake, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 39-44.
- , 2004b, Thunder Bay Marine Sanctuary Sink Hole Investigations, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 55-56.
- Black, T. J., Gregory, D., Boothman, D., Priddy, C., and Farrand, W. R., 1995, Karst Geology of the Northeast Lower Peninsula, Michigan, Michigan Basin Geological Society, 89 p.
- Black, T. J., and Wollensak, M. S., 2004a, Northeast Lower Peninsula Michigan Field Conference Road Log, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 3-38.
- , 2004b, Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, 133 p.
- Blandy, J. F., 1873, Topography with special reference to the Lake Superior Copper District: American Institute of Mining Engineers Transactions, v. 1, p. 75-82.
- Blewett, W. L., 1991a, Characteristics, correlations, and refinements of Leverett and Taylor's Port Huron Moraine in Michigan: The Great Lakes Geographer, v. 26, p. 52-60.
- , 1991b, The glacial geomorphology of the Port Huron Complex in northwestern southern Michigan, PhD: Michigan State University.
- Blewett, W. L., Drzyzga, S. A., Sherrod, L. A., and Wang, H., 2014, Geomorphic relations among glacial Lake Algonquin and the Munising and Grand Marais moraines in eastern Upper Michigan, USA: Geomorphology, v. 219, p. 270-284.
- Blewett, W. L., and Rieck, R. L., 1987, Reinterpretation of a portion of the Munising Moraine in Northern Michigan: Geological Society of America Bulletin, v. 98, no. 2, p. 169-175.
- Blewett, W. L., and Winters, H. A., 1995, The importance of Glaciofluvial Features within Michigan's Port Huron Moraine: Annals of the Association of American Geographers, v. 85, no. 2, p. 306-319.
- Blewett, W. L., Winters, H. A., and Rieck, R. L., 1993, New age control on the Port Huron moraine in northern Michigan: Physical Geography, v. 14, p. 131-138.
- Blumer, B. E., 2008, An application of OSL dating to test the perched-dune model on coastal dunes at Arcadia, Michigan, MS: Michigan State University.

- Blumer, B. E., Arbogast, A. F., and Forman, S. L., 2012, The OSL chronology of eolian sand deposition in a perched dune field along the northwestern shore of Lower Michigan: *Quaternary Research*, v. 77, no. 3, p. 445-455.
- Blumer, B. E., Behrendt, T. E., Ellis, J. M., Minnerick, R. J., LeuVoy, R. L., and Whited, C. R., 1996, Water resources data - Michigan, 1995: U.S. Geological Survey Water-Data Report, v. MI-95-1, p. 1-320.
- Blumer, S. P., 1991, Michigan floods and droughts, U.S. Geological Survey, National Water Summary 1988-89--Hydrologic events and floods and droughts, Volume 2375, p. 335-344.
- , 1993, Michigan Stream Water Quality, U.S. Geological Survey, National Water Summary 1990-91--Stream Water Quality, Volume 2400, p. 325-334.
- Blumer, S. P., Failing, J. C., Larson, W. W., Whited, C. R., and LeuVoy, R. L., 1988, Water Resources Data for Michigan, Water Year 1987: U.S. Geological Survey Water-Data Report, v. MI-87-1, p. 1-281.
- , 1989, Water Resources Data for Michigan, Water Year 1988: U.S. Geological Survey Water-Data Report, v. MI-88-1, p. 1-296.
- , 1990, Water Resources Data for Michigan, Water Year 1989: U.S. Geological Survey Water-Data Report, v. MI-89-1, p. 1-283.
- Blumer, S. P., Larson, W. W., Minnerick, R. J., Whited, C. R., and LeuVoy, R. L., 1991, Water Resources Data for Michigan, Water Year 1990: U.S. Geological Survey Water-Data Report, v. MI-90-1, p. 1-281.
- , 1992, Water Resources Data for Michigan, Water Year 1991: U.S. Geological Survey Water-Data Report, v. MI-91-1, p. 1-284.
- Bobrin, J. A., and Sanders, B. D., 1978, Guide to the Water Quality Management Plan for southeast Michigan: Southeast Michigan Council Governments, unpublished report, 166 p.
- Bockheim, J. G., 2015, Distribution and origin of glossic horizons in soils of the western Great Lakes Region, USA: *Geoderma Regional*, v. 5, p. 226-236.
- Boettcher, L. M., and Davis, A. D., 2004, Evaluation of Relationships between Hydrogeologic Environment and Petroleum Hydrocarbon Remediation in Quaternary Glacial Sediments, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 57-78.
- Bogdan, J. J., Budd, J. W., Eadie, B. J., and Hornbuckle, K. C., 2002, The Effect of a Large Resuspension Event in Southern Lake Michigan on the Short-term Cycling of Organic Contaminants: *Journal of Great Lakes Research*, v. 28, no. 3, p. 338-351.
- Boley-Morse, K. L., 2009, A classification of stream types at reference reach USGS gage stations in Michigan, MS: Michigan State University.
- Bolgrien, D. W., and Brooks, A. S., 1992, Analysis of Thermal Features of Lake Michigan from AVHRR Satellite Images: *Journal of Great Lakes Research*, v. 18, no. 2, p. 259-266.
- Bookout, J. R., 2006, Using digital elevation data to predict slopes of coastal sand dunes in Berrien County, Michigan, MS: Michigan State University.
- Booth, R. K., Brewer, S., Blaauw, M., Minckley, T. A., and Jackson, S. T., 2012, Decomposing the mid-Holocene *Tsuga* decline in eastern North America: *Ecology*, v. 93, p. 1841-1852.
- Booth, R. K., and Jackson, S. T., 2003, A high-resolution record of late-Holocene moisture variability from a Michigan raised bog, USA: *Holocene*, v. 13, p. 863-876.
- Booth, R. K., Jackson, S. T., and Gray, C. E. D., 2004, Paleoecology and high-resolution paleohydrology of a kettle peatland in upper Michigan: *Quaternary Research*, v. 61, p. 1-13.
- Booth, R. K., Jackson, S. T., and Thompson, T. A., 2002, Paleoecology of a northern Michigan lake and the relationship among climate, vegetation, and Great Lakes water levels: *Quaternary Research*, v. 57, p. 120-130.

- Booth, R. K., Notaro, M., Jackson, S. T., and Kutzbach, J. E., 2006, Widespread drought episodes in the western Great Lakes region during the past 2000 years: Geographic extent and potential mechanisms: *Earth and Planetary Science Letters*, v. 242, p. 415-427.
- Bornhorst, T. J., and Logsdon, M. J., 2016, Predicting Future Water-Quality Impacts from Mining: A 52-Year-Old Field Analog for Humidity Cell Testing, Copperwood Deposit, Michigan: *Economic Geology*, v. 111, no. 2, p. 527-542.
- Borton, T. E., 1974, Planning perspectives on water resources, Washtenaw County, Michigan: Washtenaw County Metropolitan Planning Commission.
- Bosch, N. S., 2008, The influence of impoundments on riverine nutrient transport: An evaluation using the Soil and Water Assessment Tool: *Journal of Hydrology*, v. 355, no. 1-4, p. 131-147.
- Bowman, I., 1904, A typical case of stream capture in Michigan: *Journal of Geology*, v. 12, no. 4, p. 326-334.
- Bowman, W. L., 1981, Soil Survey of Monroe County, Michigan.
- , 1986, Soil Survey of Van Buren County, Michigan.
- , 1991, Soil Survey of Cass County, Michigan.
- Brabb, E. E., 1952, Description of Whittlesey beach sediments, Ann Arbor area, Michigan, MS: University of Michigan.
- Bradley, P. W., 2009, Determination of select polybrominated diphenyl ethers and methoxylated polybrominated diphenyl ethers in sediment cores from two inland lakes in Michigan, MS: Michigan State University.
- Brannen, J. R., 1997, Hydrogeology of Four Sault Ste. Marie Tribal communities in the Upper Peninsula of Michigan: U.S. Geological Survey Fact Sheet, v. 009-97, p. 1-4.
- Brater, E. F., 1950, Beach erosion in Michigan: Michigan University Engineering Research Institute, Lake Hydraulics Laboratory, Research Publication, v. 2, p. 1-39.
- Breckenbridge, A., 2013, An analysis of the late glacial lake levels within the western Lake Superior basin based on digital elevation models: *Quaternary Research*, v. 80, p. 383-395.
- Breckenbridge, A., and Johnson, T. C., 2009, Paleohydrology of the upper Laurentian Great Lakes from the late glacial to early Holocene: *Quaternary Research*, v. 71, p. 397-408.
- Breckenbridge, A., Johnson, T. C., Beske-Diehl, S., and Mothersill, J. S., 2004, The timing of regional lateglacial events and post-glacial sedimentation rates from Lake Superior: *Quaternary Science Reviews*, v. 23, p. 2355-2367.
- Breckenbridge, A. J., 2006, Lake Superior varves: Records of Lake Agassiz overflow and ice sheet dynamics, PhD: University of Minnesota.
- Bremer, C. W., Clark, P. U., and Haggerty, R., 2002, Modeling the subglacial hydrology of the late Pleistocene Lake Michigan Lobe, Laurentide Ice Sheet: *Geological Society of America Bulletin*, v. 114, no. 6, p. 665-674.
- Brenner, A. J., Richards, P. L., Barlage, M., and Sousounis, P., 1999, The impact of land use changes 1820-2020 on water quality and quantity in southeast Michigan, *in* Heathwaite, L., ed., *Impact of Land-Use Change on Nutrient Loads from Diffuse Sources*, p. 229-233.
- Bretz, J. H., 1907, Glacial Features of Genesee County: *The Schoolmaster*, p. 482-487; 530-539.
- , 1933, How Chicagoland was made: *The Western Society of Engineers*, v. XXXVIII, p. 135-141.
- , 1944, Geology of the beach phenomena of Lake Michigan with discussion: *Shore and Beach*, v. 12, no. 2, p. 31-40.
- , 1951a, Causes of the glacial lake stages in Saginaw Basin: *Journal of Geology*, v. 59, no. 3, p. 244-258.

- , 1951b, The stages of Lake Chicago; their causes and correlations: *American Journal of Science*, v. 249, no. 6, p. 401-429.
- , 1953, Glacial Grand River, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 38, no. 3, p. 359-382.
- , 1964, Correlation of glacial lake stages in the Huron-Erie and Michigan Basins: *Journal of Geology*, v. 72, p. 618-627.
- Brewer, M. K., 1991, A regional study of ground-water quality in Barry County, Michigan, MS: Western Michigan University.
- Bricker, D. M., 1977, Seismic disturbances in Michigan: Michigan Geological Survey Division, Circular, v. 14, p. 1-13.
- Bricker, D. M., and Lilienthal, R. T., 1975a, Grand Traverse County bedrock topography.
- , 1975b, Manistee County bedrock topography.
- Bricker, F. J., and Gannon, J. E., 1976, Limnological Investigation of Hoop Lake - A Northern Michigan Bog: *Michigan Academician*, v. 9, p. 25-42.
- Brigham, E. M., 1932, Concerning a Granite Pebble Included in a Varved Pre-Cambrian Sediment: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 16, p. 373-378.
- Broecker, W. S., and Farrand, W. R., 1963, Radiocarbon age of the Two Creeks Forest Bed, Wisconsin: *Geological Society of America Bulletin*, v. 74, p. 795-802.
- Bronick, C. J., and Mokma, D. L., 2005, Podzolization in a sand pit in northern Michigan: *Soil Science Society of America Journal*, v. 69, no. 6, p. 1757-1760.
- Brown, A., 2011, Identification of source carbon for microbial methane in unconventional gas reservoirs: *American Association of Petroleum Geologists Bulletin*, v. 95, no. 8, p. 1321-1338.
- Brown, E. A., and Stuart, W. T., 1951, Ground-water resources of the glacial deposits, Bessemer area, Michigan: Michigan Geological Survey Progress Report, v. 14, p. 1-68.
- Brown, E. A., Stuart, W. T., and Rodehamel, E. L., 1954, Ground-water investigations of the Marquette Iron-mining district: Michigan Geological Survey Division, Technical Report, v. 3, p. 1-92.
- Brown, G. G., 1936, Molding sands of Michigan and their uses: Michigan Geological Survey Publication, v. 41, no. 35, p. 1-262.
- Brown, G. O., 1989, Bedford Shale (Port Lambton Group) and glacial dispersal of clay, southwestern Ontario, MS: University of Western Ontario, 243 p.
- Brown, R. E., 1963, Bedrock topography, lithology and glacial drift thickness of Lapeer and St. Clair Counties, Michigan, MS: Michigan State University, 47 p.
- Brubaker, L. B., 1975, Postglacial Forest Patterns Associated with Till and Outwash in North-Central Upper Michigan: *Quaternary Research*, v. 5, p. 499-527.
- Brugam, R. B., and Johnson, S. M., 1997, Holocene lake-level rise in the Upper Peninsula of Michigan, USA, as indicated by peatland growth: *Holocene*, v. 7, p. 355-359.
- Brugam, R. B., Owen, B., and Kolesa, L., 2004, Continental-scale climate forcing factors and environmental change at Glimmerglass Lake in the Upper Peninsula of Michigan: *Holocene*, v. 14, p. 807-817.
- Brunton, F. R., and Dodge, J. E. P., 2008, Karst of southern Ontario and Manitoulin Island: Ontario Geological Survey, Groundwater Resources Study, v. 5, p. 1-99.
- Bryan, M. L., and Larson, R. W., 1975, The Study of Fresh-Water Lake Ice Using Multiplexed Imaging Radar: *Journal of Glaciology*, v. 14, no. 72, p. 445-457.
- Bryson, R. A., Wendland, W. W., Ives, J. D., and Andrews, J. T., 1986, Radiocarbon isochrones on the disintegration of the Laurentide ice sheet: *Arctic and Alpine Research*, v. 1, p. 1-14.
- Buchanan, D. E., 1985, Soil Survey of Lake and Wexford Counties, Michigan.

- Buckler, W. R., 1979, Dune Type Inventory and Barrier Dune Classification Study of Michigan's Lake Michigan Shore, Michigan Geological Survey Report of Investigation, 36 p.
- , 1981, Rates and implications of bluff recession along the Lake Michigan shorezone of Michigan and Wisconsin, PhD: Michigan State University.
- Buckler, W. R., and Winters, H. A., 1983, Lake Michigan Bluff Recession: Annals of the Association of American Geographers, v. 73, no. 1, p. 89-110.
- Buckley, S. B., 1975, Study of post-Pleistocene ostracod distribution in the soft sediments of southern Lake Michigan, PhD: University of Illinois.
- Budd, J. W., 2004, Large-scale Transport Phenomena in the Keweenaw Region of Lake Superior: the Ontonagon Plume and the Keweenaw Eddy: Journal of Great Lakes Research, v. 30, Supplement 1, p. 467-480.
- Buening, V. E., 1994, Investigations of glacial-drift aquifer-lake interactions using hydrogeology, geochemistry, and stable isotopes at Asylum Lake, Michigan, MS: Western Michigan University.
- Bugdalski, L., Lemke, L. D., and McElmurry, S. P., 2014, Spatial Variation of Soil Lead in an Urban Community Garden: Implications for Risk-Based Sampling: Risk Analysis, v. 34, no. 1, p. 17-27.
- Bugdalski, L. E.-K., 2013, Quantifying the Risks of Soil Lead in Urban Community Gardens: Sampling to Account for Spatial Variability, MS: Wayne State University, 259 p.
- Burgis, W. A., 1970, The Imlay outlet of Glacial Lake Maumee, Imlay City, Michigan, MS: University of Michigan.
- , 1977, Lake Wisconsinan history of northeast Lower Michigan, PhD: University of Michigan.
- Burgis, W. A., and Eschman, D. F., 1981, Late-Wisconsinan History of Northeastern Lower Michigan: 30th Annual Field Conference.
- Burke, C. D., 1983, Ostracod shape analysis and deep basin paleoecology of the Lake Michigan basin, PhD: University of Wisconsin, 253 p.
- Buurman, P., Jongmans, A. G., and Nierop, K. G. J., 2008, Comparison of Michigan and Dutch podzolized soils: Organic matter characterization by micromorphology and pyrolysis-GC/MS: Soil Science Society of America Journal, v. 72, no. 5, p. 1344-1356.
- Buzby, C. E., 1979, Engineering geology of the Wadhams Bridge Site, St. Clair County, Michigan, MS: University of Michigan.
- Byelich, G. H., 1973, User Study - Characteristics and Attitudes -- Michigan's AuSable River, in Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 71-74.
- Byerlay, J. R., 1976, Report on ground-water contamination, Sullivan and Company, J. D. Burke No. 1, Calhoun County, Michigan: Michigan Geological Survey Division, p. 1-47.
- Cahn, A. R., 1932, Records and distribution of the fossil beaver *Castoroides ohioensis*: Journal of Mammalogy, v. 13, no. 3, p. 229-241.
- , 1936, Further notes on the giant beaver [*Castoroides ohioensis*]: Journal of Mammalogy, v. 17, no. 1, p. 66-67.
- Cain, S. A., 1948, Pollen grains write history: Earth Science Digest, v. 2, no. 5, p. 9-11.
- Cain, S. A., Cain, L. G., and Slater, J. V., 1948a, Palynological studies at Sodon Lake, Michigan; pt. 1, Size-frequency study of fossil spruce pollen: Science, v. 108, no. 2796, p. 115-117.
- , 1948b, Palynological studies at Sodon Lake, Michigan; pt. 2, Size-frequency studies of pine pollen, fossil and modern: American Journal of Botany, v. 35, no. 9, p. 583-590.
- , 1948c, Palynological studies at Sodon Lake, Michigan; pt. 3, The sequence of pollen spectra, profile 1: Ecology, v. 29, no. 4, p. 492-500.
- Calabro, E. J., Murry, B. A., Woolnough, D. A., and Uzarski, D. G., 2013, Application and transferability of Great Lakes coastal wetland indices of biotic integrity to high quality

- inland lakes of Beaver Island in northern Lake Michigan: Aquatic Ecosystem Health & Management, v. 16, no. 3, p. 338-346.
- Calcote, R., 2003, Mid-Holocene climate and the hemlock decline: the range limit of *Tsuga canadensis* in the western Great Lakes region, USA: Holocene, v. 13, p. 215-224.
- Callender, E., 1970, The economic potential of ferromanganese nodules in the Great Lakes, in Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor, Michigan Geological Survey, p. 56-65.
- Calus, J. K., 1996, Soil Survey of Oceana County, Michigan.
- , 2005, Soil Survey of Kalkaska County, Michigan.
- Calver, J. L., 1940, Roundness of Grains in Western Michigan Dune Sands: Papers of the Michigan Academy of Science, Arts and Letters, v. 25, no. 3, p. 465-471.
- , 1942, The glacial and post-glacial history of the Platte and Crystal Lake depressions, Benzie County, Michigan, PhD: University of Michigan.
- , 1947, The glacial and post-glacial history of the Platte and Crystal Lake depressions, Benzie County, Michigan: Occasional Papers on the geology of Michigan, v. 45, no. 38, pt. II, p. 1-70.
- Camp, M. J., 1974, Pleistocene mollusca of three southeastern Michigan marl deposits, PhD: The Ohio State University.
- Camp, M. J., and Kneller, W. A., 1980, Geology Field Guidebook Jackson, Lenawee, and Washtenaw Counties, Michigan, 89th Annual Meeting, The Ohio Academy of Sciences.
- Campbell, G. A., and Roberts, M., 2003, Urbanization and mining: a case study of Michigan: Resources Policy, v. 29, p. 49-60.
- Campbell, I. D., and McAndrews, J. H., 1991, Cluster-analysis of Late Holocene pollen trends in Ontario: Canadian Journal of Botany, v. 69, p. 1719-1730.
- Campbell, K. T., 1981, A study of landsat lineament data observed in Michigan, MS: Michigan State University, 170 p.
- Capps, D. K., Thompson, T. A., and Booth, R. K., 2007, A post-Calumet shoreline along southern Lake Michigan: Journal of Paleolimnology, v. 37, p. 395-409.
- Cardenas, M. P., Schwab, D. J., Eadie, B. J., Hawley, N., and Lesht, B. M., 2005, Sediment Transport Model Validation in Lake Michigan: Journal of Great Lakes Research, v. 31, no. 4, p. 373-385.
- Carey, L. M., 2012, Soil Survey of Isle Royale National Park, Michigan.
- Carey, N. J., 1986, An evaluation of the effectiveness of bentonite as a soil additive for the cover material on the KL Avenue sanitary landfill, Kalamazoo, Michigan, MS: Western Michigan University.
- Carlson, A. E., Mickelson, D. M., Principat, S. M., and Chapel, D. M., 2005, The genesis of the northern Kettle Moraine, Wisconsin: Geomorphology, v. 67, p. 365-374.
- Carlson, K., 2002, Inorganic and organic geochemistry of the former Lakeside Refinery in Kalamazoo, Michigan, MS: Western Michigan University.
- Carney, H. J., 1981, Diatoms and Chrysophycean cysts in the recent sediments of Frains Lake, Michigan, MS: University of Michigan.
- Carroll, A. R., 1983, Lawrence Lake, Michigan, MS: University of Michigan.
- Carter, D. S., and Hites, R. A., 1992, Unusual Alkylphenols and their Transport in the Trenton Channel of the Detroit River, Michigan: Journal of Great Lakes Research, v. 18, no. 1, p. 125-131.
- Case, E. C., 1915, On a nearly complete skull of *Symbos cavifrons* Leidy from Michigan: Occasional Papers of the Museum of Zoology University of Michigan, v. 13, p. 1-3.
- Case, E. C., Scott, I. D., Badenoch, B. M., and White, T. E., 1935, Discovery of *Elephas primigenius americanus* in the Bed of Glacial Lake Mogodore, in Cass County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 20, p. 449-454.

- Case, E. C., and Stanley, G. M., 1935, The Bloomfield Hills Mastodon: *Cranbrook Institute of Science Bulletin*, v. 4, p. 1-8.
- Cassidy, D. P., Hudak, A. J., Werkema, D. D., Jr., Atekwana, E. A., Rossback, S., Duris, J. W., Atekwana, E. A., and Sauck, W. A., 2002, In Situ Rhamnolipid Production at an Abandoned Petroleum Refinery: *Journal of Soil and Sediment Contamination*, v. 11, no. 5, p. 769-787.
- Castro, M. C., Ma, L., and Hall, C. M., 2009, A primordial, solar He–Ne signature in crustal fluids of a stable continental region: *Earth and Planetary Science Letters*, v. 279, no. 3–4, p. 174-184.
- Castro, M. C., Warrier, R. B., Hall, C. M., and Lohmann, K. C., 2012, A late Pleistocene–Mid-Holocene noble gas and stable isotope climate and subglacial record in southern Michigan: *Geophysical Research Letters*, v. 39, no. 19, p. L19709.
- Caveny, E. W., Jr., 1973, Michigan State Forests and the Off-Road Vehicle, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 75-80.
- Cha, Y., Stow, C. A., Reckhow, K. H., DeMarchi, C., and Johengen, T. H., 2010, Phosphorus load estimation in the Saginaw River, MI using a Bayesian hierarchical/multilevel model: *Water Research*, v. 44, no. 10, p. 3270-3282.
- Chamberlain, V. D., 1968, Meteorites of Michigan: *Geological Survey Bulletin* v. 5, p. 1-42.
- Chamberlin, T. C., 1883, Preliminary paper on the terminal moraine of the second glacial epoch: *U.S. Geological Survey, Annual Report*, v. 3, p. 291-402.
- Chambers, R. L., 1975, Information content of grain-size frequency distributions in coastal deposits on the eastern shore of Lake Michigan, PhD: Michigan State University.
- Chambers, R. L., and Eadie, B. J., 1981, Nepheloid and Suspended Particulate Matter in Southeastern Lake-Michigan: *Sedimentology*, v. 28, no. 3, p. 439-447.
- Chang, H. C., 1968, X-ray diffraction studies of test boring samples from the glacial lake plain in Wayne County, Michigan, MS: Wayne State University, 89 p.
- Chapelle, F. H., Haack, S. K., Adriaens, P., Henry, M. A., and Bradley, P. M., 1996, Comparison of Eh and H₂ measurements for delineating redox processes in a contaminated aquifer: *Environmental Science & Technology*, v. 30, p. 3565-3569.
- Chapman, D. H., 1937a, Late-glacial and postglacial history of the Champlain Valley: *American Journal of Science*, v. 234, no. 200, p. 89-124.
- , 1937b, Late-glacial and postglacial history of the Champlain Valley, PhD: University of Michigan, 89-124 p.
- Chapman, M. J., 1978, An Economic Study of Coastal Sand Dune Mining in Michigan: *Michigan Geological Survey Report of Investigation*, v. 20, p. 1-19.
- Chapman, R. H., 1952, Seismic depth to ledge studies as related to water problems at Morris Mine, Ishpeming, Michigan, MS: Michigan College of Mining and Technology, 1-51 p.
- Chapman, W. B., 1950, Terrestrial tides as determined from deviations of gravity at Ann Arbor, Michigan, MS: University of Michigan.
- Chapra, S. C., and Dolan, D. M., 2012, Great Lakes total phosphorus revisited: 2. Mass balance modeling: *Journal of Great Lakes Research*, v. 38, no. 4, p. 741-754.
- Chapra, S. C., Dove, A., and Rockwell, D. C., 2009, Great Lakes chloride trends: Long-term mass balance and loading analysis: *Journal of Great Lakes Research*, v. 35, no. 2, p. 272-284.
- Chapra, S. C., Dove, A., and Warren, G. J., 2012, Long-term trends of Great Lakes major ion chemistry: *Journal of Great Lakes Research*, v. 38, no. 3, p. 550-560.
- Charles Kerfoot, W., Urban, N. R., McDonald, C. P., Rossmann, R., and Zhang, H., 2016, Legacy mercury releases during copper mining near Lake Superior: *Journal of Great Lakes Research*, v. 42, no. 1, p. 50-61.

- Chase, R. B., 2003, Lake Michigan Coastal Bluff Erosion: Slump Models and Dewatering Strategies.
- Chase, R. B., Chase, K. E., Kehew, A. E., and Montgomery, W. W., 2001a, Determining the kinematics of slope movements using low-cost monitoring and cross-section balancing: *Environmental and Engineering Geoscience*, v. 7, p. 193-203.
- Chase, R. B., Kehew, A. E., Glynn, M. E., and Selegean, J. P., 2007a, Modeling debris slide geometry with balanced cross sections: A rigorous field test: *Environmental and Engineering Geoscience*, v. 13, no. 1, p. 45-53.
- Chase, R. B., Kehew, A. E., Kaunda, R. B., and Glynn, M. E., 2007b, Mitigation of slope failures in a freeze/thaw environment by removal of groundwater, *in* Schaefer, V. R., Schuster, R. L., and Turner, A. K., eds., 1st North American Landslide Conference, Volume 23, Association of Engineering Geologists, p. 1582-1594.
- Chase, R. B., Kehew, A. E., and Montgomery, W. W., 2001b, Determination of slope displacement mechanisms and causes using new geometric modeling techniques and climate data, *in* Harmon, R. S., and Doe, W. W., eds., *Landscape Erosion and Evolution Modeling*, Kluwer Academic Plenum Publishers, p. 57-88.
- Chase, R. B., and Selegean, J. P., 2013, Geology, erosion history, and mitigation strategies applied to Great Lakes coastal bluffs; an examination of the Allegan County, Michigan, dewatering demonstration site: *Geological Society of America Field Guide*, v. 31, p. 103-118.
- Che-Alota, V., 2009, Temporal geophysical and geochemical signatures due to contaminant source reduction at Wurtsmith airforce base in Oscoda, Michigan, USA, MS: Oklahoma State University.
- Chen, S. H., and Nyman, M. C., 2005, Slow desorption behavior of one highly resistant aromatic amine in Lake Macatawa, Michigan, USA, sediment: *Environmental Toxicology and Chemistry*, v. 24, no. 12, p. 3020-3029.
- Cherkauer, K. A., and Sinha, T., 2010, Hydrologic impacts of projected future climate change in the Lake Michigan region: *Journal of Great Lakes Research*, v. 36, p. 33-50.
- Chhin, S., Chumack, K., Dahl, T., David, E. T., Kurzeja, P., Magruder, M., and Telewski, F. W., 2013, Growth-climate relationships of *Pinus strobus* in the floodway versus terrace forest along the banks of the Red Cedar River, Michigan: *Tree-Ring Research*, v. 69, no. 2, p. 37-47.
- Childs, K. E., 1970, History of the salt, brine and paper industries and their probable effect on the ground-water quality in the Manistee Lake area of Michigan, 69 p.
- , 1973a, The Historical Development of Manistee and its Environmental Impact, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 182-196.
- , 1973b, The Historical Development of Manistee and Its Environmental Impact, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 81-84.
- Childs, K. E., and Upchurch, S. B., 1973, Environmental Geology of the Houghton Lake Area, Roscommon County, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 3-13.
- Chittrayanont, S., 1978, A geohydrologic study of the Garfield Township coal basin area, Bay County, Michigan, MS: Michigan Technological University, 183 p.
- Chowdhury, S. H., 1999, A comprehensive approach for evaluation of groundwater vulnerability to contamination, PhD: Western Michigan University.
- Chowdhury, S. H., and Kehew, A. E., 2003, Correlation between nitrate contamination and ground water pollution potential: *Ground Water*, v. 41, no. 6, p. 735-745.

- Christensen, E. R., and Karls, J. F., 1996, Unmixing of lead, ¹³⁷Cs, and PAH records in lake sediments using curve fitting with first- and second-order corrections: *Water Research*, v. 30, no. 11, p. 2543-2558.
- Christensen, E. R., and Zhang, X. C., 1993, Sources of polycyclic aromatic hydrocarbons to Lake Michigan determined from sedimentary records: *Environmental Science & Technology*, v. 27, no. 1, p. 139-146.
- Christensen, M. D., 1993, Acoustic investigation and new depositional model for the development of the St. Clair Delta, Ontario, Canada, MS: University of Windsor.
- Christensen, R. H., Jr., 1990, A hydrogeological and hydrogeochemical investigation of groundwater at a landfill for sludge from the Kalamazoo wastewater treatment plant, MS: Western Michigan University.
- Christenson, D. R., and Butt, M. B., 1998, Nitrogen mineralization in soils from Michigan's Saginaw Valley and Thumb region: *Communications in Soil Science and Plant Analysis*, v. 29, no. 15-16, p. 2355-2363.
- Chrzastowski, M. J., Pranschke, F. A., and Shabica, C. W., 1991, Discovery and preliminary investigations of the remains of an early Holocene forest on the floor of southern Lake Michigan: *Journal of Great Lakes Research*, v. 17, p. 543-552.
- Chrzastowski, M. J., and Thompson, T. A., 1994, Late Wisconsinan and Holocene geologic history of the Illinois-Indiana coast of Lake Michigan: *Journal of Great Lakes Research*, v. 20, p. 9-26.
- Chrzastowski, M. J., Thompson, T. A., and Trask, C. B., 1994, Coastal Geomorphology and Littoral Cell Divisions Along the Illinois-Indiana Coast of Lake Michigan: *Journal of Great Lakes Research*, v. 20, p. 27-43.
- Chun, Y. M., and Choi, Y. D., 2012, Structure, Species Composition, and Soil Characteristics in a Chronosequence of Jack Pine (*Pinus banksiana* Lamb.) Stands on the Southern Shore of Lake Michigan: *American Midland Naturalist*, v. 168, no. 2, p. 408-426.
- Churchill, J. H., and Charles Kerfoot, W., 2007, The Impact of Surface Heat Flux and Wind on Thermal Stratification in Portage Lake, Michigan: *Journal of Great Lakes Research*, v. 33, no. 1, p. 143-155.
- Clark, I. D., Al, T., Jensen, M., Kennell, L., Mazurek, M., Mohapatra, R., and Raven, K. G., 2013, Paleozoic-aged brine and authigenic helium preserved in an Ordovician shale aquiclude: *Geology*, v. 41, no. 9, p. 951-954.
- Clark, J. A., Befus, K. M., and Sharman, G. R., 2012, A model of surface water hydrology of the Great Lakes, North America during the past 16,000 years: *Physics and Chemistry of the Earth, Parts A/B/C*, v. 53-54, p. 61-71.
- Clark, J. A., Hendriks, M., Timmermans, T. J., Struck, C., and Hilverda, K. J., 1994, Glacial isostatic deformation of the Great Lakes region.: *Geological Society of America Bulletin*, v. 106, p. 19-31.
- Clark, J. A., Pranger, H. S., II, Walsh, J. K., and Primus, J. A., 1990, A numerical model of glacial isostasy in the Lake Michigan basin, *in* Schneider, A. F., and Fraser, G. S., eds., *Late Quaternary history of the Lake Michigan basin*, Volume 251, Geological Society of America, p. 111-123.
- Clark, J. A., Zylstra, D. J., and Befus, K. M., 2007, Effects of great lakes water loading upon glacial isostatic adjustment and lake history: *Journal of Great Lakes Research*, v. 33, p. 627-641.
- Clark, P. U., 1992, Surface form of the Southern Laurentide Ice-sheet and its implications to ice-sheet dynamics: *Geological Society of America Bulletin*, v. 104, no. 5, p. 595-605.
- Clark, P. U., and Johnson, W. H., 1989, Modelling the Influence of Till Rheology on the Flow and Profile of the Lake-Michigan Lobe, Southern Laurentide Ice-Sheet, USA - Discussion: *Journal of Glaciology*, v. 35, p. 284-285.

- Clawson, C. R., 2011, Relative dating and correlation of soil chronosequences developed in sandy late quaternary sediments near Detroit, Michigan using potassium adsorption isotherm analysis, MS: Wayne State University, 161 p.
- Claypole, E. W., 1882, Evidence from the drift of Ohio, Indiana and Illinois, in support of the preglacial origin of the basins of lakes Erie and Ontario: American Association for the Advancement of Science Proceedings, v. 30, p. 147-159.
- Cleland, C. E., 1973a, The Pi-Wan-Go-Ning Prehistoric District at Norwood, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 85-87.
- , 1973b, Prehistoric settlement of Northwest Lower Michigan, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 88-89.
- Clements, D., 1952, Later S phases of the Michigan earthquake of August 9, 1947, MS: University of Michigan.
- Clements, J. M., 1896, Some stages in the development of rivers as illustrated by the Deer River, Michigan: American Geologist, v. 17, no. 2, p. 126-127.
- Cline, J. T., and Chambers, R. L., 1977, Spatial and Temporal Distribution of Heavy-Metals in Lake-Sediments near Sleeping Bear Point, Michigan: Journal of Sedimentary Petrology, v. 47, no. 2, p. 716-727.
- Clites, A. H., Smith, J. P., Hunter, T. S., and Gronewold, A. D., 2014, Visualizing relationships between hydrology, climate, and water level fluctuations on Earth's largest system of lakes: Journal of Great Lakes Research, v. 40, no. 3, p. 807-811.
- Clotts, R. A., McCambridge, C. E., Barrera, E., Saylor, B. Z., Palmer, D. F., and Coakley, J. P., 2005, Middle Holocene hydrologic change and hypolimnion formation in Lake Erie: Journal of Great Lakes Research, v. 31, p. 296-308.
- Coakley, J. P., Crowe, A. S., and Huddart, P. A., 1998, Subsurface sediment profiles below Point Pelee: indicators of postglacial evolution in western Lake Erie: Canadian Journal of Earth Sciences, v. 35, p. 88-99.
- Cole, H. D., 1990, Highway deicing salts and the mobilization of selected heavy metals from stream sediments, PhD: Western Michigan University.
- Cole, J. F., 1970, Mineralogy and physical properties of clays underlying US-45 highway relocation, Ontonagon, Michigan, MS: Michigan Technological University.
- Cole, L. J., 1903, The delta of the St. Clair River: Michigan Geological Survey, v. 9, no. pt. I, p. 1-28.
- Coleman, S. M., Forester, R. M., Reynolds, R. L., Sweetkind, D. S., King, J. W., Gangemi, P., Jones, G. A., Keigwin, L. D., and Foster, D. S., 1994, Lake-level history of Lake Michigan for the past 12,000 years: The record from deep lacustrine sediments: International Association of Great Lakes Research, v. 20, p. 73-92.
- Colgan, P. M., 1999a, Early middle pleistocene glacial sediments (780000-620000 BP) near Kansas City, northeastern Kansas and northwestern Missouri, USA: Boreas, v. 28, p. 477-489.
- , 1999b, Reconstruction of the Green Bay Lobe, Wisconsin, United States, from 26,000 to 13,000 radiocarbon years BP, *in* Mickelson, D. M., and Attig, J. W., eds., Meeting of the North-Central-Geological-Society-of-America/Midwest Glaciology: Madison, p. 137-150.
- Colgan, P. M., Vanderlip, C. A., and Braunschneider, K. N., 2015, Athens Subepisode (Wisconsin Episode) non-glacial and older glacial sediments in the subsurface of southwestern Michigan, USA: Quaternary Research, v. 84, no. 3, p. 382-397.
- Colingsworth, R. F., Hohn, M. H., and Collings, G. B., 1967, Postglacial physicochemical conditions of Vestaburg Bog, Montcalm County, Michigan, based on diatom analyses: Papers of the Michigan Academy of Science, Arts and Letters, v. 52, p. 19-30.

- Colman, S. M., Clark, J. A., Clayton, L., Hansel, A. K., and Larsen, C. E., 1994a, Deglaciation, lake levels, and meltwater discharge in the Lake Michigan basin: *Quaternary Science Reviews*, v. 13, no. 9–10, p. 879-890.
- Colman, S. M., Forester, R. M., Reynolds, R. L., Sweetkind, D. S., King, J. W., Gangemi, P., Jones, G. A., Keigwin, L. D., and Foster, D. S., 1994b, Lake-level history of Lake Michigan for the past 12,000 years - The records from deep lacustrine sediments: *Journal of Great Lakes Research*, v. 20, p. 73-92.
- Colman, S. M., and Foster, D. S., 1994, A Sediment Budget for Southern Lake Michigan: Source and Sink Models for Different Time Intervals: *Journal of Great Lakes Research*, v. 20, no. 1, p. 215-228.
- Colman, S. M., Foster, D. S., and Harrison, D. W., 1992, Depressions and Other Lake-Floor Morphologic Features in Deep Water, Southern Lake Michigan: *Journal of Great Lakes Research*, v. 18, no. 2, p. 267-279.
- Colman, S. M., King, J. W., Jones, G. A., Reynolds, R. L., and Bothner, M. H., 2000, Holocene and recent sediment accumulation rates in Southern Lake Michigan: *Quaternary Science Reviews*, v. 19, no. 16, p. 1563-1580.
- Conley, D. J., 1988, Biogenic silica as an estimate of siliceous microfossil abundance in Great Lakes sediments: *Biogeochemistry*, v. 6, no. 3, p. 161-179.
- Conley, D. J., and Scavia, D., 1991, Size Structure of Particulate Biogenic Silica in Lake Michigan: *Journal of Great Lakes Research*, v. 17, no. 1, p. 18-24.
- Connallon, C. B., 2015, Mapping and characterizing a relict lacustrine delta in central Lower Michigan, MS: Michigan State University.
- Cookman, R. R., 2000, Comparison of hydrologic and chemical outputs from three watersheds of the Keweenaw Peninsula and four U.S. Geological Survey monitored watersheds in the Lake Superior basin, MS: Michigan Technological University.
- Cooper, W. F., 1905, Water supply of the Lower Peninsula, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist.
- , 1906, Geological Report of Bay County: Geological Survey of Michigan Annual Report, v. 1905, p. 1-283.
- Cooper, W. F., 1907, Geology and Physical Geography of Michigan: Ninth Report of the Michigan Academy of Science 1907, v. 9, p. 136-144.
- Cooper, W. F., 1908, Pleistocene Beaches of Saginaw County: Tenth Annual Report of the Michigan Academy of Science 1908, v. 10, p. 90-98.
- Coram, M., 2011, Stratigraphy and provenance of late pleistocene glacial sediments in the Pontiac South quadrangle, Southeastern Michigan, MS: Wayne State University, 118 p.
- Corder, P. G., 1979, Soil Survey of Clare County, Michigan, p. 1-122.
- , 1984, Soil Survey of Mecosta County, Michigan.
- Corey, R. M., 1992, Water resources activities in Michigan, 1991: U.S. Geological Survey Open-File Report, v. 92-157, p. 1-83.
- Cornett, C. L., Crowley, S. L., McGowan, R. M., Blumer, S. P., and Reeves, H. W., 2006, Summary of recovered historical ground-water level data for Michigan, 1934–2005: U.S. Geological Survey Open-File Report, v. 2006-1057, p. 1-369.
- Cottrell, R. J., Shepardson, S. P., Dalgarn, D. S., and Karpovich, D. S., 2001, Can plants be used to remove lead contamination from soil in Mid-Michigan?: Abstracts of Papers of the American Chemical Society, v. 221, p. U173-U173.
- Cowan, E. S., 1983, Soil Survey of St. Joseph County, Michigan.
- Cregger, D. M., 1977, Flow of acid mine water in the abandoned Hiawatha-Dober-Isabella mine complex, Iron River district, Michigan, MS: Michigan Tech, 104 p.

- Creameens, D. L., and Mokma, D. L., 1986, Argillic Horizon Expression and Classification in the Soils of Two Michigan Hydrosequences: *Soil Science Society of America Journal*, v. 50, no. 4, p. 1002-1007.
- , 1987, Fine Clay Mineralogy of Soil Matrices and Clay Films in Two Michigan Hydrosequences: *Soil Science Society of America Journal*, v. 51, no. 5, p. 1378-1381.
- Crisman, D. P., 1982, Groundwater geochemistry in the Portage Lake Volcanics, Hancock, Michigan and implications for native copper stability, MS: Michigan Technological University, 138 p.
- Croley, T. E., and Lewis, C. F. M., 2006, Warmer and drier climates that make terminal great lakes: *Journal of Great Lakes Research*, v. 32, p. 852-869.
- Croskey, H. M., and Holtschlag, D. J., 1983, Estimating generalized flood skew coefficients for Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 83-4194, p. 1-27.
- Crozier, S., 1999, A preliminary record of Holocene Eolian activity in Michigan's eastern Upper Peninsula, MA: Michigan State University.
- Csanady, G. T., 1967, Large-scale motion in the Great Lakes: *Journal of Geophysical Research*, v. 72, no. 16, p. 4151-4162.
- Cummings, T. R., 1973, Relation of Channel Slope to Reaeration of Michigan Streams: U.S. Geological Survey Open-File Report, v. 73-54, p. 1-19.
- , 1978, Agricultural Land Use and Water Quality in the Upper St. Joseph River Basin, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 78-950, p. 1-160.
- , 1980a, Chemical and physical characteristics of natural ground waters in Michigan: A preliminary report: U.S. Geological Survey Open-File Report, v. 80-953, p. 1-34.
- , 1980b, Chemical and Physical Characteristics of Natural Groundwaters in Michigan: A Preliminary Report: U.S. Geological Survey Open-File Report, v. 80-953, p. 1-34.
- , 1984, Estimates of Dissolved and Suspended Substance Yield of Stream Basins in Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 83-4288, p. 1-57.
- , 1989, Natural ground water quality in Michigan: 1974-87: U.S. Geological Survey Open-File Report, v. 89-259, p. 1-50.
- Cummings, T. R., and Gillespie, J. L., 1991, Installation Restoration Program, Phase II, Confirmation/Quantification, Stage 1, Wurtsmith Air Force Base, Michigan: U.S. Geological Survey Administrative Report.
- Cummings, T. R., Gillespie, J. L., and Grannemann, N. G., 1990, Hydrology and land use in Grand Traverse County, Michigan: U.S. Geological Survey Water Investigation Reports, v. 90-4122, p. 1-99.
- Cummings, T. R., and Miller, J. B., 1982, Time of travel of the Flint River, Utah Dam to Highway M-13, Michigan: August 4-8, 1981: U.S. Geological Survey Open-File Report, v. 82-853, p. 1-21.
- Cummings, T. R., and Twenter, F. R., 1986, Assessment of ground-water contamination at Wurtsmith Air Force Base, Michigan, 1982-85: U.S. Geological Survey Water-Resources Investigations Report, v. 86-4188, p. 1-120.
- Cummings, T. R., Twenter, F. R., and Holtschlag, D. J., 1984, Hydrology and land use in Van Buren County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 84-4112, p. 1-124.
- Curran, D. L., Leske, D. N., and Miller, L. J., 1981, Hydrogeologic Atlas of Michigan, Kalamazoo, Department of Geology, Western Michigan University, 174 p.
- Cutler, P. M., Mickelson, D. M., Colgan, P. M., MacAyeal, D. R., and Parizek, B. R., 2001, Influence of the Great Lakes on the dynamics of the Southern Laurentide ice sheet: Numerical experiments: *Geology*, v. 29, p. 1039-1042.
- Cypher, J. A., 2008, Hydrogeologic modeling of a 1,4-dioxane plume in a glacial aquifer system; Washtenaw County, Michigan, MS: Wayne State University.

- Dannemiller, G. T., and Baltusis, M. A., 1990, Physical and chemical data for ground water in the Michigan basin, 1986-89: U.S. Geological Survey Open-File Report, v. 90-368, p. 1-155.
- Danyluk, W., 1990, Port Huron Study: Historical development of Hydrocarbons and Subsequent Problems: Contribution to Michigan Geology Report, v. 90-4, p. 1-19.
- Darner, R. A., Sheets, R. A., and Anonymous, 2012, Using existing data to estimate aquifer properties, Great Lakes region, USA: *Ground Water*, v. 50, no. 3, p. 477-484.
- Davis, C. A., 1900a, A contribution to the natural history of marl: *Journal of Geology*, v. 8, no. 6, p. 485-497.
- , 1900b, A remarkable marl lake: *Journal of Geology*, v. 8, no. 6, p. 498-503.
- , 1901, A second contribution to the Natural History of Marl: *Journal of Geology*, v. 9, no. 6, p. 491-506.
- , 1903, A second contribution to the natural history of marl: *Journal of Geology*, v. 9, no. 6, p. 491-506.
- , 1907a, Peat: essays on its origin, uses and distribution in Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist.
- , 1907b, Some Interesting Glacial Phenomena in the Marquette Region Ninth Report of the Michigan Academy of Science 1907, v. 9, p. 132-135.
- , 1908a, Peat deposits as geological records: Michigan Academy Science Report, v. 10, p. 107-112.
- , 1909, Report on the geology of Tuscola County, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist.
- Davis, C. M., 1935, The high plains of Michigan, PhD: University of Michigan.
- Davis, D. H., 1908b, A study of river meanders on the Middle Rouge: *Journal of Geology*, v. 16, no. 8, p. 755-764.
- Davis, M. B., Brubaker, L. B., and Beiswenger, J. M., 1971, Pollen grains in lake sediments: Pollen percentages in surface sediments from southern Michigan: *Quaternary Research*, v. 1, no. 4, p. 450-467.
- Davis, R. A., 1965, Underwater study of ripples, southeastern Lake Michigan: *Journal of Sedimentary Research*, v. 35, no. 4, p. 857-866.
- Davis, R. A., Jr., 1964, Sedimentation in the nearshore environment, southeastern Lake Michigan, PhD: University of Illinois.
- Deeter, E. B., 1926, Soil Survey of Tuscola County, Michigan, p. 1-40.
- Delcourt, P. A., Nester, P. L., Delcourt, H. R., Mora, C. I., and Orvis, K. H., 2002, Holocene lake-effect precipitation in northern Michigan: *Quaternary Research*, v. 57, p. 225-233.
- Delcourt, P. A., Petty, W. H., and Delcourt, H. R., 1996, Late-Holocene Formation of Lake Michigan Beach Ridges Correlated with a 70-yr Oscillation in Global Climate: *Quaternary Research*, v. 45, no. 3, p. 321-326.
- Derecki, J. A., and Potok, L. A. J., 1979, Regional runoff simulation for southeast Michigan: *JAWRA Journal of the American Water Resources Association*, v. 15, no. 5, p. 1418-1429.
- Derouin, S. A., Lowell, T. V., and Hajdas, I., 2007, Landscape evolution and deglaciation of the Upper Peninsula, Michigan: An examination of chronology and stratigraphy in kettle lake cores: *Journal of Great Lakes Research*, v. 33, p. 875-886.
- Desor, E., 1851a, On clay and drift deposits in the vicinity of Lake Superior: *Boston Society of Natural History Proceedings*, v. 3, p. 235-236.
- , 1851b, On the sand dunes of Lake Superior: *Boston Society of Natural History Proceedings*, v. 3, p. 207-207.

- , 1854a, On the existence of dunes on the shores of the upper American lakes: Boston Society of Natural History Proceedings, v. 4, p. 41-42.
- , 1854b, On the origin of some of the elements of the so-called Tertiary or drift of Lake Superior: Boston Society of Natural History Proceedings, v. 4, p. 28-29.
- Deutsch, M., 1956, Effects of dissemination of radioactive materials on water resource conservation with special reference to Michigan: First Revision 1960: U.S. Geological Survey, p. 1-35.
- , 1961, Incidents of chromium contamination of ground water in Michigan: U.S. Public Health Service Technical Report, v. W61-5, p. 98-104.
- , 1962a, Controlled induced recharge tests at Kalamazoo, Michigan: Journal of American Water Works Association, v. 54, no. 2, p. 181-196.
- , 1962b, Phenol contamination of an artesian aquifer at Alma, Michigan: Proceedings of the Society for Water Treatment and Examination, v. 11, p. 94-100.
- , 1963, Ground-Water Contamination and Legal Controls in Michigan: U.S. Geological Survey Water Supply Paper, v. 1691, p. 1-79.
- Deutsch, M., Burt, E. M., and Vanlier, K. E., 1958, Summary of Ground-Water Investigations in the Holland Area, Michigan: Michigan Geological Survey Progress Report, v. 23, p. 1-85.
- Deutsch, M., and Vanlier, K. E., 1961, Ground water for Michigan's future: U.S. Geological Survey Open-File Report, p. 1-42.
- Deutsch, M., Vanlier, K. E., and Giroux, P. R., 1960, Ground-Water Hydrology and Glacial Geology of the Kalamazoo Area, Michigan: Michigan Geological Survey Progress Report v. 23, p. 1-122.
- deVries-Zimmerman, S., Fisher, T. G., Hansen, E. C., Dean, S., and Björck, S., 2014, Sand in lakes and bogs in Allegan County, Michigan, as a proxy for eolian sand transport, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 111-132.
- Dibajnia, M., Nairn, R. B., and Ross, P., 2004, Analysis of long-term sand accumulation at a harbor using 2DH numerical simulation: *Coastal Engineering*, v. 51, p. 863-882.
- Dick, B. M., Hey, R., Peralta, P., Jewell, I., Simon, P., and Peszlen, I., 2014, Estimating Annual Riverbank Erosion Rates - A dendrogeomorphic Method: *River Research and Applications*, v. 30, no. 7, p. 845-856.
- Dietrich, R. V., 1978, Post-Valders Geological History of Beaver Island, Michigan: *Michigan Academician*, v. 10, no. 3, p. 283-297.
- Din, S.-M., 1999, A geochemical survey and water quality modelling study of the Lake St. Clair water systems MS: University of Windsor.
- Dodge, S. L., 1984, Soil texture, glacial sediments, and woodlot species composition in northeast Ingham County, Michigan PhD: Michigan State University.
- Dodge, S. L., and Harman, J. R., 1985, Soil, subsoil, and forest composition in south-central Michigan, USA: *Physical Geography*, v. 6, no. 1, p. 85-100.
- Dodson, R. L., 1985, Topographic and sedimentary characteristics of the Union streamlined plain and morainic areass PhD: Michigan State University.
- , 1993, Reinterpretation of the Northwest Portion of the Tekonsha Moraine, South-Central Michigan: *Physical Geography*, v. 14, p. 139-153.
- Dodson, R. L., and Winters, H. A., 1977, Fluting and Till Fabric Relationships in a Portion of South-Central, Michigan: *Professional Geographer*, v. 29, p. 166-170.
- Doherty, M. C., 1973, A preliminary investigation of the Antrim County drumlin field in northwestern lower Michigan.
- Dolan, D. M., and Chapra, S. C., 2012, Great Lakes total phosphorus revisited: 1. Loading analysis and update (1994–2008): *Journal of Great Lakes Research*, v. 38, no. 4, p. 730-740.

- Doonan, C. J., and Byerlay, J. R., 1973, Ground water and geology of Baraga County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 11, p. 1-26.
- Doonan, C. J., and Hendrickson, G. E., 1966, Ground-water resources of Dickinson County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 5, p. 1-49.
- , 1967, Ground water in Iron County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 7, p. 1-61.
- , 1968, Ground-water resources in Gogebic County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 8, p. 1-22.
- , 1969, Ground water in Ontonagon County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 9, p. 1-29.
- Doonan, C. J., Hendrickson, G. E., and Byerlay, J. R., 1970, Ground water and geology of Keweenaw Peninsula, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 10, p. 1-41.
- Doonan, C. J., and Van Alstine, J. L., 1979, Ground water and geology of Marquette County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 12, p. 1-57.
- Doss, P. K., 1993, The nature of a dynamic water table in a system of non-tidal, freshwater coastal wetlands: *Journal of Hydrology*, v. 141, no. 1-4, p. 107-126.
- Dott, E. R., and Mickelson, D., 1995, Lake Michigan water levels and the development of Holocene beach ridge complexes at Two Rivers, Wisconsin - Stratigraphic, geomorphic and radiocarbon evidence: *Geological Society of America Bulletin*, v. 107, no. 3, p. 286-296.
- Douglass, C. C., 1839, Report [on Ingham County, and parts of Eaton and Jackson Counties]: Michigan State Geologists Annual Report, v. 2, p. 66-77.
- Dove, A., and Chapra, S. C., 2015, Long-term trends of nutrients and trophic response variables for the Great Lakes: *Limnology and Oceanography*, v. 60, no. 2, p. 696-721.
- Dow, K. W., 1938, The Origin of Perched Dunes on the Manistee Moraine: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 23, p. 427-440.
- , 1940, Some Examples of Ventifacts from Sleeping Bear Point, Leelanau County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 25, no. 3, p. 473-476.
- Drake, R. H., 1979, Lake Whittlesey outlet channels and the late Wisconsinan history of the Michigan thumb region, MS: University of Michigan.
- , 1980, Late Wisconsinan history of Michigan thumb: *Michigan Academician*, v. 13, p. 181-197.
- Drake, R. H., and Reinking, R. L., 1978, Sources of Sediment Pollution in the Lake Macatawa Drainage Basin, Michigan: *Michigan Academician*, v. 10, no. 3, p. 264-272.
- Dreimanis, A., 1958, Beginning of the Nipissing Phase of Lake Huron: *Journal of Geology*, v. 66, p. 591-594.
- Dreimanis, A., 1977, Late Wisconsin glacial retreat in the Great Lakes region, North America: *Annals of the New York Academy of Sciences*, v. 288, no. 1, p. 70-89.
- Drexler, C., 1977, Outlet Channels in the Upper Peninsula of Michigan for the Post-Duluth Lake Stages: *Michigan Academician*, v. 10, no. 1, p. 101-113.
- Drexler, C. W., 1969, Sand dunes along the east shore of Lake Michigan, MS: University of Michigan.
- , 1981, Outlet channels for the post-Duluth lakes in the Upper Peninsula of Michigan, PhD: University of Michigan.
- Drobyshev, I., Goebel, P. C., Bergeron, Y., and Corace Iii, R. G., 2012, Detecting changes in climate forcing on the fire regime of a North American mixed-pine forest: A case study of Seney National Wildlife Refuge, Upper Michigan: *Dendrochronologia*, v. 30, no. 2, p. 137-145.

- Drummond, C. N., 1994, Stable isotopic and stratigraphic proxy records of local, regional, and global climate, PhD: University of Michigan.
- Drymond, J., 1941, Survey of the Wisconsin glaciation of Lower Michigan, BS: Carleton College.
- Dubay, B. R., 2012, Urban soil genesis, weathering of waste building materials, and bioavailability of lead in a chronosequence at former demolition sites, Detroit, Michigan, MS: Wayne State University, 120 p.
- Dumouchelle, D. H., Cummings, T. R., and Klepper, G. R., 1988, Michigan ground-water quality in National Water Summary 1986 - Hydrologic events and ground-water quality: U.S. Geological Survey Water-Supply Paper, v. 2325, p. 305-312.
- Dumper, T. A., 1970, The relationship of the physical environment to land use potential in Muskegon County, Michigan, MS: Virginia Polytechnic Institute and State University.
- Dunlap, C. J., Dooms, A. J., and Schreeg, L. A., 2001, Effect of dissolved organic material on phosphate adsorption in southwest Michigan soils: pH and DOM identity effects: Abstracts of Papers of the American Chemical Society, v. 221, p. U29-U29.
- Duris, J. W., and Beeler, S., 2008, Fecal-indicator bacteria and *Escherichia coli* pathogen data collected near a novel sub-irrigation water-treatment system in Lenawee County, Michigan, June–November 2007: U.S. Geological Survey Open-File Report, v. 2008-1025, p. 1-13.
- Duris, J. W., and Haack, S. K., 2005, Water-Quality Data, Huron County, Michigan 2004: U.S. Geological Survey Open-File Report, v. 2005-1380, p. 1-30.
- Duris, J. W., Reeves, H. W., and Kiesler, J. L., Jr., 2005, Atrazine Concentrations in Stream Water and Streambed Sediment Pore Water in the St. Joseph and Galien River Basins, Michigan and Indiana, May 2001-September 2003: U.S. Geological Survey Open-File Report, v. 2004-1326, p. 1-25.
- Dustin, F., 1936, Agates of the Lake Superior region: Rocks and Minerals, v. 11, no. 9, p. 152-155.
- Dustin, N. M., Wilkinson, B. H., and Owen, R. M., 1986, Littlefield Lake, Michigan: Carbonate budget of Holocene sedimentation in a temperate-region lacustrine system: Limnology and Oceanography, v. 31, no. 6, p. 1301-1311.
- Duveneck, M. J., Scheller, R. M., White, M. A., Handler, S. D., and Ravenscroft, C., 2014, Climate change effects on northern Great Lake (USA) forests: A case for preserving diversity: Ecosphere, v. 5, no. 2.
- Dworkin, S. I., 1984, Late Wisconsin ice-flow reconstruction for the central Great Lakes region, MS: Michigan State University, 30 p.
- Dworkin, S. I., Larson, G. J., and Monaghan, G. W., 1985, Late Wisconsin ice-flow reconstruction for the central Great Lakes region: Canadian Journal of Earth Sciences, v. 22, p. 935-940.
- Dyl, S. J., 1979, Engineering geologic factors affecting the stability of slopes in Ontonagon clay at the Military Hill slide, U.S. Highway 45, Ontonagon county, Michigan, MS: Michigan Technological University.
- Eadie, B. J., Schwab, D. J., Johengen, T. H., Lavrentyev, P. J., Miller, G. S., Holland, R. E., Leshkevich, G. A., Lansing, M. B., Morehead, N. R., Robbins, J. A., Hawley, N., Edgington, D. N., and Van Hoof, P. L., 2002, Particle Transport, Nutrient Cycling, and Algal Community Structure Associated with a Major Winter-Spring Sediment Resuspension Event in Southern Lake Michigan: Journal of Great Lakes Research, v. 28, no. 3, p. 324-337.
- Earle, G. H., Jr., 1972, Soil Survey of Lapeer County, Michigan, p. 1-148.
- Eastman, I. R., 1884, A new meteorite (Grand Rapids, Michigan): American Journal of Science, v. 128, p. 299-300.

- Eberts, S. M., and George, L. L., 2001, Regional Ground-Water Flow and Geochemistry in the Midwestern Basins and Arches Aquifer system in Parts of Indiana, Ohio, Michigan, and Illinois: U.S. Geological Survey Professional Paper, v. 1423-C.
- Edgington, D. N., and Callender, E., 1970, Minor element geochemistry of Lake Michigan ferromanganese nodules: Earth and Planetary Science Letters, v. 8, no. 2, p. 97-100.
- Ege, J. R., 1979, Surface Subsidence and Collapse in Relation to Extraction of Saalt and Other Soluble Evaporites: U.S. Geological Survey Open-File Report, v. 79-1666, p. 1-34.
- , 1984, Formation of Solution-Subsidence Sinkholes above Salt Beds: U.S. Geological Survey Circular, v. 897, p. 1-11.
- Ehlers, G. M., 1918, An interesting illustration of a process of destruction of a glaciated surface: Twentieth Annual Report of the Michigan Academy of Science 1918, v. 20, p. 59-63.
- , 1936, Guide to the Sixth Annual Field Trip of the Section of Geology and Mineralogy of the Michigan Academy of Science: A Study of the Fort Wayne Outlet of the Early Glacial Lakes and the Niagaran Strata of Northern Indiana.
- Ehlers, R. B., 1934, Municipal ground water supplies in the Southern Peninsula of Michigan, with emphasis on quality, MS: Michigan State University.
- Ekdahl, E. J., 2004, The sediment record of Crawford Lake, Ontario and Derby Lake, Michigan: Anthropogenic modification of diatom communities and paleoclimate reconstructions, PhD: University of Michigan.
- Ellis, R. J., 1999, Heavy metal partitioning in soils of variable texture and redox potential : an evaluation of sequential chemical extractions, MS: Michigan State University, 194 p.
- Ells, G. D., 1973, A comentary on Non-Renewable-Resource Utilization, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 90-92.
- Elowski, R. C., and Bricker, D. M., 1976a, Kalkaska County bedrock topography, scale 1:62,500.
- , 1976b, Otsego County bedrock topography, scale 1:62,500.
- Elowski, R. C., and Ostrander, A. G., 1977, Gypsum karst and related features in the Michigan Basin: 1977 Guidebook Alpena, Michigan: National Speleological Society, p. 31-39.
- Emery, S. M., Doran, P. J., Legge, J. T., Kleitch, M., and Howard, S., 2013, Aboveground and Belowground Impacts Following Removal of the Invasive Species Baby's Breath (*Gypsophila paniculata*) on Lake Michigan Sand Dunes: Restoration Ecology, v. 21, no. 4, p. 506-514.
- Engberg, C. A., and Austin, F. R., 1974, Soil Survey of Livingstone County, Michigan, p. 1-90.
- Engel, R. J., 1977, Soil survey of Washtenaw County, Michigan, p. 1-106.
- Engels, W. L., 1931, Two new records of the Pleistocene beaver *Castoroides ohioensis*: American Midland Naturalist, v. 12, no. 12, p. 529-532.
- Erickson, R. L., 1948, A petrographical study of the longitudinal deposition within the Mason esker relative to its origin, MS: Michigan State University, 27 p.
- Eschman, D. F., 1980, Some Evidence of Mid-Wisconsinan Events in Michigan: Michigan Academician, v. 12, no. 4, p. 423-436.
- , 1982, An Unusual Ball and Pillow Structure Locality in Michigan: Journal of Geology, v. 90, no. 6, p. 742-744.
- , 1985, Summary of the Quaternary history of Michigan, Ohio, and Indiana: Journal of Geological Education, v. 33, p. 161-167.
- Eschman, D. F., and Farrand, W. R., 1970, Glacial History of the Glacial Grand Valley, *in* Stonehouse, H. B., ed., Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of North America: North-central Section, p. 131-158.
- , 1974, Glacial History of the Glacial Grand Valley: Michigan Academician, v. 7, p. 31-56.

- Eschman, D. F., Farrand, W. R., and Evenson, E. B., 1973, Pleistocene Geology of the Northwestern Quarter Southern Peninsula, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 14-18.
- Eschman, D. F., and Karrow, P. F., 1985, Huron Basin Glacial Lakes: A Review: Quaternary Evolution of the Great Lakes, p. 80-93.
- Eschman, D. F., and Mickelson, D. M., 1986, Correlation of glacial deposits of the Huron, Lake Michigan and Green Bay lobes in Michigan and Wisconsin: *Quaternary Science Reviews*, v. 5, p. 53-57.
- Eshelman, R. E., 1974, Black Bear from Quaternary Deposits in Michigan: *Michigan Academician*, v. 6, no. 3, p. 291-298.
- Eshelman, R. E., Evenson, E. B., and Hibbard, C. W., 1972, The Peccary, *Platygonus compressus* Le Conte, from Beneath Late Wisconsinan Till, Washtenaw County, Michigan: *Michigan Academician*, v. 5, no. 2, p. 243-256.
- Espenshade, E. B., Jr., 1932, An intensive study of the sphericity and roundness of beach and dune sands of the south of Lake Michigan, MS: University of Chicago.
- Eubanks, S. W., 1979, Urban and rural services study-draft: Genesee-Lapeer-Shiawassee Region V Planning and Development Commission, p. 1-171.
- Evans, M. S., Eadie, B. J., and Glover, R. M., 1998, Sediment Trap Studies in Southeastern Lake Michigan: Fecal Pellet Express or the More Traveled Route?: *Journal of Great Lakes Research*, v. 24, no. 3, p. 555-568.
- Evans, O. F., 1935, Bathymetric studies of the Lake Michigan basin: *Geographical Review*, v. 25, no. 4, p. 667-670.
- , 1937, Origin of the coastal lakes of western Michigan: *Geographical Review*, v. 27, no. 1, p. 136-137.
- , 1938a, Transportation of sediments on fresh-water surfaces by flotation: *Journal of Sedimentary Research*, v. 8, no. 1, p. 33-35.
- , 1938b, The Undertow: *Science*, v. 88, no. 2282, p. 279-281.
- , 1940a, The low and ball of the eastern shore of Lake Michigan: *Journal of Geology*, v. 48, no. 5, p. 476-511.
- , 1940b, The low and ball of the eastern shore of Lake Michigan, MS: University of Michigan.
- , 1941, The classification of wave-formed ripple marks: *Journal of Sedimentary Research*, v. 11, no. 1, p. 37-41.
- , 1942, The relation between the size of wave-formed ripple marks, depth of water, and the size of the generating waves: *Journal of Sedimentary Research*, v. 12, no. 1, p. 31-35.
- , 1944, Some structural differences between wind-laid and water-laid deposits on the west shore of Lake Michigan: *Journal of Sedimentary Research*, v. 14, no. 2, p. 94-96.
- , 1950, On the action of waves breaking against the edge of a submerged shelf: *Journal of Geology*, v. 58, no. 3, p. 281-282.
- Eveland, H. E., Jr., 1948, Topographic expression of geology in the Lake Huron basin, MS: University of Illinois, 18 p.
- Evenson, E. B., 1973a, Late Pleistocene Shorelines and Stratigraphic Relations in the Lake Michigan Basin: *Geological Society of America Bulletin*, v. 84, p. 2281-2298.
- , 1973b, A reevaluation of the "Valders" limit in the Lake Michigan Basin, *in* Evenson, E. B., Eschman, D. F., and Farrand, W. R., eds., *The "Valderan" problem, Lake Michigan basin*, 22nd Annual Midwest Friends of the Pleistocene Field Conference Guidebook: Ann Arbor, Midwest Friends of the Pleistocene.
- Evenson, E. B., Eschman, D. F., and Farrand, W. R., 1973, Late Glacial History of the Pere Marquette River, Mason and Lake Counties, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 19-25.

- Evenson, E. B., Farrand, W. R., and Eschman, D. F., 1974, Late Pleistocene shorelines and stratigraphic relations in the Lake Michigan Basin: Reply: Geological Society of America Bulletin, v. 85, p. 661-664.
- Evenson, E. B., Farrand, W. R., Eschman, D. F., Mickelson, D. M., and Maher, L. J., 1978a, Greatlakean Substage: A Replacement for Valderan Substage in the Lake Michigan Basin: Quaternary Research, v. 6, p. 411-424.
- , 1978b, Greatlakean Substage: A Replacement for Valderan Substage in the Lake Michigan Basin - reply: Quaternary Research, v. 9, p. 123-129.
- Evenson, E. B., and Taylor, L. D., 1981, The "Valders" problem, East Central Section of National Association of Geology Teachers: GVSU Field Trip Guide.
- Eversoll, J. S., and Carey, L. M., 2010, Soil Survey of Ontonagon County, Michigan.
- Ewald, S. K., 2012, A Stratigraphic Framework for the Saginaw Lobe, Bary and Calhoun Counties, Michigan, MS: Western Michigan University.
- Ewing, H. A., and Nater, E. A., 2002, Holocene soil development on till and outwash inferred from lake-sediment geochemistry in Michigan and Wisconsin: Quaternary Research, v. 57, no. 2, p. 234-243.
- Ezeagu, A., 2002, Electrical resistivity tomography and induced polarization techniques with paired vertical resistivity probes, MS: Western Michigan University, 111 p.
- Fahle, E., 1991, An analysis of dissolved organic compounds and their contribution to iron complexation in the shallow leachate plume of the West KL landfill, Kalamazoo, Michigan, MS: Western Michigan University.
- Fang, J., Barcelona, M. J., Krishnamurthy, R. V., and Atekwana, E., 2000, Stable carbon isotope biogeochemistry of a shallow sand aquifer contaminated with fuel hydrocarbons: Applied Geochemistry, v. 15, p. 157-160.
- Farnsworth, J. W., 1980, Relationship of gravity anomalies to a drift filled bedrock valley system in Calhoun County, Michigan, MS: Western Michigan University.
- Farrand, W. R., 1960, Former shorelines in western and northern Lake Superior basin, PhD: University of Michigan.
- , 1969, The Quaternary history of Lake Superior: 12th Conference on Great Lakes Research, p. 181-197.
- , 1976, Was there really a Valders?: Michigan Academician, v. 8, p. 477-486.
- , 1977, Revision of the Two Rivers "Valders" Drift Border and the Age of Fluted Points in Michigan: Anthropological Papers, v. 61, p. 74-84.
- , 1988, The Glacial Lakes around Michigan: Michigan Geological Survey Bulletin, v. 4.
- , 1995, The Pleistocene Glacial Record in the area of Alpena, Montmorency and Presque Isle counties, Michigan, *in* Black, T. J., ed., Karst Geology of the Northeast Lower Peninsula, Michigan, Michigan Basin Geological Society, p. 35-42.
- Farrand, W. R., and Drexler, C. W., 1985, Late Wisconsinan and Holocene history of the Lake Superior basin: Quaternary Evolution of the Great Lakes, p. 17-32.
- Farrand, W. R., and Eschman, D. F., 1974, Glaciation of the Southern Peninsula of Michigan: A Review: Michigan Academician, v. 7, no. 1, p. 31-56.
- Farrand, W. R., Zahner, R., and Benninghoff, W. S., 1969, Cary-Port Huron Interstade: Evidence from a buried bryophyte bed, Cheboygan County, Michigan, U.S. Contributions to Quaternary Research, Volume 123, Geological Society of America, p. 249-262.
- Farrish, K. W., Doolittle, J. A., and Gamble, E. E., 1990, Loamy substrata and Forest Productivity of Sandy Glacial Drift Soils in Michigan: Canadian Journal of Soil Science, v. 70, no. 2, p. 181-187.
- Fay, J. P., 1996, Using GIS to model nonpoint source pollution in an agricultural watershed in southeast Michigan, MS: University of Michigan.
- Feenstra, J. E., 1978, Soil Survey of Eaton County, Michigan, p. 1-88.
- , 1979, Soil Survey of Gratiot County, Michigan, p. 1-141.

- , 1982, Soil Survey of Oakland County, Michigan.
- Fegan, N. E., 1993, The effect of hydrologic pathways and runoff episodes on aluminum and major cations in two northern Michigan streams, PhD: Michigan State University, 117 p.
- Fenner, L. B., 1982, The hydrologic factors that control carbonate hardness in Kalamazoo County lakes, southwestern Michigan, MS: Western Michigan University.
- Ferris, J. G., 1948, Ground-water hydraulics as a geophysical aid: Michigan Geological Survey Technical Report, v. 1, p. 1-12.
- , 1953, Ground-water resources of the Holland area, Ottawa County, Michigan: Open File Report, p. 1-158.
- , 1954, Ground-water Resources of Southeastern Oakland County, Michigan: Michigan Geological Survey Progress Report, v. 16, p. 1-233.
- Fett, J. D., 2003, Assessing recovery of anthropogenically disturbed lakes using reference systems and multi-elemental techniques, MS: Michigan State University, 114 p.
- Fingleton, W. G., 1973, A study of erosion at seventeen sites along eastern Lake Michigan, MA: Western Michigan University.
- Finoli, G. W., 1978, Morphology and sedimentology of the Charlevoix-Antrim Drumlin Field, MS: University of Michigan, 111 p.
- Finkbeiner, K., 1994, Subsurface glacial geology between the Tekonsha and Kalamazoo moraines, Kalamazoo County, Michigan, MS: Western Michigan University.
- Finster, C. H., 1948, Geologic History of Michigan and Guide to Glacial Geology: Michigan Geological Survey Open File Report, v. 78.
- Fippin, E. O., and Rice, T. D., 1901, Soil Survey of Allegan County, Michigan.
- Firouzian, A., 1963, Hydrological studies of the Saginaw Formation in the Lansing, Michigan area, MS: Michigan State University, 53 p.
- Fisher, T. G., 2004, Aeolian sand preserved in Silver Lake: a new signal of Holocene high stands of Lake Michigan: *Holocene*, v. 15, p. 1072-1078.
- Fisher, T. G., and Hansen, E. C., 2014, Coastline and Dune Evolution along the Great Lakes, Geological Society of America Special Publication, Volume 508: Boulder, Geological Society of America.
- Fisher, T. G., Jol, H. M., and Boudreau, A. M., 2005, Saginaw Lobe tunnel channels (Laurentide Ice Sheet) and their significance in south-central Michigan, USA: *Quaternary Science Reviews*, v. 24, no. 22, p. 2375-2391.
- Fisher, T. G., Krantz, D. E., Castaneda, M. R., Loope, W. L., Jol, H. M., Goble, R., Higley, M. C., DeWald, S., and Hanson, P. R., 2014, Coastal geology and recent origins for Sand Point, Lake Superior, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 85-110.
- Fisher, T. G., Loope, W. L., Pierce, W., and Jol, H. M., 2007, Big lake records preserved in a little lake's sediment: an example from Silver Lake, Michigan, USA: *Journal of Paleolimnology*, v. 37, no. 3, p. 365-382.
- Fisher, T. G., and Taylor, L. D., 2002, Sedimentary and stratigraphic evidence for subglacial flooding, south-central Michigan, USA: *Quaternary International*, v. 90, p. 87-115.
- Fisher, T. G., Taylor, L. D., and Jol, H. M., 2003, Boulder-gravel hummocks and wavy basal till contacts: products of subglacial meltwater flow beneath the Saginaw Lobe, south-central Michigan, USA: *Boreas*, v. 32, p. 328-336.
- Fisher, T. G., Weyer, K. A., Boudreau, A. M., Martin-Hayden, J. M., Krantz, D. E., and Breckenridge, A., 2012, Constraining Holocene lake levels and coastal dune activity in the Lake Michigan basin: *Journal of Paleolimnology*, v. 47, no. 3, p. 373-390.
- Fisher, T. G., and Whitman, R. L., 1999, Deglacial and lake level fluctuation history recorded in cores, Beaver Lake, Upper Peninsula, Michigan: *Journal of Great Lakes Research*, v. 25, p. 263-274.

- Fitchko, J., and Hutchinson, T. C., 1975, A Comparative Study of Heavy Metal Concentrations in River Mouth Sediments Around the Great Lakes: *Journal of Great Lakes Research*, v. 1, no. 1, p. 46-78.
- Fitterman, D. V., Graves, B. J., Lehr, J. H., Butcher, K., Owen, T. E., and Mathews, M., 1986, Transient electromagnetic sounding in the Michigan Basin for ground water evaluation, Dublin, OH, United States (USA), Natl. Water Well Assoc., Dublin, OH.
- Flakne, R., 2003, The holocene vegetation history of Isle Royale National Park, Michigan, USA: *Canadian Journal of Forest Research*, v. 33, p. 1144-1166.
- Fleck, W., 1980, Geology and hydrology for environmental planning in Washtenaw County, Michigan: U.S. Geological Survey Open-File Report.
- Fleck, W. B., and McDonald, M. G., 1978, 3-Dimensional Finite-Difference Model of Groundwater System Underlying Muskegon County Wastewater Disposal System, Michigan: *Journal of Research of the U.S. Geological Survey*, v. 6, p. 307-318.
- Fletcher, M. R., 1979, Distribution patterns of Holocene and reworked Paleozoic palynomorphs in sediments from Southeastern Lake Michigan, PhD: Case Western Reserve University, 331 p.
- Flint, A. C., 1999, Stratigraphic analysis of diamicton units in north-central St. Joseph County, Michigan, MS: Western Michigan University.
- Flint, R. F., 1953, Probable Wisconsin sub-stages and late-Wisconsin events in northeastern United States and southeastern Canada: *Geological Society of America Bulletin*, v. 64, p. 897-920.
- Fogarty, L. R., 2005, PCB concentrations in Pere Marquette River and Muskegon River watersheds, 2002: U.S. Geological Survey Open-File Report, v. 2004-1088, p. 1-30.
- , 2007, Bacteria and Emerging Chemical Contaminants in the St. Clair River/Lake St. Clair Basin, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2007-1083.
- Fogarty, L. R., and Duris, J. W., 2007, Screening for the pesticides atrazine, chlorpyrifos, diazinon, metolachlor, and simazine in selected Michigan streams, March–November 2005: U.S. Geological Survey Scientific Investigations Report, v. 2005-5077, p. 1-46.
- Fogarty, L. R., Duris, J. W., and Aichele, S. S., 2005, Preliminary Survey of Antibiotic-Resistant Fecal Indicator Bacteria and Pathogenic *Escherichia coli* from River-Water Samples Collected in Oakland County, Mich., 2003: U.S. Geological Survey Scientific Investigations Report, v. 2005-2058, p. 1-34.
- Fogarty, L. R., Duris, J. W., Crowley, S. L., and Hardigan, N., 2007, Antibiotic-resistant fecal bacteria, antibiotics, and mercury in surface waters of Oakland County, Michigan, 2005–2006: U.S. Geological Survey Scientific Investigations Report, v. 2007-5242, p. 1-30.
- Folsom, M. M., 1971, Glacial geomorphology of the Hastings Quadrangle, Michigan, MS: Michigan State University, 189 p.
- Fontanna, S. G., 1946, Michigan's water problems are studied: *Michigan Conservation*, v. 15, no. 6.
- Forester, R. M., Colman, S. M., Reynolds, R. L., and Keigwin, L. D., 1994, Lake Michigan's Late Quaternary Limnological and Climate History From Ostracode, Oxygen Isotope, and Magnetic Susceptibility: *Journal of Great Lakes Research*, v. 20, no. 1, p. 93-107.
- Formolo, M. J., Salacup, J. M., Petsch, S. T., Martini, A. M., and Nüsslein, K., 2008, A new model linking atmospheric methane sources to Pleistocene glaciation via methanogenesis in sedimentary basins: *Geology*, v. 36, no. 2, p. 139-142.
- Forsythe, J. T., 1952, The pre-glacial drainage of central southern Michigan, MS: University of Michigan, 1-20 p.
- Forysth, J. L., 1971a, Geology of the Lake Erie Islands and Adjacent Shores, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, 63 p.
- , 1971b, Road Log, *in* Forysth, J. L., ed., Geology of the Lake Erie Islands and Adjacent Shores, Michigan Basin Geological Society, p. 5-18.

- Foster, D. S., and Folger, D. W., 1994, The Geologic Framework of Southern Lake-Michigan: *Journal of Great Lakes Research*, v. 20, p. 44-60.
- Foster, Z. C., Shearin, A. E., Millar, C. E., Ventch, J. O., and Donahue, R. L., 1939a, Soil Survey of Cheboygan County, Michigan, p. 1-47.
- Foster, Z. C., Veatch, J. O., Schoenmann, L. R., Pasco, R. E., Hubbard, E. H., and Donahue, R. E., 1939b, Soil Survey of Schoolcraft County, Michigan.
- Fox, W. T., Ladd, J. W., and Martin, M. K., 1966, A profile of the four moment measures perpendicular to a shoreline, South Haven, Michigan: *Journal of Sedimentary Research*, v. 36, no. 4, p. 1126-1130.
- Frahm, A., 2011, Deterministic hydrogeologic modeling of glacial sediments, Washtenaw County, Michigan, MS: Wayne State University, 124 p.
- Francis, D. R., 1997, Bryozoan statoblasts in the recent sediments of Douglas Lake, Michigan: *Journal of Paleolimnology*, v. 17, no. 3, p. 255-261.
- Frankforter, W. E., 1966, Some Recent Discoveries of Late Pleistocene Fossils in Western Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 51, no. 1, p. 209-220.
- Franz, H., 1946, Fulgurites in Michigan: *Rocks and Minerals*, v. 21, no. 6, p. 354-355.
- Franzblau, A., Demond, A., Towey, T., Adriaens, P., Chang, S. C., Luksemburg, W., Maier, M., Garabrant, D., Gillespie, B., Lepkowski, J., Chang, C. W., Chen, Q. X., and Hong, B. L., 2009, Residences with anomalous soil concentrations of dioxin-like compounds in two communities in Michigan, USA: A case study: *Chemosphere*, v. 74, no. 3, p. 395-403.
- Fraser, G. S., and Hester, N. C., 1977, Sediments and Sedimentary Structures of a Beach-Ridge Complex, Southwestern Shore of Lake-Michigan: *Journal of Sedimentary Petrology*, v. 47, no. 3, p. 1187-1200.
- Fraser, G. S., Thompson, T. A., Kvale, E. P., Carlson, C. P., Fishbaugh, D. A., Gruver, B. L., Holbrook, J., Kairo, S., Kohler, C. S., Malone, A. E., Moore, C. H., Rachmanto, B., and Rhoades, L., 1991, Sediments and Sedimentary Structures of a Barred, Nontidal Coastline, Southern Shore of Lake Michigan: *Journal of Coastal Research*, v. 7, p. 1113-1124.
- Frederick, W. E., 1985, Soil Survey of Missaukee County, Michigan.
- Freed, R. L., 1993, A fracture analysis of glacial tills in southwest Michigan, MS: Western Michigan University.
- Freedman, Z., and Zak, D. R., 2014, Atmospheric N Deposition Increases Bacterial Laccase-Like Multicopper Oxidases: Implications for Organic Matter Decay: *Applied and Environmental Microbiology*, v. 80, no. 14, p. 4460-4468.
- French, W. E., 1960, The sedimentary environment of southern Lake Huron, MS: University of Michigan.
- Fronczek, D. V., 1986, A hydrogeologic investigation of the Balkema Wetland, MS: Western Michigan University.
- Fry, L. M., Gronewold, A. D., Fortin, V., Buan, S., Clites, A. H., Luukkonen, C., Holtschlag, D., Diamond, L., Hunter, T., Seglenieks, F., Durnford, D., Dimitrijevic, M., Subich, C., Klyszejko, E., Kea, K., and Restrepo, P., 2014, The Great Lakes Runoff Intercomparison Project Phase 1: Lake Michigan (GRIP-M): *Journal of Hydrology*, v. 519, Part D, p. 3448-3465.
- Frye, J. C., and Willman, H. B., 1960, Classification of the Wisconsinan Stage in the Lake Michigan Glacial Lobe: *Illinois State Geological Survey Circular*, v. 285, p. 1-16.
- Fujita, K., and Sleep, N. H., 1991, A re-examination of the seismicity of Michigan: *Tectonophysics*, v. 186, p. 75-106.
- Fuks, K. H., and Wilkinson, B. H., 1998, Holocene sedimentation in two western Michigan estuaries: *Journal of Great Lakes Research*, v. 24, p. 822-837.

- Fukumori, E., Christensen, E. R., and Klein, R. J., 1992, A model for ^{137}Cs and other tracers in lake sediments considering particle size and the inverse solution: *Earth and Planetary Science Letters*, v. 114, no. 1, p. 85-99.
- Fuller, G. D., 1935, Postglacial vegetation of the Lake Michigan region: *Ecology*, v. 16, no. 3, p. 473-487.
- Fuller, L., 1905, Failure of wells along the lower Huron River, Michigan, in 1904, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1904, being the report of Alfred C. Lane, State Geologist.
- Fuller, L. M., Aichele, S. S., and Minnerick, R. J., 2004, Predicting Water Quality by Relating Secchi-Disk Transparency and Chlorophyll a Measurements to Satellite Imagery for Michigan Inland Lakes, August 2002: U.S. Geological Survey Scientific Investigations Report, v. 2004-5086.
- Fuller, L. M., Jodoin, R. S., and Minnerick, R. J., 2011, Predicting lake trophic state by relating Secchi-disk transparency measurements to Landsat-satellite imagery for Michigan inland lakes, 2003–05 and 2007–08: U.S. Geological Survey Scientific Investigations Report, v. 2011-5007, p. 1-36.
- Fuller, L. M., and Minnerick, R. J., 2007, Predicting Water Quality by Relating Secchi-Disk Transparency and Chlorophyll a Measurements to Landsat Satellite Imagery for Michigan Inland Lakes, 2001–2006: U.S. Geological Survey Fact Sheet, v. 2007-3022.
- , 2008, State and regional water-quality characteristics and trophic conditions of Michigan's inland lakes, 2001–2005: U.S. Geological Survey Scientific Investigations Report, v. 2008-5188, p. 1-58.
- Fuller, L. M., Morgan, T. R., and Aichele, S. S., 2006, Wetland Delineation with IKONOS High-Resolution Satellite Imagery, Fort Custer Training Center, Battle Creek, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2006-5051, p. 1-8.
- Fuller, L. M., and Taricska, C. K., 2012, Water-quality characteristics of Michigan's inland lakes, 2001–10: U.S. Geological Survey Scientific Investigations Report, v. 2011-5233, p. 1-53.
- Futyma, R. P., 1981, The northern limits of glacial lake Algonquin in upper Michigan: *Quaternary Research*, v. 15, no. 3, p. 291-310.
- Gacek, W. F., 1951, Mechanical analyses of sediments from southwest Lake Erie, MS: University of Michigan.
- Gahagan, A., Giardina, C. P., King, J. S., Binkley, D., Pregitzer, K. S., and Burton, A. J., 2015, Carbon fluxes, storage and harvest removals through 60 years of stand development in red pine plantations and mixed hardwood stands in Northern Michigan, USA: *Forest Ecology and Management*, v. 337, p. 88-97.
- Gallagher, J. T., 1956, The ground-water resources of the Jackson, Michigan area, MS: University of Michigan, 52 p.
- Gardner, D. R., and Whiteside, E. P., 1952, Zonal Soils in the Transition Region between the Podzol and Gray-Brown Podzolic Regions in Michigan: *Soil Science Society of America Proceedings*, v. 16, no. 2, p. 137-141.
- Gardner, R. C., 1997, Lithologic and Stratigraphic Analysis of Glacial Diamictons, Sturgis, Michigan, MS: Western Michigan University.
- Gates, D. M., 1939, A deposit of mammal bones under Sleeping Bear dune: *Kansas Academy of Sciences Transactions*, v. 42, p. 337-338.
- Gates, F. C., 1950, The disappearing Sleeping Bear dune: *Ecology*, v. 31, no. 3, p. 386-392.
- Geib, W. J., 1906, Soil Survey of Cass County, Michigan.
- , 1909, Soil Survey of Wexford County, Michigan.
- Gephart, C. J., 1982, Relative importance of iron-oxide, manganese-oxide, and organic material on the adsorption of chromium in natural water sediment systems, MS: Michigan State University, 125 p.

- Gidley, J. W., 1908, Descriptions of two new species of Pleistocene ruminants of the genera *Ovibos* and *Bootherium*, with notes on the later genus: U.S. National Museum Proceedings, v. 34, p. 681-684.
- Gilbert, B. D., 1914, Soil Survey of Genesee County, Michigan.
- Gilbert, G. K., 1897, Recent earth movements in the Great Lakes region: U.S. Geological Survey, Annual Report, v. 18, no. II, p. 595-647.
- , 1899, Recent earth movements in the Great Lakes region: American Journal of Science, v. 157, no. 39, p. 239-241.
- Gill, G. M., 1970, Size distribution of heavy minerals relative to the hydraulic parameters of sediments, MS Wayne State University, 86 p.
- Gillespie, J. L., 1990, Installation Restoration Program, Phase II, Confirmation/Quantification, Stage 2, Wurtsmith Air Force Base, Michigan: Hydrogeology near Wurtsmith Air Force Base: U.S. Geological Survey Administrative Report.
- Gillespie, J. L., and Dumouchelle, D. H., 1989, Ground-water flow and quality near the upper Great Lakes connecting channels, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 88-4232, p. 1-82.
- Gilliam, J. A., Kapp, R. O., and Bogue, R. D., 1967, A Post-Wisconsin Pollen Sequence from Vestaburg Bog, Montcalm County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 52, p. 3-17.
- Gilpin, A. R., 1912, Geology of Cheboygan County (Michigan), MS: The University of Chicago, 38 p.
- Ging, P. B., Long, D. T., and Lee, R. W., 1996, Selected Geochemical Characteristics of Ground Water from the Marshall Aquifer in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4220, p. 1-19.
- Giri, S. J., Diefendorf, A. F., and Lowell, T. V., 2015, Origin and sedimentary fate of plant-derived terpenoids in a small river catchment and implications for terpenoids as quantitative paleovegetation proxies: Organic Geochemistry, v. 82, p. 22-32.
- Giroux, P. R., 1957, Summary of ground-water conditions in Michigan, 1956: U.S. Geological Survey, Water Supply Report, v. 1, p. 1-49.
- , 1958, Summary of ground-water conditions in Michigan, 1957: U.S. Geological Survey, Water Supply Report, v. 2, p. 1-79.
- , 1962, Summary of ground-water conditions in Michigan, 1961: U.S. Geological Survey, Water Supply Report, v. 6, p. 1-98.
- Giroux, P. R., Hendrickson, G. E., Stoimenoff, L. E., and Whetstone, G. W., 1964, Water resources of Van Buren County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 3, p. 1-144.
- Giroux, P. R., and Huffman, G. C., 1963, Summary of ground-water conditions in Michigan, 1962: U.S. Geological Survey, Water Supply Report, v. 7, p. 1-80.
- Giroux, P. R., Stoimenoff, L. E., Nowlin, J. O., and Skinner, E. L., 1966, Ground-water resources of Branch County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 6, p. 1-158.
- Giroux, P. R., and Thompson, T., 1960, Summary of ground-water conditions in Michigan, 1958: U.S. Geological Survey, Water Supply Report, v. 3, p. 1-77.
- , 1961a, Summary of ground-water conditions in Michigan, 1959: U.S. Geological Survey, Water Supply Report, v. 4, p. 1-69.
- , 1961b, Summary of ground-water conditions in Michigan, 1960: U.S. Geological Survey, Water Supply Report, v. 5, p. 1-74.
- Glynn, M. E., Chase, R. B., Kehew, A. E., Selegean, J. P., Ferrick, M. G., and Hansen, C. M., 2012, Lake Michigan Bluff Dewatering and Stabilization Study - Allegan County, Michigan: U.S. Army Corps of Engineers.

- Goldthwait, J. W., 1906, Correlation of the raised beaches on the west side of Lake Michigan: *Journal of Geology*, v. 14, no. 5, p. 411-424.
- , 1908, A reconstruction of water planes of the extinct glacial lakes in the Lake Michigan Basin: *Journal of Geology*, v. 16, no. 5, p. 459-476.
- , 1910, Isobases of the Algonquin and Iroquois beaches, and their significance: *Geological Society of America Bulletin*, v. 21, p. 227-248.
- Gooding, M. P., 2014, A watershed classification scheme for lower Michigan, MS: University of Michigan.
- Goovaerts, P., AvRuskin, G., Meliker, J., Slotnick, M., Jacquez, G., and Nriagu, J., 2005, Geostatistical modeling of the spatial variability of arsenic in groundwater of southeast Michigan: *Water Resources Research*, v. 41, no. 7.
- Gordon, C. H., 1898, Notes on the Kalamazoo and other old glacial outlets in southern Michigan: *Journal of Geology*, v. 6, no. 5, p. 477-482.
- , 1900, Geological report on Sanilac County, Michigan: Michigan Geological and Biological Survey, Publication, v. 7, no. III, p. 1-34.
- , 1902, The Port Huron oil field, Wave cutting on west shore of Lake Huron, Sanilac County, Michigan, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, p. 269-.
- Gorman, R. F., and Akeley, R. P., Jr., 1978, Impact of sanitary landfills on water quality in southeast Michigan: Southeast Michigan Council Governments, Environment Background Paper, v. 36, p. 1-307.
- Graf, J. B., 1975, Nearshore sediment distribution, southwestern Lake Michigan, PhD: University of Illinois.
- , 1976, Comparison of measured and predicted nearshore sediment grain-size distribution patterns, southwestern Lake Michigan, U.S.A: *Marine Geology*, v. 22, no. 4, p. 253-270.
- Graney, J. R., Halliday, A. N., Keeler, G. J., Nriagu, J. O., Robbins, J. A., and Norton, S. A., 1995, Isotopic record of lead pollution in lake sediments from the northeastern United States: *Geochimica et Cosmochimica Acta*, v. 59, no. 9, p. 1715-1728.
- Grannemann, N. G., 1978, Water supply potential of the Lake Sally system, Marquette County, Michigan: U.S. Geological Survey Open-File Report, v. 78-1046, p. 1-14.
- , 1979, Water resources of the Marquette Iron Range area, Marquette County, Michigan: U.S. Geological Survey Open-File Report, v. 79-1339, p. 1-77.
- , 1984, Hydrogeology and effects of tailings basins on the hydrology of Sands Plain, Marquette County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 84-4114, p. 1-98.
- Grannemann, N. G., and Cummings, T. R., 1987, Installation Restoration Program, Phase II, Confirmation/Quantification, Stage 1, Hydrogeology of K.I. Sawyer Air Force Base, Michigan: U.S. Geological Survey Administrative Report.
- Grannemann, N. G., Hunt, R. J., Nicholas, J. R., Reilly, T. E., and Winter, T. C., 2000, The Importance of Ground Water in the Great Lakes Region: U.S. Geological Survey Water Resources Investigations, v. 00-4008.
- Grannemann, N. G., and Twenter, F. R., 1982, Ground water for public supply at Windigo, Isle Royale National Park, Michigan: U.S. Geological Survey Open-File Report, v. 82-567, p. 1-16.
- , 1985, Geohydrology and ground-water flow at Verona well field, Battle Creek, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 85-4056, p. 1-54.
- Grannemann, N. G., and Weaver, T. L., 1998, An Annotated Bibliography of Selected References on the Estimated Rates of Direct Ground-Water Discharge to the Great Lakes: U.S. Geological Survey Water-Resources Investigations Report, v. 98-4039.
- Grant, R. P., and Pringle, C. H., 1943, Topographic map of the bedrock surface of the Southern Peninsula of Michigan, scale 1:500,000.

- Gregory, C., 1995, Opportunities for Water Quality Management in Karst Areas of Northeast Michigan, *in* Black, T. J., ed., Karst Geology of the Northeast Lower Peninsula, Michigan, Michigan Basin Geological Society, p. 43-54.
- Gregory, W. M., 1902, Preliminary Report on Arenac County and parts of Ogemaw, Iosco, and Alcona Counties, *in* Lane, A. C., ed., Report of the State Board of Geological Survey of Michigan for the year 1901, Being the Report of Alfred C. Lane, State Geologist, p. 9-30.
- , 1912, Geological report on Arenac County: Michigan Geological and Biological Survey, Publication, v. 11, no. 8, p. 1-146.
- Groncki, J. M., 1999, Calibration, installation techniques, and initial measurements for vertical resistivity probes in hydrogeologic investigations, MS: Western Michigan University, 122 p.
- Gupta, N., and Bair, E. S., 1997, Variable-density flow in the midcontinent basins and arches region of the United States: *Water Resources Research*, v. 33, no. 8, p. 1785-1802.
- Gutenberg, B., 1933, Tilting due to glacial melting: *Journal of Geology*, v. 41, no. 5, p. 449-467.
- Gutschick, R. C., 1976, Geology of the Kentland Structural Anomaly, Northwestern Indiana, Field Trip Guidebook, North-Central section of the Geological Society of America and Western Michigan University, 58 p.
- Guzman, I., 2014, Stratigraphic framework and land system correlation for deposits of the Saginaw Lobe, Michigan, USA, MS: Western Michigan University.
- Haack, S. K., and Duris, J. W., 2008, Chemical and microbiological water quality of subsurface agricultural drains during a field trial of liquid dairy manure effluent application rate and varying tillage practices, Upper Tiffin Watershed, southeastern Michigan: U.S. Geological Survey Open-File Report, v. 2008-1189, p. 1-38.
- Haack, S. K., Duris, J. W., Kolpin, D. W., Fogarty, L. R., Johnson, H. E., Gibson, K. E., Focazio, M., Schwab, K. J., Hubbard, L. E., and Foreman, W. T., 2015, Genes indicative of zoonotic and swine pathogens are persistent in stream water and sediment following a swine manure spill: *Applied and Environmental Microbiology*, v. 81, p. 3430-3441.
- Haag, R. D., Jr., 1979, The hydrogeology of the Houghton Wetland, MS: University of Michigan.
- Haddadin, M. S., 1972, Engineering and ceramic studies of the glacial clays of the Keweenaw Peninsula, Michigan, MS: Michigan Technological University.
- Hage-Hassan, J., 2015, Impacts of anthropogenic watershed activity on the sedimentary record of dams from the midwestern United States: A case study from Michigan and Indiana, MS: Wayne State University.
- Haile-mariam, S., 1991, Mineralogy of fine-loamy and sandy hydrosequences in Michigan, PhD: Michigan State University.
- Hale, D. J., 1903, Marl (bog lime) and its application to the Manufacture of Portland Cement: *Geological Survey of Michigan* v. 8, no. 3, p. 1-399.
- Hall, C. M., Castro, M. C., Lohmann, K. C., and Ma, L., 2005, Noble gases and stable isotopes in a shallow aquifer in southern Michigan: Implications for noble gas paleotemperature reconstructions for cool climates: *Geophysical Research Letters*, v. 32, no. 18, p. L18404.
- , 2006, Reply to comment by Klump et al. on "Noble gases and stable isotopes in a shallow aquifer in southern Michigan: Implications for noble gas paleotemperature reconstructions for cool climates": *Geophysical Research Letters*, v. 33, no. 24, p. L24404.
- Hall, C. M., Castro, M. C., Lohmann, K. C., and Sun, T., 2012, Testing the noble gas paleothermometer with a yearlong study of groundwater noble gases in an instrumented monitoring well: *Water Resources Research*, v. 48.
- Hall, D. W., 1983, Electrical resistivity survey near the "KL" Avenue Landfill, Kalamazoo County, Michigan, MS: Western Michigan University.

- Halstead, L. L., 1979, Installation and calibration of a short-period seismic network in Upper Michigan and Northern Wisconsin, with preliminary data analysis, MS: Michigan Technological University.
- Hamilton, D. A., Sorrell, R. C., and Holtschlag, D. J., 2008, A regression model for computing index flows describing the median flow for the summer month of lowest flow in Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2008-5096, p. 1-43.
- Hammoud, A. H., 1995, Geochemical forms of lead, nickel, zinc and cadmium in undeveloped urban soils, Detroit, Michigan, MS: Wayne State University, 86 p.
- Han, H., and Allan, J. D., 2012, Uneven rise in N inputs to the Lake Michigan Basin over the 20th century corresponds to agricultural and societal transitions: *Biogeochemistry*, v. 109, no. 1, p. 175-187.
- Han, H., Bosch, N., and Allan, J. D., 2011, Spatial and temporal variation in phosphorus budgets for 24 watersheds in the Lake Erie and Lake Michigan basins: *Biogeochemistry*, v. 102, no. 1, p. 45-58.
- Handley, C. O., Jr., 1953, Marine mammals in Michigan Pleistocene beaches: *Journal of Mammalogy*, v. 34, no. 2, p. 252-253.
- Handy, A. H., 1982, Water quality of coal deposits and abandoned mines, Saginaw County, Michigan: Open-File Report - U. S. Geological Survey, p. 50-50.
- Handy, A. H., and Stark, J. R., 1984, Water resources of Sleeping Bear Dunes National Lakeshore, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 83-4253, p. 1-38.
- Handy, A. H., and Twenter, F. R., 1985, Water resources of Pictured Rocks National Lakeshore, Michigan: U.S. Geological Survey Water Resources Investigations, v. 85-4103, p. 1-41.
- Hanes, B. E., Fisher, T. G., Becker, R. H., and Martin-Hayden, J. M., 2014, Elucidating paleo dune activity and timing from wetlands in the lee of coastal sand dunes, Grand Mere Lakes, Michigan, USA, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 133-150.
- Hankinson, T. L., Davis, C. A., and Needham, J. G., 1908, A biological survey of Walnut Lake (Oakland County), Michigan, *in* Lane, A. C., ed., *Report on the State Board of Geological Survey of Michigan for the year 1907, being the report of Alfred C. Lane, State Geologist*.
- Hanrahan, J. L., Kravtsov, S. V., and Roebber, P. J., 2009, Quasi-periodic decadal cycles in levels of lakes Michigan and Huron: *Journal of Great Lakes Research*, v. 35, no. 1, p. 30-35.
- Hansel, A. K., and Mickelson, D. M., 1988, A reevaluation of the timing and causes of high lake phases in the Lake Michigan Basin: *Quaternary Research*, v. 29, p. 113-128.
- Hansen, E., DeVries-Zimmerman, S., van Dijk, D., and Yurk, B., 2009, Patterns of wind flow and aeolian deposition on a parabolic dune on the southeastern shore of Lake Michigan: *Geomorphology*, v. 105, no. 1-2, p. 147-157.
- Hansen, E. B., 1948, A postglacial plant succession at Ann Arbor, Michigan, dating from the highest Lake Maumee level: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 32, p. 47-75.
- Hansen, E. C., Arbogast, A. F., Packman, S. C., and Hansen, B., 2003, Post-Nipissing origin of a backdune complex along the southeastern shore of Lake Michigan: *Physical Geography*, v. 23, no. 3, p. 233-244.
- Hansen, E. C., Arbogast, A. F., van Dijk, D., and Yurk, B., 2006, Growth and migration of parabolic dunes along the southeastern Coast of Lake Michigan: *Journal of Coastal Research*, p. 209-214.

- Hansen, E. C., Arbogast, A. F., and Yurk, B., 2004, The history of dune growth and migration along the southeastern shore of Lake Michigan: A perspective from Green Mountain beach: *Michigan Academician*, v. 35, p. 455-478.
- Hansen, E. C., Fisher, T. G., Arbogast, A. F., and Bateman, M. D., 2010, Geomorphic history of low-perched, transgressive dune complexes along the southeastern shore of Lake Michigan: *Aeolian Research*, v. 1, no. 3–4, p. 111-127.
- Harold, M. R., 2003, The effects of wetting and drying on chromium and other metal mobility, MS: Michigan State University, 175 p.
- Hart, S. R., and Steinhart, J. S., 1965, Terrestrial heat flow: Measurement in lake bottoms: *Science*, v. 149, p. 1499-1501.
- Hart, S. R., Steinhart, J. S., and Smith, T. J., 1994, Terrestrial heat flow in Lake Superior: *Canadian Journal of Earth Sciences*, v. 31, p. 698-708.
- Hase, H. W., Jr., 1973, Geological-geophysical site investigation of a portion of the student development complex, Michigan Technological University, Houghton County, Michigan, MS: Michigan Technological University, 35 p.
- Haveman, M. J., 2009, Influence of Vegetation on Seasonal Pore Water Chemistry in a Michigan Peatland, MS: Western Michigan University.
- Hawley, N., 1991, Preliminary Observations of Sediment Erosion from a Bottom Resting Flume: *Journal of Great Lakes Research*, v. 17, no. 3, p. 361-367.
- , 2004, A Comparison of Suspended Sediment Concentrations Measured by Acoustic and Optical Sensors: *Journal of Great Lakes Research*, v. 30, no. 2, p. 301-309.
- Hawley, N., Harris, C. K., Lesht, B. M., and Clites, A. H., 2009, Sensitivity of a sediment transport model for Lake Michigan: *Journal of Great Lakes Research*, v. 35, no. 4, p. 560-576.
- Hawley, N., and Lee, C. H., 1999, Sediment resuspension and transport in Lake Michigan during the unstratified period: *Sedimentology*, v. 46, no. 5, p. 791-805.
- Hawley, N., and Lesht, B. M., 1995, Does local resuspension maintain the benthic nepheloid layer in southeastern Lake Michigan?: *Journal of Sedimentary Research*, v. 65, no. 1a, p. 69-76.
- Hayden, A., 2012, A localized investigation of high resolution groundwater flow properties of the Saginaw Aquifer Mason, Michigan, MS: Western Michigan University, 73 p.
- Hayden, Z. D., Ngouajio, M., and Brainard, D. C., 2015, Planting Date and Staggered Seeding of Rye-Vetch Mixtures: Biomass, Nitrogen, and Legume Winter Survival: *Agronomy Journal*, v. 107, no. 1, p. 33-40.
- He, C., 1997, Modeling hydrologic impact of withdrawing the Great Lakes water for agricultural irrigation: *JAWRA Journal of the American Water Resources Association*, v. 33, no. 5, p. 1055-1068.
- He, C. S., Zhang, L. H., DeMarchi, C., and Croley, T. E., 2014a, Estimating point and non-point source nutrient loads in the Saginaw Bay watersheds: *Journal of Great Lakes Research*, v. 40, p. 11-17.
- He, L., Ivanov, V. Y., Bohrer, G., Thomsen, J. E., Vogel, C. S., and Moghaddam, M., 2013, Temporal dynamics of soil moisture in a northern temperate mixed successional forest after a prescribed intermediate disturbance: *Agricultural and Forest Meteorology*, v. 180, p. 22-33.
- He, L. L., Ivanov, V. Y., Bohrer, G., Maurer, K. D., Vogel, C. S., and Moghaddam, M., 2014b, Effects of fine-scale soil moisture and canopy heterogeneity on energy and water fluxes in a northern temperate mixed forest: *Agricultural and Forest Meteorology*, v. 184, p. 243-256.
- Healy, D. F., 2005, Ground-Water/Surface-Water Relations along Honey Creek, Washtenaw County, Michigan, 2003: U.S. Geological Survey Open-File Report, v. 2004-1387, p. 1-17.

- Healy, D. F., Chambers, D. B., Rachol, C. M., and Jodoin, R. S., 2008, Water quality of the St. Clair River, Lake St. Clair, and their U.S. tributaries, 1946–2005: U.S. Geological Survey Scientific Investigations Report, v. 2007-5172, p. 1-92.
- Healy, D. F., Rheume, S. J., and Simpson, J. A., 2003, Environmental Effects of the Big Rapids Dam Remnant Removal, Big Rapids, Michigan, 2000-02: U.S. Geological Survey Water-Resources Investigations Report, v. 03-4136, p. 1-64.
- Hearn, W. E., and Griffen, A. M., 1904, Soil Survey of the Alma Area, Michigan.
- Heft, A. W., 1993, The role of atmospheric deposition of contaminant metals to the Great Lakes deduced from sediment cores, MS: Michigan State University, 150 p.
- Heim, G. E., Jr., 1957, Ground-water geology of north Ann Arbor and vicinity, MS.: University of Michigan, 47 p.
- Hendrickson, G. E., 1966, Michigan's Au Sable River—Today and Tomorrow: Michigan Geological Survey Bulletin, v. 3, p. 1-80.
- , 1973, Hydrology and Recreation on the Cold-Water Rivers of Michigan's Upper Peninsula: U.S. Geological Survey, Water Information Series Report, v. 4, p. 1-39.
- Hendrickson, G. E., and Doonan, C. J., 1966, Ground-water resources of Dickinson County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 5, p. 1-49.
- , 1970, Reconnaissance of the Pigeon River, a cold-water river in the north-central part of Michigan's southern peninsula, scale 1:62,500.
- , 1971a, Reconnaissance of the Black River of Michigan's southern peninsula, scale 1:125,000.
- , 1971b, Reconnaissance of the Pere Marquette River, a cold-water river in the central part of Michigan's southern peninsula, 1971, scale 1:62,500.
- , 1971c, Reconnaissance of the Sturgeon River, a cold-water river in the north-central part of Michigan's southern peninsula, scale 1:62,500.
- , 1972a, Hydrology and Recreation on the Cold-Water Rivers of Michigan's Southern Peninsula: U.S. Geological Survey, Water Information Series Report, v. 3, p. 1-83.
- , 1972b, Reconnaissance of the Manistee River, a cold-water river in the northwestern part of Michigan's southern peninsula, 1972, scale 1:62,500.
- , 1974, Reconnaissance of the Upper Au Sable River, a cold-water river in the north-central part of Michigan's southern peninsula, scale 1:62,500.
- Hendrickson, G. E., and Knutilla, R. L., 1974, Hydrology and trout populations of cold-water rivers of Michigan and Wisconsin: Wisconsin Academy of Sciences, Arts, and Letters, v. 62, p. 181-193.
- Henne, P. D., and Hu, F. S., 2010, Holocene climatic change and the development of the lake-effect snowbelt in Michigan, USA: Quaternary Science Reviews, v. 29, no. 7-8, p. 940-951.
- Henne, P. D., Hu, F. S., and Cleland, D. T., 2007, Lake-effect snow as the dominant control of mesic-forest distribution in Michigan, USA: Journal of Ecology, v. 95, no. 3, p. 517-529.
- Henrich, C., 1896, Faulting and accompanying features observed in glacial gravel and sand in southern Michigan: American Institute of Mining Engineers Transactions, v. 26, p. 460-464.
- Herbert, T. A., 1974, An analysis of the physical and legal aspects of erosion on Lake Michigan, a case study at St. Joseph, Michigan, PhD: Michigan State University.
- Herman, J. D., Vincent, R. K., and Drake, B., 1991, Geological and geophysical evaluation of the region around Saginaw Bay, Michigan (central Michigan Basin) with image processing techniques, *in* Catacosinos, P. A., and Daniels, P. A., Jr., eds., Early Sedimentary Evolution of the Michigan Basin, Volume 256: Boulder, Geological Society of America, p. 221-240.
- Hermanson, M. H., and Christensen, E. R., 1991, Recent Sedimentation in Lake Michigan: Journal of Great Lakes Research, v. 17, no. 1, p. 33-50.

- Hermanson, M. H., Christensen, E. R., Buser, D. J., and Chen, L.-M., 1991, Polychlorinated Biphenyls in Dated Sediment Cores from Green Bay and Lake Michigan: *Journal of Great Lakes Research*, v. 17, no. 1, p. 94-108.
- Hermanson, M. H., Moss, D. J., Monosmith, C. L., and Keeler, G. J., 2007, Spatial and temporal trends of gas and particle phase atmospheric DDT and metabolites in Michigan: Evidence of long-term persistence and atmospheric emission in a high-DDT-use fruit orchard: *Journal of Geophysical Research-Atmospheres*, v. 112, no. D4.
- Hesse, C. N., Mueller, R. C., Vuyisich, M., Gallegos-Graves, L., Gleasner, C. D., Zak, D. R., and Kuskel, C. R., 2015, Forest floor community metatranscriptomes identify fungal and bacterial responses to N deposition in two maple forests: *Frontiers in Microbiology*, v. 6.
- Heyman, L., 1949, A loess-like silt in Ann Arbor, Michigan, MS: University of Michigan.
- Hibbard, C. W., 1951, Animal Life in Michigan during the Ice Age: *Michigan Alumnus Quarterly Review*, v. 57, no. 18, p. 200-218.
- , 1952, Remains of the Barren Ground Caribou in Pleistocene Deposits of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 37, no. 3, p. 235-237.
- Hibbard, C. W., and Hinds, F. J., 1960, A radiocarbon date for a woodland musk ox in Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 45, p. 103-111.
- Hibbard, E. A., 1958, Occurrence of the Extinct Moose, *Cervalces*, in the Pleistocene of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 43, no. 1, p. 33-37.
- Hill, C. L., 2007, Geoarchaeology and late glacial landscapes in the western lake superior region, Central North America: *Geoarchaeology*, v. 22, no. 1, p. 15-47.
- , 2013, The Geoarchaeology of Lake Michigan Coastal Dunes: *The Journal of Island and Coastal Archaeology*, v. 8, no. 1, p. 147-148.
- Hill, M. A., 2006, The Duck Lake Site and Implications for Late Archaic Copper Procurement and Production in the Southern Lake Superior Basin: *Midcontinental Journal of Archaeology*, v. 31, no. 2, p. 213-247.
- Hoaglund, J. R., Huffman, G. C., and Grannemann, N. G., 2002, Michigan basin regional ground water flow discharge to three Great Lakes: *Ground Water*, v. 40, p. 390-405.
- Hoaglund, J. R., Kolak, J. J., Long, D. T., and Larson, G. J., 2004, Analysis of modern and pleistocene hydrologic exchange between Saginaw Bay (Lake Huron) and the Saginaw Lowlands area: *Geological Society of America Bulletin*, v. 116, no. 1-2, p. 3-15.
- Hoard, C. J., 2008, Concentration and spatial distribution of selected constituents in Detroit River bed sediment adjacent to Grassy Island, Michigan, August 2006: U.S. Geological Survey Open-File Report, v. 2008-1016, p. 1-21.
- Hoard, C. J., Fowler, K. K., Kim, M. H., Menke, C. D., Morlock, S. E., Peppler, M. C., Rachol, C. M., and Whitehead, M. T., 2010, Flood-inundation maps for a 15-mile reach of the Kalamazoo River from Marshall to Battle Creek, Michigan, 2010, scale 1:100,000.
- Hoard, C. J., and Westjohn, D. B., 2001, Simulated Effects of Pumping Irrigation Wells on Ground-Water Levels in Western Saginaw County, Michigan: U.S. Geological Survey Water Resources Investigations, v. 01-4227.
- , 2005, Simulation of Ground-Water Flow and Areas Contributing Ground Water to Production Wells, Cadillac, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2004-5175, p. 1-18.
- Hobbs, M. Y., Frape, S. K., Shouakar-stash, O., and McNutt, R. H., 2006, Geochemical evolution of groundwaters in the Michigan and Appalachian basins, southwestern Ontario: *Geochimica et Cosmochimica Acta*, v. 70, no. 18, Supplement, p. A254.
- Hobbs, T., Schaetzl, R. J., and Luehmann, M. D., 2011, Evidence for periodic, Holocene loess deposition in kettles in a sandy, interlobate landscape, Michigan, USA: *Aeolian Research*, v. 3, no. 2, p. 215-228.

- Hobbs, T. C., 2009, Characteristics and origin of silty kettle bottom deposits in a sandy northern lower Michigan landscape, MS: Michigan State University.
- Hobbs, W. H., 1899, The diamond fields of the Great Lakes: *Journal of Geology*, v. 7, no. 4, p. 375-388.
- , 1911a, Earthquakes in Michigan: Michigan Geological and Biological Survey, Publication, v. 5, no. 3, p. 69-87.
- , 1911b, The late glacial and postglacial uplift of the Michigan Basin: Michigan Geological and Biological Survey, Publication, v. 5, no. 3, p. 11-68.
- , 1923, The southwestern Michigan meteor of November 26, 1919: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 1, p. 253-268.
- , 1948, New Interpretation of the Deposits of the Pleistocene Continental Glaciers: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 32, no. 3, p. 287-293.
- Hobin, J. S., 1993, The hydrogeology of Bonnie Castle and Dustin Lakes and its relationship to groundwater contamination from the KL Avenue Landfill, Kalamazoo County, Michigan, MS: Western Michigan University.
- Hoffman, D. W., 1968, Soil Development and Land Use on Manitoulin Island, in Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island*, Michigan Basin Geological Society, p. 79-86.
- Hoin, S. J., Sauck, W. A., and Parker, B. K., 1981, Ground Magnetic Map of Homer and Spring Arbor 15' Quadrangles, Michigan: Michigan Geological Survey Division, Open-file Map, v. 81-1.
- Holcomb, F. W., 1975, Urban geological map of the eastern half of the City of Houghton, Michigan, MS: Michigan Technological University, 43 p.
- Holcomb, S., 1972, Soil survey of Genesee County, Michigan, p. 1-111.
- Holman, A. J., Abraczinskas, L. M., and Westjohn, D. B., 1988, Pleistocene Proboscideans and Michigan salt deposits: *National Geographic Research*, v. 4, no. 1, p. 4-5.
- Holman, J., Lundrigan, B. L., and Myers, P., 2003, Late Holocene (Little Ice Age Interval) Microvertebrates from Mackinac County, Michigan: *Michigan Academician*, v. 35, no. 2, p. 159-169.
- Holman, J. A., 1979, New Fossil Vertebrate Remains from Michigan: *Michigan Academician*, v. 11, no. 4, p. 391-397.
- , 1988, The Status of Michigan's Pleistocene Herpetofauna: *Michigan Academician*, v. 20, no. 2, p. 125-132.
- , 1990, A Late Wisconsinan Woodland Musk Ox, *Bootherium bombifrons* (Harlan), from Montcalm County, Michigan, with Remarks on Michigan Musk Oxen: *Michigan Academician*, v. 22, no. 1, p. 1-10.
- , 1991, New Records of Michigan Pleistocene Vertebrates, with Comments on the Mason-Quimby Line: *Michigan Academician*, v. 23, no. 3, p. 273-283.
- , 1992, Late Quaternary Herpetofauna of the central Great Lakes region, U.S.A.: Zoogeographical and paleoecological Implications: *Quaternary Science Reviews*, v. 11, p. 345-351.
- , 1993, Late Pleistocene Turtle Remains (Reptilia: Testudines) from Southern Michigan: *Michigan Academician*, v. 25, no. 4, p. 491-499.
- , 1995, Issues and Innovations in Pleistocene Vertebrate Paleontology in Michigan: The Last Fifty-Five Years: *Michigan Academician*, v. 27, no. 4, p. 409-424.
- , 2001, Fossil Dunes and Soils Near Saginaw Bay, A Unique Herpetological Habitat: *Michigan Academician*, v. 33, no. 2, p. 137-153.
- , 2002a, Michigan's Ice Age Behemoths: Discussion: *Michigan Academician*, v. 34, no. 3, p. 387-392.
- , 2002b, Michigan's Ice Age Behemoths: Introduction: *Michigan Academician*, v. 34, no. 3, p. 221-222.

- , 2002c, The Status of *Emydoidea hutchisoni* Holman, 1995 (Testudines: Emydidae) Michigan Academician, v. 34, no. 3, p. 393-394.
- Holman, J. A., Fisher, D. C., and Kapp, R. O., 1986, Recent Discoveries of Fossil Vertebrates in the Lower Peninsula of Michigan: Michigan Academician, v. 18, no. 3, p. 431-463.
- Holmstadt, J. L. F., 2008, Geomorphology and geoarchaeology of a small foredune complex along the eastern shore of Lake Michigan, MS: Michigan State University.
- Holtschlag, D. J., 1981, Flow model of Saginaw River near Saginaw, Michigan: U.S. Geological Survey Open-File Report, v. 81-1061, p. 1-20.
- , 1985, Cost Effectiveness of Stream-Gaging Program in Michigan: U.S. Geological Survey Water Resources Investigations Report, v. 85-4293, p. 1-72.
- , 1987, Changes in water quality of Michigan streams near urban areas, 1973-84: U.S. Geological Survey Water-Resources Investigations Report, v. 87-4035, p. 1-20.
- , 1989, Flow Model of Saginaw River Near Saginaw, Michigan, Advanced Seminar on One-Dimensional; Open- Channel Flow and Transport Modeling, Volume 89-4061, p. 35-38.
- , 1991, Installation Restoration Program, Phase II, Confirmation/Quantification, Stage 2, Wurtsmith Air Force Base, Michigan: A sequential sampling design for long-term, ground-water-quality monitoring: U.S. Geological Survey Administrative Report.
- , 1996a, A Dynamical-Systems Approach for Computing Ice-Affected Streamflow: U.S. Geological Survey Water-Supply Paper, v. 2473, p. 1-14.
- , 1996b, A Generalized Estimate of Ground-Water-Recharge Rates in the Lower Peninsula of Michigan: U.S. Geological Survey Open-File Report, v. 96-593, p. 1-37.
- , 2001, Optimal Estimation of Suspended-Sediment Concentrations in Streams: Hydrological Processes, v. 15, p. 1133-1155.
- Holtschlag, D. J., and Croskey, H. M., 1984, Statistical models for estimating streamflow characteristics of Michigan streams: U.S. Geological Survey Water-Resources Investigations Report, v. 84-4207, p. 1-80.
- Holtschlag, D. J., and Eagle, D. V., 1985, Stream discharge in Michigan--miscellaneous measurements: U.S. Geological Survey Open-File Report, v. 85-350, p. 1-344.
- Holtschlag, D. J., and Grewal, M. S., 1998, Estimating Ice-Affected Streamflow by Extended Kalman Filtering: Journal of Hydrologic Engineering, v. 3, no. 3, p. 174-181.
- Holtschlag, D. J., and Hoard, C. J., 2009, Detection of conveyance changes in St. Clair River using historical water-level and flow data with inverse one-dimensional hydrodynamic modeling: U.S. Geological Survey Scientific Investigations Report, v. 2009-5080, p. 1-39.
- Holtschlag, D. J., and Koschik, J. A., 2001a, Flow distribution and monthly flow duration in selected branches of St. Clair and Detroit Rivers within the Great Lakes Waterway: U.S. Geological Survey Water Resources Investigations, v. 01-4135, p. 1-66.
- , 2001b, A two-dimensional hydrodynamic model of the St. Clair and Detroit Rivers within the Great Lakes Basin: U.S. Geological Survey Water Resources Investigations, v. 01-4236, p. 1-60.
- Holtschlag, D. J., and Koschik, J. A., 2002, Flow Distribution in Selected Branches of St. Clair and Detroit Rivers: Journal of Great Lakes Research, v. 28, no. 3, p. 379-395.
- Holtschlag, D. J., and Koschik, J. A., 2003, An Acoustic Doppler Current Profiler Survey of Flow Velocities in Detroit River, a Connecting Channel of the Great Lakes: U.S. Geological Survey Open-File Report, v. 03-219.
- , 2004, Hydrodynamic simulation and particle-tracking techniques for identification of source areas to public-water intakes on the St. Clair-Detroit River Waterway in the Great Lakes Basin: U.S. Geological Survey Scientific Investigations Report, v. 2004-5072, p. 1-29.
- , 2005, Augmenting two-dimensional hydrodynamic simulations with measured velocity data to identify flow paths as a function of depth on Upper St. Clair River in the Great Lakes Basin: U.S. Geological Survey Scientific Investigations Report, v. 2005-5081.

- Holtschlag, D. J., and Luukkonen, C. L., 1996, Vulnerability of Ground Water to Atrazine Leaching in Kent County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 96-4198, p. 1-49.
- , 1998, Assessment of ground-water vulnerability to atrazine leaching in Kent County, Michigan: Review, comparison to results of other studies, and verification: U.S. Geological Survey Water-Resources Investigations Report, v. 98-4006, p. 1-40.
- Holtschlag, D. J., Luukkonen, C. L., and Nicholas, J. R., 1996, Analysis of Ground-Water Flow in the Saginaw Aquifer within Clinton, Eaton, and Ingham Counties, Michigan: U.S. Geological Survey Water-Supply Paper, v. 2480, p. 1-49.
- Holtschlag, D. J., and Miller, R. L., 1997, Streambed Stability and Scour Potential at Selected Bridge Sites in Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 98-4024, p. 1-73.
- Holtschlag, D. J., and Nicholas, J. R., 1998, Indirect ground-water discharge to the Great Lakes: U.S. Geological Survey Open-File Report, v. 98-579, p. 1-25.
- Holtschlag, D. J., and Salehi, H., 1992, Statistical Models for Estimating Daily Streamflow in Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 91-4194, p. 1-54.
- Holtschlag, D. J., Shively, D., Whitman, R. L., Haack, S. K., and Fogarty, L. R., 2008, Environmental factors and flow paths related to *Escherichia coli* concentrations at two beaches on Lake St. Clair, Michigan, 2002–2005: U.S. Geological Survey Scientific Investigations Report, v. 2008-5028, p. 1-38.
- Holtschlag, D. J., and Sweat, M. J., 1999, A Temporal and Spatial Analysis of Ground-Water Levels for Effective Monitoring in Huron County, Michigan: U.S. Geological Survey Open-File Report, v. 98-629, p. 1-24.
- Hore, R. E., 1910a, On the Glacial Origin of Huronian Rocks of Nipissing, Ontario: Twelfth Report of the Michigan Academy of Science 1910, v. 12, p. 43-46.
- , 1910b, On the Glacial Origin of Huronian Rocks of Nipissing, Ontario: Journal of Geology, v. 18, no. 5, p. 459-467.
- Host, G. E., Pregitzer, K. S., Ramm, C. W., Hart, J. B., and Cleland, D. T., 1987, Landform-mediated differences in successional pathways among upland forest ecosystems in northwestern Lower Michigan: Forest Science, v. 33, p. 445-457.
- Host, G. E., Pregitzer, K. S., Ramm, C. W., Lusch, D. P., and Cleland, D. T., 1988, Variation in overstory biomass among glacial landforms and ecological land units in northwestern Lower Michigan: Canadian Journal of Forest Research, v. 18, p. 659-668.
- Houdek, P. K., 1935, Pollen statistics for two bogs in southwestern Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 20, p. 49-56.
- Hough, J. L., 1934, The mechanical composition of the deposits of southern Lake Michigan, MS: University of Chicago.
- Hough, J. L., 1935, The bottom deposits of southern Lake Michigan: Journal of Sedimentary Research, v. 5, no. 2, p. 57-80.
- Hough, J. L., 1952, Fathogram indications of bottom materials in Lake Michigan: Journal of Sedimentary Research, v. 22, no. 3, p. 162-172.
- , 1953, Pleistocene chronology of the Great Lakes Region: University of Illinois.
- , 1958, Geology of the Great Lakes, Urbana, University of Illinois Press.
- , 1962, The prehistoric Great Lakes of North America: Sigma Xi-RESA National Lecture, p. 84-109.
- Hovey, E. O., 1922, Aerolite from Rose City, Michigan: American Museum Novitates, v. 52, p. 1-7.
- , 1923, A new meteorite from Michigan: Natural History, v. 23, no. 1, p. 87-88.
- Howard, J. L., 2010, Late Pleistocene glaciolacustrine sedimentation and paleogeography of southeastern Michigan, USA: Sedimentary Geology, v. 223, no. 1-2, p. 126-142.

- Howard, J. L., Clawson, C. R., and Daniels, W. L., 2012, A comparison of mineralogical techniques and potassium adsorption isotherm analysis for relative dating and correlation of Late Quaternary soil chronosequences: *Geoderma*, v. 179–180, no. 0, p. 81-95.
- Howard, J. L., Dubay, B. R., and Daniels, W. L., 2013, Artifact weathering, anthropogenic microparticles and lead contamination in urban soils at former demolition sites, Detroit, Michigan: *Environmental Pollution*, v. 179, p. 1-12.
- Howard, J. L., and Olszewska, D., 2011, Pedogenesis, geochemical forms of heavy metals, and artifact weathering in an urban soil chronosequence, Detroit, Michigan: *Environmental Pollution*, v. 159, no. 3, p. 754-761.
- Howard, J. L., and Orlicki, K. M., 2016, Composition, micromorphology and distribution of microartifacts in anthropogenic soils, Detroit, Michigan, USA: *CATENA*, v. 138, p. 103-116.
- Howard, J. L., Ryzewski, K., Dubay, B. R., and Killion, T. W., 2015, Artifact preservation and post-depositional site-formation processes in an urban setting: a geoarchaeological study of a 19th century neighborhood in Detroit, Michigan, USA: *Journal of Archaeological Science*, v. 53, p. 178-189.
- Howard, J. L., and Shuster, W. D., 2015, Experimental Order 1 soil survey of vacant urban land, Detroit, Michigan, USA: *Catena*, v. 126, p. 220-230.
- Huang, X., Senthilkumar, S., Kravchenko, A., Thelen, K., and Qi, J., 2007, Total carbon mapping in glacial till soils using near-infrared spectroscopy, Landsat imagery and topographical information: *Geoderma*, v. 141, no. 1–2, p. 34-42.
- Hubbard, B., 1839, Report [on Wayne and Monroe Counties]: *Michigan State Geologists Annual Report*, v. 2, p. 79-114.
- , 1840, Report [on Lenawee, Hillsdale, Branch, St. Joseph, Cass, Berrien, Washtenaw, Oakland and Livingston counties]: *Michigan State Geologists Annual Report*, v. 3, p. 77-111.
- Huber, N. K., 1973, Glacial and post glacial geological history of Isle Royale National Park, Michigan: *U.S. Geological Survey Professional Paper*, v. 754-A, p. 1-15.
- Huff, L. C., 1957, *Sedimentology of an aggrading river: the glacial Chippewa*, PhD: University of Chicago.
- Huffman, G. C., 1974a, Ground-water data for Michigan, 1973: *U.S. Geological Survey*, p. 1-80.
- , 1974b, Summary of ground-water hydrological data in Michigan in 1972: *U.S. Geological Survey*, p. 1-84.
- , 1975, Ground-water data for Michigan, 1974: *U.S. Geological Survey*, p. 1-82.
- , 1976, Ground-water data for Michigan, 1975: *U.S. Geological Survey*, p. 1-49.
- , 1977, Ground-water data for Michigan, 1976: *U.S. Geological Survey*, p. 1-49.
- , 1979a, Ground-water data for Michigan, 1977: *U.S. Geological Survey*, p. 1-68.
- , 1979b, Ground-water data for Michigan, 1978: *U.S. Geological Survey Open-File Report*, v. 80-002, p. 1-61.
- , 1980, Ground-water data for Michigan, 1979: *U.S. Geological Survey Open-File Report*, v. 80-1212, p. 1-56.
- , 1981, Ground-Water Data for Michigan, 1981: *U.S. Geological Survey Open-File Report*, v. 81-811, p. 1-57.
- , 1983, Ground-Water Data for Michigan--1982: *U.S. Geological Survey Open-File Report*, v. 83-753, p. 1-54.
- , 1984, Ground-Water Data for Michigan--1983: *U.S. Geological Survey Open-File Report*, v. 84-623, p. 1-47.
- , 1986, Ground-Water Data for Michigan--1985: *U.S. Geological Survey Open-File Report*, v. 86-417, p. 1-50.

- , 1988, Groundwater Data for Michigan-1986: U.S. Geological Survey Open-File Report, v. 88-87, p. 1-52.
- Huffman, G. C., and Thompson, T., 1971, Summary of Ground-Water Hydrological Data in Michigan in 1970: U.S. Geological Survey Open-File Report, v. 72-173, p. 1-94.
- , 1973, Summary of ground-water hydrological data in Michigan for 1971: U.S. Geological Survey Open-File Report, no. 1-88.
- Huffman, G. C., and Whited, C. R., 1989, Ground-Water Data for Michigan 1988: U.S. Geological Survey Open-File Report, v. 89-597, p. 1-54.
- , 1991, Ground-Water Data for Michigan 1989: U.S. Geological Survey Open-File Report, v. 91-55, p. 1-51.
- , 1993, Ground-water data for Michigan, 1990: U.S. Geological Survey Open-File Report, v. 92-114, p. 1-51.
- Hughes, J. D., 1963, Physiography of a six-quadrangle area in the Keweenaw Peninsula north of Portage Lake, PhD: Northwestern University, 229 p.
- , 1971, Post Duluth Stage Outlet from the Lake Superior Basin: Michigan Academician, v. 3, no. 4, p. 71-77.
- Hughes, L. D., 1995, A feasibility study for using computerized water well records to delineate areas of recharge-discharge potential, MS: Western Michigan University, 138 p.
- Hulbert, G. C., 1972, A study of the Flint River, Michigan, as it relates to low-flow augmentation: U.S. Geological Survey Open-File Report, v. 72-175.
- Hulsey, J. D., 1962, Beach sediments of eastern Lake Michigan, PhD: University of Illinois.
- Hunckler, R. V., and Schaetzl, R. J., 1997, Spodosol development as affected by geomorphic aspect, Baraga County, Michigan: Soil Science Society of America Journal, v. 61, no. 4, p. 1105-1115.
- Hunter, R. D., Panyushkina, I. P., Leavitt, S. W., Wiedenhoef, A. C., and Zawiskie, J., 2006, A multiproxy environmental investigation of Holocene wood from a submerged conifer forest in Lake Huron, USA: Quaternary Research, v. 66, no. 1, p. 67-77.
- Hupy, C. M., and Yansa, C. H., 2009, Late Holocene Vegetation History of the Forest Tension Zone in Central Lower Michigan, USA: Physical Geography, v. 30, p. 205-235.
- Hussey, W. J., 1911, List of earthquake shocks recorded at the observatory of the University of Michigan, Ann Arbor, during 1910: Seismological Society of America Bulletin, v. 1, p. 83-84.
- Hutchinson, D. E., 1979, Soil Survey of Midland County, Michigan, p. 1-98.
- Hyndman, D. W., Kendall, A. D., and Welty, N. R. H., 2007, Evaluating Temporal and Spatial Variations in Recharge and Streamflow Using the Integrated Landscape Hydrology Model (ILHM), in Hyndman, D. W., Day-Lewis, F. D., and Singha, K., eds., Subsurface Hydrology: Data Integration for Properties and Processes, Volume 171, p. 121-141.
- Iaquinta, J. L., 1994, Soil Survey of Saginaw County, Michigan.
- Ibrahim, A., 1970, The application of the gravity method to mapping bedrock topography in Kalamazoo County, Michigan, MS: Michigan State University.
- Icopini, G. A., 2000, Chromium speciation and mobility in contaminated soils, Sault Ste. Marie, MI, PhD: Michigan State University, 210 p.
- Ilin, D., 2012, Characterization of bacterial community structure in deep subsurface sedimentary core samples from Michigan Basin, Ontario, MS: University of Ottawa (Canada), 89 p.
- Inwood, S. E., Tank, J. L., and Bernot, M. J., 2007, Factors controlling sediment denitrification in midwestern streams of varying land use: Microbial Ecology, v. 53, no. 2, p. 247-258.
- Irvin, W. C., 1948, The topographic expression of the sub-lacustrine geology of the Lake Superior basin, MS: University of Illinois, 18 p.
- Isard, S. A., and Schaetzl, R. J., 1995, Estimating soil temperatures and frost in the lake effect snowbelt region, Michigan, USA: Cold Regions Science and Technology, v. 23, no. 4, p. 317-332.

- , 1998, Effects of winter weather conditions on soil freezing in southern Michigan: *Physical Geography*, v. 19, no. 1, p. 71-94.
- Islieb, D. R., 1973, Soils, Geology, and Agriculture in Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 32--34.
- Jackson, L. J., Ellis, C., Morgan, A. V., and McAndrews, J. H., 2000, Glacial lake levels and Eastern Great Lakes Palaeo-Indians: *Geoarchaeology*, v. 15, no. 5, p. 415-440.
- Jackson, S. T., and Booth, R. K., 2002, The role of Late Holocene climate variability in the expansion of yellow birch in the western Great Lakes region: *Diversity and Distributions*, v. 8, p. 275-284.
- Jackson, S. T., Booth, R. K., Reeves, K., Andersen, J. J., Minckley, T. A., and Jones, R. A., 2014, Inferring local to regional changes in forest composition from Holocene macrofossils and pollen of a small lake in central Upper Michigan: *Quaternary Science Reviews*, v. 98, p. 60-73.
- Jacobsen, S. I., 1978, *Geochemistry of peat bogs over different bedrock types Houghton County, Michigan*, MS: Michigan Technological University.
- Jameson, T., 1997, *Relative age dating of an inland dunefield in eastern lower Michigan, using soil data*, MA: Michigan State University.
- Jasechko, S., Gibson, J. J., and Edwards, T. W. D., 2014, Stable isotope mass balance of the Laurentian Great Lakes: *Journal of Great Lakes Research*, v. 40, no. 2, p. 336-346.
- Jay Baedke, S., and Alan Thompson, T., 2000, A 4,700-Year Record of Lake Level and Isostasy for Lake Michigan: *Journal of Great Lakes Research*, v. 26, no. 4, p. 416-426.
- Jefferson, M. S. V., 1904, The scaurs on the River Rouge: *Science*, v. 19, p. 150-151.
- , 1907, Lateral erosion on some Michigan rivers: *Geological Society of America Bulletin*, v. 18, p. 333-350.
- Jenson, J. W., Clark, P. U., MacAyeal, D. R., Ho, C., and Vela, J. C., 1995, Numerical modeling of advective transport of saturated deforming sediment beneath the Lake Michigan Lobe, Laurentide Ice Sheet: *Geomorphology*, v. 14, p. 157-166.
- Jenson, J. W., MacAyeal, D. R., Clark, P. U., Ho, C. L., and Vela, J. C., 1996, Numerical modeling of subglacial sediment deformation: Implications for the behavior of the Lake Michigan Lobe, Laurentide Ice Sheet: *Journal of Geophysical Research*, v. 101, p. 8717-8728.
- Jeong, S., 1994, *Spatial and temporal variations of chromium in sediments of the Great Lakes*, MS: Michigan State University, 103 p.
- Jepsen, R., McNeil, J., and Lick, W., 2000, Effects of gas generation on the density and erosion of sediments from the Grand River: *Journal of Great Lakes Research*, v. 26, p. 209-219.
- Jeremiason, J. D., Kanne, L. A., Laco, T. A., Hulting, M., and Simcik, M. F., 2009, A comparison of mercury cycling in Lakes Michigan and Superior: *Journal of Great Lakes Research*, v. 35, no. 3, p. 329-336.
- Jewell, W. F., 1947, *A system of inventory for the shore zones of the Great Lakes*, MS: Michigan State University.
- Jin, L., 2007, *Mg- and Ca- carbonate versus silicate dissolution rates in mid-latitude, glaciated soil profiles: Implications for riverine weathering fluxes and global geochemical budgets*, PhD: University of Michigan.
- Jin, L. X., Hamilton, S. K., and Walter, L. M., 2008a, Mineral weathering rates in glacial drift soils (SW Michigan, USA): New constraints from seasonal sampling of waters and gases at soil monoliths: *Chemical Geology*, v. 249, no. 1-2, p. 129-154.
- Jin, L. X., Mukasa, S. B., Hamilton, S. K., and Walter, L. M., 2012, Impacts of glacial/interglacial cycles on continental rock weathering inferred using Sr/Ca and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in Michigan watersheds: *Chemical Geology*, v. 300, p. 97-108.

- Jin, L. X., Ogrinc, N., Hamilton, S. K., Szramek, K., Kanduc, T., and Walter, L. M., 2009, Inorganic carbon isotope systematics in soil profiles undergoing silicate and carbonate weathering (Southern Michigan, USA): *Chemical Geology*, v. 264, no. 1-4, p. 139-153.
- Jin, L. X., Williams, E. L., Szramek, K. J., Walter, L. A., and Hamilton, S. K., 2008b, Silicate and carbonate mineral weathering in soil profiles developed on Pleistocene glacial drift (Michigan, USA): Mass balances based on soil water geochemistry: *Geochimica Et Cosmochimica Acta*, v. 72, no. 4, p. 1027-1042.
- Johengen, T. H., Biddanda, B. A., and Cotner, J. B., 2008, Stimulation of Lake Michigan plankton metabolism by sediment resuspension and river runoff: *Journal of Great Lakes Research*, v. 34, p. 213-227.
- Johnson, D. L., 1960, Geology and hydrology of the Posen area, Michigan: Michigan Geological Survey Division, p. 1-7.
- Johnson, E. P., 1990, Soil Survey of Ogemaw County, Michigan.
- , 1995, Soil Survey of Mason County, Michigan.
- , 2002a, Soil Survey of Iosco County, Michigan.
- Johnson, K. G., 1957, An aerial photography study of the Glen Lake-Sleeping Bear Point area, Leelanau County, Michigan, MS: Michigan State University.
- Johnson, K. S., 2002b, Karst in evaporite rocks of the United States: *Carbonates and Evaporites*, v. 17, no. 2, p. 90-97.
- , 2005, Subsidence hazards due to evaporite dissolution in the United States: *Environmental Geology*, v. 48, no. 3, p. 395-409.
- Johnson, W. H., 1986, Stratigraphy and Correlation of the Glacial Deposits of the Lake Michigan Lobe Prior to 14 ka BP: *Quaternary Science Reviews*, v. 5, p. 17-22.
- Johnson, W. H., Hansel, A. K., Bettis, E. A., II, Karrow, P. F., Larson, G. J., Lowell, T. V., and Schneider, A. F., 1997, Late Quaternary temporal and event classifications, Great Lakes Region, North America: *Quaternary Research*, v. 47, p. 1-12.
- Johnson, W. J., 1973, The Site Dictates the Plan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 93-103.
- Johnston, J. W., 2004, Changes in water level, vertical ground movement, shoreline behavior and climate in the Lake Superior basin during the last 5,000 years, PhD: Indiana University.
- Johnston, J. W., Baedke, S. J., Booth, R. K., Thompson, T. A., and Wilcox, D. A., 2004, Late Holocene lake-level variation in southeastern Lake Superior: Tahquamenon Bay, Michigan: *Journal of Great Lakes Research*, v. 30, p. 1-19.
- Johnston, J. W., Thompson, T. A., Wilcox, D. A., and Baedke, S. J., 2007, Geomorphic and sedimentologic evidence for the separation of Lake Superior from Lake Michigan and Huron: *Journal of Paleolimnology*, v. 37, p. 349-364.
- Jones, F. G., and Wilkinson, B. H., 1978, Structure and Growth of Lacustrine Pisoliths from Recent Michigan Marl Lakes: *Journal of Sedimentary Petrology*, v. 48, no. 4, p. 1103-1110.
- Jones, G. B., and Carr, M. E., 1905, Soil Survey of the Oxford Area, Michigan.
- Jones, J. T., 1905, Unwatering the Hamilton Mine: *Engineering Mining Journal*, v. 80, p. 867-868.
- , 1906, Unwatering the Hamilton Mine and Ludington Mines: *Proceedings of the Lake Superior Mining Institute*, v. 11, p. 139-145.
- Jones, K. R., 1991, Measuring Groundwater Flow with Seepage Meters at Whitmore Lake, Michigan (with Numerical Modeling Appendix), MS: University of Michigan.
- Jones, L., 1992, Hydrogeologic characterization of a multi-aquifer system at Station 11 in Kalamazoo, Michigan, MS: Western Michigan University.
- Jordan, J. T., 2014, The Geoarchaeology of Lake Michigan Coastal Dunes: *Environmental Archaeology*, v. 19, no. 2, p. 176-176.

- Judd, J. H., 1970, Lake stratification caused by runoff from street deicing: *Water Research*, v. 4, no. 8, p. 521-532.
- Jweda, J., and Baskaran, M., 2011, Interconnected riverine–lacustrine systems as sedimentary repositories: Case study in southeast Michigan using ^{210}Pb and ^{137}Cs -based sediment accumulation and mixing models: *Journal of Great Lakes Research*, v. 37, no. 3, p. 432-446.
- Kadlec, R. H., and Robbins, J. A., 1984, Sedimentation and sediment accretion in Michigan coastal wetlands (U.S.A.): *Chemical Geology*, v. 44, no. 1, p. 119-150.
- Kahan, A. Y., Currie, W. S., and Brown, D. G., 2014, Nitrogen and Carbon Biogeochemistry in Forest Sites along an Indirect Urban-Rural Gradient in Southeastern Michigan: *Forests*, v. 5, no. 4, p. 643-665.
- Kane, D. A., Snapp, S. S., and Davis, A. S., 2015, Ridge Tillage Concentrates Potentially Mineralizable Soil Nitrogen, Facilitating Maize Nitrogen Uptake: *Soil Science Society of America Journal*, v. 79, no. 1, p. 81-88.
- Kannan, K., Yun, S. H., Ostaszewski, A., McCabe, J. M., Mackenzie-Taylor, D., and Taylor, A. B., 2008, Dioxin-like toxicity in the saginaw river watershed: Polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls in sediments and floodplain soils from the Saginaw and Shiawassee Rivers and Saginaw Bay, Michigan, USA: *Archives of Environmental Contamination and Toxicology*, v. 54, no. 1, p. 9-19.
- Kapp, R. O., 1970, A 24,000-Year-Old Jefferson Mammoth from Midland County, Michigan: *Michigan Academician*, v. 3, no. 2, p. 95-99.
- Kapp, R. O., and Kneller, W. A., 1962, A Buried Biotic Assemblage from an Old Saline River Terrace at Milan, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 47, no. 1, p. 135-145.
- Karrow, P. F., 1965, Pleistocene Geology, Toronto-Scarborough Area, *in* Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., eds., *Guidebook: Geology of Central Ontario*, Michigan Basin Geological Society, p. 81-92.
- , 1980, The Nipissing transgression around southern Lake Huron: *Canadian Journal of Earth Sciences*, v. 17, p. 1271-1274.
- , 1987, Glacial and glaciolacustrine events in Northwestern Lake Huron, Michigan and Ontario: *Geological Society of America Bulletin*, v. 98, no. 1, p. 113-120.
- , 2007, Geological and geophysical evidence for pre-Nipissing (> 5,000 years BP) transgression infilled valleys in the Lake Huron basin, Ontario.: *Journal of Paleolimnology*, v. 37, p. 419-434.
- Karrow, P. F., and Calkin, P. F., 1985, Quaternary Evolution of the Great Lakes, Geological Association of Canada special paper, Volume 30, Geological Association of Canada, p. 258.
- Karrow, P. F., Dreimanis, A., and Barnett, P. J., 2000, A proposed diachronic revision of late Quaternary time-stratigraphic classification in the eastern and northern Great Lakes area: *Quaternary Research*, v. 54, p. 1-12.
- Karrow, P. F., Seymour, K. L., Miller, B. B., and Mirecki, J. E., 1997, Pre-Late Wisconsinan Pleistocene biota from southeastern Michigan, U.S.A.: *Palaeogeography Palaeoclimatology Palaeoecology*, v. 133, p. 81-101.
- Kasenow, M., 1994, Hydrogeology and hydrogeochemistry of Government Marsh, north St. Joseph County, Michigan, PhD: Western Michigan University.
- Kaufman, M. M., Rogers, D. T., and Murray, K. S., 2009, Using soil and contaminant properties to assess the potential for groundwater contamination to the lower Great Lakes, USA: *Environmental Geology*, v. 56, no. 5, p. 1009-1021.
- Kaunda, R. B., 2007, Some applications of Gaussian quadrature and neural network modeling in earth flows and other slow-moving landslides in cohesive slope materials, PhD: Western Michigan University, 83 p.

- Kaunda, R. B., Chase, R. B., Kehew, A. E., Kaugars, K., and Selegan, J. P., 2008, Interpretation of a Progressive Slope movement using balanced cross sections and numerical integration: *Environmental and Engineering Geoscience*, v. 14, no. 2, p. 121-131.
- , 2010, Neural network monitoring applications in active slope stability problems: *Environmental Earth Sciences*, v. 60, no. 7, p. 1545-1558.
- Keck, W. G., 1938, Geophysical Measurements in Livingston County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 23, p. 463-476.
- Keener, A. M., 2013, Natural landscape drivers of total phosphorus concentrations in Michigan lakes, MS: Michigan State University.
- Kehew, A., 2012, Subglacial drainage of the Saginaw Lobe, Michigan, USA: *Quaternary International*, v. 279–280, p. 238.
- Kehew, A. E., 1993, Glacial-Lake Outburst Erosion of the Grand Valley, Michigan, and Impacts on Glacial Lakes in the Lake Michigan Basin: *Quaternary Research*, v. 39, p. 36-44.
- Kehew, A. E., Beukema, S. P., Bird, B. C., and Kozlowski, A. L., 2005, Fast flow of the Lake Michigan Lobe: evidence from sediment-landform assemblages in southwestern Michigan, USA: *Quaternary Science Reviews*, v. 24, p. 2335-2353.
- Kehew, A. E., and Brewer, M. K., 1990, Analysis of groundwater quality data from Barry County, Michigan, Kalamazoo, Western Michigan University, Michigan Groundwater Survey, 45 p.:
- , 1992, Groundwater quality variations in glacial drift and bedrock aquifers, Barry County, Michigan, USA: *Environmental Geology and Water Sciences*, v. 20, no. 2, p. 105-115.
- Kehew, A. E., Esch, J. M., Kozlowski, A. L., and Ewald, S. K., 2012a, Glacial landsystems and dynamics of the Saginaw Lobe of the Laurentide Ice Sheet, Michigan, USA: *Quaternary International*, v. 260, p. 21-31.
- Kehew, A. E., Ewald, S. K., Esch, J. M., and Kozlowski, A. L., 2013a, On the origin of tunnel valleys of the Saginaw Lobe of the Laurentide Ice Sheet; Michigan, USA: *Boreas*, v. 42, no. 2, p. 442-462.
- Kehew, A. E., and Kozlowski, A. L., 2001, Glacial Geology of Southwest Michigan: Landforms of the Lake Michigan Lobe, Southwestern Michigan, 32 p.:
- , 2007, Tunnel Channels of the Saginaw Lobe, Michigan, USA, *in* Johnanson, P., and Sarala, P., eds., *Applied Quaternary research in the central part of glaciated terrain*, Volume 46, Geological Survey of Finland, p. 69-78.
- Kehew, A. E., Kozlowski, A. L., Bird, B. C., and Esch, J. M., 2013b, Contrasting terrains of the Lake Michigan and Saginaw Lobes of the Laurentide ice sheet in southern Michigan: *Geological Society of America Field Guide*, v. 31, p. 15-36.
- Kehew, A. E., Nicks, L. P., and Straw, W. T., 1999, Palimpsest tunnel valleys: evidence for relative timing of advances in an interlobate area of the Laurentide ice sheet: *Annals of Glaciology*, v. 28, p. 47-52.
- Kehew, A. E., and Passero, R. N., 1988, Preliminary Statistical Analysis of groundwater quality, Berrien County, Michigan, Policy, Planning, and Resource Protection Conference: Kalamazoo, Western Michigan University, p. 65-80.
- , 1990, pH and Redox Buffering Mechanisms in a Glacial Drift Aquifer Contaminated by Landfill Leachate: *Ground Water*, v. 28, p. 728-737.
- Kehew, A. E., Passero, R. N., Krishnamurthy, R. V., Lovett, C. K., Betts, M. A., and Dayharsh, B. A., 1998, Hydrogeochemical interaction between a wetland and an unconfined glacial drift aquifer, southwestern Michigan: *Ground Water*, v. 36, p. 849-856.
- Kehew, A. E., Passero, R. N., and Rudder, J. D., Jr., 1988, Inorganic geochemistry of the KL landfill leachate plume, Kalamazoo County, Michigan, Groundwater Geochemistry Conference: Denver, National Water Well Association, p. 621-637.

- Kehew, A. E., Piotrowski, J. A., and Jørgensen, F., 2012b, Tunnel valleys: Concepts and controversies — A review: *Earth-Science Reviews*, v. 113, no. 1–2, p. 33-58.
- Kehew, A. E., Schmaltz, L. J., and Straw, W. T., 1989, *Glacial Geology of Southwestern Michigan*, Michigan Basin Geological Society.
- Kehew, A. E., Straw, W. T., Steinmann, W. K., Barrese, P. G., Guiseppe, P., and Wei-Shyuan, P., 1996, Ground-water quality and flow in a shallow glaciofluvial aquifer impacted by agricultural contamination: *Ground Water*, v. 34, p. 491-500.
- Kehew, A. E., and Teller, J. T., 1994, History of late glacial runoff along the southwestern margin of the Laurentide ice sheet: *Quaternary Science Reviews*, v. 13, p. 859-877.
- Kelley, R. W., 1962, Michigan's Sand Dunes, p. 1-22.
- Kelley, R. W., and Coburn, W. H., 1964, Great Lakes Shore Lines Measurements: Michigan Geological Survey Intra-departmental Report, p. 1-6.
- Kelley, R. W., and Farrand, W. R., 1967, The glacial lakes around Michigan: Michigan Geological Survey Division, Bulletin, v. 4, p. 1-23.
- Kellogg, R. L., 1964, A geophysical investigation of hydrogeologic characteristics of the Udell Hills area, Manistee County, Michigan, MS: Michigan State University.
- Kellow, F. B., 1973, Solid Waste Disposal, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 104-106.
- Kelly, W., 1892, Sinking through wet gravel and quicksand near Norway, Michigan: *American Institute of Mining Engineers Transactions*, v. 20, p. 188-195.
- , 1898, A mine-dam: *American Institute of Mining Engineers Transactions*, v. 27, p. 400-404.
- Kemp, C. E., 1966, Regional Geology of the Sault Ste. Marie Area, *Proceedings of the Twelfth Annual Insitute on Lake Superior Geology Guidebook*, Institute on Lake Superior Geology, p. 1-11.
- Kempema, E. W., and Holman, R. A., 1994, Video Monitoring of Nearshore Ice in Southern Lake Michigan: *Journal of Great Lakes Research*, v. 20, no. 1, p. 196-205.
- Kempema, E. W., Reimnitz, E., and Barnes, P. W., 2001, Anchor-ice formation and ice rafting in southwestern Lake Michigan, USA: *Journal of Sedimentary Research*, v. 71, no. 3, p. 346-354.
- Kendall, A., Kesler, S. E., and Keoleian, G. A., 2008, Geologic vs.geographic constraints on cement resources: *Resources Policy*, v. 33, p. 160-167.
- Kendall, A. D., 2009, Predicting the impacts of land use and climate on regional-scale hydrologic fluxes, PhD: Michigan State University, 211 p.
- Kendzierski, S., 2005, An investigation of the Interlobate Area west of Three Rivers, Michigan and its Relationship to the Late Wisconsinan Glaciation of Southwest Michigan, MS: Western Michigan University.
- Keough, J. R., Thompson, T. A., Guntenspergen, G. R., and Wilcox, D. A., 1999, Hydrogeomorphic factors and ecosystem responses in coastal wetlands of the Great Lakes: *Wetlands*, v. 19, p. 821-834.
- Kerfoot, W. C., Budd, J. W., Eadie, B. J., Vanderploeg, H. A., and Agy, M., 2004, Winter storms: Sequential sediment traps record *Daphnia* ehippial production, resuspension, and sediment interactions: *Limnology and Oceanography*, v. 49, no. 4, part2, p. 1365-1381.
- Kettle, J. M., 2015, Paleoclimatic interpretation of southeastern Lower Michigan over the last 2000 years inferred from the fossil pollen record of Otter Lake, MS: Michigan State University.
- Keuhner, I. V., 1977, Hydrology and development of northeastern Lower Michigan karst: 1977 Guidebook Alpena, Michigan: National Speleological Society, v. 2, p. 56-58.
- Khader, O., and Novakowski, K., 2014, Impacts of Pleistocene glacial loading on abnormal porewater pressure in the eastern Michigan Basin: *Geofluids*, v. 14, no. 2, p. 200-220.
- Kick, J. F., 1961, An analysis of the bottom sediments of Lake Erie, MS: University of Toronto.

- Kilibarda, Z., and Shillinglaw, C., 2015, A 70 year history of coastal dune migration and beach erosion along the southern shore of Lake Michigan: *Aeolian Research*, v. 17, no. 0, p. 263-273.
- Kilibarda, Z., Venturelli, R., and Goble, R., 2014, Late Holocene dune development and shift in dune-building winds along southern Lake Michigan, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 47-64.
- Kimmel, R. E., 1973, Implications of photogeologic linears in the south Long Lake area, Alpena and Presque Isle Counties, Michigan, MS: Western Michigan University, 89 p.
- Kinabo, B. D., 2003, Geophysical characterization of a former refinery site, Kalamazoo, Michigan, MS: Western Michigan University, 90 p.
- Kincare, A. K., 2007, Response of the St. Joseph River to lake level changes during the last 12,000 years in the Lake Michigan basin: *Journal of Paleolimnology*, v. 37, no. 3, p. 383-394.
- Kincare, K. A., 2010, The late Wisconsin and Holocene development of the St. Joseph River drainage basin, southwest Michigan and northern Indiana, PhD: Michigan State University.
- Kindle, E. M., 1923, The physical and biological characteristics of certain types of marlite balls from Manitoba and Michigan: *Royal Society of Canada Proceedings and Transactions*, v. 17, no. 4, p. 105-114.
- Kingsley, R. G., 1981, Hopewell Middle Woodland settlement systems and cultural dynamics in southern Michigan: *Mid-Continental Journal of Archaeology*, v. 6, p. 131-177.
- Kinsman-Costello, L. E., O'Brien, J., and Hamilton, S. K., 2014, Re-flooding a Historically Drained Wetland Leads to Rapid Sediment Phosphorus Release: *Ecosystems*, v. 17, no. 4, p. 641-656.
- Kireta, A. R., Reavie, E. D., Danz, N. P., Axler, R. P., Sgro, G. V., Kingston, J. C., Brown, T. N., and Hollenhorst, T., 2007, Coastal Geomorphic and Lake Variability in the Laurentian Great Lakes: Implications for a Diatom-based Monitoring Tool: *Journal of Great Lakes Research*, v. 33, Supplement 3, p. 136-153.
- Kirk, M. F., Martini, A. M., Breecker, D. O., Colman, D. R., Takacs-Vesbach, C., and Petsch, S. T., 2012, Impact of commercial natural gas production on geochemistry and microbiology in a shale-gas reservoir: *Chemical Geology*, v. 332, p. 15-25.
- Kirkby, E. A., 1967, Senescence and extinction of inland lakes in the Lower Peninsula of Michigan, MS: Michigan State University.
- Kitchin, S. L., 1993, Groundwater chemistry analysis of the Saginaw Formation in Delhi Township, Michigan, MS: Western Michigan University, 135 p.
- Klanke, J. E., 1981, An analysis of nitrate concentrations in the ground-water of Antwerp Township, Van Buren County, Michigan, MS: Western Michigan University.
- Klasner, J. S., 1964, A study of buried bedrock valleys near South Haven, Michigan by the gravity method, MS: Michigan State University.
- Kleiman, R., 1995, The effects of season, land use/cover, and hydrology on stream water chemistry in Michigan's Lower Peninsula, MS: University of Michigan.
- Klump, S., Brennwald, M. S., and Kipfer, R., 2006, Comment on "Noble gases and stable isotopes in a shallow aquifer in southern Michigan: Implications for noble gas paleotemperature reconstructions for cool climates" by Chris M. Hall et al: *Geophysical Research Letters*, v. 33, no. 24, p. L24403.
- Knapp, B. D., 1987, Soil Survey of Allegan County, Michigan.
- , 1993, Soil Survey of Presque Isle County, Michigan.
- Kneller, W. A., 1964, A geological and economic study of gravel deposits of Washtenaw County and vicinity, Michigan, PhD: University of Michigan, 226 p.

- Knopp, P. D., 1999, Landscape ecosystems of the Maumee Lake Plain, southeastern lower Michigan, MS: University of Michigan.
- Knowlton, F. G., 1946, Drift or float copper: *Rocks and Minerals*, v. 21, no. 8, p. 491-492.
- Knutilla, R. L., 1966, Surface-water characteristics of the North Branch Clinton River basin, Michigan: U.S. Geological Survey Open-File Report, p. 1-35.
- , 1967, Flow characteristics of Michigan streams: U.S. Geological Survey Open-File Report, v. 67-135.
- , 1968, Regional draft storage relationships for the Grand River basin, Michigan: U.S. Geological Survey Open-File Report, v. 68-162.
- , 1969a, Gazetteer of hydrologic data for the Belle River basin, southeastern Michigan water resources study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 2, p. 1-24.
- , 1969b, Gazetteer of Hydrologic Data for the River Rouge Basin, Southeastern Michigan: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 1, p. 1-84.
- , 1969c, Water Resources of the Belle River Basin, Southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. HA-317.
- , 1969d, Water Resources of the Pine River Basin, Southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. HA-327.
- , 1970a, Statistical Summaries of Michigan Streamflow Data: U.S. Geological Survey Open-File Report, v. 70-189, p. 1-283.
- , 1970b, Water resources of the Black River basin, southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. 338, p. 1-10.
- , 1971a, Gazetteer of hydrologic data for the River Raisin basin, southeastern Michigan Water Resources Study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 6, p. 1-100.
- , 1971b, Upper Rifle River Basin, northeastern Lower Michigan; An evaluation of its water resources and hydrologic environment: U.S. Geological Survey, Water Information Series Report, v. 1, p. 1-66.
- , 1971c, Water resources of the River Rouge basin, southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. HA-356, p. 1-12.
- , 1972a, Gazetteer of hydrologic data for the Huron River basin, southeastern Michigan Water Resources Study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 7, p. 1-115.
- , 1972b, Gazetteer of hydrologic data for the Pine River basin, Southeastern Michigan water resources study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 3, p. 1-54.
- , 1974, Compilation of Miscellaneous Streamflow Measurements in Michigan through September, 1970: U.S. Geological Survey, Water Information Series Report, v. 5, p. 1-185.
- Knutilla, R. L., and Allen, W. B., 1975, Water resources of the River Raisin basin, southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. HA-520, p. 21-22.
- Knutilla, R. L., and Swallow, L. A., 1975a, Map Showing Flood of April 1975 at East Lansing, Michigan: U.S. Geological Survey Open-File Report, v. 75-299.
- , 1975b, Map Showing Flood of April 1975 at Meridian Township, Michigan: U.S. Geological Survey Open-File Report, v. 75-301.
- , 1975c, Map Showing Flood of April 1975 at Williamston, Michigan: U.S. Geological Survey Open-File Report, v. 75-289.
- Knutilla, R. L., and Twenter, F. R., 1973, Gazetteer of hydrologic data for incidental streams draining into St. Clair River, Lake St. Clair, Detroit River, and Lake Erie, southeastern Michigan water resources study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 8, p. 1-75.

- Knutilla, R. L., Twenter, F. R., and Larson, R. W., 1971, Upper Rifle River Basin Northeastern Lower Michigan: U.S. Geological Survey Water Information Series Report, v. 1, p. 1-66.
- Koehler, J. A., 1988, Electrical resistivity as an approach to evaluating brine contamination of groundwater in the Walker Oil Field, Ottawa County, Michigan, MS: Western Michigan University.
- Kolak, J. J., 2000, An evaluation of ground water surface water interactions in Saginaw Bay, Lake Huron, with implications for trace metal cycling, PhD: Michigan State University.
- Kolak, J. J., Long, D. T., Beals, T. M., Eisenrich, S. J., and Swackhamer, D. L., 1998, Anthropogenic inventories and historical and present accumulation rates of copper in Great Lakes sediments: *Applied Geochemistry*, v. 13, no. 1, p. 59-75.
- Kolak, J. J., Long, D. T., Charles Kerfoot, W., Beals, T. M., and Eisenreich, S. J., 1999a, Nearshore Versus Offshore Copper Loading in Lake Superior Sediments: Implications for Transport and Cycling: *Journal of Great Lakes Research*, v. 25, no. 4, p. 611-624.
- Kolak, J. J., Long, D. T., Matty, J. M., Larson, G. J., Sibley, D. F., and Councell, t. B., 1999b, Ground-water, large-lake interactions in Saginaw Bay, Lake Huron: A geochemical and isotopic approach: *Geological Society of America Bulletin*, v. 111, p. 177-188.
- Kolker, A., Haack, S. K., Cannon, W. F., Westjohn, D. B., Kim, M.-J., Nriagu, J., and Woodruff, L. G., 2003, Arsenic in southeastern Michigan, *in* Welch, A. H., and Stollenwerk, K. G., eds., *Arsenic in Ground Water: Geochemistry and Occurrence*: Boston, MA, Springer US, p. 281-294.
- Koltun, G. F., and Holtschlag, D. J., 2010, Application of AFINCH as a tool for evaluating the effects of streamflow-gaging-network size and composition on the accuracy and precision of streamflow estimates at ungaged locations in the Southeast Lake Michigan Hydrologic Subregion: U.S. Geological Survey Scientific Investigations Report, v. 2010-5020, p. 1-14.
- Konkel, D. C., 1979, Heavy metal distributions of Lake St. Clair, MS: Wayne State University, 195 p.
- Koon, G. J., 1965, Some geologic and engineering properties of the Pleistocene clays at Victoria, Ontonagon County, Michigan, MS: Michigan Tech.
- Koons, G. J., 1969, Some geologic and engineering properties of the Pleistocene Ontonagon Clays at Victoria, Ontonagon County, Michigan, MS: Michigan Technological University.
- Kornelsen, K. C., and Coulibaly, P., 2014, Synthesis review on groundwater discharge to surface water in the Great Lakes Basin: *Journal of Great Lakes Research*, v. 40, no. 2, p. 247-256.
- Kotar, J., 1986, Soil-habitat type relationships in Michigan and Wisconsin: *Journal of Soil and Water Conservation*, v. 41, no. 5, p. 348-350.
- Kowalski, D. M., 2014, Comparison of sand dune chronologies in the Great Plains and eastern Lake Michigan coastal zone, MS: Michigan State University.
- Kozak, J. A., 1998, A spatial analysis of the aqueous geochemistry of the near surface groundwaters of the Michigan Basin aquifer system, MS: Michigan State University, 146 p.
- Kozlowski, A. L., 1999, Three dimensional mapping of the East Leroy and Union City 7.5 minute quadrangles, southwest Michigan, MS: Western Michigan University.
- , 2004, Origin of the Central Kalamazoo Valley, southwestern Michigan, USA, PhD: Western Michigan University.
- Kozlowski, A. L., Kehew, A. E., and Bird, B. C., 2005, Outburst flood origin of the Central Kalamazoo River Valley, Michigan, USA: *Quaternary Science Reviews*, v. 24, p. 2354-2374.
- Krakker, J. J., 2011, A Hafted Stone Celt from Genesee County, Michigan and Implications for Ground Stone Tool Use in the Eastern Woodlands: *Midcontinental Journal of Archaeology*, v. 36, no. 1, p. 5-28.

- Kravchenko, A. N., and Robertson, G. P., 2015, Statistical Challenges in Analyses of Chamber-Based Soil CO₂ and N₂O Emissions Data: *Soil Science Society of America Journal*, v. 79, no. 1, p. 200-211.
- Krishnamurthy, R. V., Atekwana, E., and Guha, H., 1997, A simple, inexpensive carbonate-phosphoric acid reaction method for the analysis of carbon and oxygen isotopes of carbonates: *Analytical Chemistry*, v. 69, p. 4256-4258.
- Krishnamurthy, R. V., Syrup, K., Baskaran, M., and Long, A., 1995, Late glacial climate record of Midwestern United States from the Hydrogen Isotope Ratio of Lake Organic Matter: *Science*, v. 269, p. 1565-1567.
- Krist, F., and Schaetzl, R. J., 2001, Paleowind (11,000 BP) directions derived from lake spits in Northern Michigan: *Geomorphology*, v. 38, no. 1-2, p. 1-18.
- Krist Jr, F. J., and Lusch, D. P., 2004, Glacial history of Michigan, U.S.A.: A regional perspective, *in* Ehlers, J., and Gibbard, P. L., eds., *Developments in Quaternary Sciences*, Volume Volume 2, Part B, Elsevier, p. 111-117.
- Kroel, M. L., III, 2007, Soil Survey of Oscoda County, Michigan.
- , 2008, Soil Survey of Benzie and Manistee Counties, Michigan.
- Krumbein, W. C., 1933, Textural and Lithological Variations in Glacial Till: *Journal of Geology*, v. 41, no. 4, p. 382-408.
- Ku, H. F. H., 1966, Ground-water geology of Augusta Township, Washtenaw County and vicinity, MS: University of Michigan, 1-66 p.
- Kuiper, S., 2015, Determining Discharge from the Fallasburg Dam and the Hydrology of the Flat River Bypass Channel, Lowell, Michigan, MS: Western Michigan University, 114 p.
- Kunkle, G. R., 1961, The ground-water geology and hydrology of Washtenaw County and the Upper Huron River basin, PhD: University of Michigan.
- LaBeau, M. B., Gorman, H., Mayer, A., Dempsey, D., and Sherrin, A., 2013, Tributary phosphorus monitoring in the U.S. portion of the Laurentian Great Lake Basin: Drivers and challenges: *Journal of Great Lakes Research*, v. 39, no. 4, p. 569-577.
- LaBlanc, K. J., 2001, A GIS-based study of sedimentation rates and sediment fluxes of the Lake Michigan and Green Bay Lobes of the Southern Laurentide Ice Sheet, MS: University of Wisconsin.
- Lachance, A. D., 1992, The application of a statistical trend analysis program to ground-water quality monitoring data from eight western Michigan solid waste landfills, MS: Western Michigan University.
- Lachlan, M., 1855a, On the periodical rise and fall of the Lakes: *American Journal of Science*, v. 69, no. 55-56, p. 164-175.
- , 1855b, On the periodical rise and fall of the Lakes: *American Journal of Science*, v. 70, no. 58, p. 45-53.
- , 1855c, On the periodical rise and fall of the Lakes: *American Journal of Science*, v. 69, no. 55-56, p. 60-71.
- Laidlaw, M. A. S., Zahran, S., Mielke, H. W., Taylor, M. P., and Filippelli, G. M., 2012, Re-suspension of lead contaminated urban soil as a dominant source of atmospheric lead in Birmingham, Chicago, Detroit and Pittsburgh, USA: *Atmospheric Environment*, v. 49, p. 302-310.
- Landes, K. K., and Wilson, J. T., 1944, Groundwater exploration by earth resistivity methods: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 29, p. 345-354.
- Landrum, P. F., Gossiaux, D. C., Nalepa, T. F., and Fanslow, D. L., 2000, Evaluation of Lake Michigan Sediment For Causes of the Disappearance of *Diporeia* spp. in Southern Lake Michigan: *Journal of Great Lakes Research*, v. 26, no. 4, p. 402-407.
- Landtiser, G. R., 1974, Soil Survey of St. Clair County, Michigan.
- Lane, A. C., 1897, The drainage of the Saginaw Valley: *Science*, v. 5, p. 553-553.

- , 1899a, Lower Michigan mineral waters, a study into the connection between their chemical composition and mode of occurrence: U.S. Geological Survey Water-Supply Paper, v. 31, p. 1-97.
- , 1899b, Note on a method of stream capture: Geological Society of America Bulletin, v. 10, p. 12-15.
- , 1899c, Water resources of the Lower Peninsula of Michigan: U.S. Geological Survey Water-Supply Paper, v. 30, p. 1-97.
- , 1900, Geological Report on Huron County, Michigan: Michigan Geological Survey, v. 7, no. II, p. 1-329.
- , 1902, Asphalt in Delta County, Michigan: Engineering Mining Journal, v. 73, p. 50-50.
- , 1905, Water supply of the Upper Peninsula, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 113-167.
- , 1907, Salt water in the Lake mines: Proceedings of the Lake Superior Mining Institute, v. 12, p. 154-163.
- , 1908a, Mine waters: Proceedings of the Lake Superior Mining Institute, v. 13, p. 63-152.
- , 1908b, Summary of the surface geology of Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1907, being the report of Alfred C. Lane, State Geologist.
- , 1909, Michigan iron mines and their mine waters: Mining World, v. 31, p. 413-416.
- , 1910, Michigan iron mines and their mine waters: Canadian Mining Institute Journal, v. 12, p. 114-129.
- , 1914, Mine water composition an index to the course of ore-bearing currents: Economic Geology, v. 9, no. 3, p. 239-263.
- Lanney, N. A., 1977, The depositional and erosional history of the Commerce Outwash plain, southeastern Michigan, MS: University of Michigan.
- Larsen, C. E., 1987, Geological history of Glacial Lake Algonquin and the upper Great Lakes: U.S. Geological Survey Bulletin, v. 1801, p. 1-36.
- Larsen, C. E., 1994, Beach Ridges as Monitors of Isostatic Uplift in the Upper Great Lakes: Journal of Great Lakes Research, v. 20, no. 1, p. 108-134.
- Larson, G., Ehlers, J., and Gibbard, P. L., 2003, Large scale glaciotectonic deformation in the Great Lakes basin, USA-Canada: Boreas, v. 32, p. 370-385.
- Larson, G., and Schaetzl, R., 2001, Origin and Evolution of the Great Lakes: Journal of Great Lakes Research, v. 27, no. 4, p. 518-546.
- Larson, G. J., 1979, Groundwater recharge potential to the Saginaw Formation, Ingham and Clinton Counties, Michigan, p. 1-5.
- Larson, G. J., 2011, Chapter 37 - Ice-Margin Fluctuations at the End of the Wisconsin Episode, Michigan, USA, *in* Jürgen Ehlers, P. L. G., and Philip, D. H., eds., Developments in Quaternary Sciences, v. 15, Elsevier, p. 489-497.
- Larson, G. J., Delcore, M. R., and Offer, S., 1987, Application of the Tritium Interface Method for Determining Recharge Rates To Unconfined Drift Aquifers: 1 Homogeneous Case: Journal of Hydrology, v. 91, p. 59-72.
- Larson, G. J., Lawson, D. E., Evenson, E. B., Alley, R. B., Knudsen, O., Lachniet, M. S., and Goetz, S. L., 2006, Glaciohydraulic supercooling in former ice sheets?: Geomorphology, v. 75, p. 20-32.
- Larson, G. J., and Long, D., 1980, An investigation of the hydrogeochemical controls affecting groundwater quality of the Saginaw Formation, South-central Michigan, East Lansing, MI, United States (USA), Michigan State University, Institute of Water Research, 1980 annual report, 13 p.
- Larson, G. J., Lowell, T. V., and Ostrom, N. E., 1994, Evidence for the Two Creeks Interstade in the Lake Huron Basin: Canadian Journal of Earth Sciences, v. 31, no. 5, p. 793-797.

- Larson, G. J., Monaghan, G. W., and Winters, H. A., 1988, Wisconsinan and Holocene Stratigraphy in southwestern Michigan, Midwest Friends of the Pleistocene, Midwest Friends of the Pleistocene 35th Field Conference, May 21-22, 62 p.
- Larson, J. D., 1977, Soil Survey of Wayne County area, Michigan, p. 1-80.
- , 1980, Soil Survey of Berrien County, Michigan.
- Larson, J. H., Richardson, W. B., Vallazza, J. M., and Nelson, J. C., 2012, An exploratory investigation of the landscape-lake interface: Land cover controls over consumer N and C isotopic composition in Lake Michigan rivermouths: *Journal of Great Lakes Research*, v. 38, no. 4, p. 610-619.
- Larson, R. L., 1971, Soil Survey of Macomb County, Michigan, p. 1-108.
- Larson, R. L., and Buchanan, D. E., 1978, Soil Survey of Antrim County, Michigan.
- Larson, R. W., Allen, W. B., and Hanson, S. D., 1975, Water resources of the Huron River basin, southeastern Michigan, scale 1:250,000.
- Laton, W. R., 1997, Groundwater-Kalamazoo River interaction near the Parchment City wellfield, Parchment, Michigan, PhD: Western Michigan University.
- Lawhead, H. F., 1961, Discussion of paper by Ivan W. Brunk, "Changes in the levels of lakes Michigan and Huron": *Journal of Geophysical Research*, v. 66, no. 12, p. 4324-4329.
- Lawler, T. L., 1962, A field study of local magnetic disturbances from glacial drift in Michigan, MS: Michigan State University.
- Leavitt, S. W., Panyushkina, I. P., Lange, T., Cheng, L., Schneider, A. F., and Hughes, J., 2007, Radiocarbon "Wiggles" in great lakes wood at about 10,000 to 12,000 BP: *Radiocarbon*, v. 49, p. 855-864.
- Leavitt, S. W., Panyushkina, I. P., Lange, T., Wiedenhoef, A. C., Cheng, L., Hunter, R. D., Hughes, J., Pranschke, F., Schneider, A. F., Moran, J., and Stieglitz, R. D., 2006, Climate in the great lakes region between 14,000 and 4000 years ago from isotopic composition of conifer wood: *Radiocarbon*, v. 48, p. 205-217.
- Leduc, S. D., and Rothstein, D. E., 2007, Initial recovery of soil carbon and nitrogen pools and dynamics following disturbance in jack pine forests: A comparison of wildfire and clearcut harvesting: *Soil Biology & Biochemistry*, v. 39, no. 11, p. 2865-2876.
- Lee, C. H., and Hawley, N., 1998, The response of suspended particulate material to upwelling and downwelling events in southern Lake Michigan: *Journal of Sedimentary Research*, v. 68, no. 5, p. 819-831.
- Lee, T. E., 1968, Sheguiandah in Retrospect, *in* Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island*, Michigan Basin Geological Society, p. 93-95.
- , 1978, Sheguiandah and Early Man, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area*, Volume 3, Michigan Basin Geological Society, p. 87-90.
- Leege, L. M., and Kilgore, J. S., 2014, Recovery of Foredune and Blowout Habitats in a Freshwater Dune Following Removal of Invasive Austrian Pine (*Pinus nigra*): *Restoration Ecology*, v. 22, no. 5, p. 641-648.
- Leenheer, M. J., Flessland, K. D., and Meyers, P. A., 1984, Comparison of lipid character of sediments from the Great Lakes and the Northwestern Atlantic: *Organic Geochemistry*, v. 7, no. 2, p. 141-150.
- LeFever, A. M., 2008, Morphological analysis of the Charlevoix-Antrim and Northport Drumlin Fields, Michigan using digital elevation models, MS: Western Michigan University.
- Legall, F. D., 2002, Geochemical and isotopic characteristics associated with high soil conductivities in a shallow hydrocarbon-contaminated aquifer, PhD: Western Michigan University.
- Leibman, J., 1977, A survey and comparison of the flora of two roadcuts through Mackinac breccia.: University of Michigan.
- Leighton, M. O., 1906, Shall Pollution of Michigan Streams Be Permitted? : Eighth Report of the Michigan Academy of Science 1906, v. 8, p. 119-121.

- Leja, S. L., 1983, A magnetic and resistivity survey of Cork Street landfill, MS: Western Michigan University.
- Lemke, A. K., 2015, Great Lakes Rangifer and Paleoindians: Archaeological and Paleontological Caribou Remains from Michigan: *PaleoAmerica*, v. 1, no. 3, p. 276-283.
- Lendyay, J. M., Sauck, W. A., McCormick, M. L., Barcelona, M. J., Kampbell, D. H., Wilson, J. T., and Adriaens, P., 1998, Geophysical Characterization, Redox Zonation, and Contaminant Distribution at a Groundwater/Surface Water Interface: *Water Resources Research*, v. 34, no. 12, p. 3545-3559.
- Leney, G. W., and Leney, A. T., 1957, Armored Till Balls in the Pleistocene Outwash of southeastern Michigan: *Journal of Geology*, v. 65, p. 105-106.
- Lepczyk, X. C., 2001, Geomorphic history of sand dunes at Petoskey State Park, Petoskey, Michigan, MS: Michigan State University.
- Lepczyk, X. C., and Arbogast, A. F., 2005, Geomorphic history of dunes at Petoskey State Park, Petoskey, Michigan: *Journal of Coastal Research*, v. 21, no. 2, p. 231-241.
- Leverett, F., 1892a, On the correlation of moraines with raised beaches of Lake Erie: *American Journal of Science*, v. 143, no. 256, p. 281-301.
- , 1892b, On the correlation of moraines with raised beaches of Lake Erie: *Wisconsin Academy of Sciences Transactions*, v. 8, p. 233-240.
- , 1897, The Pleistocene features and deposits of the Chicago area: *Chicago Academy of Science, Bulletin*, v. 2, p. 1-86.
- , 1901a, Field Notes of Frank Leverett, Notebook 169: Michigan Geological Survey Open File Report, v. 22.
- , 1901b, Field Notes of Frank Leverett, Notebook 170: Michigan Geological Survey Open File Report, v. 23.
- , 1901c, Field Notes of Frank Leverett, Notebook 171: Michigan Geological Survey Open File Report, v. 24.
- , 1901d, Field Notes of Frank Leverett, Notebook 172: Michigan Geological Survey Open File Report, v. 25.
- , 1902a, Field Notes of Frank Leverett, Notebook 175: Michigan Geological Survey Open File Report, v. 26.
- , 1902b, Field Notes of Frank Leverett, Notebook 176: Michigan Geological Survey Open File Report, v. 27.
- , 1902c, Field Notes of Frank Leverett, Notebook 177: Michigan Geological Survey Open File Report, v. 28.
- , 1902d, Field Notes of Frank Leverett, Notebook 178: Michigan Geological Survey Open File Report, v. 29.
- , 1902e, Field Notes of Frank Leverett, Notebook 179: Michigan Geological Survey Open File Report, v. 30.
- , 1902f, Field Notes of Frank Leverett, Notebook 180: Michigan Geological Survey Open File Report, v. 31.
- , 1902g, Field Notes of Frank Leverett, Notebook 181: Michigan Geological Survey Open File Report, v. 32.
- , 1902h, Field Notes of Frank Leverett, Notebook 182: Michigan Geological Survey Open File Report, v. 33.
- , 1902i, Glacial formations and drainage features of the Erie and Ohio basins: *U.S. Geological Survey Monograph*, v. 41, p. 1-802.
- , 1902j, Report on Alcona County: Surface Geology, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, *State Geologist*, p. 35-64.
- , 1904, Review of the Glacial Geology of the Southern Peninsula of Michigan: *Sixth Report of the Michigan Academy of Science 1904*, v. 6, p. 100-110.

- , 1905a, Field Notes of Frank Leverett, Notebook 202: Michigan Geological Survey Open File Report, v. 34.
- , 1905b, Field Notes of Frank Leverett, Notebook 203: Michigan Geological Survey Open File Report, v. 35.
- , 1905c, Field Notes of Frank Leverett, Notebook 204: Michigan Geological Survey Open File Report, v. 36.
- , 1905d, Field Notes of Frank Leverett, Notebook 205: Michigan Geological Survey Open File Report, v. 37.
- , 1905e, Field Notes of Frank Leverett, Notebook 206: Michigan Geological Survey Open File Report, v. 38.
- , 1905f, Field Notes of Frank Leverett, Notebook 207: Michigan Geological Survey Open File Report, v. 39.
- , 1905g, Field Notes of Frank Leverett, Notebook 208: Michigan Geological Survey Open File Report, v. 40.
- , 1906a, Field Notes of Frank Leverett, Notebook 215: Michigan Geological Survey Open File Report, v. 41.
- , 1906b, Flowing-well districts in the eastern part of the Northern Peninsula of Michigan: U.S. Geological Survey Water-Supply Paper, v. 160, p. 29-53.
- , 1906c, Flowing-wells and municipal water supplies in the southern portion of the Southern Peninsula of Michigan: U.S. Geological Survey Water-Supply Paper, v. 182, p. 1-292.
- , 1906d, Geological Conditions of Municipal and Institutional Water Supplies in Michigan: Eighth Report of the Michigan Academy of Science 1906, v. 8, p. 99-110.
- , 1907, Flowing-wells and municipal water supplies in the middle and northern part of the Southern Peninsula of Michigan: U.S. Geological Survey Water-Supply Paper, v. 183, p. 1-393.
- , 1909a, Field Notes of Frank Leverett, Notebook 228: Michigan Geological Survey Open File Report, v. 42.
- , 1909b, Field Notes of Frank Leverett, Notebook 229: Michigan Geological Survey Open File Report, v. 42A.
- , 1909c, Field Notes of Frank Leverett, Notebook 230: Michigan Geological Survey Open File Report, v. 43.
- , 1909d, Field Notes of Frank Leverett, Notebook 231: Michigan Geological Survey Open File Report, v. 44.
- , 1909e, Field Notes of Frank Leverett, Notebook 232: Michigan Geological Survey Open File Report, v. 45.
- , 1909f, Field Notes of Frank Leverett, Notebook 233: Michigan Geological Survey Open File Report, v. 46.
- , 1910, Outline of the History of the Great Lakes Twelfth Report of the Michigan Academy of Science 1910, v. 12, p. 19-42.
- , 1911a, Field Notes of Frank Leverett, Notebook 242: Michigan Geological Survey Open File Report, v. 47.
- , 1911b, Surface geology of the Northern Peninsula of Michigan with notes on agricultural conditions and water power: Michigan Geological and Biological Survey, Publication, v. 7, no. 5, p. 1-91.
- , 1912a, Correlation of Lake Agassiz with Glacial Lakes in Great Lakes Basins Fourteenth Report of the Michigan Academy of Science 1912, v. 14, p. 115-115.
- , 1912b, Field Notes of Frank Leverett, Notebook 243: Michigan Geological Survey Open File Report, v. 48.
- , 1917, Glacial Lakes and Their Correlative Ice-Borders in the Superior Basin Nineteenth Annual Report of the Michigan Academy of Science 1917, v. 19, p. 101-102.

- , 1918, Features of the Country Around Camp Custer: Twentieth Annual Report of the Michigan Academy of Science 1918, v. 20, p. 53-54.
 - , 1919a, Field Notes of Frank Leverett, Notebook 269: Michigan Geological Survey Open File Report, v. 50.
 - , 1919b, Field Notes of Frank Leverett, Notebook 270: Michigan Geological Survey Open File Report, v. 51.
 - , 1919c, Field Notes of Frank Leverett, Notebook 271: Michigan Geological Survey Open File Report, v. 52.
 - , 1919d, Field Notes of Frank Leverett, Notebook 272: Michigan Geological Survey Open File Report, v. 52A.
 - , 1920, Glacial and Glacial Lake Features in the Vicinity of Kalamazoo: Twenty-first Annual Report of the Michigan Academy of Science 1919, v. 21, p. 91-92.
 - , 1921a, Field Notes of Frank Leverett, Notebook 275: Michigan Geological Survey Open File Report, v. 53.
 - , 1921b, Results of Glacial Studies in the Northern Peninsula of Michigan in 1919 Twenty-Second Annual Report of the Michigan Academy of Science 1920, v. 22, p. 89-90.
 - , 1921c, Studies on the Shore Lines of the Saginaw Basin Twenty-Second Annual Report of the Michigan Academy of Science 1920, v. 22, p. 89-89.
 - , 1922, Field Notes of Frank Leverett, Notebook 278: Michigan Geological Survey Open File Report, v. 54.
 - , 1923, Field Notes of Frank Leverett, Notebook 280: Michigan Geological Survey Open File Report, v. 54A.
 - , 1924, Field Notes of Frank Leverett, Notebook 283: Michigan Geological Survey Open File Report, v. 55.
 - , 1929a, Field Notes of Frank Leverett, Notebook 293: Michigan Geological Survey Open File Report, v. 56.
 - , 1929b, Moraines and shorelines of the Lake Superior Basin: U.S. Geological Survey Professional Paper, v. 154, p. 1-72.
 - , 1930, Field Notes of Frank Leverett, Notebook 294: Michigan Geological Survey Open File Report, v. 57.
 - , 1931a, Field Notes of Frank Leverett, Notebook 296: Michigan Geological Survey Open File Report, v. 58.
 - , 1931b, Field Notes of Frank Leverett, Notebook 297: Michigan Geological Survey Open File Report, v. 59.
 - , 1933, Field Notes of Frank Leverett, Notebook 298: Michigan Geological Survey Open File Report, v. 60.
 - , 1934, Field Notes of Frank Leverett, Notebook 299: Michigan Geological Survey Open File Report, v. 61.
 - , 1938, Field Notes of Frank Leverett, Notebook 300: Michigan Geological Survey Open File Report, v. 62.
 - , 1939, Correlation of beaches with moraines in the Huron and Erie basins: American Journal of Science, v. 237, no. 7, p. 456-475.
- Leverett, F., Bergquist, S. G., and Newcombe, R. B., 1932, Second Annual Excursion, Michigan Academy of Science Field Excursion, p. 1-3.
- Leverett, F., and Schneider, C. F., 1912, Surface Geology and Agricultural Conditions of the Southern Peninsula of Michigan: Michigan Geological and Biological Survey, Publication, v. 9, no. 7, p. 186.
- , 1917, Surface Geology and Agricultural Conditions of Michigan with a chapter on climate: Michigan Geological and Biological Survey, Publication, v. 25, no. 21, p. 1-223.

- Leverett, F., Scott, I. D., Stanley, G., and Bergquist, S. G., 1934, Pleistocene Geology of the Thumb Area of Michigan: Michigan Academy of Science, Arts, and Letters Field Excursion Guide Book.
- Leverett, F., and Taylor, F. B., 1915, The Pleistocene of Indiana and Michigan and the history of the Great Lakes: U.S. Geological Survey Monograph, v. 53, p. 1-587.
- Lewis, C. F. M., 1968, Late Quaternary Events on Manitoulin Island, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 60-67.
- Lewis, C. F. M., Heil, C. W., Hubeny, J. B., King, J. W., Moore, T. C., and Rea, D. K., 2007, The Stanley unconformity in Lake Huron basin: evidence for a climate-driven closed lowstand about 7900 C-14 BP, with similar implications for the Chippewa lowstand in Lake Michigan basin: *Journal of Paleolimnology*, v. 37, p. 435-452.
- Lewis, C. F. M., Karrow, P. F., Blasco, S. M., McCarthy, F. M. G., King, J. W., Moore, T. C., and Rea, D. K., 1998, Evolution of lakes in the Huron basin: Deglaciation to present: *Aquatic Ecosystem Health and Management*, v. 11, p. 127-136.
- Lewis, C. F. M., Moore, T. C., Rea, D. K., Dettman, D. L., Smith, A. M., and Mayer, L. A., 1994, Lakes of the Huron basin: their record of runoff from the Laurentide ice sheet: *Quaternary Science Reviews*, v. 13, no. 9, p. 891-922.
- Libby, L. W., 1973, Economic Implications of Land Use Change in Northern Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 107-109.
- Licciardi, J. M., Clark, P. U., Jenson, J. W., and MacAyeal, D. R., 1998, Deglaciation of a soft-bedded Laurentide Ice Sheet: *Quaternary Science Reviews*, v. 17, p. 427-448.
- Licciardi, J. M., Teller, J. T., and Clark, P. U., 1999, Freshwater Routing by the Laurentide Ice Sheet During the Last Deglaciation, *Mechanisms of Global Climate Change at Millennial Time Scales*, American Geophysical Union, p. 177-201.
- Lichter, J., 1995, Lake Michigan Beach-Ridge and Dune Development, Lake Level, and Variability in Regional Water Balance: *Quaternary Research*, v. 44, no. 2, p. 181-189.
- , 1997, AMS Radiocarbon Dating of Lake Michigan Beach-Ridge and Dune Development: *Quaternary Research*, v. 48, no. 1, p. 137-140.
- Lichter, J., 1998, Rates of weathering and chemical depletion in soils across a chronosequence of Lake Michigan sand dunes: *Geoderma*, v. 85, no. 4, p. 255-282.
- Lichy, C. M., 2006, Quaternary geology of the southern portion of the Northville, Michigan 7.5 minute quadrangle, MS: Wayne State University.
- Lin, Y.-T., and Wu, C. H., 2014, A field study of nearshore environmental changes in response to newly-built coastal structures in Lake Michigan: *Journal of Great Lakes Research*, v. 40, no. 1, p. 102-114.
- Lineback, J. A., Dell, C. I., and Gross, D. L., 1979, Glacial and post-glacial sediments in Lakes Superior and Michigan: *Geological Society of America Bulletin*, v. 90, no. 8, p. 781-791.
- Lineback, J. A., Gross, D. L., and Meyer, R. P., 1974, Glacial tills under Lake Michigan: *Environmental Geology Notes*, v. 69, p. 1-64.
- Lingle, D., 2013, High levels of Ammonium originating from the decay of *in situ* organic material in a confined aquifer, Ottawa County, Michigan, MS: Western Michigan University.
- Linsemier, L. H., 1980, Soil Survey of Huron County, Michigan.
- , 1989, Soil Survey of Dickinson County, Michigan.
- , 1997, Soil Survey of Iron County, Michigan.
- Lipinski, B. A., 2002, Estimating natural attenuation rates for a chlorinated hydrocarbon plume in a glacio-fluvial aquifer, Schoolcraft, Michigan, MS: Michigan State University.
- Livingston, B. E., 1902, The distribution of the plant societies of Kent County, Michigan, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, p. 81-103.

- , 1905, Relation of soils to natural vegetation in Roscommon and Crawford Counties, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 9-30.
- Long, D. T., and Larson, G. J., 1983, Field Evidence for Shale Membrane Filtration of Groundwater, South-Central Michigan, OWRT A-108-MICH(1).
- Long, D. T., Rezabek, D. H., Takacs, M. J., and Wilson, T. P., 1986, Geochemistry of ground waters, Bay County Michigan, MDPH:ORD 38553.
- Long, D. T., Wilson, T. P., Takacs, M. J., and Rezabek, D. H., 1988, Stable isotope geochemistry of saline near-surface groundwater East-central Michigan Basin: Geological Society of America Bulletin, v. 100, no. 10, p. 1568-1577.
- Loope, H. M., Loope, W. L., Goble, R. J., Fisher, T. G., Jol, H. M., and Seong, J. C., 2010, Early Holocene dune activity linked with final destruction of Glacial Lake Minong, eastern Upper Michigan, USA: Quaternary Research, v. 74, no. 1, p. 73-81.
- Loope, W. L., 1991, Interrelationships of fire history, land use history, and landscape pattern within Pictured Rocks National Lakeshore, Michigan: Canadian Field-Naturalist, v. 105, no. 1, p. 18-28.
- Loope, W. L., and Arbogast, A. F., 2000, Dominance of an ~150-Year Cycle of Sand-Supply Change in Late Holocene Dune-Building along the Eastern Shore of Lake Michigan: Quaternary Research, v. 54, no. 3, p. 414-422.
- Loope, W. L., Fisher, T. G., Jol, H. M., Goble, R. J., Anderton, J. B., and Blewett, W. L., 2004, A Holocene history of dune-mediated landscape change along the southeastern shore of Lake Superior: Geomorphology, v. 61, no. 3-4, p. 303-322.
- Loope, W. L., Jol, H. M., Fisher, T. G., Blewett, W. L., Loope, H. M., and Legg, R. J., 2014a, A previously unrecognized path of early Holocene base flow and elevated discharge from Lake Minong to Lake Chippewa across eastern Upper Michigan, Coastline and Dune Evolution Along the Great Lakes, Volume 508, Geological Society of America, p. 1-13.
- , 2014b, A previously unrecognized path of early Holocene base flow and elevated discharge from Lake Minong to Lake Chippewa across eastern Upper Michigan, *in* Fisher, T. G., and Hansen, E. C., eds., Coastline and Dune Evolution along the Great Lakes, Volume 508: Boulder, Geological Society of America, p. 1-14.
- Loope, W. L., Loope, H. M., Goble, R. J., Fisher, T. G., Lytle, D. E., Legg, R. J., Wysocki, D. A., Hanson, P. R., and Young, A. R., 2012, Drought drove forest decline and dune building in eastern upper Michigan, USA, as the upper Great Lakes became closed basins: Geology, v. 40, no. 4, p. 315-318.
- LoPiccolo, R. D., 1972, Sediment-topography relationships in the inner nearshore zone, southeastern Lake Michigan, MA: Western Michigan University.
- Lou, J., Schwab, D. J., Beletsky, D., and Hawley, N., 2000, A model of sediment resuspension and transport dynamics in southern Lake Michigan: Journal of Geophysical Research: Oceans, v. 105, no. C3, p. 6591-6610.
- Lovan, N. A., 1977, Analysis of an interlobate boundary in the Wisconsin drift of Kalamazoo County and adjacent areas in southwestern Michigan, MS: Western Michigan University, 129 p.
- Lovato, J., 1979, The geohydrologic characteristics of the glacial drift within the Water Quality Management Project Site, Michigan State University, MS: University of Michigan, 136 p.
- LoVetere, C., 1996, Spatial and temporal variability in the distribution of nitrate in an agriculturally-impacted aquifer, Cass County, Michigan, MS: Western Michigan University.
- Lovetere, S. C., Kirby, M. J., and Kehew, A. E., 1998, Spatial and temporal variability in the distribution of nitrate in an agriculturally-impacted aquifer, Cass County, Michigan, Animal Production Systems and the Environment, 1998: Ames, p. 513-518.

- Lovett, C., 1995, A wellhead protection study of a small agricultural community in glaciated terrain, as a model for wellhead protection efforts by similar communities, PhD: Western Michigan University.
- Lovett, C. K., Krishnamurthy, R. V., Kehew, A. E., and Passero, R. N., 1995, Tritium and $\delta^{18}\text{O}$ as indicators of connectivity in a multiple-aquifer complex, Cass County, southwestern Michigan, *in* Leibundgut, C., ed., Tracer Technologies for Hydrological Systems Volume 229, The International Association of Hydrological Sciences, p. 23-30.
- Lovis, W. A., 1985, Seasonal Settlement Dynamics and the Role of the Fletcher Site in the Woodland Adaptations of the Saginaw Drainage-Basin: *Arctic Anthropology*, v. 22, p. 153-170.
- Lovis, W. A., Donahue, R. E., and Holman, M. B., 2005, Long-distance logistic mobility as an organizing principle among northern hunter-gatherers: A Great Lakes Middle Holocene settlement system: *American Antiquity*, v. 70, p. 669-693.
- Lovis, W. A., Egan-Bruhy, K. C., Smith, B. A., and Monaghan, G. W., 2001, Wetlands and emergent horticultural economies in the Upper Great Lakes: A new perspective from the Schultz site: *American Antiquity*, v. 66, p. 615-632.
- Lowell, T. V., Larson, G. J., Hughes, J. D., and Denton, G. H., 1999, Age verification of the Lake Gribben forest bed and the Younger Dryas Advance of the Laurentide Ice Sheet: *Canadian Journal of Earth Sciences*, v. 36, no. 3, p. 383-393.
- Luby, T. P., 1982, The investigation of Drift-covered Environments via the Shallow Reflection Seismic Method in Kalamazoo County, Michigan, MS: Western Michigan University.
- Luehmann, M. D., 2011, Characterizing, mapping, and interpreting thin loess deposits in the western Upper Peninsula of Michigan, MS: Michigan State University.
- Luehmann, M. D., Peter, B. G., Connallon, C. B., Schaetzi, R. J., Smidt, S. J., Liu, W., Kincare, K. A., Walkowiak, T. A., Thorlund, E., and Holler, M. S., 2016, Loamy, Two-Storeyed Soils on the Outwash Plains of Southwestern Lower Michigan: Pedoturbation of Loess with the Underlying Sand: *Annals of the American Association of Geographers*, p. 1-21.
- Luehmann, M. D., Schaetzi, R. J., Miller, B. A., and Bigsby, M. E., 2013, Thin, pedoturbated, and locally sourced loess in the western Upper Peninsula of Michigan: *Aeolian Research*, v. 8, no. 0, p. 85-100.
- Lundstrom, S. C., 2004, The Glaciated Landscape in the Grand Traverse Bay Region of Michigan and the Nature of the Greatlakean Advance of the Laurentide Ice Sheet in Michigan, USA, *in* Black, T. J., and Wollensak, M. S., eds., Northeast Lower Peninsula, Michigan Geological Field Conference, Michigan Basin Geological Society, p. 53-54.
- Lusch, D. P., Stanley, K. E., Schaetzi, R. J., Kendall, A. D., Van Dam, R. L., Nielsen, A., Blumer, B. E., Hobbs, T. C., Archer, J. K., Holmstadt, J. L. F., and May, C. L., 2009, Characterization and Mapping of Patterned Ground in the Saginaw Lowlands, Michigan: Possible Evidence for Late-Wisconsin Permafrost: *Annals of the Association of American Geographers*, v. 99, no. 3, p. 445-466.
- Luszcz, E. C., 2013, Modeling nutrient loading to watersheds in the Great Lakes Basin: A detailed source model at the regional scale, MS: Michigan State University.
- Luszcz, E. C., Kendall, A. D., and Hyndman, D. W., 2015, High resolution spatially explicit nutrient source models for the Lower Peninsula of Michigan: *Journal of Great Lakes Research*, v. 41, no. 2, p. 618-629.
- Luukkonen, C. L., 1995, Ground-Water Withdrawals in Clinton, Eaton, and Ingham Counties, Michigan: U.S. Geological Survey Fact Sheet, v. 226-95, p. 1-2.
- Luukkonen, C. L., Blumer, S. P., Weaver, T. L., and Jean, J., 2004, Simulation of the Ground-Water-Flow System in the Kalamazoo County area, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2004-5054.
- Luukkonen, C. L., Grannemann, N. G., and Holtschlag, D. J., 1997a, Ground-Water Flow in the Saginaw Aquifer in the Vicinity of the North Lansing Well Field, Lansing, Michigan--

- Part2, Simulations with a Regional Model Using a Reduced Cell Size: U.S. Geological Survey Open-File Report, v. 97-570, p. 1-25.
- , 1997b, Ground-Water Flow in the Saginaw Aquifer in the Vicinity of the North Lansing Well Field, Lansing , Michigan--Part 1, Simulations with a Regional Model: U.S. Geological Survey Open-File Report, v. 97-569, p. 1-13.
- Luukkonen, C. L., Holtschlag, D. J., Reeves, H. W., Hoard, C. J., and Fuller, L. M., 2015, Estimation of monthly water yields and flows for 1951–2012 for the United States portion of the Great Lakes Basin with AFINCH: U.S. Geological Survey Scientific Investigations Report, v. 2014-5192, p. 1-83.
- Luukkonen, C. L., and Westjohn, D. B., 2000, Ground-Water Flow and Contributing Areas to Public -Supply Wells in Kingsford and Iron Mountain, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 00-4426.
- Lynch, E. A., and Grannemann, N. G., 1997a, Geohydrology and Contamination at the Michigan Department of Transportation Maintenance Garage Area, Kalamazoo County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 97-4068, p. 1-45.
- , 1997b, Geohydrology and Simulations of Ground-water flow at Verona Well Field, Battle Creek, Michigan, 1988: U.S. Geological Survey Water-Resources Investigations Report, v. 97-4068, p. 1-45.
- Lynch, E. A., and Waldron, M. C., 1996, Michigan wetland resources, National Water Summary on Wetland Resources, Volume 2425, p. 231-236.
- Lytle, D. E., 2005, Palaeoecological evidence of state shifts between forest and barrens on a Michigan sand plain, USA: Holocene, v. 15, no. 6, p. 821-836.
- Ma, L., 2009, Noble gases dissolved in groundwaters of the Michigan Basin: Implications for paleoclimatology, hydrogeology, tectonics and mantle geochemistry, PhD: University of Michigan, 245 p.
- Ma, L., Castro, M. C., and Hall, C. M., 2004, A late Pleistocene–Holocene noble gas paleotemperature record in southern Michigan: Geophysical Research Letters, v. 31, no. 23, p. L23204.
- Ma, L., Castro, M. C., and Hall, C. M., 2009a, Atmospheric noble gas signatures in deep Michigan Basin brines as indicators of a past thermal event: Earth and Planetary Science Letters, v. 277, no. 1-2.
- Ma, L., Castro, M. C., and Hall, C. M., 2009b, Crustal noble gases in deep brines as natural tracers of vertical transport processes in the Michigan Basin: Geochemistry, Geophysics, Geosystems, v. 10, no. 6, p. Q06001.
- Ma, L., Castro, M. C., Hall, C. M., and Walter, L. M., 2005, Cross-formational flow and salinity sources inferred from a combined study of helium concentrations, isotopic ratios, and major elements in the Marshall aquifer, southern Michigan: Geochemistry, Geophysics, Geosystems, v. 6, no. 10, p. Q10004.
- Ma, Y. T., Van Dam, R. L., and Jayawickreme, D. H., 2014, Soil moisture variability in a temperate deciduous forest: insights from electrical resistivity and throughfall data: Environmental Earth Sciences, v. 72, no. 5, p. 1367-1381.
- MacAlpin, A. J., 1940, A census of mastodon remains in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 25, p. 481-490.
- Maccoux, M. J., Dolan, D. M., and Chapra, S. C., 2013, Chloride and total phosphorus budgets for Green Bay, Lake Michigan: Journal of Great Lakes Research, v. 39, no. 3, p. 420-428.
- Maccubbin, A. E., Ersing, N., and Frank, M. E., 1991, Mutagenicity of Sediments from the Detroit River: Journal of Great Lakes Research, v. 17, no. 3, p. 314-321.
- Maccurdy, H. M., 1920, Mastodon Remains Found in Gratiot County, Michigan: Twenty-first Annual Report of the Michigan Academy of Science 1919, v. 21, p. 109-110.

- Macdonald, N. W., and Hart, J. B., 1990, Relating Sulfate Adsorption to Soil Properties in Michigan Forest Soils: *Soil Science Society of America Journal*, v. 54, no. 1, p. 238-245.
- Macdonald, N. W., Rediske, R. R., Scull, B. T., and Wierzbicki, D., 2008, Landfill cover soil, soil solution, and vegetation responses to municipal landfill leachate applications: *Journal of Environmental Quality*, v. 37, no. 5, p. 1974-1985.
- MacDonald, R. A., and Longstaffe, F. J., 2008, The late Quaternary oxygen-isotope composition of Southern Lake Huron: *Aquatic Ecosystem Health and Management*, v. 11, p. 137-143.
- Machavaram, M., and Krishnamurthy, R. V., 1994, Survey of factors controlling the stable isotope ratios in precipitation in the Great Lakes region: *Israel Journal of Earth Sciences*, v. 43, p. 195-202.
- , 1995, Earth surface evaporative processes: A case study from the Great Lakes Region of the United States based on deuterium excess in precipitation: *Geochimica et Cosmochimica Acta*, v. 59, p. 4279-4283.
- Machemer, P. L., Simmons, C., and Walker, R. T., 2006, Refining landscape change models through outlier analysis in the Muskegon watershed of Michigan: *Landscape Research*, v. 31, no. 3, p. 277-294.
- Mackin, J. E., and Owen, R. M., 1979, Geochemistry of sediments from Little Traverse Bay, Lake Michigan - Influence of physical processes: *Canadian Journal of Earth Sciences*, v. 16, no. 3, p. 532-539.
- MacLachlan, D. B., 1939, Warren shoreline in Ontario and in the thumb of Michigan, and its deformation, PhD: University of Michigan.
- MacLean, W. F., 1962, Post glacial uplift in the Great Lakes region, PhD: University of Michigan.
- MacLeod, A., Sibert, R., Snyder, C., and Koretsky, C. M., 2011, Eutrophication and salinization of urban and rural kettle lakes in Kalamazoo and Barry Counties, Michigan, USA: *Applied Geochemistry*, v. 26, Supplement, p. S214-S217.
- Madsen, B. J., 1987, Interaction of vegetation and physical processes in patterned peatlands: A comparison of two sites in Upper Michigan, PhD: University of Michigan.
- Mahaney, W. M., Gross, K. L., Blackwood, C. B., and Smemo, K. A., 2015, Impacts of prairie grass species restoration on plant community invasibility and soil processes in abandoned agricultural fields: *Applied Vegetation Science*, v. 18, no. 1, p. 99-109.
- Maher, L. J., and Mickelson, D., 1996, Palynological and radiocarbon evidence for deglaciation events in the Green Bay Lobe, Wisconsin: *Quaternary Research*, v. 46, p. 251-259.
- Mahjoory, R., 1971, Clay mineralogy of some lithosequences and toposequences of soils in Michigan, PhD: Michigan State University.
- Mahjoory, R. A., and Whiteside, E. P., 1975, Relationship of the New Soil Classification System to Mineral Soils in Ingham County, Michigan, USA (Case Study of a Modern National Cooperative Soil Survey): *Soil Science*, v. 120, no. 4, p. 295-300.
- Malanchak, J. E., 1973, Geology of Atwater well field, Kalamazoo County, Michigan, MA: Western Michigan University.
- Malone, M. H., 2003, Validation of the Land Transformation Model (LTM) to predict land use changes in Grand Blanc Township, Michigan, MS: Michigan State University, 90 p.
- Mandle, R. J., 1986, Plan of study for the regional aquifer systems analysis of the Michigan Basin: Open-File Report - U. S. Geological Survey, p. 23-23.
- Mandle, R. J., and Westjohn, D. B., 1987, Preliminary interpretation of vertical electrical-resistivity soundings in the Saginaw Valley, Michigan: U.S. Geological Survey Open-File Report, v. 87-474, p. 1-45.
- , 1989, Geohydrologic framework and ground-water flow in the Michigan basin, *in* Swain, L. A., and Johnson, A. I., eds., *Regional Aquifer Systems of the United States--Aquifers of the Midwestern Area*, Volume 13, p. 83-109.
- Mangum, A. W., and Mann, C. J., 1905, Soil Survey of the Owosso Area, Michigan.

- Manson, M. L., and Halls, H. C., 1991, An investigation of Superior Shoal, Central Lake Superior with a manned submersible: *Canadian Journal of Earth Sciences*, v. 28, no. 1, p. 145-150.
- Mao, D., and Cherkauer, K. A., 2009, Impacts of land-use change on hydrologic responses in the Great Lakes region: *Journal of Hydrology*, v. 374, no. 1–2, p. 71-82.
- Marko, K. M., 2008, Tracing the Flow of Organic Matter from the Muskegon River Estuary System to Nearshore Lake Michigan: a Stable Isotope Analysis, MS: University of Michigan.
- Marko, K. M., Rutherford, E. S., Eadie, B. J., Johengen, T. H., and Lansing, M. B., 2013, Delivery of nutrients and seston from the Muskegon River Watershed to near shore Lake Michigan: *Journal of Great Lakes Research*, v. 39, no. 4, p. 672-681.
- Marks, W. D., 1973, Surface waters of Northwestern Lower Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 47-51.
- Marlor, K. M., Webster, C. R., and Chimner, R. A., 2014, Disturbance and Wetland Type Alter Reed Canarygrass Cover in Northern Michigan: *Invasive Plant Science and Management*, v. 7, no. 1, p. 121-131.
- Marschner, A. W., 1952, A method for the size analysis of sand on a frequency basis, MS: Wayne State University.
- Marschner, A. W., 1953, A method for the size analysis of sand on a number frequency basis: *Journal of Sedimentary Petrology*, v. 23, no. 1, p. 49-59.
- Marsh, W. M., 1990, Nourishment of perched sand dunes and the issue of erosion control in the Great Lakes: *Environmental Geology and Water Sciences*, v. 16, no. 2, p. 155-164.
- Marshall, N. J., 1973, Perception and Values in the Recreational Use of the Natural Environment, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 110-112.
- Martin, H. M., 1937, The geological and physical features of Michigan: *Michigan Today*, p. 11-41.
- , 1938, The ice age and Michigan: *Michigan Conservation*, v. 7, no. 7-9.
- , 1944, More about our most important resource - water: *Michigan Conservation*, v. 13, no. 4, p. 6-7.
- , 1945, Geology to archeology: *Michigan Conservation*, v. 14, no. 3, p. 3, 10.
- , 1946, The biology of the past: prehistoric life in Michigan: *Metropolitan Detroit Science Review*, p. 14-17, 46-47.
- , 1957, Map of the surface formations of the Northern Peninsula of Michigan: Michigan Geological Survey Division Publication, v. 49.
- Martin, H. M., Ehlers, G. M., Kelly, W. A., Hussey, R. C., and Bergquist, S. G., 1948, Pleistocene and Early Paleozoic of the Eastern Part of the Northern Peninsula of Michigan, Michigan Academy of Arts, Sciences, and Letters and Michigan Geological Society, Guidebook, Annual Geological Excursion of the Michigan Academy of Arts, Sciences, and Letters and the Michigan Geological Society, 28 p.
- Martin, P. E., and Mainfort, R. C., 1985, The Battle Point Site - A Late Historic Cemetery in Ottawa County, Michigan: *Arctic Anthropology*, v. 22, p. 115-129.
- Martina, J. P., Hamilton, S. K., Turetsky, M. R., and Phillippo, C. J., 2014, Organic matter stocks increase with degree of invasion in temperate inland wetlands: *Plant and Soil*, v. 385, no. 1-2, p. 107-123.
- Martinez-Martinez, E., Nejadhashemi, A. P., Woznicki, S. A., Adhikari, U., and Giri, S., 2015, Assessing the significance of wetland restoration scenarios on sediment mitigation plan: *Ecological Engineering*, v. 77, p. 103-113.

- Martini, A. M., Budai, J. M., Walter, L. M., and Schoell, M., 1996, Microbial generation of economic accumulations of methane within a shallow organic-rich shale: *Nature*, v. 383, p. 155-158.
- Martini, A. M., Walter, L. M., and McIntosh, J. C., 2008, Identification of microbial and thermogenic gas components from Upper Devonian black shale cores, Illinois and Michigan basins: *American Association of Petroleum Geologists Bulletin*, v. 92, no. 3, p. 327-339.
- Martini, A. M. W., L. M., Budai, J. M., Ku, T. C. W., Kaiser, C. J., and Schoell, M., 1998, Genetic and temporal relations between formation waters and biogenic methane: Upper Devonian Antrim Shale, Michigan Basin, USA: *Geochimica et Cosmochimica Acta*, v. 62, no. 10, p. 1699-1720.
- Matelski, R. P., and Turk, L. M., 1947, Heavy minerals in some podzol soil profiles in Michigan: *Soil Science*, v. 64, no. 6, p. 469-487.
- Matty, J. M., 1992, Influence of early diagenesis on the geochemical cycling of arsenic and mercury, PhD: Michigan State University, 156 p.
- Mayotte, T. J., 1988, An investigation of a soil gas sampling technique and its applicability for detecting gaseous PCE and TCA over an unconfined granular aquifer, MS: Western Michigan University.
- McCallum, M. L., 1949, A petrographic investigation of vertical deposition within the Mason esker relative to its origin, MS: Michigan State University, 39 p.
- McCann, S., Brown, L. M., Ribant, M., Lieurance, S., Chenier, F. J., Gere, M. A., Jr., and Rexroad, C. B., 1995, Bedrock geology of Chippewa County, Michigan: *Michigan Academician*, v. 27, no. 1, p. 81-93.
- McCool, M. M., Veatch, J. O., and Spurway, C. H., 1923, Soil profile studies in Michigan: *Soil Science*, v. 16, no. 2, p. 95-106.
- McCool, M. M., Weidemann, A. G., and Schlubatis, G., 1927, Further studies on Michigan soil profiles with special reference to dispersed materials: *Soil Science*, v. 23, no. 5, p. 391-398.
- McDaniel, M. D., Grandy, A. S., Tiemann, L. K., and Weintraub, M. N., 2014, Crop rotation complexity regulates the decomposition of high and low quality residues: *Soil Biology & Biochemistry*, v. 78, p. 243-254.
- McDonald, M. G., 1980, Hydraulic characteristics of an underdrained irrigation circle, Muskegon County wastewater disposal system, Michigan: U.S. Geological Survey Open-File Report, v. OFR 80-773.
- , 1981, Hydraulic characteristics of an under-drained irrigation circle, Muskegon County wastewater disposal system, Michigan: U.S. Geological Survey Water-Supply Paper, v. 2081, p. 1-14.
- McDonald, M. G., and Fleck, W. B., 1978, Model analysis of the impact on ground-water conditions of the Muskegon County wastewater disposal system, Michigan: U.S. Geological Survey Open-File Report, v. 78-99, p. 1-63.
- McElmurry, S. P., 2008, Characterization of dissolved organic carbon: Assessment of copper complexation and export of carbon from watersheds as a function of land use, PhD: Michigan State University, 262 p.
- McGeary, D. F. R., 1964, Size analysis of nearshore sediments, southeastern Lake Michigan, MS: University of Illinois.
- McGuinness, C. L., Poindexter, O. F., and Otten, E. G., 1949, Ground-water supplies of the Ypsilanti area, Michigan: U.S. Geological Survey Water-Supply Paper, v. 1078, p. 1-105.
- McGuinness, C. L., 1940, Hydrologic problems in the Ohio and Michigan basins; a brief review of ground-water conditions in Michigan: *American Geophysical Union Transactions*, v. 21st Annual Meeting, no. II, p. 1122-1126.

- McGuinness, C. L., Pointdexter, O. F., and Otton, E. G., 1949, Ground-water supplies of the Ypsilanti area, Michigan: U.S. Geological Survey Water-Supply Paper, v. 1087, p. 1-105.
- McGuire, J. T., 2002, Quantifying redox reactions in an aquifer contaminated with waste fuel and chlorinated solvents, PhD: Michigan State University, 148 p.
- McGuire, J. T., Smith, E. W., Long, D. T., Hyndman, D. W., Haack, S. K., Klug, M. J., and Velbel, M. A., 2000, Temporal variations in parameters reflecting terminal-electron-accepting processes in an aquifer contaminated with waste fuel and chlorinated solvents: *Chemical Geology*, v. 169, p. 471-485.
- McIntosh, J. C., 2004, Impact of Pleistocene glaciation on midcontinent sedimentary basin fluids: Reorganization of salinity structure and generation of microbial gas, PhD: University of Michigan.
- McIntosh, J. C., Garven, G., and Hanor, J. S., 2011, Impacts of Pleistocene glaciation on large-scale groundwater flow and salinity in the Michigan Basin: *Geofluids*, v. 11, no. 1, p. 18-33.
- McIntosh, J. C., and Walter, L. M., 2005, Volumetrically significant recharge of Pleistocene glacial meltwaters into epicratonic basins: Constraints imposed by solute mass balances: *Chemical Geology*, v. 222, p. 292-309.
- McIntosh, J. C., Walter, L. M., and Martini, A. M., 2002, Pleistocene recharge to midcontinent basins: Effects on salinity structure and microbial gas generation: *Geochimica et Cosmochimica Acta*, v. 66, no. 10, p. 1681-1700.
- , 2004, Extensive microbial modification of formation water geochemistry: Case study from a Midcontinent sedimentary basin, United States: *Geological Society of America Bulletin*, v. 116, no. 5-6, p. 743-759.
- McKee, J. D., 1990, Geochemical cycling of heavy metals in profundal sediments of Lake Superior, MS: Michigan State University, 85 p.
- McKee, J. D., Wilson, T. P., Long, D. T., and Owen, R. M., 1989a, Geochemical partitioning of Pb, Zn, Cu, Fe, and Mn across the sediment-water interface in large lakes: *Journal of Great Lakes Research*, v. 15, p. 46-58.
- McKee, J. D., Wilson, T. P., Long, D. T., and Owen, R. M., 1989b, Pore Water Profiles and Early Diagenesis of Mn, Cu, and Pb in Sediments from Large Lakes: *Journal of Great Lakes Research*, v. 15, no. 1, p. 68-83.
- McLaughlin, G. E., 1973, Pere Marquette River Auto Tour, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 143-147.
- McLaughlin, J. W., Calhoun, E. B. W., Gale, M. R., Jurgensen, M. F., and Trettin, C. C., 2011, Biogeochemical cycling and chemical fluxes in a managed northern forested wetland, Michigan, USA: *Forest Ecology and Management*, v. 261, no. 3, p. 649-661.
- McLean, M., Roseman, E. F., Pritt, J. J., Kennedy, G., and Manny, B. A., 2015, Artificial reefs and reef restoration in the Laurentian Great Lakes: *Journal of Great Lakes Research*, v. 41, no. 1, p. 1-8.
- McLeese, R. L., 1981, Soil Survey of Jackson County, Michigan.
- McLeese, R. L., and Tardy, S. W., 1985, Soil Survey of Isabella County, Michigan.
- McLendon, W. E., and Carr, M. E., 1904, Soil Survey of the Saginaw Area, Michigan.
- McMurray, M. G., Kloos, G., Kapp, R. O., and Sullivan, K., 1978, Paleocology of Crystal Marsh, Montcalm County, Based on Macrofossil and Pollen Analysis: *Michigan Academician*, v. 10, no. 4, p. 403-417.
- McNamee, R. L., 1930, The surface waters of Michigan: hydrology and qualitative characteristics and purification for public use: Michigan University, Engineering Research Bulletin, v. 16, p. 1-323.
- McNeary, D., 2002, The depositional characteristics of ^7Be , ^{210}Pb , and ^{210}Po in southeastern Michigan, MS: Wayne State University, 134 p.

- McNeary, D., and Baskaran, M., 2007, Residence times and temporal variations of Po-210 in aerosols and precipitation from southeastern Michigan, United States: *Journal of Geophysical Research-Atmospheres*, v. 112, no. D4.
- McNeil, J., 1994, Problems associated with using ground penetrating radar to locate a LNAPL plume, MS: Western Michigan University, 55 p.
- Meingast, K. M., Falkowski, M. J., Kane, E. S., Potvin, L. R., Bencotter, B. W., Smith, A. M. S., Bourgeau-Chavez, L. L., and Miller, M. E., 2014, Spectral detection of near-surface moisture content and water-table position in northern peatland ecosystems: *Remote Sensing of Environment*, v. 152, p. 536-546.
- Meisel, K. E., 1985, The use of electrical resistivity to delineate a brine contamination plume in the Walker Oilfield, Kent County, Michigan, MS: Western Michigan University, 167 p.
- Meissner, B. D., 1993, The geochemistry and source for solutes in ground water from the Pennsylvanian bedrock sequence in the Michigan Basin, MS: Michigan State University, 126 p.
- Meissner, B. D., Long, D. T., and Lee, R. W., 1996, Selected Geochemical Characteristics of Ground Water from the Saginaw Aquifer in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 93-4220, p. 1-19.
- Melbardis, V. V., 1990, Hydrogeology and hydrogeochemistry of the Tekonsha Moraine and adjacent interlobate deposits in Charleston Township, Kalamazoo County, Michigan, MS: Western Michigan University.
- Melhorn, W. N., 1955, Valdres glaciation of the Southern Peninsula of Michigan, PhD: University of Michigan.
- Meliker, J. R., Slotnick, M. J., Avruskin, G. A., Haack, S. K., and Nriagu, J. O., 2009, Influence of groundwater recharge and well characteristics on dissolved arsenic concentrations in southeastern Michigan groundwater: *Environmental Geochemical Health*, v. 31, p. 147-157.
- Mencenberg, F. E., 1963, Groundwater geology of the (Pennsylvanian) Saginaw Group in the Lansing area, Michigan, MS: Michigan State University, 38 p.
- Meredith, D. D., 1970, Modeling of the Great Lakes Water System: *JAWRA Journal of the American Water Resources Association*, v. 6, no. 1, p. 55-64.
- Merrill, G. P., 1899, Preliminary note on new meteorites from Allegan, Michigan and Mart, Texas: *Science*, v. 10, no. 256, p. 770-771.
- , 1928, Heretofore undescribed meteoric irons from (1) Bolivia, South America, (2) Western Arkansas, and (3) Seneca Township, Michigan: *U.S. National Museum Proceedings*, v. 72, p. 1-4.
- Merrill, G. P., and Stokes, H. N., 1900, A new stony meteorite from Allegan, Michigan and a new iron meteorite from Mart, Texas: *Proceedings of the Washington Academy of Sciences*, v. 2, p. 41-68.
- Mettert, W., 1969, Soil Survey of Osceola County, Michigan, p. 1-137.
- , 1972, Soil Survey of Gladwin County, Michigan, p. 1-110.
- Mettert, W. K., 1989, Soil Survey of Tuscola County, Michigan.
- Meyers, P. A., 2003, Applications of organic geochemistry to paleolimnological reconstructions: a summary of examples from the Laurentian Great Lakes: *Organic Geochemistry*, v. 34, p. 261-289.
- Meyers, P. A., Bourbonniere, R. A., and Takeuchi, N., 1980, Hydrocarbons and fatty acids in two cores of Lake Huron sediments: *Geochimica et Cosmochimica Acta*, v. 44, no. 8, p. 1215-1221.
- Meyers, P. A., and Eadie, B. J., 1993, Sources, degradation and recycling of organic matter associated with sinking particles in Lake Michigan: *Organic Geochemistry*, v. 20, no. 1, p. 47-56.

- Meyers, P. A., and Ishiwatari, R., 1993, Lacustrine organic geochemistry—an overview of indicators of organic matter sources and diagenesis in lake sediments: *Organic Geochemistry*, v. 20, no. 7, p. 867-900.
- Meyers, P. A., Leenheer, M. J., Eaoie, B. J., and Maule, S. J., 1984, Organic geochemistry of suspended and settling particulate matter in Lake Michigan: *Geochimica et Cosmochimica Acta*, v. 48, no. 3, p. 443-452.
- Meyers, P. A., and Takeuchi, N., 1979, Fatty acids and hydrocarbons in surficial sediments of Lake Huron: *Organic Geochemistry*, v. 1, no. 3, p. 127-138.
- Meyers, P. A., Zsolnay, A., and Eadie, B. J., 1995, Pyrolysis-mass spectrometry of sediment trap organic matter from Lake Michigan: *Chemical Speciation & Bioavailability*, v. 7, no. 1, p. 33-37.
- Michael Lewis, C. F., Karrow, P. F., Blasco, S. M., McCarthy, F. M. G., King, J. W., Moore, T. C., and Rea, D. K., 2008, Evolution of lakes in the Huron basin: Deglaciation to present: *Aquatic Ecosystem Health & Management*, v. 11, no. 2, p. 127-136.
- Michigan Water Resources Commission, 1953, Report on the water resources of the Clinton River basin, p. 1-47.
- , 1955, Water resource conditions and uses in the Au Sable River basin.
- , 1956, Water resource conditions and uses in the Flint River basin.
- , 1957, Water resource conditions and uses in the Huron River basin.
- , 1960, Water resource conditions and uses in the Au Sable River basin.
- , 1961, Water resource conditions and uses in the Upper Grand River basin.
- , 1963, Water resource conditions and uses in the Shiawassee River basin.
- , 1964, Water resource conditions and uses in the Maumee River basin.
- , 1966, Water resource conditions and uses in the Au Sable River basin.
- , 1967, Water resource conditions and uses in the Lower Grand River basin.
- Micklin, P. P., and Hodler, T. W., 1983, Stormwater management in a small Michigan watershed: *Physical Geography*, v. 4, no. 1, p. 38-52.
- Mier, J. M., and Garcia, M. H., 2011, Erosion of glacial till from the St. Clair River (Great Lakes basin): *Journal of Great Lakes Research*, v. 37, no. 3, p. 399-410.
- Mikesell, L. R., 2002, Hornblende etching as an indicator of soil development and relative weathering among spodosols, MS: Michigan State University, 134 p.
- Mikesell, L. R., Schaetzl, R. J., and Velbel, M. A., 2004, Hornblende etching and quartz/feldspar ratios as weathering and soil development indicators in some Michigan soils: *Quaternary Research*, v. 62, no. 2, p. 162-171.
- Milando, C., Huang, L., and Batterman, S., 2016, Trends in PM_{2.5} emissions, concentrations and apportionments in Detroit and Chicago: *Atmospheric Environment*, v. 129, p. 197-209.
- Milejczak, R., 1989, The relation of radium-226 and 228 to the groundwater geochemistry of carbon, sulfur, and chlorine near Michigan's Saginaw Bay, MS: Western Michigan University.
- Miller, B. B., Tevesz, M. J. S., and Pranschke, F., 2000, An early Holocene oxygen isotope record from the Olson buried forest bed, southern Lake Michigan: *Journal of Paleolimnology*, v. 24, p. 271-276.
- Miller, B. B., Tevesz, M. J. S., and Smith, J. E., 1997, Post-Chippewa oxygen isotope record from Cowles Bog, southern Lake Michigan basin: *Journal of Paleolimnology*, v. 18, p. 299-305.
- Miller, D. G., and Simons, P. T., 1919, Drainage in Michigan: Michigan Geological and Biological Survey, Publication, v. 28, no. 23, p. 1-133.
- Miller, J. B., and Blumer, S. P., 1988, Flood of September 10 to 15, 1986, across the central Lower Peninsula of Michigan, National Water Summary 1986 - Hydrologic events and ground water quality, Volume 2325, p. 64-65.

- Miller, J. B., Failing, J. C., and Larson, W. W., 1987, Water Resources Data for Michigan, Water Year 1986: U.S. Geological Survey Water Data-Report, v. MI-86-1, p. 1-353.
- Miller, J. B., Oberg, J. L., and Failing, J. C., 1986, Water Resources Data for Michigan, Water Year 1985: U.S. Geological Survey Water Data-Report, v. MI-85-1, p. 1-297.
- Miller, J. B., Oberg, J. L., and Sieger, T., 1984, Water Resources Data, Michigan Water Year 1983: U.S. Geological Survey Water Data-Report, v. MI-8301, p. 1-289.
- Miller, J. B., Oberg, J. L., and Sieger, T., Jr., 1983, Water Resources Data Michigan, Water Year 1982: U.S. Geological Survey Water Data-Report, v. MI-82-1, p. 1-487.
- Miller, J. B., and Swallow, L. A., 1975, Flood of April 1975 at Lansing, Michigan: U.S. Geological Survey Open-File Report, v. 75-300, p. 1-2.
- Miller, J. B., and Thompson, T., 1970, Compilation of data for Michigan Lakes: U.S. Geological Survey Open-File Report, v. 70-227, p. 1-368.
- Miller, K. M., 1989, Application of BIOPLUME II to simulate biodegradation: A study of an aviation fuel spill from a leaking underground storage tank in Traverse City, Michigan MS: Rice University.
- Miller, N. G., and Benninghoff, W. S., 1969, Plant fossils from Cary-Port Huron Interstade deposit and their paleoecological interpretation, *in* Schumm, S. A., and Bradley, W. C., eds., United States Contributions to Quaternary Research; Papers Prepared on the Occasion of the VIII Congress of the International Association for Quaternary Research Paris, France, 1969, Volume 123: Boulder, Geological Society of America, p. 225-248.
- Miller, N. G., and Futyma, R. P., 1987, Paleohydrological implications of Holocene peatland development in northern Michigan: Quaternary Research, v. 27, no. 3, p. 297-311.
- Milstein, R. L., 1987, Sleeping Bear Dunes National Lakeshore, Michigan: Geological Society of America Centennial Field Guide, v. North-Central Section, p. 303-306.
- Minch, B. A., 1940, Geology of the basins of Lake Michigan and Lake Huron, MA: University of Wisconsin.
- Minnerick, R. J., 2001, Effects of Residential Development on the Water Quality of Higgins Lake, Michigan 1995-99: U.S. Geological Survey Water-Resources Investigations Report, v. 01-4055.
- , 2004, Michigan Lakes: An Assessment of Water Quality: U.S. Geological Survey Fact Sheet, v. 2004-3048, p. 1-4.
- Mirynch, E., 1965, Pleistocene Features of South-Central Ontario, Lake Simcoe to Moira River, *in* Terwilliger, F. W., Sheldon, F. D., Hill, J. V., and Brittain, W. D., eds., Guidebook: Geology of Central Ontario, Michigan Basin Geological Society, p. 93-97.
- Misuraca, N. A., 2003, Landscape-based path analysis of phosphorus and suspended sediment in Michigan streams, MS: University of Michigan.
- Moaddel, H., 1989, Resistivity and seismic refraction surveys applied to a groundwater investigation in Richland Township, Kalamazoo County, Michigan, MS: Western Michigan University.
- Moffett, J. L., 1980, Distribution of certain heavy metals in cores from Lake St. Clair and western Lake Erie, MS: Wayne State University, 82 p.
- Mokma, D. L., 1993, Color and Amorphous Materials in Spodosols from Michigan: Soil Science Society of America Journal, v. 57, no. 1, p. 125-138.
- Mokma, D. L., and Cremeens, D. L., 1991, Relationships of saturation and B horizon colour patterns in soils of three hydrosequences in south-central Michigan, USA: Soil Use and Management, v. 7, no. 1, p. 56-61.
- Mokma, D. L., Schaetzl, R. J., Doolittle, J. A., and Johnson, E. P., 1990, Ground-penetrating radar study of ortstein continuity in some Michigan Haplaquods: Soil Science Society of America Journal, v. 54, p. 936-938.
- Mokma, D. L., and Sprecher, S. W., 1994a, Water table depths and color patterns in soils developed from red parent materials in Michigan, USA: Catena, v. 22, no. 4, p. 287-298.

- , 1994b, Water table depths and color patterns in Spodosols of two hydrosequences in Northern Michigan, USA: *Catena*, v. 22, no. 4, p. 275-286.
- Molaroni, S., 2010, Modeling ambient air quality in the Detroit-Windsor airshed, MS: Wayne State University, 158 p.
- Monaghan, G. W., 1984, Late Wisconsinan drift stratigraphy of the Saginaw and Lake Michigan ice lobes in Southwestern Michigan, MS: Michigan State University, 123 p.
- , 1989, Systematic variation in clay-mineral composition of Wisconsin age till sheets in the Lake Michigan Basin, PhD: Michigan State University.
- , 1990, Systematic variation in the clay-mineral composition of till sheets; Evidence for the Erie Interstade in the Lake Michigan basin, *in* Schneider, A. F., and Fraser, G. S., eds., *Late Quaternary History of the Lake Michigan Basin*, Volume 251: Boulder, Geological Society of America, p. 43-50.
- Monaghan, G. W., and Larson, G. J., 1986, Late Wisconsinan drift stratigraphy of the Saginaw ice lobe in south-central Michigan: *Geological Society of America Bulletin*, v. 97, p. 324-328.
- Monaghan, G. W., Larson, G. J., and Gephart, G. D., 1986a, Late Wisconsinan drift stratigraphy of the Lake Michigan Lobe in southwestern Michigan: *Geological Society of America Bulletin*, v. 97, p. 329-334.
- Monaghan, G. W., Lovis, W. A., and Egan-Bruhy, K. C., 2006, Earliest Cucurbita from the Great Lakes, Northern USA: *Quaternary Research*, v. 65, no. 2, p. 216-222.
- Monaghan, G. W., Lovis, W. A., and Fay, L., 1986b, The Lake Nipissing transgression in the Saginaw Bay region, Michigan: *Canadian Journal of Earth Sciences*, v. 23, p. 1851-1854.
- Montgomery, W. W., 1998, Groundwater Hydraulics and Slope Stability Analysis: Elements for prediction of Shoreline Recession, PhD: Western Michigan University, 256 p.
- Moon, J. W., 1925, Soil survey of Menominee County, Michigan, p. 1-43.
- Moon, J. W., and Wildermuth, R., 1928, Soil Survey of Branch County, p. 1-40.
- Moore, J. E., 1958, Petrography of Late Wisconsin tills in the northern part of the Southern Peninsula of Michigan, MS: University of Illinois.
- , 1960, Petrography of northeastern Lake Michigan bottom sediments, PhD: University of Illinois.
- Moore, R. K., 1959, Pre-Pleistocene topography, lithology and glacial drift thickness of Livingston and Shiawassee Counties, Michigan, MS: Michigan State University, 39 p.
- Moore, S., 1948, Crustal movement in the Great Lakes area: *Geological Society of America Bulletin*, v. 59, no. 7, p. 697-710.
- , 1949, Crustal movement in the Great Lakes area: *Journal of Geology*, v. 57, no. 3, p. 312-314.
- Moore, T. C., 1999, The history and architecture of lacustrine depositional systems in the northern Lake Michigan basin: *Journal of Paleolimnology*, v. 22, no. 4, p. 475-496.
- Moore, T. C., Rea, D. K., and Godsey, H., 1998, Regional variation in modern radiocarbon ages and their hard-water effects in Lakes Michigan and Huron: *Journal of Paleolimnology*, v. 20, p. 347-351.
- Morenz, M. L., Van Til, R. L., and Luukkonen, C. L., 2005, Water Use for Irrigation in Michigan, 2001: U.S. Geological Survey Fact Sheet, v. 2005-3079, p. 1-4.
- Morse, E. W., 1970, A study of subsurface Pleistocene drift at Saginaw, Michigan MS: Wayne State University, 100 p.
- Mortenson, M. E., 1975, Granulometry and morphology of the Defiance and Fort Wayne moraines in Lenawee County and vicinity, Michigan, MS: University of Michigan, 34 p.
- Mortimer, C. H., 1988, Discoveries and testable hypotheses arising from Coastal Zone Color Scanner imagery of southern Lake Michigan: *Limnology and Oceanography*, v. 33, no. 2, p. 203-226.

- Moses, J., 1977, The subtle sinkholes of Monroe: 1977 Guidebook Alpena, Michigan: National Speleological Society, v. 2, p. 16-24.
- Moss, J. D., 2004, Quantifying the specific conductivity of contaminated groundwater using ground-penetrating radar at the former Wurtsmith Air Force Base, Oscoda, Michigan, MS: Michigan State University.
- Mozola, A. J., 1953, A survey of groundwater resources in Oakland County, Michigan, PhD: Syracuse University.
- , 1954a, The Hydrologic Units in Oakland County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 39, no. 3, p. 367-386.
- , 1954b, A survey of groundwater resources in Oakland County, Michigan: Occasional Papers on the geology of Michigan, v. 48, no. II, p. 97-348.
- , 1969, Geology for land and groundwater development in Wayne County, Michigan: Michigan Geological Survey Report of Investigation, v. 3, p. 1-25.
- , 1970, Geology for Environmental Planning in Monroe County, Michigan: Michigan Geological Survey Report of Investigation, v. 13, p. 1-34.
- , 1972, Glacial features of the Hamilton-Galt area and sub-drift topography of the Erie-Huron lowland, *in* Sanford, J. T., Martini, I. P., and Mosher, R. E., eds., Niagaran Stratigraphy: Hamilton, Ontario, Michigan Basin Geological Society, p. 27-41.
- Mudbidre, R., 2009, Distributions of PCBs in the Clinton River watershed and implications to its fate using polonium-210 and lead-210 as tracers, PhD: Oakland University.
- Mudge, E. H., 1893, Observations along the valley of Grand River, Michigan: American Geologist, v. 12, no. 5, p. 284-288.
- , 1894, Drainage systems of the Carboniferous area of Michigan: American Geologist, v. 14, no. 5, p. 301-308.
- , 1895, Central Michigan and the post-glacial submergence: American Journal of Science, v. 150, no. 30, p. 442-445.
- , 1897, Some features of pre-glacial drainage in Michigan: American Journal of Science, v. 154, no. 23, p. 383-386.
- , 1899a, Further notes on pre-glacial drainage in Michigan: American Journal of Science, v. 160, no. 56, p. 158-160.
- , 1899b, The mouth of Grand River: American Journal of Science, v. 158, no. 43, p. 31-54.
- Murphy, D. H., 1978, Carbonate deposition and facies distribution in a central Michigan marl lake MS: University of Michigan.
- Murphy, D. H., and Wilkinson, B. H., 1980, Carbonate Deposition and Facies Distribution in a Central Michigan Marl Lake: Sedimentology, v. 27, no. 2, p. 123-135.
- Murray, K. S., Heiden, J., Farkas, A., Mayfield, M., Brennan, M., and Czach, M., 1997, Heavy Metal Contamination of Bed Sediments, Rouge River, Southeast Michigan: Michigan Academician, v. 29, no. 4, p. 537-554.
- Murray, K. S., Rogers, D. T., and Kaufman, M. M., 2004, Heavy metals in an urban watershed in southeastern Michigan: Journal of Environmental Quality, v. 33, no. 1, p. 163-172.
- , 2006, Dissolved heavy metals in shallow ground water in a southeastern Michigan urban watershed: Journal of the American Water Resources Association, v. 42, no. 3, p. 777-792.
- Musselman, G. H., 1953, Ground-water resources of the Ann Arbor area, MS: University of Michigan, 21 p.
- Myers, D. N., Thomas, M. A., Frey, J. W., Rheaume, S. J., and Button, D. T., 2000, Water Quality in the Lake Erie-Lake Saint Clair Drainages, Michigan, Ohio, Indiana, New York and Pennsylvania, 1996-98: U.S. Geological Survey Circular, v. 1203, p. 1-35.
- Naeve, V. A., 1979, Postglacial environmental history of a marl lake site in Kalamazoo County, southwestern Michigan, MS: Western Michigan University.

- Nascimento, C., Atekwana, E. A., and Krishnamurthy, R. V., 1997, Concentrations and isotope ratios of dissolved inorganic carbon in denitrifying environments: *Geophysical Research Letters*, v. 24, no. 12, p. 1511-1514.
- Nash, M. S., 1997, Geophysical investigation of anomalous conductivity associated with a hydrocarbon contamination site, MS: Western Michigan University, 78 p.
- Ndenga, N. T., 2005, Seasonal variability in trace metal speciation and vertical redox stratification of freshwater lake and marsh sediments in the Kalamazoo River Watershed (MI, USA), MS: Western Michigan University, 182 p.
- Necpalova, M., Anex, R. P., Kravchenko, A. N., Abendroth, L. J., Del Grosso, S. J., Dick, W. A., Helmers, M. J., Herzmann, D., Lauer, J. G., Nafziger, E. D., Sawyer, J. E., Scharf, P. C., Strock, J. S., and Villamil, M. B., 2014, What does it take to detect a change in soil carbon stock? A regional comparison of minimum detectable difference and experiment duration in the north central United States: *Journal of Soil and Water Conservation*, v. 69, no. 6, p. 517-531.
- Neff, B. P., Day, S. M., Piggot, A. R., and Fuller, L. M., 2005a, Base Flow in the Great Lakes Basin: U.S. Geological Survey Scientific Investigations Report, v. 2005-5217, p. 1-23.
- Neff, B. P., and Nicholas, J. R., 2005, Uncertainty in the Great Lakes Water Balance: U.S. Geological Survey Scientific Investigations Report, v. 2004-5100, p. 1-42.
- Neff, B. P., Piggot, A. R., and Sheets, R. A., 2005b, Estimation of shallow ground-water recharge in the Great Lakes Basin: U.S. Geological Survey Scientific Investigations Report, v. 2005-5284, p. 1-20.
- Neff, B. P., Weaver, T. L., and Wydra, D. G., 2005c, Changes in Streamflow Patterns Related to Hydrologic Restoration of a Sedge Fen Wetland in Seney National Wildlife Refuge, Michigan, 1998-2004: U.S. Geological Survey Scientific Investigations Report, v. 2005-5137, p. 1-20.
- Nejathashemi, A. P., Wardynski, B. J., and Munoz, J. D., 2012, Large-scale hydrologic modeling of the Michigan and Wisconsin agricultural regions to study impacts of land use changes: *Transactions of the ASABE*, v. 55, no. 3, p. 821-838.
- Nelson, J., Licht, K., Yansa, C., and Filippelli, G., 2010, Climate-related cyclic deposition of carbonate and organic matter in Holocene lacustrine sediment, Lower Michigan, USA: *Journal of Paleolimnology*, v. 44, no. 1, p. 1-13.
- Newberry, J. S., 1882, On the origin and drainage of the basins of the Great Lakes: *Proceedings of the American Philosophical Society*, v. 20, no. III, p. 91-95.
- Newcombe, R. J. B., and Lindberg, G. D., 1935, Glacial expression of structural features in Michigan, preliminary study: *American Association of Petroleum Geologists Bulletin*, v. 19, no. 8, p. 1173-1191.
- Ni, X., 2014, An integrated groundwater recharge and flow model to predict base flow, MS: Michigan State University.
- Nicholas, J. R., Blumer, S. P., and McGowan, R. M., 2002, Comparison of Hydrologic Data from Monroe County, Michigan, 1991-2001: U.S. Geological Survey Open-File Report, v. 01-498.
- Nicholas, J. R., Rowe, G. L., and Brannen, J. R., 1996, Hydrology, Water Quality, and Effects of Drought in Monroe County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4161, p. 1-169.
- Nichols, L., II, 1973, Michigan's Planning System, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 113-120.
- Nichols, R., and Helmer, J., 1974, An analysis of the exposed geologic features of Littlefield township, Emmet County, Michigan.
- Nicks, L. P., 2004, Glacial Geology of southern St. Joseph County, Michigan, PhD: Western Michigan University.

- Nielsen, E. R., 1973, Sedimentological study of the bottom sediments of Southern Portage Lake, MS: Michigan Technological University.
- Niu, J., Shen, C. P., Li, S. G., and Phanikumar, M. S., 2014, Quantifying storage changes in regional Great Lakes watersheds using a coupled subsurface-land surface process model and GRACE, MODIS products: *Water Resources Research*, v. 50, no. 9, p. 7359-7377.
- Noecker, M., and Wiitala, S. W., 1948, Flood of August 1942 in the Ontonagon River basin, Michigan: U.S. Geological Survey Open-File Report, p. 1-29.
- Nold, S. C., Bellecourt, M. J., Kendall, S. T., Ruberg, S. A., Sanders, T. G., Klump, J. V., and Biddanda, B. A., 2013, Underwater sinkhole sediments sequester Lake Huron's carbon: *Biogeochemistry*, v. 115, no. 1, p. 235-250.
- Nordeng, S. C., 1975, Glacial overburden study in the northern part of Michigan's Upper Peninsula, MS: Michigan Technological University, 79 p.
- Norman, S. A., Schaeztl, R. J., and Small, T. W., 1995, Effects of slope angle on mass movement by tree uprooting: *Geomorphology*, v. 14, no. 1, p. 19-27.
- Norman, W. R., 1982, Nitrate levels in the groundwater of Kalamazoo County, Michigan, MS: Western Michigan University.
- Normani, S. D., and Sykes, J. F., 2012, Paleohydrogeologic simulations of Laurentide ice-sheet history on groundwater at the eastern flank of the Michigan Basin: *Geofluids*, v. 12, no. 1, p. 97-122.
- Norris, S. E., 1978, Hydrologic Environment of the Silurian Salt Deposits in Parts of Michigan, Ohio, and New York: US Department of Energy.
- Norton, R. K., Meadows, G. A., and Meadows, L. A., 2013, The deceptively complicated "elevation ordinary high water mark" and the problem with using it on a Laurentian Great Lakes shore: *Journal of Great Lakes Research*, v. 39, no. 4, p. 527-535.
- Nowlin, J. O., 1971, Gazetteer of hydrologic data for the Clinton River Basin, southeastern Michigan water resources study: U.S. Army Corps of Engineers, Detroit District, Technical Paper, v. 5, p. 1-157.
- , 1973, Water Resources of the Clinton River basin, southeastern Michigan: U.S. Geological Survey Hydrologic Investigations Atlas, v. HA-469, p. 1-36.
- Nwachukwu, S. O. O., 1964, The geologic significance of geomagnetic measurements over the Lake Huron basin and adjacent areas, PhD: University of Toronto.
- O'Gorman, J. A., and Lovis, W. A., 2006, Before Removal: An Archaeological Perspective on the Southern Lake Michigan Basin: *Midcontinental Journal of Archaeology*, v. 31, no. 1, p. 21-56.
- Obeginski, D., and Boesenecker, P. W., 1973, Survey of chloride concentrations in water wells Flushing Township (T. 8 N. R. 5 E.) Genesee County, State of Michigan: Genesee County Health Department, p. 1-22.
- Obiadzaie, A. C., 2011, Application of geophysical methods to locate buried tunnel channels beneath the Glacial drift deposits in Texas Township, Kalamazoo County, MI, PhD: Western Michigan University, 82 p.
- Odegaard, C., 2001, Stratigraphy of the mid-Holocene black bands in Lakes Michigan and Huron: Evidence for possible basin-wide anoxia, MS: University of Michigan.
- Odegaard, C., Rea, D. K., and Moore, T. C., 2003, Stratigraphy of the mid-Holocene black bands in Lakes Michigan and Huron: Evidence for possible basin-wide anoxia: *Journal of Paleolimnology*, v. 29, p. 221-234.
- Ohio Drilling Company, 1971, Report on the aquifer test of the Atwater Well Field, Kalamazoo, Michigan, p. 1-34.
- , 1973, Aquifer test of Lake Campbell Well Field, Kalamazoo, p. 1-33.
- , 1974, Evaluation of long-term ground water supply for the Metropolitan Kalamazoo Area, p. 1-85.

- Olcott, P. G., 1992, Ground Water Atlas of the United States: Segment 9, Iowa, Michigan, Minnesota, Wisconsin, 730J.
- Olivarez, A. M., Owen, R. M., and Long, D. T., 1989, Geochemistry of Rare Earth Elements in Benthic Layer Particulate Matter and Sediments of Lake Superior: *Journal of Great Lakes Research*, v. 15, no. 1, p. 59-67.
- Olson, F. C. W., 1950, The currents of western Lake Erie, PhD: Ohio State University.
- Orr, B., 1997, Land Use Change on Michigan's Lake Superior Shoreline: Integrating Land Tenure and Land Cover Type Data: *Journal of Great Lakes Research*, v. 23, no. 3, p. 328-338.
- Ostrander, A. G., 1978, Cheboygan County bedrock topography.
- Osvold, H., 1935, A bog at Hartford, Michigan: *Ecology*, v. 16, no. 3, p. 520-528.
- Owens, K. E., Reed, D. D., Londo, A. J., Maclean, A. L., and Mroz, G. D., 1999, A landscape level comparison of pre-European settlement and current soil carbon content of a forested landscape in upper Michigan: *Forest Ecology and Management*, v. 113, no. 2-3, p. 179-189.
- Padley, E. A., 1989, Associations among glacial landforms, soils, and vegetation in northeastern Lower Michigan, PhD: Michigan State University.
- Padley, E. A., Bartelli, L. J., and Trettin, C. C., 1985, Spodic horizon criteria applied to soils of northern Michigan: *Soil Science Society of America Journal*, v. 49, no. 2, p. 401-405.
- Paesalu, M., 2011, Tracing the source of groundwater for three different coastal peatlands along Lake Superior, MS: Michigan Technological University.
- Palmer, M. M., Forrester, J. A., Rothstein, D. E., and Mladenoff, D. J., 2014, Conversion of open lands to short-rotation woody biomass crops: site variability affects nitrogen cycling and N₂O fluxes in the US Northern Lake States: *Global Change Biology Bioenergy*, v. 6, no. 4, p. 450-464.
- Panyushkina, I. P., Leavitt, S. W., Thompson, T. A., Schneider, A. F., and Lange, T., 2008, Environment and paleoecology of a 12 ka mid-North American Younger Dryas forest chronicled in tree rings: *Quaternary Research*, v. 70, p. 433-441.
- Papp, R. J., 1986, Reconstructing the late glacial and post-glacial history of northwestern Cheboygan County, Michigan.
- Pare, P., 1995, A study on the causes of variations in transmissivity and storativity during pump tests at Asylum Lake, MA: Western Michigan University.
- Parette, R., McCrindle, R., McMahon, K. S., Pena-Abaurrea, M., Reiner, E., Chittim, B., Riddell, N., Voss, G., Dorman, F. L., and Pearson, W. N., 2015, Halogenated indigo dyes: A likely source of 1,3,6,8-tetrabromocarbazole and some other halogenated carbazoles in the environment: *Chemosphere*, v. 127, p. 18-26.
- Parker, J., 1964, Sublacustrine topography of Eastern Lake Superior, MS: Michigan Technological University.
- Parkins, A. E., 1911, Valley filling by intermittent streams: *Journal of Geology*, v. 19, no. 3, p. 217-222.
- Parsons, M. J., 2011, Sources and pathways for Mercury to Michigan's inland lakes, PhD: Michigan State University, 221 p.
- Parsons, M. J., Long, D. T., and Yohn, S. S., 2010, Assessing the natural recovery of a lake contaminated with Hg using estimated recovery rates determined by sediment chronologies: *Applied Geochemistry*, v. 25, no. 11, p. 1676-1687.
- Patrick, J. L., 1955, The effects of Lake Superior shore currents on recent sediments, MS: Michigan State University.
- Pepper, J. F., 1925, Some features in the occurrence of marl noted during the field season of 1925 MS: University of Michigan.
- Perkins, S. O., and Tyson, J., 1922, Soil Survey of Kalamazoo County, Michigan.
- Perkis, W. E., 1997, Soil Survey of Hillsdale County, Michigan.

- , 2004, Soil Survey of Otsego County, Michigan.
- , 2010, Soil Survey of Gogebic County, Michigan.
- Perry, S. H., 1939, The Seneca Township meteorite: *Popular Astronomy*, v. 47, no. 4, p. 183-193.
- Person, M., McIntosh, J., Bense, V., and Remenda, V. H., 2007, Pleistocene hydrology of North America: The role of ice sheets in reorganizing groundwater flow systems: *Reviews of Geophysics*, v. 45, no. 3, p. RG3007.
- Peterman, J. F., 1978, Artesian recharge areas of the eastern Upper Peninsula: Eastern Upper Peninsula Regional Planning and Development Commission, p. 1-23.
- Peters, B. C., 1973, Changing Ideas About The Use Of Vegetation As An Indicator Of Soil Quality: Example Of New York And Michigan: *Journal of Geography*, v. 72, no. 2, p. 18-28.
- Peters, C. A., Robertson, D. M., Saad, D. A., Sullivan, D. J., Scudder, B. C., Fitzpatrick, F. A., Richards, K. D., Stewart, J. S., Fitzgerald, S. A., and Lenz, B. N., 1998, Water Quality in the Western Lake Michigan Drainages, Wisconsin and Michigan: U.S. Geological Survey Circular, v. 1156, p. 1-40.
- Peterson, C. J., and Dersch, E. A., 1981, A guide to sand dune and coastal ecosystem functional relationships: Michigan State University Extension Bulletin, v. E-1529, p. 1-18.
- Peterson, W. L., 1982, Preliminary surficial geologic map of the Iron River 1° x 2° quadrangle, Michigan and Wisconsin: U.S. Geological Survey Open-File Report, v. 82-301.
- Pettijohn, F. J., 1931, Petrography of the beach sands of southern Lake Michigan: *Journal of Geology*, v. 39, no. 5, p. 432-455.
- Petty, W. H., Delcourt, P. A., and Hazel, R., 1996, Holocene lake-level fluctuations and beach-ridge development along the northern shore of Lake Michigan, USA: *Journal of Paleolimnology*, v. 15, no. 2, p. 147-169.
- Peverly, A. A., Salamova, A., and Hites, R. A., 2014, Air is Still Contaminated 40 Years after the Michigan Chemical Plant Disaster in St. Louis, Michigan: *Environmental Science & Technology*, v. 48, no. 19, p. 11154-11160.
- Pfeiffer, E. L., and Rossmann, R., 2010, Lead in Lake Michigan and Green Bay surficial sediments: *Journal of Great Lakes Research*, v. 36, no. 1, p. 20-27.
- Phillips, B. A. M., 1993, A time-space model for the distribution of shoreline archaeological sites in the lake superior basin: *Geoarchaeology*, v. 8, no. 2, p. 87-107.
- Phillips, W. S., Pearson, D. C., Edwards, C. L., and Stump, B. W., 1997, Microseismicity induced by a controlled, mine collapse at White Pine, Michigan: *International Journal of Rock Mechanics and Mining Sciences*, v. 34, no. 3-4, p. 246.e241-246.e214.
- Phinney, H. K., 1946, A peculiar lake sediment of algal origin: *American Midland Naturalist*, v. 35, no. 2, p. 453-459.
- Pierce, D. M., 1973, Hydro-geological evaluations essential to effective land disposal of wastewaters, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 52-53.
- Pierce, J., 1825, Notice of the peninsula of Michigan, in relation to its topography, scenery, agriculture, population, resources, etc.: *American Journal of Science*, v. 10, p. 304-319.
- Piggot, A. R., and Neff, B. P., 2005, Calculation of Streamflow Statistics for Ontario and the Great Lakes States: U.S. Geological Survey Open-File Report, v. 2005-1295, p. 1-12.
- Pilant, A. N., 1996, Satellite and ground passive microwave remote sensing studies of ice and snow on and near Lake Superior, PhD: Michigan Technological University.
- Plato, P. A., and Jacobson, A. P., 1976, Cesium-137 in Lake Michigan sediments: Areal distribution and correlation with other man-made materials." *Environmental Pollution: Environmental Pollution*, v. 10, no. 1, p. 19-34.
- Plattner, S., Mason, D. M., Leshkevich, G. A., Schwab, D. J., and Rutherford, E. S., 2006, Classifying and Forecasting Coastal Upwellings in Lake Michigan Using Satellite Derived

- Temperature Images and Buoy Data: *Journal of Great Lakes Research*, v. 32, no. 1, p. 63-76.
- Pogoncheff, N. C., 1982, The effects of precipitation on the quality of ground water and leachate seeps at a stabilizing landfill, MS: Western Michigan University.
- Poindexter, O. F., 1931, The non-metallic mineral resources of Michigan: Pit and Quarry, v. 22, no. 11, p. 27-32, 34.
- , 1933, Geology of Schoolcraft County: Michigan Geological Survey Division, Unpublished Manuscript, p. 1-70.
- , 1935, A Study of Underground Waters Bearing on the Source of "Big Spring," Schoolcraft County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 20, p. 477-483.
- , 1936a, Geology of Schoolcraft County: Michigan Geological Survey Open File Report, v. 79.
- , 1936b, Sinkholes in the Indian Lake Region, Schoolcraft County, and Other Michigan Sinks: Papers of the Michigan Academy of Science, Arts and Letters, v. 21, p. 439-444.
- , 1940a, Ground water table at 5-year low: Michigan Conservation, v. 9, no. 8.
- , 1940b, Michigan's highlands - a geologist looks at a relief map: Michigan Conservation, v. 9, no. 4.
- , 1943, Water is a vital resource: Michigan Conservation, v. 12, no. 2.
- Pollock, J. P., Schillinger, A. W., and Bur, T., 1960, A geochemical anomaly associated with a glacially transported boulder train, Mt. Bohemia, Keweenaw County, Michigan, 21st International Geological Congress, Volume 21, p. 20-27.
- Pollyea, A. M., 2013, Spatial and temporal trends of soil moisture in the Great Lakes region of the USA, 1900-2008, MS: Michigan State University.
- Pompeani, D. P., Abbott, M. B., Bain, D. J., DePasqual, S., and Finkenbinder, M. S., 2014, Copper mining on Isle Royale 6500–5400 years ago identified using sediment geochemistry from McCargoe Cove, Lake Superior: Holocene, v. 25, n. 2, p. 253-262.
- Poprik, L. A., 1968, Sedimentation in the St. Clair River Delta, Muscamoot Bay area, Michigan, MS: Wayne State University, 93 p.
- Potzger, J. E., 1942, Pollen spectra from four bogs on the Gillen Nature Reserve, along the Michigan-Wisconsin state line: *American Midland Naturalist*, v. 28, no. 2, p. 501-511.
- , 1946, Phytosociology of the primeval forest in central-northern Wisconsin and upper Michigan, and a brief post-glacial history of the lake forest formation: *Ecological Monograph*, v. 16, no. 3, p. 211-250.
- , 1948, A pollen study in the tension zone of lower Michigan: *Bulter University Botanical Studies*, v. 8, no. 14, p. 161-177.
- Potzger, J. E., and Wilson, I. T., 1941, Post-Pleistocene forest migration as indicated by sediments from three deep inland lakes: *American Midland Naturalist*, v. 25, no. 2, p. 270-289.
- Powers, W. E., 1958, Geomorphology of the Lake Michigan Shoreline: Michigan Geological Survey Open File Report, v. 71.
- Pregitzer, K. S., 1968, Soil Survey of Muskegon County, Michigan, p. 1-88.
- , 1972, Soil Survey of Ottawa County, Michigan, p. 1-137.
- , 1978, Soil Survey of Clinton County, Michigan, p. 1-86.
- Pregitzer, K. S., Barnes, B. V., and Lemme, G. D., 1983, Relationship of Topography to Soils and Vegetation in an Upper Michigan Ecosystem: *Soil Science Society of America Journal*, v. 47, no. 1, p. 117-123.
- Preston, H. L., 1903a, Reed City meteorite: *Rochester Academy of Science Proceedings*, v. 4, p. 89-91.
- , 1903b, Reed City meteorite: *Journal of Geology*, v. 11, no. 2, p. 230-233.

- Previant, W. J., and Nagel, L. M., 2014, Forest Diversity and Structure Surrounding Vernal Pools in Pictured Rocks National Lakeshore, Michigan, USA: *Wetlands*, v. 34, no. 6, p. 1073-1083.
- Price, J. R., 1994, Geochemical mass balance models of sandstone weathering in the Pennsylvanian recharge beds of south-central Michigan, MS: Michigan State University, 109 p.
- Prosen, B. J., 1988, Natural brine contamination of groundwater in the western Upper Peninsula, Michigan, MS: Michigan Technological University.
- Prouty, C. E., 1983, The Tectonic Development of the Michigan Basin Infrastructures, in *Tectonics, Structure and Karst in Northern Lower Michigan*, in Black, T. J., and Kimmel, R. E., eds., p. 36-81.
- Prouty, C. E., Cline, L. M., Hough, J. L., and Black, R. F., 1960, Lower Paleozoic and Pleistocene Stratigraphy Across Central Wisconsin, Michigan Basin Geological Society, Michigan Basin Geological Society Annual Field Excursion, 34 p.:
- Purkey, T. H., 1986, Soil Survey of Kent County, Michigan.
- , 1995, Soil Survey of Newaygo County, Michigan.
- , 2002, Soil Survey of Montmorency County, Michigan.
- Putnam, D. F., 1955, The surface features of Peninsular Ontario, in Mozola, A. J., ed., *The Niagara Escarpment of Peninsular Ontario, Canada*, Michigan Geological Survey and Michigan Geological Society, p. 45-49.
- Quinn, F. H., 1977, Annual and seasonal flow variations through the Straits of Mackinac: *Water Resources Research*, v. 13, no. 1, p. 137-144.
- , 1981, Secular changes in annual and seasonal Great Lakes precipitation, 1854–1979, and their implications for Great Lakes water resource studies: *Water Resources Research*, v. 17, no. 6, p. 1619-1624.
- , 1992, Hydraulic Residence Times for the Laurentian Great Lakes: *Journal of Great Lakes Research*, v. 18, no. 1, p. 22-28.
- Quinn, F. H., Derecki, J. A., and Sellinger, C. E., 1993, Pre-1900 St. Clair River Flow Regime: *Journal of Great Lakes Research*, v. 19, no. 4, p. 660-664.
- Quinn, F. H., and Sellinger, C. E., 1990, Lake Michigan Record Levels of 1838, a Present Perspective: *Journal of Great Lakes Research*, v. 16, no. 1, p. 133-138.
- , 2006, A Reconstruction of Lake Michigan–Huron Water Levels Derived from Tree Ring Chronologies for the Period 1600–1961: *Journal of Great Lakes Research*, v. 32, no. 1, p. 29-39.
- Rachdawong, P., Christensen, E. R., and Karls, J. F., 1998, Historical PAH fluxes to Lake Michigan sediments determined by factor analysis: *Water Research*, v. 32, no. 8, p. 2422-2430.
- Rachol, C. M., and Boley-Morse, K. L., 2009, Estimated bankfull discharge for selected Michigan rivers and regional hydraulic geometry curves for estimating bankfull characteristics in southern Michigan rivers: U.S. Geological Survey Scientific Investigations Report, v. 2009-5133, p. 1-300.
- Rachol, C. M., and Button, D. T., 2006, Areal Distribution and Concentration of Contaminants of Concern in Surficial Streambed and Lakebed Sediments, Lake St. Clair and Tributaries, Michigan, 1999–2003: U.S. Geological Survey Scientific Investigations Report, v. 2006-5189, p. 1-50.
- Rachol, C. M., Fitzpatrick, F. A., and Rossi, T., 2005, Historical and Simulated Changes in Channel Characteristics of the Kalamazoo River, Plainwell to Otesgo, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2005-5044, p. 1-67.
- Radfar, S., 1979, Determination of recharge areas from ground-water quality data, Ingham County, Michigan, MS: Michigan State University.

- Rakestraw, L., 1965, Historic mining on Isle Royale, *in* Huber, N. K., ed., The Geologic story of Isle Royale National Park, Volume 1309, U.S. Geological Survey, p. 1-66.
- Rasmussen, T., Fraser, R., Lemberg, D. S., and Regis, R., 2002, Mapping Stamp Sand Dynamics: Gay, Michigan: Journal of Great Lakes Research, v. 28, no. 2, p. 276-284.
- Ravenscroft, P., and McArthur, J. M., 2004, Mechanism of regional enrichment of groundwater by boron: the examples of Bangladesh and Michigan, USA: Applied Geochemistry, v. 19, p. 1413-1430.
- Rawling, J. E., III, and Hanson, P. R., 2014, Dune formation on late Holocene sandy bay barriers along Lake Michigan's Door Peninsula: The importance of increased sediment supply following the Nipissing and Algoma high lake-level phases, *in* Fisher, T. G., and Hansen, E. C., eds., Coastline and Dune Evolution along the Great Lakes, Volume 508: Boulder, Geological Society of America, p. 65-84.
- Raymond, R. E., Kapp, R. O., and Janke, R. A., 1975, Postglacial and Recent Sediments of Inland Lakes of Isle Royale National Park, Michigan: Michigan Academician, v. 7, no. 4, p. 453-465.
- Rea, D. K., 1977, A walking tour of Mackinac Island: 1977 Guidebook Alpena, Michigan: National Speleological Society, v. 2, p. 43-46.
- Rea, D. K., and Colman, S. M., 1995, Radiocarbon ages of pre-bomb clams and the hard-water effect in Lakes Michigan and Huron: Journal of Paleolimnology, v. 14, no. 1, p. 89-91.
- Rea, D. K., Moore Jr, T. C., Lewis, C. F. M., Mayer, L. A., Dettman, D. L., Smith, A. J., and Dobson, D. M., 1994, Stratigraphy and paleolimnologic record of lower Holocene sediments in northern Lake Huron and Georgian Bay: Canadian Journal of Earth Sciences, v. 31, no. 11, p. 1586-1605.
- Rea, D. K., Owen, R. M., and Meyers, P. A., 1981, Sedimentary processes in the Great Lakes: Reviews of Geophysics, v. 19, no. 4, p. 635-648.
- Rech, J. A., Nekola, J. C., and Pigati, J. S., 2012, Radiocarbon ages of terrestrial gastropods extend duration of ice-free conditions at the Two Creeks forest bed, Wisconsin, USA: Quaternary Research, v. 77, no. 2, p. 289-292.
- Redmond, C. E., and Engberg, C. A., 1967, Soil Survey of Arenac County, Michigan, p. 1-141.
- Reed, J. E., Deutsch, M., and Wiitala, S. W., 1966, Induced recharge of an artesian glacial drift aquifer at Kalamazoo, Michigan: U.S. Geological Survey Water-Supply Paper, v. 1594-D, p. 1-62.
- Reeves, H. W., Hamilton, D. A., Seelbach, P. W., and Asher, A. J., 2009, Ground-water-withdrawal component of the Michigan water-withdrawal screening tool: U.S. Geological Survey Scientific Investigations Report, v. 2009-5003, p. 1-36.
- Reeves, H. W., Wright, K. V., and Nicholas, J. R., 2004, Hydrogeology and Simulation of Regional Ground-Water-Level Declines in Monroe County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 03-4312, p. 1-72.
- Regis, R. S., 1997, Late Pleistocene glacial history of Central Marquette and Northern Dickinson Counties, Michigan, PhD: Michigan Technological University.
- Reid, J. R., Jr., 1957, Geology of Burt Lake, Cheboygan County, Michigan, MS: University of Michigan.
- Reinking, R. L., and Gephart, G. D., 1978, Pattern of revegetation of a Shoreline Dune Area, Allegan County, Michigan: Michigan Academician, v. 11, no. 2, p. 147-155.
- Reuss, R. J., 1962, An investigation of the use of seismic methods to track meteorological disturbances over Lake Superior and to locate strain releases taking place in the Houghton-Hancock areas, MS: Michigan College of Mining and Technology.
- Rezek, S. E., 1991, The effects of urbanization on a portion of the Portage Creek watershed: A case study on surface water and groundwater quality, MS: Western Michigan University.
- Rheume, S. J., 1990, Geohydrology and Water Quality of Kalamazoo County, Michigan, 1986-1988.

- , 1991, Hydrologic provinces of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 91-4120, p. 1-73.
- Rheaume, S. J., Hubbell, D. L., Rachol, C. M., Simard, A., and Fuller, L. M., 2004, Sediment Characteristics and Configuration within the Otsego City Dam Impoundment on the Kalamazoo River, Michigan, 2001-02: U.S. Geological Survey Water-Resources Investigations Report, v. 03-4218.
- Rheaume, S. J., Neff, B. P., and Blumer, S. P., 2007, Cooperative Water-Resources Monitoring in the St. Clair River/Lake St. Clair Basin, Michigan: U.S. Geological Survey Open-File Report, v. 2007-1148.
- Rheaume, S. J., Rachol, C. M., Hubbell, D. L., and Simard, A., 2002, Sediment Characteristics and Configuration within Three Dam Impoundments on the Kalamazoo River, Michigan, 2000: U.S. Geological Survey Water-Resources Investigations Report, v. 02-4098.
- Rhoads, B. L., 1982, Interrelationships between glacially buried organic matter, the bedrock surface, and the present topography in south-central Michigan: a case for multiple paleosurfaces, MA: Michigan State University, 89 p.
- Rhoads, B. L., Rieck, R. L., and Winters, H. A., 1984, Trend surface analysis of glacially buried Pleistocene organic deposits in central Michigan: *The Professional Geographer*, v. 36, no. 1, p. 64-73.
- Rhodehamel, E. C., 1951, An interpretation of the pre-Pleistocene geomorphology of a portion of the Saginaw lowland, MS: Michigan State University, 163 p.
- Rice, T., D., and Geib, W. J., 1904, Soil Survey of the Munising Area, Michigan.
- Richards, K. D., Sullivan, D. J., and Steward, J. S., 1997, Surface-Water Quality at Fixed Sites in the Western Lake Michigan Drainages, Wisconsin and Michigan, and the Effects of Natural and Human Factors, 1993-95: U.S. Geological Survey Water-Resources Investigations Report, v. 97-4208.
- Richards, P. L., and Brenner, A. J., 2004, Delineating Source Areas for Runoff in Depressional Landscapes: Implications for Hydrologic Modeling: *Journal of Great Lakes Research*, v. 30, no. 1, p. 9-21.
- Richardson, W. D., 1919, The singing sands of Lake Michigan: *Science*, v. 50, no. 1300, p. 493-495.
- Rieck, R. L., 1976, The glacial geomorphology of an interlobate area in southeast Michigan, relationships between landforms, and bedrock, PhD: Michigan State University, 216 p.
- , 1979, Ice Stagnation and Paleodrainage In and Near an Interlobate Area: *Michigan Academician*, v. 11, no. 3, p. 219-235.
- Rieck, R. L., Klasner, J. S., Winters, H. A., and Marlette, P. A., 1991, Glaciotectonic effects on a Middle-Wisconsin boreal fenland peat in Michigan, USA: *Boreas*, v. 20, p. 155-167.
- Rieck, R. L., and Winters, 1976, The bedrock surface and its relationship to hydrography and buried organic and oxidized deposits: *Michigan Academician*, v. 9, p. 97-108.
- Rieck, R. L., and Winters, H. A., 1979, Lake, stream, and bedrock in south central Michigan: *Annals of the Association of American Geographers*, v. 69, no. 2, p. 276-288.
- Rieck, R. L., and Winters, H. A., 1980, Distribution and Significance of Glacially Buried Organic Matter in Michigan's Southern Peninsula: *Physical Geography*, v. 1, no. 1, p. 74-89.
- Rieck, R. L., and Winters, H. A., 1982a, Characteristics of a Glacially Buried Cuesta in Southeast Michigan: *Annals of the Association of American Geographers*, v. 72, p. 482-494.
- , 1982b, Low-altitude organic deposits in Michigan - evidence for pre-Woodfordian Great Lakes and paleosurfaces: *Geological Society of America Bulletin*, v. 93, no. 8, p. 726-734.
- , 1991, Paleotopography and Present Terrain in Southwestern Michigan: *Michigan Academician*, v. 23, no. 3, p. 241-256.
- , 1993, Drift volume in the southern peninsula of Michigan—A prodigious Pleistocene endowment: *Physical Geography*, v. 14, p. 478-493.

- Rieck, R. L., Winters, H. A., Mokma, D. L., and Mortland, M. M., 1979, Differentiation of surficial glacial drift in southeastern Michigan from $^{7-Å}/^{10-Å}$ X-ray diffraction ratios of clays: Geological Society of America Bulletin, v. 90, p. 216-220.
- Ries, H., 1900, Clays and shales of Michigan: their properties and uses: Michigan Geological Survey, v. 8, no. 1, p. 1-67.
- Ries, H., and Rosen, J. A., 1908, Foundry Sands, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1907, being the report of Alfred C. Lane, State Geologist.
- Riggs, R. B., 1885, The Grand Rapids meteorite: American Journal of Science, v. 130, no. 178, p. 312-312.
- Rindfleisch, P. R., 1999, Lithologic discontinuities and multiple parent materials in some soils of the Northport Drumlin Field, Michigan, MA: Michigan State University, 275 p.
- Rindfleisch, P. R., and Schaetzl, R. J., 2001, Soils and geomorphic evidence for a high lake stand in a Michigan drumlin field: Physical Geography, v. 22, no. 6, p. 483-501.
- Ritter, M. H., 1980, The use of tritium for confirming areas of groundwater recharge, Meridian Township, Michigan, MS: Michigan State University, 144 p.
- Robbins, J. A., and Edgington, D. N., 1975, Determination of recent sedimentation rates in Lake Michigan using Pb-210 and Cs-137: Geochimica et Cosmochimica Acta, v. 39, no. 3, p. 285-304.
- Robbins, J. A., Krezoski, J. R., and Mozley, S. C., 1977, Radioactivity in sediments of the Great Lakes: Post-depositional redistribution by deposit-feeding organisms: Earth and Planetary Science Letters, v. 36, no. 2, p. 325-333.
- Roberts, M. R., and Gilliam, F. S., 1995, Disturbance effects on herbaceous layer vegetation and soil nutrients in Populus forests of northern lower Michigan: Journal of Vegetation Science, v. 6, p. 903-912.
- Robertson, D. M., 1997, Regionalized Loads of Sediment and Phosphorus to Lakes Michigan and Superior—High Flow and Long-term Average: Journal of Great Lakes Research, v. 23, no. 4, p. 416-439.
- , 1998, Evaluation of the Surface-Water Sampling Design in the Western Lake Michigan Drainages in Relation to Environmental Factors Affecting Water Quality at Base Flow U.S. Geological Survey Water-Resources Investigations Report, v. 98-4072.
- Robertson, D. M., and Saad, D. A., 2011, Nutrient Inputs to the Laurentian Great Lakes by Source and Watershed Estimated Using SPARROW Watershed Models: JAWRA Journal of the American Water Resources Association, v. 47, no. 5, p. 1011-1033.
- Robertson, L. S., Knezek, B. D., and Belo, J. O., 1975, A survey of Michigan soils as related to possible boron toxicities: Communications in Soil Science and Plant Analysis, v. 6, no. 4, p. 359-373.
- Robinson, A. M., 2014, Spatial and temporal trends of polycyclic aromatic hydrocarbon loadings to inland lakes in Michigan, MS: Michigan State University, 70 p.
- Rogers, J. R., 1959, Deep water sediments of northwestern Lake Huron, MS: University of Illinois.
- Rogers, R. F., and Smith, W. G., 1919, Soil Survey of Calhoun County, Michigan.
- Rominger, C. L., 1862, Description of Calamopora found in the gravel deposits near Ann Arbor, Michigan, with some introductory remarks: American Journal of Science, v. 84, no. 102, p. 389-400.
- Rose, H., 1952, Tidal gravity measurements at Ann Arbor, Michigan, MS: University of Michigan.
- Ross, A. R., 1950, Pleistocene and Recent sediments in western Lake Erie, PhD: University of Michigan.
- Rossmann, R., 2002, Lake Michigan 1994–1996 Surficial Sediment Mercury: Journal of Great Lakes Research, v. 28, no. 1, p. 65-76.

- Rossmann, R., Pfeiffer, E. L., and Filkins, J. C., 2014, Lake Michigan sediment lead storage and history of loads: *Journal of Great Lakes Research*, v. 40, no. 4, p. 851-858.
- Roth, E. A., 1992, The geochemical evolution of groundwater and surface water in a small glaciated basin involving effluents from iron mining : hydrologic and geochemical constraints, MS: Michigan State University, 123 p.
- Rothstein, D. E., Yermakov, Z. Y., and Buell, A. L., 2004, Loss and recovery of ecosystem carbon pools following stand-replacing wildfire in Michigan jack pine forests: *Canadian Journal of Forest Research*, v. 34, no. 9, p. 1908-1918.
- Rovey, C. W., and Borucki, M. K., 1994, Bluff evolution and long term recession rates, southwestern Lake Michigan: *Environmental Geology*, v. 23, p. 256-263.
- , 1995, Subglacial to Proglacial Sediment Transition in a Shallow Ice-Contact Lake: *Boreas*, v. 24, p. 117-127.
- Rowell, D. J., and Brunton, F. R., 2012, 22. Project Unit 12-012. The St. Edmund Formation— The Next Major Bedrock-Derived Aggregate Source in Ontario?: Ontario Geological Survey Open File Report, v. 6280, p. 22-21 to 22-11.
- Rubin, M., 1956, A radiocarbon chronology of glacial events during Wisconsin time, PhD: University of Chicago.
- Rudder, J., 1988, The significance of organic complexing in the mobility of iron in the KL landfill leachate plume, Kalamazoo, Michigan, MS: Western Michigan University, 69 p.
- Runkel, A. C., Tipping, R. G., Alexander, E. C., and Alexander, S. C., 2006, Hydrostratigraphic characterization of intergranular and secondary porosity in part of the Cambrian sandstone aquifer system of the cratonic interior of North America: Improving predictability of hydrogeologic properties: *Sedimentary Geology*, v. 184, no. 3-4, p. 281-304.
- Russell, I. C., 1905a, Drumlin Areas in Northern Michigan: Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 36-37.
- , 1905b, A geological reconnaissance along the north shores of lakes Huron and Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1904, being the report of Alfred C. Lane, State Geologist.
- , 1905c, The influence of caverns on topography: *Science*, v. 21, p. 30-32.
- Russell, I. C., and Leverett, F., 1908, Description of the Ann Arbor quadrangle: U.S. Geological Survey Atlas folio, v. 155, p. 1-15.
- Ryner, P. C., 1973, Changing Patterns of Shoreland Use, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 197-203.
- Saarnisto, M., 1974, The deglaciation history of the Lake Superior region and its climatic implications: *Quaternary Research*, v. 4, p. 316-339.
- Sabatini, F. M., Burton, J. I., Scheller, R. M., Amatangelo, K. L., and Mladenoff, D. J., 2014, Functional diversity of ground-layer plant communities in old-growth and managed northern hardwood forests: *Applied Vegetation Science*, v. 17, no. 3, p. 398-407.
- Sachdev, S. C., 1969, Size analysis of the pan fraction and mineral analysis of the sediments of the Muscamoot Bay, Michigan, MS: Wayne State University, 91 p.
- Safarudin, and Moore, T. C., 1999, The history and architecture of lacustrine depositional systems in the northern Lake Michigan basin: *Journal of Paleolimnology*, v. 22, no. 4, p. 475-496.
- Sage, R. P., and Sage, V. L., 2006, Glacial Lake Algonquin and Nipissing Shoreline Bedrock Features: Mackinac Island, Michigan, 52nd Annual Meeting of the Institute on Lake Superior Geology Guide Book, 28 p.
- Saladin, N. P., 2005, Sources of chloride to surface waters in the Muskegon River Watershed, MS: Michigan State University, 180 p.

- Sallman, J. B., 1996, The development of salt weathering and honeycomb weathering on carboniferous sandstones in the Mid-Western United States, MS: Michigan State University, 171 p.
- Samonil, P., Danek, P., Schaetzl, R. J., Vasickova, I., and Valtera, M., 2015, Soil mixing and genesis as affected by tree uprooting in three temperate forests: *European Journal of Soil Science*, v. 66, no. 3, p. 589-603.
- Šamonil, P., Valtera, M., Schaetzl, R. J., Adam, D., Vašíčková, I., Daněk, P., Janík, D., and Tejnecký, V., 2016, Impacts of old, comparatively stable, treethrow microtopography on soils and forest dynamics in the northern hardwoods of Michigan, USA: *CATENA*, v. 140, p. 55-65.
- Sampath, P. V., 2014, Understanding fen hydrology - a hierarchical, multi-scale groundwater modeling approach, PhD: Michigan State University.
- Santini, A. D., King, T., Krawczyk, K., and Kern, J. W., 2015, Effectiveness of a Sediment Time Critical Removal Action-PCB Reduction in Fish Tissue, Surface Water, and Sediment via Wet Excavation: *Integrated Environmental Assessment and Management*, v. 11, no. 1, p. 161-170.
- Santos, F., Fraser, M. P., and Bird, J. A., 2014, Atmospheric black carbon deposition and characterization of biomass burning tracers in a northern temperate forest: *Atmospheric Environment*, v. 95, p. 383-390.
- Sargent, C. S., 1907, *Crataegus* in southern Michigan, in Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist, p. 7-91.
- Sauk, W. A., Atekwana, E. A., and Nash, M. S., 1998, High Conductivities Associated With an LNAPL Plume Imaged by Integrated Geophysical Techniques: *Journal of Environmental and Engineering Geophysics*, v. 2, no. 3, p. 203-212.
- Sauer, C. O., 1918, A Soil Classification For Michigan: Twentieth Annual Report of the Michigan Academy of Science 1918, v. 20, p. 83-91.
- Schaetzl, R., 1986, Complete soil profile inversion by tree uprooting: *Physical Geography*, v. 7, p. 181-189.
- , 1991a, A lithosequence of soils in extremely gravelly, dolomitic parent materials, Bois Blanc Island, Lake Huron: *Geoderma*, v. 48, p. 305-320.
- , 1992a, Texture, Mineralogy, and Lamellae Development in Sandy Soils in Michigan: *Soil Science Society of America Journal*, v. 56, p. 1538-1545.
- , 1996a, Regional-scale relationships between climate and strength of podzolization in the Great Lakes Region, North America: *Catena*, v. 28, p. 47-69.
- , 2001a, Late Pleistocene ice-flow directions and the age of glacial landscapes in northern lower Michigan: *Physical Geography*, v. 22, p. 28-41.
- , 2002a, A Spodosol-Entisol transition in Northern Michigan: *Soil Science Society of America Journal*, v. 66, p. 1272-1284.
- , 2008a, The distribution of silty soils in the Grayling Fingers region of Michigan: Evidence for loess deposition onto frozen ground: *Geomorphology*, v. 102, p. 287-296.
- Schaetzl, R., Drzyzga, S. A., Weisenborn, B. N., Kincare, K. A., Lepczyk, X. C., Shein, K., Dowd, C. M., and Linker, J., 2002, Measurement, correlation, and mapping of glacial Lake Algonquin shorelines in northern Michigan: *Annals of the Association of American Geographers*, v. 92, p. 399-415.
- Schaetzl, R., and Forman, S. L., 2008, OSL ages on glaciofluvial sediment in northern Lower Michigan constrain expansion of the Laurentide ice sheet: *Quaternary Research*, v. 70, p. 81-90.
- Schaetzl, R., Forman, S. L., and Attig, J. W., 2014, Optical ages on loess derived from outwash surfaces constrain the advance of the Laurentide Ice Sheet out of the Lake Superior Basin, USA: *Quaternary Research*, v. 81, p. 318-329.

- Schaetzl, R., and Isard, S. A., 1991a, The distribution of spodosol soils in southern Michigan: A climatic interpretation: *Annals of the Association of American Geographers*, v. 81, p. 425-442.
- Schaetzl, R., and Loope, W. L., 2008a, Evidence for an eolian origin for the silt-enriched soil mantles on the glaciated uplands of eastern Upper Michigan, USA: *Geomorphology*, v. 100, p. 285-295.
- Schaetzl, R., and Mokma, D. L., 1988, A numerical index of podzol and podzolic soil development: *Physical Geography*, v. 9, p. 232-246.
- Schaetzl, R., Yansa, C. H., and Luehmann, M. D., 2013a, Paleobotanical and environmental implications of a buried forest bed in northern Lower Michigan, USA: *Canadian Journal of Earth Sciences*, v. 50, p. 483-493.
- Schaetzl, R. J., 1990, Effects of treethrow microtopography on the characteristics and genesis of Spodosols, Michigan, USA: *CATENA*, v. 17, no. 2, p. 111-126.
- Schaetzl, R. J., 1991b, Factors affecting the formation of dark, thick epipedons beneath forest vegetation, Michigan, USA: *Journal of Soil Science*, v. 42, no. 3, p. 501-512.
- , 1992b, Texture, Mineralogy, and Lamellae Development in Sandy Soils in Michigan: *Soil Science Society of America Journal*, v. 56, no. 5, p. 1538-1545.
- , 1996b, Spodosol-Alfisol intergrades: Bisequal soils in NE Michigan, USA: *Geoderma*, v. 74, no. 1-2, p. 23-47.
- , 2001b, Late pleistocene ice-flow directions and the age of glacial landscapes in northern lower Michigan: *Physical Geography*, v. 22, no. 1, p. 28-41.
- , 2001c, Morphologic evidence of lamellae forming directly from thin, clayey bedding planes in a dune: *Geoderma*, v. 99, no. 1, p. 51-63.
- , 2002b, A spodosol-entisol transition in northern Michigan: *Soil Science Society of America Journal*, v. 66, no. 4, p. 1272-1284.
- , 2008b, The distribution of silty soils in the Grayling Fingers region of Michigan: Evidence for loess deposition onto frozen ground: *Geomorphology*, v. 102, no. 3-4, p. 287-296.
- Schaetzl, R. J., Enander, H., Luehmann, M. D., Lusch, D. P., Fish, C., Bigsby, M., Steigmeyer, M., Guasco, J., Forgacs, C., and Pollyea, A., 2013b, Mapping the physiography of Michigan with GIS: *Physical Geography*, v. 34, no. 1, p. 2-39.
- Schaetzl, R. J., and Follmer, L. R., 1990, Longevity of treethrow microtopography: implications for mass wasting: *Geomorphology*, v. 3, no. 2, p. 113-123.
- Schaetzl, R. J., Frederick, W. E., and Tornes, L., 1996, Secondary carbonates in three fine and fine-loamy alfisols in Michigan: *Soil Science Society of America Journal*, v. 60, no. 6, p. 1862-1870.
- Schaetzl, R. J., and Hook, J., 2008, Evidence for loess in northwest Lower Michigan: Characterizing the silty mantle on the Buckley Flats outwash plain: *Physical Geography*, v. 29, no. 2, p. 140-157.
- Schaetzl, R. J., and Isard, S. A., 1991b, The Distribution of Spodosol Soils in Southern Michigan: A Climatic Interpretation: *Annals of the Association of American Geographers*, v. 81, no. 3, p. 425-442.
- Schaetzl, R. J., Knapp, B. D., and Isard, S. A., 2005, Modeling soil temperatures and the mesic-frigid boundary in the central great lakes region, 1951-2000: *Soil Science Society of America Journal*, v. 69, no. 6, p. 2033-2040.
- Schaetzl, R. J., Krist, F. J., Rindfleisch, P. R., Liebens, J., and Williams, T. E., 2000, Postglacial landscape evolution of northeastern lower Michigan, interpreted from soils and sediments: *Annals of the Association of American Geographers*, v. 90, no. 3, p. 443-466.
- Schaetzl, R. J., and Loope, W. L., 2008b, Evidence for an eolian origin for the silt-enriched soil mantles on the glaciated uplands of eastern Upper Michigan, USA: *Geomorphology*, v. 100, no. 3-4, p. 285-295.

- Schaetzl, R. J., and Luehmann, M. D., 2013, Coarse-textured basal zones in thin loess deposits: Products of sediment mixing and/or paleoenvironmental change?: *Geoderma*, v. 192, p. 277-285.
- Schaetzl, R. J., Luehmann, M. D., and Rothstein, D., 2015, Pulses of Podzolization: The Relative Importance of Spring Snowmelt, Summer Storms, and Fall Rains on Spodosol Development: *Soil Science Society of America Journal*, v. 79, no. 1, p. 117-131.
- Schaetzl, R. J., Mikesell, L. R., and Velbel, M. A., 2006, Soil characteristics related to weathering and pedogenesis across a geomorphic surface of uniform age in Michigan: *Physical Geography*, v. 27, no. 2, p. 170-188.
- Schaetzl, R. J., and Schwenner, C., 2006, An application of the Runge "Energy Model" of Soil development in Michigan's Upper Peninsula: *Soil Science*, v. 171, no. 2, p. 152-166.
- Schaetzl, R. J., and Weisenborn, B. N., 2004, The Grayling Fingers region of Michigan: soils, sedimentology, stratigraphy and geomorphic development: *Geomorphology*, v. 61, p. 251-274.
- Schaetzl, R. J., Yansa, C. H., and Luehmann, M. D., 2013c, Paleobotanical and environmental implications of a buried forest bed in northern Lower Michigan, USA: *Canadian Journal of Earth Sciences*, v. 50, no. 4, p. 483-493.
- Scharenbroch, B. C., 2007, Soils and biogeochemical cycling in gaps of old growth northern hardwood-hemlock forests, PhD: University of Wisconsin.
- Scharenbroch, B. C., and Bockheim, J. G., 2007, Pedodiversity in an old-growth northern hardwood forest in the Huron Mountains, Upper Peninsula, Michigan: *Canadian Journal of Forest Research*, v. 37, no. 6, p. 1106-1117.
- Schelske, C. L., 1988, Historic Trends in Lake Michigan Silica Concentrations: *Internationale Revue der gesamten Hydrobiologie und Hydrographie*, v. 73, no. 5, p. 559-591.
- Schelske, C. L., Stoermer, E. F., and Kenney, W. F., 2006, Historic low-level phosphorus enrichment in the Great Lakes inferred from biogenic silica accumulation in sediments: *Limnology and Oceanography*, v. 51, no. 1, part 2, p. 728-748.
- Schermerhorn, L. Y., 1887, Physical characteristics of the northern and northwestern lakes: *American Journal of Science*, v. 133, no. 196, p. 278-284.
- Scherzer, H. J., 1978, Glacial stratigraphy of St. Clair County, Michigan, MS: University of Michigan, 66 p.
- Schliemann, S. A., and Bockheim, J. G., 2014, Influence of gap size on carbon and nitrogen biogeochemical cycling in Northern hardwood forests of the Upper Peninsula, Michigan: *Plant and Soil*, v. 377, no. 1-2, p. 323-335.
- Schmid, A. A., 1961, Michigan Water Use and development problems: Michigan State University Agricultural Economics Circular Bulletin, v. 230, p. 1-30.
- Schmitt, G. T., 1949, A petrographic investigation of the relationship of deposition of sediments in a group of eskers related to the Charlotte till plain, MS: Michigan State University, 52 p.
- Schneider, A. F., and Fraser, G. S., 1990, Late Quaternary History of the Lake Michigan Basin, Geological Society of America Special Paper, Volume 251: Boulder, Geological Society of America.
- Schneider, I. F., 1960, Soil Survey of Montcalm County, Michigan, p. 1-38.
- , 1961, Soil Survey of Sanilac County, Michigan, p. 1-80.
- Schomberg, J. D., Host, G., Johnson, L. B., and Richards, C., 2005, Evaluating the influence of landform, surficial geology, and land use on streams using hydrologic simulation modeling: *Aquatic Sciences*, v. 67, no. 4, p. 528-540.
- Schwab, D. J., and Beletsky, D., 2003, Relative effects of wind stress curl, topography, and stratification on large-scale circulation in Lake Michigan: *Journal of Geophysical Research: Oceans*, v. 108, no. C2, p. 3044.

- Schwab, D. J., Beletsky, D., and Lou, J., 2000, The 1998 Coastal Turbidity Plume in Lake Michigan: Estuarine, Coastal and Shelf Science, v. 50, no. 1, p. 49-58.
- Schwab, D. J., Eadie, B. J., Assel, R. A., and Roebber, P. J., 2006, Climatology of Large Sediment Resuspension Events in Southern Lake Michigan: Journal of Great Lakes Research, v. 32, no. 1, p. 50-62.
- Schwenner, C., 1989, Soil Survey of Menominee County, Michigan.
- , 1991, Soil Survey of Houghton County Area, Michigan.
- , 2007, Soil Survey of Marquette County, Michigan.
- , 2013, Soil Survey of Alger County, Michigan.
- Scott, I. D., 1921, Inland lakes of Michigan: Michigan Geological and Biological Survey, Publication, v. 30, no. 25, p. 1-383.
- , 1927, Ice-push on lake shores: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 107-123.
- , 1946, Study of the Platte and Crystal Lake depressions: Geological Survey Division Occasional Papers.
- Scott, I. D., and Dow, K. W., 1937, Dunes of the Herring Lake Embayment, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 22, p. 437-450.
- Scull, P., and Schaetzl, R., 2011, Using PCA to characterize and differentiate loess deposits in Wisconsin and Upper Michigan, USA: Geomorphology, v. 127, p. 143-155.
- Scull, P. R., and Harman, J. R., 2004, Forest distribution and site quality in southern Lower Michigan, USA: Journal of Biogeography, v. 31, no. 9, p. 1503-1514.
- Segall, R. T., and Sorensen, H. O., 1973, Geological Significance of the Petoskey-Charlevoix Area -- its Economic and Environmental Impact, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 151-181.
- Seibel, E., Carlson, C. T., and Maresca Jr, J. W., 1976, Ice Ridge Formation: Probable Control by Nearshore Bars: Journal of Great Lakes Research, v. 2, no. 2, p. 384-392.
- Seilheimer, T. S., Zimmerman, P. L., Stueve, K. M., and Perry, C. H., 2013, Landscape-scale modeling of water quality in Lake Superior and Lake Michigan watersheds: How useful are forest-based indicators?: Journal of Great Lakes Research, v. 39, no. 2, p. 211-223.
- Sellers, D. L., 1982, Landstat vegetative anomalies and their use as hydrocarbon indicators in the northern Niagaran pinnacle reefs, MS: University of Michigan.
- Sellinger, C. E., 1994, Groundwater flux into a portion of eastern Lake Michigan, MS: University of Michigan.
- , 1995, Groundwater Flux into a Portion of Eastern Lake Michigan: Journal of Great Lakes Research, v. 21, no. 1, p. 53-63.
- Semken, H. A., Miller, B. B., and Stevens, J. B., 1964, Late Wisconsin woodland musk oxen in association with pollen and invertebrates from Michigan: Journal of Paleontology, v. 38, no. 5, p. 823-835.
- Seng, D. L., 1995, Geophysical investigation at the mouth of the St. Joseph River Valley and adjacent Lake Michigan shoreline in St. Joseph and Benton Harbor, Michigan, MS: Western Michigan University, 43 p.
- Seybold, C. A., Grossman, R. B., and Pierce, F. J., 2003, On-site assessment of use-dependent soil properties in Michigan: Communications in Soil Science and Plant Analysis, v. 34, no. 5-6, p. 765-780.
- Seydel, I. S., 1971, Distribution and circulation of arsenic through water, organisms and sediments of Lake Michigan, MS: University of Michigan.
- Seymour, K. L., 2004, Pleistocene Vertebrates from the Pre-Late Wisconsinan Mill Creek Site, St. Clair County, Michigan: Michigan Academician, v. 36, no. 2, p. 191-211.
- Shah, B. P., 1971, Evaluation of natural aggregates in Kalamazoo County and vicinity, PhD: Michigan State University, 187 p.

- Shah, B. P., 1974, Glacial aggregate evaluation in Kalamazoo County and vicinity in Michigan: Michigan Department of State Highways Research Report, v. R-835, p. 1-60.
- Shaler, N. S., 1893, The geological history of harbors: U.S. Geological Survey Annual Report, v. 13, no. II, p. 93-209.
- Sharma, S., Mora, G., Johnson, J. W., and Thompson, T. A., 2005, Stable isotope ratios in swale sequences of Lake Superior as indicators of climate and lake level fluctuations during the Late Holocene: *Quaternary Science Reviews*, v. 24, p. 1941-1954.
- Shaver, R. B., 1975, Nitrate enrichment of ground water in Shelby Township, Michigan, MS: Wayne State University, 109 p.
- Shcherbak, I., and Robertson, G. P., 2014, Determining the Diffusivity of Nitrous Oxide in Soil using In Situ Tracers: *Soil Science Society of America Journal*, v. 78, no. 1, p. 79-88.
- Shea, J. H., 1964, Petrology and stratigraphy of sediments from southern and central Lake Michigan, PhD: University of Illinois.
- Shedlock, R. J., Wilcox, D. A., Thompson, T. A., and Cohen, D. A., 1993, Interactions Between Ground-Water and Wetlands, Southern Shore of Lake-Michigan, USA: *Journal of Hydrology*, v. 141, p. 127-155.
- Shelden, F. D., 1959, Glacial and Post-glacial Geology of the Mackinac Straits Region, *in* Shelden, F. D., ed., *Geology of Mackinac Island and Lower and Middle Devonian South of the Straits of Mackinac*, Michigan Basin Geological Society, p. 59-63.
- Shen, C., 2009, A process-based distributed hydrologic model and its application to a Michigan watershed, PhD: Michigan State University.
- Shen, C., and Phanikumar, M. S., 2010, A process-based, distributed hydrologic model based on a large-scale method for surface–subsurface coupling: *Advances in Water Resources*, v. 33, no. 12, p. 1524-1541.
- Shepherd, F., 1847, Observations on the drift furrows, grooves, scratches and polished surfaces of the rocks of Lake Superior: *American Journal of Science*, v. 54, no. 11, p. 282-283.
- Sherman, H. M., 2004, Hydrogeochemical controls on uranium in aquifers of the Jacobsville Sandstone, PhD: Michigan Technological University, 132 p.
- Sherman, H. M., Gierke, J. S., and Anderson, C. P., 2007, Controls on spatial variability of uranium in sandstone aquifers: *Ground Water Monitoring and Remediation*, v. 27, no. 2, p. 106-118.
- Sherrill, M. G., 1978, Geology and ground water in Door County, Wisconsin, with emphasis on contamination potential in the Silurian Dolomite: U.S. Geological Survey Water-Supply Paper, v. 2047, p. 1-38.
- Sherzer, W. H., 1900, Geological Report on Monroe County, Michigan: Michigan Geological Survey Division, v. 7, no. 1, p. 1-240.
- Sherzer, W. H., 1901, Geological report on Monroe County, Michigan, PhD: University of Michigan.
- Sherzer, W. H., 1902, Ice work in southeastern Michigan: *Journal of Geology*, v. 10, no. 2, p. 194-216.
- , 1913, Geological report on Wayne County, Michigan: Michigan Geological and Biological Survey, Publication, v. 12, no. 9, p. 1-388.
- , 1927, A new find of the woolly elephant in Michigan: *Science*, v. 65, p. 616-616.
- Shetron, S. G., 1977, Establishing vegetation on alkaline iron and copper tailings: Michigan Geological Survey Report of Investigation, v. 17, p. 1-15.
- Shoshani, J., 1989, A Report on the Shelton Mastodon Site and a Discussion of the Numbers of Mastodons and Mammoths in Michigan: *Michigan Academician*, v. 21, no. 2, p. 115-132.
- Shoshani, J., Fisher, D. C., Zawiskie, J., Thurlow, S. J., Shoshani, S. L., Benninghoff, W. S., and Zoch, F. H., 1989, The Shelton Mastodon Site: Multidisciplinary study of a Late Pleistocene (Twocreekan) locality in Southeastern Michigan: *Contributions from the Museum of Paleontology The University of Michigan*, v. 27, no. 14, p. 393-436.

- Shoshani, J., and Smith, G. J., 1996, Late Pleistocene fishes from the Shelton Mastodon Site (Oakland County, Michigan) and their ecological context: Contributions from the Museum of Paleontology The University of Michigan, v. 29, no. 16, p. 419-433.
- Shott, M. J., 1995, Reliability of Archaeological Records on Cultivated Surfaces: A Michigan Case Study: *Journal of Field Archaeology*, v. 22, no. 4, p. 475-490.
- Shuchman, R. A., Sayers, M., Fahnenstiel, G. L., and Leshkevich, G., 2013, A model for determining satellite-derived primary productivity estimates for Lake Michigan: *Journal of Great Lakes Research*, v. 39, Supplement 1, p. 46-54.
- Shufeldt, G. A., 1867, On the subterranean sources of the waters of the Great Lakes: *American Journal of Science*, v. 93, no. 128, p. 193-197.
- Shwetz, J. V., 2005, Trace metal partitioning and concentration in sediment from the St. Clair Delta, Lake St. Clair and the Detroit River, Ontario, Canada, MS: University of Windsor.
- Sibert, R. J., 2012, The Effects of Road Salt Influx on the Geochemical Cycling of Woods Lake, Kalamazoo, Michigan, MS: Western Michigan University.
- Simard, A., 2003, Annotated Bibliography of Selected References on PCB and the Kalamazoo River Superfund Site, Michigan, 1982-2002: U.S. Geological Survey Open-File Report, v. 03-338, p. 1-31.
- , 2007, Predicting groundwater flow and transport using Michigan's statewide Wellogig database, PhD: Michigan State University.
- Sinclair, W. C., 1959, Reconnaissance of the Ground-Water Resources of Schoolcraft County, Michigan: Michigan Geological Survey Progress Report v. 22, p. 1-49.
- , 1960, Reconnaissance of the Ground-Water Resources of Delta County, Michigan: Michigan Geological Survey Progress Report, v. 24, p. 1-95.
- Sitarz, W. J., 1996, Accumulation and inventory of mercury in sediments of the Great Lakes (with appendix data for arsenic, cadmium, and lead), MS: Michigan State University, 353 p.
- Sjogren, D. B., Fisher, T. G., Taylor, L. D., Jol, H. M., and Munro-Stasiuk, M. J., 2002, Incipient tunnel channels: *Quaternary International*, v. 90, no. 1, p. 41-56.
- Skeels, M. A., 1961, The mastodons and mammoths of Michigan, MS: University of Michigan.
- , 1962, The Mastodons and Mammoths of Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 47, p. 101-132.
- Slawson, C. B., 1933, The Jasper Conglomerate, an Index of Drift Dispersion: *Journal of Geology*, v. 41, no. 5, p. 546-552.
- Slayton, D. F., 1982, Field evidence for shale membrane filtration of groundwater, south-central Michigan, MS: Michigan State University, 80 p.
- Sledzinski, G., 1994, Geochemical behavior of lead in an Alfisol and an Ultisol at very high levels of contamination MS: Wayne State University, 62 p.
- Slotnick, M. J., Meliker, J., and Nriagu, J. O., 2003, Natural sources of arsenic in Southeastern Michigan groundwater: 12th International Conference on Heavy Metals in the Environment, p. 1247-1250.
- Smart, L. A., 2007, Geophysical monitoring probes and their applications to some hydrogeological problems, PhD: Western Michigan University, 716 p.
- Smith, H., and Wilding, L. P., 1972, Genesis of Argillic Horizons in Ochraqualfs Derived From Fine Texture Till Deposits of Northwestern Ohio and Southeastern Michigan: *Soil Science Society of America Proceedings*, v. 36, p. 808-815.
- Smith, H. C., Jr., 1952, Sedimentary fabrics in unconsolidated sands, MS: Michigan State University, 28 p.
- Smith, H. I., 1901a, Summary of the Archeology of Saginaw Valley, Michigan - Part I: *American Anthropologist*, v. 3, p. 286-293.
- , 1901b, Summary of the Archeology of Saginaw Valley, Michigan - Part II: *American Anthropologist*, v. 3, p. 501-512.

- , 1901c, Summary of the Archeology of Saginaw Valley, Michigan - Part III: American Anthropologist, v. 3, p. 726-736.
- Smith, J., 2012, Large scale landslide on the Ontonagon River, Michigan, MS: Michigan Technological University.
- Smith, J. E., 1968, The Ancestral Lake Nipissing Strandline on Manitoulin Island, *in* Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 68-70.
- Smith, P. A., and Moore, J. R., 1972, The distribution of trace metals in the surficial sediments surrounding Keweenaw Point, upper Michigan: Sea Grant College, Reprint, p. 383-393.
- Smith, R. A., and Frye, F. R., 1978, Saginaw Valley brines pose problems: Michigan Conservation, v. 14, no. 12, p. 12-12.
- Smits, M. M., Hoffland, E., Jongmans, A. G., and van Breemen, N., 2005, Contribution of mineral tunneling to total feldspar weathering: *Geoderma*, v. 125, no. 1-2, p. 59-69.
- Smyth, B. B., 1896, The closing of Michigan glacial lakes: *Transactions of the Kansas Academy of Sciences*, v. 15, p. 23-27.
- Snodgrass, D. B., 1952, A study of Lake Michigan bottom sediments, MS: University of Illinois, 35 p.
- Sofuoglu, S. C., Paode, R. D., Sivadechathep, J., Noll, K. E., Holsen, T. M., and Keeler, G. J., 1998, Dry Deposition Fluxes and Atmospheric Size Distributions of Mass, Al, and Mg Measured in Southern Lake Michigan during AEOLOS: *Aerosol Science and Technology*, v. 29, no. 4, p. 281-293.
- Soonthornnonda, P., Zou, Y., Christensen, E. R., and Li, A., 2011, PCBs in Great Lakes sediments, determined by positive matrix factorization: *Journal of Great Lakes Research*, v. 37, no. 1, p. 54-63.
- Sorensen, H., 1970, Clay and Shale Resources of Michigan, *in* Kneller, W. A., ed., Sixth Forum on Geology of Industrial Minerals, Volume 1: Ann Arbor, Michigan Geological Survey, p. 143-155.
- Spencer, J. W. W., 1882, A short study of the features of the region of the lower Great Lakes during the great river age; or notes on the origin of the Great Lakes of North America: *American Association for the Advancement of Science Proceedings*, v. 30, p. 131-146.
- , 1891a, Deformation of the Algonquin beach and brith of Lake Huron: *American Journal of Science*, v. 141, no. 241, p. 12-21.
- , 1891b, High level shores in the region of the Great Lakes and their deformation: *American Journal of Science*, v. 141, no. 243, p. 201-211.
- , 1891c, Origin of the basins of the Great Lakes of America: *American Geologist*, v. 7, no. 2, p. 86-97.
- , 1898, An account of the researches relating to the Great Lakes: *American Geologist*, v. 21, no. 2, p. 110-123.
- Spotts, Z. L., 2015, Naturally-Occurring Metals Concentrations in Michigan Soils: A 2015 Survey, MS: Western Michigan University, 67 p.
- Sprengelmeyer, E. E., and Rebertus, A. J., 2015, Seed bank dynamics in relation to disturbance and landscape for an ant-dispersed species: *Plant Ecology*, v. 216, no. 3, p. 371-381.
- Squire, G. R., 1972, A Field Guide to the Geology of Southwestern Michigan: Intended Primarily for Secondary Earth Science Teachers, Kalamazoo, Dept. of Geology, Western Michigan University, 58 p.
- Stanley, G. M., 1932, Abandoned strands of Isle Royale and northeastern Lake Superior, PhD: University of Michigan.
- , 1936a, Abrupt Decline of the Whittlesey Beach at Birmingham, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 21, p. 445-452.
- , 1936b, The geology of the Cranbrook area: *Cranbrook Institute of Science Bulletin*, v. 6, p. 1-56.

- , 1938, The submerged valley through Mackinac Straits: *Journal of Geology*, v. 46, p. 966-974.
- , 1945, Prehistoric Mackinac Island: Michigan Geological and Biological Survey, Publication, v. 43, no. 36, p. 1-74.
- Stark, J. R., Cummings, T. R., and Twenter, F. R., 1983, Ground-water contamination at Wurtsmith Air Force Base, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 83-4002, p. 1-93.
- Steeves, E. G., 2001, The geochemistry of a leaf composting leachate plume, Asylum Lake, Kalamazoo, Michigan, MS: Western Michigan University.
- Steinbrecher, L., 1980, Rockport sinkhole management study: Northeast Michigan Council of Government, p. 1-39.
- Steiner, W. W., 1952, An interpretation of size analyses of a beach sand, Sterling State Park, Monroe County, Michigan, MS: Wayne State University, 40 p.
- Steinman, A. D., Biddanda, B., Chu, X., Thompson, K., and Rediske, R., 2007, Environmental analysis of groundwater in Mecosta County, Michigan: *Environmental Monitoring and Assessment*, v. 134, no. 1, p. 177-189.
- Stevenson, E. B., 1931, The Dunes of the Manistique Area: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 14, p. 475-485.
- Steward, D. P., 1948, The surface geology of Wexford County, Michigan, MS: Michigan State University.
- Stewart, D. P., 1949, Surface Geology of Wexford County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 33, no. 3, p. 233-242.
- Stoermer, E. F., 1977, Post-Pleistocene diatom successions in Douglas Lake, Michigan: *Journal of Phycology*, v. 13, p. 73-80.
- Stoermer, E. F., Kocielek, J. P., Shoshani, J., and Frisch, C., 1988, Diatoms from the Shelton Mastodon Site: *Journal of Paleolimnology*, v. 1, no. 3, p. 193-199.
- Stoimenoff, L. E., 1960, Floods of May 1959 in the Au Gres and Rifle River basins, Michigan: U.S. Geological Survey Open-File Report, v. 60-135, p. 1-14.
- , 1963, Floods in southeastern Michigan, magnitude and frequency: U.S. Geological Survey Open-File Report, p. 1-9.
- , 1972, Regional draft-storage relationships for central and western upper peninsula of Michigan: U.S. Geological Survey Open-File Report, v. 72-362, p. 1-13.
- , 1975a, Flood plains of the Portage River, Livingston County, Michigan: U.S. Geological Survey Open-File Report, v. 75-77, p. 1-9.
- , 1975b, Flood plains of the South Branch Shiawassee River, Livingston County, Michigan: U.S. Geological Survey Open-File Report, v. 75-78, p. 1-7.
- Stoker, B. A., 1977, Measurement of coastal bluff recession from aerial photographs, Muskegon County, Michigan, MS: University of Michigan.
- Stoline, M. R., Miller, P. S., Kehew, A. E., Passero, R. N., Bereza, S. E., and Robertson, J. E., 1990a, Groundwater chemistry statistical summaries for Calhoun County, Michigan, Western Michigan University, Michigan Groundwater Survey, 120 p.
- Stoline, M. R., Miller, P. S., Kehew, A. E., Passero, R. N., and DeBoer, W. P., 1989a, Groundwater chemistry statistical summaries for Barry County, Michigan, Western Michigan University, Michigan Groundwater Survey, 160 p.
- , 1990b, Groundwater chemistry statistical summaries for Eaton County, Michigan, Western Michigan University, Michigan Groundwater Survey, 114 p.
- Stoline, M. R., Miller, P. S., Kehew, A. E., Passero, R. N., and Rowe, G. W., 1988, Groundwater chemistry statistical summaries for Ingham County, Michigan, Western Michigan University, Michigan Groundwater Survey, 128 p.
- Stoline, M. R., Miller, P. S., Kehew, A. E., Passero, R. N., and Witkowski, G. T., 1989b, Groundwater chemistry statistical summaries for Berrien County, Michigan, Western Michigan University, Michigan Groundwater Survey, 116 p.

- Stone, B. D., Kincare, K. A., O'Leary, D. W., Lundstrom, S. C., Taylor, E. M., and Brown, S. E. D., 2003, Glacial and postglacial geology of the Berrien County Region of Michigan, Field Trip Guidebook for 49th Midwest Friends of the Pleistocene Field Conference.
- Stonehouse, H. B., 1970, Guidebook for Field Trips, Michigan Basin Geological Society and Geological Society of America: North-central Section, p. 177.
- , 1973, Traverse City to Ludington, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 221-224.
- Stottlemeyer, R., and Hanson, D. G., 1989, Atmospheric Deposition and Ionic Concentrations in Forest Soils of Isle Royale National Park, Michigan: *Soil Science Society of America Journal*, v. 53, no. 1, p. 270-274.
- Stottlemeyer, R., and Toczydlowski, D., 1996a, Modification of snowmelt chemistry by forest floor and mineral soil, Northern Michigan: *Journal of Environmental Quality*, v. 25, no. 4, p. 828-836.
- , 1996b, Precipitation, snowpack, stream-water ion chemistry, and flux in a northern Michigan watershed, 1982-1991: *Canadian Journal of Fisheries and Aquatic Sciences*, v. 53, no. 12, p. 2659-2672.
- , 1999, Seasonal change in precipitation, snowpack, snowmelt, soil water and streamwater chemistry, northern Michigan: *Hydrological Processes*, v. 13, no. 14-15, p. 2215-2231.
- , 2006, Effect of reduced winter precipitation and increased temperature on watershed solute flux, 1988-2002, Northern Michigan: *Biogeochemistry*, v. 77, no. 3, p. 409-440.
- Stoutamire, W. P., and Benninghoff, W. S., 1964, Biotic assemblage associated with a mastodon skull from Oakland County, Michigan: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 49, p. 47-60.
- Stramel, G. J., Wisler, C. O., and Laird, L. B., 1954, Water resources of the Grand Rapids area, Michigan: *U.S. Geological Survey Circular*, v. 323, p. 1-40.
- Straw, W. T., 1976, Some Aspects of the Glacial Geology in the Kalamazoo Area, Field Trip Guidebook, North-Central section of the Geological Society of America and Western Michigan University, 29 p.
- Straw, W. T., Passero, R. N., and Kehew, A. E., 1993, Conceptual hydrogeologic glacial facies models: Implications for aquifers and agrichemicals in Southwest Michigan, *in* Eckstein, Y., and Zaporozec, A., eds., *USA/CIS Joint Conference on Environmental Hydrology and Hydrogeology*, Water Environment Federation, p. 35-68.
- Striker, M. M., and Harmon, L. I., 1961, Soil Survey of Lenawee County, Michigan, no. 1-59.
- Strommen, N. D., 1973, Fall Storm and High Lake Levels Spell Disaster Around the Great Lakes: *Mariners Weather Log*, v. 17, no. 2, p. 66-69.
- Strommen, N. D., Knutilla, R. L., and Mueller, C., 1968a, Hydrologic Studies of Small Watersheds in Agricultural Areas of Southern Michigan: Michigan Water Resources Commission Report, v. 3, p. 1-191.
- Strommen, N. D., Knutilla, R. L., Mueller, C., and Kidder, E. H., 1968b, Sloan- Deer Creek Basin, streamflow characteristics 1954-67, streamflow data 1954-67, and precipitation data 1956-67: Michigan Water Resources Commission Report, v. 3, p. 1-191.
- Strong, W. L., and Hills, L. V., 2005, Late-glacial and Holocene palaeovegetation zonal reconstruction for central and north-central North America: *Journal of Biogeography*, v. 32, p. 1043-1062.
- Stuart, W. T., 1945, Ground-water resources of the Lansing area, Michigan: Michigan Geological Survey Progress Report v. 13, p. 1-33.
- , 1953, Progress report on ground-water conditions at the Cayia mine, near Crystal Falls, Michigan: U.S. Geological Survey Open-File Report, p. 1-27.
- Stuart, W. T., Brown, E. A., and Rhodehamel, E. C., 1954, Ground-water investigations of the Marquette iron-mining district, Michigan: Michigan Geological Survey Division, Technical Report, v. 3, p. 1-92.

- Stuart, W. T., and Stallman, R. W., 1945, Ground-water resources of the Benton Harbor area, Michigan: Michigan Geological Survey Progress Report v. 12, p. 1-32.
- Stuart, W. T., Theis, C. V., and Stanley, G. M., 1948, Ground-water problems in the Iron River district, Michigan: Michigan Geological Survey Division, Technical Report, v. 2, p. 1-59.
- Stuk, M., 1992, A study of ground-water quality in a priority agricultural and livestock watershed, Cass County, Michigan, MS: Western Michigan University.
- Sugita, S., Parshall, T., and Calcote, R., 2006, Detecting differences in vegetation among paired sites using pollen records: *Holocene*, v. 16, p. 1123-1135.
- Sundeen, S. P., 1978a, Geologic study of sand deposits in the State of Michigan, Phase I: Geological Survey Division, Final Report, Open-file Report, v. MGSD OFR 78-3, p. 1-60.
- , 1978b, Geologic study of sand deposits in the State of Michigan, Phase II: Geological Survey Division, Final Report, Open-file Report, v. MGSD OFR 78-4, p. 1-60.
- Suwanwaree, P., and Robertson, G. P., 2005, Methane oxidation in forest, successional, and no-till agricultural ecosystems: Effects of nitrogen and soil disturbance: *Soil Science Society of America Journal*, v. 69, p. 1722-1729.
- Swain, L. A., 1986, Michigan basin regional aquifer-system study, *in* Sun, R. J., ed., *Regional Aquifer-System Analysis Program of the U.S. Geological Survey--Summary of projects, 1978-1984, Volume 1002*, p. 242-244.
- Swanson, D. E., 1970, Ground water in Ionia County, Michigan, MS: Michigan State University.
- Swearingen, T. L., Childs, K. E., and Upchurch, S. B., 1973, Environmental Geology of the Houghton Lake Area, Roscommon County, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 135-142.
- Sweat, M. J., 1992, Hydrogeology of Huron County, Michigan: Water-Resources Investigations - U. S. Geological Survey, 76 p.
- , 1995, Ground-Water Levels in Huron County, Michigan, March 1993 through December 1994: U.S. Geological Survey Open-File Report, v. 95-430, p. 1-9.
- , 1996, Ground-Water Levels in Huron County, Michigan, January 1995 through December 1995: U.S. Geological Survey Open-File Report, v. 96-175, p. 1-8.
- , 1997a, Continuous Seismic-Reflection Profiling near Grassy Island, Wyandotte Unit of Shiawassee National Wildlife Refuge, Wyandotte, Michigan.
- , 1997b, Ground-Water Levels in Huron County, Michigan, January 1996 through December 1996: U.S. Geological Survey Open-File Report, v. 97-196, p. 1-9.
- , 1999, Contaminant distribution in sediments and ground water on and near Grassy Island: U.S. Geological Survey.
- , 2001, Hydrology of C-3 Watershed, Seney National Wildlife Refuge, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 01-4053.
- Sweat, M. J., and Rheame, S. J., 1998, Water Resources of the Keweenaw Bay Indian Community, Baraga County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 98-4060.
- Sweat, M. J., and Van Til, R. L., 1988, Water use and methods of data acquisition in Michigan, *in* Waterstone, M., and Burt, R. J., eds., *Water-use data for water resources management*, Tucson, 1988: Tucson, American Water Resources Association, p. 133-141.
- , 1989, Michigan--Water supply and use, *in* National Water Summary 1987--Hydrologic events and water supply and demand: U.S. Geological Survey Water-Supply Paper, v. 2350, p. 305-312.
- Sweat, M. J., and Wolf, J. R., 1997, Combined-Sewer Overflow Data and Methods of Sample Collection for Selected Sites, Detroit, Michigan: U.S. Geological Survey Open-File Report, v. 96-646, p. 1-23.
- Sweringen, T. L., 1973, The significance of ground water on the Houghton Lake drainage basin, MS: Michigan State University.

- Syed, A. T., and Bennett, J. P., 2004, Analysis of Sediment Transport Associated with Low-Head Dams, Proceedings of the Water Environment Federation, Water Environment Federation, p. 1206-1235.
- Syed, A. T., Bennett, J. P., and Rachol, C. M., 2005, A pre-dam-removal assessment of sediment transport for four dams on the Kalamazoo River between Plainwell and Allegan, Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2004-5178, p. 1-41.
- Syed, A. T., and Fogarty, L. R., 2005, Trends in Surface-Water Quality at Selected National Stream Quality Accounting Network(NASQAN) Stations, in Michigan: U.S. Geological Survey Scientific Investigations Report, v. 2005-5158, p. 1-38.
- Syed, A. T., and Jodoin, R. S., 2006, Estimation of nonpoint-source loads of total nitrogen, total phosphorous, and total suspended solids in the Black, Belle, and Pine River basins, Michigan, by use of the PLOAD model: U.S. Geological Survey Scientific Investigations Report, v. 2006-5071, p. 1-42.
- Szramek, K., 2002, Controls on carbonate equilibria and mass transport in a glaciated mid-continent watershed, MS: University of Michigan.
- Szramek, K., and Walter, L. M., 2004, Impact of Carbonate Precipitation on Riverine Inorganic Carbon Mass Transport from a Mid-continent, Forested Watershed: Aquatic Geochemistry, v. 10, no. 1-2, p. 99-137.
- Szramek, K., Walter, L. M., and McCall, P., 2004, Arsenic mobility in groundwater/surface water systems in carbonate-rich Pleistocene glacial drift aquifers (Michigan): Applied Geochemistry, v. 19, no. 7, p. 1137-1155.
- Szramek, K. J., 2006, Carbonate mineral weathering in mid-latitude watersheds: Importance of calcite and dolomite dissolution on dissolved inorganic carbon acquisition and transport, PhD: University of Michigan.
- Tague, G. C., 1938, An Occurrence of Nonwetting Sand at Muskallonge Lake, Luce County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 497-502.
- , 1943, The postglacial geology of the Grand Marias embayment, Berrien County, Michigan, PhD: University of Michigan.
- , 1947, The post-glacial geology of the Grand Marais embayment in Berrien County, Michigan: Occasional Papers on the Geology of Michigan, v. 45, no. 38, p. 1-82.
- Takacs, M. J., Long, D. T., Wilson, T. P., and Rezabek, D. H., 1988, The origin of near-surface saline ground waters; central Michigan Basin, First Annual Ground Water Geochemistry Conference: Dublin, OH, United States (USA), Natl. Water Well Assn., Dublin, OH, p. 77-101.
- Talicksa, M., 1999, Effects of roadside salt on nearby soils in NW Lower Michigan, MS: Michigan State University.
- Talsma, V. L., 1991, An analysis of physical and chemical variance between sub-basins on the Upper Black River: Cheboygan, Otsego, Montmorency and Presque Isle Counties, Michigan.: Biological Station, University of Michigan.
- Tang, J. W., Bolstad, P. V., and Martin, J. G., 2009, Soil carbon fluxes and stocks in a Great Lakes forest chronosequence: Global Change Biology, v. 15, no. 1, p. 145-155.
- Tangtong, C., 2014, Environmental processes controlling the fate and transport of aristolochic acid in agricultural soil and copper in contaminated lake sediment, PhD: Michigan State University, 305 p.
- Tanner, W. F., 1975, Beach Processes, Berrien County, Michigan: Journal of Great Lakes Research, v. 1, no. 1, p. 171-178.
- Tanton, J. H., 1973, Soils Can be a Disaster, *in* Straw, W. T., and Chambers, R. L., eds., Geology and the Environment, Michigan Basin Geological Society, p. 121-133.
- Tardy, S. W., 1991, Soil Survey of Cheboygan County, Michigan.

- , 1997, Soil Survey of Calhoun County, Michigan.
- , 2005, Soil Survey of Roscommon County, Michigan.
- , 2006, Soil Survey of Keweenaw County Area, Michigan.
- Tassin, W., 1908, On the occurrence of calcium sulphide (oldhamite) in the Allegan meteorite: U.S. National Museum Proceedings, v. 34, no. 1622, p. 433-434.
- Taylor, F. B., 1892, The highest old shore line on Mackinac Island: American Journal of Science, v. 143, no. 255, p. 210-218.
- , 1894a, A reconnaissance of the abandoned shore lines of Green Bay: American Geologist, v. 13, no. 5, p. 316-327.
- , 1894b, A reconnaissance of the abandoned shore lines of the south coast of Lake Superior: American Geologist, v. 13, no. 6, p. 365-383.
- , 1895a, Changes of level in the region of the Great Lakes in recent geological time: American Journal of Science, v. 149, no. 289, p. 69-71.
- , 1895b, The Munuscong Islands: American Geologist, v. 15, no. 1, p. 24-33.
- , 1895c, Niagara and the Great Lakes: American Journal of Science, v. 149, no. 292, p. 249-270.
- , 1895d, Niagara and the Great Lakes; a correction: American Geologist, v. 15, no. 6, p. 394-395.
- , 1895e, The Nipissing beach on the north Superior shore: American Geologist, v. 15, no. 5, p. 304-314.
- , 1895f, The second Lake Algonquin: American Geologist, v. 15, no. 2, p. 100-120.
- , 1895g, The second Lake Algonquin: American Geologist, v. 15, no. 3, p. 162-179.
- , 1896a, The Algonquin and Nipissing beaches: American Geologist, v. 17, no. 6, p. 397-400.
- , 1896b, Preliminary notes on studies of the Great Lakes made in 1895: American Geologist, v. 17, no. 4, p. 253-257.
- , 1897a, Moraines of recession and their significance in glacial theory: Journal of Geology, v. 5, no. 5, p. 421-465.
- , 1897b, Notes on the abandoned beaches of the north coast of Lake Superior: American Geologist, v. 20, no. 2, p. 111-128.
- , 1899, The great ice-dams of lakes Maumee, Whittlesey and Warren: American Geologist, v. 24, no. 1, p. 6-38.
- , 1902, Surface geology of Lapeer County, Report on the State Board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, p. 111-117.
- , 1905, Relation of Lake Whittlesey to the Arkona beaches: Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 29-39.
- , 1912, Map of the Old Tributaries of the St. Clair and Detroit Rivers Fourteenth Report of the Michigan Academy of Science 1912, v. 14, p. 142-142.
- , 1927a, Evidence of Recurrent Depression and Resilience in the Region of the Great Lakes: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 135-143.
- , 1927b, The Present and Recent Rate of Land-Tilting in the Region of the Great Lakes: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 145-157.
- , 1929, The Status of Lake Erie in Present and Recent Land-Tilting: Papers of the Michigan Academy of Science, Arts and Letters, v. 10, p. 251-260.
- , 1939a, Correlations of the Port Huron morainic system of Michigan in Ontario and Western New York: American Journal of Science, v. 237, no. 6, p. 375-388.
- , 1939b, Geological story of the Great Lakes: Science Monthly, v. 49, no. 1, p. 49-56.
- Taylor, F. C., 1930, Pontiac, Michigan, report on water supply: Pontiac, Dept. of Water Supply, v. III.
- Taylor, L. D., 1990, Evidence for high glacial-lake levels in the northeastern Lake Michigan basin and their relation to the Glenwood and Calumet phases of glacial Lake Chicago, *in*

- Schneider, A. F., and Fraser, G. S., eds., Late Quaternary History of the Lake Michigan Basin, Volume 251: Boulder, Geological Society of America, p. 91-110.
- Templeton, J. S., and Willman, H. B., 1963, Champlainian Series (Middle Ordovician) in Illinois: Illinois Geological Survey Bulletin, v. 89, p. 1-260.
- Tenzer, G. E., Meyers, P. A., Robbins, J. A., Eadie, B. J., Morehead, N. R., and Lansing, M. B., 1999, Sedimentary organic matter record of recent environmental changes in the St. Marys River ecosystem, Michigan–Ontario border: *Organic Geochemistry*, v. 30, no. 2–3, p. 133-146.
- Terwilliger, F. W., 1952, The glacial geology and ground-water resources of Van Buren County, Michigan, MS: Michigan State University, 103 p.
- , 1954, The glacial geology and groundwater resources of Van Buren County, Michigan: *Occasional Papers on the geology of Michigan*, v. 48, no. 1, p. 1-96.
- , 1967, Pleistocene Geology of the Munising Area, *in* Ostrom, M. E., and Slaughter, A. E., eds., *Correlation Problems of the Cambrian and Ordovician Outcrop Areas, Northern Peninsula of Michigan*, Michigan Basin Geological Society, p. 65-66.
- Terwilliger, F. W., Shelden, F. D., Hill, J. V., and Brittain, W. D., 1965, Guidebook: Geology of Central Ontario, Michigan Basin Geological Society Annual Field Excursion, Michigan Basin Geological Society, 97 p.
- Thiet, R. K., Boerner, R. E. J., Nagy, M., and Jardine, R., 2005, The effect of biological soil crusts on throughput of rainwater and N into Lake Michigan sand dune soils: *Plant and Soil*, v. 278, no. 1-2, p. 235-251.
- Thobaben, E. T., and Hamilton, S. K., 2014, The Relative Importance of Groundwater and its Ecological Implications in Diverse Glacial Wetlands: *American Midland Naturalist*, v. 172, no. 2, p. 205-218.
- Toen, G. F., 1990, Soil Survey of Barry County, Michigan.
- Toen, G. F., and Olson, R. W., 1986, Soil Survey of Branch County, Michigan.
- Thomas, J. C., Cable, E., Dabkowski, R. T., Gargala, S., McCall, D., Pangrazzi, G., Pierson, A., Ripper, M., Russell, D. K., and Rugh, C. L., 2013, Native Michigan plants stimulate soil microbial species changes and PAH remediation at a legacy steel mill: *International Journal of Phytoremediation*, v. 15, no. 1, p. 5-23.
- Thomas, R. L., Christensen, M. D., Szalinska, E., and Scarlat, M., 2006, Formation of the St. Clair River Delta in the Laurentian Great Lakes System: *Journal of Great Lakes Research*, v. 32, no. 4, p. 738-748.
- Thomason, J. F., 2006, Laboratory studies of till deformation with implications for the motion and sediment transport of the Lake Michigan Lobe, PhD: Iowa State University.
- Thompson, T. A., 1989, Anatomy of a Transgression Along the Southeastern Shore of Lake-Michigan: *Journal of Coastal Research*, v. 5, p. 711-724.
- , 1990, Dune and beach complex and back-barrier sediments along the southeastern shore of Lake Michigan: Cowles Bog area of the Indiana Dunes National Lakeshore, *in* Schneider, A. F., and Fraser, G. S., eds., *Late Quaternary History of the Lake Michigan Basin, Volume 251: Boulder, Geological Society of America*, p. 9-20.
- , 1992, Beach-Ridge Development and Lake-Level Variation in Southern Lake-Michigan: *Sedimentary Geology*, v. 80, no. 3-4, p. 305-318.
- Thompson, T. A., and Baedke, S. J., 1995, Beach-ridge development in Lake Michigan: Shoreline behavior in response to quasi-periodic lake-level events: *Marine Geology*, v. 129, p. 163-174.
- , 1997, Strand-plain evidence for late Holocene lake-level variations in Lake Michigan: *Geological Society of America Bulletin*, v. 109, p. 666-682.
- Thompson, T. A., Baedke, S. J., and Johnston, J. W., 2004, Geomorphic Expression of Late Holocene Lake Levels and Paleowinds in the Upper Great Lakes: *Michigan Academician*, v. 35, no. 4, p. 355-371.

- Thompson, T. A., Johnston, J. W., and Lepper, K., 2014, The contemporary elevation of the peak Nipissing phase at outlets of the Upper Great Lakes, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 15-30.
- Thompson, T. A., Lepper, K., Endres, A. L., Johnston, J. W., Baedke, S. J., Argyilan, E. P., Booth, R. K., and Wilcox, D. A., 2011, Mid Holocene lake level and shoreline behavior during the Nipissing phase of the upper Great Lakes at Alpena, Michigan, USA: *Journal of Great Lakes Research*, v. 37, no. 3, p. 567-576.
- Thomsen, F. H., 1969, *Hydrology of the glacial section along the Manistee River, Kalkaska, Grand Traverse, Wexford, and Missaukee Counties, Michigan*, MS: Michigan Technological University.
- Thomsen, J. E., Bohrer, G., Matheny, A. M., Ivanov, V. Y., He, L. L., Renninger, H. J., and Schafer, K. V. R., 2013, Contrasting Hydraulic Strategies during Dry Soil Conditions in *Quercus rubra* and *Acer rubrum* in a Sandy Site in Michigan: *Forests*, v. 4, no. 4, p. 1106-1120.
- Threlkeld, G. W., and Alfred, S., 1967, *Soil Survey of Ionia County, Michigan*, p. 1-166.
- Threlkeld, G. W., and Feenstra, J. E., 1974, *Soil Survey of Shiawassee County, Michigan*, p. 1-106.
- Thwaites, F. T., 1926, The origin and significance of pitted outwash: *Journal of Geology*, v. 34, no. 4, p. 308-319.
- , 1949, *Geomorphology of the Basin of Lake Michigan: Papers of the Michigan Academy of Science, Arts and Letters*, v. 33, no. 3, p. 243-251.
- Tiemann, L. K., and Grandy, A. S., 2015, Mechanisms of soil carbon accrual and storage in bioenergy cropping systems: *Global Change Biology Bioenergy*, v. 7, no. 2, p. 161-174.
- Timmermans, T. J., 1989, *Glacio-isostasy of the Southern Lake Michigan basin* MS: Michigan State University, 206 p.
- Timmons, E. A., Fisher, T. G., Hansen, E. C., Eisaman, E., Daly, T., and Kashgarian, M., 2007, *Elucidating aeolian dune history from lacustrine sand records in the Lake Michigan Coastal Zone, USA: Holocene*, v. 17, p. 789-801.
- Tinklepaugh, B. M., 1952, *A sedimentary, petrographic and statistical study of certain glacial clays of northern Michigan as an aid in correlation* MS: Michigan State University.
- Tipping, R. G., Runkel, A. C., Alexander, E. C., Alexander, S. C., and Green, J. A., 2006, Evidence for hydraulic heterogeneity and anisotropy in the mostly carbonate Prairie du Chien Group, southeastern Minnesota, USA: *Sedimentary Geology*, v. 184, no. 3-4, p. 305-330.
- Tolliver, R. L., 1992, *Calcite cementation of Pleistocene glacial deposits in southwest Michigan*, MS: Western Michigan University.
- Tomczak, D., 2000, *Microclimate and its effect on thermo-hydrologic properties of cultivated and forested soils, Saginaw County, Michigan*, MS: Michigan State University.
- Tovell, W. M., 1978, Notes on the Quaternary Geology of the Bruce Peninsula, *in* Sanford, J. T., ed., *Geology of the Manitoulin Area*, Volume 3, Michigan Basin Geological Society, p. 91-92.
- Towell, W. M., 1968, The Entrance to Georgian Bay, *in* Liberty, B. A., and Shelden, F. D., eds., *The Geology of Manitoulin Island*, Michigan Basin Geological Society, p. 71-76.
- Travis, P. A., 1966, *An analysis of Pleistocene sediments in an aquifer recharge area, Kalamazoo, Michigan*, MS: Michigan State University.
- Treese, K. L., and Wilkinson, B. H., 1982, Peat Marl Deposition in a Holocene Paludal-Lacustrine Basin - Sucker Lake, Michigan: *Sedimentology*, v. 29, no. 3, p. 375-390.
- Treese, T. N., Owen, R. M., and Wilkinson, B. H., 1981, Sr/Ca and Mg/Ca ratios in polygenetic carbonate allochems from a Michigan marl lake: *Geochimica et Cosmochimica Acta*, v. 45, p. 439-445.

- Tushingham, A. M., 1992, Postglacial Uplift Predictions and Historical Water Levels of the Great Lakes: *Journal of Great Lakes Research*, v. 18, no. 3, p. 440-455.
- Twenter, F. R., 1966, General availability of ground water in glacial deposits in Michigan: Michigan Water Resources Commission.
- , 1975, Ground water and geology--southeastern Michigan: U.S. Army Corps of Engineers, Detroit District, p. 1-143.
- , 1981, Geology and hydrology for environmental planning in Marquette County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 80-90, p. 1-44.
- Twenter, F. R., and Cummings, T. R., 1985, Quality of ground water in Monitor and Williams Townships, Bay County, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 85-4110, p. 1-39.
- Twenter, F. R., Cummings, T. R., and Grannemann, N. G., 1983, Ground-water contamination in East Bay Township, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 85-4064, p. 1-63.
- Twenter, F. R., and Knutilla, R. L., 1972, Water for a rapidly growing urban community -- Oakland County, Michigan: U.S. Geological Survey Water-Supply Paper, v. 2000, p. 1-150.
- Twenter, F. R., Knutilla, R. L., and Cummings, T. R., 1975, Water resources of basins for minor streams draining into St. Clair River, Lake St. Clair, Detroit River, and Lake Erie, southeastern Michigan, scale 1:250,000.
- Twenter, F. R., Knutilla, R. L., and Nowlin, J. O., 1976, Water resources of Washtenaw County, Michigan: U.S. Geological Survey and Washtenaw County Planning Commission.
- Unangst, D., 1999, Hydrogeology and hydrogeochemistry of wetlands located in the North Ridge Subdivision, Brighton, Michigan, MS: Eastern Michigan University.
- United States Department of Agriculture, Soil Conservation Service, 1979, Supplement to soil survey, Lenawee County, Michigan, p. 1-148.
- United States Department of Agriculture Natural Resources Conservation service and United States Department of the Interior National Park Service, 2013, Soil Survey of Sleeping Bear Dunes National Lakeshore, Michigan.
- Unterreiner, G. A., 2002, Chemical, Isotopic, and Hydrogeologic investigations of an agriculturally impacted watershed, Calhoun County, Michigan, PhD: Western Michigan University.
- Unterreiner, G. A., and Kehew, A. E., 2005, Spatial and temporal distribution of herbicides and herbicide degradates in a shallow glacial drift aquifer/surface water system, southwestern Michigan: *Groundwater Modeling and Remediation*, v. 25, no. 2, p. 1-10.
- Upchurch, S. B., 1973a, Lake Michigan Coastal Process: Leland to Manistee, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 204-220.
- , 1973b, Lake Michigan Coastal Processes: Leland to Manistee, Michigan, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 54-66.
- Upham, W., 1891, Altitudes between Lake Superior and the Rocky Mountains: U.S. Geological Survey Bulletin, v. 72, p. 1-229.
- , 1896, Beaches of lakes Warren and Algonquin: *American Geologist*, v. 17, no. 6, p. 400-402.
- Vader, M. J., Zeman, B. K., Schaetzl, R. J., Anderson, K. L., Walquist, R. W., Freiburger, K. M., Emmendorfer, J. A., and Wang, H., 2012, Proxy Evidence for Easterly Winds in Glacial Lake Algonquin, from the Black River Delta in Northern Lower Michigan: *Physical Geography*, v. 33, no. 3, p. 252-268.
- Van Dam, R. L., 2012, Landform characterization using geophysics—Recent advances, applications, and emerging tools: *Geomorphology*, v. 137, no. 1, p. 57-73.

- van Dijk, D., 2014, Short- and long-term perspectives on the evolution of a Lake Michigan foredune, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 195-216.
- van Hees, E. H. P., Chopin, E. I. B., Sebastian, T. M., Washington, G. D., Germer, L. M., Domanski, P., Martz, D., and Schweitzer, L., 2010, Distribution, sources, and behavior of trace elements in the Clinton River Watershed, Michigan: *Journal of Great Lakes Research*, v. 36, no. 4, p. 606-617.
- Van Hise, C. R., 1896, A northern Michigan base-level: *Science*, v. 4, no. 217-220.
- Van Luven, D. M., 1995, Determination of the influence of wind on the Keweenaw Current in the Lake Superior Basin as constrained by Advanced Very High Resolution Radiometer (AVHRR) imagery, MS: Michigan Technological University.
- Van Oort, M., Arbogast, A. F., Hansen, E. C., and Hansen, B., 2001, Geomorphological History of Massive Parabolic Dunes, Van Buren State Park, Van Buren County, Michigan: *Michigan Academician*, v. 33, no. 2, p. 175-188.
- Van Til, R. L., and Scott, G., 1986, Water use for thermoelectric power generation in Michigan: Michigan Department of Natural Resources, Engineering and Water Management Division, p. 1-42.
- Vanlier, K. E., 1958, Reconnaissance of the Ground-Water Resources of Mackinac County, Michigan: Michigan Geological Survey Progress Report, v. 19, p. 1-88.
- , 1959, Reconnaissance of the Ground-Water Resources of Luce County, Michigan: Michigan Geological Survey Progress Report v. 21, p. 1-83.
- , 1962, Ground-water conditions in the Elsie area, Michigan: Michigan Geological Survey Progress Report, v. 25, p. 1-38.
- , 1963a, Ground-water resources of the Alma area, Michigan: U.S. Geological Survey Water-Supply Paper, v. 1619-E, p. 1-66.
- , 1963b, Ground water in Menominee County: Michigan Geological Survey Division, Water Investigation Report, v. 2, p. 1-42.
- , 1963c, Reconnaissance of the ground-water resources of Alger County, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 1, p. 1-55.
- , 1966, Ground-water resources of the Battle Creek area, Michigan: Michigan Geological Survey Division, Water Investigation Report, v. 4, p. 1-52.
- , 1968, Comprehensive planning study of the Grand River basin, Michigan, Appendix E, Ground-water resources and geology of the Grand River basin, Michigan: U.S. Army Corps of Engineers, Detroit District, p. 1-82.
- Vanlier, K. E., and Deutsch, M., 1958a, Reconnaissance of the Ground-Water Resources of Chippewa County, Michigan: Michigan Geological Survey Progress Report, v. 17, p. 1-81.
- , 1958b, Reconnaissance of the ground-water resources of Mackinac County, Michigan: Michigan Geological Survey Progress Report, v. 19, p. 1-82.
- Vanlier, K. E., and Wheeler, M. L., 1968a, Analog simulation of ground-water developments of the Saginaw Formation, Lansing Metropolitan Area, Michigan: Tri-County Planning Commission Ground-water Report, p. 1-40.
- , 1968b, Ground-water potential of the Saginaw Formation in the Lansing metropolitan area, Michigan: U.S. Geological Survey Open-File Report, p. 1-40.
- Vanlier, K. E., Wood, W. W., and Brunett, J. O., 1973, Water supply development and management alternatives for Clinton, Eaton and Ingham Counties, Michigan: U.S. Geological Survey Water Supply Paper, v. 1969, p. 1-111.
- Vannier, R. G., 2014, Understanding Geochemical Recovery in Anthropogenically Disturbed Landscapes, PhD: Michigan State University, 177 p.
- VanWyckhouse, R. J., 1966, A study of test borings from the Pleistocene of the southeastern Michigan glacial lake plain, Wayne County, Michigan, MS: Wayne State University, 85 p.

- Vaughan, V. C., 1906, Michigan Water Supplies: Eighth Report of the Michigan Academy of Science 1906, v. 8, p. 111-118.
- Veatch, J. O., 1924, Soil Survey of Roscommon County, Michigan, p. 1-27.
- , 1926, Geology as a factor in soil classification: Papers of the Michigan Academy of Science, Arts and Letters, v. 5, p. 287-296.
- , 1928, Soil Survey of Ogemaw County, Michigan, p. 1-24.
- , 1938a, Geology in relation to pedology: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 503-505.
- , 1938b, Pedologic evidence of changes of climate in Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 23, p. 385-390.
- , 1940a, Soil profiles in relation to the recession and extinction of Michigan lakes: Soil Science, v. 50, no. 2, p. 103-110.
- , 1940b, Soil profiles in relation to the recession and extinction of Michigan lakes: Soil Science, v. 50, no. 1, p. 103-113.
- Veatch, J. O., Schoenman, L. R., Lesh, F. R., and Foster, Z. C., 1929a, Soil Survey of Alger County, Michigan.
- Veatch, J. O., Schoenmann, L. R., Foster, Z. C., and Lesh, F. R., 1927, Soil Survey of Crawford County, Michigan, p. 1-38.
- Veatch, J. O., Schoenmann, L. R., Millar, C. E., and Shearin, A. E., 1929b, Soil Survey of Luce County, Michigan.
- , 1931, Soil Survey of Oscoda County, Michigan.
- Veatch, J. O., Stone, J. T., and Matelski, R. P., 1954, Soil Associations, Presque Isle County, Michigan, p. 1-31.
- Veatch, J. O., Tyson, J., and Lee, W. D., 1921, Reconnaissance soil survey of Ontonagon County, Michigan.
- Velbel, M. A., Matty, D. J., Wacker, J. F., and Linke, M. P., 2002, The Worden meteorite: A new ordinary chondrite fall from Michigan, USA: *Meteoritics & Planetary Science*, v. 37, no. S12, p. B25-B29.
- Velbel, M. A., McGuire, J. T., and Madden, A. S., 2007, Chapter 15 Scanning Electron Microscopy of Garnet from Southern Michigan Soils: Etching Rates and Inheritance of Pre-Glacial and Pre-Pedogenic Grain-Surface Textures, *in* Maria, A. M., and David, T. W., eds., *Developments in Sedimentology*, Volume Volume 58, Elsevier, p. 413-432.
- Venable, N. B. H., 2006, *Sedimentology and Stratigraphy of the Pennsylvanian Saginaw Aquifer, Central Lower Michigan, U.S.A.*, MS: Western Michigan University.
- Ver Wiebe, W. A., 1926, Surface Geology of Menominee County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 167-179.
- , 1927a, Geology of Roscommon County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 159-166.
- , 1927b, Surface Geology of Menominee County, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 7, p. 167-179.
- Verhougstraete, M. P., and Rose, J. B., 2014, Microbial investigations of water, sediment, and algal mats in the mixed use watershed of Saginaw Bay, Michigan: *Journal of Great Lakes Research*, v. 40, Supplement 1, p. 75-82.
- Vitorello, I., 1975, Paleomagnetic studies of Late Pleistocene and Holocene sediments from Lake Michigan cores, MS: University of Michigan.
- Vitorello, I., and Van der Voo, R., 1977, Magnetic stratigraphy of Lake Michigan sediments obtained from cores of lacustrine clay: *Quaternary Research*, v. 7, no. 3, p. 398-412.
- Vitton, S. J., and Williams, A., 2008, Estimate of Cliff Recession Rates for the Baraga Cliffs: Michigan Department of Transportation.

- Vogel, A. H., Sygo, J. J., Kelly, T. M., Canale, R. P., Allen, H. E., and Rothman, E. D., 1976, Short-Term Transient Variations of Limnological Parameters in Grand Traverse Bay, Lake Michigan: *Journal of Great Lakes Research*, v. 2, no. 1, p. 193-205.
- Vought, J. B., 2001, Assessment of zinc accumulation in sediments of the Great Lakes, MS: Michigan State University, 66 p.
- Vukenkeng, C.-A., Atekwana, E. A., Atekwana, E. A., Sauck, W. A., and Werkema, D., 2009, Temporal geophysical signatures from contaminant-mass remediation: *Geophysics*, v. 74, no. 4, p. B113-B123.
- Wadsworth, J. R., 1975, Transport mechanisms operating on a recurved spit, Tawas Point, Michigan, MS: University of Michigan.
- Wagner, G., 1903, Observations on *Platygonus compressus* Leconte: *Journal of Geology*, v. 11, no. 8, p. 777-782.
- Wahrer, M. A., 1993, The geochemistry and source of solutes in ground water from the glacial drift regional aquifer, Michigan Basin, MS: Michigan State University, 111 p.
- Walch, D., 1977, Chemical analysis of selected water wells: Genesee County Health Department, no. 1-20.
- Waldron, P. J., Petsch, S. T., Martini, A. M., and Nüsslein, K., 2007, Salinity Constraints on Subsurface Archaeal Diversity and Methanogenesis in Sedimentary Rock Rich in Organic Matter: *Applied and Environmental Microbiology*, v. 73, no. 13, p. 4171-4179.
- Walker, B., 1906, An illustrated catalogue of the Mollusca of Michigan, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1905, being the report of Alfred C. Lane, State Geologist.
- , 1913, The *Unione* fauna of the Great Lakes, *Nautilus*, v. 27, p. 18-23, 29-34, 40-47, and 56-59.
- Wallbom, T., 2000, Glacial history of Sleeping Bear Dunes National Lakeshore, northwestern lower Michigan: Evidence for late Pleistocene and Holocene lake level changes, MS: Michigan State University.
- Wallis, E. E., 2003, Application of Geochemical Fingerprinting and Environmental Isotopes to Identify Landfill Gas Impacts to Groundwater, MS: Western Michigan University.
- Walsh, K. M., 1989, Wetland study of southeastern Portage Township, Kalamazoo County, Michigan, MS: Western Michigan University.
- Walston, G. M., 1967, Bedrock topography and glacial drift thickness of Macomb County and the south half of St. Clair County, Michigan, MS: Wayne State University, 76 p.
- Walters, M. B., Willis, J. L., and Gottschalk, K. W., 2014, Seedling growth responses to light and mineral N form are predicted by species ecologies and can help explain tree diversity: *Canadian Journal of Forest Research*, v. 44, no. 11, p. 1356-1368.
- Waltrip, D. A., 1973, Sourcebook and Field Guide to the Geology of the West-Central Lower Peninsula of Michigan, Kalamazoo, Department of Geology, Western Michigan University, 145 p.
- Wan, H., 2003, Satellite observations of physical and biological variability in the Laurentian Great Lakes, MS: Michigan Technological University.
- Wang, Z., Zachara, J. M., Boily, J.-F., Xia, Y., Resch, T. C., Moore, D. A., and Liu, C., 2011, Determining individual mineral contributions to U(VI) adsorption in a contaminated aquifer sediment: A fluorescence spectroscopy study: *Geochimica et Cosmochimica Acta*, v. 75, no. 10, p. 2965-2979.
- Waples, J. T., Orlandini, K. A., Edgington, D. N., and Klump, J. V., 2004, Seasonal and spatial dynamics of $^{234}\text{Th}/^{238}\text{U}$ disequilibria in southern Lake Michigan: *Journal of Geophysical Research: Oceans*, v. 109, no. C10, p. C10S06.
- Waples, J. T., Paddock, R., Janssen, J., Lovalvo, D., Schulze, B., Kaster, J., and Val Klump, J., 2005, High Resolution Bathymetry and Lakebed Characterization in the Nearshore of

- Western Lake Michigan: Journal of Great Lakes Research, v. 31, Supplement 1, p. 64-74.
- Warburton, W. L., 1987, Hydrology and copper budget of Torch Lake, Houghton County, Michigan, MS: Michigan Technological University.
- Ward, F. L., 1932, Methods and costs of mining and preparing sand and gravel at the plant of the Ward Sand and Gravel Co., Oxford, Mich.: U.S. Bureau of Mines Information Circular, v. 6580, p. 1-16.
- Ward, H. L., 1899, Notice of an aerolite that recently fell at Allegan, Michigan: American Journal of Science, v. 158, no. 48, p. 412-414.
- Ward, W. P., 1971, Nearshore sedimentation in lower Lake Huron, MS: Wayne State University, 41 p.
- Warner, B. G., Karrow, P. F., Morgan, A. V., and Morgan, A., 1987, Plant and insect fossils from Nipissing sediment along the Goulas River, southeastern Lake Superior: Canadian Journal of Earth Sciences, v. 24, p. 1526-1536.
- Warner, D. M., and Lesht, B. M., 2015, Relative importance of phosphorus, invasive mussels and climate for patterns in chlorophyll a and primary production in Lakes Michigan and Huron: Freshwater Biology, v. 60, no. 5, p. 1029-1043.
- Warren, J. C., 1855, Supernumary tooth in *Mastodon giganteus*: American Journal of Science, v. 69, p. 349-353.
- Warrier, R. B., 2013, New Applications of Atmospheric Noble Gases in Hydrogeology, Atmospheric Sciences, Paleoclimate and Tectonics, PhD: University of Michigan, 310 p.
- Warrier, R. B., Castro, M. C., Hall, C. M., and Lohmann, K. C., 2013, Large atmospheric noble gas excesses in a shallow aquifer in the Michigan Basin as indicators of a past mantle thermal event: Earth and Planetary Science Letters, v. 375, p. 372-382.
- Warrington, D. S., 2001, Great Lakes chlorophyll and turbidity estimates using SeaWiFS (Sea-viewing Wide Field-of-View Sensor) imagery, MS: Michigan Technological University.
- Watkin, E. M., and Winch, J. E., 1968, Existent and Potential Agriculture on Manitoulin Island, in Liberty, B. A., and Shelden, F. D., eds., The Geology of Manitoulin Island, Michigan Basin Geological Society, p. 87-92.
- Wattrus, N. J., and Rausch, D. E., 2001, A preliminary survey of relict shoreface-attached sand ridges in Western Lake Superior: Marine Geology, v. 179, p. 163-177.
- Wayland, K. G., 2001, An approach for characterizing the biogeochemical fingerprints of land use in surface waters: Grand Traverse Bay watershed, Michigan, PhD: Michigan State University, 228 p.
- Wayne, W. J., and Zumberge, J. H., 1954, Pleistocene Geology of Indiana and Michigan, The Quaternary of the United States: Princeton, Princeton University Press, p. 63-83.
- Weaver, T. L., 1996, Hydrogeology and ground-water quality of the Bay Mills Indian Community Study Area, near Brimley, Michigan: U.S. Geological Survey Fact Sheet, v. FS-247-95.
- Weaver, T. L., Blumer, S. P., and Crowley, S. L., 2006a, Ground-Water Levels in Huron County, Michigan, 2002-03: U.S. Geological Survey Open-File Report, v. 2005-1082a, p. 1-18.
- Weaver, T. L., Blumer, S. P., and Fuller, L. M., 2008, Ground-Water Levels in Huron County, Michigan, 2006-07: U.S. Geological Survey Open-File Report, v. 2008-1248, p. 1-22.
- Weaver, T. L., Crowley, S. L., and Blumer, S. P., 2006b, Ground-Water Levels in Huron County, Michigan, 2004-05: U.S. Geological Survey Open-File Report, v. 2005-1082b, p. 1-16.
- Weaver, T. L., and Fuller, L. M., 2007, Stream-Water Quality during Storm-Runoff Events and Low-Flow Periods in the St. Clair River/Lake St. Clair Basin, Michigan: U.S. Geological Survey Open-File Report, v. 2007-1201, p. 1-19.
- Weaver, T. L., Healy, D., and Sabin, T. G., 2005a, Water Resources on and near the Nottawaseppi Huron Band of Potawatomi Indian Tribal Lands, Calhoun County, Michigan, 2000-03: U.S. Geological Survey Open-File Report, v. 2004-1406, p. 1-47.

- Weaver, T. L., Neff, B. P., and Ellis, J. M., 2005b, Water quality and hydrology of the Lac Vieux Desert Watershed, Gogebic County, Michigan, and Vilas County, Wisconsin, 2002-04: U.S. Geological Survey Scientific Investigations Report, v. 2005-5237, p. 1-42.
- Weaver, T. R., Frape, S. K., and Cherry, J. A., 1995, Recent cross-formational fluid-flow and mixing in the shallow Michigan Basin: Geological Society of America Bulletin, v. 107, no. 6, p. 697-707.
- Webb-Sullivan, L. D., and Evans, J. E., 2014, Sediment budget approach to understanding historical stages of the Ottawa River in the context of land-use change, northwestern Ohio and southeastern Michigan, USA: Anthropocene, v. 7, p. 42-56.
- Webb III, T., 1973, A comparison of modern and presettlement pollen from southern Michigan (U.S.A.): Review of Palaeobotany and Palynology, v. 16, no. 3, p. 137-156.
- Webb, W. M., 1964, The geology of Mullet Lake, MS: University of Michigan.
- Weber, H. L., 1973, Soil Survey of Leelanau County, Michigan, p. 1-88.
- Weber, H. L., Hall, R., Benson, N. R., and Van Winter, G., 1966, Soil Survey of Grand Traverse County, Michigan, p. 1-130.
- Weesis, G. A., 1980, Soil Survey of Bay County, Michigan, p. 1-105.
- Weinberg, E. L., 1948, Deep water sediments of western Lake Huron, MS: University of Illinois, 20 p.
- Weisenborn, B. N., 2001, A model for fragipan evolution in Michigan soils, MS: Michigan State University.
- Weisenborn, B. N., and Schaetzl, R. J., 2005a, Range of fragipan expression in some Michigan soils: I. Morphological, micromorphological, and pedogenic characterization: Soil Science Society of America Journal, v. 69, no. 1, p. 168-177.
- , 2005b, Range of fragipan expression in some Michigan soils: II. A model for fragipan evolution: Soil Science Society of America Journal, v. 69, no. 1, p. 178-187.
- Welch, A. H., Westjohn, D. B., Helsel, D., and Wanty, R., 2000, Arsenic in ground water of the United States: Occurrence and geochemistry: Ground Water, v. 38, no. 4, p. 589-604.
- Wells, R. R., Langendoen, E. J., and Simon, A., 2007, Modeling pre- and post-dam removal sediment dynamics: The Kalamazoo River, Michigan: Journal of the American Water Resources Association, v. 43, no. 3, p. 773-785.
- Welsh, J. P., Jr., 1971, Patterns of compositional variation in some glaciofluvial sediments in the Lower Peninsula of Michigan, MS: Michigan State University.
- Wen, T., Castro, M. C., Hall, C. M., Pinti, D. L., and Lohmann, K. C., 2016, Constraining groundwater flow in the glacial drift and saginaw aquifers in the Michigan Basin through helium concentrations and isotopic ratios: Geofluids, v. 16, no. 1, p. 3-25.
- Werkema, D., 1998, A generic multi-electrode automated/semi-automated field resistivity system, MS: Western Michigan University, 64 p.
- Werlein, J. O., 1998, Soil Survey of Crawford County, Michigan.
- Werlein, J. O., and Kroel, M. L., III, 1990, Soil survey interim report for Camp Grayling.
- Wernette, P. A., 2012, Coastline change at four sites in Lower Michigan, MS: Michigan State University.
- West, C. C., Lyon, W. G., Ross, D. L., and Pennington, L. K., 1994, Investigation of vertical distribution and morphology of indigenous organic matter at Sleeping Bear site, Michigan: Environmental Geology, v. 24, no. 3, p. 176-187.
- West, G. F., 1948, A postglacial fossil flora near Forester, Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 32, p. 151-186.
- West, N., Schreiber, M., and Gotkowitz, M., 2012, Arsenic release from chlorine-promoted alteration of a sulfide cement horizon: Evidence from batch studies on the St. Peter Sandstone, Wisconsin, USA: Applied Geochemistry, v. 27, no. 11, p. 2215-2224.
- Westjohn, D. B., 1989, Application of Geophysics in the Delineation of the Freshwater/Saline-Water Interface in the Michigan Basin, Regional Aquifer Systems of the United States,

- 24th Annual AWRA Conference and Symposium, Volume 13: Milwaukee, American Water Resources Association, p. 111-134.
- , 1992, Use of geophysical logs logs to delineate the position of the freshwater/saline-water interface in the Michigan Basin, *in* Paillet, F. L., and Williams, J. H., eds., U.S. Geological Survey workshop on the application of borehole geophysics to ground-water investigations, Volume 94-4103: Albany, p. 33-39.
- , 1997, Stratigraphy, sedimentology, and volume of sediments behind a dam relic on the Muskegon River, Big Rapids, Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 97-4069, p. 1-14.
- Westjohn, D. B., and Carter, P. J., Jr., 1989, Direct-current vertical-electrical resistivity soundings in the Michigan basin: U.S. Geological Survey Open-File Report, v. 89-244, p. 1-57.
- Westjohn, D. B., and Hoard, C. J., 2006, Hydrogeology and ground-water quality, Chippewa Township, Isabella County, Michigan, 2002-05: Scientific Investigations Report, p. 27-27.
- Westjohn, D. B., Olsen, H. W., and Willden, A. T., 1990, Matrix-controlled hydraulic properties of Mississippian and Pennsylvanian sandstones from the Michigan Basin: Open-File Report - U. S. Geological Survey, 18 p.
- Westjohn, D. B., and Weaver, T. L., 1996a, Configuration of Fresh water/Saline-Water Interface and Geologic Controls on Distribution of Freshwater in a Regional Aquifer System, Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4242, p. 1-44.
- , 1996b, Hydrogeologic Frame work of Pennsylvanian and Late Mississippian Rocks in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4107, p. 1-44.
- , 1996c, Hydrogeologic Framework of Mississippian Rocks in the Central Lower Peninsula of Michigan: U.S. Geological Survey Water-Resources Investigations Report, v. 94-4246, p. 1-46.
- , 1998, Hydrogeologic framework of the Michigan Basin Regional Aquifer System: U. S. Geological Survey Professional Paper, v. 1418, p. 1-47.
- Wheeler, M. L., 1967, Electric analog model study of the hydrology of the Saginaw Formation in the Lansing, Michigan area, MS: Michigan State University, 74 p.
- Wheeler, M. L., 1970, Electric analog model study of the hydrology of the Saginaw Formation in the Lansing, Michigan area; 1963: Technical Report - Institute of Water Research, Michigan State University, no. 10, p. 1-63.
- Wheeting, L. C., and Bergquist, S. C., 1921, Soil Survey of St. Joseph County, Michigan.
- , 1926, Soil Survey of Manistee County, Michigan.
- White, W. A., 1992, Displacement of salt by the Laurentide Ice Sheet: Quaternary Research, v. 38, no. 3, p. 305-315.
- Whiting, H., 1831, Remarks on the supposed tides, and periodical rise and fall of the North American lakes: American Journal of Science, v. 20, no. 2, p. 205-219.
- Whitney, G., 1997, Soil Survey of Mackinac County, Michigan.
- Whitney, G., and Calus, J. K., 2013, Soil Survey of Schoolcraft County, Michigan.
- Whitney, G., and Rodcock, S., 2006, Soil Survey of Luce County, Michigan.
- Whitney, G. D., 1992, Soil Survey of Chippewa County, Michigan.
- Whittlesey, C., 1851, On the "superficial deposits" of the northwestern part of the United States: American Association for the Advancement of Science Proceedings, v. 5, p. 54-57.
- , 1854, Drift etchings, Lake Superior: Annals of Science, v. 2, p. 57-59.
- , 1858, Fluctuations of level in the North American lakes: American Association for the Advancement of Science Proceedings, v. 11, p. 154-160.
- , 1874, On the cause of the transient fluctuations of level in Lake Superior: American Association for the Advancement of Science Proceedings, v. 22, no. B, p. 42-46.

- , 1885, Preglacial channel of Eagle River, Keweenaw Point, Lake Superior: American Journal of Science, v. 129, no. 173, p. 392-397.
- Wickham, J. T., Gross, D. L., Lineback, J. A., and Thomas, R. L., 1978, Late Quaternary sediments of Lake Michigan: Environmental Geology Notes, v. 84, p. 1-42.
- Wiitala, S. W., 1961, Some aspects of effect of urban and suburban development upon runoff: U.S. Geological Survey Open-File Report, v. 61-172, p. 1-28.
- , 1962, Floods in Mount Clemens, Michigan, scale 1:18,000.
- Wiitala, S. W., Newport, T. G., and Skinner, E. L., 1967, Water resources of the Marquette iron range area, Michigan: U.S. Geological Survey Water Supply Paper, v. 1842, p. 1-142.
- Wiitala, S. W., Vanlier, K. E., and Krieger, R. A., 1963, Water resources of the Flint area, Michigan: U.S. Geological Survey Water Supply Paper, v. 1499-E, p. 1-86.
- Wilder, H. J., and Geib, W. J., 1903, Soil Survey of the Pontiac Area, Michigan.
- Wildermuth, R., and Kerr, J. A., 1926, Soil Survey of Van Buren County, Michigan.
- Wildermuth, R., Moon, J. W., Schoenmann, L. R., and Veatch, J. O., 1924, Soil Survey of Alpena County, Michigan, p. 1-30.
- Wilkes, G., and Sawada, M., 2005, Geostatistically Derived Great Lakes USLE Monthly Rainfall Erosivity Factors: Journal of Great Lakes Research, v. 31, no. 2, p. 155-165.
- Wilkinson, B. H., Pope, B. N., and Owen, R. M., 1980, Nearshore Ooid Formation in a Modern Temperate Region Marl Lake: Journal of Geology, v. 88, no. 6, p. 697-704.
- William, F. E., 1910, Recent sedimentation in the western Great Lakes, MS: University of Wisconsin.
- Williams, E. L., Szramek, K. J., Jin, L. X., Ku, T. C. W., and Walter, L. M., 2007a, Carbonate system geochemistry of shallow groundwater-surface water systems in temperate glaciated watersheds (Michigan, USA): Significance of open-system dolomite weathering: Geological Society of America Bulletin, v. 119, no. 5-6, p. 515-528.
- Williams, E. L., Walter, L. M., Ku, T. C. W., Baptist, K. K., Budai, J. M., and Kling, G. W., 2007b, Silicate weathering in temperate forest soils: insights from a field experiment: Biogeochemistry, v. 82, no. 2, p. 111-126.
- Williams, G. R., 1940, Natural water loss in selected drainage basins: U.S. Geological Survey Water Supply Paper, v. 846, p. 1-62.
- Williams, G. R., Crawford, L. C., and Eisenlohr, W. S., 1942, Maximum discharges at stream-measurement stations through Dec. 31, 1937, with a supplement including additions and changes through Sept. 30, 1938 by W. S. Eisenlohr: U.S. Geological Survey Water Supply Paper, v. 847, p. 1-226.
- Williams, T. E., 1998, Soil Survey of Alcona County, Michigan.
- , 2004, Soil Survey of Alpena County, Michigan.
- Wilson, I. T., 1945, A Study of the Sediment in Douglas Lake, Cheboygan County, Michigan, : Papers of the Michigan Academy of Science, Arts and Letters, v. 30, no. 2, p. 391-419.
- Wilson, I. T., and Potzger, J. E., 1943, Pollen study of sediments from Douglas Lake, Cheboygan County and Middle Fish Lake, Montmorency County, Michigan: Proceedings of the Indiana Academy of Science, v. 52, p. 87-92.
- Wilson, J. A., 1999, Petrologic constraints of possible reactions of saline formation water with sediments at equilibrium with fresh pore water, Saginaw Bay, MS: Michigan State University, 66-66 p. p.
- Wilson, L. M., 1955, Surficial glacial deposits of the Michigan-Saginaw lobes in the Grand Rapids area, a study of relationships, MS: Michigan State University.
- Wilson, R. L., 1965, The Pleistocene vertebrates of Michigan, MS: University of Michigan.
- Wilson, R. L., 1967, The Pleistocene Vertebrates of Michigan: Papers of the Michigan Academy of Science, Arts and Letters, v. 52, no. 1, p. 197-234.
- Wilson, R. L., and Zug, G. R., 1966, A Fossil Map Turtle (*Graptemys pseudogeographica*) from Central Michigan: Copeia, no. 2, p. 368-369.

- Wimbrow, G. H., II, 2012, A statistical analysis of streamflow trends for the state of Michigan, MS: Michigan State University.
- Winchell, A., 1865a, Notice of the remains of a mastodon recently discovered in Michigan: American Journal of Science, v. 88, no. 113, p. 223-224.
- , 1865b, The soils and subsoils of Michigan, Lansing, 30 p.:
- , 1865c, Some indications of a northward transportation of drift materials in the Lower Peninsula of Michigan: American Journal of Science, v. 90, no. 120, p. 331-338.
- , 1866, The Grand Traverse region, a report on the geological and industrial resources of the counties of Antrim, Grand Traverse, Benzie, and Leelanau in the Lower Peninsula of Michigan, Ann Arbor, Michigan Geological Survey Open File Report, 97 p.
- , 1869, Outline of a proposed final report of a survey of the State of Michigan, Ann Arbor, 8 p.
- , 1871a, Geology of Berrien Co., in Cowles, E. B., ed., Berrien County directory and history: Buchanan, Record Steam Printing House, p. 21-26.
- , 1873, The diagonal system in the physical features of Michigan: American Journal of Science, v. 106, no. 31, p. 36-40.
- , 1875, Supposed agency of ice floes in the Champlain period: Science Monthly, v. 1, p. 14-17.
- , 1876, Supposed agency of ice floes in the Champlain period: American Journal of Science, v. 111, no. 63, p. 225-228.
- Winchell, A., Hosford, O., Haddock, R., and Walling, H. F., 1873, Atlas of the State of Michigan, including statistics and descriptions of its topography, hydrogeography, climate, nature and civil history, railways, educational institutions, material resources, etc., Detroit R. M. and S. T. Tackabury, Publishers.
- Winchell, N. H., 1871b, The glacial features of Green Bay of Lake Michigan with some observations on a probable former outlet of Lake Superior: American Journal of Science, v. 102, no. 7, p. 15-19.
- Windmuller-Campione, M. A., Kotar, J., and Nagel, N. M., 2015, Habitat types – What they can tell us now and in the future: Applied Ecology and Environmental Research, v. 13, no. 3, p. 893-913.
- Wingard, N. E., 1969, Economic and petrographic evaluation of gravel resources in southern Michigan, PhD: Michigan State University, 124 p.
- Winkler, E. M., 1960, Post-Pleistocene ostracodes of Lake Nipissing age, Michigan: Journal of Paleontology, v. 34, no. 5, p. 923-932.
- Winslow, D. C., 1952, Laboratory study of lake ice, MS: University of Michigan, 36 p.
- Winters, H. A., and Rieck, R. L., 1980, Significance of landforms in southeastern Michigan: Annals of the Association of American Geographers, v. 70, p. 413-423.
- Winters, H. A., and Rieck, R. L., 1982, Drainage reversals and transverse relationships of rivers to moraines in southern Michigan: Physical Geography, v. 3, no. 1, p. 70-82.
- Winters, H. A., and Rieck, R. L., 1991, Late glacial terrain transformation in Michigan: Michigan Academician, v. 23, p. 137-148.
- Winters, H. A., Rieck, R. L., and Knapp, R. O., 1986, Significance and Ages of Mid-Wisconsinan organic deposits in southern Michigan: Physical Geography, v. 7, p. 292-305.
- Wireman, M., 1987, Nitrate pollution of ground water in glacial sediments underlying a fertigated site in Kalamazoo County, Michigan, MS: Western Michigan University.
- Wisler, C. O., Stramel, G. J., and Laird, L. B., 1952, Water resources of the Detroit Area, Michigan U.S. Geological Survey Circular, v. 183, p. 1-36.
- Wittala, S. W., Vanlier, K. E., and Krieger, R. A., 1963, Water resources of the Flint area, Michigan U.S. Geological Survey Water-Supply Paper, v. 1499-E, p. 1-86.
- Wittkop, C., Teranes, J., Lubenow, B., and Dean, W. E., 2014, Carbon- and oxygen-stable isotopic signatures of methanogenesis, temperature, and water column stratification in Holocene siderite varves: Chemical Geology, v. 389, p. 153-166.

- Wittkop, C. A., 2004, Paleoenvironmental reconstruction using laminated sediments containing authigenic carbonate minerals: Case studies from the Great Lakes region of North America, PhD: University of Minnesota.
- Wittkop, C. A., Teranes, J. L., Dean, W. E., and Guilderson, T. P., 2009, A lacustrine carbonate record of Holocene seasonality and climate: *Geology*, v. 37, no. 8, p. 695-698.
- Woerner, J., 1973, Don't Wait for Tomorrow, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 133-133.
- Wold, R., 1980, Review of Lake Michigan Seismic Reflection Data: U.S. Geological Survey Open-File Report, v. 80-902.
- Wold, R. J., Hutchinson, D. R., and Johnson, t. C., 1982, Topography and surficial structure of Lake Superior bedrock as based on seismic reflection profiles, *in* Wold, R. J., and Hinze, W. J., eds., *Geology and Tectonics of the Lake Superior Basin*, Volume 156: Boulder, Geological Society of America, p. 257-272.
- Wold, R. J., Paull, R. A., Wolosin, C. A., and Friedel, R. J., 1981, Geology of central Lake Michigan: *American Association of Petroleum Geologists Bulletin*, v. 65, no. 9, p. 1621-1632.
- Wolin, J. A., 1992, Paleoclimatic implications of Late Holocene lake-level fluctuations in Lower Herring Lake, Michigan, PhD: University of Michigan.
- , 1996, Late Holocene lake-level and lake development signals in Lower Herring Lake, Michigan: *Journal of Paleolimnology*, v. 15, no. 1, p. 19-45.
- Wolin, J. A., and Stoermer, E. F., 2005, Response of a Lake Michigan coastal lake to anthropogenic catchment disturbance: *Journal of Paleolimnology*, v. 33, no. 1, p. 73-94.
- Wong, S. A., 2002, Stratigraphic analysis of diamicton units in southern Allegan County, Michigan, MS: Western Michigan University.
- Wonser, C. H., Veatch, J. O., and DeBoer, W. J., 1939, Soil survey of Mason County, Michigan.
- Wood, B. D., 1912, Gaging stations maintained by the United States Geological Survey, 1888-1910, and survey publications relating to water resources: U.S. Geological Survey Water Supply Paper, v. 280, p. 1-102.
- Wood, L. E., 1958, Bottom sediments of Saginaw Bay, Michigan, PhD: Michigan State University.
- Wood, W. L., Todd Stockberger, M., and Madalon, L. J., 1994, Modeling Beach and Nearshore Profile Response to Lake Level Change: *Journal of Great Lakes Research*, v. 20, no. 1, p. 206-214.
- Wood, W. W., 1969, Geochemistry of ground water of the Saginaw Formation in the upper Grand River basin, Michigan, PhD: Michigan State University, 104 p.
- Wood, W. W., 1970, Chemical quality of Michigan streams: U.S. Geological Survey Circular, v. 634, p. 1-21.
- Woodruff, J. C., 1973a, Geology and the Energy-Environment Dilemma, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 67-68.
- , 1973b, Geology and the Energy-Environment Dilemma, *in* Straw, W. T., and Chambers, R. L., eds., *Geology and the Environment*, Michigan Basin Geological Society, p. 148-150.
- Woods, K. D., 2014, Multi-decade biomass dynamics in an old-growth hemlock-northern hardwood forest, Michigan, USA: *Peerj*, v. 2.
- Wooldridge, C. W., 1884, Recent geological change in western Michigan: *Popular Science Monthly*, v. 24, p. 826-830.
- , 1888a, The post-glacial geology of Ann Arbor, Michigan: *American Geologist*, v. 2, no. 1, p. 35-39.
- , 1888b, The river-lake system of western Michigan: *American Geologist*, v. 1, no. 3, p. 143-146.

- Woolever, C. J., 2008, Origin of Esker and Tunnel Valley Assemblages in the Saginaw Lobe, Barry County, Michigan, MS: Western Michigan University.
- Wooster, L. C., 1884, Kames near Lansing, Michigan: *Science*, v. 3, p. 4-4.
- , 1911, An esker at Mason, Michigan: *Kansas Academy of Sciences Transactions*, v. 23-24, p. 91-94.
- Woznicki, S. A., Nejadhashemi, A. P., Ross, D. M., Zhang, Z., Wang, L. Z., and Esfahanian, A. H., 2015, Ecohydrological model parameter selection for stream health evaluation: *Science of the Total Environment*, v. 511, p. 341-353.
- Wright, G. F., 1918, Explanation of the abandoned beaches about the south end of Lake Michigan: *Geological Society of America Bulletin*, v. 29, p. 235-244.
- Wright Jr, H. E., 1971, Retreat of the Laurentide ice sheet from 14,000 to 9000 years ago: *Quaternary Research*, v. 1, no. 3, p. 316-330.
- Wulf, G. R., 1963, Bars, spits, and ripple marks in a Michigan lake: *American Association of Petroleum Geologists Bulletin*, v. 47, no. 4, p. 691-695.
- Wyman, D., 2014, Effects of Road Salt on Asylum Lake Geochemistry, MS: Western Michigan University, 106 p.
- Xinyu, Y., 2014, A stochastic multi-scale model of stream-groundwater interaction in strongly heterogeneous porous medium and its application in southern Branch County, Michigan, MS: Michigan State University.
- Yermakov, Z., and Rothstein, D. E., 2006, Changes in soil carbon and nitrogen cycling along a 72-year wildfire chronosequence in Michigan jack pine forests: *Oecologia*, v. 149, no. 4, p. 690-700.
- Yohn, S., Long, D., Fett, J., and Patino, L., 2004, Regional versus local influences on lead and cadmium loading to the Great Lakes region: *Applied Geochemistry*, v. 19, no. 7, p. 1157-1175.
- Yohn, S. S., 2004, Natural and anthropogenic factors influencing spatial and temporal patterns of metal accumulation in inland lakes, PhD: Michigan State University, 322 p.
- Young, C. T., and Droege, D. R., 1986, Archaeological applications of resistivity and magnetic methods at Fort Wilkins State Park, Michigan: *Geophysics*, v. 51, no. 3, p. 568-575.
- Yu, S.-Y., Colman, S. M., and Milne, G. A., 2013, Radiocarbon Dating of Basal Peats Supports Separation of Lake Superior from Lakes Michigan-Huron about 1250 years ago: *Earth and Planetary Science Letters*, v. 375, p. 319-325.
- Yu, S. Y., Colman, S. M., Lowell, T. V., Milne, G. A., Fisher, T. G., Breckenridge, A., Boyd, M., and Teller, J. T., 2010, Freshwater Outburst from Lake Superior as a Trigger for the Cold Event 9300 Years Ago: *Science*, v. 328, p. 1262-1266.
- Yun, S. H., Addink, R., McCabe, J. M., Ostaszewski, A., Mackenzie-Taylor, D., Taylor, A. B., and Kannan, K., 2008, Polybrominated diphenyl ethers and polybrominated biphenyls in sediment and floodplain soils of the Saginaw River watershed, Michigan, USA: *Archives of Environmental Contamination and Toxicology*, v. 55, no. 1, p. 1-10.
- Yurista, P. M., Kelly, J. R., Cotter, A. M., Miller, S. E., and Van Alstine, J. D., 2015, Lake Michigan: Nearshore variability and a nearshore-offshore distinction in water quality: *Journal of Great Lakes Research*, v. 41, no. 1, p. 111-122.
- Yurk, B., Hansen, E. C., deVries-Zimmerman, S., Kilibarda, Z., van Dijk, D., Bodenbender, B., Krehel, A., and Pennings, T., 2014, The role of extratropical cyclones in shaping dunes along southern and southeastern Lake Michigan, *in* Fisher, T. G., and Hansen, E. C., eds., *Coastline and Dune Evolution along the Great Lakes*, Volume 508: Boulder, Geological Society of America, p. 167-194.
- Yurk, B. P., DeVries-Zimmerman, S., Hansen, E., Bodenbender, B. E., Kilibarda, Z., Fisher, T. G., and van Dijk, D., 2013, Dune complexes along the southeastern shore of Lake Michigan; geomorphic history and contemporary processes: *Geological Society of America Field Guide*, v. 31, p. 57-102.

- Zabik, S. M., 1992, Azimuthal Resistivity in Glacial Deposits: A comparison of Azimuthal Sensitivity Using Different Array Geometrics, MS, Western Michigan University.
- Zekkos, D., Kabalan, M., Syal, S. M., Hambright, M., and Sahadewa, A., 2013, Geotechnical characterization of a Municipal Solid Waste Incineration Ash from a Michigan monofill: *Waste Management*, v. 33, no. 6, p. 1442-1450.
- Zhang, X., Rygwelski, K. R., Rowe, M. D., Rossmann, R., and Kreis Jr, R. G., 2016, Global and regional contributions to total mercury concentrations in Lake Michigan water: *Journal of Great Lakes Research*, v. 42, no. 1, p. 62-69.
- Zhang, X. C., Christensen, E. R., and Yan, L. Y., 1993, Fluxes of Polycyclic Aromatic Hydrocarbons to Green Bay and Lake Michigan Sediments: *Journal of Great Lakes Research*, v. 19, no. 2, p. 429-444.
- Zimmerman, A. R. B., and Owen, R. M., 1990, A Quantitative Model of the Dispersal of Detrital Inputs and Minor Compositional Components in Lake Michigan Sediments: *Journal of Great Lakes Research*, v. 16, no. 3, p. 444-456.
- Zirbel, N. N., 1940, Michigan Weathering: *Geophysics*, v. 5, no. 4, p. 382-384.
- Zogg, G. P., and Barnes, B. V., 1995, Ecological classification and analysis of wetland ecosystems, northern Lower Michigan, U.S.A.: *Canadian Journal of Forest Research*, v. 25, no. 11, p. 1865-1875.
- Zorn, T. G., and Wills, T. C., 2012, A Reconnaissance Survey of the Effects of Sediment Traps on Michigan Streams: *North American Journal of Fisheries Management*, v. 32, no. 5, p. 1005-1016.
- Zumberge, J. E., 1960, Correlation of Wisconsin drifts in Illinois, Indiana, Michigan and Ohio: *Geological Society of America Bulletin*, v. 71, p. 1177-1188.
- Zumberge, J. E., and Potzer, J. E., 1956, Late Wisconsin chronology of the Lake Michigan Basin Correlated with Pollen Studies: *Geological Society of America Bulletin*, v. 67, p. 271-288.
- Zumberge, J. H., 1955, Pollen profiles, radiocarbon dating and geologic chronology of Lake Michigan Basin: *Science*, v. 121, no. 3139, p. 374-383.
- , 1957, Land drainage and the water table in Southern Michigan and Northern Indiana: *Papers of the Michigan Academy of Science, Arts and Letters*, v. 48, p. 105-113.
- Zumberge, J. H., and Wilson, J. T., 1953, Quantitative studies on thermal expansion and contraction of lake ice: *Journal of Geology*, v. 61, no. 4, p. 374-383.
- Zuzek, P. J., Nairn, R. B., and Thieme, S. J., 2003, Spatial and Temporal Considerations for Calculating Shoreline Change Rates in the Great Lakes Basin: *Journal of Coastal Research*, v. 38, p. 125-146.

Other Michigan Geology References

- Allen, R. C., 1912, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1910 and prior years: Michigan Geological and Biological Survey, Publication, v. 8, no. 6.
- , 1913, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1912 and prior years: Michigan Geological and Biological Survey, Publication, v. 13, no. 10, p. 1-255.
- , 1914a, Biennial Report of the Director: Michigan Geological and Biological Survey, Publication, v. 17, no. 14, p. 1-104.
- , 1914b, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1913 and prior years: Michigan Geological and Biological Survey, Publication, v. 16, no. 13, p. 1-150.
- , 1915, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1914 and prior years: Michigan Geological and Biological Survey, Publication, v. 19, no. 16, p. 1-359.
- , 1916a, Biennial report of the Director and report on retracement and permanent monumenting of the Michigan-Ohio boundary: Michigan Geological and Biological Survey, Publication, v. 22, no. 18, p. 1-118.
- , 1916b, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1915 and prior years: Michigan Geological and Biological Survey, Publication, v. 21, no. 17, p. 1-402.
- , 1917a, Geological map of Michigan: Michigan Geological and Biological Survey, Publication, v. 23, no. 19.
- , 1917b, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1916 and prior years: Michigan Geological and Biological Survey, Publication, v. 24, no. 20, p. 1-291.
- , 1918, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1917 and prior years: Michigan Geological and Biological Survey, Publication, v. 27, no. 22, p. 1-225.
- , 1920, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1918 and prior years: Michigan Geological and Biological Survey, Publication, v. 29, no. 24, p. 1-214.
- , 1936, Occasional Papers on the Geology of Michigan: Michigan Geological and Biological Survey, Publication, v. 40, no. 34, p. 1-260.
- Allen, R. C., and Ruthven, A. G., 1911, Progress of the Geological and Biological Survey of Michigan: Thirteenth Report of the Michigan Academy of Science 1911, v. 13, p. 69-80.
- , 1912, Progress of the Geological and Biological Survey of Michigan: Fourteenth Report of the Michigan Academy of Science 1912, v. 14, p. 33-44.
- Andrews, R. M., 1910, Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics, v. 1909.
- Anonymous, 1899, Dr. Douglass Houghton: Michigan Miner, v. 2, no. 1, p. 26-27.

- Barnett, L., 1997, A Union List of Publications from Michigan's Mineral Springs, Mineral Wells, and Mineral Baths: The Michigan Historical Review, v. 23, p. 167-187.
- Barrett, L. P., 1922, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1922 and prior years: Geological Survey Division Publication, v. 34, p. 146.
- Been, W., 1966, Mineral resources, depletion or deterioration?: Michigan Geological Survey Circular, v. 3, p. 1-8.
- Bertalan, D. T., 1979, Blowout prevention Equipment: Use and Testing: Michigan Geological Survey Circular, v. 17.
- Bloor, D. L., 1960, Geologic planiform maps of the Southern Peninsula of Michigan, MS: University of Michigan, 20 p.
- Bradish, A., 1889, Memoir of Douglass Houghton, first state Geologist of Michigan: with an appendix containing reports of abstracts of the first geological survey, a chronological statement of the progress of geological exploration in Michigan, p. 1-302.
- Briggs, L. I., 1968, Geology of Subsurface Waste Disposal in Michigan Basin, Subsurface Disposal in Geologic Basins- A Study of Reservoir Strata, Volume 10, AAPG, p. 128-153.
- Broderick, G. N., 1972, Mineral Industry of Michigan, 1970: Annual Statistical Summary, v. 15, p. 1-18.
- , 1973, Mineral Industry of Michigan, 1971: Annual Statistical Summary, v. 17, p. 1-16.
- , 1974, Mineral Industry of Michigan, 1972: Annual Statistical Summary, v. 19, p. 1-21.
- , 1976, Mineral Industry of Michigan, 1973: Annual Statistical Summary, v. 21, p. 1-22.
- Bussey, F. R., 1949, Analysis of gravity measurements in the Great Lakes region: University of Michigan.
- Byerley, J. R., 1964, Directory of Michigan mineral operators, 1963: Michigan Geological Survey Division, p. 1-65.
- Champion, B. L., 1959, Inventory of sample logs and core descriptions available at Michigan Geological Survey, January 1956 through December 1959, p. 1-29.
- Champion, B. L., and Edwards, R. H., 1955, Inventory of sample logs and core descriptions available at Michigan Geological Survey, p. 1-85.
- Cookingham, E. R., 1894, Atlas of Sanilac County, Michigan, Philadelphia, J. L. Smith.
- Coons, A. T., 1933, Salt, bromine, calcium chloride, and iodine: U.S. Geological Survey Mineral Yearbook, v. 1932, p. 687-700.
- , 1934, Salt, bromine, calcium chloride, and iodine: U.S. Geological Survey Mineral Yearbook, v. 1933, p. 929-945.
- , 1935, Salt, bromine, calcium chloride, and iodine: U.S. Geological Survey Mineral Yearbook, v. 1934, p. 1029-1046.
- Coons, A. T., and Harris, F. E., 1937, Salt, bromine, calcium chloride, and iodine: U.S. Geological Survey Mineral Yearbook, v. 1933, p. 1413-1427.
- , 1938, Salt, bromine, calcium chloride, and iodine: U.S. Geological Survey Mineral Yearbook, v. 1936, p. 1269-1283.
- , 1939, Salt: U.S. Geological Survey Mineral Yearbook, v. 1938, p. 1355-1366.
- , 1940, Salt: U.S. Geological Survey Mineral Yearbook, v. 1939, p. 1421-1433.
- , 1941, Salt: U.S. Geological Survey Mineral Yearbook, v. 1940, p. 1369-1380.
- Corliss, B. C., 1960, Southeastern Michigan Geology: A guidebook for teachers [MS: University of Michigan, 111 p.
- Currie, W. W., 1978, Annotated list of the publications of the Michigan Geological Survey, 1838-1977: Michigan Geological Survey Division, Circular, v. 16, p. 1-38.
- Dorr, J. A., and Eschman, D. F., 1970, Geology of Michigan, Ann Arbor, The University of Michigan Press, 476 p.:

- Eddy, G. E., 1966, Role of geology in state government: Michigan Geological Survey Circular, v. 6, p. 1-6.
- Edwards, J. P., 1892, Mines and Mineral Statistics Annual Report of the Commissioner of Mineral Statistics. 1891, 1-138 p.:
- , 1893, Mines and Mineral Statistics Annual Report of the Commissioner of Mineral Statistics. 1892, 1-138 p.:
 - , 1897, Mines and Mineral Statistics Annual Report of the Commissioner of Mineral Statistics. 1896, 1-138 p.:
- Esparza, L. E., and Gere, M. A., Jr., 1990, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1989, p. 247-260.
- Gere, M. A., Jr., 1979, Michigan's Mineral Producers 1978: Michigan Geological Survey Division, Annual Directory, v. 12, p. 1-106.
- Gillespie, R., Harrison III, W. B., and Grammer, G. M., 2008, Geology of Michigan and the Great Lakes, Cengage.
- Halt, R. T., 1947, History of the Cranbrook mineral collection: Midwest Geology, v. 1, no. 2, p. 5-5.
- Hanna, T. A., 1903, Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics, v. 1902, p. 1-162.
- , 1904, Mines and Mineral Statistics 1903: Annual Report of the Commissioner of Mineral Statistics.
- Hardenberg, H. J., 1948, Michigan's mineral industries, 1946: Michigan Geological Survey Publication, p. 1-10.
- Hardenberg, H. J., and Rosenau, J. C., 1948, Michigan's Mineral Industries, 1948: Michigan Geological Survey Division, p. 1-7.
- , 1950a, Michigan's mineral industries, 1948: Michigan Geological Survey Division, p. 1-34.
 - , 1950b, Michigan's mineral industries, 1949: Michigan Geological Survey Division, p. 1-47.
- Harness, C. L., and Downey, M. G., 1945, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1944, p. 1298-1309.
- , 1946, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1945, p. 1313-1324.
 - , 1947, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1946, p. 588-599.
- Harris, F. E., and Tucker, E. M., 1945, Salt: U.S. Geological Survey Mineral Yearbook, v. 1944, p. 1484-1497.
- , 1946, Salt: U.S. Geological Survey Mineral Yearbook, v. 1945, p. 1513-1527.
 - , 1947, Salt: U.S. Geological Survey Mineral Yearbook, v. 1946, p. 1031-1045.
 - , 1948, Salt: U.S. Geological Survey Mineral Yearbook, v. 1947, p. 1019-1033.
- Harris, F. E., and Warner, K. G., 1942, Salt: U.S. Geological Survey Mineral Yearbook, v. 1941, p. 1483-1495.
- , 1943, Salt: U.S. Geological Survey Mineral Yearbook, v. 1942, p. 1477-1490.
 - , 1944, Salt: U.S. Geological Survey Mineral Yearbook, v. 1943, p. 1527-1540.
- Heinrich, E. W., 1976, The mineralogy of Michigan: Michigan Geological Survey Bulletin, v. 6, p. 1-225.
- , 1979, Economic geology of the sand and sandstone resources of Michigan: Geological Survey Division Report of Investigation, v. 21, p. 1-31.
- Herringshaw, D. E., and McGowan, D., 1947, Burying gas in Michigan: Public Utilities Fortnightly, v. 40, p. 471-475.
- Hill, J. J., 1983, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1982, p. 271-282.
- , 1987, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1986, p. 241-254.
 - , 1988, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1987, p. 197-208.

- , 1989, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1988, p. 251-264.
- Hill, J. J., and Prosser, L. J., Jr., 1980, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1978-1979, p. 263-276.
- Hill, J. J., and Tuchman, R. J., 1981, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1980, p. 259-273.
- , 1982, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1981, p. 255-266.
- Hill, J. J., and West, W. J., 1984, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1983, p. 301-316.
- , 1985, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1984, p. 285-301.
- , 1986, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1985, p. 285-301.
- Houghton, D., 1842, Fifth Annual Report of the State Geologist 1842: House, v. 14.
- Houk, L. G., and Downey, M. G., 1948, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1947, p. 580-592.
- Hubbard, B., 1881, A Michigan geological excursion in 1837: Michigan Pioneer Collection, v. 3, p. 189-201.
- Hubbard, O. P., 1841, Notice of Geological Surveys; I, of the State of Ohio; II, of Indiana; III of Michigan: American Journal of Science, v. 40, p. 126-137.
- Jefferson, M. S. W., 1904, What has Geology Done for Michigan?: Michigan Academy of Science Annual Report, v. 1, no. 1, p. 4-5.
- , 1905, Report of the State Geologist of Michigan for the Year, 1904.: Bulletin of the Michigan Academy of Science, v. 2, no. 2, p. 8-9.
- Karpiak, S., 1978, The Establishment of the Porcupine Mountains State Park: Michigan Academician, v. 11, no. 1, p. 75-83.
- Kelley, R. W., 1957, Geology Notes for Upper Peninsula Traveling Workshop.
- , 1962, Guide to Michigan Fossils: Michigan Geological Survey Pamphlet, v. 3.
- , 1964, Our rock riches: A selected collection of reprinted articles on Michigan's mineral resources by various authors: Michigan Geological Survey Bulletin, v. 1, p. 1-109.
- , 1968, Bedrock of Michigan, scale 1:2,500,000.
- , 1971, Geological Sketch of Michigan Sand Dunes: Michigan Geological Survey Pamphlet, v. 5.
- , 1977, Bedrock of Michigan, scale 1:2,500,000.
- Kelley, R. W., and Hardenberg, H. J., 1962, Collecting Minerals in Michigan: Michigan Geological Survey Pamphlet, v. 4.
- Kelley, R. W., and Kirkby, E. A., 1963, Michigan Geological Sourcebook: Michigan Geological Survey Circular, v. 1, p. 1-15.
- , 1967, Sources of Geologic Information in Michigan: Michigan Geological Survey Circular, v. 5, p. 1-24.
- Kirkby, E. A., 1961, Bibliography of Michigan Geology, 1956-1960: Michigan Geological Survey Division, v. 50, p. 1-66.
- , 1964, Geologic contributions to "Michigan Conservation": Classified and Annotated List, 1935-1964: Michigan Geological Survey Circular, v. 2, p. 1-11.
- , 1967, Index to Michigan Geologic Theses: Michigan Geological Survey Circular, v. 7, p. 1-32.
- , 1970a, Geologic Map Index of Michigan: Michigan Geological Survey Division, Circular, v. 8, p. 1-56.
- , 1970b, Geologic map index of Michigan 1843-1962: Michigan Geological Survey Circular, v. 8, p. 1-56.

- Klyce, D. F., 1964, Mineral Industry of Michigan, 1963: Annual Statistical Summary, v. 1, p. 1-25.
- , 1966, Mineral Industry of Michigan, 1964: Annual Statistical Summary, v. 3, p. 1-22.
 - , 1967, Mineral Industry of Michigan, 1965: Annual Statistical Summary, v. 5, p. 1-19.
 - , 1968, Mineral Industry of Michigan, 1966: Annual Statistical Summary, v. 7, p. 1-19.
 - , 1969, Mineral Industry of Michigan, 1967: Annual Statistical Summary, v. 9, p. 1-19.
 - , 1970, Mineral Industry of Michigan, 1968: Annual Statistical Summary, v. 11, p. 1-19.
 - , 1971, Mineral Industry of Michigan, 1969: Annual Statistical Summary, v. 13, p. 1-18.
- Krause, D., 1989, Henry Rowe Schoolcraft and the Native Copper of the Keweenaw: Earth Sciences History, v. 8, no. 1, p. 4-13.
- Lamey, C. A., 1935, Mineral Resources of Michigan, Federal Emergency Relief Administration Project: Houghton.
- Lane, A. C., 1900, The geological survey: annual report of the State Geologist for the year ending December 31, 1899: Michigan Miner, v. 2, no. 3, p. 9-13.
- , 1901a, Annual Report of the State Geologist for 1900: Michigan Miner, v. 3, no. 2, p. 13-21.
 - , 1901b, The economic geology of Michigan in its relation to the business world: Michigan Miner, v. 4, no. 1, p. 9-15.
 - , 1902a, Recent Work of the Geological Survey: Third Report of the Michigan Academy of Science 1901, v. 3, p. 38-39.
 - , 1902b, Report of the state board of Geological Survey of Michigan for the year 1901, being the report of Alfred C. Lane, State Geologist, 304 p.
 - , 1903, Annual report geological survey of Michigan for 1902: Michigan Miner, v. 5, no. 2, p. 16-26.
 - , 1904, Historical Review of the Geology of Michigan: Fifth Report of the Michigan Academy of Science 1903, v. 5, p. 184-195.
 - , 1905a, Natural Resources, Their Consumption and Conservation (Presidential Address): Seventh Report of the Michigan Academy of Science 1905, v. 7, p. 17-26.
 - , 1905b, Report of the State Board of Geological Survey of Michigan for the year 1903, being the report of Alfred C. Lane, State Geologist: Michigan Geological Survey Annual Report, v. 1903, p. 1-432.
 - , 1905c, Report of the State Board of Geological Survey of Michigan for the year 1904, being the report of Alfred C. Lane, State Geologist: Michigan Geological Survey Annual Report, v. 1904, p. 1-182.
 - , 1906, Report of the State Board of Michigan Geological Survey for the year 1905, being the report of Alfred C. Lane, State Geologist: Michigan Geological Survey Annual Report, p. 1-638.
 - , 1907, Report of the State Board of Michigan Geological Survey for the year 1906, being the report of Alfred C. Lane, State Geologist: Michigan Geological Survey Annual Report, p. 1-601.
 - , 1908, Report of the State Board of Michigan Geological Survey for the year 1907 being the report of Alfred C. Lane, State Geologist, 1-288 p.
 - , 1909a, Annual Report of the State Geologist, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist.
 - , 1909b, Report of the State Board of Michigan Geological Survey for the year 1908 being the report of Alfred C. Lane, State Geologist, 1-402 p.
- Lane, A. C., and Seaman, A. E., 1909, Notes on the geological section of Michigan for geologists, teachers and drillers, *in* Lane, A. C., ed., Report on the State Board of Geological Survey of Michigan for the year 1908, being the report of Alfred C. Lane, State Geologist.

- Lankton, L. D., and Hyde, C. K., 1982, Old Reliable - an illustrated history of the Quincy Mining Company, Hancock, The Quincy Mine Hoist Association, Inc., 159 p.
- Lawton, C. D., 1886, Mineral Resources, Annual Report of the Commissioner of Mineral Statistics.
- , 1887, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1886, 280 p.:
 - , 1888, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1887.
 - , 1889, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1888.
 - , 1890, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1889.
 - , 1891, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1890.
- Lewis, J. D., 1975, Michigan's Industrial Sand Resources: Michigan Geological Survey Circular, v. 11, p. 1-33.
- Martin, H. M., 1923, An Abstract of "A History of The Michigan Geological and Biological Survey by R. C. Allen and H. M. Martin": Papers of the Michigan Academy of Science, Arts and Letters, v. 1, p. 224-247.
- , 1937a, The Centennial Geological Map of Michigan: Michigan Geological and Biological Survey, Publication, v. 39, no. 33.
 - , 1937b, A hundred years of geological survey in Michigan: Michigan Conservation, v. 7.
 - , 1937c, The Michigan Geological Survey: Association of American State Geologists Journal, v. 8, no. 3, p. 3-15.
 - , 1942a, They need not vanish: a discussion of the natural resources of Michigan, p. 294.
 - , 1942b, War jobs for Michigan minerals: Michigan Conservation, v. 11, no. 7.
 - , 1945a, Douglass Houghton (1809-1845): Michigan Conservation, v. 14, no. 10, p. 11-11.
 - , 1945b, Geology to archaeology: Michigan Conservation, v. 14, no. 3, p. 3, 10.
 - , 1946, R. A. Smith is retiring on August 1: Michigan Conservation, v. 15, no. 6, p. 5, 14.
 - , 1950a, Michigan story: Michigan Conservation, v. 19, no. 2, p. 5-8.
 - , 1950b, Those busy bacteria: Michigan Conservation, v. 19, no. 6, p. 11-12.
 - , 1951, How old is Michigan?: Michigan Conservation, v. 20, no. 1, p. 9-10.
 - , 1952, Outline of the geologic history of Michigan: Michigan Geological Survey Division, p. 1-12.
 - , 1953, Romance of the pipe lines: Michigan Conservation, v. 22, no. 5, p. 15-20.
 - , 1954, How it all began: Michigan Conservation, v. 23, no. 5, p. 7-10.
 - , 1957a, Geological Map of Michigan: Michigan Geological and Biological Survey, Publication, v. 39, no. 33.
 - , 1957b, Outline of the Geologic History of Cheboygan County: Michigan Department of Conservation, Geological Survey Division.
 - , 1957c, Outline of the Geologic History of Grand Traverse County: Michigan Department of Conservation, Geological Survey Division.
 - , 1957d, Outline of the Geologic History of Hillsdale County: Michigan Department of Conservation, Geological Survey Division.
 - , 1957e, Outline of the Geologic History of Kalamazoo County: Michigan Department of Conservation, Geological Survey Division.
 - , 1957f, Outline of the Geologic History of Oceana County: Michigan Department of Conservation, Geological Survey Division.
 - , 1957g, Outline of the Geologic History of Ogemaw County: Michigan Department of Conservation, Geological Survey Division.

- , 1957h, Outline of the Geologic History of Saginaw County: Michigan Department of Conservation, Geological Survey Division.
- , 1958a, Outline of the Geologic History of Branch County: Michigan Department of Conservation, Geological Survey Division.
- , 1958b, Outline of the Geologic History of Ingham County: Michigan Department of Conservation, Geological Survey Division.
- , 1958c, Outline of the Geologic History of Lenawee County: Michigan Department of Conservation, Geological Survey Division.
- , 1958d, Outline of the Geologic History of Mecosta County: Michigan Department of Conservation, Geological Survey Division.
- , 1958e, Outline of the Geologic History of Midland County: Michigan Department of Conservation, Geological Survey Division.
- , 1958f, Outline of the Geologic History of Ottawa County: Michigan Department of Conservation, Geological Survey Division.
- , 1958g, Outline of the Geologic History of Roscommon County: Michigan Department of Conservation, Geological Survey Division.
- , 1958h, Outline of the Geologic History of Shiawassee County: Michigan Department of Conservation, Geological Survey Division.
- , 1973, Glimpses into the Life of Carl Ludwig Rominger: Museum of Paleontology, Papers on Paleontology, v. 5, p. 1-60.
- Martin, H. M., and Straight, M. T., 1956, An Index of Michigan Geology 1823-1955: Michigan Geological Survey Division Publication, v. 50, p. 1-461.
- Mattice, A. E., 1900a, How Michigan was made: Michigan Miner, v. 2, no. 1, p. 15-17.
- , 1900b, How Michigan was made: Michigan Miner, v. 2, no. 2, p. 9-14.
- , 1900c, How Michigan was made: Michigan Miner, v. 2, no. 3, p. 13-17.
- , 1900d, How Michigan was made: Michigan Miner, v. 2, no. 4, p. 20-22.
- , 1900e, How Michigan was made: Michigan Miner, v. 2, no. 5, p. 9-9.
- Merk, G., 1982, Douglass Houghton, Michigan's First State Geologist: Earth Sciences History, v. 1, no. 1, p. 36-44.
- Merk, G. P., 1996, The Genesis of Michigan's Iron Ore: A Tale of Mistaken Identity: Michigan Academician, v. 28, no. 2, p. 165-180.
- Michigan Geological and Biological Survey Division., 1923, Catalog and Table of Contents of the Publications of the Geological and Biological Survey Division of the Michigan Department of Conservation with a list of publications of the U.S. Geological Survey relating to Michigan: Michigan Geological and Biological Survey, Publication List, v. 1, p. 1-36.
- Michigan Geological Survey Division, 1954, List of Publications, Revised: Michigan Geological Survey Publication List, v. 2.
- , 1972, Reports and Publications of the Geological Survey Division: Michigan Geological Survey Publication List, v. 3, p. 1-39.
- , 1972, State of Michigan mineral well act and general rules governing mineral well operations: Michigan Geological Survey Circular, v. 10, p. 1-16.
- , 1976, Mine reclamation act and rules: Michigan Geological Survey Circular, v. 13, p. 1-13.
- Monette, C. J., 1976, The history of Jacobsville and its sandstone quarries, Lake Linden, Welden H. Curtin, 71 p.:
- Morey, G., 1989a, Early Geologic Studies in the Lake Superior Region-the Contributions of H.R. Schoolcraft, J.J. Bigsby, and H.W. Bayfield: Earth Sciences History, v. 8, no. 1, p. 36-42.
- Morey, G. B., 1989b, Early geologic studies in the Lake Superior region; the contributions of H. R. Schoolcraft, J. J. Bigsby, and H. W. Bayfield: Earth Sciences History, v. 8, no. 1, p. 36-42.

- Morrison, P. C., 1942a, Michigan Limestone in the Great Lakes Stone Trade: Economic Geography, v. 18, no. 4, p. 413-427.
- Morrison, P. C., 1942b, The Michigan Limestone Industry: Economic Geography, v. 18, no. 3, p. 259-274.
- , 1944, Cement production and trade on the Great Lakes: Economic Geography, v. 20, no. 1, p. 37-53.
- , 1945, Cement plant migration in Michigan: Economic Geography, v. 21, no. 1, p. 1-16.
- Moyer, F. T., 1940, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1939, p. 1227-1236.
- , 1941, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1940, p. 1197-1206.
- , 1942, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1941, p. 1291-1301.
- Moyer, F. T., and Downey, M. G., 1943, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1942, p. 1283-1296.
- , 1944, Gypsum: U.S. Geological Survey Mineral Yearbook, v. 1943, p. 1341-1352.
- Nankervis, J. L., 1906, Mines and Mineral Statistics 1905: Annual Report of the Commissioner of Mineral Statistics.
- , 1907, Mines and Mineral Statistics 1906: Annual Report of the Commissioner of Mineral Statistics.
- , 1908, Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics, v. 1907.
- , 1909, Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics, v. 1908.
- Newcombe, R. B., Pardee, F. G., and Poindexter, O. F., 1928, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1924, 1925, 1926, and prior years with a report on oil and gas development: Michigan Geological and Biological Survey, Publication, v. 37, no. 31, p. 1-321.
- Newett, G. A., 1898, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1897.
- , 1899a, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1898.
- , 1899b, Mines and Mineral Statistics, Annual Report of the Commissioner of Mineral Statistics. 1899.
- , 1900, Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics, p. 1-490.
- Osgood, W., and Poindexter, O. F., 1933, Production and values of minerals and mineral products in Michigan, 1927 to 1931 and prior years: Michigan Geological Survey Summary Report, v. 1, p. 1-46.
- , 1936, Production and values of minerals and mineral products in Michigan, 1930 to 1934 and prior years: Michigan Geological Survey Summary Report, v. 2.
- , 1940, Mineral Industries of Michigan, 1934-1938 and prior years: Michigan Geological Survey Division, p. 1-53.
- Paull, R. K., and Paull, R. A., 1977, Geology of Wisconsin and Upper Michigan, Dubuque, Kendall/Hunt Publishing Company.
- Peterson, E. C., 1977, Mineral Industry of Michigan, 1974: Annual Statistical Summary, v. 23, p. 1-23.
- Peterson, E. C., and Middlewood, E. A., 1978, Mineral Industry of Michigan, 1975: Annual Statistical Summary, v. 25, p. 1-26.
- , 1979, Mineral Industry of Michigan, 1976: Annual Statistical Summary, v. 27, p. 1-31.
- , 1980, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1977, p. 291-312.

- Phillips, T. L., 2007, Biography of Aural T. Cross: World class coal geologist, palynologist, paleobotanist and educator: *International Journal of Coal Geology*, v. 69, no. 1–2, p. 1-20.
- Poindexter, O. F., 1933, *Geology of Michigan*: Michigan Geological Survey Division, Unpublished Manuscript, p. 1-91.
- , 1934, *Geology of Michigan*: Michigan Geological Survey Open File Report, v. 80.
- , 1965, *Rocks and Minerals of Michigan*: Geological Survey Bulletin, v. 2, p. 1-103.
- Poindexter, O. F., Martin, H. M., and Bergquist, S. G., 1939, *Rocks and minerals of Michigan*: Michigan Geological and Biological Survey, Publication, v. 42, p. 1-94.
- , 1951, *Rocks and minerals of Michigan*, Revision by H. M. Martin: Michigan Geological and Biological Survey, Publication, v. 42, p. 1-124.
- , 1971, *Rocks and Minerals of Michigan*: Michigan Geological Survey Bulletin, v. 2.
- Raphael, C. N., and McDonald, J. R., 1995, *Geography and Geology at Eastern Michigan University: The First Hundred Years of the "Normal,"* Michigan Academician, v. 27, no. 4, p. 425-438.
- Reed, R. C., 1975, One thousand million tons: Michigan iron ore shipments through 1974: Michigan Geological Survey Division, Circular, v. 12, p. 1-12.
- Riggs, C. H., 1943, Oil man's nightmare: Michigan Conservation, v. 12, no. 1.
- Robinson, G., 2004, *Mineralogy of Michigan*, Revised: Michigan Geological Survey Bulletin, v. 6.
- Rominger, C. L., 1875, *Field Notebook-Diaries of C. L. Rominger*, State Geologist 1871-1874: Michigan Geological Survey Open File Report, v. 19.
- , 1884, *Field Notebook-Diaries of C. L. Rominger*, State Geologist 1875-1884: Michigan Geological Survey Open File Report, v. 20.
- Russell, I. C., 1904a, Bela Hubbard: Fourth Report of the Michigan Academy of Science 1902, v. 5, p. 163-165.
- , 1904b, Douglass Houghton: Fourth Report of the Michigan Academy of Science 1902, v. 5, p. 160-162.
- Russell, J., 1901, *Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics*, 1900, p. 1-136.
- Russell, J., 1902, *Mines and Mineral Statistics: Annual Report of the Commissioner of Mineral Statistics*, v. 1901, p. 1-148.
- Santer, R. A., 1977, *Michigan, Heart of the Great Lakes*, Dubuque, Kendall/Hunt Publishing Company, 364 p.:
- Schoeneck, W. E., 1945, Injection of water into underground reservoirs in the state of Michigan: *Oil & Gas Journal*, v. 44, no. 28, p. 193-203.
- Schueller, D. A., 1994, *Hypercard-driven guide to the Seaman Mineralogical Museum*, MS: Michigan Technological University.
- Slaughter, A. E., 1952, You'll Never Miss the Water -- A few pointers on Ground Water Supplies: Michigan Geological Survey Pamphlet, v. 2.
- Smith, R. A., 1946, Occasional papers for 1946 on the Geology of Michigan: Geological Survey Division Publication, v. 45, no. 38, p. 1-52.
- Smith, R. A., and Barrett, L. P., 1922, *Mineral resources of Michigan with statistical tables of production and value of mineral products for 1922 and prior years*: Michigan Geological and Biological Survey, Publication, v. 34, no. 28, p. 1-146.
- , 1923, *Mineral resources of Michigan with statistical tables of production and value of mineral products for 1923 and prior years*: Michigan Geological and Biological Survey, Publication, v. 35, no. 29, p. 1-115.
- Smith, R. A., Barrett, L. P., Martin, H. M., and Robinson, W. I., 1920, *Mineral resources of Michigan with statistical tables of production and value of mineral products for 1920 and*

- prior years: Michigan Geological and Biological Survey, Publication, v. 32, no. 26, p. 1-145.
- Smith, R. A., and Martin, H. M., 1921, Mineral resources of Michigan with statistical tables of production and value of mineral products for 1921 and prior years: Michigan Geological and Biological Survey, Publication, v. 33, no. 27, p. 1-138.
- Sommers, L. M., 1977, Atlas of Michigan, East Lansing, Michigan State University Press, 235 p.:
- Sorensen, H. O., and Carlson, E. T., 1953, Michigan's Mineral Industries, 1951: Michigan Geological Survey Division, p. 1-50.
- , 1954, Michigan's Mineral Industries, 1952: Michigan Geological Survey Division, p. 1-62.
- , 1955a, Michigan's Mineral Industries, 1953: Michigan Geological Survey Division, p. 1-61.
- , 1955b, Michigan's Mineral Industries, 1954: Michigan Geological Survey Division, p. 1-84.
- , 1956, Michigan's Mineral Industries, 1955: Michigan Geological Survey Division, p. 1-84.
- , 1957, Michigan's Mineral Industries, 1956: Michigan Geological Survey Division, p. 1-89.
- , 1958, Michigan's Mineral Industries, 1957: Michigan Geological Survey Division, p. 1-93.
- , 1959, Michigan's Mineral Industries, 1958: Michigan Geological Survey Division, p. 1-93.
- , 1960, Michigan's Mineral Industries, 1959: Michigan Geological Survey Division, p. 1-107.
- , 1961, Michigan's Mineral Industries, 1960: Michigan Geological Survey Division, p. 1-118.
- , 1962, Michigan's Mineral Industries, 1961: Michigan Geological Survey Division, p. 1-99.
- , 1963, Michigan's Mineral Industries, 1962: Michigan Geological Survey Division, p. 1-97.
- Spencer, J. W. W., 1895, The geological survey of the Great Lakes: American Association for the Advancement of Science Proceedings, v. 43, p. 237-243.
- Spindle, J. E., Michigan natural gas storage project, *in* Proceedings American Gas Association Proceedings, 26th Ann. Mtg., May 11-13 1944, p. 121-121.
- Stevens, A. H., 1971, Study of subsurface analysis of the proposed outdoor instruction area, Michigan Technological University, Houghton County Michigan [MS: Michigan Technological University.
- U.S. Bureau of Mines., 1993, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1993-1994, Volume 2, U.S. Geological Survey, p. 123-126.
- , 1994, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1994, Volume 2, U.S. Geological Survey, p. 125-127.
- , 1995, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1995, Volume 2, U.S. Geological Survey, p. 1-5.
- , 1996, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1996, Volume 2, U.S. Geological Survey, p. 1-7.
- , 1997, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1997, Volume 2, U.S. Geological Survey, p. 1-6.
- , 1998, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1998, Volume 2, U.S. Geological Survey, p. 24.21-24.25.
- , 1999, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 1999, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2000, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2000, Volume 2, U.S. Geological Survey, p. 24.21-24.28.
- , 2001, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2001, Volume 2, U.S. Geological Survey, p. 24.21-24.26.
- , 2002, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2002, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2003, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2003, Volume 2, U.S. Geological Survey, p. 24.21-24.28.
- , 2004, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2004, Volume 2, U.S. Geological Survey, p. 24.21-24.14.

- , 2008, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2005, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2009, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2006, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2010, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2007, Volume 2, U.S. Geological Survey, p. 24.21-24.26.
- , 2012, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2008, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2013, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2009, Volume 2, U.S. Geological Survey, p. 24.21-24.27.
- , 2015, The Mineral Industry of Michigan, Minerals Yearbook Area Reports: Domestic 2010-2011, Volume 2, U.S. Geological Survey, p. 24.21-24.29.
- Wadsworth, M. E., 1898, The Michigan College of Mines: American Institute of Mining Engineers Transactions, v. 27, p. 696-711.
- Wallin, H. A., 1977, Douglass Houghton, State Geologist: Michigan Geological Survey Pamphlet, v. 1.
- Wender, C., 1946, Those "Lake-bottom" leases: Michigan Conservation, v. 15, no. 3.
- West, W. J., and Gere, M. A., Jr., 1991, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1990, p. 255-269.
- Wilson, S. E., 1976, Collecting Rocks, Minerals and Fossils in Michigan: Michigan Geological Survey Pamphlet, v. 6.
- , 1980, Michigan's Sand Dunes: Michigan Geological Survey Pamphlet, v. 7.
- Winchell, A., 1871, Report on the progress of the state geological survey of Michigan, Lansing, 64 p.
- Wood, R. H., II, and Gere, M. A., Jr., 1992, The Mineral Industry of Michigan, U.S. Geological Survey Mineral Yearbook, Volume 1991, p. 265-277.
- Wright, C. E., 1879, First annual report of the commissioner of mineral statistics of the State of Michigan for 1877-1878 and previous years, p. 1-229.
- , 1881, Annual report of the commissioner of mineral statistics of the State of Michigan for 1880.
- , 1882, Annual report of the commissioner of mineral statistics of the State of Michigan for 1881.
- , 1883, Annual report of the commissioner of mineral statistics of the State of Michigan for 1882.
- , 1884, Annual Report of the commissioner of mineral statistics for the State of Michigan for 1883, p. 117.
- , 1885, Annual Report of the commissioner of mineral statistics for the State of Michigan for 1884.
- Wright, J. D., 1973, The remarkable Man Carl Ludwig Rominger State Geologist: Papers on Paleontology, v. 4, p. 1-148.
- Zodac, P., 1947, Trip to Detroit: Rocks and Minerals, v. 22, no. 11, p. 1011-1017.

Publications of the Michigan Geological Repository for Research and Education, Western Michigan University: PTTC Workshops

The Michigan Geological Repository for Research and Education hosts the Michigan Section of the Petroleum Technology Transfer Council. Michigan PTTC runs 1-day workshops on aspects of Michigan Geology and on New and Emerging Techniques in the Oil Industry. The workshops run 1-2 times per year. Inquiries on the availability of workshop workbooks should be directed to the MGRRE Staff.

1991: Antrim Shale Core Workshop

December 13, 1991, Kalamazoo, MI

Harrison, W. B., III, with Contributions from Twynham, M., Maness, T., Carlton, B., and Cain, B., Antrim Shale Core Workshop

1997: Horizontal Drilling: A Workshop for the Michigan Basin

December 8, 1997, Mount Pleasant, MI

Harrison, W. B., III, and Foley, M., Part 2 – Completed and Current Michigan Horizontal Drilling Activity: Data Set

Harrison, W. B., III, Wood, J. R., Huntoon, J. E., Pennington, W., Tester, C., and Taylor, E., Improved Recovery Using Horizontal Drilling in the Dundee Formation, Michigan Basin (Part 1: Horizontal Drilling Project Case History – Crystal Field, Montcalm County)

1998: Internet for the Petroleum Industry

August 28, 1998, Kalamazoo, MI

Anonymous, The Internet Explored for the Petroleum Professional

1999: Wireline Logging Applications for the Michigan Basin

February 18, 1999, Mount Pleasant, MI

Cowen, T. and Wood, J., Acquiring Digital Logs by Scanning and Image Processing Using Logscan and Neuralog

Guy, W., Michigan and Kansas Case Studies

Harrison, W. B., III, Introduction

Maness, T., Maness Petroleum Digital Log Library

Moss, K., New Wireline Logging Technology for Michigan – Baker Atlas

Sutton, T., New Wireline Logging Technology for Michigan – Schlumberger

Watney, L., Demonstration of PFEFFER Ver. 2.0 Professional Real Time Interactive Log Analysis and Display Software

Way, G., Using Spreadsheets for Log Analysis

1999: Surface Exploration for Oil and Gas in Mature Basins: Assumptions, Applications and Recent Advances

December 10, 1999, Lansing, MI

Schumacher, D., Surface Exploration for Oil and Gas in Mature Basins: Assumptions, Applications, and Recent Advances; A Short Course

2000: New Techniques for Handling Water During Production: Downhole Oil or Gas/Water Separators

July 14, 2000, Lansing, MI

Harrison, W. B., III, Technology Transfer and Improving Oil and Gas Recovery in Michigan's Fields

Langhus, B. G., Down-Hole Oil/Water Separators

2001: Keys to Optimized Exploitation in Marginal Settings

March 28, 2001

Knoll, R. G., Keys to Optimized Exploitation in Marginal Settings: A Short Course

2001: Improving Recovery from Old Fields Using Geochemical and High Resolution Seismic Techniques

September 26, 2001, Kalamazoo, MI

Clark, J., Prospecting for Oil and Gas with High Definition Seismic Surveys

Schumacher, D., Geochemical Exploration to find By-passed Oil and Gas in Mature Basins

2002 Well Cuttings Analysis Seminar and Workshop

November 22, 2002, Kalamazoo Michigan

Jordan, C., Well Cuttings Analysis Seminar and Workshop

2003: Horizontal Drilling – Real Michigan Field Experiences

March 20, 2003 Mount Pleasant, Michigan

Bomar, B., Six Lakes Gas Storage Field

De Werff, R., Horizontal Well Downhole Rod Pump Recommendations

Fairbanks, M., Shell's Niagaran Horizontal Drilling Results

Godbold, T. and Wellman, T., Permitting, bonding and Other Aspects of Horizontal Wells in Michigan

Howland, K., Successes and Failures, with Drilling Horizontal Wells in Michigan

Mesbergen, M., Horizontal Drilling in the Kawkawlin Dundee Field

Moss, K., Options for Horizontal Well Logging

Palmer, M., Economically Evaluating a Horizontal Before you Drill

Schmude, D., Case Histories of Horizontal Wells – Problems and Solutions, Where to Look Inside a Reef Complex, and the Future of Horizontal Development

Wood, C., Development of the SOMOCO 29 Oil Reservoir in Wayne County, Using Directional and Horizontal Wells

2003: Produced Water – Reducing Problems and Costs

July 11, 2003, Mount Pleasant, Michigan

Henderson, R., Overview of Part 615, Supervisor of Wells and Administrative Rules

Reynolds, R. R., with Contributions from Kiker, R. D., Produced Water and Associated Issues: Reducing Problems and Costs

2003: Trenton/Black River Core Workshop and Case Studies: Possibilities with the Michigan Basin and Similarities Outside the Basin

October 23, 2003, Mount Pleasant, MI

Guoynes, J., Trenton/Black River Reservoir Evaluation Solutions

Harrison, W. B., III, Trenton/Black River Oil and Gas Reservoirs in Michigan

Loucks, R. G., Origin of Lower Ordovician Carbonate Brecciated and Fractured Reservoirs

Pearson, W. C., and Gay, S. G., Aeromagnetic Evidence for Basement Wrench Faulting Responsible for Hydrothermal Dolomite Porosity in Trenton Black River Reservoirs – Examples from Albion-Scipio and Stony Point Oil Fields, Michigan

Rickman, R. G., and Kent, W. N., [POSTER] Hydrothermal Hydrocarbon System

Roth, B. L., Trenton/Black River Seismic Anomalies [Slides not in Workbook]

Sallee, D., Utilizing Chemical to Increase Profits While Reducing Operational Problems in the Trenton/Black River Formation

Wylie, A. S., and Wood, J., Regional Trends in the Trenton and Black River of the Michigan Basin: Well Log Tomography of Log Curves and Lithology Data Reveal Potential Exploration Opportunities

2004: Michigan Field Experiences – Focus on the Niagaran

March 19, 2004 Mount Pleasant, MI

Harrison, W. B., III, History of Horizontal Drilling in the Niagaran: Relationship to Production, Remaining Potential

Wylie, A. S., and Wood, J., Using Well Log Tomography and 3D Visualization to Image Niagaran Pinnacle Reefs and Show Distribution of Permeability and Porosity

Barratt, M., Economics and Practical Aspects of Risk Evaluation to Compare Different Drilling Opportunities

Harrison, W. B., III, Core Lab Resources, Update on New Building

Metzger, F., and Dereniewski, E., Horizontals Proven to Reduce Costs and Increase Production in Six Lakes Gas Storage Complex

Elenbaas, D., Use of Production Logging to Identify Highly Productive Intervals in Gas Storage Wells

Brock, T., Performance and Productive History of Dover 33 and 36 Fields Since Commencement of CO₂ Injection

Sweezey, C., USGS – Introduces Current Assessment of Remaining Oil and Gas Reserves in Michigan

Fowler, J., and Schaefer, S., Attempted Redevelopment of a Niagaran Reef Reservoir Using 3D Seismic and Horizontal Drilling

Coy, A., Underbalanced Drilling Results in Production Rates Exceeding Expectations

Goodman, W., and Maness, T., Niagaran Pinnacle Reef Development in Mason and Oceana Counties; Recommendations for Successful Approach

Moodro, A., Niagaran Reef Seismic Proves More Complicated than You Think: Keys to Successful Exploration

Harrison, W. B., III, and Sandomierski, A., Core Workshop with 600' Niagaran Reef Core from Oceana County Displayed With Core Analysis Information

2004: Petroleum Systems of the Michigan Basin – A Look at Remaining and Undiscovered Oil and Gas Resources

September 23, 2004, Grand Rapids

Duszynski, J., The History of Petroleum Production in Michigan

Harrison, W. B., III, Michigan Basin Core Research Laboratory: Today and Tomorrow

Hatch, J. R., Review of the Geochemistry of Michigan Basin Natural Gases, Oils and Hydrocarbon Source Rocks

Hayba, D. O., Stratigraphic Thermal Modeling of the Michigan Basin

Repetski, J. E., Conodonts Applied to Thermal Maturation and Stratigraphic Studies in the Ordovician of the Michigan Basin

Sullivan, C., Marfurt, K., Blumentritt, C., and al Dossary, S., Geometric Attributes Applied to Fracture, Karst, and Hydrothermal Overprints

Swezey, C., The U.S. Geological Survey Oil and Gas Assessment of the Michigan Basin

Wylie, A. S., Views of Existing and Prospective Producing Formations in Michigan

2005: Michigan Field Experiences: Focus on the Antrim

March 18, 2005, Mount Pleasant, MI

Black, T. J., Mapping the Base of the Drift and Antrim Subcrop

Brock, T., Analysis of the Bagley Otsego Infill Program for 2004 – A Case History

Goodman, W., Goodman, M., and Harrison, W. B., III, Antrim Core Studies – Key to Deciphering Results and Predicting Performance

Harrison, W. B., III, Results of Horizontal Drilling in the Antrim Shale

Kohler, S. P., How Much Gas is Left?

Maness, T., Antrim Production Trends in Time and Space

McIntosh, J. C., Hydrology, Geochemistry, and Microbiology of the Antrim Shale Gas Play, Michigan Basin

Murray, F., Update on Monitoring O₂ for the Antrim Transmission Lines and Plant Processing

Myers, R., Low Gel-load Fracturing Fluids Reduce Formation Damage

Tipton, K., Corrosion/Erosion Inspection for System Integrity

Weber, J., Real-time Biogenesis in Coals of the Powder River Basin

Williamson, J., Practical Use of Core and Natural Fracture Data in the Antrim Shale

Yohe, B. N., Effective Field Operations

Zarian, P., Moss, K., Reinmiller, R., Added Value from Your CBIL Image Data

2006: Michigan Field Experiences – Carbonate Reservoirs

March 23, 2006 Mount Pleasant, MI

Eberli, G. P., Difficulties of Predicting Porosity and Permeability in Carbonates from Seismic Data

Grammer, G. M., Carbonate Reservoir Characterization – A New Look at a Niagaran Pinnacle Reef

Harrison, W. B., III, Michigan Carbonate Reservoirs: Facies and Reservoir Properties

Huber, J. S., and Maness, T. R., Rosebush Field: Viability for Waterflooding

Jarman, P. K., Cementrite, Inc.: Cementing, Acidizing, and Coiled Tubing Specialists

Johnston, M., Shallow Seismic Raypath Anomalies and Effects on Niagaran and Trenton Seismic Reflection Character

Mesbergen, M., Kawkawlin Dundee Field: Secondary Recovery

Myles, J., The Albion-Scipio Trend: A View from Afar

Pearce, L. A., Horizontal Drilling in the Northern Reef Trend of the Michigan Basin

Perarnau, A., Advantages of Nuclear Magnetic Resonance Logs

Quinlan, W. C., Springdale 15/16 Field Non-reefal Niagaran Exploration and Production

Rowe, A., Downhole Fluidics, Inc.

2006: Well Stimulation and Increased Production Technology

May 18, 2006, Traverse City, MI

Rowe, A., Well Stimulation and Increased Production Technology: A Short Course

2007: Michigan Field Experiences – Focus on Hydrothermal Dolomite, Shallow Gas and New Techniques

March 22, 2007, Mount Pleasant, MI

Barnes, D. A., Hydrothermal Dolomite (HTD): Occurrence and Possible Mechanisms in the Michigan Basin, USA

Barratt, M. W., Results of Two Horizontal Holes Drilled in a Salt-Plugged Niagaran Reef in St. Clair Co., Michigan

Coleman, J. L., Jr., Sweezey, C. S., Ryder, R. T., Charpentier, R. R., Milici, R. C., Hatch, J. R., East, J. A., Schenk, C. J., Cook, T. A., Klett, T. R., Pollastro, R. M., and Schmoker, J. W., Oil and Gas Resources Underlying the U.S. Portions of the Great Lakes

Crisp, J., (POSTER), Sequence Stratigraphy and 3-D Reservoir Characterization of the Ray Reef, Macomb County, Michigan

Fairchild, N., Michigan Antrim Shale Horizontal Re-Entry Program

Gillespie, R., Barnes, D. A., Grammer, G. M., and Harrison, W. B., III, Albion-Scipio Field, Michigan: What Does a Detailed Look at Cores and Outcrop Analogs Tell Us About the Reservoir?

Grammer, G. M., Barnes, D. A., Harrison, W. B, III, and Gillespie, R., An Overview of Hydrothermal Dolomite (HTD) Reservoirs with Examples from the Michigan Basin

Harrison, W. B, III, Shallow Gas Production in the Michigan Basin – Is the Antrim All There Is?

Kirschner, J. P., and Barnes, D. A., (POSTER), Subsurface Stratigraphy of the Devonian Dundee Formation, Michigan Basin, USA – A Log-Based Approach

Kohler, S. P., Victory 20 Production Overview: Mason County, MI

Laun, L., Michigan Gas Storage Wells Drilled Under Balanced with Coiled Tubing

Murray, L., The Structural Geology of the Reading Field, Hillsdale County, Michigan

Noack, A. K., and Grammer, G. M., (POSTER), Evaluation of Pore Architecture in Relationship to Reservoir Quality in the Ray Reef Field, Macomb County, Michigan

Seneshen, D. M., and Viellenave, J. H., Finding Resources, Protecting Assets, Outgrowth of Direct Geochemical

2007: Carbonate Reservoir Characterization Workshop and Short Course

May 4, 2007

Harrison, W. B., III, and Grammer, G. M., Carbonate Reservoir Characterization Workshop and Short Course

2007: Seizing Opportunities in a Mature Basin

October 18, 2007, Gaylord, MI

Barnes, D., An Overview of Digital Subsurface Data Analysis: Examples Using MDEQ-OGS Subsurface Data and Various Software Applications

Bols, R., Michigan Wells and Production

Brock, T., and Moss, K., Horizontal Well Production Enhancement – A Case History

Coleman, J. L., Oil and Gas Resources Underlying the U.S. Portions of the Great Lakes

Evans, A., An Overview on Why Seismic Data Doesn't Have to Cost You Anything

Harrison, W. B., III, and Barnes, D., Data Mining at the Michigan Geological Repository for Research and Education

Ohanian, M., Baker Hughes INTEQ Presents: Directional Drilling Answers for Coiled Tubing Applications

Poli, P., Michigan Public Service Commission: On-line Information and How to Access It

Wilson, S. E., Office of the Geological Survey Homepage

2008: Michigan Field Experiences – Focus on the Trenton-Black River

March 20, 2008, Mount Pleasant, MI

Bauman, W., Behind Pipe Reserves and Untested Pay Zones in Old Devonian Fields in Michigan

Clark, J., and Kurtzweil, L., 3-D Seismic: Design, Logistical Considerations, Applications

Collins, J., and Andreason, M., High-rate/High-volume Fracture Stimulation, Sterling Field, Arenac Co.

Gay, S. P., Jr., Basement Fault Control on Black River-Trenton Oil and Gas Production in Michigan, West Virginia and New York

Grammer, G. M., Update on Reservoir Characterization Research at MGRRE/WMU: Trenton/Black River Hydrothermal Dolomite Reservoirs and Silurian (Niagaran) Reef Reservoirs

Harrison, W. B., III, Michigan's Trenton/Black River Data and Resources at MGRRE-
Western Michigan University

Jennings, J., and Snow, M., Michigan Oil and Gas Regulations – Spacing *Then and Now*

Knox, C., The Lima-Indiana Oil and Gas Field

Mesbergen, M., and Maness, T., Muskegon Development Company's Williams Berea
Waterflood

Moodro, A., Examples of "Flower Structures"

O'Brien, T. P., and Klimetz, S., Presented a Brief Overview of BLM's Involvement with
Oil and Gas Development in the Eastern United States [Note no slides in Workbook]

Quirein, J., Exact Frac ®

Smith, L., Nyahay, R., and Reservoir Characterization Group at the New York State
Museum, Widespread Hydrothermal Dolomitization of Trenton and Black River Groups,
Eastern North America

2008: Trenton-Black River Core Workshop and Reservoir Characterization Symposium

September 25-26, 2008, Kalamazoo, MI

[Note Workbook also includes an overview of the Trenton/Black River Cores and Thin Sections
available at MGRRE as well as drillers reports and wireline log data for selected cores displayed
during the workshop and an extract from Grammer, G. M. 2007, DOE Final Scientific/Technical
Report: DE-FC26-04NT15513]

Gillespie, R., Albion-Scipio Field, Michigan: Overview

Grammer, G. M., Barnes, D. A., Harrison, W. B., III, and Gillespie, R., An Overview of
Hydrothermal Dolomite (HTD) Reservoirs with Examples from the Michigan Basin

Harrison, W. B., III, Trenton/Black River Oil and Gas Reservoirs in Michigan

2009: Michigan Field Experiences

March 26, 2009, Mount Pleasant, MI

Brock, T., J., Playing the Edge of the Antrim is a function of ...

Canter, L., Role of Primary Depositional Facies on Reservoir Development and
Distribution, Ordovician Red River Formation, Williston Basin

Esch, J., and Snow, M., Michigan Activity 2008

Grammer, G. M. (with contributions from Qualman, H., Noack, A. K., Ritter, A., Wold, J.,
and Thornton, J.), Three-dimensional Modeling and Reservoir Characterization of
Silurian (Niagaran) Reefs in the Michigan Basin

Kirschner, J., Geologic Controls on Dundee Reservoirs

Knox, C., The Fort Wayne and Moore Fields

Kulka, D., The Last Drop

McDaniel, H., Shale Log Analysis: A New Way of Looking at an Old Formation

Murray, L., Recent Activity in the Trenton/Black River Formation and the Relationship between the Van Wert Zone of the Black River and Hydrothermal Reservoirs

Schaefer, S., and Philo, J., Lyon 20 Niagaran Reef Gas Storage Conversion: A Seismic Case Study

Schmude, D., and Schmude, P., The Keys to Successful Redrilling of Niagaran Reefs in Northern Michigan

2009: Computer Mapping for Petroleum Exploration

November 5, 2009, Mount Pleasant, MI

Leetaru, H. E., Computer Mapping for Exploration and Production: A Short Course

2010: Michigan Basin Insights and Field Experiences

March 25, 2010, Mount Pleasant, MI

Barratt, M. W., Fort Knox Military Reservation New Albany Gas Development Project, Meade, Hardin, and Bullitt Counties, Kentucky and Antrim-New Albany Shale Comparison

Esch, J., Free GIS Data Viewers, and Free Petroleum, Geological and Base GIS Datasets for Petroleum Exploration

Fowler, J., Matson, M., and Van Sickle, W., Field Evaluations of Trenton and Black River Reservoirs

Grammer, G. M., and Harrison, W. B., III, Evaluation and Modeling of Stratigraphic Control on the Distribution of Hydrothermal Dolomite Reservoirs Away from Major Fault Planes

Harrison, W. B., III, Michigan Geological Repository for Research and Education (MGRRE), Geosciences Department, Western Michigan University

Learn, M., An Overview of Drilling Experiences in Karsted Formations in Huron County

Modroo, A., and Paul, D., Faulting in the Michigan Basin

Rock, F., and Barnes, D., Application of Oil Field Reservoir Characterization Methodology to Geosequestration Studies

Stewart, R., Tilden: Improved Oil Recovery Strategies in Micro-fractured Silurian Reef Using Nitrogen Gas

Strunk, K., Jointing, Fracturing, Faulting, Structural Patterns, and Stress Fields in the Southern Portions of the Michigan Basin

Thompson, P., Lost Circulation Solutions

2010: Characteristics of Evaporites and Restricted Carbonates for the Petroleum Geologist

April 26, 2010

Schreiber, C. and Harrison, W. B., III, Characteristics of Evaporites and Restricted Carbonates for the Petroleum Geologist: A Short Course

2010: Trenton and Black River Core Workshop [Eastern Section AAPG Meeting]

September 25, 2010, Kalamazoo, MI

Grammer, G. M., Harrison, W. B., III, Schulz, J., Thornton, J., Robinson, M., and Feutz, P., Trenton and Black River Core Workshop

2010: Organic Shales and Fine-grained Organic Carbonates of the Michigan Basin: Core Viewing Workshop [Eastern Section AAPG Meeting]

September 29, 2010, Kalamazoo, MI

Harrison, W. B., III, Organic Shales and Fine-grained Organic Carbonates of the Michigan Basin (Collingwood Shale, Antrim Shale, and A-1 Carbonate): A Short Course

2011: Michigan Basin Insights and Field Experiences

March 31, 2011, Mount Pleasant MI

Astore, C., Lipid Biomarkers in Assessing Biogenic Reservoirs

Feutz, P., Harrison, W. B., III, and Grammer, G. M., [POSTER] The Effects of Thin Shales on the Lateral Distribution of Hydrothermal Dolomite Reservoirs, Albion-Scipio and Stoney Point Fields, Michigan Basin

Fowler, J., Rice Creek Pool, Albion-Scipio field – A New Discovery in the Trenton and Black River of Southern Michigan

Harrison, W. B., III, The Collingwood/Utica Shale in Michigan

Henderson, R., and Jankowski, P., Regulatory Issues Related to the Utica/Collingwood Development

Hinks, A., Gravity Anomalies Associated with Michigan Basin Dundee Formation: Fractured Hydrothermal Dolomite Reservoirs and Implications for Exploration

Knox, C., The Trenton Gas Field of Indiana

Kohler, S., Out and About the Prairie du Chien

Kohler, S., What Does the Mature Antrim Play Look Like?

McCloskey, S., Harrison, W. B., III, and Grammer, G. M., [POSTER] Sequence Stratigraphy and 3-D Reservoir Characterization of the South Buckeye Field, Dundee Formation (Devonian), Michigan Basin, USA

Mesbergen, M., and Bach, R., Enhancing Production and Improving Lift Efficiency in Low Pressure Wells with Liquid Loading Conditions Using a Sequential Lift System

Robinson, M., Harrison, W. B., III, and Grammer, G. M., [POSTER] Integrating Depositional Facies and Stratigraphy in Characterizing Hydrothermal Dolomite Reservoirs: Trenton Group of the Albion-Scipio Trend, Michigan Basin

Solow, J., HyperScratcher, Well Rejuvenation Overview

Thornton, J. E., Grammer, G. M., and Harrison, W. B., III, Prediction of Petrophysical Properties of Trenton-Black River (Ordovician) Reservoirs by Comparing Pore Architecture and Permeability to Sonic Velocity

Trout, J. L., Harrison, W. B., III, and Grammer, G. M., [POSTER], Faunal Distribution and Relative Abundance in a Silurian (Wenlock) Pinnacle Reef Complex – Ray Reef, Macomb County, Michigan

2012: Michigan Basin Insights and Field Experiences: Focus on the Trenton/Black River

March 30, 2012, Mount Pleasant, MI

Augustine, J., Horizontal Completion Options for the Trenton/Black River Region

Brock, T. J., Analysis of BHP Data and Production in TBR Reservoirs

Budros, R., Hydrothermal Dolomite Reservoir Pore Types Observed in the full diameter core from the West Bay Exploration Co. West Bay 1-22 Wellbore, Napoleon Field, Jackson County, Michigan [Slides not in Workbook]

Esch, J., GeoWebFace Introduction

Feutz, P., [POSTER], Evaluating the Effects of Lithofacies and Thin Shales on the Later Distribution of Hydrothermal Dolomite Reservoirs in the Michigan Basin

Fowler, J., Geology of the Napoleon Field, Jackson County, Michigan

Grammer, G. M., Thornton, J. E., and Harrison, W. B., III, Enhanced Reservoir Characterization and Permeability Prediction of Heterogeneous Reservoirs Comparing Pore Architecture and Permeability to Sonic Velocity

Grammer, G. M., Thornton, J. E., Robinson, M. R., Feutz, P. J., Schulz, J. E., and Harrison, W. B., III, Stratigraphic Control on the Lateral Distribution of Hydrothermal Dolomites Away from Major Fault Zones

Harrison, W. B., III, Trenton/Black River Oil Field Production History

Johnston, M., and Schaefer, S., Seismic Evolution of the Napoleon Field, Jackson Co., MI [Slides not in Workbook]

Knox, C., Elshoff #3H, The Trenton Horizontal: Drilled in March of 2010 by Innex Oil and Gas Co. at St. Marys, Ohio

Prezbindowski, D. R., Depositional Sequences and Reservoir Development in the Black River Group of Eastern Indiana

Robinson, M. R., [POSTER], Integrating Depositional Facies and Stratigraphy in Characterizing Hydrothermal Dolomite Reservoirs: Trenton Group of the Albion-Scipio Trend, Michigan Basin

Van Sickle, W., A Stratigraphic Model of HTD (Hydrothermal Dolomite) Occurrences in the Napoleon Field, Jackson County, MI

2012: Office of Oil, Gas, and Minerals Staff Meeting and Core Workshop

August 23, 2012

Harrison, W. B., III, Office of Oil, Gas, and Minerals Staff Meeting and Core Workshop

2013: Michigan Basin Insights and Field Experiences

March 21, 2013, Mount Pleasant, MI

Abduslam, A., Harrison, W. B., III, and Barnes, D. A., Reservoir Characterization and Enhanced Oil Recovery Potential in Middle Devonian Dundee Limestone

Esch, J., Bedrock Topography, Glacial Drift Thickness, Bedrock Outcrops, Bedrock Valleys, and Potential Structural Features Reflected up Through the Bedrock Surface of Michigan

Goodman, W., Pardini, R., and Modroo, A., North Chester 5 Niagaran Reef EOR Flood Progress Report: Come Learn With Us!

Harrison, W. B., III, Facies, Fabrics and Organic Geochemistry of the A-1 Carbonate in Michigan

Kohler, S. P., Production Declines of Hot Plays [Slides not in Workbook]

Maness, T., Drilling of a Dundee Well in Isabella County [No slides – Video Presentation]

Patterson, D., Mekic, N., Bolshakov, A., Harrison, C., and Tang, X., Conventional and Unconventional Reservoir Fracture Evaluation Utilizing Deep Shear Wave Imaging

Paul, W., Utica/Collingwood Play in Northern Michigan

Quinlan, W. C., The Dual Lift System: Artificial Lift for Horizontal Wells

Snow, M., Michigan's Regulatory Response to High Volume Hydraulic Fracturing and Update of Current Activities

Voice, P. J., Harrison, W. B., III, and Grammer, G. M., Geology and Petroleum Geology of the Lower Silurian Burnt Bluff Group

2013: How to Find Bypassed Pay in Old Wells Using DST Data

October 15-17, 2013, Traverse City, MI

Reid, H. W., How to Find Bypassed Pay in Old Wells Using DST Data: A Short Course

2014: Michigan Basin Field Experience and Devonian Carbonate Reservoir Core Workshop

March 20, 2014

Volume 1:

Brock, T. J., A Review of Selected Michigan Niagaran Reef Waterfloods to Estimate the Fractional Flow Behavior During Flooding and Hysteresis Effects After Flooding

Donham, C., and Dennen, C., Post Water Flood Development

LoPiccolo, R. D., The A-1 Carbonate Resource Play: Birthing Pains? – What We Know Now

Quinlan, W. C., The Dual Lift System: Trenton-Black River Production Application

Schmude, D. R., and Schmude, P. D., The Value of Seismic Attributes in Oil Exploration: Case Study of the Allis 24 Reef

Wygant, A., Hydraulic Fracturing Proposed Rules

Volume 2:

Adducci, J., Currie, B., Farag, A. Z. A, The Middle Devonian Dundee and Rogers City Formations: A Brief Stratigraphic Overview, Michigan Basin, USA

Cox, K., and Emil, M. K., Investigation of the Devonian Traverse Group in the Subsurface of the Michigan Basin

Harrison, W. B., III, and Voice, P. J., Devonian Carbonate Reservoirs of the Michigan Basin: A Core Workshop

Manche, C. J., Mohamed, K. B, and Voice, P. J., The Geological Context of the Late Silurian to Early Devonian Units in the St. Charlton #4-30 Well: Otsego County, Michigan

Panyard, N. R., and Aljammaz, A. I., Parasequences and Facies Identifications of the Detroit River Group, Amherstburg Formation and Lucas Formation, Richfield Member, Benchley #1-29, Clare County, Michigan Basin, USA

Rine, M., and Othman, A., The Depositional Facies of the Bois Blanc Formation and Sylvania Sandstone of the Michigan Basin

Sattler, F., and Suhaimi, A. A., Middle Devonian Traverse Group, Michigan Basin, USA: A Core Description and Environmental Interpretation

Voice, P. J., Interpretation of the Depositional Environments of the Dundee-Bell Shale Interval in the Central Michigan Basin

2015: Michigan Basin Field Experience and Carbonate and Shale Reservoir Core Workshop

March 26, 2015, Mount Pleasant, MI

Bohjanen, D., What is an Anomaly?

Crumrine, C. C., III, and Beckett, D., The Use of Micro-CT Scanner to Characterize Pore Size Distribution

Esch, J., Bedrock Depth Determination Using the HVSR Passive Seismic Method

Esch, J., GeoWebFace Enhancements

Gould, J. H., Water Conformance

Hinks, A. W., Prezbindowski, D., and Sullivan, K. J., Support for a Deep Fault Related Hydrothermal Dolomite Model for Some Michigan Basin Dundee Formation Oil Reservoirs

Katz, D., Thyer, T., Canter, L., Parrot, K., Dellva, P., and Harman, C., Geologic Characterization of Hydrothermally Altered Reservoirs and Future Exploration Potential in Eastern Michigan Basin

Matson, M., The Origin of Natural Fractures in the Antrim Shale, Michigan

Rine, M. J., Petrophysical and Stratigraphic Characterization of Michigan Silurian Reefs

Updyke, B. S., Electronic Flow Measurement for Natural Gas Storage Field Optimization

Voice, P. J., Revising the Basement Map of the Lower Peninsula: New Constraints from Cores and Cuttings.

2015: Pathways of Exploration in the Michigan Basin Petroleum Systems and Examination of Cores from Prospective Strata

November 12, 2015, Kalamazoo, MI

Harrison, W. B., III, Petroleum Systems of the Michigan Basin – Examples from the Rocks

Sweezey, C. S., Petroleum Systems of the Michigan Basin

Sweezey, C. S., Stratigraphic Settings of Organic-Rich Shale in the Eastern United States

2016: Michigan Basin Going Forward – Future Development Potential and Lessons Learned from the Past

March 16, 2016, Mount Pleasant, MI

Bohjanen, D., Money Ideas Oil

Caruthers, A. H., Rine, M. J., Gröcke, D. R., Kaczmarek, S. E., Harrison, W. B., III, Kuglitsch, J., and Barnes, D. A., Regional Implications of Organic Carbon-isotope Analysis in the Michigan Basin; An Example Using the Subsurface Silurian Stratigraphy

Currie, B. J., [POSTER], Review of the Upper Devonian-Lower Mississippian Stratigraphy with an emphasis on the Ellsworth Shale Petroleum System Michigan Basin, USA

Fowler, J., The Mid-Continent Gravity High

Garrett, J. D., [POSTER] Stratigraphic Reservoir Characterization and Modeling of the Niagara-Lower Salina Reef Complexes of the Michigan Basin, U.S.A.

Harrison, W. B., III, Petroleum Systems of the Michigan Basin – Examples from the Rocks

Manche, C. J., [POSTER] Diagenetic Influence on Dolomitization and the Development of Porosity in the Richfield Member of the Lucas Formation (Detroit River Group), Michigan Basin

Rine, M. J. [POSTER] - Using a combination of chemo-, bio-, and sequence stratigraphy to resolve the chronostratigraphic relationships of Niagara-Lower Salina Reef Complexes throughout the Michigan Basin

Sweezey, C., Petroleum Systems of the Michigan Basin

Sweezey, C., Stratigraphic Settings of Petroleum Source Rocks in the Eastern United States

Voice, P. J., Central Basin Burnt Bluff Group Deposits: A Review of their Production History and Reservoir Properties

Zaid, N., [POSTER] High Resolution Petrophysical Characterization of Silurian Lower Salina-Niagaran Pinnacle Reef Complex Reservoirs Using Wire-line Logs

Zambito, J. J., IV, and Panyard, N., A New Tool for Characterizing Rock Properties: pXRF Elemental Analysis of the Squaw Bay and Antrim Formations

Publications of the Groundwater Education in Michigan Center, Institute for Water Sciences, Western Michigan University

The GEM Center and the Institute for Water Sciences were long running programs in Western Michigan University's Department of Geology. Their missions were to produce resources and publications on the nature, quality and distribution of Michigan's Groundwater for the general public, for teachers and for state officials. The list below represents some of the documents produced by these programs. In addition, journal articles and other peer-reviewed documents were generated by the staff of the Institute for Water Sciences - these are cited in the Quaternary section.

- Anonymous, 1989, Nature Center Groundwater Education Program, Western Michigan University Department of Geology.
- Anonymous, 1989, Groundwater Education in Michigan: GEM Teacher Training Workshop, November, 9-10, 1989; Teachers Groundwater Packet, Western Michigan University Department of Geology.
- Anonymous, 1995, A Collection of Groundwater Protection Activities and Actions Undertaken by Local Communities within the State of Michigan, Western Michigan University Department of Geology.
- Chilton-Stringham, P. A., 1992, Henry Goes Underground, Kalamazoo County Cooperative Extension Service Groundwater Education Program and Western Michigan University Department of Geology, 32 p.
- Dane, A., Haas, T., Passero, R. N., and Ziehl, R., 1991, GEM Ground-water Transparencies: Instructional Resources for Michigan Educators, Western Michigan University Department of Geology.
- Dickason, D. G., Hughes, L. D., and Passero, R., 1995a, Beyond 2000: Protecting Groundwater on the I-94 Highway Corridor: Volume I: Comstock, Charter Township, Kalamazoo County, Western Michigan University Department of Geology.
- Dickason, D. G., Hughes, L. D., and Passero, R., 1995b, Beyond 2000: Protecting Groundwater on the I-94 Highway Corridor: Volume II: Antwerp Township, Van Buren County, Western Michigan University Department of Geology.
- Dickason, D. G., Hughes, L. D., and Passero, R., 1995c, Beyond 2000: Protecting Groundwater on the I-94 Highway Corridor: Volume III: Texas Township, Kalamazoo County, Western Michigan University Department of Geology.
- Ervin, E. (ed.), 1995, Exploring Groundwater: A Journey through Time and Space in Van Buren County, Western Michigan University Department of Geology, 60 p.
- Erwin, E. (ed.), 1996, Walking on Water: The Life Story of Groundwater in St. Joseph County, Western Michigan University Department of Geology.
- Erwin, E., (ed.), 1996, The Water Below: A Subterranean Saga of Groundwater in Calhoun County, Western Michigan University Department of Geology.

- Kirby, M., and Hughes, L. D., 1995, Protecting the Groundwater of Van Buren County: A Blueprint for Action, Van Buren Conservation District.
- Passero, R. N., Chase, K. M., Schmaltz, L. J., and Straw, W. T., (eds.), 1878, Kalamazoo County: Geology and the Environment, Western Michigan University Department of Geology, 144 p.
- Passero, R. N., Straw, W. T., and Schmaltz, L. J., 1981, Hydrogeology for Underground Injection Control in Michigan: Part 1, Western Michigan University Department of Geology.
- Passero, R. N., and Straw, W. T., 1988, Groundwater in Southwest Michigan: A Guide for Citizens and Public Officials Concerned with Protecting Our Underground Drinking Water Supplies, Western Michigan Department of Geology, 42 p.
- Ruawerda, L. A., 1996, Groundwater Protection Education Models: Grades 7-12, Western Michigan University, Department of Geology.
- Ward, T., 1990-1991, GEE-WOW!: Adventures in Water Education, Ecology Center of Ann Arbor.
- Williams, S., 1998, Nottawa Creek Watershed Project Water Quality Plan, Calhoun Conservation District in Cooperation with Western Michigan University Department of Geology, Michigan Department of Environmental Quality Surface Water Quality Division and the U.S. Department of Agriculture National Resource Conservation Service, 151 p.