MINNESOTA GEOLOGICAL SURVEY

Matt Walton Director

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PUBLICATIONS OF THE
MINNESOTA GEOLOGICAL SURVEY

AND ITS PREDECESSOR
THE GEOLOGICAL AND NATURAL HISTORY SURVEY
OF MINNESOTA

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1985
PUBLICATIONS OF THE
MINNESOTA GEOLOGICAL SURVEY

AND ITS PREDECESSOR
THE GEOLOGICAL AND NATURAL HISTORY SURVEY
OF MINNESOTA

By
Lynn Swanson
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PUBLICATIONS OF
THE MINNESOTA GEOLOGICAL SURVEY
AND ITS PREDECESSOR
THE GEOLOGICAL AND NATURAL HISTORY SURVEY OF MINNESOTA

by
Lynn Swanson

PREFACE

The following listing is limited to the geological publications of the Minnesota Geological Survey and its predecessor, the Geological and Natural History Survey of Minnesota. Geological activities of the earlier Survey were carried out under the direction of N.H. Winchell, the state geologist from 1872 to 1900. Little attention during these years was given to the natural history portion of the Survey, but with the completion of the final report on the geology of the state in 1900, emphasis shifted from geological investigations (which for all intents and purposes ceased in that year) to botanical and zoological investigations under the direction of the state botanist and state zoologist. These investigations into the natural history of the state continued many years into this century, with the last publications issued under the auspices of the Geological and Natural History Survey appearing in 1916. In the meantime, the Minnesota Geological Survey was established in 1911 as separate from the Geological and Natural History Survey of Minnesota.

The listing, current through October 1985, is arranged alphabetically by publication name, and numerically or chronologically within each series. The additional category at the end entitled OTHER PUBLICATIONS includes those which are not part of a series or set. Both a contributor and an area index have been included for easy reference. It should be noted that the area index is not meant to be a substitute for the much more substantial area and subject indexes found in the two published bibliographies of Minnesota geology—Bulletin 34 and 46.

Not included in this listing are most of the botanical and zoological series publications of the earlier Survey, except where they are part of established geological series publications such as the Annual Reports and Bulletins. File and open-file reports and maps have not been included, nor have most publications of a peripheral or transitory nature like news releases and informal field guides. Also excluded are publications for which the Survey shares publishing credit with other organizations or which the Survey has completed as part of another organization's activities, as when, for example, the Survey is host for the annual meeting of the Institute on Lake Superior Geology and prepares for it a proceedings volume.
AEROMAGNETIC MAP SERIES

A-1 1983 Chandler, V.W., Aeromagnetic map of Minnesota, Cook and Lake Counties, total magnetic intensity anomaly: Scale 1:250,000, 2 pls.
A-2 1983 Chandler, V.W., Aeromagnetic map of Minnesota, St. Louis County, total magnetic intensity anomaly: Scale 1:250,000, 2 pls.
A-3 1983 Chandler, V.W., Aeromagnetic map of Minnesota, Carlton and Pine Counties, total magnetic intensity anomaly: Scale 1:250,000, 2 pls.
A-4 1983 Chandler, V.W., Aeromagnetic map of Minnesota, east-central region, total magnetic intensity anomaly: Scale 1:250,000, 2 pls.
A-5 1985 Chandler, V.W., Aeromagnetic map of Minnesota, central region, total magnetic intensity anomaly: Scale 1:250,000, 2 pls.

ANNUAL REPORTS

*1st 1872 Winchell, N.H., with a contribution by Twining, E.H., 1873, The first annual report, for the year 1872: Published in the Regents' Report for 1872, 112 p.; 2nd ed. of 1884 identical. CONTENTS: Address; Historical sketch and list of publications relating to the geology and natural history of Minnesota; General principles; The surface contour of the State; The surface geology; Sketch of the geology of Minnesota; Plans and recommendations; List of plants.

*2nd 1873 Winchell, N.H., and Peckham, S.F., 1874, The second annual report, for the year 1873: Published in the Regents' Report for 1873, 145 p.; 2nd ed. of 1893 identical. CONTENTS: Address; The Belle Plaine Salt Well; Peat; The geology of the Minnesota Valley.

*3rd 1874 Winchell, N.H., 1875, The third annual report, for the year 1874: Published in the Regents' Report for 1874, 42 p.; 2nd ed. of 1894 identical. CONTENTS: Address; Report on the geology of Freeborn County; Report on the geology of Mower County.

*4th 1875 Winchell, N.H., with Harrington, M.W., assistant, and a contribution by Angst, R., 1876, The fourth annual report, for the year 1875: Also in the Regents' Report for 1875, 162 p. CONTENTS: Address and summary statement; Report on the geology of Fillmore County; Report on Olmsted County; Dodge County; Steele County; Topography; Railroad elevations; Report on the General Museum.


*Out of print
CONTENTS: Summary statement; The geology of Houston County; Notes on the fossils of the Trenton limestone in Minnesota; Chemistry; Botany; Fungi; Ornithology, Entomology; The geology of Hennepin County; Aves; A new cyclops.

CONTENTS: Summary statement; The water supply of the Red River Valley; Reconnaissances; The geology of Morrison County; The geology of Ramsey County; The geology of Rock and Pipestone Counties; Notes on the fossils of the Trenton in Minnesota; Report on the geology of Rice County; Chemistry; Entomology; Ornithology; Railroad elevations; Report on the General Museum.

CONTENTS: Summary statement; Sketch of the work of the season of 1878; Field report of C.W. Hall; Elevations on the Minnesota Northern Railroad; Chemistry; Ornithology; The plants of the North Shore of Lake Superior; Report on the General Museum; Microscopic Entomostraca.

*8th 1879 Winchell, N.H., with contributions by Upham, W., Hall, C.W., Roberts, T.S., Peckham, S.F., Hatch, P.L., and Smith, J.L., 1880, The eighth annual report, for the year 1879: Also in the Regents' Report for 1879-1880, 187 p.; included at the back of some copies of the annual report for this year are Miscellaneous Publication 8 and Circular 5, 37 p. For more information on these series, see MISCELLANEOUS PUBLICATIONS.
CONTENTS: Summary statement; Lithology; The Museum; Descriptions of new species of Brachiopoda from the Trenton and Hudson River Formations in Minnesota; Preliminary report on the geology of central and western Minnesota; Report of Professor C.W. Hall; Plants of the North Shore of Lake Superior, Minnesota; Chemistry; Ornithology; On lintonite and other forms of thomsonite: A preliminary notice of the zeolites of the vicinity of Grand Marais, Cook County, Minnesota; Correspondence with the United States Geological Survey; Study of Emmet County meteorite that fell near Estherville, Emmett County, Iowa, May 10, 1879; Castoroides ohioensis, Foster.

CONTENTS: Summary statement; Preliminary list of rocks; New Brachiopoda from the Trenton and Hudson River Formations in Minnesota; The Museum report for 1880; List of books in the Library of the Geological and Natural History Survey; The water
supply of the Red River Valley; The Upper Mississippi region; The hydrology of Minnesota; Report of progress in exploration of the glacial drift and its terminal moraines; Chemistry; A list of birds of Minnesota; The winter birds of Minnesota; Determination of latitude and longitude in Minnesota; The cupriferous series in Minnesota; An ancient outlet of Lake Manitoba.

CONTENTS: Summary statement; Preliminary list of rocks; The Potsdam sandstone; Typical thin sections of the rocks of the cupriferous series in Minnesota; The Museum; Geological notes on Minnesota [a translation]; Chemistry; The geology of the deep well drilled by C.C. Whelpley at Minneapolis, at the "C" Washburn mill; Papers on the Crustacea of the fresh waters of Minnesota.

CONTENTS: The mineralogy of Minnesota; The crystalline rocks of Minnesota [a translation]; Notes on rock-outcrops in central Minnesota; Lake Agassiz: A chapter in glacial geology; The iron region of northern Minnesota; Note on the age of the rocks of the Mesabi and Vermilion iron districts; Chemical analyses; Minnesota laws relating to mines and mining.


CONTENTS: Summary statement; Reconnaissances; The Vermilion iron ores; The crystalline rocks of Minnesota; Additional rock samples numbered; The Humboldt salt well in Kittson County; The deep well at Lakewood Cemetery; Notes on the artesian wells at Mendota, Hastings, Red Wing, Lake City and Brownsville, and on the deep wells at St. Paul; Fossils from the red quartzite at Pipestone; The New Orleans Industrial and Cotton Centennial Exposition; Report on the Museum for 1884; Notes on the geology of Minnehaha County, Dakota; Chemistry; Minnesota geographical names derived from the Dakota language with some that are

*Out of print
obsolete; Entomology; The crystalline rocks of the Northwest; Geological notes in Blue Earth County; Fossil elephant in Winona County; Boulder-clays; On the foraminifera of the boulder-clay taken from a well shaft 22 feet deep, Meeker County, central Minnesota; Notes on the mammals of Big Stone Lake and vicinity.

*14th 1885

CONTENTS: Summary statement; Notes on some deep wells in Minnesota; List of the Aphididae of Minnesota, with descriptions of some new species; Report on the Lower Silurian Bryozoa with preliminary descriptions of some of the new species; Remarks upon the names Chelrocrinus and Calceocrinus, with descriptions of three new generic terms and one new species; Conchological notes; Report on the Museum for 1885; The bibliography of the foraminifera, recent and fossil, including Eozoon and Receptaculites, 1565-Jan. 1, 1886; New species of fossils; A supposed silver alloy of copper and silver from the North Shore of Lake Superior; Revision of the stratigraphy of the Cambrian in Minnesota; Notes of a trip up the Thief River and at Lake Mille Lacs; Chemistry; Ornithology.

*15th 1886

CONTENTS: Summary report; Report of geological observations made in northeastern Minnesota during the season of 1886; Geological report of N.H. Winchell; Partial report of observations made by H.V. Winchell; Chemistry; Railroad elevations; Geographical names from the Chippewa language; Notes on Illaeni.

*16th 1887

CONTENTS: Summary statement; Report of N.H. Winchell; Report of a geological survey in Minnesota during the season of 1887; Report of observations made during the summer of 1887; Notes on the molluscan fauna of Minnesota.

*17th 1888

CONTENTS: Summary statement for 1888; Report of N.H. Winchell; Report of field observations made during the season of 1888 in the iron regions of Minnesota; Report of geological observations made in northeastern Minnesota during the summer of 1888; Museum additions; Appendix—List of recent publications relating to the crystalline rocks.

*18th 1889

Out of print
CONTENTS: Summary statement for 1889; Report of field observations; American opinion on older rocks.

19th 1890

CONTENTS: The elements of a new method of chemico-microscopic analysis of rocks and minerals [a translation]; Geognostic and geographic observations in the State of Minnesota [a translation]; Chemistry; The woods of Minnesota; Museum additions; Additions to the Library since the report of 1889; Catalogue of the meteorites in the University collection, with references to literature describing them; Notes on the petrography and geology of the Akeley Lake region in northeastern Minnesota; New Lower Silurian Lamellibranchiata, chiefly from Minnesota rocks.

20th 1891

CONTENTS: The crystalline rocks: Some preliminary considerations as to their structures and origin; Field notes of N.H. Winchell in 1890; Field observations on certain granitic areas in northeastern Minnesota; The Mesabi iron range; Sketch of the coastal topography of the north side of Lake Superior, with special reference to the abandoned strands of Lake Warren (the greatest of the Late Quaternary lakes of North America); Diatomaceae of Minnesota inter-glacial peat; List of species and some notes upon them; Oxide of manganese; Museum additions; Additions to the Library since the report for 1890.

21st 1892

CONTENTS: Summary statement and comparative nomenclature; The geology of Kekequabic Lake in northeastern Minnesota, with special reference to an augite soda-granite; Catalogue of rock specimens collected in northeastern Minnesota in 1892; Preliminary report of a reconnaissance in northwestern Minnesota in 1892; Field observations of N.H. Winchell in 1892; Additional rock samples collected in 1892 to illustrate the report of N.H. Winchell; Additions to the Library since the report for 1891.

22nd 1893

CONTENTS: Summary statement; List of rock samples collected to illustrate the notes of N.H. Winchell, 1893; Preliminary report of field work during 1893 in northeastern Minnesota, chiefly related to the glacial drift; Preliminary report of field work during 1893 in northeastern Minnesota by U.S. Grant; List of rock samples collected in 1893 by U.S. Grant; List of rock samples collected in 1893 by A.D. Meeds; Preliminary

Out of print
report of a reconnaissance in northwestern Minnesota during 1893 by J.E. Todd; Notes on the geology of Itasca County, Minnesota; Preliminary report on field work done in 1893 by J.E. Spurr; List of rock samples collected in 1893 by J.E. Spurr; Preliminary report of leveling party; Preliminary report of field work during 1893 in northeastern Minnesota by A.H. Elftman; List of rock samples collected in 1893 by A.H. Elftman; Museum additions; Additions to the Library since the report of 1892; The exhibit of the Survey at the Columbian Exposition.


CONTENTS: Summary statement; The origin of the Archean greenstones; Preliminary report on the Rainy Lake gold region; The topographical survey of Minnesota; Historical sketch of the discovery of mineral deposits in the Lake Superior region; Late Glacial or Champlain subsidence and re-elevation of the St. Lawrence River basin; Notes on Minnesota minerals; Chemical analyses; The progress of mining; Compressive strength of some Minnesota bricks and building stones; List of rock samples collected in 1894 by U.S. Grant; Notes upon the bedded and banded structures of the gabbro and upon an area of troctolyte; Additions to the Library since the report for 1893; Museum additions; List of rock samples collected in 1894 to illustrate the field notes of N.H. Winchell.


CONTENTS: Summary statement; Rock samples collected to illustrate the notes of N.H. Winchell in 1896, with annotations; Rock samples collected to illustrate the field notes of N.H. Winchell in 1897, with annotations; Rock samples collected by N.H. Winchell in 1898, with field annotations; Record of geological field work in northeastern Minnesota, 1892 to 1898 by U.S. Grant; List of rock samples collected in northeastern Minnesota in 1898 by U.S. Grant; Preliminary report of field work during the summer of 1895; List of rock samples collected in northeastern Minnesota in 1895, 1896 and 1897 by A.H. Elftman; Additions to the Library since the report for 1894; General index of the annual reports of the Minnesota Survey, reports I-XXIV, 1872-1899.
BULLETINS

1  1889  Winchell, N.H., The history of geological surveys in Minnesota: 37 p.
2  1887  Wadsworth, M.E., Preliminary description of the peridotites, gabbros, diabases and andesites of Minnesota: 172 p.
4  1887  Oestlund, O.W., Synopsis of the Aphididae of Minnesota: 100 p.
6  1891  Winchell, N.H., and Winchell, H.V., Iron ores of Minnesota, their geology, discovery, development, qualities and origin, and comparison with those of other iron districts: 430 p., 3 pls. in pocket.
7  1892  Herrick, C.L., The mammals of Minnesota. A scientific and popular account of their features and habits: 300 p.
8  1893  Lawson, A.C., I. The anorthosites of the Minnesota coast of Lake Superior. II. The laccolithic sills of the northwest coast of Lake Superior; with a prefatory note on the Norian of the Northwest, by N.H. Winchell: 48 p.
9  1894-1898  MacMillan, C., editor, Minnesota botanical studies, vol. 1: 1081 p.; also v. 2 of the Reports of the Survey, Botanical Series. This volume was distributed by the State Botanist.
10 1894  Spurr, J.E., The iron-bearing rocks of the Mesabi range in Minnesota: 260 p.
12 1915  Leverett, F., Surface formations and agricultural conditions of northwestern Minnesota; with a chapter on climatic conditions of Minnesota, by U.G. Purssell: 78 p., 1 pl. in pocket.
13 1917  Leverett, F., and Sardeson, F.W., Surface formations and agricultural conditions of northeastern Minnesota; with a chapter on climatic conditions of Minnesota, by U.G. Purssell: 72 p., 1 pl. in pocket.
14 1919  Leverett, F., and Sardeson, F.W., Surface formations and agricultural conditions of the south half of Minnesota; with a chapter on climatic conditions of Minnesota, by U.G. Purssell: 147 p., 1 pl. in pocket.
15 1918  Harder, E.C., and Johnston, A.W., Preliminary report on the geology of east central Minnesota, including the Cuyuna iron-ore district: 178 p., 5 pls. in pocket.
17 1919  Grout, F.F., and Broderick, T.M., The magnetite deposits of the eastern Mesabi range, Minnesota: 58 p., 1 pl. in pocket.
19 1924  Gruner, J.W., Contributions to the geology of the Mesabi range, with special reference to the magnetites of the iron-bearing

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<tr>
<td>1925</td>
<td>A guidebook to Minnesota Trunk Highway No. 1</td>
<td>Schwartz, G.M.</td>
<td>128 p.</td>
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<tr>
<td>1926</td>
<td>The geology and magnetite deposits of northern St. Louis County, Minnesota</td>
<td>Grout, F.F.</td>
<td>220 p.</td>
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<tr>
<td>1932</td>
<td>The geology and water resources of northwestern Minnesota</td>
<td>Allison, I.S.</td>
<td>245 p.</td>
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<tr>
<td>1933</td>
<td>Investigation of the commercial possibilities of marl in Minnesota</td>
<td>Schwartz, G.M.</td>
<td>79-190 p.</td>
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<tr>
<td>1935</td>
<td>The history of the upper Mississippi River in Late Wisconsin and postglacial time</td>
<td>Cooper, W.S.</td>
<td>116 p., 4 p. of pls.</td>
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<td>1936</td>
<td>The geology of the Minneapolis-St. Paul metropolitan area</td>
<td>Schwartz, G.M.</td>
<td>267 p., 7 pls. in pocket.</td>
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<td>1939</td>
<td>The geology of the anorthosites of the Minnesota coast of Lake Superior</td>
<td>Grout, F.F. and Schwartz, G.M.</td>
<td>116 p., 6 pls. in pocket.</td>
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<tr>
<td>1944</td>
<td>The geology and underground waters of southern Minnesota</td>
<td>Thiel, G.A.</td>
<td>506 p.</td>
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<tr>
<td>1947</td>
<td>The geology and underground waters of northeastern Minnesota</td>
<td>Thiel, G.A.</td>
<td>247 p.</td>
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<tr>
<td>1949</td>
<td>The geology of the Duluth metropolitan area</td>
<td>Schwartz, G.M.</td>
<td>136 p., 19 pls. in pocket.</td>
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<tr>
<td>1955</td>
<td>The geology of the Cuyuna district, Minnesota</td>
<td>Grout, F.F. and Wolff, J.F., Sr.</td>
<td>144 p., 6 pls. in pocket.</td>
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<tr>
<td>1954</td>
<td>The stratigraphy and structure of the Mesabi range, Minnesota</td>
<td>White, D.A.</td>
<td>92 p., 4 pls. on 17 sheets in pocket.</td>
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*Out of print*
Schneider, A.F., Pleistocene geology of the Randall region, central Minnesota: 151 p., 1 pl. in pocket.


Taylor, R.B., Geology of the Duluth Gabbro Complex near Duluth, Minnesota: 63 p., 1 pl. in pocket.


CIRCULARS. See MISCELLANEOUS PUBLICATIONS

COUNTY ATLAS SERIES


C-2 1984 Balaban, N.H., and Olsen, B.M., editors, Geologic atlas of Winona County, Minnesota: Scale 1:100,000 and smaller, 8 pls. CONTENTS: Pl. 1, Olsen, B.M., Data base map; pl. 2, Mossler, J.H., and Book, P.R., Bedrock geology; pl. 3, Hobbs, H.C., Surficial geology; pl. 4, Kanivetsky, R., Bedrock hydrogeology; pl. 5, Dalgleish, J.B., and Alexander, E.C., Jr., Sinkholes and sinkhole probability; pl. 6, Kanivetsky, R., Susceptibility of the ground-water system to pollution; pl. 7, Olsen, B.M., Geology and well construction; pl. 8, Jirsa, M.A., and Meyer, G.N., Geologic resources.

Out of print
**EDUCATIONAL SERIES**

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<tr>
<td>1984</td>
<td>Morey, G.B.</td>
<td>The search for oil and gas in Minnesota</td>
<td>30 p.</td>
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**FINAL REPORT**

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<th>Title</th>
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<td><strong>CONTENTS:</strong></td>
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<td>Winchell, N.H., a historical sketch of explorations and surveys in Minnesota, the general physical features of the state, the building stones, and the geology of Houston, Winona, Fillmore, Mower, Freeborn, Pipestone, Rock, and Rice Counties; Harrington, M.W., the geology of Olmsted, Dodge, and Steele Counties; and Upham, W., the geology of Waseca, Blue Earth, Faribault, Watonwan, Martin, Cottonwood, Jackson, Murray, Nobles, Brown, Redwood, Yellow Medicine, Lyon, Lincoln, Big Stone, Lac qui Parle, and Le Sueur Counties.</td>
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<tr>
<td><strong>CONTENTS:</strong></td>
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<td>Winchell, N.H., the geology of Wabasha, Goodhue, Dakota, Hennepin, Ramsey, and Washington Counties; and Upham, W., the geology of Carver, Scott, Sibley, Nicollet, McLeod, Renville, Swift, Chippewa, Kandiyohi, Meeker, Wright, Chisago, Isanti, Anoka, Benton, Sherburne, Stearns, Douglas, Pope, Grant, Stevens, Wilkin, Traverse, Otter Tail, Wadena, Todd, Crow Wing, Morrison, Mille Lacs, Kanabec, Pine, Becker, and Clay Counties.</td>
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<td><strong>CONTENTS:</strong></td>
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<td>Winchell, N.H., and Ulrich, E.O., Historical sketch of investigation of the Lower Silurian in the Upper Mississippi</td>
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CONTENTS: Winchell, N.H., the geology of Carlton, St. Louis, and Lake Counties, and the geology of the Hibbing, Mountain Iron, Virginia, Partridge River, Dunka River, Pigeon Point, Vermilion Lake, Carlton, and Duluth plates; Upham, W., the geology of Aitkin, Cass, and a part of Crow Wing Counties; Todd, J.E., the geology of Hubbard, Norman, Polk, Marshall, Roseau, Kittson, and Beltrami Counties, and a part of Cass County; Grant, U.S., the geology of Itasca and Cook Counties, and the geology of Pokegama Lake, Grand Rapids, Swan Lake, Gabбро Lake, Snowbank Lake, Fraser Lake, Akeley Lake, Gunflint Lake, Rove Lake, and Mountain Lake plates; and Winchell, H.V., Minnesota iron mining, economically and statistically considered.


CONTENTS: Winchell, N.H., Structural geology; Winchell, N.H., and Grant, U.S., Petrographic geology of crystalline rocks of Minnesota; Petrographic geology and descriptions; Winchell, N.H., Mineralogy and petrology of Minnesota; and Winchell, N.H., Appendix.


*Out of print

12
GEOLOGIC MAP INDEX


GEOLOGIC MAP OF MINNESOTA [Scale 1:250,000]

1966  Sloan, R.E., and Austin, G.S., compilers, Geologic map of Minnesota, St. Paul sheet, bedrock geology.


1982  Green, J.C., compiler, Geologic map of Minnesota, Two Harbors sheet, bedrock geology.

GEOLOGIC MAP SERIES

*GM-1  1964  Taylor, R.B., Bedrock geology of Duluth and vicinity, St. Louis County, Minnesota: 12 p., 1 pl. in pocket.


Series ceased with GM-3, 1970

*Out of print
RESUME OF GEOLOGY OF MINNESOTA, by P.K. Sims and G.B. Morey

HISTORY OF INVESTIGATIONS
--History of geologic investigations, by P.K. Sims
--Geochronology in Minnesota, by S.S. Goldich

EARLY PRECAMBRIAN
--Northern Minnesota, general geologic features, by P.K. Sims
--Vermilion district and adjacent areas, by P.K. Sims
--Metavolcanic and associated synvolcanic rocks in Vermilion district, by P.K. Sims
--Ultramafic rocks in Vermilion district, by J.C. Green
--Banded iron-formations in Vermilion district, by P.K. Sims
--Graywackes and related rocks of Knife Lake Group and Lake Vermilion Formation, Vermilion district, by R.W. Ojakangas
--Granite-bearing conglomerates in the Knife Lake Group, Vermilion district, by R.K. McLimans
--Burntside Granite Gneiss, Vermilion district, by P.K. Sims and M.G. Mudrey, Jr.
--Saganaga batholith, by G.N. Hanson
--Vermilion granite-migmatite massif, by D.L. Southwick
--Giants Range batholith, by P.K. Sims and S. Viswanathan
--Syenitic plutons and associated lamprophyres, by P.K. Sims and M.G. Mudrey, Jr.
--Petrology of the lamprophyre pluton near Dead River, by A.L. Geldon
--Linden pluton, by P.K. Sims, D. Sinclair, and M.G. Mudrey, Jr.
--Rainy Lake area, by R.W. Ojakangas
--Mineral deposits in Lower Precambrian rocks, northern Minnesota, by P.K. Sims
--Minnesota River Valley, southwestern Minnesota, by J.A. Grant

MIDDLE PRECAMBRIAN
--General geologic setting, by G.B. Morey
--Mesabi range, by G.B. Morey
--Gunflint range, by G.B. Morey
--Cuyuna district, by R.W. Marsden
--East-central Minnesota, by C.W. Keighin, G.B. Morey, and S.S. Goldich
--Diabase dikes in northern Minnesota, by P.K. Sims and M.G. Mudrey, Jr.
--Minnesota River Valley, by G.B. Morey
--Aitkin County sulfide deposits, by G.B. Morey
--Evidences of Precambrian life in Minnesota, by D.G. Darby
--Amino acids in some Middle Precambrian rocks of northern Minnesota and southern Ontario, by J.R. Niehaus and F.M. Swain
Chap. 5 LATE PRECAMBRIAN
--Regional geologic setting, by C. Craddock
--General geology, northeastern Minnesota, by J.C. Green
--North Shore Volcanic Group, by J.C. Green
--Duluth Complex, history of nomenclature, by W.C. Phinney
--Northwestern part of Duluth Complex, by W.C. Phinney
--Northern prong, Duluth Complex, by W.C. Phinney
--Eastern part of Duluth Complex, by D.M. Davidson, Jr.
--Southern part of Duluth Complex, by B. Bonnichsen
--Sulfide minerals in the Duluth Complex, by B. Bonnichsen
--Logan intrusions, by P.W. Weiblen, E.A. Mathez, and G.B. Morey
--Cook County fissure vein deposits, by M.G. Mudrey, Jr., and G.B. Morey
--Magmatic sulfides and associated fissure vein deposit at the
Green prospect, Cook County, by M.G. Mudrey, Jr.
--Puckwunge Formation of northeastern Minnesota, by A.F. Mattis
--Keweenawan geology of east-central and southeastern Minnesota, by
C. Craddock
--Keweenawan volcanic rocks in east-central Minnesota, by G.B.
Morey and M.G. Mudrey, Jr.
--Sedimentation and petrology of the Upper Precambrian Hinckley
Sandstone of east-central Minnesota, by A.D. Tryhorn and R.W.
Ojakangas
--Petrology of Keweenawan sandstones in the subsurface of
southeastern Minnesota, by G.B. Morey
--The Sioux Quartzite, southwestern Minnesota, by G.S. Austin

Chap. 6 PALEOZOIC AND MESOZOIC
--Paleozoic lithostratigraphy of southeastern Minnesota, by G.S.
Austin
--Paleoecology of the Cambrian and Ordovician strata of Minnesota,
by G.F. Webers
--Paleozoic structure and stratigraphy of the Twin City region, by
J.H. Mossler
--The iron ores of southeastern Minnesota, by R.L. Bleifuss
--Pre-Mt. Simon regolith, by G.B. Morey
--Cretaceous rocks, by G.S. Austin

Chap. 7 CENOZOIC
--Quaternary history of Minnesota, by H.E. Wright, Jr.
--Quaternary geology of southwestern Minnesota, by C.L. Matsch
--Physiography of Minnesota, by H.E. Wright, Jr.

Chap. 8 GRAVITY AND MAGNETICS
--Regional gravity field, by P.K. Sims
--Magnetic data and regional magnetic patterns, by P.K. Sims

Chap. 9 GROUND-WATER GEOLOGY
--Ground-water resources in Minnesota, by R.K. Hogberg

Pl. 1 Geologic map of Minnesota, bedrock geology, by P.K. Sims
Pl. 2 Bouguer gravity map showing Midcontinent Gravity High, compiled by
C. Craddock

GEOLOGY OF MINNESOTA--THE FINAL REPORT. See FINAL REPORT
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<tr>
<th>Year</th>
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<td>1972</td>
<td>Webers, G.F., and Austin, G.S.</td>
<td>Field trip guide book for Paleozoic and Mesozoic rocks of southeastern Minnesota, with Special papers: Austin, G.S., Paleozoic lithostratigraphy of southeastern Minnesota; Webers, G.F., Paleozoic geology of the Ordovician strata of southeastern Minnesota; Sloan, R.E., Notes on the Platteville Formation, southeastern Minnesota; and Austin, G.S., Precambrian quartzite and Cretaceous rocks of southern Minnesota: Prepared for the Geological Society of America, 85th Annual Meeting, Minneapolis, Minnesota, 81 p.</td>
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<td>1972</td>
<td>Matsch, C.L., Tipton, M., Steege, F., Rutford, R.H., and Parham, W.E.</td>
<td>Field trip guide book for geomorphology and Quaternary stratigraphy of western Minnesota and eastern South Dakota, with Special papers: Matsch, C.L., Rutford, R.H., and Tipton, M.J., Quaternary geology of northeastern South Dakota and southwestern Minnesota; Steege, F.V., Ice-stagnation drift, Coteau des Prairies, South Dakota; Wright, H.E., Postglacial environmental history of the Coteau des Prairies; and Parham, W.E., A possible peneplain of Early Late Creta-</td>
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ceous age in Minnesota: Prepared for the Geological Society of America, 85th Annual Meeting, Minneapolis, Minnesota, 84 p.


*Out of print
INFORMATION CIRCULARS

*1 1964 Hogberg, R.K., compiler, Directory of Minnesota mineral pro-
2 1965 Ruotsala, A.P., and Tufford, S.P., compilers, Chemical anal-
yses of igneous rocks: 87 p.
3 Number never used
*4 1966 Hogberg, R.K., compiler, Directory of Minnesota mineral pro-
*5 1969 Hogberg, R.K., compiler, Directory of Minnesota industrial
6 1969 Austin, G.S., Paleozoic lithostratigraphic nomenclature for
southeastern Minnesota: 11 p., 1 loose pl.
*7 1969 Sims, P.K., and Westfall, I., editors, Summary of fieldwork,
*8 1970 Sims, P.K., and Westfall, I., editors, Summary of fieldwork,
*9 1971 Mossler, J., Winter, T.C., and Tufford, S., Instructions for
using the Minnesota system for storage and retrieval of
geologic log data: 32 p.
10 1974 Bonnichsen, B., Copper and nickel resources in the Duluth
Complex, northeastern Minnesota: 24 p.
11 1976 Morey, G.B., The basis for a continental drilling program in
Minnesota: 25 p.
12 1977 Beltrame, R.J., Selected bibliography of Cuyuna range geology,
mining and metallurgy: 22 p.
13 1977 Beltrame, R.J., Directory of information on Cuyuna range
geology and mining: 52 p.
14 1978 Beltrame, R.J., Index to geophysical investigations in
Minnesota: 52 p.
15 1979 Earth science educational materials for Minnesota: 17 p.
16 1979 Holtzman, R.C., and Wahl, T.E., Minnesota Geological Survey
17 1979 Davis, P.A., Interpretation of resistivity sounding data:
computer programs for solutions to the forward and inverse
problems: 23 p.
18 1980 Southwick, D.L., Subsurface research and scientific drilling
in western Minnesota: 18 p.
19 1981 Morey, G.B., Geologic terranes of Minnesota and their uranium
potential: 40 p.
20 1984 Meyer, G.N., and Jirsa, M.A., Aggregate resources inventory, Twin
Cities Metropolitan Area, Minnesota: 16 p., 2 loose pls.

MISCELLANEOUS MAP SERIES

*M-1 1965 Payne, C.M., Bedrock geologic map, Minneapolis, St. Paul and
vicinity: Scale 1:24,000; withdrawn in 1973--additional data
since compilation. For a comparable map at the scale
1:48,000, see Miscellaneous Map Series M-57, 1985.

*Out of print
M-2 1966  Green, J.C., Phinney, W.C., and Weiblen, P.W., Geologic map of Gabbro Lake quadrangle, Lake County, Minnesota: Scale 1:31,680.

*M-3 1968  Ikola, R.J., Simple Bouguer gravity map of Minnesota, Hibbing sheet: Scale 1:250,000; this map was superseded by Miscellaneous Map Series M-56, 1985.

*M-4 1968  Ikola, R.J., Simple Bouguer gravity map of southern part of Duluth Complex and adjacent areas, Minnesota: Scale 1:125,000.

*M-5 1968  Sims, P.K., Morey, G.B., Ojakangas, R.W., and Griffin, W.L., Preliminary geologic map of the Vermilion district and adjacent areas, northern Minnesota: Scale 1:125,000; this map was printed with the wrong scale (1:250,000) indicated on the sheet, an error corrected on most of the distributed copies.

*M-6 1969  Griffin, W.L., Geologic map of the Embarrass quadrangle, St. Louis County, Minnesota: Scale 1:24,000.

M-7 1969  Davidson, D.M., Jr., Geologic map of the Kawishiwi Lake quadrangle, Lake and Cook Counties, Minnesota: Scale 1:24,000; accompanying discussion: The Duluth Complex in the Perent Lake and Kawishiwi Lake quadrangles, Lake and Cook Counties, Minnesota, 10 p.

M-8 1969  Davidson, D.M., Jr., Geologic map of the Perent Lake quadrangle, Lake County, Minnesota: Scale 1:24,000; accompanying discussion: The Duluth Complex in the Perent Lake and Kawishiwi Lake quadrangles, Lake and Cook Counties, Minnesota, 10 p.

M-9 1970  Ikola, R.J., Simple Bouguer gravity map of Minnesota, Two Harbors sheet: Scale 1:250,000.


M-11 1971  Bonnichsen, B., Outcrop map of southern part of Duluth Complex and associated Keweenawan rocks, St. Louis and Lake Counties, Minnesota: Scale 1:125,000.


M-13 1973  Sims, P.K., Geologic map of western part of Vermilion district, northeastern Minnesota: Scale 1:48,000.

*M-14 1970  Sims, P.K., Geologic map of Minnesota, bedrock geology: Scale 1:1,000,000; this map is also included with Geology of Minnesota: A centennial volume.

M-15 1974  Sims, P.K., Reconnaissance geologic map of Biwabik NW quadrangle, St. Louis County, Minnesota: Scale 1:24,000.

M-16 1974  Sims, P.K., and Viswanathan, S., Reconnaissance geologic map of Britt quadrangle, St. Louis County, Minnesota: Scale 1:24,000.

M-17 1977  Ojakangas, R.W., and Sims, P.K., Geologic map of Lost Lake quadrangle, St. Louis County, Minnesota: Scale 1:24,000.

M-18 1974  Viswanathan, S., Reconnaissance geologic map of Dewey Lake NW quadrangle, St. Louis County, Minnesota: Scale 1:24,000.

*Out of print
M-19 1974 Viswanathan, S., Reconnaissance geologic map of Side Lake quadrangle, Itasca and St. Louis Counties, Minnesota: Scale 1:24,000.
M-20 1974 Viswanathan, S., and Ojakangas, R.W., Reconnaissance geologic map of Stingy Lake quadrangle, Itasca and St. Louis Counties, Minnesota: Scale 1:24,000.
M-21 1974 Viswanathan, S., Reconnaissance geologic map of O'Leary Lake quadrangle, Itasca County, Minnesota: Scale 1:24,000.
M-22 1974 Viswanathan, S., and Ojakangas, R.W., Reconnaissance geologic map of Dewey Lake quadrangle, St. Louis County, Minnesota: Scale 1:24,000.
M-23 1974 Viswanathan, S., Reconnaissance geologic map of Dark Lake quadrangle, St. Louis County, Minnesota: Scale 1:24,000.
M-26 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Beth Lake quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-27 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Kelso Mountain quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-28 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Eagle Mountain quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-29 1977 Davidson, D.M., Jr., and Burnell, J.R., Reconnaissance geologic map of Brule Lake quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-30 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Cherokee Lake quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-31 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Pine Mountain quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-32 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Lima Mountain quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-33 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Alice Lake quadrangle, Lake County, Minnesota: Scale 1:24,000.
M-34 1977 Davidson, D.M., Jr., Reconnaissance geologic map of Lake Polly quadrangle, Lake and Cook Counties, Minnesota: Scale 1:24,000.
M-36 1977 Mudrey, M.G., Jr., Geologic map of Pigeon Point quadrangle, Cook County, Minnesota: Scale 1:24,000.
M-38 1977 Morey, G.B., and Nathan, H.D., Geologic map of the South Lake quadrangle, Cook County, Minnesota: Scale 1:24,000.


M-42 1978 Morey, G.B., and Nathan, H.D., Geologic map of the Gunflint Lake quadrangle, Cook County, Minnesota: Scale 1:24,000.


M-50 1982 Green, J.C., and Schulz, K.J., Geologic map of the Ely quadrangle, St. Louis and Lake Counties, Minnesota: Scale 1:24,000.

M-51 1983 Mossier, J.H., Paleozoic lithostratigraphy of southeastern Minnesota: Scale 1:500,000, 8 pls.

CONTENTS: Pl. 1, A. Maquoketa-Dubuque-Galena Formations, and B. Decorah-Platteville-Glenwood formations; pl. 2, A. St. Peter Sandstone, and B. Prairie du Chien Group; pl. 3, Jordan Sandstone; pl. 4, St. Lawrence and Franconia Formations; pl. 5, Ironton and Galesville Sandstones; pl. 6, Eau Claire Formation; pl. 7, Mt. Simon and Hinckley Sandstones; pl. 8, Pre-Hinckley bedrock surface.

M-52 1983 Mossier, J.H., Bedrock topography and isopachs of Cretaceous and Quaternary strata, east-central and southeastern Minnesota: Scale 1:500,000, 2 pls.

M-53 1984 Chandler, V.W., Nordstrand, E., and Anderson, S., Shaded relief aeromagnetic anomaly map of northeastern and east-central Minnesota: Scale 1:1,000,000.

M-54 1985 Meyer, G.N., Quaternary geologic map of the Minneapolis-St. Paul urban area, Minnesota: Scale 1:48,000.

M-55 is in preparation


M-57 1985 Bloomgren, B.A., Bedrock geologic and topographic maps of the Minneapolis-St. Paul urban area, Minnesota: Scale 1:48,000, 2 pls.

*Out of print
This series includes circulars and announcements that were designed to inform the public in the Survey's early days of its plans, activities, and needs. They were considered to have very little scientific value and to be of only transitory interest. Few copies of each were printed. They are occasionally found referenced in early Survey reports, as well as in bibliographies and catalogs, which is why they have been included here. To date, the Survey has been able to locate copies of numbers 2, 3, 8, 9 (Circular 5), and 10 (Circular 6).

*1 1872 Circular 1. Laws of Minnesota, 1872. To provide for a geological and natural history survey of the state [includes a note asking for the cooperation of citizens and others]: 4 p.?


*3 1874 Winchell, N.H., Report of Prof. N.H. Winchell concerning the salt spring lands due to the state of Minnesota [a history of all official transactions relating to them, and a statement of their amount and location]: 26 p.

*4 1875 Lapham, I.A., A catalogue of the plants of Minnesota: Prepared in 1865, contributed to the Geological and Natural History Survey of Minnesota, and published by the State Horticultural Society in 1875.

*5 1876 Circular 2. Botany [relating to botany and giving general directions for collecting information on the flora of the state]: 4 p.?

*6 1877 Circular 3. The Museum [the establishment and organization of the Museum]: 4 p.?


*9 1880 Circular 5. Winchell, N.H., Building stones, lime, clay, etc. To quarrymen and builders [relating to the collection of two-inch cubes of building stones for physical tests of strength, and for chemical examination, and samples of clay and brick for the General Museum]: 3 p.


NEWSLETTERS

*1962 CONTENTS: Introduction; History; Appropriations; Staff; Advisory committee; Current activities; Noteworthy results; Need for detailed systematic geologic mapping; Publications issued by the Survey during the year; Plans for new publication series; Topographic mapping;

*Out of print
Other geologic activities in the state: 6 p., mimeograph, dated June 6.

*1963
CONTENTS: Activities; Fiscal statement; Natural Resources Bill; Staff notes; Current projects; Noteworthy results of current projects; Publications; Papers presented during the year; Other publications on Minnesota geology; Notes; Topographic mapping in Minnesota; Other geologic activities in the state: 6 p., mimeograph, dated June 16.

*1964
CONTENTS: Activities; Fiscal statement; Staff notes; Proposal for geologic map atlases of Minnesota; Publications; Current projects; Noteworthy results of current projects; Magnetic anomaly in Fillmore County drilled; Minnesota mineral industry--1963; Survey exhibits; Geologic studies of the Mesabi Range by the Minnesota Geological Survey; Other geologic activities in the state: 13 p.

*1965
CONTENTS: Summary of activities; Budget; Staff notes; Taconite amendment; Minnesota mineral industry--1964; The 1965 Omnibus Natural Resources Act; Long-range plan; George Melvin Schwartz Geological Survey Fund; Current projects; Publications; Noteworthy results; Status of topographic mapping; Status of aeromagnetic mapping; Survey exhibits; Other geologic activities in the state: 19 p.

*1966
CONTENTS: Summary of activities; Budget; Staff notes; Copper-nickel exploration resumed in Minnesota; Taconite drilling program; Highlights of Minnesota mineral industry--1965; Special activities; Projects; State geologic map project; Publications 1965-1966; Theses on Minnesota geology, 1961-1966; Topographic mapping program; Other geologic activities in the state: 18 p.

*1967
CONTENTS: Summary of activities; Budget; Staff notes; Mesabi range deep drilling project; State on threshold of a copper-nickel industry; Highlights of Minnesota's mineral industry--1966; Special activities; Projects; State geologic map project; Publications 1966-1967; Programs related to water resources; Noteworthy results; Reprint Series begun; Topographic mapping program; George Melvin Schwartz Geological Survey Fund; Other geologic activities in the state: 22 p.

*1968
CONTENTS: Summary of activities; Budget; Staff notes; Environmental geology; Copper-nickel exploration--progress; Highlights of Minnesota's mineral industry--1967; Projects; Special activities; State geologic map atlas project; State gravity mapping project; Aeromagnetic surveying program; Publications 1967-68; Noteworthy results; Topographic mapping program; George Melvin Schwartz Geological Survey Fund; In memorium, Raymond D. Nolan; Other geologic activities in the state: 16 p.

*1969
CONTENTS: Summary of activities; Budget; Staff notes; Exploration for base metal sulfides in Minnesota; Highlights of Minnesota's mineral industry--1968; Projects; News items; State geologic map atlas project; State gravity map project; Minnesota's topographic mapping program; Publications 1968-69; George Melvin Schwartz Geological Survey Fund; Other geologic activities in the state: 16 p.

*1970
CONTENTS: Summary of activities; Budget; Staff notes; Exploration for base metal sulfides in Minnesota; Highlights of Minnesota's mineral production--1969; Projects; State geologic map atlas project; Minnesota's topographic mapping program; State gravity map project;

*1968 Out of print

23

No newsletters were published between 1970 and 1985. Publication was resumed semiannually with the Summer 1985 issue.

*1985 CONTENTS: Recent oil and gas exploration in Minnesota; Director's column; Project updates; Staff news; Funding report; MGS staff; News notes; Recent Survey publications; In the lighter vein: v. 1, no. 1, Summer issue, 8 p.

REPORTS OF INVESTIGATIONS

1  1963  Sims, P.K., and Austin, G.S., Geologic interpretation of magnetic map of McLeod County, Minnesota: 7 p., 2 pls. in pocket.

2  1963  Austin, G.S., Geology of clay deposits, Red Wing area, Goodhue and Wabasha Counties, Minnesota: 23 p., 1 pl. in pocket.


4  1965  Sims, P.K., Austin, G.S., and Ikola, R.J., Interpretation of Lake Washington magnetic anomaly, Meeker County, Minnesota: 13 p., 1 pl. in pocket.


7  1967  Morey, G.B., Stratigraphy and petrology of the type Fond du Lac Formation, Duluth, Minnesota: 35 p.

8  1968  Hanson, G.N., K-Ar ages for hornblende from granites and gneisses and for basaltic intrusives in Minnesota: 20 p.


12 1970  Austin, G.S., Deep stratigraphic test well near Hollandale, Minnesota: 52 p.


15 1976  Goebel, J.E., Quaternary geologic map index of Minnesota: 22 p., 1 pl. in pocket.

*Out of print
Morey, G.B., Revised Keweenawan subsurface stratigraphy, southeastern Minnesota: 67 p.


Mossler, J.H., Cedar Valley Formation (Devonian) of Minnesota and northern Iowa: 44 p., 2 pls. in pocket.


Geology of the Deer Lake Complex, Itasca County, Minnesota, includes (A) Berkley, J.L., and Himmelberg, G.R., Cumulus mineralogy and petrology of the Deer Lake Complex, Itasca County, Minnesota; and (B) Ripley, E.M., Sulfide minerals in the layered sills of the Deer Lake Complex, Itasca County, Minnesota: 50 p.

Morey, G.B., Lower and Middle Precambrian stratigraphic nomenclature for east-central Minnesota: 52 p., 1 pl. in pocket.

Kanivetsky, R., Regional approach to estimating the groundwater resources of Minnesota: 13 p.


Lively, R.S., and Southwick, D.L., Radon activity in ground waters of seven test areas in Minnesota: 60 p.

Green, J.C., Geology of the Milepost 7 area, Lake County, Minnesota: 12 p.

Beltrame, R.J., Chandler, V.W., and Gulbranson, B.L., Geophysical investigation of the Cedar Mountain Complex, Redwood County, Minnesota: 20 p.


Jones, N.W., Petrology of some Logan diabase sills, Cook County, Minnesota: 40 p.


Southwick, D.L., editor, Shorter contributions to the geology of the Sioux Quartzite (early Proterozoic), southwestern Minnesota: 74 p., 1 loose pl.

CONTENTS: Ojakangas, R.W., and Weber, R.E., Petrography and paleocurrents of the lower Proterozoic Sioux Quartzite, Minnesota and South Dakota; Southwick, D.L., and Mossler, J.H., The Sioux Quartzite and subjacent regolith in the Cottonwood County basin, Minnesota; Southwick, D.L., and Lively, R.S., Hydrogeochemical anomalies associated with the basal contact of the Sioux Quartzite along the north margin of the Cottonwood County basin; Morey, G.B., Sedimentology of

*Out of print
the Sioux Quartzite in the Fulda basin, Pipestone County, southwestern Minnesota.

33  1985  Mossler, J.H., Sedimentology of the Middle Ordovician Platteville Formation, southeastern Minnesota: 27 p.

**REPRINT SERIES**

The issues in this series are reprints of papers by Survey personnel published in outside journals and reports. They are reproduced in limited quantities and numbered for convenience. Those currently available can be found in the "List of Publications in Print." Inquiries concerning the earlier numbers in the Reprint Series should be directed to the Minnesota Geological Survey Library.

**SPECIAL PUBLICATION SERIES**

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<td>SP-2</td>
<td>1968</td>
<td>Machamer, J.F., Geology and origin of iron ore deposits of the Zenith mine, Vermilion district, Minnesota: 56 p., 3 pls. in pocket.</td>
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<td>SP-3</td>
<td>1965</td>
<td>Burr, J.H., Jr., and Swain, F.M., Ostracoda of the Dubuque and Maquoketa Formations of Minnesota and northern Iowa: 40 p.</td>
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<td>SP-5</td>
<td>1968</td>
<td>Himmelberg, G.R., Geology of Precambrian rocks, Granite Falls-Montevideo area, southwestern Minnesota: 33 p., 1 pl. in pocket.</td>
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<td>SP-8</td>
<td>1969</td>
<td>Griffin, W.L., and Morey, G.B., The geology of the Isaac Lake quadrangle, St. Louis County, Minnesota: 57 p., 1 pl. in pocket.</td>
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<td>SP-9</td>
<td>Number never used</td>
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<td>SP-12</td>
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<td>SP-13</td>
<td>1970</td>
<td>Green, J.C., Lower Precambrian rocks of the Gabbro Lake quadrangle, northeastern Minnesota: 96 p., 4 pls. in pocket.</td>
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Series ceased with SP-13, 1970

*Out of print*
STATE MAP SERIES

S-1 1982 Hobbs, H.C., and Goebel, J.E., Geologic map of Minnesota, Quaternary geology: Scale 1:500,000.
S-3 1979 Kanivetsky, R., Hydrogeologic map of Minnesota, Quaternary hydrogeology: Scale 1:500,000.
S-4 1979 Goebel, J.E., and Walton, M., Geologic map of Minnesota, Quaternary geology: Scale 1:3,168,000.
S-5 1979 Kanivetsky, R., Hydrogeologic map of Minnesota, bedrock hydrogeology: Scale 1:3,168,000.
S-6 1979 Kanivetsky, R., Hydrogeologic map of Minnesota, Quaternary hydrogeology: Scale 1:3,168,000.
S-7 through S-9 have not been published
S-12 1981 Chandler, V.W., Simple Bouguer gravity anomaly map of Minnesota: Scale 1:3,168,000.
S-14 1982 Olsen, B.M., and Mossler, J.H., Geologic map of Minnesota, depth to bedrock: Scale 1:1,000,000.

SUMMARY REPORTS

All the Summary Reports are mimeographs

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<td>1952</td>
<td>Schwartz, G.M., and Harris, J.M., Notes on field work in the copper</td>
<td>8 p.</td>
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<td>-nickel prospect area, Lake County, Minnesota</td>
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<td>1954</td>
<td>Harris, J.M., Further notes on field work in the copper-nickel</td>
<td>4 p.</td>
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<td>prospect area, Lake and St. Louis Counties, Minnesota</td>
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<td>bloating clays and shales in Minnesota</td>
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**OTHER PUBLICATIONS**

(Numbered here only for convenience)

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<td>1872</td>
<td>Winchell, N.H., Preliminary geological map of Minnesota: Scale 1&quot; =</td>
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<td>20 miles; this map was reduced and printed as a postcard in 1972 as</td>
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<td>part of the commemoration of the Survey's centennial.</td>
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<td>1914-</td>
<td>Leverett, F., and Sardeson, F.W., Map of the surface formations of</td>
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<td>1916</td>
<td>Minnesota: Scale 1:500,000, 3 sheets--sheet 1 [northwestern Minnesota],</td>
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<td>by F. Leverett (also included in M.G.S. Bulletin 12); sheet 2 [northeastern Minnesota], by F. Leverett and F.W. Sardeson (also included in M.G.S. Bulletin 13); and sheet 3 [southern Minnesota], by F. Leverett and F.W. Sardeson (also included in M.G.S. Bulletin 14).</td>
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<td>1932</td>
<td>Grout, F.F., and others, preparers, Geologic map of the State of</td>
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<td>1954</td>
<td>Schwartz, G.M., and Prokopovich, N., compilers, Map of mineral</td>
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<td>resources of Minnesota, 1954: Scale 1:1,000,000.</td>
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<td>1954</td>
<td>Thiel, G.A., and Prokopovich, N., compilers, Groundwater map of</td>
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<td>Minnesota: Scale 1:2,000,000.</td>
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<td>1956</td>
<td>Schwartz, G.M., and Prokopovich, N., compilers, Map of mineral</td>
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<td>resources of Minnesota, 1956: Scale 1:1,000,000.</td>
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<td>1966</td>
<td>Schwartz, G.M., and Prokopovich, N., compilers, Map of mineral</td>
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AR ANNUAL REPORTS
B BULLETINS
C COUNTY ATLAS SERIES
ES EDUCATIONAL SERIES
FR FINAL REPORT
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GM GEOLOGIC MAP SERIES
Geol. Map GEOLOGIC MAP OF MINNESOTA
Geol. Minn. GEOLOGY OF MINNESOTA
IC INFORMATION CIRCULARS
ICL INFORMATION CIRCULARS
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MURRAY COUNTY
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areal geology: FR 1
bedrock geologic map: Geol. Map, New Ulm sheet

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areal geology: AR 6; FR 1
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bedrock geologic map: Geol. Map, east-central sheet

WASECA COUNTY
areal geology: FR 1
bedrock geologic map: Geol. Map, St. Paul sheet

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