

MINNESOTA GEOLOGICAL SURVEY

MATT S. WALTON, *Director*

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QUATERNARY GEOLOGIC  
MAP INDEX OF  
MINNESOTA

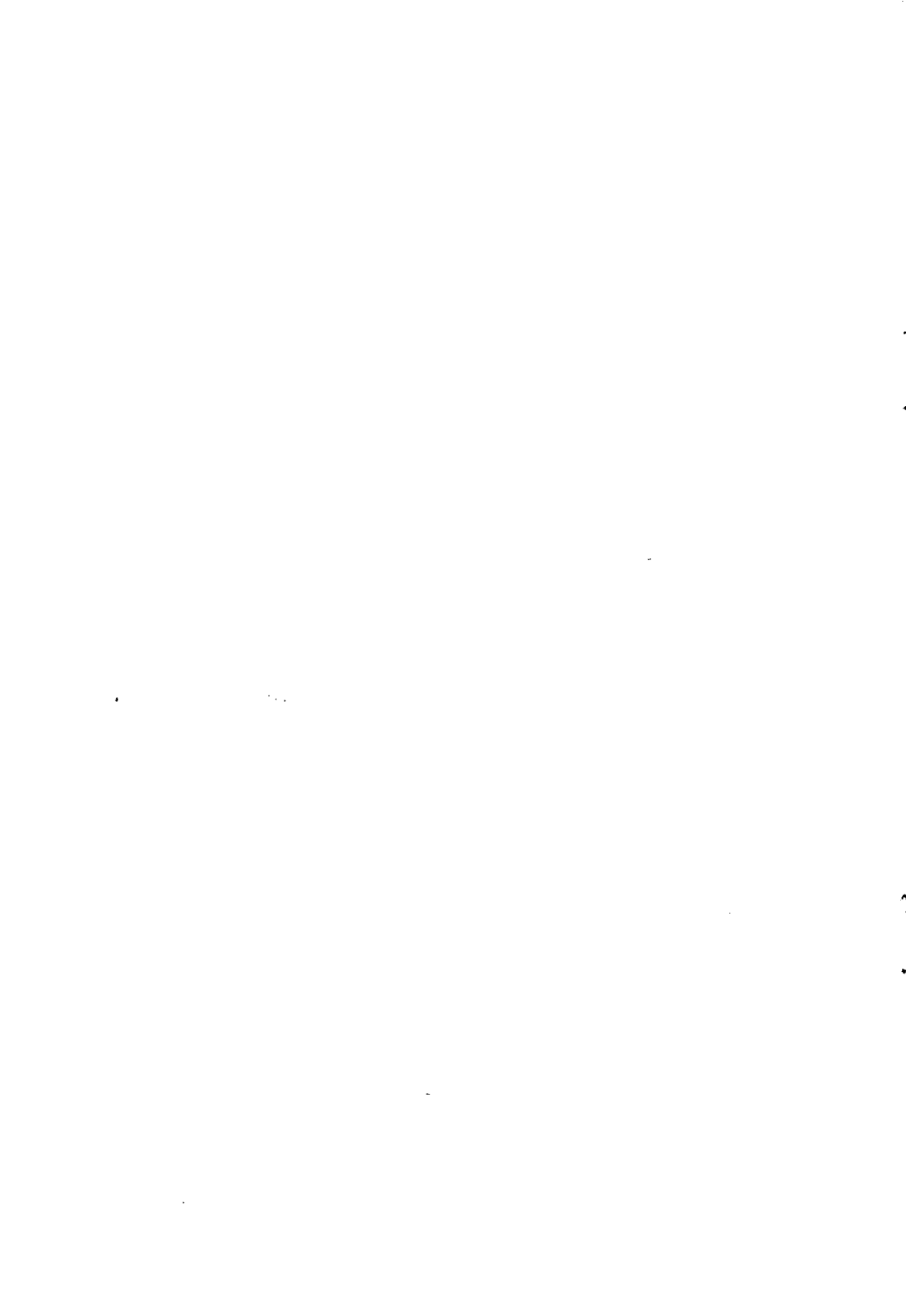
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**QUATERNARY GEOLOGIC  
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# QUATERNARY GEOLOGIC MAP INDEX OF MINNESOTA

Joseph E. Goebel

## INTRODUCTION

The following list of selected references is a guide to the maps, figures, plates, sheets and data being used to compile a new Quaternary Geologic Map of Minnesota. Topics include glacial geology, rock outcrops, bedrock topography, recent sediments, soils, geomorphic and physiographic provinces, and other information pertinent to the surficial geology of the State. These references are identified and located on the Quaternary Geologic Map Index of Minnesota (Plate 1).

## ACKNOWLEDGEMENTS

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## MAP INDEX EXPLANATION

The number assigned to each entry corresponds to the number on the Map Index which identifies the area of the State described in the reference. To facilitate locating the parameters of the area cited in the reference, a symbol is attached to the inside of the area boundary and is identified by a subscript to the reference number, e.g., 113<sub>o</sub>.

Entries which encompass the entire State have a star (\*) preceding the reference number in this list. References to the U.S. Geological Survey Hydrologic Investigations Atlas Series are preceded by two stars (\*\*\*) and are located on the inset map.

The number is usually located on the Map Index in the county designated in the reference. In those cases where a county is not named or there is possible confusion, the name of the county containing the reference number is included at the end of the entry in parenthesis, e.g., (Kittson).

## SELECTED REFERENCES

- \* 1 Ackroyd, E.A., Walton, W.C., and Hills, D.C., 1967, Groundwater contribution to streamflow and its relation to basin characteristics in Minnesota: Minn. Geol. Survey Rept. Inves. RI-6, fig. 8, Map showing major glacial lakes and rivers, 1:5,000,000, fig. 9, Map showing major surficial deposits, 1:5,000,000, fig. 10, Map of major drainage basins, 1:5,000,000.
- 2 Akin, P.D., and Jones, J.R., 1951, Geology and groundwater resources of the Cloquet area, Carlton County, Minnesota: Minn. Dept. of Conservation Bull. 6, fig. 2, Geologic map of the Cloquet area, Minnesota, 1:39,600.
- 3 Allison, Ira S., 1932, The geology and water resources of northwestern Minnesota: Minn. Geol. Survey, Bull. 22, maps showing glacial drift deposits and well records -- fig. 9, Becker, 1:570,000; fig. 10, Beltrami, 1:860,000; fig. 11, western Cass, 1:7,700,000; fig. 12, Clay, 1:490,000; fig. 13, Clearwater, 1:600,000; fig. 14, Douglas, 1:440,000; fig. 15, Grant, 1:400,000; fig. 16, Hubbard, 1:490,000; fig. 17, Kittson, 1:620,000; fig. 19, Lake of the Woods, 1:750,000; fig. 20, Mahanomen, 1:79,000; fig. 21, Marshall, 1:570,000; fig. 22, western Morrison, 1:79,000; fig. 23, Norman, 1:540,000; fig. 24, Otter Tail, 1:890,000; fig. 25, Pennington, Polk, and Red Lake, 1:1,045,000; fig. 27, Pope, 1:440,000; fig. 29, Roseau, 1:630,000; fig. 30, Stearns, 1:590,000; fig. 31, Stevens, 1:440,000; fig. 32, Todd and western Morrison, 1:630,000; fig. 33, Traverse, 1:480,000; fig. 34, Wadena, 1:380,000; fig. 35, Wilkin, 1:460,000, counties, Minnesota. (Kittson and Stearns)
- 4 Anderson, Curtis, 1976, Pleistocene geology of the Comstock-Sebeka area, west-central Minnesota: Master's thesis, North Dakota Univ., pl. 1, Surficial sediment of the Comstock-Sebeka area, west-central Minnesota, 1:250,000. (Clay)
- \* 5 Anderson, Henry W., 1976, Surficial sand aquifers: U.S. Geol. Survey, St. Paul, Minn., unpublished map, 1:1,000,000.



- \*\* 6 Anderson, Henry W., Broussard, W.L., Farrell, D.F., and Felsheim, P.E., 1975, Water resources of the Rock River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA555, Sheet 2, Groundwater, 1:500,000.
- \*\* 7 Anderson, Henry W., Broussard, W.L., Farrell, D.F., and Hult, M.F., 1976, Water resources of the Des Moines River Watershed, southwestern Minnesota: U.S. Geol. Survey, St. Paul, Minn., open-file report, Sheet 2, Groundwater, 1:500,000.
- \*\* 8 Anderson, Henry W., Farrell, D.F., and Broussard, W.L., 1974, Water resources of the Blue Earth River Watershed, south-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-525, Sheet 2, Glacial deposits, 1:500,000.
- \*\* 9 Anderson, Henry W., Farrell, D.F., and Broussard, W.L., 1974, Water resources of the Lower Minnesota Watershed, south-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-526, Sheet 2, Glacial deposits, 1:500,000.
- \*\* 10 Anderson, Henry W., Farrell, D.F., Broussard, W.L., and Felsheim, P.E., 1974, Water resources of the Cannon River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-522, Sheet 2, Glacial deposits, 1:500,000.
- \*\* 11 Anderson, Henry W., Farrell, D.F., Broussard, W.L., and Hult, M.F., 1975, Water resources of the Zumbro River Watershed, southeastern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-543, Sheet 2, Surficial deposits, 1:500,000.
- 12 Andrews, George W., 1958, Windrow Formation of Upper Mississippi Valley region--a sedimentary and stratigraphic study: Jour. Geology, v. 66, no. 6, p. 597-621, fig. 1, Index map of localities of the Windrow Formation and related deposits, 1:4,400,000. (Nicollet)
- 13 Arndt, B. Michael, and Moran, S.R., 1974, Physical data for land-use planning, Cass County, North Dakota and Clay County, Minnesota: North Dakota Geol. Survey Rept. Inves. 54, Map 2, Surface materials of Cass County, North Dakota and Clay County, Minnesota, 1:250,000.

- 14 Austin, G.S., 1963, Geology of clay deposits Red Wing area, Goodhue and Wabasha counties, Minnesota: Minn. Geol. Survey Rept. Inves. RI-2, pl. 1, Geologic map (bedrock geology) of Red Wing area, Goodhue and Wabasha Counties, 1:125,000.
- 15 Barton, Robert, H., 1957, Periglacial features in the Lake City area, southeastern Minnesota: Master's thesis, Univ. Minn., fig. 3, Drift borders of southeastern Minnesota, 1:1,045,000. (Scott)
- 16 Berkley, John L., 1972, Geology of the Deer Lake gabbro-peridotite complex, Itasca County, Minnesota: Minn. Geol. Survey and Minn. Dept. of Natural Resources, unpublished report, 1:9,600.
- \*\* 17 Bidwell, L.E., Winter, T.C., and Maclay, R.W., 1970, Water resources of the Red Lake River Watershed, northwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-346, Sheet 1, Physical setting, 1:500,000.
- \* 18 Boardman, Leona, and Young, R., 1953, Geologic map index of Minnesota: U.S. Geol. Survey, 1:750,000.
- 19 Bonnichsen, Bill, 1971, Outcrop map of southern part of Duluth complex and associated Keweenaw rocks, St. Louis and Lake Counties, Minnesota: Minn. Geol. Survey Misc. Map M-11, 1:125,000. (St. Louis)
- \* 20 Bradley, Reta, 1972, Map of the surficial geology of Minnesota: Minn. Geol. Survey, unpublished, 1:750,000.
- \*\* 21 Broussard, W.L., Anderson, H.W., and Farrell, D.F., 1973, Water resources of the Cottonwood River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-466, Sheet 2, Pleistocene glacial deposits, 1:500,000.
- \*\* 22 Broussard, W.L., Farrell, D.F., Anderson, H.W., and Felsheim, P.E., 1975, Water resources of the Root River Watershed, southeastern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-548, Sheet 2, Glacial deposits, 1:500,000.
- 23 Chamberlin, Rollin T., 1905, The glacial features of the St. Croix Dalles region: Jour. Geology, v. 13, p. 238-256, fig. 2, The geology of the St. Croix Dalles quadrangle, 1:1,000,000. (Chisago)

- \* 24 Chamberlin, Thomas C., 1883, Preliminary paper on the terminal moraine of the second glacial epoch, section on Moraine of the Lake Superior Glacier, p. 382-401, in: U.S. Geol. Survey Third Ann. Rept. 1881-1882, pl. XXXV, Map of a portion of the terminal moraine of the second glacial epoch, 1:3,800,000.
  
- 25 Chernicoff, Stanley, 1974, Pleistocene geologic investigations in the Twin Cities metropolitan area -- progress report on Washington County: U.S. Dept. of Agr., Soil Conserv. Service, unpublished report, 1:63,360.
  
- 26 Cooper, Roger W., in prep., Outcrop map of the Hoyt Lakes-Kawishiwi area, St. Louis and Lake Counties, Minnesota: Minn. Geol. Survey, unpublished map, 1:48,000. (St. Louis)
  
- \*\* 27 Cotter, R.D., and Bidwell, L.E., 1968, Water resources of the Lac Qui Parle River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-269, Sheet 2, Areas of sand and gravel, 1:250,000.
  
- \*\* 28 Cotter, R.D., and Bidwell, L.E., 1966, Water resources of the Pomme De Terre River Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-220, Sheet 2, Glacial drift, 1:250,000.
  
- \*\* 29 Cotter, R.D., Bidwell, L.E., Oakes, E.L., and Hollenstein, G.H., 1966, Water resources of the Big Stone Lake Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-213, Sheet 1, Near surface sand and gravel, 1:250,000.
  
- \*\* 30 Cotter, R.D., Bidwell, L.E., Van Voast, W.A., and Novitzki, R.P., 1968, Water resources of the Chippewa River Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-286, Sheet 2, Outwash and recent alluvium, 1:250,000.
  
- 31 Cotter, R.D., Young, H.L., Petri, L.R., and Prior, H.C., 1965, Ground and surface water in the Mesabi and Vermilion Iron Range area, northeastern Minnesota: U.S. Geol. Survey, Water-Supply Paper 1759-A, pl. 1, Map showing physiographic regions, trace of geologic section, and hydrologic features, Mesabi-Vermilion Iron Range area, northeastern Minnesota, 1:300,000. (St. Louis)

- 32 Cotter, R.D., Young, H.L., and Winter, T.C., 1964, Preliminary surficial geologic map of the Mesabi-Vermilion Iron Range area, northeastern Minnesota: U.S. Geol. Survey Misc. Geol. Inves. Map I-403, 1:125,000. (Itasca)
- 33 Cummins, Joseph, 1976, Soil geomorphic regions of southern Minnesota: U.S. Dept. of Agr., Soil Conserv. Service, written communication, 1:250,000. (Traverse)
- 34 Cummins, Joseph, 1976, Limit of karst topography: U.S. Dept. of Agr., Soil Conserv. Service, written communication, 1:160,000. (Olmsted)
- 35 Dawson, George M., 1875, On the surficial geology of the central region of North America: Geol. Soc. London Quart. Jour., v. 31, p. 603-623, pl. 32, Map and section of part of the interior of North America, 1:11,000,000. (northern half of Minnesota) (Kittson and Wilkin)
- 36 Eginton, Charles W., 1975, Geology of the White Bear Lake West quadrangle, Minnesota: Master's thesis, Oklahoma State Univ., Stillwater, fig. 7, Generalized map of the present surface morphology of the White Bear Lake West Quadrangle, Minnesota, 1:45,000. (Ramsey)
- 37 Eng, Morris, in prep., An aerial evaluation of peat resources, fen patterns, and other surficial deposits in Koochiching County: Recon. Maps no. 1, western half, and no. 2, eastern half, Minn. Dept. of Natural Resources, Div. of Waters, Soils, and Minerals, 1:62,500.
- 38 Eng, Morris, 1970, A reconnaissance map of surficial geology in Anoka, Isanti, and Chisago Counties, Minnesota: Minn. Dept. of Natural Resources, Div. of Waters, Soils and Minerals, unpublished map, 1:62,500.
- 39 Eng, Morris, Aerial interpretation of the sand and gravel of: Norman, 1:62,500, 1966; central and southeastern Polk, 1:62,500, 1966; eastern Douglas, 1:62,500, 1964; northwestern Stearns, 1:62,500, 1964; northeastern Pope, 1:62,500, 1964; Pine, 1:62,500, 1962; St. Louis, 1:62,500 and 1:125,000, 1962; northern Chisago, 1:62,500, 1962; Otter Tail, 1:62,500, 1960; eastern Hubbard, 1:62,500, 1960; Martin, 1:62,500, 1960; and part of Wright, 1:62,500, 1959, Counties, Minnesota: Minn. Dept. of Highways, unpublished maps.

- 40 Eng, Morris, Aerial interpretation of the sand and gravel and other surficial deposits of: northern Itasca, 1:62,500, 1967; Dakota, 1:125,000, 1965; Clay, 1:62,500, 1965; Freeborn, 1:62,500, 1964; part of Mower, 1:62,500, 1964; western Yellow Medicine, 1:62,500, 1963; Lyon, 1:62,500, 1963; Redwood, 1:62,500, 1963; southern Brown, 1:62,500, 1963; part of Becker, 1:62,500, 1961; and Pipestone, 1:62,500, 1960, Counties, Minnesota: Minn. Dept. of Highways, unpublished maps.
- 41 Eng, Morris, 1963, Drainage of the Brainerd and Pierz lobes from Pillager-Swanville as interpreted from aerial photographs, 1:62,500: Minn. Dept. of Highways, unpublished map. (Wadena-Todd)
- \*\* 42 Ericson, D.W., Lindholm, G.F., and Helgesen, J.O., 1974, Water resources of the Rum River Watershed, east-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-509, Sheet 2, Surficial deposits, 1:250,000.
- 43 Farnham, R.S., 1964, A late-Wisconsin buried soil near Aitkin, Minnesota, and its paleobotanical setting: Am. Jour. Sci., v. 262, p. 393-412, fig. 1, Map of part of northeastern Minnesota showing location of main Aitkin site, 1:3,000,000. (Itasca)
- 44 Farnham, R.S., 1956, Geology of the Anoka sand plain: in Schwartz, G.M., and Wright, H.E., eds, Field trip no. 3, Glacial geology of eastern Minnesota: Geol. Soc. America Guidebook Series, fig. 1, Anoka sand plain, 1:700,000. (Stearns)
- \*\* 45 Farrell, D.F., Broussard, W.L., Anderson, H.W., and Hult, M.F., 1975, Water resources of the Cedar River Watershed, southeastern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-522, Sheet 3, Surficial Deposits, 1:500,000.
- 46 Green, John C., 1972, Bedrock geologic map of Lake and parts of St. Louis Counties, Minnesota: Minn. Geol. Survey, unpublished map, 1:250,000. (St. Louis)
- 47 Green, John C., 1970, Reconnaissance geologic map of Ely 7½ minute quadrangle, St. Louis and Lake Counties, Minnesota: Minn. Geol. Survey, open-file map, 1:24,000.

- 48 Green, John C., Phinney, W.C., and Weiblen, P.W., 1966, Geologic map of the Gabbro Lake quadrangle, Lake County, Minnesota: Minn. Geol. Survey Misc. Map Series M-2, 1:31,680. (Lake)
- 49 Griffin, W.L., 1969, Geologic map of the Embarrass quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Misc. Map Series M-6, 1:24,000.
- 50 Griffin, W.L., Morey, G.B., 1969, The geology of the Isaac Lake quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Special Publication SP-8, pl. 1, Geologic map of the Isaac Lake quadrangle, 1:24,000.
- 51 Grout, Frank F., Sharp, R.P., and Schwartz, G.M., 1959, The geology of Cook County, Minnesota: Minn. Geol. Survey Bull. no. 39, pl. 1, Glacial features of Cook County, 1:316,000; pl. 2, Geology of Cook County, 1:316,000.
- \* 52 Grout, Frank F., and Soper, E.K., 1914, Preliminary report on the clays and shales of Minnesota: Minn. Geol. Survey Bull. no. 11, pl. 1, Map of Minnesota showing the distribution of the clay minerals and points at which worked, 1:1,500,000.

Reprinted in:

- Grout, Frank F., and Soper, E.K., 1919, Clays and shales of Minnesota: U.S. Geol. Survey Bull. 678, 259 p.
- 53 Hall, Christopher W., Meinzer, O.E., and Fuller, M.L., 1911, Geology and underground waters of southern Minnesota: U.S. Geol. Survey Water-Supply Paper 256, pl. II, Map of southern Minnesota showing thickness and character of surficial deposits, 1:750,000. (Big Stone)
- 54 Harris, Kenneth L., 1975, Pleistocene geology of the Grand Forks-Bemidji area, northwest Minnesota: Ph.D. dissert., Univ. North Dakota, pl. 1, The surficial sediments of the Grand Fork-Bemidji area, Minnesota, 1:250,000. (Polk)
- 55 Harris, Kenneth L., Moran, S.R., and Clayton, Lee, 1974, Late Quaternary stratigraphic nomenclature, Red River Valley, North Dakota and Minnesota: North Dakota Geol. Survey Misc. Series 52. (Kittson)

- \*\* 56 Helgesen, J.O., Ericson, D.W., and Lindholm, G.F., 1975, Water resources of the Mississippi and Sauk Rivers Watershed, central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-534, Sheet 2, Surficial deposits, 1:250,000.
- \*\* 57 Helgesen, J.O., Lindholm, G.F., Broussard, W.L., and Ericson, D.W., 1973, Water resources of the Kettle River Watershed, east-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-437, Sheet 2, Geology and groundwater, 1:250,000.
- \*\* 58 Helgesen, J.O., Lindholm, G.F., and Ericson, D.W., 1975, Water resources of the Lake of the Woods Watershed, north-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-544, Sheet 2, Geology and groundwater, 1:500,000.
- 59 Jones, J.R., Akin, P.D., and Schneider, R., 1963, Geology and groundwater conditions in the southern part of Camp Ripley Military Reservation, Morrison County, Minnesota: U.S. Geol. Survey Water-Supply Paper 1669-A, pl. 1, Surficial deposits in the southern part of the Camp Ripley Military Reservation, Minnesota, 1:24,000.
- 60 Leverett, Frank, 1929, Moraines and shorelines of the Lake Superior region: U.S. Geol. Survey Prof. Paper 154-A, pl. 1, Map of the surficial deposits of the Lake Superior region, 1:1,000,000; pl. 2, Map showing areas formerly covered by glacial lakes of northern Minnesota, northern Wisconsin, and the northern peninsula of Michigan, 1:1,000,000. (Lake of the Woods)
- \* 61 Leverett, Frank, 1915, Surface formations and agricultural conditions in northwestern Minnesota: Minn. Geol. Survey Bull. 12, 78 p., Sheet 1, Map of the surface formations of Minnesota (northwest quarter of state -- published in 1914), 1:500,000.
- Leverett, Frank, and Sardeson, F.W., 1917, Surface formations and agricultural conditions of Minnesota: Minn. Geol. Survey Bull. 13, 72 p., Sheet 2, Map of surface formations of Minnesota (northeastern quarter of state), 1:500,000.
- Leverett, Frank and Sardeson, F.W., 1919, Surface formations and agricultural conditions of the south half of Minnesota: Minn. Geol. Survey Bull. 14, 147 p., Sheet 3, Surface formations of Minnesota (southern half of state), 1:500,000.

- Leverett, Frank, 1932, Quaternary geology of Minnesota and parts of adjacent states: U.S. Geol. Survey Prof. Paper 161, pl. 1, Map of the northern part of Minnesota showing surficial deposits; pl. 2, Map of the southern part of Minnesota showing surficial deposits, 1:500,000.
- 62 Li, Wingyee J., and Morey, G.B., 1973, Data on rock outcrops for Itasca Co., Minnesota: Minn. Geol. Survey unpublished.
- 63 Lindholm, Gerald F., 1968, Geology and water resources of the Hibbing area, northeastern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-280, Sheet 2, Groundwater, 1:250,000. (St. Louis)
- \*\* 64 Lindholm, Gerald F., Farrell, D.F., and Helgesen, J.O., 1974, Water resources of the Crow River Watershed, south-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-528, Sheet 2, Glacial drift, 1:500,000.
- \*\* 65 Lindholm, Gerald F., Helgesen, J.O., Broussard, W.L., and Ericson, D.W., 1974, Water resources of the Snake River Watershed, east-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-488, Sheet 2, Surficial geology, 1:250,000.
- \*\* 66 Lindholm, Gerald F., Helgesen, J.O., Broussard, W.L., and Farrell, D.F., 1974, Water resources of the Lower St. Croix River Watershed, east-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-490, Sheet 2, Glacial deposits, 1:250,000.
- 67 Lindholm, Gerald F., Helgesen, J.O., and Mossler, J.H., 1972, Bedrock topography of east-central Minnesota, 1:250,000: Minn. Geol. Survey, on-file map. (Crow Wing)
- \*\* 68 Lindholm, Gerald F., Oakes, E.L., Ericson, D.W., and Helgesen, J.O., 1972, Water resources of the Crow Wing River Watershed, central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-380, Sheet 2, Groundwater, 1:250,000.
- 69 Maclay, Robert W., 1966, Reconnaissance of the geology and groundwater resources in the Aurora area, St. Louis County, Minnesota: U.S. Geol. Survey Water-Supply Paper 1809-U, pl. 1, Geology and groundwater occurrence near Aurora, St. Louis County, Minnesota, 1:48,000.



- \*\* 70 Maclay, Robert W., Bidwell, L.E., and Winter, T.C., 1969, Water resources of the Buffalo River Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-307, Sheet 1, Physical setting, 1:250,000.
- 71 Maclay, Robert W., and Schiner, G.W., 1962, Aquifers in buried shore and glaciofluvial deposits along the Gladstone Beach of Glacial Lake Agassiz near Stephen, Minnesota: in Short papers in geology, hydrology, and topography, articles 120-179, Geol. Survey research: U.S. Geol. Survey Prof. Paper 450-D, art. 170, p. 170-172, fig. 170.1, Map of northwestern Minnesota showing areas of groundwater investigations and trends of several beaches of Glacial Lake Agassiz, 1:500,000. (Kittson)
- 72 Maclay, Robert W., Winter, T.C. and Bidwell, L.E., 1972, Water resources of the Red River of the North Drainage Basin in Minnesota: U.S. Geol. Survey Water Resources Inves. 1-72, fig. 5, Glacial deposits; fig. 14, Thickness of glacial drift, 1:2,000,000. (Kittson)
- \*\* 73 Maclay, Robert W., Winter, T.C., and Bidwell, L.E., 1968, Water resources of the Mustinka and Bois De Sioux Rivers Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-272, Sheet 1, Glacial deposits, 1:250,000.
- \*\* 74 Maclay, Robert W., Winter, T.C., and Pike, G.M., 1967, Water resources of the Two Rivers Watershed, northwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-237, Sheet 1, Physical setting and water budget, 1:250,000.
- \*\* 75 Maclay, Robert W., Winter, T.C., and Pike, G.M., 1965, Water resources of the Middle River Watershed, northwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-201, Sheet 1, Groundwater, 1:250,000.
- \* 76 Malterer, Thomas, Farnham, R.S., and Grigal, D., 1976, General map of peat deposits of Minnesota: Soil Science Dept., Univ. Minn., circulated but unpublished, 1:500,000.
- 77 Matsch, Charles L., 1972, Quaternary geology of southwestern Minnesota, fig. VII-23, Areal geology of southwestern Minnesota, 1:2,500,000: in The geology of Minnesota: A centennial volume, P.K. Sims and G.B. Morey, eds.: Minn. Geol. Survey, 1972. (Lac Qui Parle)

- 78 Matsch, Charles L., 1971, Pleistocene stratigraphy of the New Ulm region, southwestern Minnesota: Ph.D. dissert., Univ. Minn., fig. 3, Glacial map of southern Minnesota and adjacent South Dakota moraines selected and modified from Leverett, 1:2,800,000. (Wilkin)
- 79 Matsch, Charles L., Rutherford, R.H., and Tipton, M.J., 1972, Quaternary geology of northeastern South Dakota and southwestern Minnesota: in Field trip guidebook for geomorphology and Quaternary stratigraphy of western Minnesota and eastern South Dakota: Minn. Geol. Survey Guidebook Series no. 7, fig. 2, Generalized configuration of the top of the bedrock of northeastern South Dakota and southwestern Minnesota, 1:500,000. (Traverse)
- 80 Matsch, Charles L., Rutherford, R.H., and Tipton, M.J., 1972, Quaternary geology of northeastern South Dakota and southwestern Minnesota: in Field trip guidebook for geomorphology and Quaternary stratigraphy of western Minnesota and eastern South Dakota: Minn. Geol. Survey Guidebook Series no. 7, fig. 3, Glacial lobes and moraines of eastern South Dakota, Southern Minnesota, and northern Iowa, 1:250,000. (Wilkin)
- 81 Melchior, Robert, in prep., Field trip guide to the glacial geology of the Bemidji region: Bemidji State Univ., pl. 1, Glacial features of the Bemidji area, 1:63,000. (Beltrami)
- \* 82 Minnesota Department of Conservation, Division of Waters, 1959, Hydrol. Atlas of Minnesota: Div. of Waters Bull. 10, Watershed unit maps 1-39, various scales, 1:750,000 to 1:1,800,000.
- \* 83 Minnesota, University of, Soil Science Department, 1975, Geomorphic regions map of Minnesota: Soil Science Dept., Agr. Expt. Station, Univ. Minn., St. Paul, unpublished, 1:500,000.
- \* 84 Minnesota, University of, Soil Science Department, Minnesota Soil Atlas, Bemidji sheet, unpublished, 1:125,000; Brainard sheet, 1969, 1:250,000, Misc. report 90-1969; Duluth sheet, unpublished, 1:125,000; Hibbing sheet, 1971, Misc. Report 110-1971, 1:250,000; International Falls sheet, unpublished, 1:125,000; New Ulm sheet, unpublished, 1:125,000; Roseau sheet, unpublished, 1:125,000; Saint Cloud sheet, unpublished, 1:125,000; Saint Paul sheet, 1973, 1:250,000, Misc. report 120-1973; Two Harbors sheet, unpublished, 1:125,000: Soil Science Dept., Agr. Expt. Station, Univ. Minn., St. Paul.

- 85 Morey, G.B., and Olsen, B.M., 1975, Geology of the Stillwater sheet: Minn. Geol. Survey, open-file map, 1:250,000. (Morrison)
- 86 Mossler, John H., 1976, Surficial geology of south-central Minnesota: Minn. Geol. Survey, unpublished, 1:24,000. (Nicollet)
- 87 Mossler, John H., 1973, Isopach map of unconsolidated materials, Roseau and Thief River Falls topographic sheets: Minn. Geol. Survey, open-file map, 1:250,000. (Kittson)
- 88 Mossler, John H., 1972, Subdrift topography of east-central Minnesota: Minn. Geol. Survey, unpublished map, 1:250,000. (Sherburne)
- \*\* 89 Novitzki, R.P., Van Voast, W.A., and Jerabek, L.A., 1969, Water resources of the Yellow Medicine River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-320, Sheet 2, Sand and gravel deposits, 1:500,000.
- 90 Norvitch, Ralph F., 1964, Geology and groundwater resources of Nobles and part of Jackson counties, Minnesota: U.S. Geol. Survey Water-Supply Paper 1749, pl. 1, Map of the Nobles-Jackson County area, Minnesota, 1:125,000.
- 91 Oakes, Edward L., 1970, Geology and groundwater resources of the Grand Rapids area, north-central Minnesota: U.S. Geol. Survey Hydrol. Invest. Atlas HA-322, Sheet 1, Geology and groundwater occurrence, 1:48,000. (Itasca)
- 92 Oakes, Edward L., 1964, Bedrock topography of the eastern and central Mesabi Range, northeastern Minnesota: U.S. Geol. Survey Misc. Geol. Inves. Map I-389, 1:24,000. (St. Louis)
- \*\* 93 Oakes, Edward L., Bidwell, L.E., 1968, Water resources of the Mississippi Headwaters Watershed, north-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-278, Sheet 2, Surficial (Pleistocene) geology, 1:250,000.
- 94 Ojakangas, R.W., 1968, Geologic map of part of the Roseau sheet: Minn. Geol. Survey, unpublished map, 1:250,000. (Lake of the Woods)

- 95 Parham, Walter E., and Hogberg, R.K., 1964, Map of sample localities and described sections, Minnesota River Valley in Brown, Redwood, and Renville Counties, Minnesota: Minn. Geol. Survey Rept. Inves. RI-3, 1:62,500.
- 96 Reid, David F., 1974, The Quaternary geology of the Lake Johanna region, west-central Minnesota: Master's thesis, Univ. Minn., fig. 22, Distribution of eskers in the Lake Johanna quadrangle, 1:24,000. (Pope)
- 97 Reid, David F., 1974, The Quaternary geology of the Lake Johanna region, north-central Minnesota: Master's thesis, Univ. Minn., pl. 1, Areal geology of the Lake Johanna region, Minnesota, 1:125,000. (Pope)
- 98 Ropes, L.H., Brown, R.F., and Wheat, D.E., 1969, Reconnaissance of the Red Lake River, Minnesota: Hydrol. Inves. Atlas HA-299, Sheet 1, Surficial geologic map, 1:250,000. (Pennington)
- 99 Ruhe, Robert V., and Gould, L.M., 1954, Glacial geology of the Dakota County area, Minnesota: Geol. Soc. America Bull., v. 65, p. 769-792, pl. 1, Glacial drifts of the Dakota County area, Minnesota, 1:400,000; pl. 2, Outwash terraces of the Dakota County area, Minnesota, 1:400,000. (Scott)
- 100 Ruhe, Robert V., 1954, Glacial geology of the Dakota County area, Minnesota: Geol. Soc. America Bull., v. 65, p. 769-792, fig. 3, Drift distribution in southeastern Minnesota, 1:2,000,000. (Scott)
- 101 Sackreiter, Donald K., 1975, Quaternary geology of the southern part of the Grand Forks-Bemidji quadrangles: Ph.D. dissert., Univ. North Dakota, pl. 1, Surficial sediments of the southern part of the Grand Forks and Bemidji quadrangles, 1:250,000. (Norman)
- 102 Schiner, George R. and Schneider, R., 1964, Geology and groundwater conditions of the Redwood Falls area, Redwood County, Minnesota: U.S. Geol. Survey Water-Supply Paper 1669-R, pl. 2, Map of Redwood Falls area, Redwood County, Minnesota, showing surficial geology and Precambrian basement rock, 1:34,000.
- 103 Schneider, Allan F., 1961, Pleistocene geology of the Randall region, central Minnesota: Minn. Geol. Survey Bull. 40, pl. 1, The Pleistocene geology of the Randall region, Minnesota, 1:62,500. (Todd)

- 104 Schneider, Allan F., 1956, Pleistocene geology of central Minnesota: in Schwartz, G.M., and Wright, H.E., eds., Field trip no. 3, Glacial geology of eastern Minnesota: Geol. Soc. America, Ann. Meeting, Minneapolis, Minn., 1956, fig. 4, End moraines and drumlins of central Minnesota, 1:1,000,000. (Becker)

Also appears in:

- Schneider, Allan F., 1957, Pleistocene geology of part of central Minnesota: Ph.D. dissert., Univ. Minn., fig. 3, End moraines and drumlins of central Minnesota, 1:200,000.
- 105 Schneider, Robert, and Rodis, H.G., 1959, Aquifers in melt-water channels along the southwest flank of the Des Moines lobe, Lyon County, Minnesota: U.S. Geol. Survey Water-Supply Paper 1539-F, fig. 3, Map of Lyon County showing drainage pattern and surficial glacial deposits, 1:316,800.
- 106 Schwartz, G.M., 1925, A guidebook to Minnesota trunk highway no. 1: Minn. Geol. Survey Bull. no. 20, Route map no. 1, Highway 1 through Freeborn and Steele Counties, 1:440,000; Route map no. 2, Highway 1 Through Rice and Dakota Counties, 1:440,000; Route map no. 3, The Twin City region, 1:160,000; Route map no. 4, Highway 1 from St. Paul through Chisago County, 1:412,000; Route map no. 5, Highway 1 through Pine County, 1:380,000; Route map no. 6, Highway 1 through Carlton County 1:350,000; Route map no. 7, The Duluth region, 1:160,000; Route map no. 8, Highway 1 along the North Shore . . . near Two Harbors, 1:160,000, (Lake); Route map no. 9, Highway 1 along the North Shore . . . near Beaver Bay, 1:160,000, (Lake); Route map no. 10, Highway 1 along the North Shore . . . near Little Marais and Tofte, 1:160,000, (Lake); Route map no. 11, Highway 1 along the North Shore . . . near Lutsen and Grand Marais, 1:160,000, (Cook); Route map no. 12, Highway 1 along the North Shore . . . near Grand Portage, 1:160,000, (Cook); Route map no. 13, North end of the Gunflint Trail, 1:160,000. (Cook).
- 107 Sharp, Robert P., 1953, Shorelines of the Glacial Great Lakes in Cook County, Minnesota: Am. Jour. Sci., v. 251, p. 109-139, fig. 4, Shoreline features in Good Harbor Bay area, 1:750,000.
- 108 Sims, Paul K., 1974, Reconnaissance geologic map of Biwabik N.W. quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Misc. Map M-15, 1:24,000.

- 109 Sims, Paul K., 1966, Geologic map of Minnesota, St. Paul Sheet (bedrock geology): Minn. Geol. Survey, 1:250,000. (Wright-Carver)
- 110 Sims, Paul K., Morey, G.B., Ojakangas, R.W., and Griffin, W.L., 1968, Preliminary geologic map of the Vermilion district and adjacent areas, northern Minnesota: Minn. Geol. Survey Misc. Map Series M-5, 1:125,000. (Koochiching)
- 111 Sims, Paul K., Morey, G.B., Ojakangas, R.W., and Viswanathan, S., 1970, Geologic map of Minnesota, Hibbing Sheet, Minn. Geol. Survey, 1:250,000. (Koochiching)
- 112 Sims, Paul K., and Viswanathan, S., 1974, Reconnaissance geologic map of the Britt quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Misc. Map Series M-16, 1:24,000.
- 113 Soper Edgar K., 1919, The peat deposits of Minnesota: Minn. Geol. Survey Bull. 16, pl. I, Peat deposits of the northern half of Minnesota, 1:1,000,000, (Kittson and Wilkin); pl. II, The peat deposits of Beltrami County, 1915, 1:300,000, (Lake of the Woods); pl. 3, Peat deposits of Koochiching County, 1:250,000; pl. 4, Map showing peat deposits of Itasca County, 1:300,000.
- 114 Soper Edgar K., 1915, The buried rock surface and pre-glacial river valleys of Minneapolis and vicinity: Jour. Geology, v. 23, p. 444-460, fig. 1, Topographic map, city of Minneapolis showing buried rock surface and pre-glacial river channels, 1:100,000. (Hennepin)
- 115 Souris-Red-Rainy River Basins Commission, 1972, v. 2, Souris-Red-Rainy River Basins comprehensive study, Souris-Red-Rainy River Basins Commission, pl. 6, Generalized map of glacial geology, Red River Basin, 1:1,200,000. (Kittson)
- 116 Southwick, D.L., and Ojakangas, R.W., 1973, Geologic map of Minnesota (bedrock geology), International Falls Sheet: Minn. Geol. Survey, open-file map, 1:250,000. (Koochiching)
- 117 Stark, James, R., 1974, Reconnaissance surficial geologic map of the Hoyt Lakes-Kawishiwi area, St. Louis and Lake Counties, Minnesota: Minn. Geol. Survey, open-file map, 1:48,000. (St. Louis)

- 118 Stone, John E., 1970, Surficial geology of the Centerville quadrangle: Minn. Geol. Survey, unpublished map, 1:24,000. (Anoka)
- 119 Stone, John E., 1966, Surficial geology of the New Brighton quadrangle, Minnesota: Minn. Geol. Survey geologic Map Series GM-2, fig. 2, Generalized map of the present surface morphology of the New Brighton quadrangle, 1:89,000. (Ramsey)
- 120 Stone, John E., 1965, Reconnaissance map of the surficial geology of the Minneapolis-St. Paul area: Minn. Geol. Survey, open-file map, 1:254,000. (Sherburne)
- 121 Taylor, Richard B., 1963, Bedrock geology of Duluth and vicinity, St. Louis County, Minnesota: Minn. Geol. Survey, Geologic Map Series GM-1, 1:24,000.
- 122 Thomas, John A., 1959, Geology of the Cloquet area, northeastern Minnesota: Master's thesis, Univ. Minn., fig. 8, Area relations of physiographic features of Cloquet quadrangle, 1:270,000. (Carlton)
- 123 Thompson, Gerald, 1965, Hydrology of melt-water channels in southwest Minnesota: U.S. Geol. Survey Water-Supply Paper 1809-K, pl. 3, Map of the Marshall area Minnesota showing thickness of saturated coarse grained aquifer, 1:6,400. (Lyon)
- \* 124 Tufford, Sara P., 1966, Drift thickness map of Minnesota: Minn. Geol. Survey, File map, 1:1,000,000.
- 125 U.S. Department of Agriculture, Soil Conservation Service, 1972, General soil map and geomorphic surfaces of Bois de Sioux-Mustinka River Basin of Minnesota: U.S. Dept. of Agr., Soil Conserv. Service, Sheet 1, Bois de Sioux-Mustinka River Watershed, 1:250,000. (Wilkin).
- 126 U.S. Department of Agriculture, Soil Conservation Service, 1972, General soil map and geomorphic surfaces of the Minnesota River Basin, Minnesota, South Dakota, and Iowa: U.S. Dept. Agr., Soil Conserv. Service, Sheet 1, Blue Earth River Watershed, 1:500,000, (Cottonwood); Sheet 2, Lac Qui Parle River, Yellow Medicine River, Redwood River and Cottonwood River Watersheds, 1:500,000, (Lac Qui Parle); Sheet 3, Big Stone Lake, Pomme De Terre River, and Chippewa River Watersheds, 1:500,000, (Ottertail); Sheet 4, (covering) the Minnesota River-Hawk Creek and Lower Minnesota River Watersheds, 1:500,000. (Chippewa)

- 127 U.S. Department of Agriculture, Soil Conservation Service, 1971, Soil association descriptions, Blue Earth River Subbasin of the Minnesota River Basin portion of the southern Minnesota Rivers Basin study: U.S. Dept. of Agr., Soil Conservation Service, pl. 1, Generalized soil association map, Study area 1, Blue Earth River Watershed, 1:500,000. (Cottonwood)
- \* 128 U.S. Department of the Interior, U.S. Geol. Survey, 1976, Hydrologic unit map-1974, State of Minnesota, 1:500,000: Published by U.S. Geol. Survey, Reston, Virginia, Prepared in cooperation with the U.S. Water Resources Council.
- \*\*129 Van Voast, W.A., Broussard, W.L., and Wheat, D.E., 1972, Water resources of the Minnesota River-Hawk Creek Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-391, Sheet 2, Surficial sand and gravels, 1:250,000.
- \*\*130 Van Voast, W.A., Jerabek, L.A., and Novitzki, R.P., 1970, Water resources of the Redwood River Watershed, southwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-345, Sheet 2, Surficial sand deposits, 1:494,000.
- 131 Viswanathan, S., 1974, Reconnaissance geologic map of Side Lake quadrangle, Itasca and St. Louis Counties, Minnesota: Minn. Geol. Survey Misc. Map Series M-19, 1:24,000.
- 132 Viswanathan, S., 1974, Reconnaissance geologic map of O'Leary Lake quadrangle, Itasca County, Minnesota: Minn. Geol. Survey Misc. Map Series M-21, 1:24,000.
- 133 Viswanathan, S., 1974, Reconnaissance geologic map of Dark Lake quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Misc. Map Series M-23, 1:24,000.
- 134 Viswanathan, S., and Ojakangas, R.W., 1974, Reconnaissance geologic map of Stingy Lake quadrangle, Itasca and St. Louis Counties, Minnesota: Minn. Geol. Survey Misc. Map Series M-20, 1:24,000.
- 135 Viswanathan, S., and Ojakangas, R.W., 1974, Reconnaissance geologic map of Dewey Lake quadrangle, St. Louis County, Minnesota: Minn. Geol. Survey Misc. Map Series M-22, 1:24,000.



- 136 White, David A., 1954, The stratigraphy and structure of the Mesabi Range, Minnesota: Minn. Geol. Survey Bull. 38, pl. 4, Map of the thickness of drift, Mesabi Range, Minnesota, 1:125,000. (St. Louis)
- \* 137 Winchell, Newton H., 1901, The Geology of Minnesota: Geological Atlas with synoptical descriptions, v. 6, pl. 8, Houston, 1:250,000; pl. 9, Winona, 1:250,000; pl. 10, Fillmore, 1:250,000; pl. 11, Olmsted, 1:250,000; pl. 12, Mower, 1:250,000; pl. 13, Dodge, 1:200,000; pl. 14, Freeborn, 1:250,000; pl. 15, Steele, 1:250,000; pl. 16, Blue Earth, 1:250,000; pl. 17, Faribault, 1:250,000; pl. 18, Watonwan and Martin, 1:250,000; pls. 19 and 20, Cottonwood and Jackson, 1:250,000; pls. 21 and 22, Murray and Nobles, 1:250,000; pl. 23, Pipestone and Rock, 1:348,000; pl. 25 and 26, Brown and Redwood, 1:250,000; pls. 27 and 28, Yellow Medicine, Lyon, and Lincoln, 1:317,000; pl. 29, Big Stone and Lac Qui Parle, 1:317,000; pl. 30, Le Sueur, 1:190,000; pl. 31, Rice, 1:190,000; pl. 32, Wabasha, 1:250,000; pl. 33, Goodhue, 1:317,000; pl. 34, Dakota, 1:270,000; pl. 35, Carver and Scott, 1:250,000; pl. 36, Sibley and Nicollet, 1:317,000; pl. 37, McLeod, 1:220,000; pl. 38, Renville, pl. 39, Swift and Chippewa, 1:380,000; pl. 40, Kandiyohi and Meeker, 1:317,000; pl. 41, Wright, 1:250,000; pl. 42, Hennepin, 1:250,000; pl. 43, Ramsey, 1:100,000; pl. 44, Washington, 1:190,000; pl. 45, Chisago, Isanti and Anoka, 1:380,000; pl. 46, Benton and Sherburne, 1:360,000; pl. 47, Stearns, 1:348,000; pl. 48, Douglas and Pope, 1:380,000; pl. 49, Grant and Stevens, 1:380,000; pl. 50, Wilkin and Traverse, 1:500,000; pl. 51, Otter Tail, 1:412,000; pl. 52, Wadena and Todd, 1:500,000; pl. 53, Crow Wing and Morrison, 1:380,000; pl. 54, Mille Lacs and Kanabec, 1:360,000; pl. 55, Pine, 1:380,000; pl. 56, Carlton, 1:250,000; pl. 57, Aitkin, 1:348,000; pl. 58, Cass and part of Crow Wing, 1:475,000; pl. 59, Hubbard, and the northwestern portion of Cass, 1:270,000; pl. 60, Becker, 1:360,000; pl. 61, Clay, 1:317,000; pl. 62, Polk and Norman, 1:412,000; pl. 63, Kittson, Roseau, and Marshall, 1:380,000; pl. 64, Beltrami, 1:500,000; pl. 65, Itasca, 1:500,000; pl. 66, South part of St. Louis, 1:380,000; pl. 67, North part of St. Louis, 1:380,000; pl. 68, Lake, 1:380,000; pl. 69, Cook, 1:330,000, counties Minnesota.
- \* 138 Winchell, Newton H., 1901, Glacial lakes of Minnesota: Geol. Soc. America Bull. v. 12, pl. 1, Glacial lakes of Minnesota, 1:3,800,000.

- 139 Winter, Thomas C., 1973, Hydrogeology of glacial drift, Mesabi Iron Range, northeastern Minnesota: U.S. Geol. Survey Water-Supply Paper 2029-A, fig. 3, Surficial geology, 1:1,000,000. (Itasca)
- 140 Winter, Thomas C., 1973, Hydrogeology of glacial drift, Mesabi Iron Range, northeastern Minnesota: U.S. Geol. Survey Water-Supply Paper 2029-A, pl. 3, Geohydrologic maps of glaciofluvial sediments between bouldery and surficial tills, Mesabi Iron Range, northeastern Minnesota, 1:250,000. (St. Louis)
- \*\*141 Winter, Thomas C., Bidwell, L.E., and Maclay, R.W., 1970, Water resources of the Wild Rice River Watershed, northwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-339, Sheet 2, Availability map, 1:250,000.
- \*\*142 Winter, Thomas C., Bidwell, L.E., and Maclay, R.W., 1969, Water resources of the Otter Tail River Watershed, west-central Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-296, Sheet 3, Groundwater, 1:250,000.
- 143 Winter, Thomas C., Cotter, R.D., and Young, H.L., 1974, Petrography and stratigraphy of glacial drift, Mesabi-Vermilion Iron Range, northeastern Minnesota: U.S. Geol. Survey Bull. 1331-C, pl. 1, Maps showing geomorphic features and surficial geology, Mesabi-Vermilion Iron Range, northeastern Minnesota, fig. A, Geomorphic features, fig. B, Surficial geology, 1:250,000. (Itasca)
- \*\*144 Winter, Thomas C., Maclay, R.W., and Pike, G.M., 1967, Water resources of the Roseau River Watershed, northwestern Minnesota: U.S. Geol. Survey Hydrol. Inves. Atlas HA-241, Sheet 1, Physical setting and water management, 1:250,000.
- \* 145 Wright, Herbert E., 1972, Physiography of Minnesota: in Sims, P.K. and Morey, G.B., eds., Geology of Minnesota: a centennial volume, p. 561-578: Minn. Geol. Survey, fig. VII-28, Map of physiographic areas of Minnesota, 1:3,300,000.
- 146 Wright, Herbert E., 1965, Wisconsin glaciation of Minnesota: Midwest Friends of the Pleistocene, 15th Ann. Field Conf., eastern Minnesota: Minn. Geol. Survey, and Dept. of Geol. and Geophys., Univ. Minn., Regional geomorphic map of parts of Carlton and St. Louis Counties, 1:250,000. (St. Louis)

- 147 Wright, Herbert E., 1962, Role of the Wadena lobe in the Wisconsin glaciation of Minnesota: Geol. Soc. America Bull., v. 73, p. 73-99, fig. 5, Wadena drumlin field, mapped from aerial photographs, 1:500,000.
- Also appears in
- Wright, Herbert E., 1957, Stone orientation in Wadena drumlin field, Minnesota: Geografiska Annaler v. XXXIX, hafte I, Stockholm, fig. 1, Wadena drumlin field mapped from aerial photographs, 1:570,000. (Becker)
- 148 Wright, Herbert E., 1962, Role of the Wadena lobe in the Wisconsin glaciation of Minnesota: Geol. Soc. America Bull., v. 73, p. 73-99, fig. 4, Wadena drumlin field and environs, 1:1,426,000. (Becker)
- 149 Wright, Herbert E., 1956, Glacial geology of eastern Minnesota: in Schwartz, G.M., and Wright, H.E., eds., Field trip no. 3, Glacial geology of eastern Minnesota: Geol. Soc. America, Ann. Meeting, Minneapolis, Minn., 1956, fig. 1, Index map of eastern Minnesota showing certain glacial features, 1:1,647,000. (St. Louis and Becker)
- 150 Wright, Herbert E., Mattson, L.A., and Thomas, J.A., 1970, Geology of the Cloquet quadrangle, Carlton County, Minnesota: Minn. Geol. Survey, Geol. Map Series GM-3, fig. 9, Map of major morphologic features near the Cloquet quadrangle, 1:348,000; pl. 1, Geologic map of the Cloquet quadrangle, Carlton County, Minnesota, 1:24,000.
- 151 Wright, Herbert E., and Watts, W.A., 1969, Glacial vegetational history of northeastern Minnesota: Minn. Geol. Survey Spec. Pub. SP-11, pl. 1, Map of a part of northeastern Minnesota showing major geomorphic features, 1:317,000. (Itasca)
- 152 Zarth, Randee, 1975, Quarternary geology of the Wrenshaw quadrangle, Minnesota: Minn. Geol. Survey, unpublished map, 1:24,000. (Carlton)
- \* 153 Zumberge, James H., 1952, The Lakes of Minnesota, their origin and classification: Minn. Geol. Survey Bull. 35, fig. 3, Glacial lakes, 1:6,800,000; fig. 48, Map of Minnesota showing major lake areas, 1:5,200,000.

- \*\*154 Ericson, D.W., Lindholm, G.F., and Helgesen, J.O.,  
in prep., Water resources of the Rainy Lake Watershed,  
northeastern Minnesota: U.S. Geol. Survey Hydrol.  
Inves. Atlas HA-556, Sheet 1, Groundwater, 1:1,000,000.
- \*\*155 Helgesen, J.O., Lindholm, G.F., and Ericson, D.W.,  
1974, Water resources of the Little Fork Watershed,  
northeastern Minnesota: U.S. Geol. Survey Hydrol.  
Inves. Atlas HA-551, in press, Sheet 1, Groundwater,  
1:500,000.
- \*\*156 Lindholm, G.F., Helgesen, J.O., and Ericson, D.W.,  
1974, Water resources of the Big Fork River Watershed,  
north-central Minnesota: U.S. Geol. Survey Hydrol.  
Inves. Atlas HA-549, in press, Sheet 1, Groundwater,  
1:500,000.
- \*\*157 Olcott, P.G., Ericson, D.W., Felsheim, P.E., and  
Broussard, W.L., 1976, Water resources of the Lake  
Superior Watershed, northeastern Minnesota: U.S.  
Geol. Survey open-file report 76-276, Sheet 1, Geology  
and groundwater, 1:500,000.











