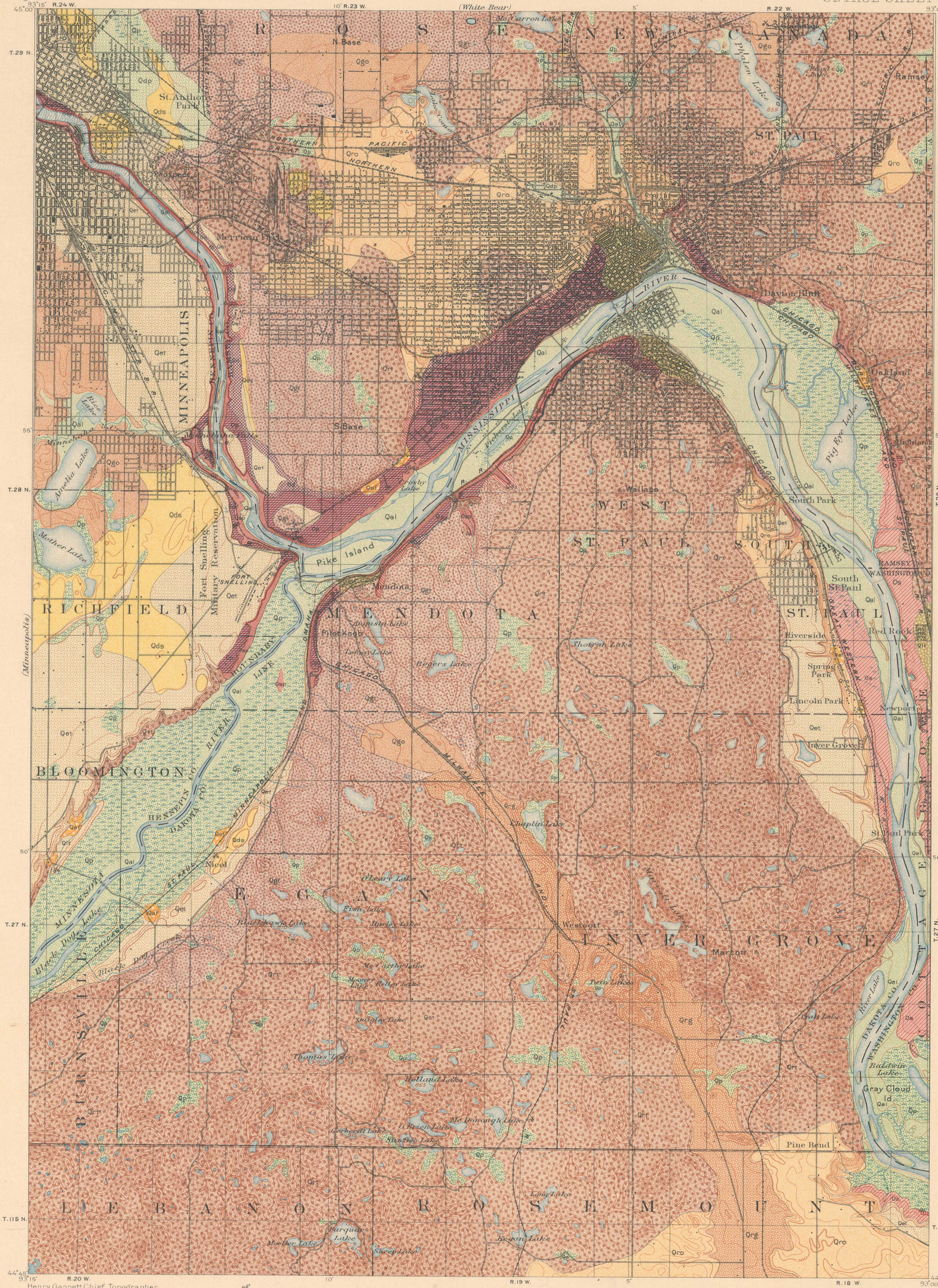
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

AREAL GEOLOGY

MINNESOTA
ST. PAUL SHEET



LEGEND

SEDIMENTARY ROCKS

(Areas of subaqueous deposits are shown by patterns of parallel lines, subaerial deposits by patterns of dots and circles)

Qp, Qdp — Peat and muck in marsh land
(dry peat in drained marshes indicated by Qdp)

Qal — Alluvium and lacustrine deposits
(chiefly sand and fine silt)

Qaf — Alluvial fans
(chiefly gravel and sand)

Qds — Dune sand
(derived from glacial river gravels and outwash from young gray drift)

Qh — Later terrace gravels of glacial River Warren time
(deposited in River Warren outlet of glacial Lake Agassiz and in the channel of Mississippi River)

Glacial Minnesota and Mississippi river channel floors on Decorah shale and Platteville limestone
(a higher terrace, generally on Decorah shale, cut in the bedrock during the deposition of the earlier terrace gravel; a lower terrace, generally on Platteville limestone, cut somewhat later, about 100 feet above present flood plains)

Qet — Earlier terrace gravels of glacial Minnesota and Mississippi rivers
(issued from young gray drift, includes some nearly bare till surfaces and some later wash on terrace slopes)

Qrg — Glacial river gravel in partly filled pre-Wisconsin channel
(thin and discontinuous gravel partly from younger gray drift, deposited over red till)

Qgo — Gray outwash gravel of the young gray drift

Qgt — Young gray till
(thin sheet, chiefly ground moraine)

Qro — Red outwash gravel of the red drift
(red sand and gravel containing few limestone pebbles)

Qrf — Red till
(red bowlder clay containing few limestone pebbles, chiefly terminal moraine)

Og — Galena limestone
(shaly limestone and shale)

Od — Decorah shale
(green shale and some interbedded crystalline limestone)

Op — Platteville limestone
(blue to gray limestone with clay beds at the base)

Osp — St. Peter sandstone
(very white, friable, quartzose sandstone)

Os — Shakopee dolomite
(chiefly massive-bedded dolomite with some sandstone)

Oo — Oneota dolomite
(dolomite with some sandstone near the top)

⚒ *Quarries*
⚒ *Gravel pits*
⚒ *Clay pits and brickyards*

Henry Gannett, Chief Topographer.
Jno. H. Renshawe, Topographer in charge.
Triangulation by U.S. Coast and Geodetic Survey.
Topography by H.L. Baldwin Jr.
Surveyed in 1894.

APPROXIMATE MEAN DECLINATION 1915.
TRUE NORTH
MAGNETIC NORTH

Scale 1/62500
1 ½ 0 1 2 3 4 Miles
1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 20 feet.
Datum is mean sea level.
Edition of Sept. 1915.

DIAGRAM OF TOWNSHIP.

6	5	4	3	2	1	
7	8	9	10	11	12	
18	17	16	15	14	13	
19	20	21	22	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

Geology by F. W. Sardeson.
Quaternary geology surveyed under supervision of Frank Leverett.
Surveyed in 1911.

Economic data: *Building stone and crushed rock can be obtained from Platteville limestone, and rough stone for ballast from Shakopee dolomite, lime from Shakopee dolomite, shale for pressed brick and tile from Decorah and Galena formations, and clay for common brick and tile from lacustrine deposits, Qal, and red till, Qrf; sand for lime-brick and molding sand from St. Peter sandstone, building sand and gravel for concrete from Qro, and gravel for roads from Qro, Qgo, Qet, and Qlt.*

Much of the area marked Qgt, Qrf, and Qrg is first-class agricultural land; Qal and Qp are good lands when properly drained; Qro, Qgo, Qet, and Qlt are level productive lands with soil of loose texture; Qds and Qaf are undulating lands with dusty sandy soils.