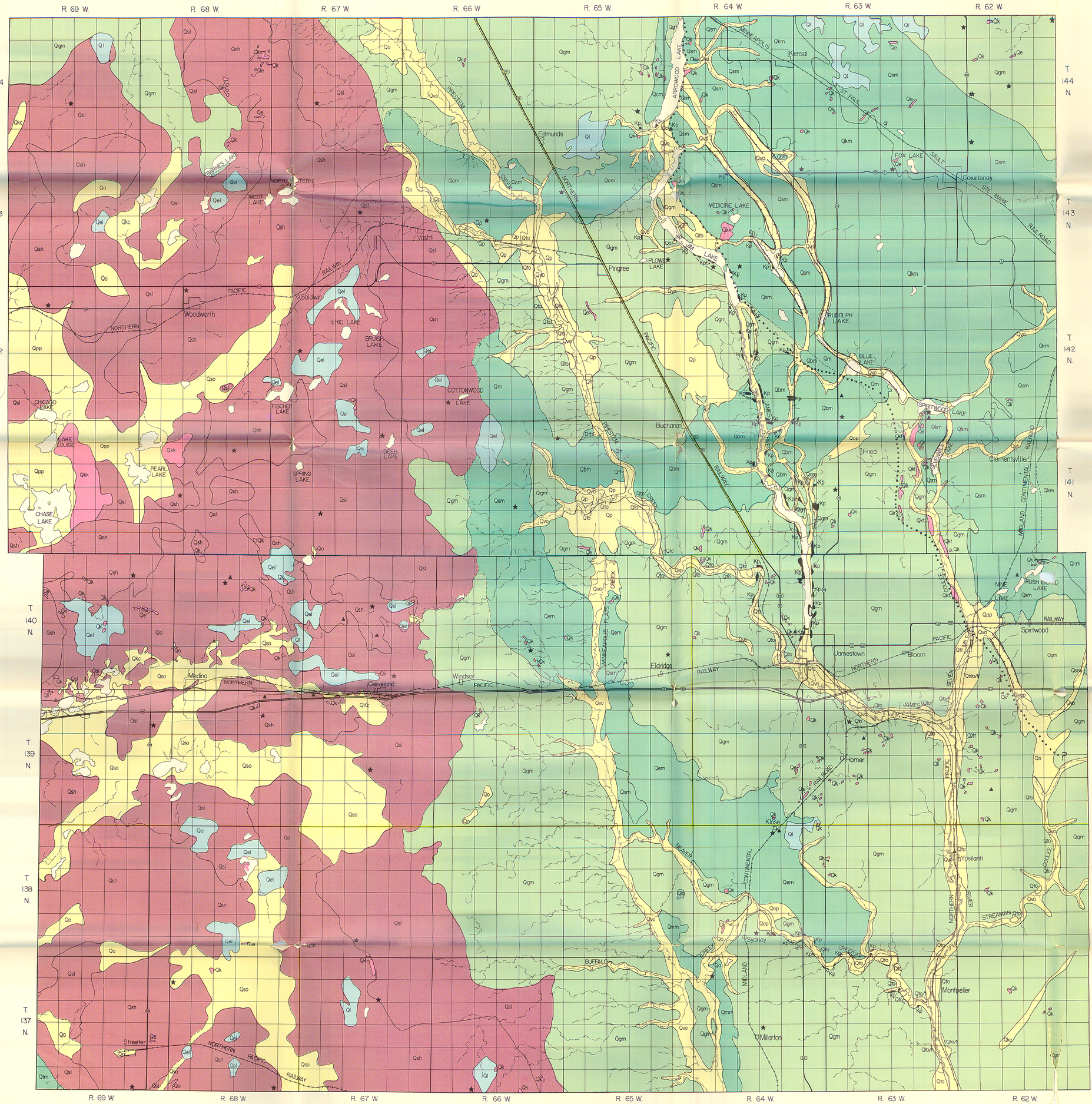



# SURFICIAL GEOLOGY OF STUTSMAN COUNTY, NORTH DAKOTA

## EXPLANATION

**Qgm** — GROUND MORAINE. Gently undulating topography with local relief averaging less than 20 feet per square mile and underlain mainly by till.

**Qm** — END MORAINE. A linear ridge-like accumulation of drift, mainly till; contains minor linear ridges within the major unit or units. Local relief generally exceeds 20 feet per square mile and knobs and undrained depressions are common at places.

**Qbm** — BUCHANAN MORAINE.

**Qem** — ELDRIDGE MORAINE.

**Qcm** — GRACE CITY MORAINE.

**Qkm** — KENSAL MORAINE.

**Qmm** — MILLARTON MORAINE.

**Qtm** — STREETER MORAINE.

**Qsm** — SUBDUED END MORAINE. A linear accumulation of drift, mainly till, with local relief of about 20 feet per square mile; contains minor linear ridges, but lacks rugged topography. Found only in association with end moraine and not with local recessional features associated with ground moraine.

**Qsh** — HUMMOCKY STAGNATION MORAINE OF HIGH ALTITUDE AND HIGH LOCAL RELIEF. Rugged landscape of relatively high altitude with an average altitude over 1,850 feet above sea level. Consisting mainly of kames and kettles. Dominant material is till. Linear patterns associated with end moraine are not apparent. Local relief may exceed 100 feet per square mile.

**Qsl** — HUMMOCKY STAGNATION MORAINE OF LOW ALTITUDE AND HIGH LOCAL RELIEF. Same as above except average altitude is below 1,850 feet above sea level and local relief averages from 50 to 100 feet per square mile.

**Ql** — PROGLACIAL AND (OR) RECENT LAKE BEDS. Lacustrine deposits that occupy a low topographic position. The deposits are mainly silt and clay and local relief seldom exceeds 10 feet per square mile (only extensive deposits are shown).

**Qel** — PERCHED LACUSTRINE PLAINS (ICE-RESTRICTED LACUSTRINE DEPOSITS). Lacustrine sediments deposited in lakes which were supported or walled by dead ice. The former lake beds may be associated with topographic highs and their related landform may be a high flat surface.

**Qkt** — KAME TERRACES. Restricted deposits of glaciofluvial material that possess a terrace form and are the result of deposition at the margin of ice occupying a valley.

**Qk** — KAME. Mound or hill consisting mainly of glaciofluvial sediments. (Several kames may be combined because of the map scale).

**Qkk** — KAME COMPLEX. A group of contiguous conical hills consisting of glaciofluvial sediments.

**Qe** — ESKER. Sinuous irregular ridge of glaciofluvial material.

**Qvo** — VALLEY OUTWASH. Extensive deposits of glaciofluvial material restricted to and underlying the floodplain of a valley, and possibly overlain by recent alluvium.

**Qvop** — VALLEY OUTWASH (PITTED). Extensive deposits of glaciofluvial material restricted to a valley that has numerous closed depressions formed by the melting of isolated blocks of ice.

**Qso** — STAGNATION OUTWASH. Extensive areas underlain by glaciofluvial material deposited in association with stagnating or dead ice. Superimposed and collapsed outwash is included in this unit. Landforms consist of ice restricted outwash plains and ice restricted gravel trains.

**Qo** — UNDIFFERENTIATED OUTWASH. Undifferentiated glaciofluvial deposits.

**Qp** — OUTWASH PLAIN. Extensive areas of low relief underlain by glaciofluvial sediments deposited by glacial streams along the distal margin of the glacier.

**Qpp** — PITTED OUTWASH PLAIN. An outwash plain with closed depressions resulting from the melting of isolated blocks of ice. Local relief may exceed 20 feet per square mile.

**Qt** — EROSIONAL TERRACES. Terraces along major streams either cut in till or remanents of an eroded valley train. (The second letter "t" designates terraces cut in till, and the letter "o" denotes terraces in which surficial sediments are glaciofluvial in origin).

**Qtt**

**Qto/t**

**Qkc** — KETTLE CHAINS. Groups of kettles that form a linear pattern.

**Kp** — PIERRE SHALE. Gray to black shale.

OBSTRUCTED MELT-WATER CHANNELS. Glacial melt-water channels that have been obstructed in part by glacial deposition.

PROMINENT LAKE BASINS OR RESERVOIRS. Major bodies of water, either permanent or intermittent in nature.

Approximate contact between mapped units.

Inferred contact between mapped units.

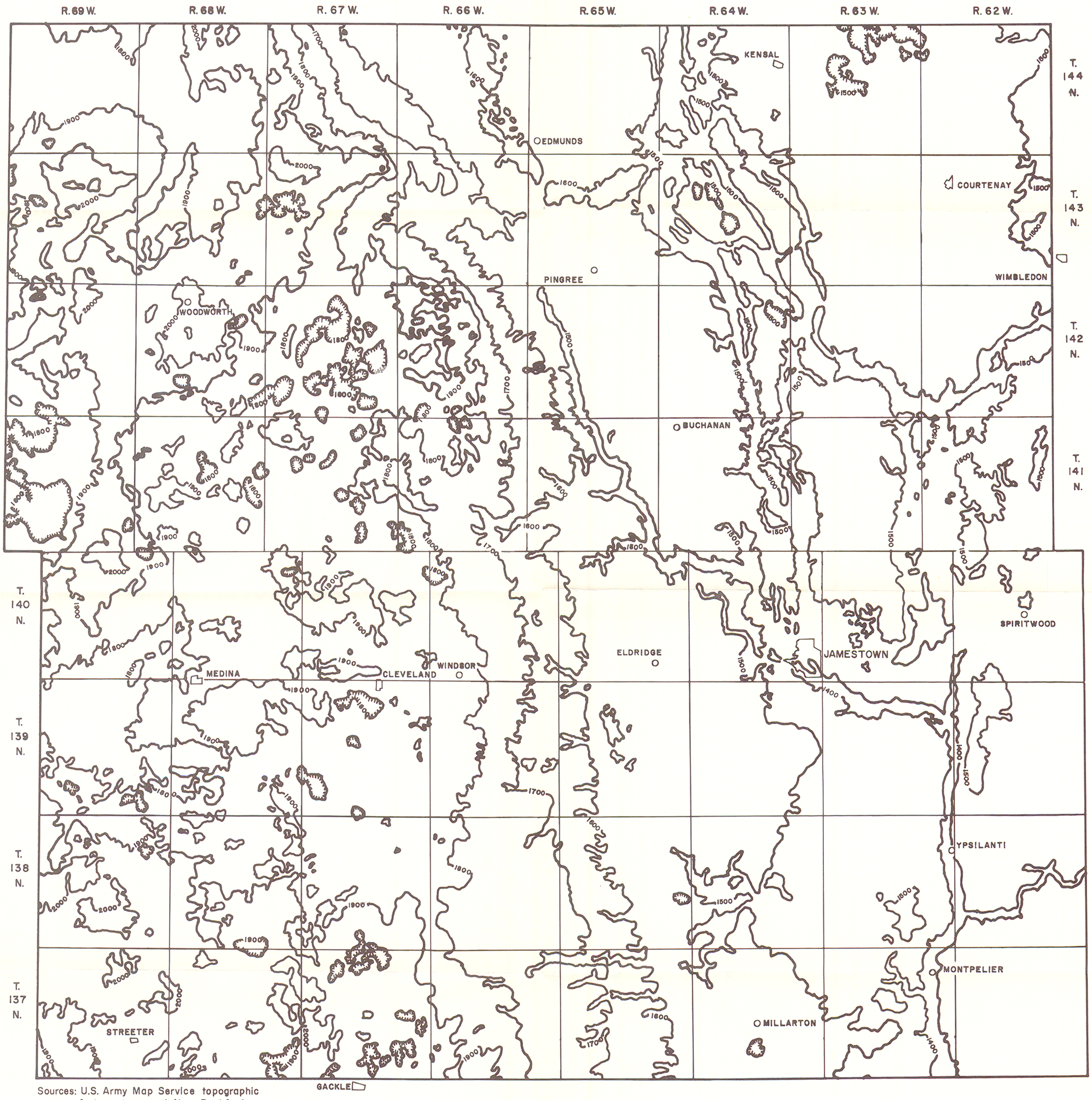
★ Locations where samples of till were collected.

▲ Locations where pebble counts were completed.

Approximate boundary of the ice advance that eventually resulted in the formation of the Kensal moraine.

SCALE
0 1 2 3 4 5 6
MILES

# TOPOGRAPHIC MAP OF STUTSMAN COUNTY, NORTH DAKOTA



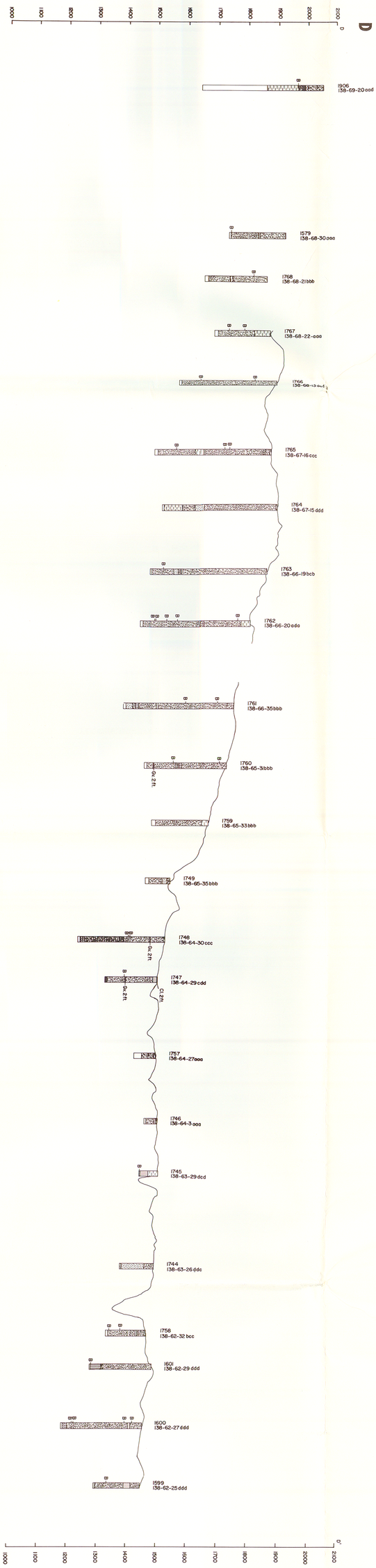

Sources: U.S. Army Map Service topographic maps of Jamestown and New Rockford, North Dakota.

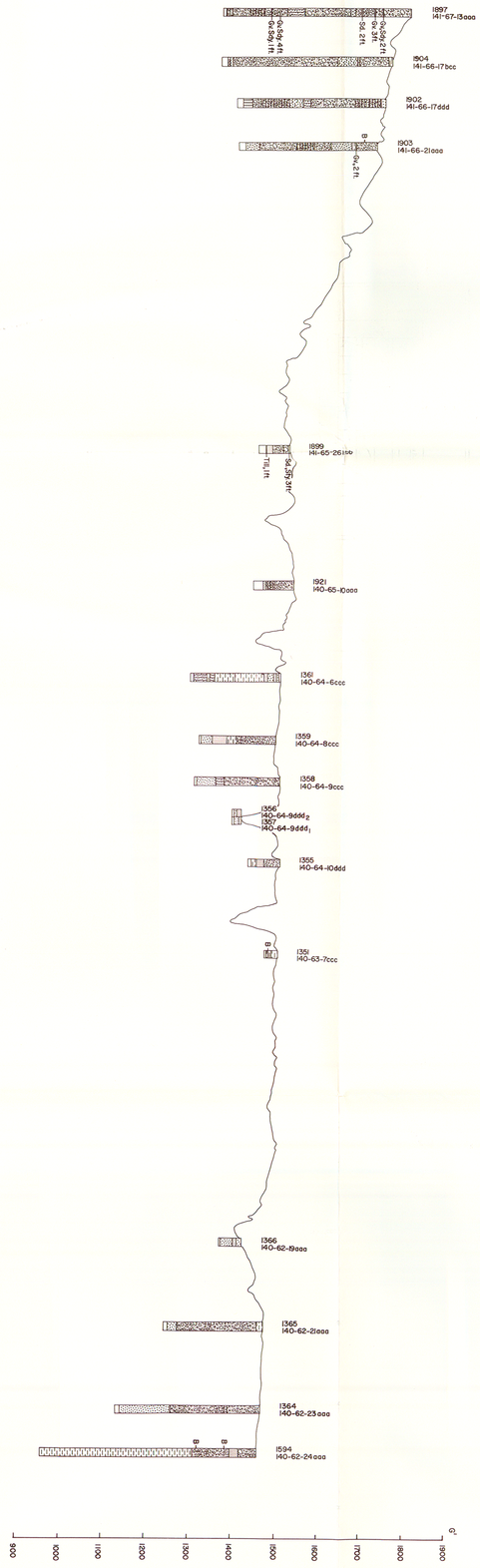
Scale 1:250,000

5 0 5 10 15 20 STATUTE MILES

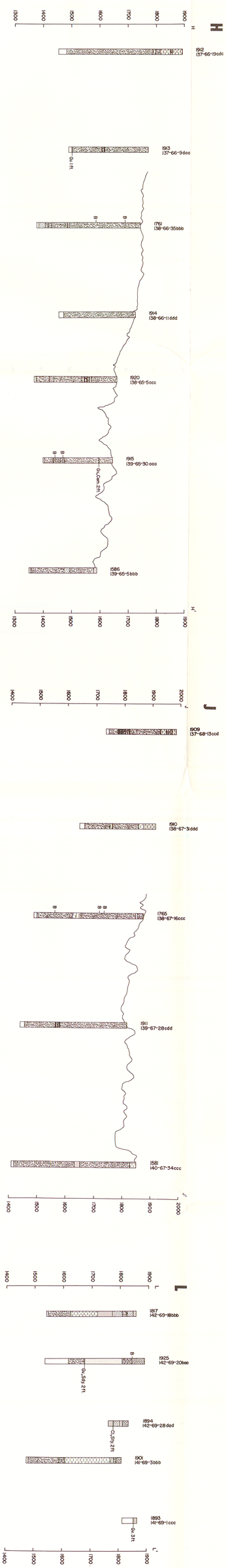
CONTOUR INTERVAL 100 FEET

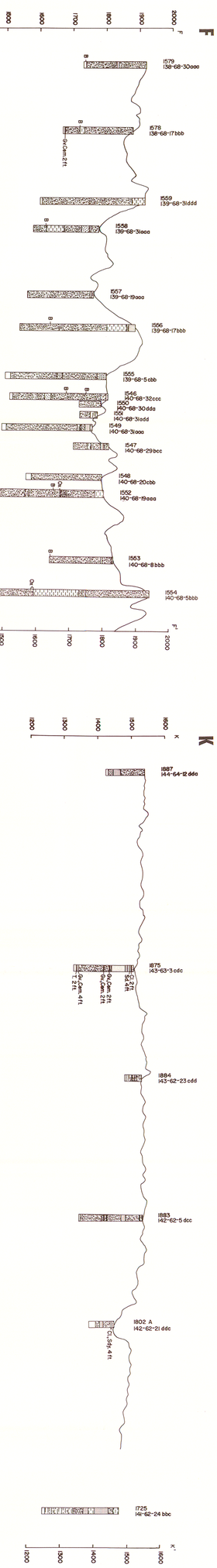
*Datum is mean sea level*


D
1906
138-69-20aad
1579
138-68-30aaa
1768
138-68-21bbb
1767
138-68-22-aaa
1766
1765
138-67-16ccc
1764
138-67-15ddd
1763
138-66-19bcb
1762
138-66-20ada
1761
138-66-35bbb
1760
138-66-3bbb
Qv.2ft
1759
138-65-33bbb
1749
138-65-35bbb
1748
138-64-30ccc
Qv.2ft
1747
138-64-29cdd
Cl.2ft
1757
138-64-27aaa
1746
138-64-3aaa
1745
138-63-29dcd
1744
138-63-26ddc
1758
138-62-32bcc
1601
138-62-29ddd
1600
138-62-27ddd
1599
138-62-25ddd
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
D'

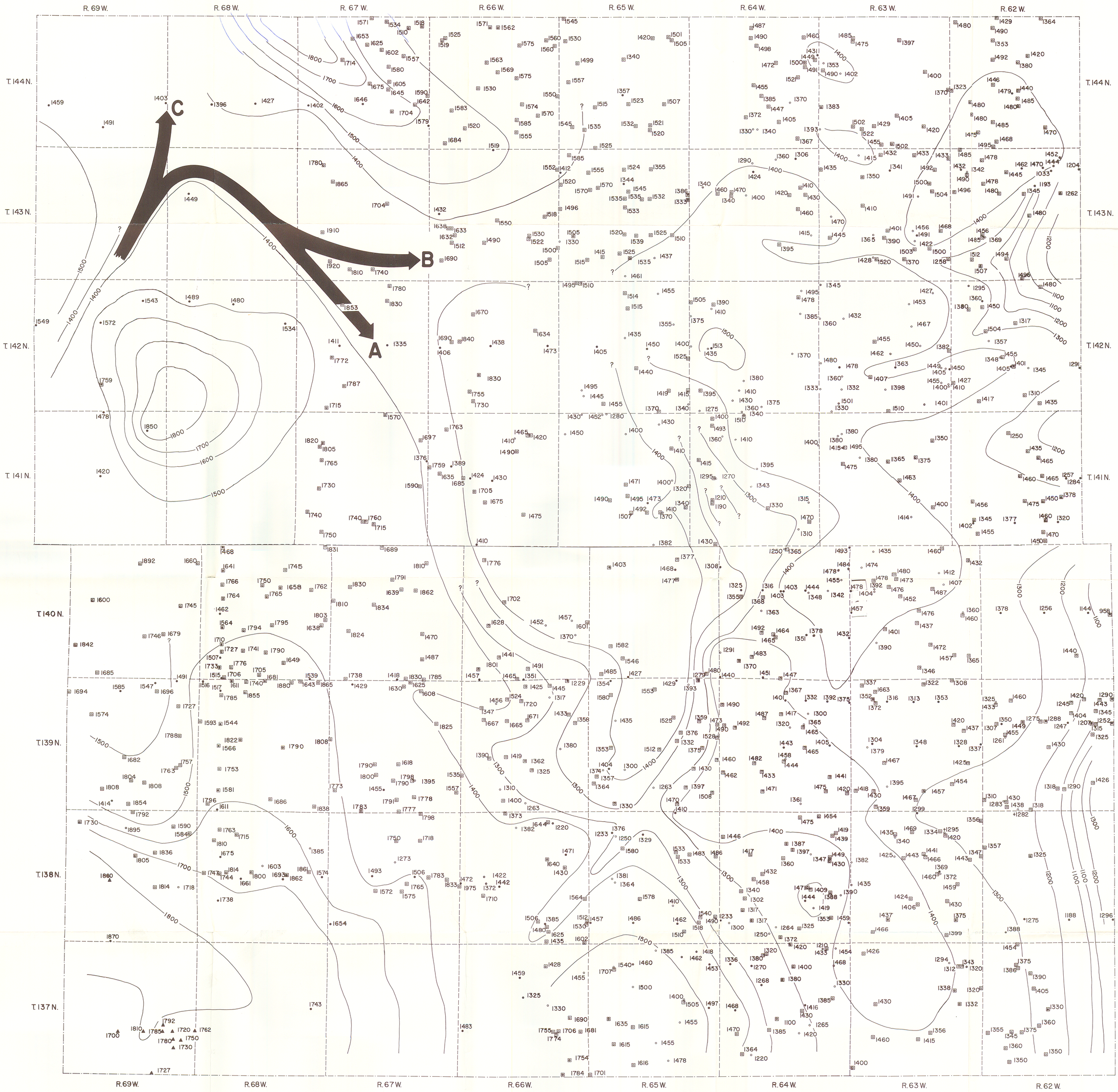

G
1897
141-67-13aaa
Qv.Sdy.4ft
Qv.Sdy.1ft
Qv.Sdy.2ft
1904
141-66-17bcc
1902
141-66-17ddd
1903
141-66-21aaa
Qv.2ft
1899
141-65-26bbb
Tfg.1ft
Cl.3dy.3ft
1921
140-65-10aaa
1361
140-64-6ccc
1359
140-64-8ccc
1358
140-64-9ccc
1356
140-64-9ddd2
1357
140-64-9ddd1
1355
140-64-10ddd
1351
140-63-7ccc
1366
140-62-19aaa
1365
140-62-21aaa
1364
140-62-23aaa
1594
140-62-24aaa
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
G'


Location of Geologic Cross Sections
In Stutsman County, North Dakota


H
1912
137-66-19cdc
1913
137-66-9daa
Qa.1ft
1761
138-66-35bbb
1914
138-66-11ddd
1920
138-65-5ccc
1915
139-65-30aaa
Qv.Cem.2ft
1586
139-65-5bbb
1400
1500
1600
1700
1800
1900
H'
J
1909
137-68-13ccd
1910
138-67-3ddd
1765
138-67-16ccc
1911
139-67-28cdd
1581
140-67-34ccc
1400
1500
1600
1700
1800
1900
J'
L
1817
142-69-18bbb
1925
142-69-20baa
Qv.Sdy.2ft
1894
142-69-28ded
Cl.3dy.2ft
1901
141-69-3bbb
1893
141-69-1ccc
Qv.1ft
1400
1500
1600
1700
1800
1900
L'


F
1579
138-68-30aaa
Qv.Cem.2ft
1578
138-68-17bbb
1562
139-68-31ddd
1558
139-68-31aaa
1557
139-68-19aaa
1556
139-68-17bbb
1555
139-68-5cbb
1546
139-68-32ccc
1554
140-68-30dda
1551
140-68-31add
1549
140-68-31aaa
1547
140-68-29bcc
1548
140-68-20cbb
1552
140-68-19aaa
1553
140-68-8bbb
1554
140-68-5bbb
1400
1500
1600
1700
1800
1900
2000
F'
K
1887
144-64-12dda
1875
143-63-3cdc
Qv.Cem.6ft
1.2ft
Qv.Cem.2ft
Qv.Cem.2ft
Qv.2ft
Qv.4ft
1884
143-62-23cdd
1883
142-62-5dcc
1802 A
142-62-21ddc
Cl.3dy.4ft
1725
141-62-24bbc
1600
1700
1800
1900
2000
K'

# GENERALIZED CONTOUR MAP OF THE BEDROCK SURFACE, STUTSMAN COUNTY, NORTH DAKOTA



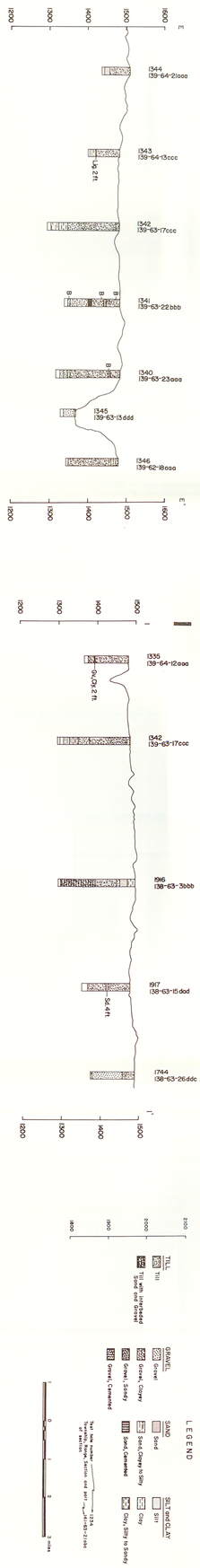

1 ½ 0 1 2 3 4 5 6 7 Miles

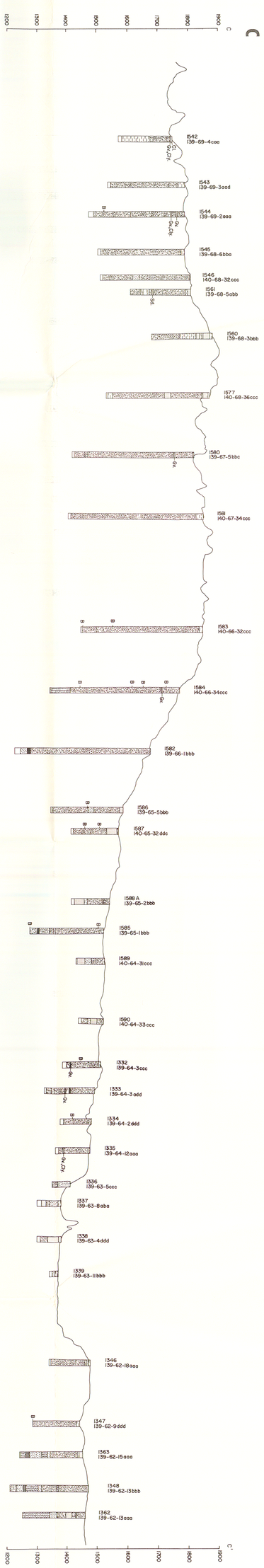
Contour interval 100 feet

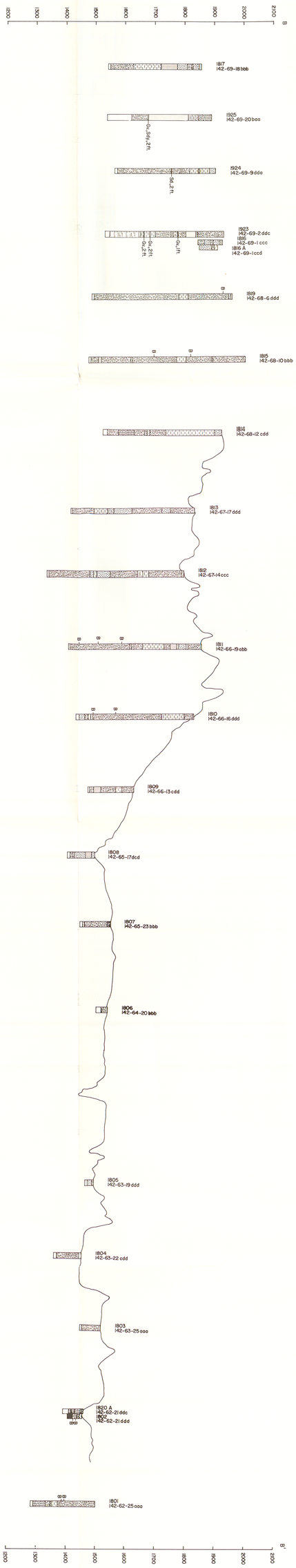
*Datum is mean sea level*

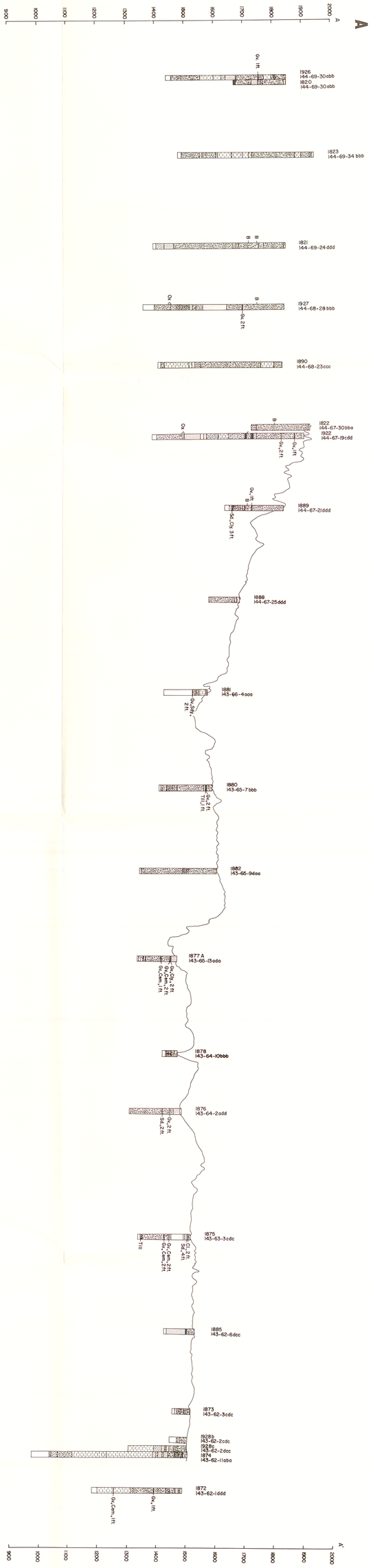
## EXPLANATION

- •1245 Test hole, altitude of bedrock shown
- ▲1245 Test hole, approximate altitude of bedrock shown
- ⊡1245 Test hole, terminated in glacial drift
- ◦1360 Water well, altitude of well bottom shown but is within bedrock
- ⊡1375 Water well, altitude of well bottom shown but is within glacial drift
- Possible trend of Ancestral Cannonball River


E
E'
I
I'
1344
139-64-21aaa
1343
139-64-13ccc
Lg 2 ft
1342
139-63-17ccc
1341
139-63-22bbb
1340
139-63-23aaa
1345
139-63-13ddd
1346
139-62-18aaa
1335
139-64-12aaa
Gv,Cly 2 ft
1342
139-63-17ccc
1916
138-63-3bbb
1917
138-63-15dad
Sd 4 ft
1744
138-63-26ddc
TILL
Till
Till with interbedded Sand and Gravel
GRAVEL
Gravel
Gravel, Clayey
Gravel, Sandy
Gravel, Cemented
SAND
Sand
Sand, Clayey to Silty
Sand, Cemented
SILT and CLAY
Silt
Clay
Clay, Silty to Sandy
Bedrock
B = Boulder
Ox = Oxidized zone
OTHER
Lignite
Boulder and Gravel Accumulation
Test hole number
Thickness, fraction and part — 1334 — 139-64-12aaa
of section
LEGEND


C
C'
1542
139-69-4caa
Gv,Cly 2 ft
1543
139-69-3aad
1544
139-69-2aaa
Gv,Cly 2 ft
1545
139-68-6bba
1546
140-68-32ccc
1561
139-68-5abb
Sd
1560
139-68-3bbb
1577
140-68-36ccc
1580
139-67-5bbc
Gv
158
140-67-34ccc
1583
140-66-32ccc
1584
140-66-34ccc
Gv
1582
139-66-1bbb
1586
139-65-5bbb
1587
140-65-32ddc
1588 A
139-65-2bbb
1585
139-65-1bbb
1589
140-64-31ccc
1590
140-64-33ccc
1532
139-64-3ccc
Gv
1533
139-64-3add
Gv
1534
139-64-2ddd
1535
139-64-12aaa
Gv,Cly
1536
139-63-5ccc
1537
139-63-8aba
1538
139-63-4ddd
1539
139-63-11bbb
1346
139-62-18aaa
1347
139-62-9ddd
1363
139-62-15aaa
1348
139-62-13bbb
1362
139-62-13aaa


B
B'
1817
142-69-18bbb
1925
142-69-20baa
Gv,Sd 4 ft
1924
142-69-9ddd
Sd 2 ft
1923
142-69-2ddc
1916
142-69-1ccc
1916 A
142-69-1ccd
Gv 2 ft
Gv 1 ft
1819
142-68-6ddd
1815
142-68-10bbb
1814
142-68-12cdd
1813
142-67-17ddd
182
142-67-14ccc
1811
142-66-19abb
1810
142-66-16ddd
1809
142-66-13cdd
1808
142-65-17dcd
1807
142-65-23bbb
1806
142-64-20bbb
1805
142-63-19ddd
1804
142-63-22cdd
1803
142-63-25aaa
1820 A
142-62-21ddc
1802
142-62-21ddd
1801
142-62-25aaa


A
A'
Gv 1 ft
1926
144-69-30abb
1820
144-69-30abb
1823
144-69-34 bbb
1821
144-69-24ddd
1927
144-68-28bbb
Gv 2 ft
1890
144-68-23ccc
1822
144-67-30bba
1922
144-67-19cdd
Gv 1 ft
1889
144-67-21ddd
Sd,Cly 3 ft
1888
144-67-25ddd
1881
143-66-4aaa
Gv,Sd 2 ft
1880
143-65-7bbb
Gv 2 ft
Till 1 ft
1882
143-66-9daa
1877 A
143-65-13ada
Gv,Cly 2 ft
Till 1 ft
Gv,Cem 1 ft
1878
143-64-10bbb
1876
143-64-2add
Gv 2 ft
Sd 2 ft
1875
143-63-3cdc
Cl 2 ft
Sd 4 ft
Till
Gv,Cem 2 ft
Gv,Cem 2 ft
1885
143-62-6dcc
1873
143-62-3cdc
1928b
143-62-2cdc
1928c
143-62-2dcc
1874
143-62-1dba
1872
143-62-1ddd
Gv,Cem 1 ft
Gv 1 ft