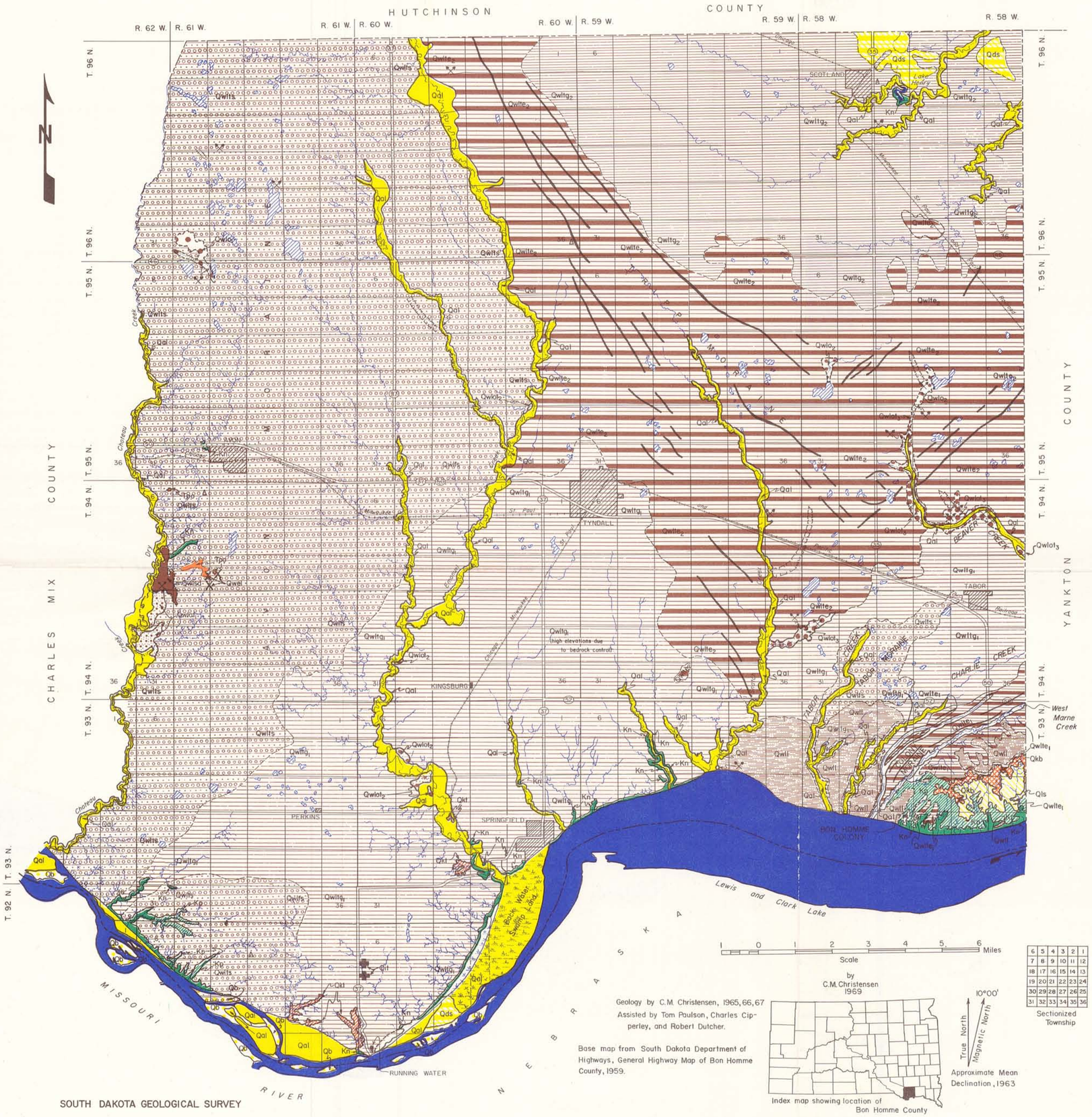


EXPLANATION

QUATERNARY — RECENT

Qls — **Landslide deposits.** Undifferentiated deposits of glacial and bedrock debris moved downslope as the result of gravity.

Qal — **Alluvium.** Black humic stratified clay and silt with minor amounts of sand and gravel; fossiliferous; 0-40 feet thick.

Qb — **Bar.** Very fine to medium sand with minor amounts of silt and clay, usually bedded.

Qds — **Dune sand.** Fine to medium wind blown sand; local topography; 0-10 feet thick.

QUATERNARY — PLEISTOCENE — LATE WISCONSIN

Qwl — **Loess.** Light yellow-brown to light gray silt and fine sand; locally fossiliferous; 0-15 feet thick.

Qwltg$_2$ — **Till (Ground moraine).** Boulder clay till; light yellow-brown to dark olive-gray; calcareous, friable, locally sandy; locally contains boulders; 0-50 feet thick.

Qwlo$_2$ — **Outwash.** Fine to coarse sand and gravel with varying amounts of silt, clay, cobbles and boulders; 0-20 feet thick.

Qwlte$_2$ — **Till (End moraine).** Boulder clay till, light yellow-brown to dark olive-gray, calcareous; friable; locally sandy or silty locally contains large boulders. 0-100+ feet thick.

Qwlot$_3$ — **Terrace outwash.** Fine to coarse sand and gravel with varying amounts of cobbles and boulders; locally sand has been removed and only large cobbles and boulders remain. 0-25 feet thick.

Qwlo$_1$ — **Outwash.** Fine to coarse sand with varying amounts of fine to coarse gravel, locally contains some clay, silt and boulders. 0-25 feet thick.

Qwlot$_2$ — **Terrace outwash.** Fine sand to coarse gravel, locally stratified, locally may contain large boulders or varying amounts of silt and cluy. 0-15 feet thick.

Qwltg$_1$ — **Till (Stagnation moraine).** Boulder clay till, light yellow-brown to dark olive-gray, calcareous, friable, locally sandy, locally contains large boulders. Numerous gravel knobs and ridges. 0-100+ feet thick.

Qwltg$_1$ — **Till (Ground moraine).** Boulder clay till, light yellow-brown to dark olive-gray, calcareous, friable, locally sandy, locally contains large boulders and varying amounts of silt and sand. May be covered in some areas by up to 10 feet of loess. 0-50+ feet thick.

Qwlte$_1$ — **Till (End moraine).** Boulder clay till; light yellow-brown to olive-gray; calcareous; friable; locally sandy, locally contains large boulders. 0-35+ feet thick.

QUATERNARY — PLEISTOCENE — EARLY WISCONSIN (?)

Qwlot$_1$ — **Terrace outwash.** Fine to coarse gravel with minor amounts of fine to coarse sand, locally stratified; locally contains large shale and chalk cobbles and boulders; 0-10 feet thick.

Qwlsa — **Ice contact stratified drift.** Fine to coarse gravel with many boulders and varying amounts of sand; locally stratified, 0-15 feet thick.

Qwel | X — **Loess.** Fine to coarse silt and fine sand; light yellow-brown to medium gray; calcareous; friable; locally mottled with a variety of colors. 0-10 feet thick.

QUATERNARY — PLEISTOCENE — ILLINOIAN

Qit | ✚ — **Till.** Boulder clay till; light yellow-brown to dark olive-gray; calcareous; blocky and hard, highly jointed with oxidation and mineralization associated with the joint pattern. Usually covered by younger sediments. 0-80 feet thick.

QUATERNARY — PLEISTOCENE — KANSAN (?)

Qks — **Sand.** Light colored, arkosic; stratified sands composed predominantly of quartz; feldspars and granites; grains are rounded and polished. 0-27+ feet thick.

Qkg — **Gravel.** Light to dark colored pebbly gravels, locally contains dark staining on the grains; composed primarily of granites; quartz and feldspars, usually stratified; locally sandy, grains are rounded and polished; locally contains clay boulders and fossil teeth. 0-25+ feet thick.

TERTIARY — PLIOCENE — OGALLALA

Tpo — **Ogallala Undifferentiated.** Pale gray to pale green orthoquartzite and conglomerate, underlain locally by clean quartz sand and multicolored clays. Quartzite is usually massive. 0-63 feet thick.

CRETACEOUS — UPPER CRETACEOUS — PIERRE

Kp — **Pierre shale.** Shale, dark brown to black, fissile; calcareous to noncalcareous; locally banded; locally contains marl and bentonite, fossiliferous, 0-330 feet thick.

CRETACEOUS — UPPER CRETACEOUS — NIOBRARA

Kn — **Niobrara Marl.** Light to medium blue-gray marl and white to cream colored limestone, calcareous, fossiliferous; weathers white to cream. 0-200+ feet thick.

Meltwater channel from which sand or gravel has been wholly or partly removed, locally contains alluvium, colluvium or till.

Intermittent Lake — Lake — Intermittent stream

Triangulation station — Gravel pit

End moraine crest — Gravel ridge

Geologic contact-dashed where approximately located

SOUTH DAKOTA GEOLOGICAL SURVEY

BULLETIN 21 PLATE I. MAP SHOWING GEOLOGY AND LANDFORMS OF BON HOMME COUNTY, SOUTH DAKOTA.

SOUTH DAKOTA GEOLOGICAL SURVEY
Bulletin 21
Plate 2

CRETACEOUS BEDROCK MAP OF BON HOMME COUNTY, SOUTH DAKOTA

R. 62 W. R. 61 W. R. 60 W. R. 59 W. R. 58 W.

HUTCHINSON COUNTY

T. 96 N. T. 95 N. T. 94 N. T. 93 N. T. 92 N.

CHARLES MIX COUNTY

YANKTON COUNTY

AVON SCOTLAND TYNDALL TABOR SPRINGFIELD BON HOMME COLONY RUNNING WATER

Chicago Milwaukee St Paul and Pacific R.R.

Choteau Creek

LEWIS AND CLARK LAKE

MISSOURI RIVER

NEBRASKA

EXPLANATION

Upper Cretaceous — Cretaceous

- Kp — Pierre Shale
- Kn — Niobrara Marl
- Kc — Carlile Shale
- Kcc — Codell Member of Carlile Shale

Contour interval = 20 feet

1250 Contour point (log available) Number is Bedrock elevation above sea level.

1260- Contour point where bedrock elevation is less than number shown.

1220 Contour on bedrock surface. Number is elevation above sea level.

Approximate location between bedrock formations and or members.

50 Numbered Highways

Roads or trails

Section lines

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

Sectionized township

Index map showing location of Bon Homme County

N

1 1/2 0 1 2 3 4 5

Scale in Miles

by
C. M. CHRISTENSEN
1969

rm

SOUTH DAKOTA GEOLOGICAL SURVEY
Bulletin 21
Plate 3

B

B'

W — E

Charles Mix Co. / Bon Homme Co

Bon Homme Co. / Yankton Co.

96-61-32 SW SW SE
96-61-34 SW SW SW SW
95-60-6 NW NW NW NW
96-60-32 SE SE SE SE
96-60-34 SW SW SW SW
95-60-3 NE NE NE NE
Emanuel Creek
95-60-2 NE NE NE NE
95-59-5 NE NE NE NE
96-59-34 SE SE SE SE
95-59-1 NE NE NE NE
95-58-1 NE NE NE NE

1653
1694
1604
1529
1476
1448
1506
1467
1435
1405
1342

Qwlo
Qwlt (ox.)
Qwlt (unox.)
Qal
Kp
Kn
Qit
Qo
Kc?

0 1 2 3 miles
Horizontal Scale

Elevation in feet above sea level

1800
1700
1600
1500
1400
1300
1200
1100
1000

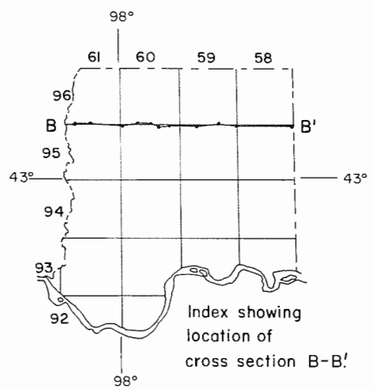


Plate 3. Stratigraphic Section B-B'

EXPLANATION

Qal - Recent Alluvium
Qwlt(ox.) - Late Wisconsin Till (oxidized)
Qwlt(unox.) - Late Wisconsin Till (unoxidized)
Qwlo - Late Wisconsin Outwash
Qo - Outwash Undifferentiated
Qit - Illinoian Till
Kp - Cretaceous Pierre Shale
Kn - Cretaceous Niobrara Marl
Kc - Cretaceous Carlile Shale

rm

SOUTH DAKOTA GEOLOGICAL SURVEY
Bulletin 21
Plate 4

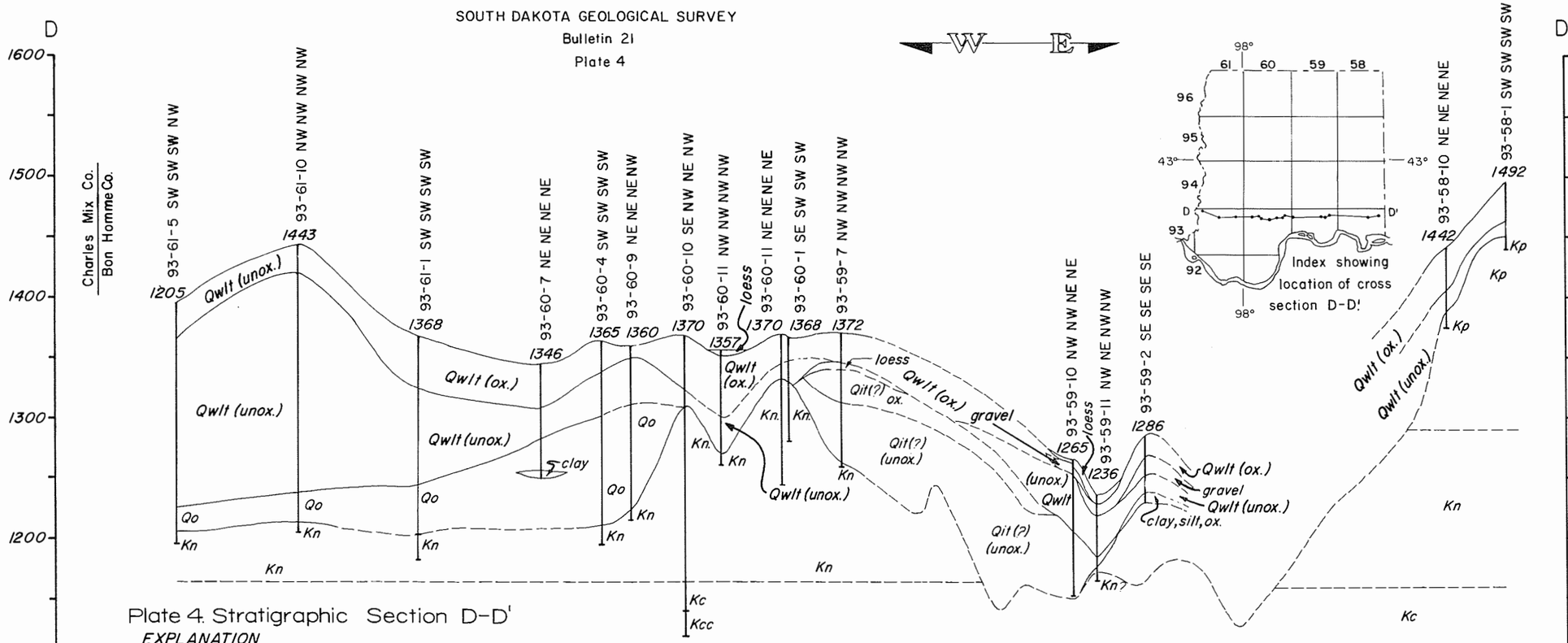


Plate 4. Stratigraphic Section D-D'

EXPLANATION

Qal-Recent Alluvium
Qwlt (ox.)-Late Wisconsin Till (oxidized)
Qwlt (unox.)-Late Wisconsin Till (unoxidized)
Qo-Outwash Undifferentiated
Qit (ox.)-Illinoian Till (oxidized)
Qit (unox.) Illinoian Till (unoxidized)

Kp-Cretaceous Pierre Shale
Kn-Cretaceous Niobrara Marl
Kc-Cretaceous Carlile Shale
Kcc-Cretaceous Codell Sandstone

rm

SOUTH DAKOTA GEOLOGICAL SURVEY
Bulletin 21
Plate 5

C

W — E

C'

Charles Mix Co. / Bon Homme Co.

94-61-6 NW NW NW NW
94-61-5 SW SW NW NE
95-61-33 SW SW SW
94-61-3 NW NW NW NW
94-61-2 NW NW NW NW
95-61-36 SW SW SW SW
95-60-32 SE SW SW SW
94-60-5 NE NE NE NE
95-60-34 SW NE SW SW
95-60-35 SW SW SW SW
94-59-4 NW NW NW NW
94-59-2 NE NE NE NE
94-58-6 NE NE NE NE
94-58-3 NE NE NE NE
94-57-6 NW NW NW NW

Bon Homme Co. / Yankton Co.

1728 1666 1637 1598 1504 1445 1415 1449 1429 1368 1400 1340 1395 1375 1375

Emanuel Creek

Qal Qo Tpo Kp Qwlt (ox.) Qwlt (unox.) sand lens silt Kn Kc Kc? Qwlo Qit Kcc Kc E-log break Till (unox.)

Index showing location of cross section C-C'

98° 61 60 59 58 96 95 94 93 92 43° C C' 43°

EXPLANATION

Qal-Recent Alluvium
Qwlt (ox.)-Late Wisconsin Till (oxidized)
Qwlt(unox)-Late Wisconsin Till (unoxidized)
Qwlo-Late Wisconsin Outwash
Qo-Outwash Undifferentiated
Qit-Illinoian Till
Tpo-Pliocene Ogallala Undifferentiated
Kp-Cretaceous Pierre Shale
Kn-Cretaceous Niobrara Marl
Kc-Cretaceous Carlile Shale
Kcc-Cretaceous Codell Sandstone

0 1 2 3 miles
Horizontal Scale

1800 1700 1600 1500 1400 1300 1200 1100 1000
Elevation in feet above sea level

Plate 5. Stratigraphic Section C-C'

rm

SOUTH DAKOTA GEOLOGICAL SURVEY

Bulletin 21

Plate 6

Hutchinson Co. / Bon Homme Co.

96-61-4 NE NE NE NE — 1705

96-61-9 SE NE NE NE — 1765

96-61-28 NE NE NE NE — 1730

96-61-34 SW SW SW SW — 1694

95-61-9 SE SE SE SE — 1615

95-61-27 NW NW NW NW — 1595

94-61-3 NW NW NW NW — 1637

94-6 SE SE SE SE — 1643

94-61-10 SW SW SW SW — 1606

94-61-15 SW SW SW SW — 1556

94-61-2 SW SW SW SW — 1553

93-61-10 NW NW NW NW — Qal 1443

93-61-15 SW SW SW SW — 1438

92-61-4 NE NE NE NE — 1537

92-61-4 SE SE SE SE — 1610

Bon Homme Co. / Nebraska

Qwlt (ox.)

lake? sediments

Qess?

silt

silt & sand

Qwlt (unox.)

Qo

black clay

Kp

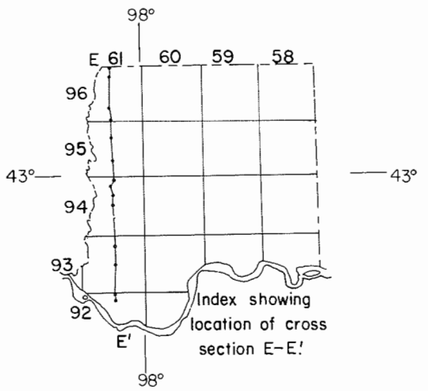
Qwlt (unox.)

silt

sand lens

Kn

N — S



0 1 2 3 miles

Horizontal Scale

EXPLANATION

Qal - Recent Alluvium

Qwlt(ox.)- Late Wisconsin Till (oxidized)

Qwlt(unox.)- Late Wisconsin Till (unoxidized)

Qo-Outwash Undifferentiated

Kp- Cretaceous Pierre Shale

Kn- Cretaceous Niobrara Marl

1800 1700 1600 1500 1400 1300 1200 1100

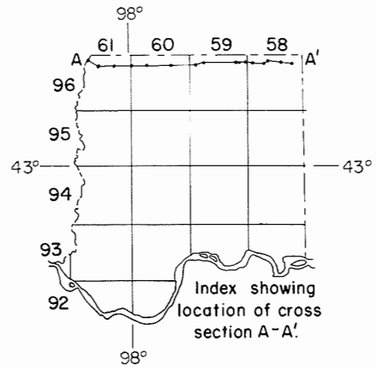
Elevation in feet above sea level

Plate 6. Stratigraphic Section E-E'

rm

SOUTH DAKOTA GEOLOGICAL SURVEY
Bulletin 21
Plate 7

A — W — E — A'



0 1 2 3 miles
Horizontal Scale

Charles Mix Co. / Bon Homme Co.

96-61-5 NW SW SW SW — 1851
96-61-9 SE NE NE — 1765
96-61-11 NW NW NW NW — 1693
96-60-7 NW NW NW NW — 1597
96-60-8 NE NE NE NE — 1476
96-60-11- NW NW NW NW — 1540
96-59-7 NE NE NE NE — 1435
96-59-5 SW SW SW SE — 1425
96-59-11 NE NE NE NE — 1380
96-59-12 NE NE NE NW — 1357
96-59-1 SE SE SE SE — 1355
96-58-6 SE SE SE SE — 1354
96-58-4 SW SW SW SW — 1355
96-58-4 SW SW SE — 1337
96-58-3 NW SW SE SE — 1225
96-58-2 SE SE SE — 1295

Bon Homme Co. / Yankton Co.

Tripp Moraine Crest

Qwlt (unox.)
Qwlt (ox.)
Qal
Qo
sand
gravel
Qwlo
Kp
Kn
Kcc
Kc

1900
1800
1700
1600
1500
1400
1300
1200
1100
1000

Elevation in feet above sea level

Plate 7. Stratigraphic Section A-A'.

EXPLANATION

Qal- Recent Alluvium
Qwlt (ox.)- Late Wisconsin Till (oxidized)
Qwlt (unox.)- Late Wisconsin Till (unoxidized)
Qwlo-Late Wisconsin Outwash
Qo-Outwash Undifferentiated
Kp-Cretaceous Pierre Shale
Kn-Cretaceous Niobrara Marl
Kc-Cretaceous Carlile Shale
Kcc-Cretaceous Codell Sandstone

rm