AREAL GEOLOGY
OF THE
STEPHAN QUADRANGLE

STATE OF SOUTH DAKOTA
SIGURD ANDERSON, GOVERNOR

STATE GEOLOGICAL SURVEY
E.P. ROTHROCK, STATE GEOLOGIST

EXPLANATION

SEDIMENTARY ROCKS

QUATERNARY

RECENT

- Qal — Alluvium
  (Flood plain and island deposits of silt, sand, and gravel in present streams)
- Qc — Colluvium
  (Slope wash, heterogeneous aggregates of rock detritus)
- Qds — Dune Sand
  (Rounded sand dunes, some grassed over, deflation topography)

PLEISTOCENE

Wisconsin

- Ql — Loess
  (Wind transported and deposited silt 0-20' thick)
- Qwo — Glacial Outwash
  (Glaciofluvial deposits of sand and gravel found in dissected till terraces in Missouri River and tributaries. Loess covered near Missouri River.)
- Qwk, Qwes — Glacial Kames and Eskers
  (Kames Qwk: Sand and gravel knobs, bee-hive shape. Eskers Qwes: Narrow ridges of sand and gravel.)
- Qwe — End Moraine
  (Undifferentiated glacial drift, boulders and boulder clay. Characterized by swell and swale surface w/th relief greater than 20' Generally loess covered.)
- Qwg — Ground Moraine
  (Undifferentiated glacial drift, boulders and boulder clay. Characterized by swell and swale surface with less than 20 feet relief. Undeveloped drainage. Generally loess covered.)

CRETACEOUS

UPPER CRETACEOUS

Pierre Formation

- Kpm — Mobridge Member
  (Blue grey limy foraminiferal bentonitic clay with rhinoy concretions, a few bentonites. 130' thick. Upper part nussing)
- Kpvc — Virgin Creek Member
  (Upper: Medium grey bentonitic clay, weathers to gumbo. Not well exposed. Lower: Dark grey shale with bentonites, small barite rosettes at base, weathers to small silvery grey flakes. Member about 50' thick.)
- Kpsv, Kpsao, Kpscc — Sully Member
  (Upper: Verendrye facies Kpsv: Light grey bentonitic clay with siderific concretions, weathers to gumbo. 170' thick. Middle: Agency-Oacoma facies Kpsao: Oacoma-light grey bentonitic clay with abundant Fe-Mn concretions (ore zone), many bentonites. 24' thick. Agency-light grey bentonitic clays and siliceous shales, few bentonitic concretions. About 18' thick. Lower: Crow Creek facies. Kpscc: Light grey formiferal marl, weathers buff. Basal 6'-1' consists of platy sandy marl. 8-9' thick.)
- Kpg — Gregory Member
  (Brown bentonitic clay and marl, brown fossiliferous concretions, few bentonites. About 80' thick.)
- Kpss — Sharon Springs Member
  (Brownish-black oil shale tough and blocky, abundant fish scales and bentonites weathers to lavender porcelanite and yellow melanterite. 17' thick.)

Niobrara Formation

- Kns — Smoky Hill Member
  (Light to medium grey foraminiferal chalk, bentonites near top, weathers light grey to buff. 33' exposed.)

DRAINAGE

- Intermittent Streams
- Intermittent Lakes

CULTURE

- Buildings (House church and school)
- Roads and Trails
- 1492 — Altitudes (In feet above sea level)
- X BM 1620 — Bench Marks (Monument marking point of known altitude)
- △ RENA — Triangulation Stations (Monument marking point of exact geographic location)
- Gravel Pits and Quarrys

Geology by R.E.Curtiss
Assisted by G.R.Waddel
Surveyed in 1950

Based on maps by Corps of Engineers
U. S. Army, and Geodetic data from U. S.
Coast and Geodetic Survey

APPROXIMATE MEAN DECLINATION 1947

Scale 1/62500

0 1 2 3 4 MILES

1951