DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, SECRETARY
U. S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

AREAL GEOLOGY

SOUTH DAKOTA
NEWELL QUADRANGLE

LEGEND

SEDIMENTARY ROCKS

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

QUATERNARY

Recent

Qal — **Alluvium**
(sand and loam, only the larger deposits shown, boundaries mostly indefinite)

Pleistocene

Qt — **Older terrace deposits**
(gravel and loam)

TERTIARY

Oligocene — White River group

Tc — **Chadron formation**
(coarse white sandstone and conglomerate and fine buff sandstone, caps buttes on north edge of quadrangle)

Eocene?

Tl — **Lance formation**
(gray clay, in part sandy, sandstone, and impure lignite)

TERTIARY ?

CRETACEOUS

Montana group — Upper Cretaceous — Colorado group

Kfh — **Fox Hills ? sandstone**
(gray sandstone, in part indurated)

Kp, Kpt — **Pierre shale**
(dark shale with gray and red calcareous concretions and limestone lentils that form tepee buttes at the surface, Kpt)

Kn — **Niobrara formation**
(limy shale and impure chalk; weathers light yellow)

Kcr — **Carlile shale**
(gray shale with many oval limestone concretions near top)

Kg — **Greenhorn limestone**
(impure, slabby, buff limestone)

Kgs — **Graneros shale**
(dark-gray, fissile shale)

Economic data: *Underground water is obtainable from the Dakota and other sandstones, as shown on the Artesian-water map. Limestone concretions in the Pierre shale may be used for lime or building stone. Much of the chalk of the Niobrara formation is suitable for manufacture of cement. Shales are available as clay for brick manufacture. Gravel of terrace deposits is suitable for road surfacing.*

Note: *Section along line A A is shown in the text.*

Geology by N. H. Darton.
Surveyed in 1912.

R. B. Marshall, Chief Geographer.
Sledge Tatum, Geographer in charge.
Topography by Glenn S. Smith, C. P. Gross, and H. L. Caldwell, and from Vale sheet.
Irrigation ditches by U. S. Reclamation Service, 1913.
Control by A. F. Dunnington, R. B. Robertson, and H. M. Hadley.
Surveyed in 1904 and 1910.

APPROXIMATE MEAN DECLINATION 1910.

Scale 1/125000
1 ½ 0 1 2 3 4 5 Miles
1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet.
Datum is mean sea level.

Edition of Jan. 1917.

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