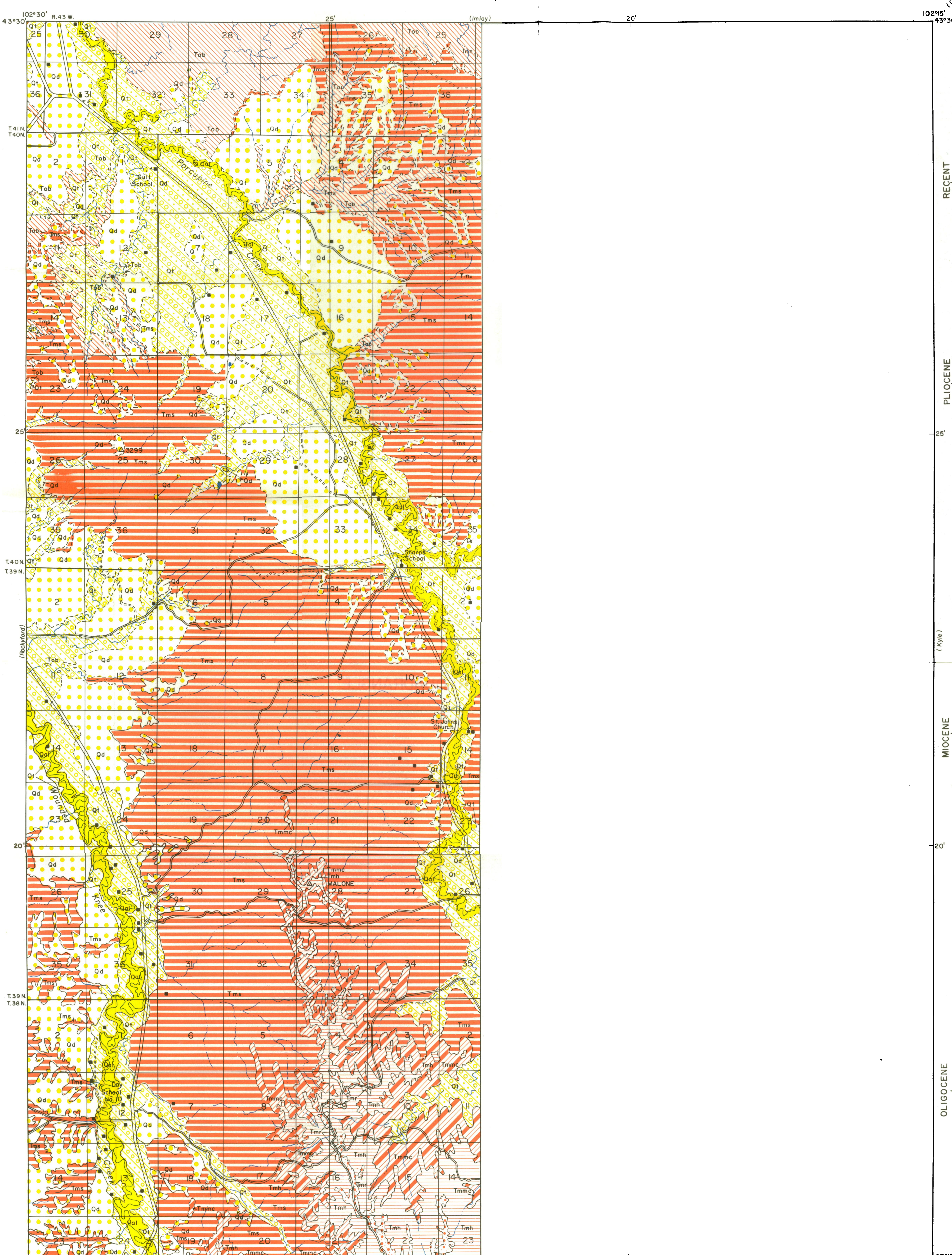
SOUTH DAKOTA GEOLOGICAL SURVEY
ALLEN F. AGNEW, STATE GEOLOGIST

STATE OF SOUTH DAKOTA
RALPH HERSETH, GOVERNOR

GEOLOGY of the SHARPS CORNER QUADRANGLE SOUTH DAKOTA



EXPLANATION

QUARTERNARY

RECENT

Qal — Alluvium
(Floodplain deposits of silt, sand, and gravel in valleys of present streams; local low terraces.)

Qd — Dune Sand
(Wind-blown deposits of quartz sand, in dunes and blowouts on upland.)

Qt — Terrace Deposits
(Stream deposits of silt, sand, and gravel at several levels above present valleys of major streams.)

PLIOCENE

Tt — Terrace Deposits
(Old stream deposit of gravel, sand, and silt about 100 feet above present valley of Wounded Creek.)

UNCONFORMITY

TERTIARY

MIOCENE

Tmr — Rosebud Facies
(Light-tan to brown interbedded calcareous sand, silt, and clay, with layered tabular concretions; clay "peaballs common; 235 feet.)

?

Tmh — Harrison Formation
(Massive gray partly cross-bedded-poorly consolidated fine to very fine sand; layers of wormy grayish white sandy marl; pipey and spherical concretions; 125 feet.)

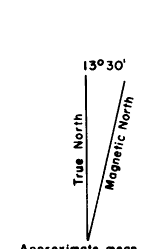
Tmmc — Monroe Creek Formation
(Compact, massive buff silty and very fine grained sand; small isolated concretions and fossil rootlets; 90 feet.)

Tms — Sharps Formation
(Massive poorly consolidated compact pinkish-tan silt; many scattered small gray calcareous "potato-ball" concretions; local lenses of impure limestone with silicified gastropods; clastic and chalcedonic dikes common, and calcareous channel sand and gravel at several levels; distinctive Rockyford ash member at base, up to 38 feet thick; thickness of Sharps 375 feet.)

OLIGOCENE

Tob — Brule Formation
(Interbedded pinkish to greenish clay, silt, and sand; thin dikes of chalcedony common; Protoceras greenish channel sands and pinkish Metamynodon channel sands in upper and lower part, respectively; 200 feet.)

Geology by J. G. Harksen, 1959
Assisted by D. G. Gieser.
Vertical and horizontal control surveyed from triangulation and level lines of Federal surveys
Drafted by Bruno C. Petsch



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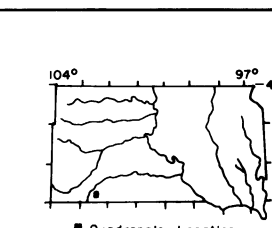
1 0 1 2 3 4 MILES

Vermillion, South Dakota
1960



SHARPS CORNER QUADRANGLE

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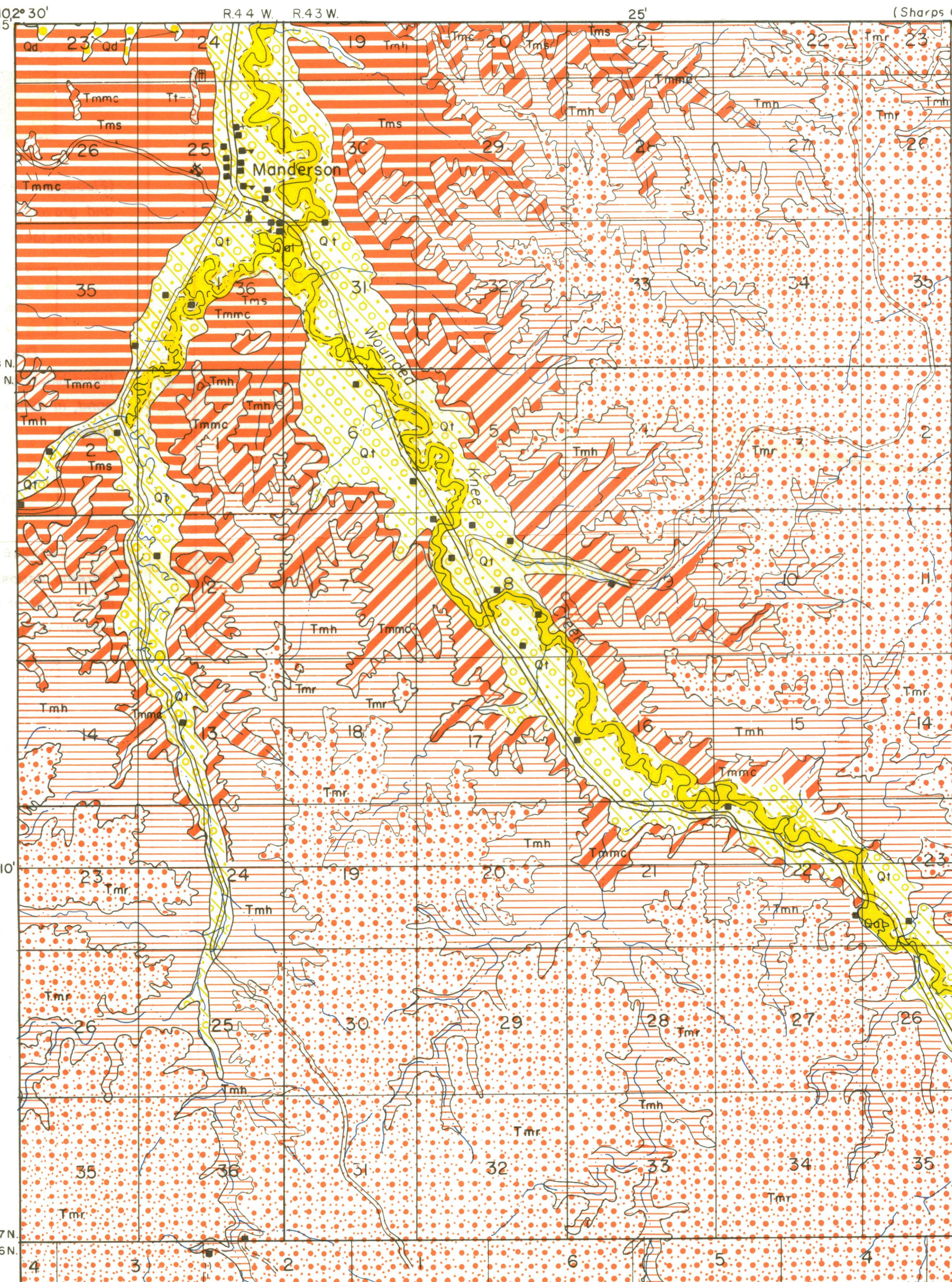
GEOLOGY of the MANDERSON QUADRANGLE SOUTH DAKOTA



GEOLOGY OF THE SHARPS CORNER QUADRANGLE

By

John C. Harksen

INTRODUCTION

The Sharps Corner, Manderson, and Malone quadrangles comprise a north-south strip approximately 25½ miles long and 6¼ miles wide, in central Shannon County (Pine Ridge Indian Reservation), South Dakota.

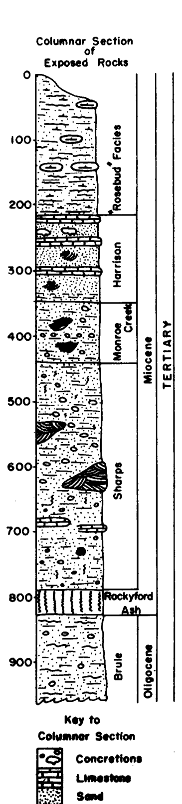
The geologic mapping project was a cooperative one, with the National Science Foundation (Grant G-6582) providing field expenses and supporting publication, the South Dakota Geological Survey furnishing jeep transportation and tent facilities, the Pine Ridge Indian Reservation of the U. S. Department of the Interior supplying the air photos, and the South Dakota School of Mines and Technology furnishing a plane table and alidade.

The geologic mapping was accomplished during the summer of 1959, under the direction of Dr. A. F. Agnew, State Geologist, and Dr. J. R. Macdonald of the American Museum of Natural History. The purpose of the mapping was three-fold: (1) to provide accurate stratigraphic descriptions for the fossil collections of Dr. Macdonald and his associates at the South Dakota School of Mines and Technology, (2) to continue the South Dakota Geological Survey's program of investigating the geology of the Tertiary tablelands of the south-central part of the State, and (3) to map deposits of potential economic importance to the Pine Ridge Indian Reservation.

The State Geological Survey is responsible for the revision of the text, which was written by Harksen and Agnew; the Survey is also responsible for the drafting of the illustrations, and the publication of the geologic maps and texts.

The maps are also to be a companion work to Dr. Macdonald's comprehensive publication on the vertebrate paleontology of the Miocene sediments of the area, which is being published by the American Museum of Natural History.

The geology was mapped on air photos with the field assistance of D. G. Gieser. Sincere thanks are extended to S. G. Collins and W. D. Sevon for geologic information and advice through several field conferences. W. D. Sevon also measured in detail the type section of the Sharps Formation. The writer also wishes to acknowledge the hospitality of Grover and Walter Sharp of Sharp's Corner, where the field camp was established, and that of rancher Henry Grooms, north of Sharps Corner.



LOCATION AND TOPOGRAPHY

Each of the three quadrangles, from north to south the Sharps Corner, Malone, and Manderson, comprises approximately 54 square miles. Most of the area is in the Tertiary Table Lands subdivision of the Missouri Plateau section of the Great Plains; however, the northern part of the Sharps Corner quadrangle is in the awesome White River Badlands, a region indescribably rough topography.

The area is drained to the north by two major semi-permanent streams, Porcupine Creek on the east, and Wounded Knee Creek on the west, which enter the White River about one mile to the north; the tributary White Horse Creek joins Wounded Knee Creek at Manderson. All permanent water bodies are the result of artificial dams.

The uplands are rolling hills that are capped by pine-clad buttes and mesas, especially in the central (Malone) quadrangle; Chimney Butte is a landmark in the northwestern part of the area (Sharps Corner quadrangle). In the southern (Manderson) quadrangle there are two levels of rolling prairie land, separated by steep pine-covered slopes. Local relief averages 200-300 feet, with maximum local relief of more than 600 feet along the northern border. Altitudes above sea level range from about 2600 feet along Porcupine Creek in the northwestern corner of the area, to more than 3450 feet in the southern quadrangle.

The area is sparsely populated except along the two valleys; the Manderson settlement in the southern quadrangle has about 350 people, and the No. 9 Day School is located there. The No. 10 Day School is in the central quadrangle, and Sharp's Corner Store is in the northern one. The No. 7 Day School is just southeast of the mapped area, and Rockyford settlement is just northwest of the area.

Two graded and graveled, all-weather roads are present in the area, following the valleys of Wounded Knee Creek and Porcupine Creek. Otherwise, transportation is by a system of poor unsurfaced roads known as fire trails; these trails are impassable when wet.

The climate is considered inhospitable by many people, as it had a temperature range in 1958 from 101°F to -27°F, and received only 14 inches of rainfall per year, based on records at Manderson, Kyle (20 miles to the northeast) and Pine Ridge (15 miles to the south).

The major stream valleys are filled with oak, willow, elm, cottonwood, and boxelder trees. The tributary gulleys are full of choke cherry and plum trees, buckbrush, and wild rose bushes. The steep slopes and hilltops on the Monroe Creek and Harrison Formations are covered with jackpine and yellow pine. The rolling plains developed on the Sharps and Rosebud Formations have a sparse growth of bunch, blue stem, and buffalo grass. The dune sand and loess deposits possess scattered yucca and grasses.

EXPOSED SEDIMENTARY ROCKS

Tertiary bedrock sediments underlie all of the mapped area, and are covered by Quaternary materials especially along the stream valleys.

White River Group

Brule Formation, Darton, 1899

[illegible]

Sharps Formation, Harksen, Macdonald, Sevon, and Agnew, 1961

[illegible]

Arikaree Group

Monroe Creek Formation, Hatcher, 1902

[illegible]

Harrison Formation, Hatcher, 1902

[illegible]

"Rosebud" facies (Matthew and Gidley, 1904)

[illegible]

SURFICIAL DEPOSITS

[illegible]

SUBSURFACE ROCKS

[illegible]

Elevation of surface (D. F.): 3344 feet

Depth (feet)	Formations
0-405	Niobrara marl and Carlile shale
405-980	Greenhorn limestone, Belle Fourche shale and Mowry shale
980-1331	Newcastle sandstone and Skull Creek shale
1331-1488	Fall River sandstone and Fuson shale
1488-2104	Morrison shale and Sundance sandstone
2104-2345	Spearfish shale
2345-2475	Minnekahta limestone and Opeche shale
2475-3358	Minnelusa Formation
3358-3367	Precambrian granite
3367	Total Depth

STRUCTURE

[illegible]

ECONOMIC GEOLOGY

Ground Water

[illegible]

Sand and Gravel

[illegible]

Clays

[illegible]

Volcanic Ash

[illegible]

Oil and Gas

[illegible]

REFERENCES CITED

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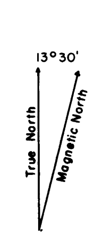
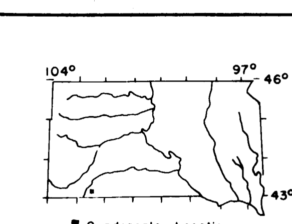


Scale 1:62 500

Vermillion, South Dakota
1960



■ Quadrangle Location