AREAL GEOLOGY OF THE GLAD VALLEY QUADRANGLE

By Robert E. Curtis

LOCATION

About seven-eighths of the quadrangle is located in Teton County, and approximately 5 miles northwest of Frazier, 102 miles northwest of Rapid City, and 34 miles north of Lemon Park between Rapid City and Sturgis. The northernmost part of the quadrangle is located on US Highway 16 in the south-central locale.

TOPOGRAPHY AND DISTANCE

Thunder Butte, the most striking topographic feature in the quadrangle, rises 1,000 feet above the gently rolling prairie and forms a conspicuous, picturesque landmark in the south-central part of the area. Most of the region comprises a part of the Thunder Butte Creek-Black Horse Butte interstream divide. Thunder Butte Creek, a west-east flowing intermittent stream which drains the south slopes of the divide and empties into the Missouri River, about four miles west of the quadrangle. Surface runoff from the divide’s north slope is conveyed north to the Grand River via Black Horse Butte Creek. Thunder Butte Creek, about three miles north of the area. The drainage pattern is dendritic, exhibiting sharply cut intermittent streams. Three springs flow from the outcrop of Mississippian-age limestones.

The maximum altitude in the quadrangle is 2,370 feet above sea level at the water level in Thunder Butte Creek. The minimum altitude in the quadrangle is 2,135 feet above sea level at the water level in Thunder Butte Creek. The relief is approximately 50 feet, and the average relief of the quadrangle is about 2,550 feet above sea level.

GENERALIZED COLUMNAR SECTION

Stratigraphy

Chonrostratigraphically, the exposed rock sequence ranges in age from Upper Cretaceous to Recent. The Hill Creek formation constitutes most of the surface geology and is the only completely exposed formation. Continuous deposition and conformable contacts prevail from the oldest Mississippian-age limestones (Upper Cretaceous age) of the youngest formation, Lujon (Paleocene age). Continuous deposition and conformable contacts prevail from the oldest Mississippian-age limestones (Upper Cretaceous age) of the youngest formation, Lujon (Paleocene age).

The Hill Creek formation is about 300 feet thick and consists of a basal conglomerate, a middle sandstone, and an upper sandstone. The basal conglomerate is about 20 feet thick and consists of arkose, conglomerate, and sandstone. The middle sandstone is about 100 feet thick and consists of fine-grained sandstone and siltstone. The upper sandstone is about 100 feet thick and consists of fine-grained sandstone and siltstone.

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