OSWEGO QUADRANGLE

R.B. Marshall, Chief Geographer.
Sledge Tatum, Geographer in charge.
Topography by the General Land Office and C. P. McKinley.
Control by the Missouri River Commission and the General Land Office.
Surveyed in 1908-1910 and 1913.

ENGRAVED JULY 1915 BY U.S.G.S.

PRELIMINARY

Scale 62500

1 0 1 2 3 4 Miles
1 0 1 2 3 4 5 Kilometers

Contour interval 20 feet.
Datum is mean sea level.

G.L.O.

Edition of Nov. 1915.

Geology mapped in 1950 by Roger B. Colton, assisted by Clarence Lohman, Jr.

APPROXIMATE MEAN DECLINATION 1913.

GEOLOGIC MAP OF THE OSWEGO QUADRANGLE, MONTANA

OSWEGO, MONT.

EXPLANATION

Qc — *Colluvium*

Slopewash deposits derived from topographically higher deposits. That derived from Flaxville gravel is largely gravel, that from Bearpaw shale is almost entirely clay, that from the Hell Creek formation and the Fox Hills sandstone is chiefly silt and sand, and that from till is pebbly to gravelly clay. Generally tan to dark brown color. Thicknesses of deposits highly variable, but maximum of 20 feet observed. Locally some deposits show rude prismatic cleavage.

Qal — *Alluvium*

Fine to locally coarse-grained flood plain deposits of Missouri River and major tributaries. Mainly silt with local gravel lenses. Deposits average about 30 feet thick but may be over 130 feet thick under Missouri River floodplain.

Ql — *Lake Clays*

Dark gray clay and silty clay beds containing a few pebbles deposited in intermittent bodies of water by running water, wind, and slopewash. As much as 15 feet thick.

Qalt — *Older alluvium*

Sand and gravel deposits similar to present day alluvium but at higher level; may be thicker locally than modern alluvium.

Qo — *Outwash deposits*

Sandy gravel and silt, as much as six feet thick, consist mainly of rounded brown quartzite pebbles derived from the Flaxville gravel. A small percentage of limestone, dolomite, and granitic pebbles present.

Qk — *Kame deposits*

Rudely stratified ice-contact deposit of sand and gravel. Poorly sorted. Contains boulders as much as two feet in diameter and a very small percentage of fines. Maximum thickness of 25 feet.

Qs — *Superglacial fluvio-lacustrine silts*

Buff to brown, medium- to fine-grained silt and sand; maximum thickness more than 24 feet.

Qt — *Ice-marginal till ridges*

Ridges of till as much as 30 feet high. Composition similar to ground moraine but more bouldery. Formed along front of retreating ice edge.

Qgm — *Ground moraine*

Unstratified, compact, highly impervious, heterogeneous mixture of approximately 55 percent clay, 40 percent sand and gravel, and 5 percent boulders. Generally 10 to 50 feet thick. Hachures indicate long low ridges 10 to 15 feet high, 50 to 100 feet wide and up to two miles long composed of ablation moraine which accumulated in crevasses in glacial ice. Mantle of ablation till between ridges 10 to 15 feet thick is more pebbly and less compact than underlying lodgement till.

Viota gravel

Consists of approximately 90 percent Flaxville type gravel and 10 percent glacially derived gravel. Five to 25 feet thick and generally overlain by till.

Tfg — *Flaxville gravel*

Rounded brown sand and gravel 90 percent of which is brown and red quartzite and argillite. Caps highlands. 30 to 50 feet thick. Well-bedded and sorted consisting of approximately 5 percent silt, 35 percent sand, 60 percent pebbles, and a few cobbles.

Khc — *Hell Creek formation*

Generally well-stratified sequence of shales, siltstones, sandstones, and carbonaceous shales about 280 feet thick. Overall appearance is one of somber greenish-grey colors. Weathered surfaces of many bentonitic shale beds have spongy texture. Lower 50 to 100 feet is predominantly medium tan sand or where cemented, sandstone. Contains vertebrate remains -usually ceratopsian. Infrequent quartzite pebbles found in basal 50 feet.

Kfh — *Fox Hill sandstone*

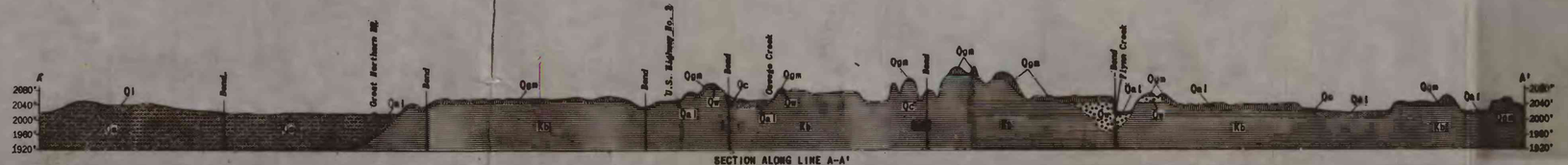
Consists of upper sandstone unit 50 to 80 feet thick underlain by transitional marine unit 35 feet thick. Lower unit consists of thin-bedded well-laminated shale grading to silt toward top. Upper sandstone contains numerous concretions.

Kb — *Bearpaw shale*

Dark olive-gray much-jointed marine shale approximately 1,100 feet thick. Only upper 400 feet exposed. Contains abundant fossiliferous calcareous and limonitic concretions. Upper hundred feet contains a few brownish sandy clay-shale beds. Thin bentonitic seams are present and bentonite in disseminated through some shale zones.

Recent | Pleistocene | Wisconsin Stage | Pliocene | Upper Cretaceous | Montana Group | Eocene-Pliocene | QUATERNARY | TERTIARY | CRETACEOUS

Contact
Contact, approximate or gradational
Contact inferred
Scarp
Meltwater channel segments
Trace of topographic break in slope on till surface inferred to reflect buried channel.
Gravel pit
Driftless area
Intermittent stream and small dam
Irrigation or drainage ditch
Trail or unimproved road
Paved road
Graded road
Secondary road



SECTION ALONG LINE A-A'
SUBSURFACE CONTACTS INFERRED
Horizontal scale, 1:62,500; Vertical scale exaggerated 16.5 times

EXPLANATION

Qal Alluvium | Ql Lake clays | Qc Colluvium
Qo Outwash deposits
Qs Superglacial fluvio-lacustrine silts
Qgm Ground moraine
Qt Viota gravels
Kb Bearpaw shale