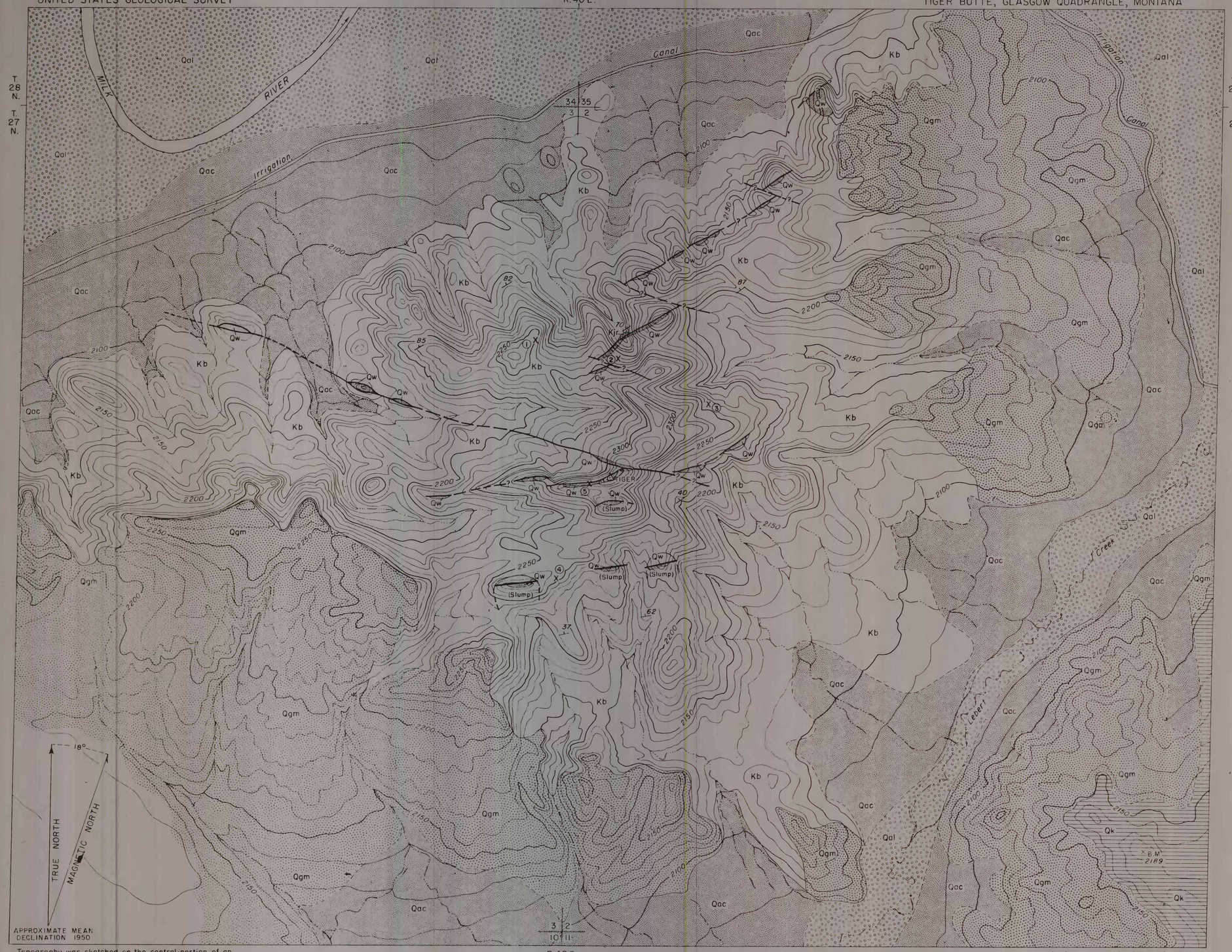
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED AS PART OF A PROGRAM OF THE DEPARTMENT OF THE INTERIOR
FOR THE DEVELOPMENT OF THE MISSOURI RIVER BASIN

MISSOURI RIVER BASIN
GEOLOGIC MAPPING AND MINERAL RESOURCE INVESTIGATIONS
TIGER BUTTE, GLASGOW QUADRANGLE, MONTANA



EXPLANATION

QUATERNARY	Pleistocene	Wisconsin (?)	Qal — Alluvium. *Light to dark brown and grayish-brown mixture of clay, silt and fine sand.*
			Qac — Alluvial-colluvial deposits. *Grayish-brown silt and clay.*
			Qk — Kintyre formation. *Light brown very fine sand and silt.*
			Qgm — Ground moraine. *Brown silt and clay containing sand and stones as large as boulders.*
			Qw — Wiota gravels. *Reddish brown non-glacial quartzite gravel containing sand interstitially and as lenses.*
CRETACEOUS	Upper Cretaceous	Montana group	Kb — Bearpaw shale. *Dark gray shale containing thin bentonite beds and several kinds of concretions.*
			Kjr — Judith River formation. *Light brown very fine grained thin-bedded sandstone and grayish brown siltstone and silty shale.*

Contact, dashed where approximate

Fault, dashed where approximate

Fault, inferred

Fault, covered

75 Strike and dip of beds

△ Tiger Triangulation station

B.M. x 2189 Bench mark Showing elevation

X (3) Fossil locality *(see text for faunal lists)*

Topography was sketched on the central portion of an enlarged air photograph, used as a plane table sheet, by F. S. Jensen, J. O. Kistler, Roger Colton and Clarence Lohman, Jr.

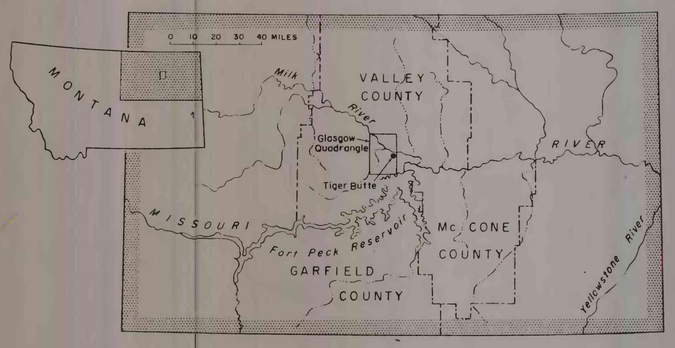
Geology mapped in 1950 and 1951 by F. S. Jensen, assisted by J. O. Kistler.

PRELIMINARY GEOLOGIC MAP OF TIGER BUTTE, GLASGOW QUADRANGLE, MONTANA

Scale, 1 inch = 390 feet

500 0 500 1000 1500 2000 Feet

Contour interval 10 feet



Geology: At Tiger Butte the strata are tilted at angles as steep as vertical, and are faulted. Such acute deformation is distinctly abnormal in this part of Montana. Tiger Butte is of further interest because Pleistocene deposits have apparently been involved in the structural movements. That deep-seated rather than surficial causes are responsible for the deformation is evidenced by the appearance at the surface in these hills of strata occurring several hundred feet beneath the surface in the surrounding vicinity. Strata belonging in the lower part of the 1,140 foot thick Bearpaw shale (see faunal lists below) compose most of the hills. The Judith River formation, occurring stratigraphically just below the Bearpaw shale, crops out in one small area. The shale strata at the surface near these hills are middle Bearpaw.

The structure can be generalized as follows. A long fault trending west-northwest divides the area of Tiger Butte into two nearly equal parts. On the north side of this fault the strata strike northeast and dip to the northwest at angles ranging from 70° to vertical. On the south side of the fault the beds strike more nearly east and dip to the north at much less steep angles. The fault used above as a reference is one of an inferred set of parallel faults which offset a somewhat older(?) set of faults which strike northeast. The older (northeast) faults are bedding plane thrusts, and the younger (northwest) faults are either tear faults associated with the thrusting or are, less probably, normal faults caused by the relaxation of pressure after thrusting. Rotation on the fault surface of the reference fault is believed to account, at least in part, for the abrupt change in strike and dip of the beds at the line of outcrop of the fault. Slumping has obscured true structural relations in several places, especially in the southern part of the hills. Were the Bearpaw shale less prone to slump and to weather to homogenous gumbo, it is believed that imbricate structure could be mapped. The information obtainable is suggestive of such.

The Wiota gravels, of early (?) to late Pleistocene age, form a small but integral part of the hills, being intercalated, like the filling of a sandwich, between Bearpaw strata or between Judith River and Bearpaw strata. During thrusting bedrock was pushed up and over the gravels, causing them to locally take on the character of fault gouge.

Fossil collections characteristic (in toto) of the lower part of the Bearpaw shale (see map for localities):

1. *Nostoceras stevensoni* (Whitfield) U.S.G.S. Mesozoic collection 23383.
2. *Nostoceras stevensoni* (Whitfield) U.S.G.S. Mesozoic collection 23384.
   Baculites sp. U.S.G.S. Mesozoic collection 23384.
3. *Leptocardia borealis* (Whiteaves) U.S.G.S. Mesozoic collection 23374.
   Anisomyon sexsulcatus (Meek and Hayden) U.S.G.S. Mesozoic collection 23373.
   Baculites compressus var. *corrugatus* Elias, U.S.G.S. Mesozoic collection 23373.
   Emperoceras beecheri Hyatt, U.S.G.S. Mesozoic collection 23373.
4. *Baculites compressus* var. *corrugatus* Elias, U.S.G.S. Mesozoic collection 23385.

Fossil mammoth tooth characteristic of the Wisconsin stage of the Pleistocene (see map for locality), collected from the Wiota gravels:

5. *Mammuthus boreus* Hay (identified by Mrs. M. J. Hough, U.S.G.S.).

Montana (Tiger Butte). Geol. 1:4,700. 1951.