



STRUCTURE SECTION ALONG LINE A-B

GEOLOGICAL SURVEY



Tp. 12

Tp. 11

Tp. 10

Tp. 9

LEGEND

- CENOZOIC**
- TERTIARY**
- PALEOCENE
PORCUPINE HILLS FORMATION: crossbedded sandstones, shale, carbonaceous shale
- CRETACEOUS OR TERTIARY
UPPER CRETACEOUS OR PALEOCENE
WILLOW CREEK FORMATION: interbedded maroon, green, and grey shale with numerous calcareous concretions and soft grey sandstone beds
- CRETACEOUS**
- UPPER CRETACEOUS
ST. MARY RIVER FORMATION: crossbedded sandstones, silty shale, shale, carbonaceous shale, ironstone concretions
- BEARPAW FORMATION: dark grey marine shale with calcareous concretions, coarse grey sandstone beds
- BELLY RIVER FORMATION: crossbedded sandstones, shale, carbonaceous shale
- WAPIABI (Upper Alberta) FORMATION: dark grey marine shale, silty shale, calcareous shale, concretions
- BIGHORN (Cardium) FORMATION: conglomerate, sandstone, sandy shale
- BLACKSTONE (Lower Alberta) FORMATION: dark grey marine shale, silty shale, sandstone (in structure-section only)
- Rock outcrop x
- Bedding (horizontal, inclined, overturned) + / X
- Fault (direction of dip of plane) ~~~~~
- Anticlinal axis +
- Synclinal axis -
- Well (abandoned) ⚪
- Well (drilling) ⚫
- Geology by G. Shaw, 1944, and R. J. W. Douglas, 1945.
Geological compilation and descriptive notes by R. J. W. Douglas.
- Road, well travelled ———
- Road, not well travelled - - - - -
- Trail - - - - -
- Township boundary, ———
- Contours, interval 50 feet ~~~~~

DESCRIPTIVE NOTES

The eastern part of the map-area is underlain by the Porcupine Hills and Willow Creek formations. The strata are essentially east dipping; the Porcupine Hills beds vary from an angle of 30 degrees in the west to nearly horizontal in the east; the Willow Creek strata show considerable minor contortions and a few minor east-dipping faults.

The western part of the area lies within the foothills belt of repeated Belly River and Wapiabi formations. The Belly River beds are mostly steeply west dipping, with numerous faults and few definite folds of appreciable size. The Wapiabi shale, as exposed on Oldman River, is highly contorted, faults shown elsewhere within this formation are probably not all simple single faults as indicated, but may represent numerous small slippages, and offset the Bighorn formation of depth.

Intermediate between eastern and western parts of the map-area is a belt underlain by the St. Mary River formation, which is repeated by an east-dipping thrust fault in the north, compressed into south plunging folds in the central part, and divided in the south into two main ridges by a relatively depressed block of Willow Creek beds. This fault block is bounded on the west by a west-dipping thrust fault and on the east by an east-dipping thrust fault. It is believed to be the northern extension of the syncline of Willow Creek in the Cowley map-area to the south.

The contact between the Belly River and the underlying Wapiabi formation is drawn at the base of massive, evenly crossbedded, medium-grained beds of grey weathering, grey sandstones. This, platy, dark brown weathering sandstones below are transitional into the underlying dark grey, marine shales of the Wapiabi. With the exception of a single outcrop of a pebble conglomerate of the Bighorn formation, the Wapiabi is the oldest formation exposed in the area.

On Oldman River both contacts of the Bearpaw formation are faulted, though the stratigraphic displacements are probably not great. The strata are, in part, steeply folded. A few massive, medium- to coarse-grained, grey sandstones are interbedded in the dark grey, fissile, marine shale.

The St. Mary River formation consists of crossbedded, fine- to coarse-grained, grey to buff weathering, fairly hard, grey sandstones, interbedded with silty shale, grey and green shale, carbonaceous shale, and calcareous ironstone concretions. Its thickness is estimated to be about 2,900 feet. The basal sandstones are grey, coarse grained, rusty brown to pinkish weathering, and are interbedded with coal, carbonaceous shale, and fissile dark grey shale, with an oyster coquina bed near the base.

The Willow Creek formation consists of maroon, mottled maroon and green, green, and grey shales with abundant, small, irregular, white weathering, calcareous concretions, interbedded with soft, light grey, massive, crossbedded sandstones. Within the map-area three zones can be distinguished and traced northward where they are overlain progressively by the basal Porcupine Hills sandstone and pebble conglomerate. At North Creek (Sec. 19, Tp. 11, R. 1) a massive sandstone of the Porcupine Hills formation overlies grey and nodular maroon shales of the Willow Creek with angular unconformity.

The Willow Creek passes transitionally into the underlying St. Mary River formation. The contact has been drawn at the base of the lowest sandstones and green shale of typical Willow Creek lithology. As mapped this contact maintains a fairly constant stratigraphic position with respect to a zone of massive, blocky, fine-grained, grey sandstones near the top of the St. Mary River formation. These beds form the crests of the main ridges and have been traced northward into the upper part of the Edmonton formation. The relationships of these formations in this map-area and in the Langford Creek map-area to the north show that the Porcupine Hills and Pasopoo formations are stratigraphic equivalents, and that an erosional unconformity of considerable magnitude separates the Porcupine Hills - Pasopoo formations from the underlying Willow Creek - St. Mary River - Edmonton formations. This would appear to indicate a late Upper Cretaceous age for the Willow Creek formation, though previous determinations on fossils collected from these beds have suggested a Paleocene age.

The youngest rocks exposed in the area are those of the Porcupine Hills formation. Their maximum preserved thickness is about 4,000 feet. The formation consists of interbedded fine- to coarse-grained, crossbedded, brown weathering, grey sandstones and grey, brown weathering, shales. Northward it can be traced into the Pasopoo formation. It is underlain with erosional unconformity by Willow Creek beds.

The Marjon Lundbreck No. 1 well (Sec. 4, Tp. 10, R. 2) commenced near the top of the Wapiabi, and the Blairmore was first penetrated at a depth of 2,990 feet. The well was abandoned in Belly River at 6,204 feet after passing through repetitions of Alberta shale and Blairmore beds.

Maxson No. 1 well (Sec. 20, Tp. 9, R. 2) is still drilling. It commenced in the Belly River, and at last report was in Blairmore beds at a depth of 9,460 feet.

PRELIMINARY MAP 46-10
CALLUM CREEK
WEST OF FIFTH MERIDIAN
ALBERTA

Scale: 2 inches to 1 mile



Surveyed and compiled by the Topographical Survey, 114° 45' W. Issued 1946