CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES, FORESTS AND SCIENTIFIC SERVICES BRANCH

GEOLOGICAL SURVEY OF CANADA

Structure-sections along lines A-B and C-D

Joins Map 934A, "Stimson Creek"

PUBLISHED, 1949.

LEGEND

CENOZOIC

TERTIARY
PALEOCENE

11 — *PORCUPINE HILLS FORMATION: crossbedded sandstones, shale, carbonaceous shale, basal chert-pellet conglomerate*

CRETACEOUS OR TERTIARY
UPPER CRETACEOUS OR PALEOCENE

10 — *WILLOW CREEK FORMATION: interbedded, maroon, green, and grey shales with calcareous concretions, and soft grey sandstones*

MESOZOIC

CRETACEOUS
UPPER CRETACEOUS

9 — *ST. MARY RIVER FORMATION: hard crossbedded sandstones, shale, carbonaceous shale, coal seams, ironstone concretions*

8 — *BEARPAW FORMATION: dark grey shale; coarse grey sandstone*

7 — *BELLY RIVER FORMATION: crossbedded grey sandstones, shale, carbonaceous shale*

6 — *WAPIABI (Upper Alberta) FORMATION: dark grey marine shale*

5 — *BIGHORN (Cardium) FORMATION: sandstone, sandy shale*

4 — *BLACKSTONE (Lower Alberta) FORMATION: dark grey marine shale, silty shale, basal grit and pellet conglomerate*

LOWER CRETACEOUS

3 — *BLAIRMORE GROUP: sandstone, shale, thin limestone bands, basal conglomerate*

2 — *KOOTENAY FORMATION: (in structure-section A-B only)*

JURASSIC

1 — *FERNIE GROUP: (in structure-section A-B only)*

Rock outcrop
Bedding (inclined, vertical, overturned)
Fault (showing direction of dip)
Anticlinal axis (arrow indicates direction of plunge)
Synclinal axis
Well (abandoned)

Road and buildings
Road not well travelled
Trail
Township boundary
Section line
Forest Reserve boundary
Intermittent lake and stream
Marsh
Sand or gravel
Contours (interval 50 feet) — 4500
Depression contour
Height in feet above mean sea-level — 4242

Geology by G.S. Hume, 1940; G. Shaw, 1944; and R.J.W. Douglas, 1946.

Geological compilation and descriptive notes by R.J.W. Douglas.

Base-map compiled by the Topographical Survey, 1941, from aerial photographs taken in August and September, 1939. Cartography by the Geological Mapping Division, 1948.

Approximate magnetic declination, 22°30' East.

SCALE, 1 INCH TO 200 MILES

DESCRIPTIVE NOTES

The greater part of the map-area is underlain by the east-dipping Porcupine Hills, Willow Creek, and St. Mary River formations. The strata dip very gently to the east in the eastern part of the area, and gently west in the northeast corner, but become steeper to the west, and are sharply upturned along the St. Mary River ridges. Evidence of the east-dipping fault in the St. Mary River formation may be seen in Callum Creek map-area to the south, and along Callum Creek in sec. 22, tp. 12, rge. 2, but no indication of it could be found farther north.

The contact between the Blackstone formation and underlying Blairmore beds (3), the oldest rocks exposed in the map-area, has been placed at the base of a coarse-grained sandstone containing small chert pellets. The Blackstone (4) is poorly exposed, but its thickness, as determined from the Rice Creek well, is not more than 740 feet. The overlying Bighorn formation (5) consists of fine-grained, thinly laminated, dark grey sandstone. Both the upper and lower pebble conglomerates were observed off the southwest border, but not within the area. In the Rice Creek well its thickness is about 150 feet. The overlying Wapiabi formation (6), in this well, has a maximum thickness of 1,080 feet. Its contact with the Belly River (7) is placed at the base of the massive, medium-grained, thickly crossbedded, grey sandstones of that formation. The contact between Belly River and Bearpaw formations was not seen. Included with the latter (8) are dark grey, fissile shales and associated coarse-grained, reddish brown weathering, grey sandstones. Similar sandstones, but with associated green and light grey shales and coal seams were placed in the basal St. Mary River strata. The upper and greater part of the St. Mary River formation (9) 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 and beds. Its thickness is 3,100 feet in the Callum Creek map-area to the south. The contact with the overlying Willow Creek formation is transitional, being placed at the base of the lowest sandstone and green shale of typical Willow Creek lithology. The Willow Creek formation (10) consists of maroon, mottled maroon and green, green, and grey shales with zones of irregular calcareous concretions, interbedded with soft, light grey, massive, crossbedded, fine- to coarse-grained and conglomeratic sandstones.

The Porcupine Hills formation (11) overlies the Willow Creek with erosional disconformity. On Rice Creek the basal chert-pebble conglomerate of the Porcupine Hills overlies Willow Creek red and green shale and a chert-pellet conglomerate lying some 780 feet above the base. East of the Chain Lakes a coarse-grained, yellowish green weathering sandstone, containing small chert pellets, overlies green and purplish shale of the lower 540 feet of the Willow Creek. The rocks of the Porcupine Hills formation are the youngest exposed in the area, and have a maximum preserved thickness of about 4,000 feet. They consist of fine- to coarse-grained, crossbedded, yellowish brown weathering, grey sandstones and grey and brown shales.

The St. Mary River and Porcupine Hills formations of this map-area have been traced northward into the Edmonton and Paskapoo formations respectively of the adjoining Stimson Creek map-area. There the unconformity between the Porcupine Hills and Willow Creek formations passes into the Paskapoo-Edmonton unconformity, and at least most of the Willow Creek is removed by erosion.

Two wells furnish information on the structure of the outer margin of the disturbed belt. The Willow Creek well, in sec. 29, tp. 14, rge. 2, was drilled on a south-plunging anticline, the crest of which is broken by a fault that dies out at depth into an overturned syncline of Blairmore beds. A short distance to the south the Rice Creek well is drilled on a second, south-plunging anticline. These two structures are separated by a fault that is folded anticlinally conformably with them. Farther east the fault is folded synclinally, and separates east-dipping Belly River strata of the east flank of the upper anticline from contorted and synclinally folded Belly River strata of the east flank of the lower anticline. The Rice Creek well, in sec. 4, tp. 14, rge. 2, first penetrated 700 feet of Alberta beds, and then passed through the folded fault and encountered the Belly River strata of the lower anticline. Drilling was continued through a complete section of Alberta 2,060 feet thick and 1,130 feet of Blairmore strata, to where Alberta beds were again encountered at a depth of 5,210 feet, indicating a second major fault. This latter fault is presumed to lie close below the Blairmore in the lower part of the Willow Creek well. Although not encountered in this well, Palæozoic strata are probably present above the fault to the west, and as the structure is plunging south at about 3 degrees the structural high lies to the north.

MAP 981A

LANGFORD CREEK

WEST OF FIFTH MERIDIAN

ALBERTA

Scale: One Inch to One Mile = 1/63,360

Miles

This map has been produced from a scanned version of the original map
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