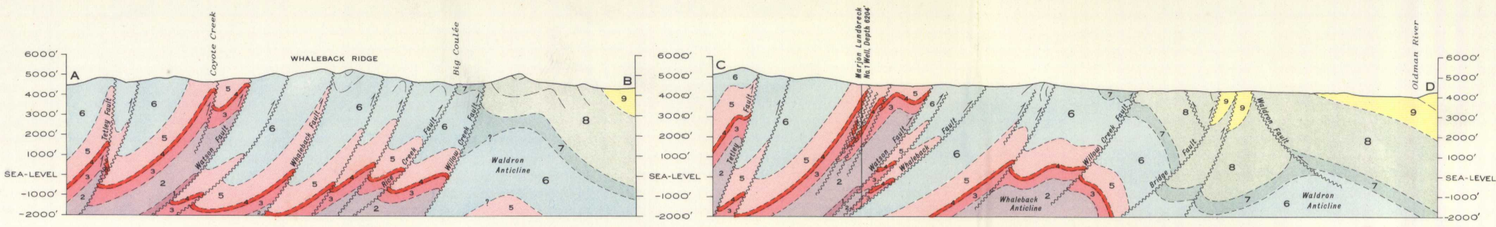
CANADA

DEPARTMENT OF MINES AND RESOURCES

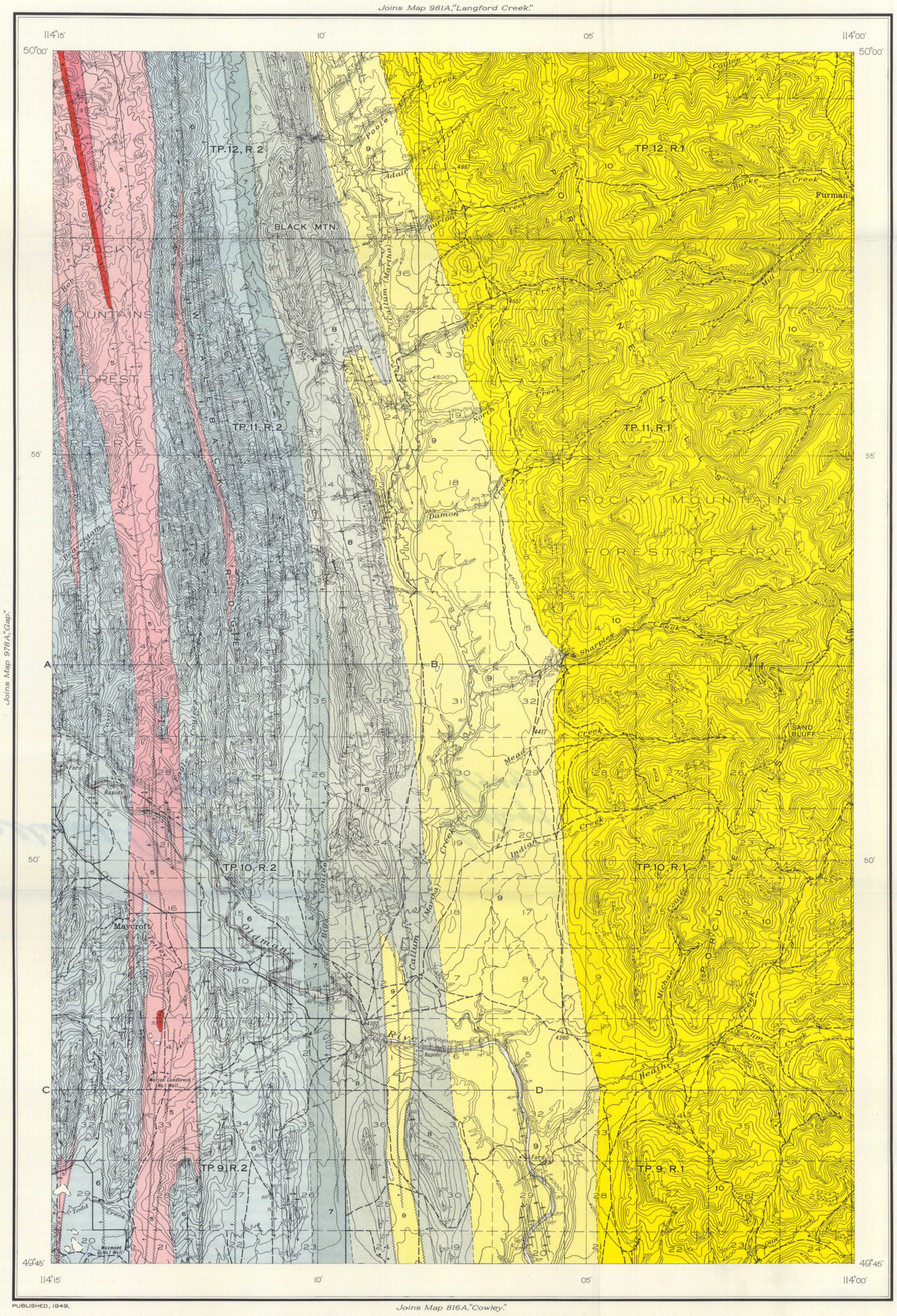
MINES, FORESTS AND SCIENTIFIC SERVICES BRANCH

GEOLOGICAL SURVEY OF CANADA



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

Joins Map 981A, "Langford Creek."



LEGEND

CENOZOIC

TERTIARY
PALEOCENE

10 — *PORCUPINE HILLS FORMATION: crossbedded sandstones, shale, carbonaceous shale*

CRETACEOUS OR TERTIARY
UPPER CRETACEOUS OR PALEOCENE

9 — *WILLOW CREEK FORMATION: interbedded maroon, green, and grey shale with numerous calcareous concretions and soft grey sandstone beds*

MESOZOIC

CRETACEOUS
UPPER CRETACEOUS

8 — *ST. MARY RIVER FORMATION: crossbedded sandstones, silty shale, shale, carbonaceous shale, ironstone concretions*

7 — *BEARPAW FORMATION: dark grey marine shale with calcareous concretions; coarse grey sandstone beds*

6 — *BELLY RIVER FORMATION: crossbedded sandstones, shale, carbonaceous shale*

5 — *WAPIABI (Upper Alberta) FORMATION: dark grey marine shale, silty shale, calcareous shale, concretions*

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

3 — *BLACKSTONE (Lower Alberta) FORMATION: dark grey marine shale, silty shale, sandstone*

LOWER CRETACEOUS

2 — *BLAIRMORE GROUP: green and maroon shale, green sandstone, basal conglomeratic sandstone (in structure-sections only)*

1 — *KOOTENAY FORMATION: dark grey and carbonaceous shale, coal seams, dark grey sandstone (in structure-sections only)*

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

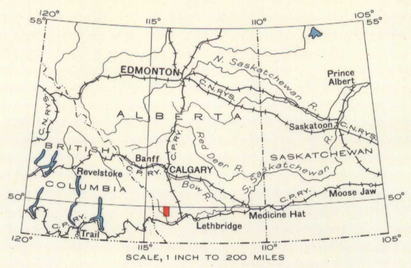
Road and buildings
Road not well travelled
Trail
School
Post Office
Township boundary
Section line
Forest Reserve boundary
Intermittent lake and stream
Marsh
Sand or gravel
Contours (interval 50 feet)
Depression contour
Height in feet above mean sea-level 4107

Geology by G. Shaw, 1944, and R. J. W. Douglas, 1945.

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

Base-map compiled by the Topographical Survey, 1942, from aerial photographs taken in August and September, 1939. Cartography by the Geological Mapping Division, 1948.

Approximate magnetic declination, 23° East.



SCALE, 1 INCH TO 200 MILES

DESCRIPTIVE NOTES

The eastern part of the map-area is underlain by the Porcupine Hills (10) and Willow Creek (9) formations. The strata are essentially east dipping: those of the Porcupine Hills dip at an angle that varies from 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 (6) and Wapiabi (5) strata. The Belly River beds are mainly steeply west dipping, with numerous small faults and a 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 at depth.

Intermediate between the eastern and western parts of the map-area is a belt underlain mainly by the St. Mary River formation (8). The strata are repeated by an east-dipping thrust fault in the north; are compressed into south-plunging folds, broken by a tear fault, in the central part; and are divided, in the south, into two main ridges by a relatively depressed thrust slice of Willow Creek beds. This thrust slice 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 sandstone. Thin, platy, dark brown weathering sandstones below are transitional into the underlying dark grey, marine shales of the Wapiabi. Outcrops of the Bighorn (4) and Blackstone (3) formations are scarce.

The contact between the Bearpaw formation (7) and the underlying Belly River beds is placed where the silty, green and grey shales of the Belly River change to rubbly, dark grey shale. Thin beds of coal and carbonaceous shale occur in the upper 100 feet of the Belly River. A few, massive, medium- to coarse-grained, grey sandstone beds are interstratified with the dark grey, fissile, marine shale of the Bearpaw.

The St. Mary River formation (8) consists of crossbedded, fine- to coarse-grained, grey to buff weathering, hard and soft, grey sandstones, interbedded with silty shale, grey and green shale, carbonaceous shale, and calcareous ironstone concretions. Its thickness is about 3,000 feet along Oldman River, but the complete section is not present in a single fault slice. The basal 580 feet contains grey, coarse-grained, rusty brown to pinkish weathering sandstones, with interbedded coal, carbonaceous shale, and fissile, dark grey shale. An oyster coquina occurs 75 feet above the faulted contact with the Bearpaw.

The Willow Creek formation (9) consists of maroon, mottled maroon and green, green, grey, and purplish shales, with abundant, small, irregular, white weathering, calcareous concretions, interbedded with soft, light grey, massive, crossbedded sandstones. Within the map-area and the Langford Creek area to the north, five 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, rge. 1), the basal, 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 shales 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 about 450 feet below 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 as mapped in the Stimson Creek map-area. The Porcupine Hills formation has been traced northward into the Paskapoo formation, in which direction the underlying Willow Creek beds become progressively thinner through removal by erosion. The presence of this unconformity would appear to indicate a late Upper Cretaceous age for the Willow Creek, though previous determinations on fossil plants collected from the upper part of this formation farther east have suggested a Paleocene age.

The youngest rocks exposed in the area are those of the Porcupine Hills formation (10). 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.

The Marjon Lundbreck No. 1 well (sec. 4, tp. 10, rge. 2), commenced in Wapiabi strata. A summary of the log is as follows (See Structure-section C-D): top of Bighorn, 510 and 1,920 feet; top of Blairmore, 2,840 and 2,990 feet; fault from Blairmore to Blackstone at 5,080 feet; top of Blairmore, 5,230 feet; fault from Blairmore to Blackstone at 5,480 feet; fault from Blackstone to Belly River at 5,920 feet; total depth of well 6,204 feet. Maxmont No. 1 well (sec. 20, tp. 9, rge. 2) commenced in the Belly River formation, and has reached a depth of 9,916 feet. No details are available for publication.

A major anticlinal structure lies beneath the easternmost belt of Belly River strata; both north and south closures are indicated. Belly River beds of the west flank of this structure extend to a depth of at least 6,204 feet, where they were drilled by Marjon Lundbreck No. 1 well. East-dipping, St. Mary River and closely folded upper Belly River and Bearpaw strata form the east flank, which is broken by faults, probably of small displacement.

PUBLISHED, 1949.

MAP 982A

CALLUM CREEK

WEST OF FIFTH MERIDIAN

ALBERTA

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

Miles 1 ¾ ½ ¼ 0 1 2 3