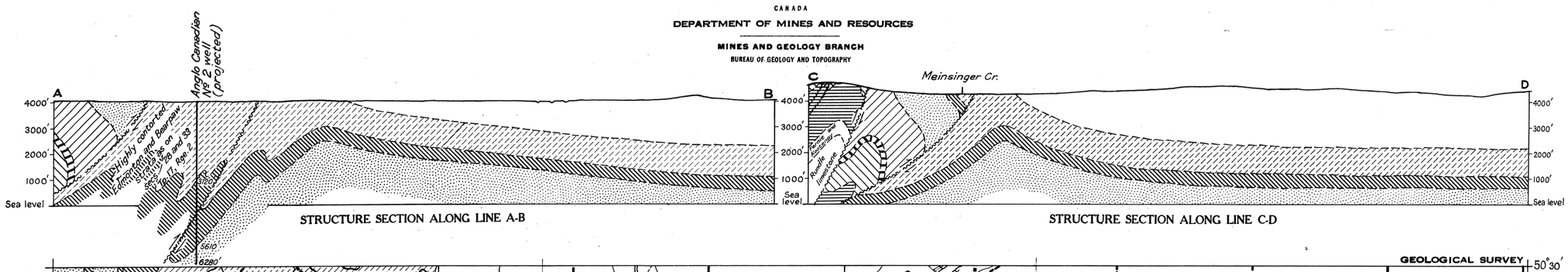
CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY



STRUCTURE SECTION ALONG LINE A-B

STRUCTURE SECTION ALONG LINE C-D

GEOLOGICAL SURVEY

50°30'

Tp. 18

Tp. 17

Tp. 16

Tp. 15

25'

20'

114°15'

10'

5'

114°00'

50°15'

R. 2

R. 1

LEGEND

CENOZOIC

TERTIARY

PASKAPOO FORMATION: sandstone, shale, carbonaceous shale

CRETACEOUS

UPPER CRETACEOUS

EDMONTON FORMATION: bentonitic sandstone, sandstone, shale, carbonaceous shale, coal, oyster beds

BEARPAW FORMATION: shale, sandy shale, sandstone, glauconitic sandstone, coal

MESOZOIC

BELLY RIVER FORMATION: sandstone, shale, conglomerate, coal

WAPIABI (Upper Alberta) FORMATION: shale, sandy shale, sandstone

BIGHORN (Cardium) FORMATION: conglomerate, sandstone, sandy shale

BLACKSTONE (Lower Alberta) FORMATION: shale, sandy shale, thin sandstone beds

LOWER CRETACEOUS

BLAIRMORE GROUP: sandstone, shale, conglomerate, thin limestone bands

Rock outcrop ×

Bedding (horizontal, inclined, overturned)

Fault

Well (abandoned) A

Geology by G. S. Hume, 1936, 1940.

Road, well travelled

Road, not well travelled

Township outline

DESCRIPTIVE NOTES

The map-area is largely within the plains, but a narrow strip on the west side is within the foothills. The plains area, except close to the foothills, is underlain by gently folded strata the youngest of which are of Tertiary age. These have a maximum thickness of possibly 4,000 feet. They are separated from underlying Cretaceous beds by an erosional disconformity represented by a basal Paskapoo sandstone containing chert and quartzite pebbles and cobbles up to 6 inches in diameter. The Edmonton formation cannot be measured in this map-area, but as drilled by the Arca well, a few miles to the north, is known to be about 1,100 feet thick. It thickens southward within the map-area where, apparently, the uppermost strata have not been eroded as deeply. South of the map-area the thickness increases and the beds are continuous with those of the St. Mary River formation. From field relationships, therefore, it is inferred that the St. Mary River formation is the stratigraphic equivalent of the Edmonton with additional younger beds. Also, as the contact between the Edmonton and the Paskapoo formations is traced southward, mottled red shales with abundant, small, calcareous nodules appear below the basal conglomeratic sandstone of the Paskapoo and above beds lithologically similar to those of the St. Mary River formation. These represent the Willow Creek formation. No recognizable Willow Creek beds occur in Stimson Creek map-area, but they appear only a few miles south of it. Also, no sharply defined contact has been observed in this general region between the Willow Creek and the St. Mary River formations, although an arbitrary division is possible. The change from one formation to the other is transitional, suggesting that the Willow Creek represents Cretaceous sedimentation and that the erosional break with the Tertiary is at the base of the Paskapoo. The latter, as it is traced southward, passes into similar beds of the Porcupine Hills formation.

In Stimson Creek map-area the Edmonton formation commonly has a coarse, conglomeratic sandstone at the base, although this is not everywhere present. It is underlain by Bearpaw beds that, normally, are marine shales, but on the edge of the foothills in this area are shoreline deposits and contain not only marine shales with glauconitic sandstones but also coal seams a foot or more thick. On the edge of the foothills the Bearpaw beds are highly contorted and faulted, but it is believed they are not less than 200 nor more than 400 feet thick. The formation thickens eastwards and becomes more strictly marine. It is considered to be about 700 feet thick on the east side of the map-area, judging from information derived from the nearby Arca well.

The division between the Bearpaw and the underlying non-marine Belly River beds is difficult to make in the western part of the map-area, where the Bearpaw also contains non-marine strata. An arbitrary boundary, however, can be made at the top of a coal-bearing zone that elsewhere is known to form the top of the Belly River formation. In the western part of the map-area the Belly River formation is 1,700 feet thick, but thins eastward. It overlies the Alberta formation, which also thins to the east from 2,700 feet to about 2,000 feet. In the western part of the map-area the Alberta is divisible into an upper (Wapiabi) and lower (Blackstone) part separated by an intermediate sandstone formation (Bighorn) that is perhaps not over 40 feet thick and consists of relatively thin sandstone beds with interbedded sandy shales. The formation commonly contains thin pebble beds that may or may not occur on the top of the uppermost sandstone bed or in the shale immediately overlying it. In the eastern part of the map-area these pebble beds are likely to be the only trace of this central formation that can be identified in drilling samples.

In the western part of the map-area the Lower Cretaceous is divisible into the Blairmore group and Kootenay formation, the former including a basal sandstone and conglomerate. In the eastern part of the map-area the conglomerate may be recognizable in drilling samples, but farther east it apparently disappears, and the division between the Blairmore and Kootenay cannot be made with certainty. The Blairmore beds are 1,000 to 1,200 feet thick in the west and about 800 feet in the east. The Kootenay is very thin, with a maximum of possibly only 100 feet in the west and thinning eastward.

The Jurassic, Fernie shales, that lie beneath the Cretaceous strata also thin from about 200 feet, on the west, to less than 100 feet on the east side of the map-area. They directly overlie the Rundle limestones, of Palaeozoic age, in which oil and gas occur in the Turner Valley field, a few miles northwest of the area.

Two wells have been drilled in the map-area. These are Davies No. 3 well (Sec. 33, tp. 17, rge. 2) and Anglo-Canadian No. 2 well (Sec. 33, tp. 16, rge. 2). Davies No. 3 well commenced in Edmonton strata, but due to folding and faulting the base of the Edmonton lay at a depth of 1,470 feet and the base of the Bearpaw at 3,050 feet. The excessive thickness of Bearpaw is probably due to repetition and contortions of strata caused by the East Side, Turner Valley fault continued southward from sec. 4, tp. 17, rge. 2, as indicated on the map. Anglo-Canadian No. 2 well also commenced in Edmonton beds and, similarly, encountered a repetition of strata. The base of the Edmonton was reached at a depth of 3,120 feet and the base of the Bearpaw at 5,610 feet. The well was abandoned in Belly River strata at 6,280 feet. Highly contorted and faulted strata, such as presumably were drilled in these two wells, outcrop on secs. 21 and 28, tp. 17, rge. 2.

The southward plunge of the south end of the Turner Valley structure is indicated by the southwest trend of the Paskapoo-Edmonton contact in the north part of the map-area. Within the belt underlain by Edmonton strata there are probably more thrust faults than shown on the map, but no information is available owing to scarcity of outcrops.

Within the Foothills belt, but close to its eastern edge, is an east-dipping fault. The fault was observed on Highwood River west of Turner Valley, and its extension southward into the map-area is inferred from the structural relationships of Belly River and Bearpaw strata. It is believed that this fault may continue across the west side of at least the north part of the map-area, and that it lies west of the major overthrust fault that structurally divides the foothills and the plains.

The structure of the Paskapoo in this map-area is that of an asymmetrical syncline with the steep limb on the western side. Dips are very gentle toward the east side of the area, east of which is the probable southward continuation of the Arca fold, known on Highwood River to the north.

Surveyed and compiled by the Topographical Survey. Issued 1943.

PRELIMINARY MAP 43-8

STIMSON CREEK

WEST OF FIFTH MERIDIAN

ALBERTA

Scale:- 2 inches to 1 mile

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