CANADA
DEPARTMENT OF MINES AND RESOURCES
MINES, FORESTS, AND SCIENTIFIC SERVICES BRANCH

LEGEND

CRETACEOUS

UPPER CRETACEOUS

14 — *BELLY RIVER FORMATION: crossbedded grey and green sandstones; grey, green, and carbonaceous shale; concretionary limestone*

13 — *WAPIABI (Upper Alberta) FORMATION: dark grey shale, silty shale, and thin sandstones*

12 — *BIGHORN (Cardium) FORMATION: rubbly grey sandstones and silty grey shale*

11 — *BLACKSTONE (Lower Alberta) FORMATION: dark grey shale, silty shale, and thin sandstones*

10 — *CROWSNEST FORMATION: agglomerate and tuff*

LOWER CRETACEOUS

9 — *BLAIRMORE GROUP: grey and green sandstones, conglomerate; grey, green, maroon, and carbonaceous shale; limestone; basal conglomerate*

8 — *KOOTENAY FORMATION: dark grey and carbonaceous shale; fine- to coarse-grained black sandstones; coal*

JURASSIC

7 — *FERNIE GROUP: dark grey and black shale, black limestone, black and brown sandstone; basal coquina and conglomerate*

TRIASSIC AND EARLIER

6 — *SPRAY RIVER AND ROCKY MOUNTAIN FORMATIONS (?): variegated dolomites and grey limestone; arenaceous cherty grey dolomite and limestone*

CARBONIFEROUS

MISSISSIPPIAN

5 — *RUNDLE FORMATION (Member D): buff dolomite, porous and grey limestone, green and red shale, chert and dolomite breccia*

4 — *RUNDLE FORMATION: (Member C): massive fine-grained black limestone*

3 — *RUNDLE FORMATION (Member B): platy argillaceous brown dolomite; massive, cherty grey limestone*

2 — *RUNDLE FORMATION (Member A): grey-weathering, massive, cherty grey limestone and dolomite; porous limestone; crystalline, buff limestone*

1 — *BANFF FORMATION: buff-weathering, banded, cherty grey limestone and dolomite*

MESOZOIC

PALAEOZOIC

Rock outcrop ..... ×

Bedding (horizontal, inclined, vertical, overturned) .....

Anticlinal axis .....

Synclinal axis .....

Fault (showing direction of dip) .....

Well (drilling) ..... ⊙

Coal adit .....

NOTE 1: No exposures; probably highly contorted and faulted Alberta and Blairmore strata.

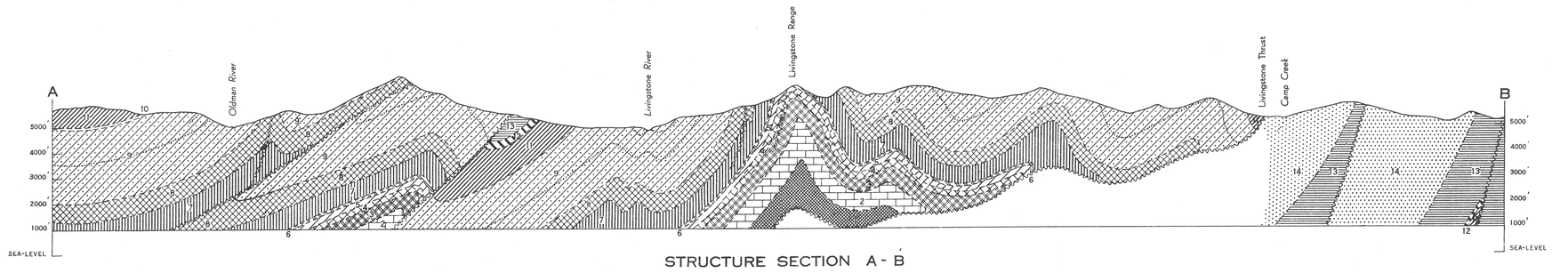
NOTE 2: Projection of structure as exposed on Oldman River 1 mile to the south (Structure-section C-D).

Geology by R. J. W. Douglas 1946-47

Road, ...

Trail .....

Marsh .....



STRUCTURE SECTION A-B

VERTICAL SCALE: 2 INCHES TO 1 MILE

DESCRIPTIVE NOTES

The map-area includes part of the southern extension of the Livingstone Range, the easternmost uplift of the 'disturbed belt' in which Palaeozoic strata are exposed. A major, low-angle thrust fault of more than 3 miles lateral displacement, termed the Livingstone thrust, underlies Livingstone Range and part of the Foothills to the east. In the south, this fault lies close to the eastern margin of the Palaeozoic formations, but trends eastward through the central part of the map-area as a bedding-plane thrust between Fernie or Kootenay and Belly River formations. It then continues northward, with steepening inclination, between Blairmore or Alberta and Belly River strata. The sinuous surface trace of the Livingstone thrust is the result of subsequent folding of the fault plane.

East of the Livingstone thrust, Belly River and Wapiabi strata are repeated by thrust faults, which vary from low angle in the west to high angle in the east. West of Livingstone Range the strata are, in part, closely folded, and are broken by a few widely spaced thrust faults.

The thicknesses of the various exposed formations are as follows: Banff (1), 800 feet; Rundle (2, 3, 4, 5), 1,720 to 1,965 feet; Member A (2), 790 feet at The Gap, 890 feet in the south; Member B (3), 490 feet at The Gap, 520 feet in the south; Member C (4), 200 feet; Member D (5), 250 feet at The Gap, 225 feet 1 mile to the east, 375 feet in the south; Rocky Mountain (6), 200 feet at The Gap, 66 feet 1 mile to the east; 101 feet on White Creek, and 280 feet in the south; Spray River (6), 26 to 40 feet; Fernie (7), 500 to 700 feet; Kootenay (8), 370 to 700 feet; Blairmore (9), 2,200 feet, thinning to the east; Crowsnest (10), maximum of 300 feet in the southwest; Blackstone (11), 1,000 feet, thinning to the east; Bighorn (12), 300 feet in the west, 30 feet in the east; Wapiabi (13), 1,600 feet, thinning to the east; Belly River (14), 3,000 to 4,000 feet.

No fossils were found in the strata ascribed to the Rocky Mountain and Spray River formations, and their identification is, consequently, based solely on their stratigraphic position and lithology.

The Spray River, consisting of variegated dolomites and grey limestone, is disconformably overlain by a coquina and a chert and dolomite conglomerate of the basal Fernie strata. The contact between the Fernie and the Kootenay is gradational, and is placed where the brown sandstones of the Fernie change to the black sandstones of the Kootenay. Coarse-grained sandstones are commoner in the upper part of the Kootenay formation.

A massive, chert-pebble conglomerate marks the base of the Blairmore group. Conglomeratic sandstones occur 250, 1,300, and 2,100 feet above the base, and a thick, massive sandstone at 1,200 feet. Grey limestone and black shale are characteristic of the basal 250 feet, and maroon shale is more abundant in the upper half of the group.

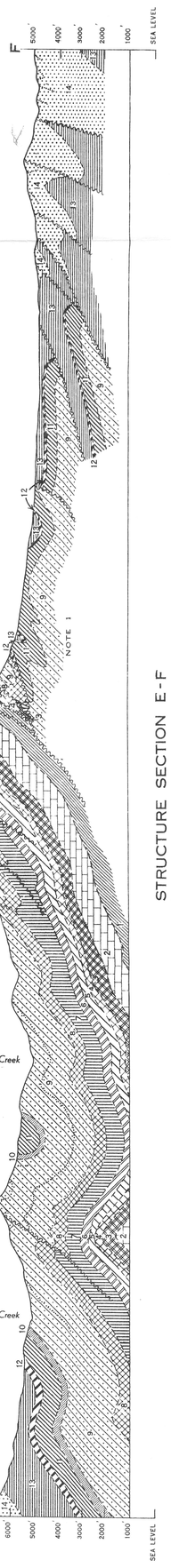
The Crowsnest formation is composed of volcanic tuff and agglomerate, some of which is waterlain. The agglomerate contains bombs up to 2 feet in diameter, composed of phenocrysts of orthoclase, with rare analcite and garnet, in a fine-grained green groundmass. The volcanic phase reaches its maximum development in the southwest, and thins eastward and northward. Sedimentary strata of equivalent age may be represented in the upper part of the Blairmore group elsewhere in the area, but were not mapped separately.

The Bighorn (Cardium) formation is represented by 30 to 50 feet of sandstone in the east, but thickens westward to 300 feet, consisting of three sandstones, each about 50 feet thick, with interbedded silty shale. Chert-pebble conglomerate was only found interbedded with the upper sandstone in the west.

The Belly River formation has a minimum thickness of 4,200 feet in the northeast, if the section there is not faulted. The basal beds are massive, coarse-grained, grey sandstones with crossbeds up to 2 inches thick. The central part of the formation consists of medium- to fine-grained, crossbedded, grey and green sandstones and grey-green, silty shale. The upper part contains pale green and grey shale, with limestone concretions and lenticular beds, minor coal and carbonaceous shale, and thin, fine-grained, green and grey sandstones.

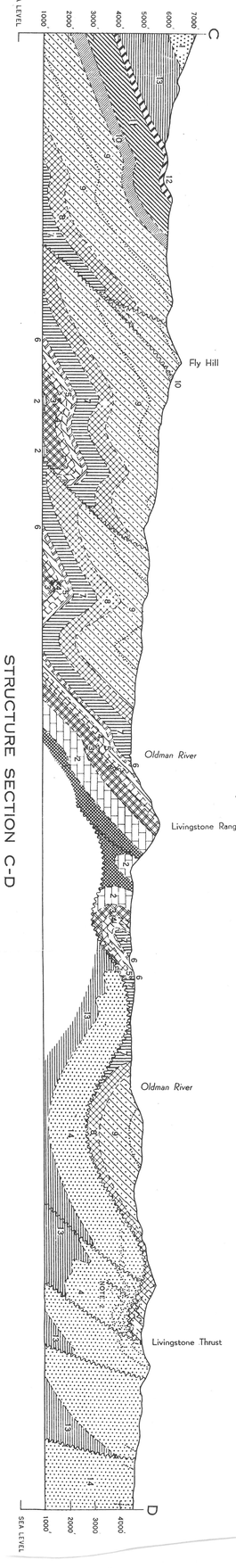
Quaich Globe No. 1 well in ls. 12, sec. 35, tp. 9, rge. 3, is on the north end of a north-plunging anticlinal structure, which is broken by low-angle thrust faults along its eastern flank.

The Kootenay formation contains seams of bituminous coal that range in thickness from 3 to 9 feet. Along the west flank of the Livingstone Range the strata are least disturbed, and are most readily accessible for development.



STRUCTURE SECTION E-F

VERTICAL SCALE: 2 INCHES TO 1 MILE



STRUCTURE SECTION C-D

VERTICAL SCALE: 2 INCHES TO 1 MILE

PRELIMINARY MAP 47-23

GAP
ALBERTA

Scale: 2 inches to 1 mile

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