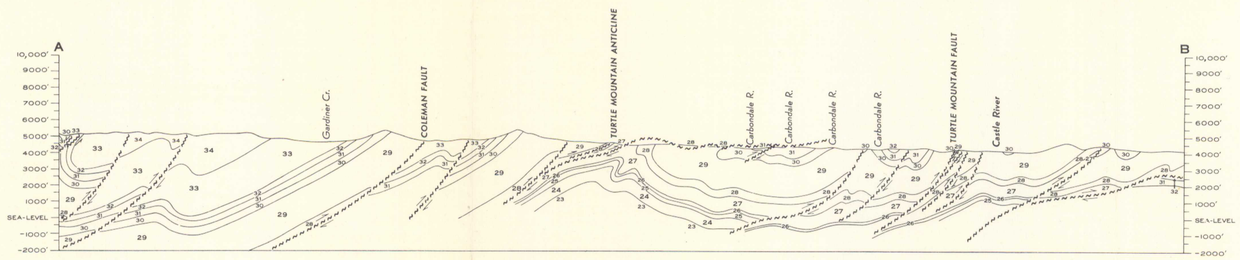
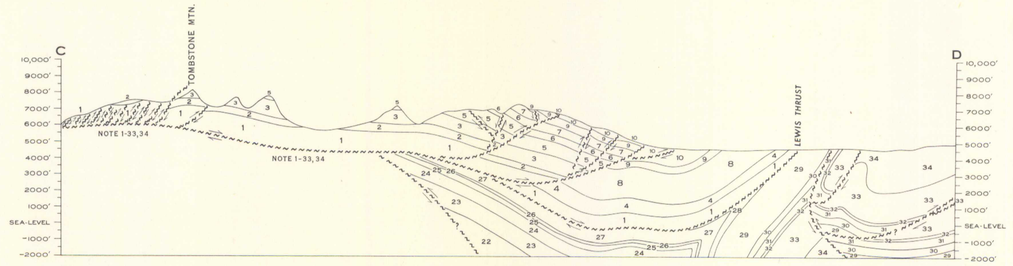


SECTION ALONG LINE A-B



SECTION ALONG LINE C-D

LEGEND

MESOZOIC

CRETACEOUS

UPPER CRETACEOUS

34 BELLY RIVER FORMATION: grey and greenish grey sandstone, mudstone; includes Bearpaw, Blood Reserve and St. Mary River formations south of Beaver Mines Lake

ALBERTA GROUP (31-33)

33 WAPIABI FORMATION: dark grey shale and silty shale, thin-bedded sandstone

32 CARDIUM FORMATION: black, silty mudstone, dark grey siltstone, light grey sandstone

31 BLACKSTONE FORMATION: dark grey mudstone and siltstone, thin, grey sandstone

LOWER CRETACEOUS

30 CROWSNEST FORMATION: green and grey tuffaceous sandstone, green agglomerate

BLAIRMORE GROUP

29 Greenish grey and grey sandstone, green and maroon mudstone, conglomerate

28 KOOTENAY FORMATION: medium and dark grey siltstone and mudstone, medium grey sandstone, coal

JURASSIC

FERNIE GROUP

27 Dark grey mudstone, yellowish grey siltstone, brownish grey sandstone, thin, medium grey limestone

PALAEOZOIC

PENNSYLVANIAN (?) AND PERMIAN (?)

26 ROCKY MOUNTAIN FORMATION: grey sandstone, conglomerate, yellowish grey mudstone; may include Triassic Spray River formation in part

MISSISSIPPIAN

RUNDLE GROUP (23-25)

25 ETHERINGTON FORMATION: grey limestone and dolomite, grey sandstone, thin, green mudstone

24 MOUNT HEAD FORMATION: grey limestone and dolomite, breccias. (In structure sections only)

23 LIVINGSTONE FORMATION: grey, bioclastic limestone, grey dolomite. (In structure sections only)

22 BANFF FORMATION: grey dolomite and limestone, chert-banded limestone. (In structure sections only)

CAMBRIAN

MIDDLE CAMBRIAN

21 Grey and greyish green shale, variegated green, brown and maroon shale, thin grey sandstone, grey nodular limestone

MIDDLE CAMBRIAN OR EARLIER

20 Light grey sandstone, thin, dark grey and maroon mudstone

PRECAMBRIAN

PURCELL

19 KINTLA FORMATION (Member D): green and grey argillite, shale, oolitic limestone

18 KINTLA FORMATION (Member C): red quartzite and sandstone

17 KINTLA FORMATION (Member B): grey and green sandstone, greyish green siltstone, grey and maroon argillite

16 KINTLA FORMATION (Member A, upper part): red siltstone, red sandstone, thin, greyish green siltstone

15 KINTLA FORMATION (Member A, lower part): yellowish grey and red sandstone, colour-banded siltstone, red argillite

14 SHEPPARD FORMATION: pale greyish green dolomite, pale greyish green siltstone and sandstone

13 Dark green and purplish green amygdaloidal andesite, pillow andesite

12 SIYEH FORMATION (Upper part): green grey and red argillite, light grey, molar-tooth dolomite, algal limestone

11 SIYEH FORMATION (Middle part): grey, algal dolomite

10 SIYEH FORMATION (Lower part): grey and green argillite, grey dolomite and limestone, grey algal limestone and dolomite, oolitic limestone

9 GRINNELL FORMATION: red argillite, grey sandstone, conglomerate

7 APPEKUNNY FORMATION (Upper part): green and maroon argillite, greyish green and pale red quartzite

6 APPEKUNNY FORMATION (Middle part): green argillite, white and grey quartzite

5 APPEKUNNY FORMATION (Lower part): green and black argillite, white and pale greyish green quartzite, buff weathering dolomite

8 APPEKUNNY FORMATION: undivided

3 ALTYN FORMATION (Upper part): grey dolomite, black argillite

2 ALTYN FORMATION (Lower part): dark grey argillite, thin, grey limestone and dolomite

4 ALTYN FORMATION: undivided

1 WATERTON FORMATION: colour-banded, grey, green and red dolomite, green and grey argillite, grey and pale red limestone

Note 1 (on structure section C-D and in Haig Brook and Cate Creek fensters): poorly exposed, undifferentiated and intensely deformed Wapiabi and Belly River strata.

Rock outcrop (attitude not attainable) . . . . . ×

Sedimentary contact (approximate) . . . . .

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

Fault, thrust (teeth on hanging-wall side; approx., assumed) . . . . .

Fault, normal (solid circle on downthrown side) . . . . .

Anticline, trace of axial plane (approximate) . . . . .

Syncline, trace of axial plane (approximate) . . . . .

Anticline, overturned . . . . .

Syncline, overturned . . . . .

Anticline or syncline (arrow indicates direction of plunge) . . . . .

Fossil locality . . . . . (F)

Well (drilling, abandoned) . . . . . o, ⊘

Geology by D.K. Norris, 1958

Roads (loose surface) . . . . .

Cart track . . . . .

Trail . . . . .

Interprovincial boundary . . . . .

Township boundary (surveyed) . . . . .

Township boundary (unsurveyed) . . . . .

Section line and number 36

Stream (approximate) . . . . .

Contour (interval 500 feet) 5000

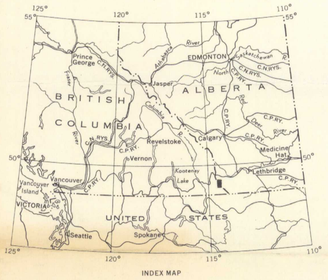
Height in feet above mean sea-level 4744

Approximate magnetic declination, 21° 05' East

Cartography by the Geological Survey of Canada, 1959

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario

In response to public demand for earlier publication, Preliminary Series maps are now being issued in this simplified form, thereby effecting a substantial saving in time. There is no loss of information, but the maps will be clearer to read if all or some of the map-units are hand-coloured.



INDEX MAP

GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MAP 5-1959

GEOLOGY

CARBONDALE RIVER

ALBERTA AND BRITISH COLUMBIA

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

1 ½ 0 1 2 3 Miles

Geographical names subject to revision

PRELIMINARY SERIES

SHEET 82 G/8 (West Half)

PUBLISHED, 1959
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA

PRINTED BY THE SURVEYS AND MAPPING BRANCH

DESCRIPTIVE NOTES

Carbondale River map-area in southwestern Alberta is structurally divisible into two parts. North of the surface trace of the Lewis thrust is the Disturbed Belt and south of it the Rocky Mountains.

The principal structural features in the north half of the area are the Coleman fault, the Turtle Mountain fault, the southward plunging Turtle Mountain anticline, and the Maverick Hill structure. Of these, the last is fundamental as it exhibits extreme deformation of a shoulder on a thrust plane. There the coal-bearing Kootenay strata are split in the plane of the bedding at a point just below the middle sandstone member. Upper Kootenay and younger strata forming the shoulder are completely overturned next to the thrust plane, whereas lower Kootenay and older beds are upright. The apparent lack of structure in the broad band of upper Cretaceous rocks in front of the Lewis thrust plate may be due to lack of exposures and adequate stratigraphic control.

Immediately in front of the surface trace of the Lewis thrust, between the west boundary of the area and Castle River, is a continuous overturned section of lower Cretaceous rocks in fault contact with overturned upper Cretaceous strata. The overturning of the lower Cretaceous beds may be due to a split in the Kootenay formation and an inversion of the stratigraphic succession from Kootenay to Belly River, in the same manner as that observed in the Maverick Hill structure. The inverted east-dipping thrust lying between the lower and upper Cretaceous rocks is considered to be a direct result of the splitting and overturning.

The south half of the map-area contains part of the Lewis thrust sheet. It consists of Precambrian rocks, for the most part in broad, open folds. Close to the front of the sheet, however, are minor west- and east-dipping thrust faults. Local areas of considerable complexity occur southwest of Table Mountain, between West Castle River and Syncline Brook, and above the Haig Brook and Cate Creek fensters in the extreme southwest corner of the map-area. A second major east-dipping thrust fault is postulated beneath the plate to account for the presence of the beds in front of the thrust plate older than those exposed in the fensters.

Rocks ranging in age from Precambrian to upper Cretaceous outcrop within the area. The Precambrian formations are essentially the same as those represented in the adjacent Beaver Mines map-area, but with the addition of Waterton and Altyn strata occurring immediately above the Lewis thrust from Castle River to the west boundary of the area. On the extreme northwest shoulder of Barnaby Ridge are approximately 440 feet of strata ascribed to the undivided Waterton formation (1) and approximately 480 feet of undifferentiated Altyn formation (4). Both formations are considerably thicker in the southwest corner of the map-area. Above Haig Brook and Cate Creek fensters, approximately 1,500 feet of Waterton strata occur. On the northwest shoulder of Mount Haig the Altyn formation is approximately 1,300 feet thick. In this part of the map-area Altyn strata are divisible into an upper resistant unit (2) and a lower recessive unit (3). The gradational contact with Appekunny strata (5, 6, 7, 8) is mapped with difficulty on sheer mountain faces, as the beds above and below the contact are equally resistant. A composite section of the formation on the north ridge from Whistler Mountain and the north face of Barnaby Ridge, where the basal quartzites and argillites were measured, is approximately 2,100 feet thick. The overlying Grinnell formation (9), in gradational contact with Appekunny strata, is 630 feet thick in the vicinity of Whistler Mountain. It thins to 370 feet west-southwest of Syncline Mountain. Conformably overlying this is the Siyeh formation (10, 11, 12), 1,650 feet thick on a south-trending ridge about 2 miles east-southeast of Whistler Mountain. There a variably dolomitized cryptozoon bed 65 feet thick, lies 335 feet below the top of the formation. It has been mapped separately. The Purcell lava (13) at the same locality is 295 feet thick, a representative figure. The overlying Sheppard formation (14) is 440 feet thick on a ridge between Windsor Mountain and Mount Gladstone in the adjacent Beaver Mines map-area, but thins to less than half this figure along the southern boundary of the map. The resistant sandstones, siltstones, and argillites, forming a 100-foot unit (15) at the base of Member A of the Kintla formation, have been mapped separately. The remainder of Member A (16) Members B (17) and C (18) are 720, 510, and 460 feet thick respectively. Member D (19) occurs only along the south boundary on the walls of Castle River valley. Its thickness could not be determined in the map-area.

The grey sandstone member (20) of the Cambrian, marking the base of the Palaeozoic succession, is 85 feet thick on the ridge running north from Windsor Mountain. It rests with slight angular unconformity on Members C and D of the Kintla formation west of Castle River, near the south boundary of the map-area. Conformably overlying this, the Cambrian shale member (21) on Windsor Mountain, just beyond the eastern map boundary, is 288 feet thick. The overlying mottled dolomite member of the Cambrian as well as Devonian formations are not exposed in the area.

On the nose of the Turtle Mountain anticline, 52 feet of late Palaeozoic strata are exposed along Adanac strip mine road. Of this, 32 feet are attributed to the Mississippian, Etherington formation (25) and the remainder to the Rocky Mountain formation (26). Overlying this is a 27.7-foot unit of siltstone and sandstone bounded below by a chert and sandstone-pebble conglomerate. It may represent the Triassic Spray River formation in part.

Strata of the Fernie group (27) outcrop over a small part of the map-area. On Adanac strip mine road a composite, restored section is 776 feet thick. In gradational contact with the Fernie group is the Kootenay formation (28). At Adanac strip mine it is 258 feet thick, the lower contact being drawn at the base of thick-bedded to massive, grey weathering sandstone. Overlying the Kootenay with local conformity is the Blairmore group (29). No well exposed and complete sections of Blairmore strata occur in the map-area. On Willoughby Ridge the group is 1,800 feet thick by graphical methods. On lower Link Creek the Crowsnest formation (30) is 469 feet thick. Its base is drawn at the top of a 1.7-foot greenish grey, coarse-grained, chert and quartz sandstone marker bed. The basal chert-pebble conglomerate of the Blackstone formation is widespread in the area and forms a sharp lower contact; the upper contact is gradational. The Blackstone formation (31) is 283 feet thick on Link Creek due north of Cherry Hill. Farther downstream, just below the junction of George and Lynx Creeks, the Cardium formation (32) is 252 feet thick, the top being drawn at the top of a 13-foot light grey, resistant sandstone, overlain by black recessive shales of the Wapiabi (34). The latter formation is very poorly exposed and generally highly deformed. In the extreme northwest corner of the map-area, however, its thickness appears normal, being 1,900 feet by graphical calculation. Both the top and base of the overlying Belly River formation are known to occur only in the east central part of the area. There, by graphical method, the formation is of the order of 4,000 feet thick, with allowance for the highly faulted condition of the lower beds on Castle River and some possible deformation higher in the section.

South of Beaver Mines Lake and close to the Lewis thrust are 155 feet of brackish water sandstones and siltstones with coal. The upper limit is a fault contact with a slice of Crowsnest formation. An abundant shelly fauna would indicate that these beds may be a correlative of the basal member of the St. Mary River formation.

To date three wells have been completed in the map-area. One is the Kelly well, situated a short distance from the junction of the west and south branches of Castle River in sec. 16, tp. 5, rge. 3, W. 5th mer. It was abandoned at a depth of 1,500 feet in Belly River strata. Two others were drilled in Precambrian rocks on the West Castle River in sec. 8, tp. 4, rge. 3, and abandoned at depths of 1,700 and 3,000 feet respectively. Their exact sites are unknown. At present Shell Calalta Carbondale 6-12 in sec. 12, tp. 6, rge. 3, W. 5th mer. is drilling, its objective being the Palaeozoic rocks above the Mill Creek fault on the northward extension of the Waterton Park-Castle River gas field. No additional potential stripping sites for bituminous coal of the Kootenay formation were found beyond those already exploited on the west flank of the Turtle Mountain anticline.

MAP 5-1959
CARBONDALE RIVER
ALBERTA-BRITISH COLUMBIA
SHEET 82 G/8 (West Half)

5-1959

5-1959