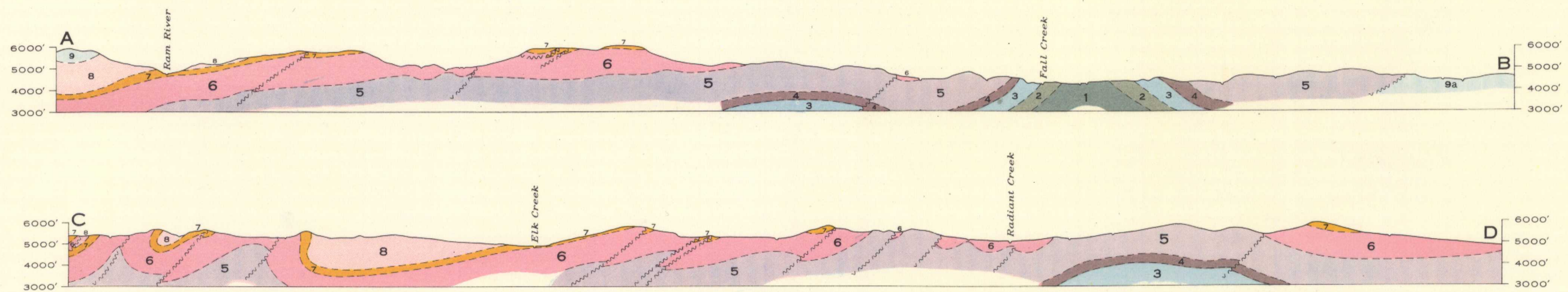


CANADA
DEPARTMENT OF MINES AND RESOURCES
MINES AND GEOLOGY BRANCH
BUREAU OF GEOLOGY AND TOPOGRAPHY



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

LEGEND

CRETACEOUS AND LATER
UPPER CRETACEOUS (Mainly)

- 9 BRAZEAU FORMATION: sandstone, shale, conglomerate; 9a, probably Paleocene
- 8 WAPIABI FORMATION: shale; minor sandstone and limestone
- 7 BIGHORN FORMATION: siliceous sandstone, sandy shale, conglomerate
- 6 BLACKSTONE FORMATION: shale, minor thin sandstone beds

LOWER CRETACEOUS

- 5 BLAIRMORE GROUP: sandstone, shale, conglomerate, coal seams

JURASSIC

- 4 FERNIE GROUP: platy and cherty limestone, dark phosphatic limestone, black fissile shale, carbonaceous shale, sandstone. May include Triassic limestone at base and some Lower Cretaceous (Nikanassin) sandstone at top

CARBONIFEROUS
MISSISSIPPIAN AND (?) PENNSYLVANIAN

- 3 RUNDLE FORMATION: light grey limestone, buff-weathering shaly limestone, dolomite

MISSISSIPPIAN

- 2 BANFF FORMATION: buff-weathering dark limestone, calcareous platy shale

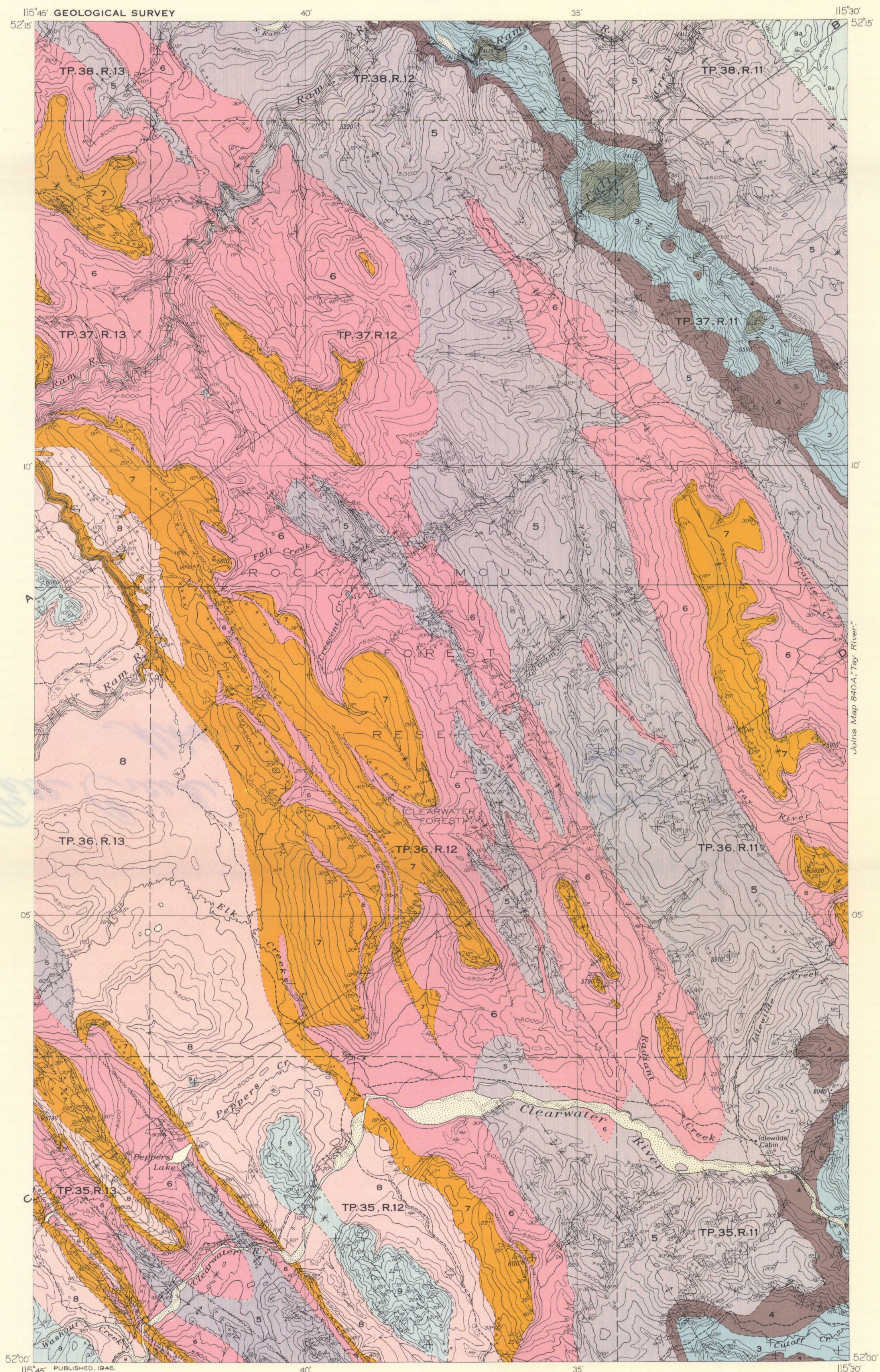
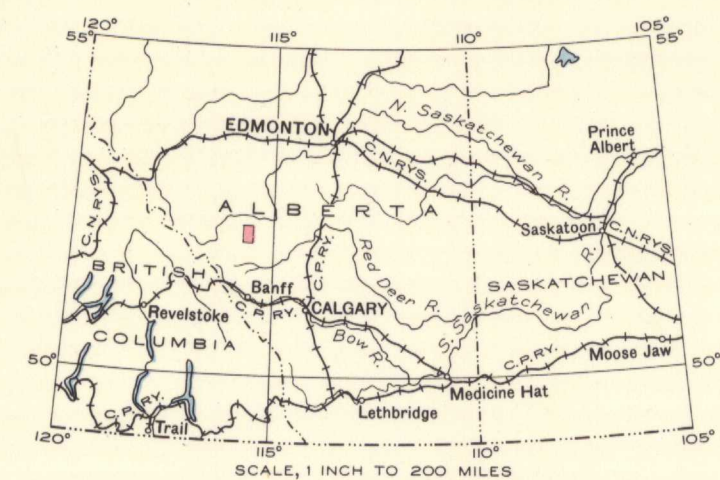
DEVONIAN

- 1 Dark limestone and dolomite

- Bedding (horizontal, inclined, vertical, overturned)
Rock outcrops (altitude of beds unknown)
Fault
Anticlinal axis
Synclinal axis
Trail and building
Township line (surveyed)
Township line (unsurveyed)
Intermittent stream
Falls
Marsh
Sand or gravel
Contours (interval 100 feet)
Height in feet above mean sea-level

Geology by J. F. Henderson, 1944.

Base map compiled by the Topographical Survey, 1941, from original surveys in 1940. Cartography by the Drafting and Reproducing Division, 1946.



MAP 883A
FALL CREEK
WEST OF FIFTH MERIDIAN
ALBERTA

Scale, 63360 or 1 Inch to 1 Mile
Miles
Approximate magnetic declination, 25°30' East.

DESCRIPTIVE NOTES

The map-area has a maximum relief of about 2,000 feet, ranging from 4,500 to 6,500 feet above sea-level. The topography is controlled by the structure and character of the bedrock formations. Thus the highest range of hills, extending across the northeastern part of the area, is formed of resistant Palaeozoic limestones outcropping in the core of an anticlinal structure. Southwest of this range, in the area underlain by Mesozoic sandstones and shales, the relief is effected to a large extent by the thin, but resistant Bighorn sandstone formation, which caps the higher hills to form mesa-like topography where the beds are gently inclined, or conspicuous ridges or hogbacks where they dip steeply.

Devonian strata (1) are exposed in the northeastern part of the map-area, in the valley of Fall Creek. They consist mainly of thick-bedded, massive, dark blue-grey limestone.

The Banff formation (2) of lower Mississippian age is composed of buff weathering, platy, dark grey limestone, shaly limestone, and calcareous shale, with occasional thick beds of light weathering, blue-grey limestone. It is estimated to be 600 to 650 feet thick.

The Rundle formation (3) is at least mainly of Mississippian age. It is exposed along the crest of three major anticlines, and forms the highest hills in the area. The formation may be divided into three lithologic units, consisting, from the base upward, of about 200 feet of massive, thickly bedded, white weathering, light grey, crystalline, crinoidal limestone, succeeded by 150 feet or more of thinly bedded, buff to grey weathering, shaly limestone, which is overlain by about 350 feet of white weathering, massively bedded limestone and dolomite somewhat similar to that at the base of the formation.

A pinkish weathering, very hard, fine-grained quartzite, 20 to 30 feet thick, outcrops between the Rundle and Fernie formations 2,000 feet northwest of Cutoff Creek, on the southwest flank of an anticline. It was not observed at any other place in the area, and probably represents the Pennsylvanian, Rocky Mountain formation.

The Fernie group (4) is divisible into two lithologic units. The lower unit consists of 125 to 150 feet of thin-bedded, fine-grained, platy, dark grey limestone with much interbedded chert. The beds weather buff to purplish grey, with a hackly surface, and generally form conspicuous cliffs and dip slopes. A bed of dark, phosphatic limestone at or near the top contains fossils identified tentatively as of Lower Jurassic age. No fossils have been found in the lower part of the limestone and some of it may be of Triassic age. The upper unit of the Fernie group consists of 200 to 250 feet of black shale and sandstone. Much of the shale contains interbeds of crumbly, rusty weathering sandstone, 1 to 2 inches thick. The shale and interbedded sandstone grade upward into 50 feet or more of buff to brown weathering, thickly bedded, medium-grained sandstone, which is overlain by a conglomerate that marks the base of the Blairmore group. The sandstone underlying the Blairmore conglomerate has been mapped with the Fernie formation, but may be in part of Lower Cretaceous (Nikanassin) age.

The base of the non-marine Blairmore group (5) is marked by a pebble-conglomerate 35 to 45 feet thick that is mapped as the Cadomin formation in areas to the north and northwest. This conglomerate is resistant to weathering, and generally forms prominent ridges. The well-rounded pebbles average 1 to 2 inches in diameter, and are made up of white and grey quartzite and pink, grey, and black chert. The matrix is a medium- to rather coarse-grained, hard, quartzitic sandstone, and the conglomerate contains many lenses of this sandstone among the pebble layers. The basal conglomerate is overlain by coarse-grained, quartzitic sandstone, crossbedded, dark brown sandstones, and brown to black, carbonaceous shale. Conglomerates are interbedded with the sandstones, but unlike the basal conglomerate are not continuous throughout the area. Coal seams occur some 650 to 750 feet above the basal conglomerate. The upper part of the Blairmore group consists of medium- to coarse-grained, grey to buff weathering, massive, crossbedded sandstones; olive-green, crumbly shales; and, near the top, maroon weathering, thinly bedded, platy, crossbedded sandstones. Pebble-conglomerate marks the contact of the Blairmore with the overlying Blackstone formation. It is, apparently, continuous throughout the area, and ranges in thickness from more than 22 feet, as on Fall Creek, 2½ miles above its junction with Gloomy Creek, to less than 2 feet, as on Ram River, 3 miles west of its junction with North Ram River. The conglomerate consists of well-rounded quartzite and chert pebbles averaging an inch or more in diameter, but in places as much as 6 inches. It resembles the basal Blairmore (Cadomin) conglomerate, but the pebbles are in general somewhat smaller and less firmly cemented in a finer grained, quartz sandstone matrix. The conglomerate is a resistant member, forms many outcrops, and is most useful in tracing the Blairmore-Blackstone contact.

The marine Blackstone formation (6) consists mainly of black, fissile shales, dark grey, sandy shales, and some thin beds of fine-grained sandstone. The shales are soft, and weather readily in contrast with the hard, resistant sandstone member of the overlying Bighorn formation. The upper 1,000 feet of the Blackstone is exposed in the canyon of Ram River, and the total thickness of the formation is estimated to be between 1,200 and 1,300 feet.

The marine Bighorn formation (7) may be divided into three members: a lower member consisting of 80 to 90 feet of siliceous sandstone and conglomerate; an intermediate member composed of 190 to 205 feet of sandy shales; and an upper member, 20 to 30 feet thick, of siliceous sandstone similar to some of the lower sandstone. The conglomerate interbedded with the lower sandstone consists of rounded, white, grey, and black quartzite and chert pebbles up to 1½ inches in diameter. It increases in amount in the southwestern part of the area, and is inconspicuous or absent to the northeast. The lower, and to a lesser degree the upper, sandstone members are hard, resistant rocks that cap or form many of the higher hills and ridges.

The Wapiabi formation (8) consists of black marine shale, sandy shale, and occasional thin beds of buff weathering limestone. The contact with the underlying Bighorn sandstone is marked by a thin layer of small, highly polished chert pebbles. The contact with the overlying Brazeau formation is transitional, the uppermost 100 feet or so of shales becoming more and more sandy to where a massive, greenish grey sandstone bed is reached that marks the base of the succeeding formation. No complete section of Wapiabi strata is exposed, but based on outcrops along Clearwater River, the thickness is estimated to be about 1,500 feet.

Non-marine sandstones and conglomerates of the Brazeau formation (9) lie within two large synclines in the northwestern part of the area, where they cap high, plateau-like hills below which the soft Wapiabi shales form steep slopes. The sandstones weather buff to maroon; are conspicuously crossbedded; and are of medium to rather coarse grain, and arkosic in composition. Beds and lenses of chert pebble-conglomerate, with pebbles averaging ½ inch in diameter but as large as 2 inches, are abundant, and many of the sandstone beds contain scattered pebbles.

Light grey, yellowish weathering, thick-bedded, poorly consolidated sandstones (9a) of probable Paleocene age underlie the northeastern corner of the map-area. Exposures are poor within the area, but are excellent along Ram River 1½ miles to the north, where they contain coal seams.

A major thrust fault passes through the northeastern part of the map-area along the contact between lower Blairmore and probable Paleocene formations. The fault is well exposed on Ram River, 1½ miles northwest of the area, and appears to have a shallowly southwesterly dip. Most of the area southwest of this fault may be considered as part of one large thrust block within which the strata are folded and broken by many subsidiary faults.

An anticline in the northeastern part of the area extends southeast from the falls on Ram River. It is a nearly symmetrical structure with a Palaeozoic limestone core and average dips of 45 to 55 degrees on the southwest and northeast limbs (See structure-section A-B). Northeast from Fall Creek to the northern boundary of the area the plunge of the structure is northward. Southeast from Fall Creek the northwesterly plunge decreases to horizontal or nearly so, as evidenced by several exposures of the Rundle-Fernie contact along the crest of the structure at about the same elevation. Farther southeast, near Prairie Creek in the adjoining Tay River area, the structure plunges to the southeast.

Another large anticlinal structure extends northwesterly across the central part of the map-area. The Palaeozoic limestone core is exposed near the southeastern border of the area, but plunges beneath Mesozoic sandstones and shales to the northwest. In the Palaeozoic limestones the structure consists of two well-defined anticlines, the larger of which lies northeast and the other southwest of Clearwater River. The former is the northwesterly continuation of the Idlewild anticline, and on Idlewild Mountain, 1 mile east of the map-area, the Devonian limestone core is exposed. As the plunge is northwest the Devonian and overlying Banff and Rundle formations disappear beneath Fernie and Blairmore strata near the southeast corner of the area. This anticline may be traced for about 2 miles northwest of the headwaters of Idlewild Creek, where it divides in Blairmore strata into a number of smaller folds, but the structure persists, although becoming less pronounced, to the northern boundary of the map-area, crossing Ram River about a mile southwest of its junction with the North Ram. The smaller anticline, although well defined where the Palaeozoic core is exposed south of Cutoff Creek, is difficult to trace to the northwest, where it is expressed in the overlying Blairmore and Blackstone formations as a series of closely spaced folds and minor thrust faults. Both anticlinal folds plunge northwest, but the plunge decreases to horizontal or nearly so in the central part of the map-area where outcrops of the uppermost Blairmore conglomerate appear at about the same elevation along the crest of the structure, as: between Tay River and Gloomy Creek at elevations of 5,200 to 5,300 feet; on the 5,300-foot hill northwest of the junction of Gloomy and Fall Creeks; and on the hills 5,300 feet high traversed by the trail in the north-central part of tp. 37, rg. 12. For this distance of about 6 miles the crest of the structure must be essentially horizontal. Farther northwest the northwesterly plunge is resumed. A thrust fault extends along the Blairmore-Blackstone contact on the northeast flank of the structure; the displacement along it is small, but increases to the southeast.

A third anticlinal structure crosses the southwestern part of the area and is flanked to the northeast and southwest by synclines of Wapiabi and Brazeau formations. The structure consists of two sharp anticlines with exposed cores of Blairmore sandstone, and an intervening syncline floored by Bighorn and Wapiabi beds. The northeastern flanks of both folds are overturned and faulted. The small part of the structure in the map-area plunges northwest, and the Blairmore sandstones exposed along the crest disappear to the northeast beneath Blackstone, Bighorn, and Wapiabi formations.

Two thick bituminous coal seams outcrop in Blairmore strata on the north bank of Ram River, 1½ miles southwest of its junction with the North Ram. The lower seam is 6 feet 2 inches thick, and the upper one more than 7 feet thick with the top not exposed. The two seams are separated by about 80 feet of sandstone. They strike northwest and dip 8 to 12 degrees southwest. Coal seams were observed at several other places, but are not thick enough to be commercial. The coal is in Blairmore strata mapped as the Luscar formation in areas to the north and northwest.

NOT TO BE TAKEN FROM LIBRARY
NE PAS SORTIR DE LA BIBLIOTHEQUE

883A