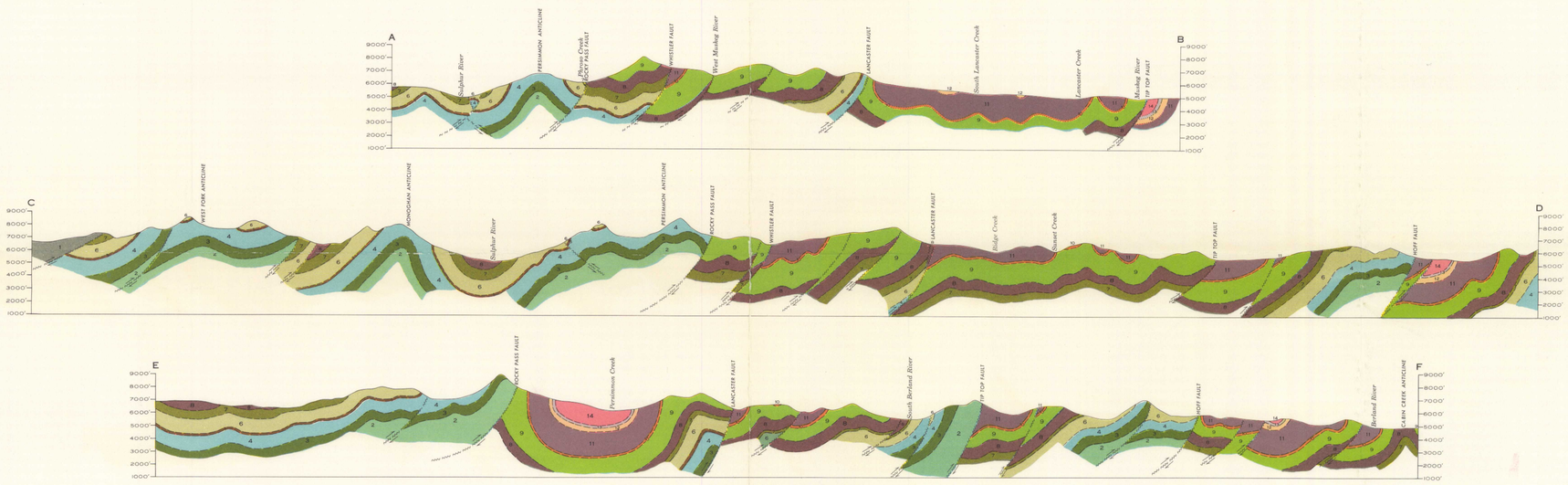
GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS



Sections along lines A-B, C-D and E-F

SHEET 83 E/10

LEGEND

CRETACEOUS

UPPER CRETACEOUS

17 | 17A — *BRAZEAU FORMATION:* sandstone, shale, conglomerate; minor coal seams and ash beds (non-marine)
17A. *Solomon Sandstone Member at base of Brazeau Formation (marine)*

16 — *WAPIABI FORMATION:* shale, sandy shale (marine)

15 — *CARDIUM (BIGHORN) FORMATION:* sandstone, sandy shale, shale (marine and non-marine)

14 — *BLACKSTONE FORMATION:* shale, sandy shale, ironstone bands (marine)

13 — *DUNVEGAN FORMATION:* sandstone, sandy shale (marine and non-marine)

LOWER CRETACEOUS

12 — *"FORT ST. JOHN" GROUP:* shale, sandy shale, ironstone bands (marine)

11 — *LUSCAR FORMATION:* sandstone, argillaceous sandstone, shale, carbonaceous shale, fine conglomerate, coal (non-marine)

10 — *CADOMIN FORMATION:* massive conglomerate; minor sandstone (non-marine)

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

9 — *NIKANASSIN FORMATION:* sandstone, shale, carbonaceous shale (marine and non-marine)

JURASSIC

FERNIE GROUP

8 — *Shale, silty shale, siltstone; minor sandstone and limestone (marine)*

TRIASSIC

7 — *WHITEHORSE FORMATION:* limestone, dolomite, argillaceous and arenaceous limestone and dolomite (marine)

6 — *Calcareous shale, silty shale, siltstone, arenaceous dolomite, sandstone (marine)*

MESOZOIC

PENNSYLVANIAN (?), PERMIAN (?)

ROCKY MOUNTAIN FORMATION (?): quartzite and calcareous sandstone, chert, phosphatic conglomerate (marine)

MISSISSIPPIAN

RUNDLE GROUP

4 — *Limestone and dolomite (marine)*

3 — *BANFF FORMATION:* calcareous shale, argillaceous limestone (marine). Includes at the base shale and limestone, probably equivalent to the Exshaw Formation

DEVONIAN

2 — *Limestone, dolomite, calcareous shale (marine)*

CAMBRIAN (?)

1 — *Sandstone, feldspathic sandstone, conglomerate (marine)*

PALÆOZOIC

Small rock outcrop (not shown in the mountain zone)
Bedding (horizontal, inclined, vertical, overturned)
Fault (position defined, position approximate, arrow shows direction of dip)
Fault (presence and position assumed)
Anticline (approximate)
Syncline (approximate)
Coal outcrop — Coal
Fossil locality

Geology by E. J. W. Irish, 1958 and J. K. Eccles 1954, 1955
Descriptive notes by E. J. W. Irish

Cartography by the Geological Survey of Canada, 1963

Trail
Building
Horizontal control point, with elevation — 8428 ▲
Township or range boundary (unsurveyed)
Stream, intermittent or dry
Lake, intermittent
Marsh or swamp
Contours (interval 100 feet)
Depression contour
Height in feet above mean sea-level — 7330

Base-map prepared by the Surveys and Mapping Branch

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

Approximate magnetic declination, 25° 20' East, decreasing 3.7' annually

INDEX MAP

DESCRIPTIVE NOTES

Most of the area is characterized by ridges and valleys that parallel the northwesterly structural trend. The nature of the topography has been controlled by the folds and faults and, to a large degree, by the different resistance to erosion offered by the various bedrock formations. Timber-line is between 6,000 and 6,500 feet above sea-level and all ridges below this altitude are tree covered, except where the timber has been burned or the soil is too thin for trees to grow. The maximum relief is about 5,000 feet.

The map-area is underlain by a succession of marine and non-marine sedimentary strata ranging in age from Cambrian (?) to Upper Cretaceous. These strata have been folded along northwesterly trending axes and displaced by longitudinal thrust faults. As a result the formations outcrop, in general, as long, relatively narrow, northwesterly trending bands and tongues.

Formation 1 is thought to be the oldest exposed within the map-area. These strata, consisting of more than 1,500 feet of quartzite and conglomerate, occur in the extreme southwestern corner of the area where they have been thrust northeastward over Triassic limestones. No fossils were found but the geographic position of these strata relative to probable Cambrian strata to the southeast suggests that they also may be of that age.

Devonian (2) rocks are exposed along the southeastern half of the Tip Top and Rocky Pass faults, and also, are exposed as windows where Sulphur River and several creeks have cut through the Monoghan anticline. These strata have not been subdivided and their maximum exposed thickness is about 1,660 feet. The oldest Devonian strata consist of dark grey to black, thin-bedded shale and argillaceous limestone. These beds are overlain by dark grey to black, thin- to medium-bedded limestone and dolomite which, in turn, is overlain by dark grey to black, light- to medium-grey-weathering, thick-bedded to massive limestone and dolomite.

The Banff Formation (3) has a similar distribution to that of the Devonian beds. Measured thicknesses range between 470 and 580 feet; this range is mainly due to the diachronic nature of the contact with the overlying Rundle Group. To the west, in exposures along the Rocky Pass fault and the Monoghan anticline, 60 to 80 feet of dark grey to black, buff-weathering shale occurs between typical Banff strata and the underlying massive Devonian beds. This shale may be equivalent in age to the Exshaw Formation. Wherever the shale is exposed the contact between it and the underlying massive dolomite is abrupt. The upper contact is transitional into the overlying Banff Formation due to the intercalation of thin limestone beds, and for this reason, the shale has been included with the Banff Formation.

The Rundle Group (4) lies conformably above the Banff beds, the contact being placed at the base of the lowest thick, dark grey to black limestone bed. The formation is between 600 and 700 feet thick where it is exposed along the Hoff and Tip Top faults and more than 1,200 feet thick where it is exposed along the Monoghan and Persimmon anticlines. The lower 200 feet of the formation is thick-bedded to massive and, at some localities, both the lower and upper parts are composed of thicker beds than the middle part. The strata consist essentially of limestone and dolomite. Some beds are porous to vuggy and veinlets of white carbonate are common along joint planes. Light to dark grey chert is abundant toward the top of the formation.

The Rocky Mountain Formation (?) (5) lies with apparent conformity on the Rundle Group. It was seen wherever the top of the Rundle is exposed west and southwest of the Rocky Pass fault. East of this fault, the formation is absent or only present as small remnants. Where present, the total thickness of the formation ranges from about 50 feet in the northeast to more than 80 feet in the southwest. Between 50 and 60 feet below the top of the formation is a lenticular, dark grey conglomerate up to 2 feet thick composed of pebbles and grains of quartz and chert with phosphate nodules.

Beds of Triassic age disconformably overlie the Rundle Group in the east and the Rocky Mountain Formation (?) in the west. The lower part (6) consists of shale and silty shale grading upward into sandstone and dolomitic sandstone. This unit ranges in thickness from about 900 feet on the Cabin Creek anticline to about 1,000 feet on the Monoghan and Persimmon anticlines to the southwest. Beds between 50 and 200 feet above the base yielded a Lower Triassic fauna. It grades upward into sandy dolomite, dolomite, limestone, shaly limestone and calcareous shale of the Whitehorse Formation (7) which is between 80 and 100 feet thick in the northeastern part of the map-area and at least 1,000 feet thick in the southwestern part. Fossils of Middle Triassic (Anisian) age were found in the lower beds of this unit. Its thickness and lithology is comparable to the section farther northwest where beds in the upper part yielded an Upper Triassic fauna. In the southwestern corner of the map-area the unit contains a considerable thickness of red- and ochre-coloured shales. These represent the northwestern limit of the varicoloured shales associated with the gysum deposit near Mowitch Creek south of this map-area.

The Whitehorse Formation is overlain disconformably by strata of the Jurassic Fernie Group (8) which consist predominantly of shale. The upper contact with the overlying Nikanassin Formation is transitional due to an increase upward in the number and thickness of intercalated sandstone beds. The contact has been placed, for purposes of mapping, at the base of the lowest bed of sandstone more that 10 feet thick. The Fernie Group is represented by 600 to 900 feet of strata.

The lower part of the Nikanassin Formation (9) consists mainly of thick-bedded quartzitic sandstone with thin beds of grey shale. In the upper part the strata are thinner and more shaly with carbonaceous shale and some thin, coaly beds present at some localities. This formation thickens markedly from east to west, the thickness ranging from about 1,000 feet near the Cabin Creek anticline to well over 2,000 feet above the Whistler fault. Most of the formation is considered to be of Lower Cretaceous age but the marine lower beds are probably Jurassic.

The Cadomin Formation (10) is a distinctive conglomerate overlying the Nikanassin beds and forms conspicuous outcrops throughout the map-area. It consists mainly of a hard, closely packed and well-cemented conglomerate of black, grey, green and red chert and white quartzite pebbles in a matrix of quartzitic sandstone. The pebbles are well rounded and range from ¼ inch to 5 inches in diameter. Locally beds and lenses of sandstone occur within the conglomerate. The thickness ranges between 30 and 100 feet.

The Luscar Formation (11), lying conformably above the Cadomin conglomerate, consists of fine- to medium-grained, grey to grey-brown sandstones interbedded with dark grey to greenish grey and black shales. Coal seams from 6 inches to 6 feet thick are present below the uppermost 250 feet of sandstone. Nowhere within the map-area are Luscar strata well exposed so the thickness could not be determined. In adjacent areas the formation is about 2,000 feet thick.

The Luscar Formation is conformably overlain by shales of the 'Fort St. John' Group (12). These shales are not well exposed within the map-area and the few outcrops seen were so highly sheared and contorted that no measurement of thickness could be made. In Moon Creek map-area to the east, the 'Fort St. John' is about 400 feet thick and there is no reason to suppose that it is much different in the Adams Lookout map-area. The two best exposures occur on Persimmon Creek and below the Lancaster fault between Muskeg and South Muskeg rivers.

The 'Fort St. John' Group is transitional upward into the Dunvegan Formation (13) which consists of a basal 80 feet thick-bedded, quartzitic sandstone overlain by about 190 feet of dark grey, silty shale and thin-bedded, poorly cemented sandstone which, in turn is overlain by about 100 feet of medium- to thick-bedded quartzitic sandstone. The formation is about 380 feet thick on Berland River near its confluence with Adams Creek.

The Blackstone (14), Cardium (Bighorn) (15), and Wapiabi (16) Formations occur only in the northeastern half of the map-area. They are poorly exposed and the shales are, in most places, contorted. In Moon Creek map-area to the east, thicknesses of about 1,800 feet, 240 feet, and 1,500 feet respectively were measured.

Overlying the Wapiabi is the Brazeau Formation (17) of late Upper Cretaceous age. The Solomon Sandstone Member (17A) at the base is an excellent horizon marker, consisting of 100 feet of distinctive, slabby, buff-weathering, grey to greenish grey, hard sandstone. This member is of marine origin. The typical pebble-conglomerate of the formation is separated from the Solomon Member by about 100 feet of soft, coarse-grained, greenish grey sandstone and sandy shale. Above the conglomerate the formation consists of more than 1,000 feet of interbedded sandstone and shale.

The dominant structural features of the map-area are northwesterly trending folds and strike thrust faults. Deformation has resulted in considerably more crumpling of the Mesozoic formations than the more competent Palæozoic strata, and is particularly evident immediately to the northeast of the larger overthrust faults. Major anticlines are well developed; two of these, the Persimmon and Monoghan folds, plunge to the northwest. The area of Mississippian rocks in the Cabin Creek anticline represents a culmination in this structure as younger Mesozoic strata appear along strike in both directions. In most cases major synclines are more complex and have been more disturbed by faulting than the anticlines. Although there appears to be no large thrust along the northeast limb of the Monoghan anticline within this map-area, the Fernie shales, which underlie part of the valley of Sulphur River and Rock Creek, are intensely sheared and contorted. The major faults are southwesterly dipping, northwesterly trending thrusts. The straightness of most of these indicates that the dip of the fault surfaces is fairly steep at the present erosion surface.

The coal-bearing Luscar Formation is poorly exposed and, although coaly debris was seen at a few places, actual seams were observed at only two places. Two seams, each at least 6 feet thick, occur on the high ridge between Muskeg River and South Muskeg River. These are separated by about 200 feet of beds but their stratigraphic position within the formation could not be ascertained. On Thoreau Creek Pass, 45 feet of beds contain two 3-foot coal seams separated by interbedded shales and 1-inch coal seams.

No oil or gas wells have been drilled in the map-area. Southwest of the Rocky Pass fault potential producing horizons are exposed in the surface structures. North of the Rocky Pass fault possible oil or gas structures may be present although surface structures appear to be underlain by thrust faults.

Samples of the conglomerate in the Rocky Mountain Formation (?) were taken at several localities and all show the presence of phosphate.

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MAP 1104A

GEOLOGY

ADAMS LOOKOUT

WEST OF SIXTH MERIDIAN

ALBERTA

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

Miles 1 ½ 0 1 2 3