

Structure sections along lines A-B, C-D, E-F, G-H and I-J.

SHEET 83 ^E/₁₅

GEOLOGICAL SERIES

- LEGEND**
- CRETACEOUS**
- UPPER CRETACEOUS**
- 13 BRAZEAU FORMATION: sandstone, shale, pebble-conglomerate; probably includes some undifferentiated Paleocene beds. 13A, Solomon sandstone member at base of Brazeau formation
 - 12 WAPIABI FORMATION: shale and sandy shale
 - 11 BIGHORN FORMATION: quartzitic sandstone, pebble-conglomerate, sandy shale, shale
 - 10 BLACKSTONE FORMATION: shale, silty shale
 - 9 DUNVEGAN FORMATION: sandstone, siltstone, silty shale
- LOWER CRETACEOUS**
- 8 FORT ST. JOHN GROUP: shale, silty shale
 - 7 LUSCAR AND (?) MOUNTAIN PARK FORMATIONS: sandstone, shale, conglomerate, coal
 - 6 CADOMIN FORMATION: conglomerate
 - 5 NIKANASSIN FORMATION: quartzitic sandstone, shale, thin coaly beds
- JURASSIC**
- 4 FERNIE GROUP: shale, quartzitic sandstone
- TRIASSIC**
- 3 WHITEHORSE FORMATION: limestone, dolomite; some sandy limestone and dolomite
 - 2 Quartzitic siltstone and sandstone
- CARBONIFEROUS**
- MISSISSIPPIAN**
- 1 RUNDLE FORMATION: dolomite, limestone

- Small rock outcrop, area of outcrop
 Bedding (horizontal, inclined, vertical, overturned)
 Fault (position defined, position approximate)
 Fault (position and (or) occurrence assumed)
 Anticline axis
 Synclinal axis
 Well drilled in search of oil (abandoned)
 Coal outcrop
 Fossil locality

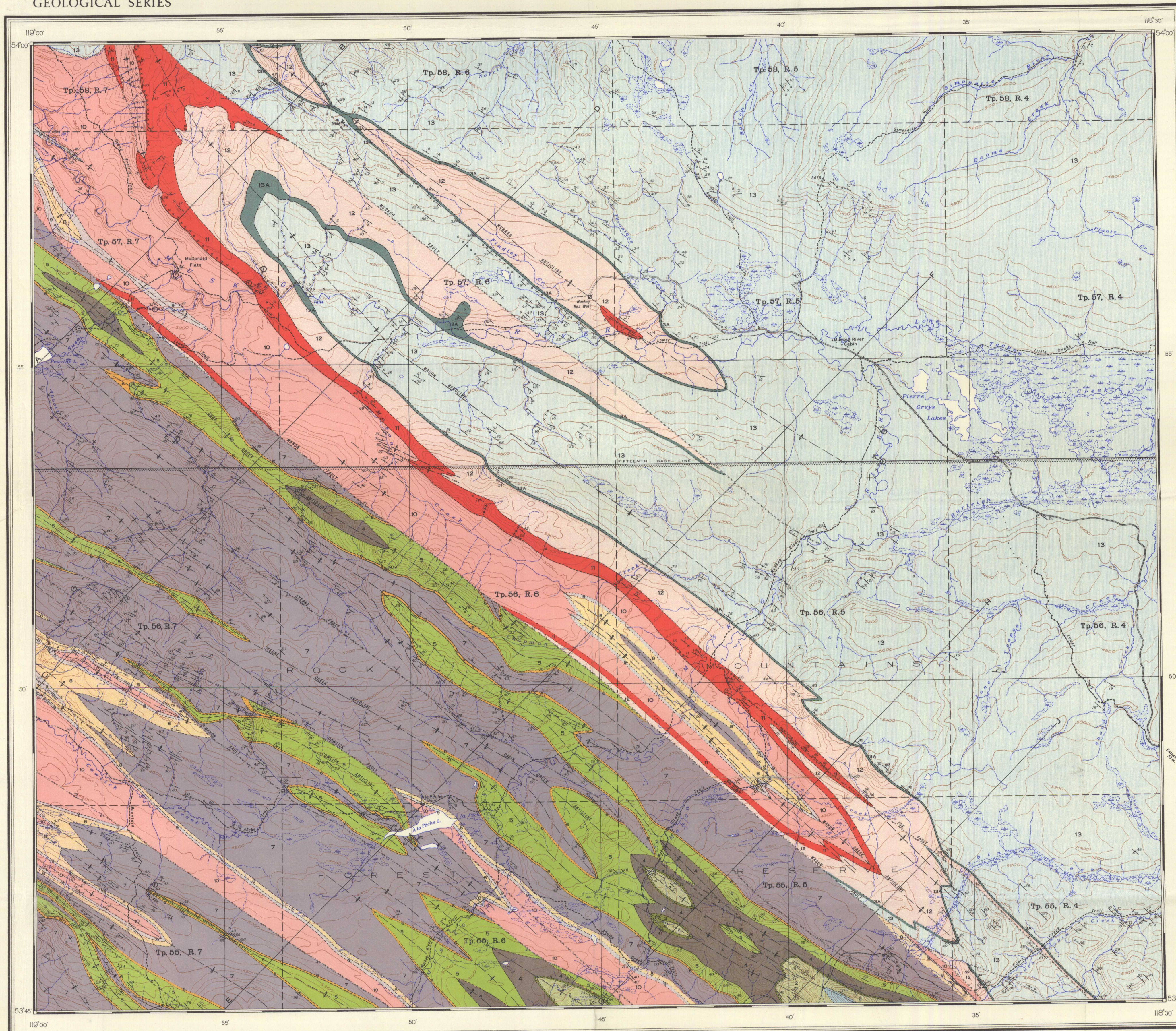
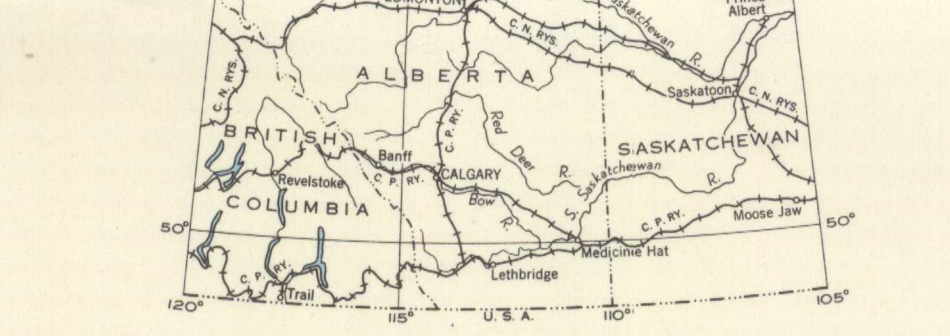
Geology by A.H. Lang and E.J.W. Irish, 1947, 1948
 Descriptive notes by E.J.W. Irish

Cartography by the Geological Mapping Division, 1950

- Road
 Bush road or trail
 Building
 Cemetery
 Telephone line (along trail, along road)
 Forest Reserve boundary
 Township boundary (surveyed, unsurveyed)
 Triangulation station
 Intermittent stream
 Marsh or swamp
 Sand or gravel
 Contour (Interval 100 feet)
 Height in feet above mean sea-level

Base map surveyed by the Topographical Survey in 1943, 1945 and 1946. Compiled by the Topographical Survey, in 1947 from air photographs taken in 1943

Approximate magnetic declination, 26° 20' East



DESCRIPTIVE NOTES

Nearly two-thirds of the map-area is characterized by northwesterly trending ridges and valleys. This alignment becomes less noticeable northward toward the Plains, where the high, elongated ridges give way to low, irregularly shaped hills separated by wide swampy valleys. Timber-line is about 6,000 feet above sea-level, and the few peaks rising above this elevation are bare on top. Most of the ridges, however, are completely forested, except where the timber has been burned. Both elevation and relief increase toward the mountains, and the maximum relief for the area is about 3,400 feet.

Two pre-Glacial east-trending valleys are notable physiographic features, and are for the most part underlain by reworked glacial material and flanked by gravel terraces. The more northerly of these now contains Pierre Grey's Lakes, Peavine Lake, and the westward-flowing part of Muskeg River, and the more southerly valley contains Cowick Creek and A la Pache Lake.

The map-area is underlain by a succession of marine and non-marine strata ranging in age from Mississippian to, probably, Paleocene. The strata have been deformed by folding along northwesterly trending axes and by thrust faults that parallel the axes of the folds. As a result, the formations are, in general, exposed as long, relatively narrow, northwest-trending bands and tongues.

The RUNDLE formation (1) of Mississippian age is the oldest exposed in the area. It is represented by 90 feet of thick-bedded to massive, grey, light grey weathering dolomite and limestone, on the nose of an anticline near the middle, and just within the south boundary, of the map-area.

The main part of the Triassic section (2) overlies the Rundle formation discontinuously. It consists of about 1,000 feet of quartzitic, grey, red-brown weathering siltstones and sandstones, which become calcareous toward the top of the section. These strata outcrop only in the south-central part of the map-area. No determinable fossils have been found in them, and their exact age is not known.

The WHITEHORSE formation (3) conformably overlies the arenaceous beds of the Triassic, and its distribution is identical with the underlying siltstones and sandstones. It consists of 110 feet of grey to white, cream and light grey weathering limestone and dolomite, some of which is sandy. Fossils obtained from this formation indicate a Middle Triassic age.

The FERNIE group (4) overlies the Whitehorse formation, apparently conformably. Rocks of the group underlie small areas at the core and on the noses of anticline folds in the south and west-central parts of the map-area. The lower part of the group consists mainly of black, fissile shale and silty shale, with, near the base, some beds of extremely hard, brittle, cherty rock. Concretionary, yellow weathering ironstone bands are common in this part of the group. Grey, quartzitic sandstone beds become progressively more numerous. At the top, where the Fernie passes gradually into the overlying Nikanassin formation, the quartzitic sandstone becomes the predominant rock type. Fossils collected from the Fernie in Pierre Grey's Lakes area indicate a Jurassic age.

The NIKANASSIN formation (5) outcrops only in the southwestern half of the map-area, as long, narrow, irregular bands and patches exposed by erosion of anticline ridges. These strata, with the exception of some beds of quartzitic sandstone at the base of the formation, may be of marine origin, and consist mainly of non-marine, grey and grey-brown, quartzitic sandstones that weather grey and black shale, and thin coaly beds. Because the Fernie is gradational upward into the Nikanassin, an arbitrary division to facilitate field mapping has been assumed at the base of the first sandstone bed with a thickness of 20 feet or more. An approximate thickness of 900 feet was obtained for the formation in this area by graphical measurement on Structure-section A-B.

The CADOMIN formation (6), stratigraphically above the Nikanassin, forms a long, narrow, sinuous band on either flank of most of the larger anticline folds, and may extend around one or both ends of these structures. The formation outcrops boldly, and for this reason is an excellent horizon marker. It is generally between 30 and 100 feet thick, and is a hard, closely packed, and well-cemented conglomerate, consisting of well-rounded pebbles of chert and quartzite ranging in diameter from 1/2 inch to 5 inches.

LUSCAR and (?) MOUNTAIN PARK formations (7) underlie the greater part of the southwestern half of the map-area, and have a combined thickness of about 2,000 feet. The upper part of the section, which may represent the Mountain Park formation, consists of between 300 and 350 feet of fine, medium, and coarse-grained, grey and greenish grey, thick-bedded sandstones, with minor amounts of interbedded shale. Below these strata are typical Luscar beds consisting of non-marine and brackish-water sandstone, shale, and coal. They contain abundant plant remains, but well-preserved material is difficult to obtain.

The stratigraphic interval between the Luscar or Mountain Park formations and the basal Upper Cretaceous Dunvegan formation is occupied by about 400 feet of dark grey to black shale and silty shale (8). No fossils were found in these beds, but their stratigraphic position and lithology suggest that they are equivalent to part of the Fort St. John group of the Peace River district. The shale is exposed as long, narrow bands in the southwestern half of the map-area.

The DUNVEGAN formation (9) of Upper Cretaceous age conformably overlies the Fort St. John group. The formation is about 350 to 500 feet thick, and consists of hard, fine- to medium-grained, grey sandstone and siltstone, and dark grey to black silty shale. It contains marine and brackish-water fossils.

The BLACKSTONE formation (10), comprising about 1,800 feet of black, marine shale, overlies the Dunvegan. Large areas underlain by these shales occur as northwesterly trending bands in the central and southwestern parts of the map-area. Blackstone strata are poorly exposed except in the canyon of Muskeg River between the mouth of Susta Creek and the northwest corner of the area. In most places the shales are extremely contorted, but on Susta Creek the exposures, though not continuous, indicate relatively little repetition.

The BIGHORN formation (11) overlies the Blackstone conformably. It outcrops in the central part of the map-area as relatively narrow bands along the southwest limb and around the northwest nose of a wide syncline and, farther southwest, on both limbs and the southeast nose of a composite anticline structure. The formation consists of bands of hard, grey, quartzitic sandstone, with some fine chert-pebble conglomerate separated by silty sandstone, silty shale, and shale. The strata are best exposed where they are cut by Muskeg River just east of its confluence with Susta Creek. There the formation is about 580 feet thick.

The WAPIABI marine shale formation (12) overlies the Bighorn strata conformably. Like the Blackstone shales, the Wapiabi beds are very poorly exposed. They underlie the centre of the Muskeg anticline areas on both sides, and around the northwest nose, of the large syncline west of the Muskeg structure; and a wide area around the southeast nose of the composite anticline structure west of the syncline. The best exposures occur along the lower part of Veronique Creek and along Muskeg River about half a mile above the mouth of Veronique Creek. The thickness of the formation is assumed to be about 1,500 feet, which is the stratigraphic interval between the Bighorn and Brazeau formations as scaled from Structure-section C-D.

Overlying the Wapiabi conformably is the BRAZEAU formation (13) of late Upper Cretaceous age. The Solomon sandstone member (13A) at its base is an excellent horizon marker, consisting of 80 to 100 feet of distinctive, hard, grey to greenish, shaly, buff weathering sandstone, most of it of all of which is of marine origin. Above the Solomon member is a transition zone of about 100 feet consisting of coarse, grey and green, soft sandstone and silty shale. These strata are, in turn, overlain by about 500 to 600 feet of conglomeratic and pebbly sandstone, which is typical of the lower part of the Brazeau. The remainder of the formation above the pebble bed and conglomerate zone consists of about 5,000 feet of interbedded sandstone and shale, with minor amounts of interbedded conglomerate and thin coal seams.

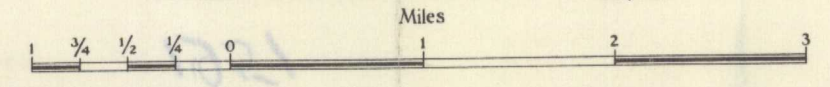
The Brazeau beds underlie the greater part of the northeastern half of the map-area, but in the northeast corner probably include undifferentiated Paleocene beds.

Muskeg No. 1, a test well, was drilled on the Muskeg anticline in sec. 24, T. 57, R. 6, W. 8th mer., commencing in Wapiabi shale and ending in the Banff formation at a depth of 10,709 feet. A little gas but no oil was obtained, and the hole was abandoned in 1948, but the failure of this one well does not condemn the area as a whole for further testing.

Coal seams from a few inches to more than 6 feet thick were observed in the Luscar formation within the map-area. They lie within the northwesterly continuation of measures from which coal was formerly mined at Brodie, and is now being mined at Cadomin and Luscar still farther southeast. Some prospecting was carried on in the district some thirty years ago, but no mines were developed. According to old analyses, the coal is of high-grade bituminous rank, and the area may contain large reserves that can be made available when required.

MAP 996A
PIERRE GREYS LAKES
WEST OF SIXTH MERIDIAN
ALBERTA

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



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