

Structure-sections along lines A-B, C-D, and E-F

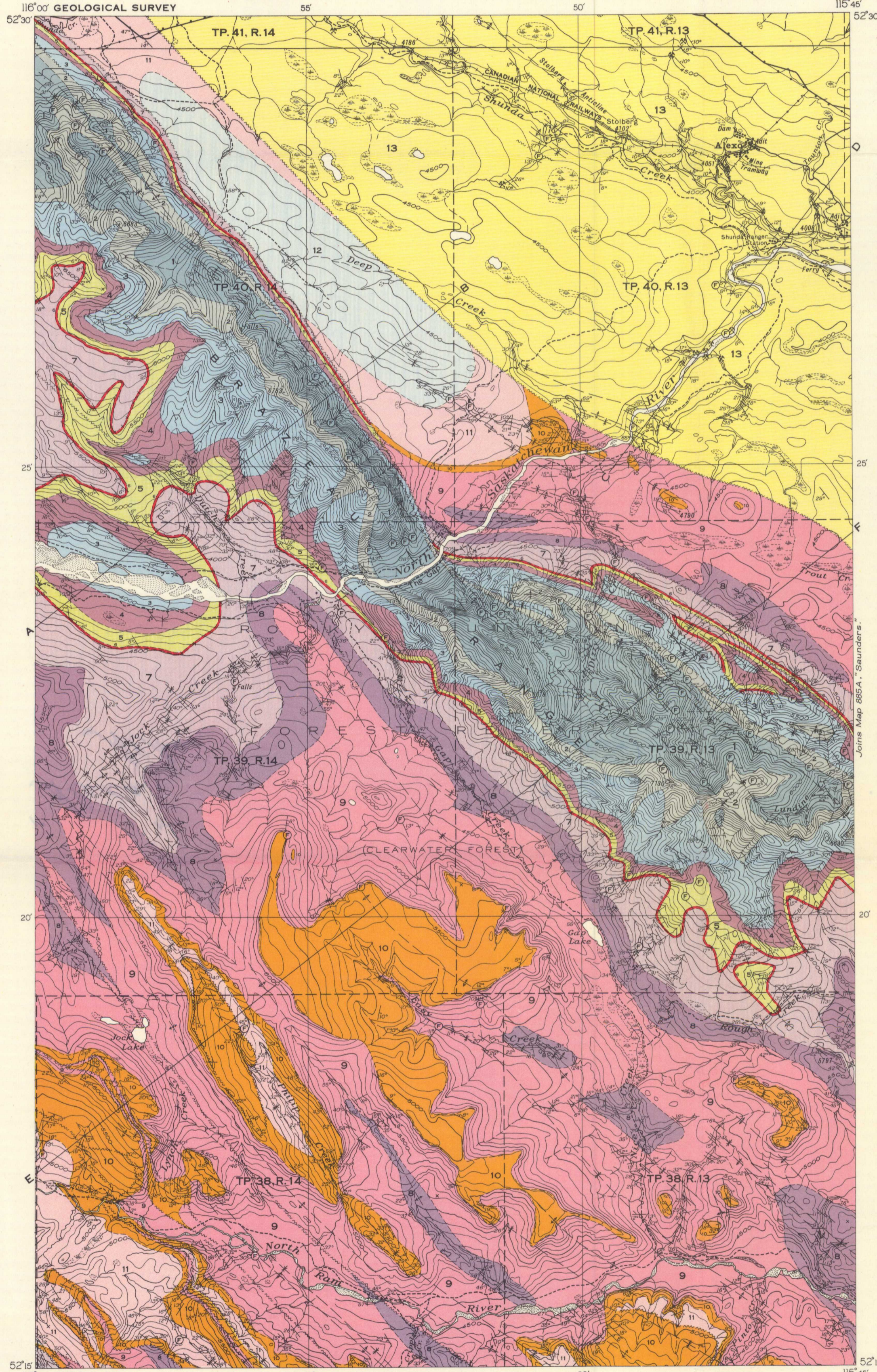
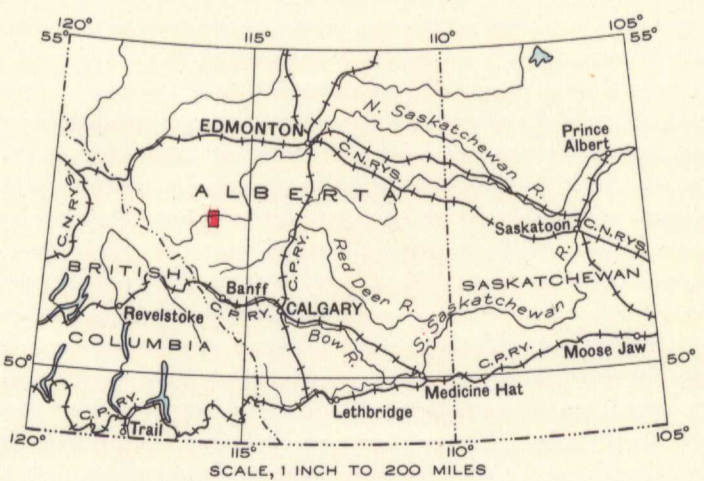
LEGEND

- |          |            |                  |                                     |   |  |
|----------|------------|------------------|-------------------------------------|---|--|
| CENOZOIC | TERTIARY   | PALEOCENE        | 13                                  | Sandstone, shale, conglomerate, volcanic ash, coal seams; lower part may include some Upper Cretaceous beds   |  |
|          | CRETACEOUS | UPPER CRETACEOUS | 12                                  | BRAZEAU FORMATION: sandstone, shale, conglomerate; a few thin coal seams; lower beds transitional into Wapiabi  |  |
| MESOZOIC |            |                  | 11                                  | WAPIABI FORMATION: dark marine shale and sandy shale, ferruginous limestone concretions; chert pebble-conglomerate  |  |
|          |            |                  | 10                                  | BIGHORN FORMATION: siliceous sandstone, sandy shale and dark marine shale; conglomerate   |  |
|          |            |                  | 9                                   | BLACKSTONE FORMATION: chiefly black marine shale, sandy shale, ferruginous limestone concretions  |  |
|          |            | LOWER CRETACEOUS | 8                                   | MOUNTAIN PARK FORMATION: grey sandstone and sandy shale, weathering olive-green and rusty-maroon; conglomerate; a few thin coal seams   |  |
|          |            |                  | 7                                   | LUSCAR FORMATION: black and grey carbonaceous shale, grey sandstone, coal seams   |  |
|          |            |                  | 6                                   | CADOMIN FORMATION: chert and quartzite pebble-conglomerate  |  |
|          |            |                  | 5                                   | NIKANASSIN FORMATION: alternating light grey sandstone and black carbonaceous shale; thin coal stringers  |  |
|          |            | JURASSIC         | 4                                   | FERNIE GROUP: alternating sandstone and soft black shale; phosphatic cherty dark limestone  |  |
|          | PALAEOZOIC | CARBONIFEROUS    | MISSISSIPPIAN AND (?) PENNSYLVANIAN | 3   | RUNDLE FORMATION: light brown-grey, medium-grained, dense to porous, ash-grey weathering limestone; shaly, buff weathering limestone; dolomitic limestone; chert |
|          |            |                  | MISSISSIPPIAN                       | 2   | BANFF FORMATION: medium dark brown-grey shaly limestone, crinoidal limestone; chert  |
|          |            | DEVONIAN         | 1                                   | Hard grey limestone; buff-weathering grey shaly limestone; drab porous saccharoidal dolomite; brown-grey, silty and calcareous shale, weathering cream; brown-black calcareous shale and black limestone. Top few feet are black fissile shale of Ezzahaw formation |  |

- Rock outcrop (bedding not determinable) ..... x  
 Bedding (horizontal, inclined, vertical, overturned) ..... +  
 Fault ..... -  
 Anticlinal axis ..... +  
 Synclinal axis ..... -  
 Coal outcrop (seam 1 foot or more thick) ..... x  
 Coal mine adit ..... -  
 Fossil locality ..... @
- Road and buildings ..... -  
 Road not well travelled ..... -  
 Bush road or trail ..... -  
 School ..... -  
 Post Office ..... -  
 Cemetery ..... -  
 Mine dump ..... -  
 Power transmission line ..... -  
 Power transmission line along road ..... -  
 Township boundary (surveyed) ..... -  
 Township boundary (unsurveyed) ..... -  
 Section line ..... -  
 Intermittent stream ..... -  
 Marsh ..... -  
 Sand or gravel ..... -  
 Contours (interval 100 feet) ..... -  
 Depression contour ..... -  
 Height in feet above mean sea-level ..... 6830'

Geology by G. P. Crombie, 1943, O. A. Erdman, 1944.

Base-map from surveys and topography by the Topographical Survey, 1940. Cartography by the Drafting and Reproducing Division, 1946.



DESCRIPTIVE NOTES

Alexo map-area lies in the Foothills Belt of west-central Alberta, about 80 miles north of Banff and an equal distance west of Red Deer. The maximum relief is about 3,400 feet. Brazeau Range, the most prominent topographic feature of the area, is underlain by calcareous Paleozoic rocks. All topographic features are related to the structural arrangement and differential erosion of the various formations. During Pleistocene time Cordilleran ice covered the area to elevations of at least 6,000 feet above sea-level.

The approximate total thicknesses of the formations exposed in the map-area southwest of the main thrust fault northeast of Brazeau Range are as follows: Devonian, 2,300 feet; Banff, 575 to 620 feet; Rundle, 620 to 645 feet; Fernie, 270 to 330 feet; Nikanassin, 230 to 270 feet; Cadomin, 20 to 40 feet; Luscar, 850 to 900 feet; Mountain Park, 600 feet; Blackstone, 1,300 feet; Bighorn, 275 to 320 feet; Wapiabi, 1,400 to 1,630 feet; and Brazeau, 1,500 feet (top eroded).

Rocks of Paleocene age (13) underlie most of the area northeast of the main thrust fault. An estimated 4,000 feet of beds of Paleocene age occupy the northeast limb of the Stolberg anticline in this area, and a calculated 2,600 feet of beds outcrop on North Saskatchewan River on the southwest limb of the same structure. A cobble-conglomerate is exposed on North Saskatchewan River at the crest of the anticline, and a 1- to 2-foot band of purple tuff outcrops about 100 feet stratigraphically above the conglomerate. At least five coal seams, each more than a foot thick, occur within an interval of 800 to 1,400 feet above the cobble-conglomerate, and their outcrops are indicated on the map. The middle seam is 5.5 feet thick. Fossil plants several hundred feet below the commercial coal seam at Alexo indicate a Paleocene age.

Structures in the map-area are typical of those in the Foothills Belt of west-central Alberta. The formations are involved in complex folds and faults that trend generally northward. Thrust faulting in the southwest corner of the map-area has caused much repetition of Blackstone, Bighorn, and Wapiabi beds. A thrust fault of about 2,500 feet stratigraphic throw brings Luscar or Mountain Park strata on the southwest in contact with Bighorn strata on the northeast. Folding subsequent to faulting is demonstrated on Phillip Creek, where a synclinally folded thrust fault repeats Bighorn rocks. Between Phillip Creek and Brazeau Range the Bighorn formation is folded into broad, gentle anticlines and synclines. The underlying, incompetent rocks exhibit steeper dips and closer folding. An inlier of the Rundle outcrops near the west edge of the map-area on both sides of North Saskatchewan River.

Brazeau Range is a Palaeozoic outlier characterized by asymmetric folds, thrust faults, and folded faults. The main anticline is continuous for the full length of the range, and its axis is essentially parallel with, and a short distance northeast of, the crest of the range. North of the river the range is narrow, and a well-marked fault-line scarp bounds its northeast side. South of the river, the range is much wider, the trend changes from southeast to east, and folding replaces some of the faulting. The main structural high or culmination, about 1 1/2 miles northwest of the Gap of North Saskatchewan River, is another, about 2 1/2 miles west of the east margin of the map-area, correspond closely to the topographic highs in those parts of the range. Near the east boundary of the map-area by the Palaeozoic rocks plunge steeply southeast below Mesozoic rocks, and Brazeau Range loses its identity.

A folded thrust fault, due, apparently, to subsequent fault movements, occurs on the northeast side of Brazeau Range between Dizzy and Lundine Creeks. The anticlinally folded parts of the fault are exposed in two places across strike (See Structure-section E-F) and are known to affect rocks of from Upper Devonian to Lower Cretaceous age. The stratigraphic throw of the fault appears to decrease towards the northeast and southeast from the Dizzy Creek outcrops, where it has an average displacement of 1,200 feet. The folded fault is doubly plunging, and for this reason the fault trace outlines elongate windows of the underlying formations. Faulting that occurred during or after the folding of the folded fault is indicated in Devonian beds in the second creek east of Dizzy Creek. The main overthrust fault of the area is well exposed on North Saskatchewan River, 3 miles above the mouth of Shunda Creek. It cuts diagonally across the map-area, and brings in contact Blackstone, Bighorn, Wapiabi, and Brazeau formations on the southwest, with strata of Paleocene age on the northeast. The calculated stratigraphic throw on North Saskatchewan River is 7,000 to 8,000 feet. The northward trend of the fault is interrupted near the east boundary of the map-area by a prominent bulge to the northeast. The fault has resulted in steep to overturned dips in rocks of Paleocene age for half a mile northeast of its surface trace.

The Stolberg anticline trends north 50 degrees west across the northeast part of the map-area. The dips of the beds are generally low and uniform in the southeastern part, but steepen toward the northwest. The plunge of the anticline is not known, but is believed to undulate gently along strike.

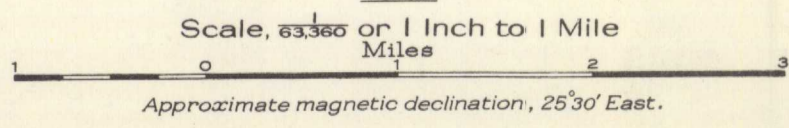
Imperial-Shell-Stolberg No. 1 well is being drilled near the crest of Stolberg anticline, about 4 miles northwest of the map-area. The following abridged log as determined by the Petroleum and Natural Gas Conservation Board of Alberta, is reproduced through the courtesy of Imperial Oil Limited and the Shell Oil Company of Canada:

"Brazeau to Wapiabi, 4020 feet; fault, Wapiabi to Brazeau, 4,630 feet; Brazeau to Wapiabi, 4,850 feet; Wapiabi to Bighorn, 6,890 feet; Bighorn to Blackstone, 7,240 feet; "grit" 9,580 feet; Blackstone to Mountain Park, 9,640 feet; Mountain Park to Luscar, 10,160 feet; Luscar to Cadomin, 11,635 feet; Cadomin to Nikanassin, 11,645 feet; Nikanassin to Fernie (top of Brown sand), 11,725 feet; Fernie to Rundle, 12,218 feet; fault, Rundle to Fernie, 12,475 feet; and Fernie to Rundle, 12,826 feet."

Outcrops of coal seams 1 foot or more in thickness are shown on the map, those of Luscar coal occurring on both flanks of Brazeau Range. At most places the beds dip steeply southwest. One seam on the southwest flank of Brazeau Range is 10 feet thick.

Commercially thick coal seams of Paleocene age are present on both limbs of the Stolberg anticline. On the northeast limb, the coal is mined at Alexo by Alexo Coal Company, Limited. The seam is about 5 feet thick and the beds dip 5 to 10 degrees northeast. The coal is of high volatile, bituminous rank. The production of coal from Alexo in 1945 was 26,601 tons.

MAP 884A  
ALEXO  
WEST OF FIFTH MERIDIAN  
ALBERTA



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