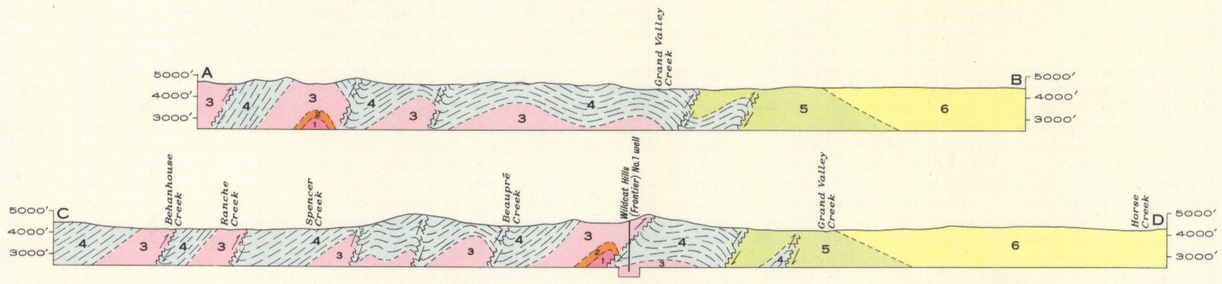
CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

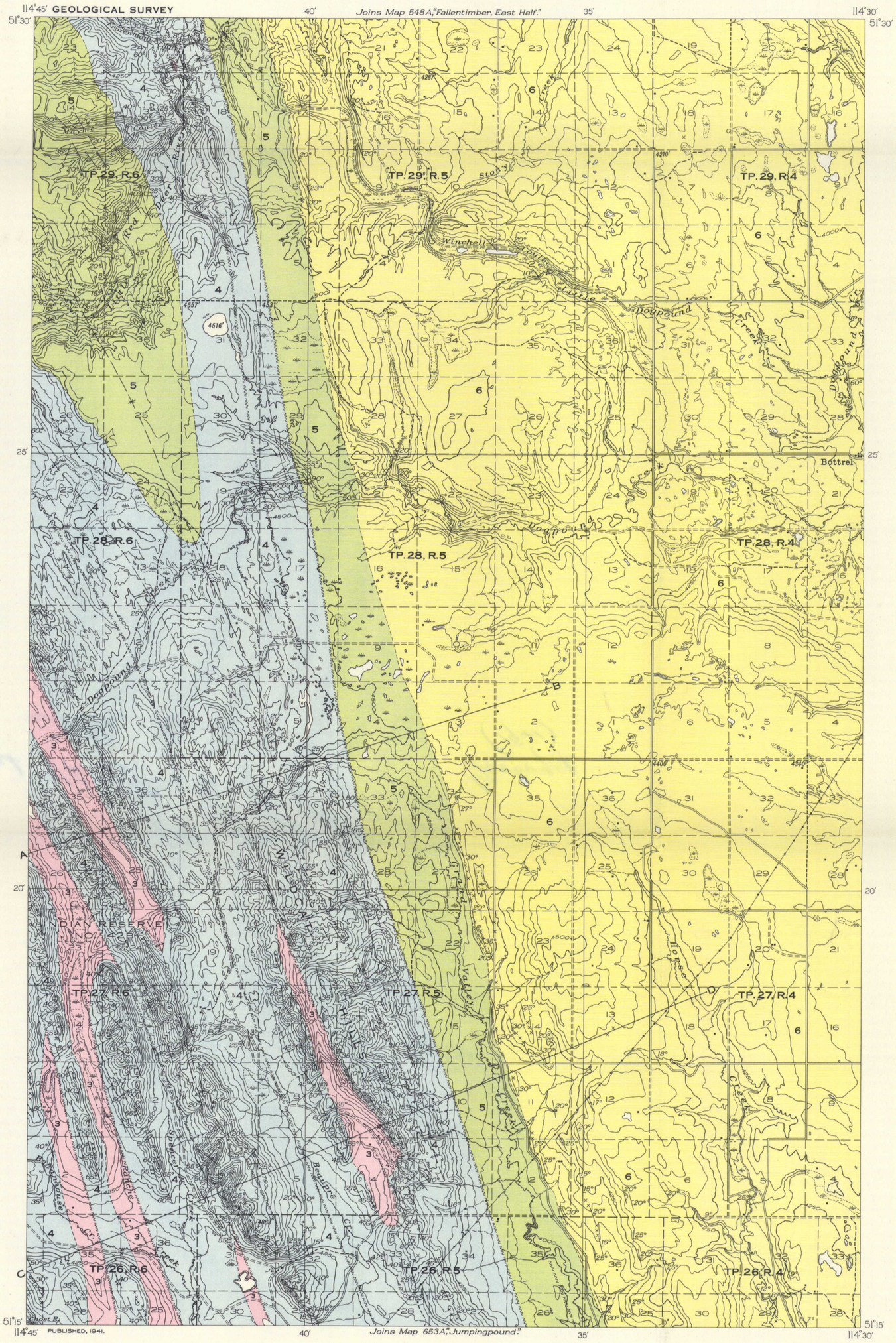
BUREAU OF GEOLOGY AND TOPOGRAPHY



Structure sections along lines A-B and C-D

114°45′ GEOLOGICAL SURVEY — 40′ — Joins Map 548A, "Fallentimber, East Half." — 35′ — 114°30′

51°30′



51°15′ — 114°45′ PUBLISHED, 1941. — 40′ — Joins Map 653A, "Jumpingpound." — 35′ — 114°30′ — 51°15′

LEGEND

CENOZOIC

TERTIARY

6 — *PASKAPOO FORMATION: sandstone, shale*

CRETACEOUS

UPPER CRETACEOUS

5 — *EDMONTON FORMATION: sandstone, shale, bentonite, coal*

MESOZOIC

4 — *BELLY RIVER FORMATION: sandstone, shale, bentonite, conglomerate, coal*

3 — *UPPER ALBERTA (WAPIABI) FORMATION: shale, sandstone*

2 — *CARDIUM FORMATION: sandstone and sandy shale. (appears on structure sections only)*

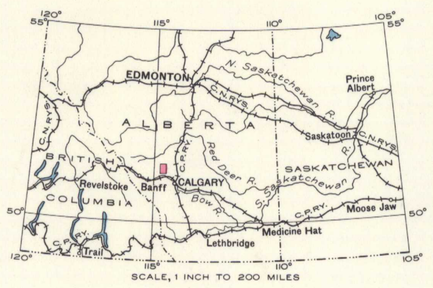
1 — *LOWER ALBERTA (BLACKSTONE) FORMATION: shale, sandy shale. (appears on structure sections only)*

Rock outcrop
Bedding (inclined)
Fault
Anticlinal axis
Synclinal axis
Well (unproductive, or not commercial)

Road and buildings
Road not well travelled
Road along township boundary
Bush road or trail
School
Post Office
Power transmission line
Township boundary
Section line
Indian Reserve boundary
Intermittent stream
Marsh
Contours (interval 50 feet) 5000
Depression contour
Height in feet above Mean sea-level 4400′

Geology by G. S. Hume, 1932; and C. O. Hage, 1939.

Base-map from surveys by the Topographical Division, Geological Survey, 1928 and 1929. Cartography by the Drafting and Reproducing Division, 1941.



SCALE, 1 INCH TO 200 MILES

DESCRIPTIVE NOTES

Topographically and structurally the map-area may be divided into a western and an eastern part separated, in the south, by Grand Valley. The western portion is a part of the Foothills belt, within which the strata have been folded and faulted by forces that, farther west, built the Rocky Mountains. The northwesterly-trending ridges and valleys reflect the character of the underlying bedrock in that valleys are mainly cut in soft shales whereas the ridges owe their relief to more resistant sandstone measures. The eastern part of the map-area is underlain by gently-dipping strata and is largely covered by glacial debris composed of light brown boulder clay and poorly sorted sand and gravel. The bend to the west in Grand Valley Creek, 7 miles north of the south boundary of the map-area, has been caused by accumulated morainal deposits that extend northward beyond the area.

The map-area is underlain by Tertiary, Mesozoic and Palaeozoic sediments. In its eastern part a regular succession of formations is believed to underlie the Paskapoo. Farther west, within the area of the foothills, the succession is interrupted by many thrust faults. The oldest exposed strata are those of the Upper Alberta (Wapiabi) formation. The only deep test well, Wildcat Hills (Frontier) No. 1, was drilled through 1,000 feet of Upper Alberta shale before encountering a thrust fault that brought it back into Belly River beds. Data on formations that lie below the Belly River have been obtained from records in neighboring areas and indicate the following succession: Upper Alberta (Wapiabi), 1,700 feet; Cardium, 300 feet; Lower Alberta (Blackstone), 950 feet; Blairmore (Lower Cretaceous), 2,000 feet; Kootenay (Lower Cretaceous), 300 feet; Fernie (Jurassic), 150 feet; and Palaeozoic limestone.

The upper 150 feet of the Upper Alberta (Wapiabi) formation (3) is exposed in a small anticline on Little Red Deer River near the north boundary of the map-area. It consists of dark grey, thinly-bedded shales containing brown, ironstone concretions.

The Belly River formation (4) consists of alternating grey and brown weathering sandstones and dark grey and green shales of freshwater origin. The sandstones are commonly cross-bedded and their coarser beds contain lenses of conglomerate holding black chert and grey quartzite pebbles. The shale members in the upper part of the formation are softer than the lower shale beds. Thin beds of bentonite are common and lend a characteristic coating to weathered surfaces of the outcrops. Thin coal seams are present near the base and top of the formation. The Belly River is 2,660 feet thick on Little Red Deer River but thickens toward the north.

The Edmonton formation (5) consists of fine to coarse-grained, grey and bluish-grey sandstones interbedded with buff, green, and light and dark grey shales. The sandstones are usually thinly laminated and cross-bedded and possess a characteristic, flaky weathered surface. Bentonite beds are common. The shales are softer and lighter in colour than those of the Belly River formation. Coal seams are present but none of commercial importance was found in the map-area though they have been mined in adjacent areas to the north and south. West of the large syncline on Little Red Deer River the base of the Edmonton is a sandstone member about 90 feet thick containing several conglomeratic bands in the lower 10 feet. The conglomerate holds pebbles of quartzite, chert, porphyry, white quartz, and sandstone. The Edmonton measured about 3,000 feet thick on Little Red Deer River.

The Paskapoo formation (6) dips gently to the east and consists of freshwater beds composed of medium to coarse-grained, grey, cross-bedded sandstone interbedded with buff, green, and light and dark grey shales. The sandstones are coarser than those of the Edmonton formation and most of the shales are lighter in colour. The basal member of the Paskapoo is a massive sandstone and is particularly well exposed on the east side of Grand Valley where, near the bottom, it carries a large number of quartzite, chert, and porphyry pebbles.

The chief structural features of the map-area are folds and thrust-faults. Some of the folds are simple flextures; others are drag-folds formed against thrust faults. At the surface and for a few thousand feet below the surface (see Structure Sections) these faults have an average westerly dip of 60 degrees. At greater depths they are believed to flatten appreciably and join with major, low-angle thrust faults along which great displacements have occurred. The Grand Valley fault, as best observed on Bow River, south of the map-area, is believed to be such a low-angle thrust fault.

In prospecting for possible accumulations of oil several factors must be taken into consideration. The principal oil-producing rocks, as in Turner Valley, would be the Palaeozoic limestones. Oil in commercial quantity might also be found in the Blairmore sandstones. Where low-angle thrust faults occur it is of the greatest economic importance that they pass beneath substantial bodies of Palaeozoic limestone and it is also important that the limestone should lie within practical drilling depths. None of these conditions have yet been tested in this map-area. The principal anticlinal structures are those of the Wildcat Hills, and the extensions of the Grease Creek, Little Coulée and Red Deer River-Silver Creek anticlines from adjacent map-areas to the west and north. The drilling depth to Palaeozoic limestone on the Red Deer River-Silver Creek structure would be about 9,000 feet, provided no low-angle thrust fault was encountered. No structures with closures were observed to the east of the Grand Valley fault and in this part of the map-area the stratigraphic depth to the Palaeozoic limestone from the Edmonton-Paskapoo contact is estimated to be in excess of 10,000 feet.

MAP 652A

WILDCAT HILLS

(EAST HALF)

ALBERTA

Scale, 1/63,360 or 1 Inch to 1 Mile

1 Mile 0 1 2 3

Approximate magnetic declination, 23° East.

652A