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REPORT ON GEOLOGY

AND RECOMMENDATIONS FOR 1978 PROGRAM

ROCKY MOUNTAIN - M429

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for

Chevron Standard Limited
Minerals Staff
Vancouver, B.C.

by

L. Dekker

Vancouver, B. C.
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INTRODUCTION

During the 1977 field season a geological reconnaissance survey was done in the Rocky Mountains' Main Range south of Mount Assiniboine Park to try to establish the facies change from platform Cambro-Ordovician carbonates to basinal shales. The basal carbonate, the Cathedral Formation, was given particular attention as it hosts lead and zinc at Field 50 miles on strike to the north. The intervening area is not available for prospecting it being located in the National Parks (see Figures 1, 2 and 3).

Geological maps of the area do not exist which makes grass roots mapping almost a necessity if a serious understanding of the stratigraphy is to be obtained. In addition to the geological work 161 silt samples were collected from drainages in the area where the Cathedral escarpment was believed to exist. These were analyzed for Cu, Pb and Zn. The results are discussed in a separate report by D. Taylor.

ACCESS

Accessibility is by truck over a forestry road from the Kootenay Valley for the southern part of the area. For most of the area, however, a helicopter is a necessity. A Bell 47-G3B1 leased in Invermere was used for the geological and geochemical surveys.

STRUCTURE

Two major structural features characterize the area (see Figure No. 4); a major NNW trending thrust fault and a major NNW trending anticline. The thrust fault brings basinal Chancellor Formation, which is intensely folded and cleavaged, over the west limb of this major anticline (see Figure No. 5). South of the Assiniboine Park boundary the anticlinal axis follows more or less Assiniboine Creek, Mitchell and Cross River Valleys before crossing the Albert River and heading off towards the junction of Queen Mary Creek and the Palliser River. The anticline is asymmetric with a very gently dipping east flank and a gently dipping west flank which becomes overturned southwest of the Albert River. The west flank is broken in a few places as a result of lithological changes. The anticline plunges sharply towards its southern end with progressively younger formations exposed south of the Albert River.

In the eastern flank of the anticline the Cathedral Formation is exposed at the base of the carbonate section just above the river valleys. At Assiniboine Lake and the northwest end of the Mount Brussilof massif the underlying Mount Whyte Formation can be seen. The base of the Cathedral Formation consists here of an oolitic limestone. Otherwise the base of the Cathedral is mostly covered in scree.

Several observations are important:

(1) The formation is difficult to study as it forms cliffs which makes large areas inaccessible.

(2) A breccia on the southwest side of Mount Brussilof may well be a reef talus breccia and, if so, suggest very close proximity to the Cathedral escarpment (a few hundred feet).

(3) Several dolomite patches can be seen in outcrop east of the anticlinal axis. Dolomite is of very massive coarse crystalline nature and no "zebra textures" were observed. Most observations are from scree samples, however, and more detailed work is needed to establish extent and character of the dolomitization.

(4) Except east of Mount Docking outcrops immediately under the Chancellor thrust are probably equivalents of younger carbonates which overly the Cathedral on the east side of the valley. The Cathedral seems in places to make up the valley floor and may be present in scree slopes below the younger carbonate units. Going south apparently progressively younger carbonates are present immediately under the thrust and the Cathedral must be present at depth.

(5) The sharp structural break in places observed on the west flank of the anticline is probably lithologically controlled indicating a facies change from platform carbonates to more basinal shales. It is thought that this break represents this facies change in either the Cathedral or Eldon-Pika Formation.

CONCLUSIONS

(1) The geology suggests that the escarpment of the Cathedral Formation which marks the facies change from platform to basinal sedimentation could be present at several places on the east but possibly also the west limb of a major anticlinal structure south of Assiniboine Park.

(2) This escarpment may be partially eroded out by some of the rivers that cut valleys more or less parallelling the anticlinal axis.

(3) The contact of the Cambro-Ordovician platform carbonate sequence with the basinal Chancellor Formation is structural and is a major thrust. This structural break however could indicate close proximity to the original platform-basin facies change.

(4) The sudden reversal in attitude from a gently east dipping thick platform carbonate sequence to a sometimes broken, steeply dipping to overturned west limb is likely an expression of a lithologic change from competent platform rocks to more incompetent basinal facies. This deserves closer investigation.

(5) Dolomitization of carbonates overlying the Cathedral Formation (Eldon-Pika) has created banded textures not unlike "zebra" textures which are associated with mineralization in the Cathedral Formation at Kicking Horse. Coarse crystalline dolomite crystals in these bands are rimming vuggy to intercrystalline pore spaces often filled with hematite after pyrite.

RECOMMENDATIONS

Some detailed geological mapping and prospecting of the area is required from the area south of Assiniboine Park to the headwaters of the Albert River. Particularly areas where streams cut through the strike in the east limb of the anticline are worthy of further investigation as mineralization associated with dolomitization may occur well back from the Cathedral escarpment. The "zebra" texture which accompanies mineralization is a lithology easy to identify. The geochemical anomalies both situated close to south boundary of Assiniboine Park also merit closer examination (see geochemical report).

The west limb of the anticline should be investigated further to establish type and character of the facies change and to check for mineralization. With the distribution of the Cathedral Formation roughly determined prospecting along the base of the cliffs on the scree slopes seems to be the best tool to adequately identify the favourable lithology that accompanies potential mineralization.

L. Dekker
August, 1977

Figure 1.

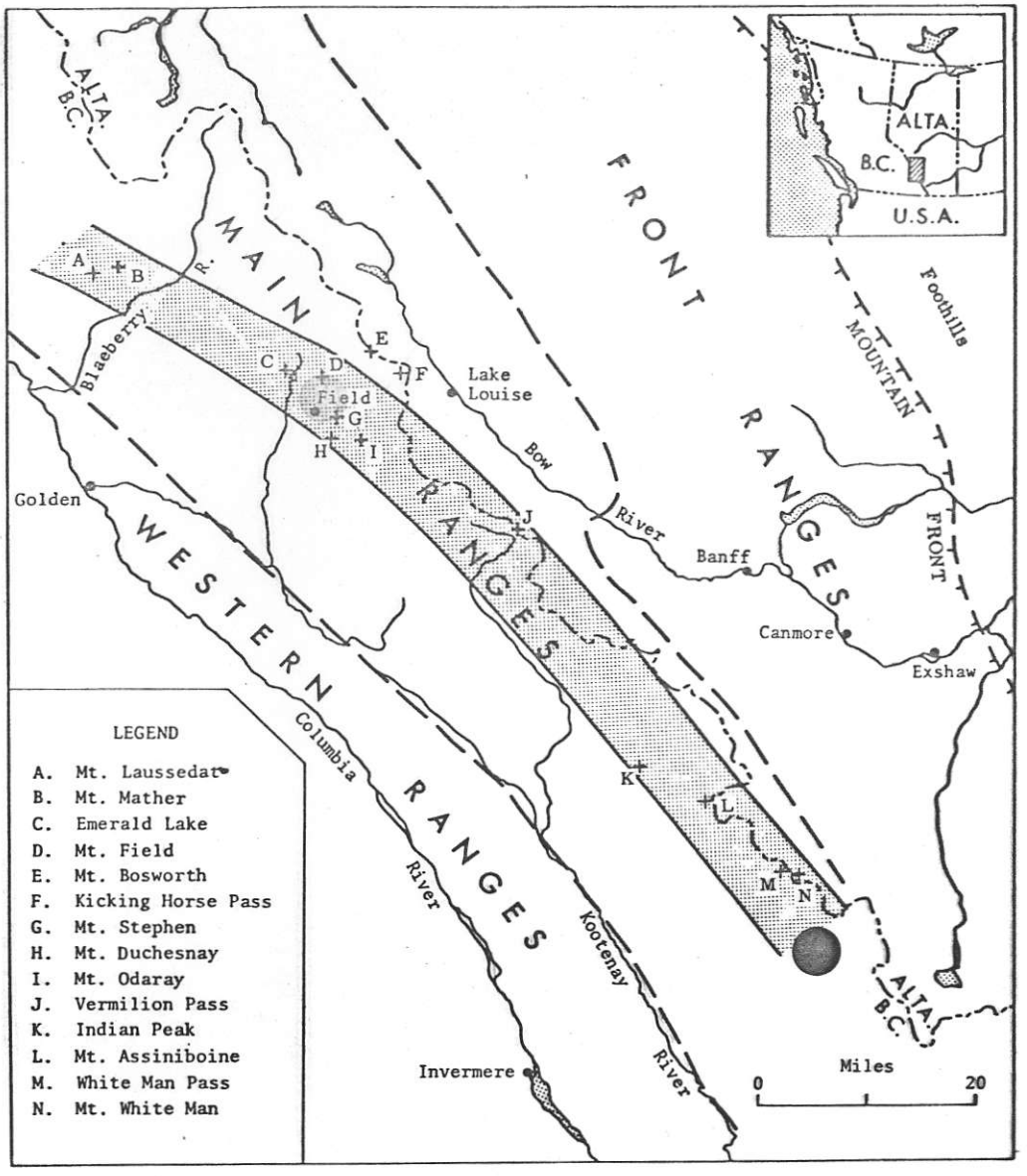


Fig. 1. The Kicking Horse belt (stippled).

Figure 2.

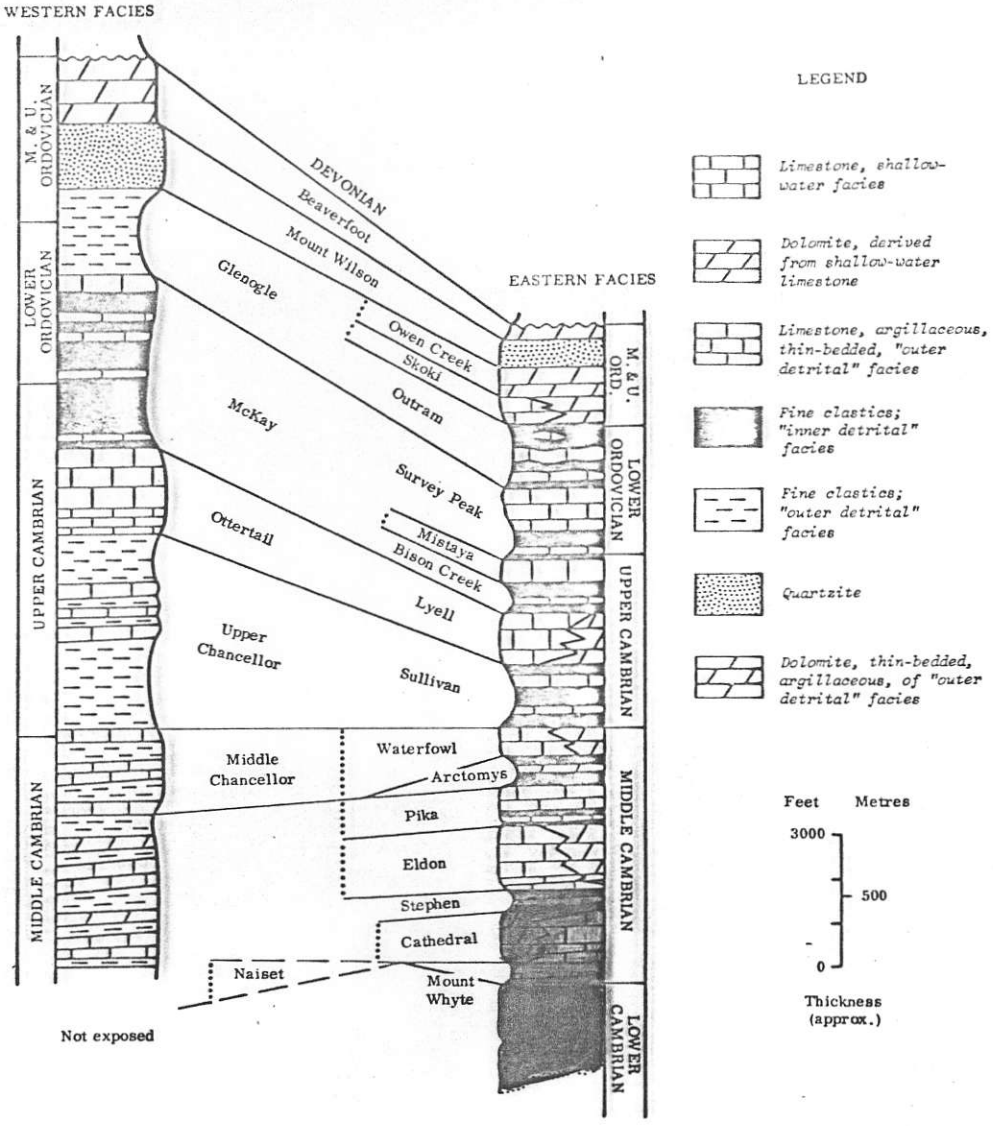


Fig. 2. Summary of stratigraphy east and west of the Kicking Horse belt (adapted in part from Cook, 1970, fig. 3-2).

SCHEMATIC CROSS-SECTION & MODEL

Vicinity of Mt. Field - Mt. Stephen

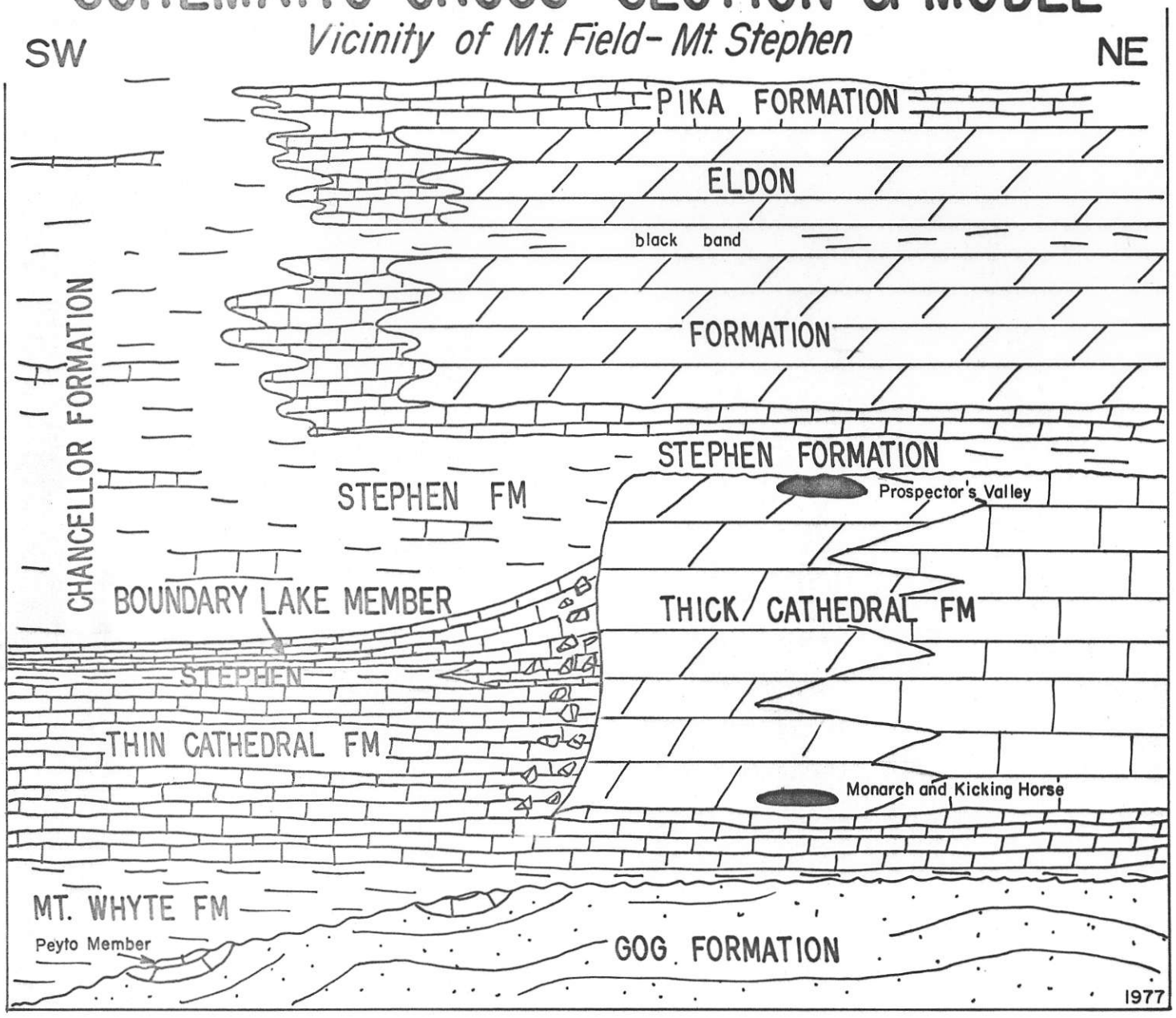


Figure 3.

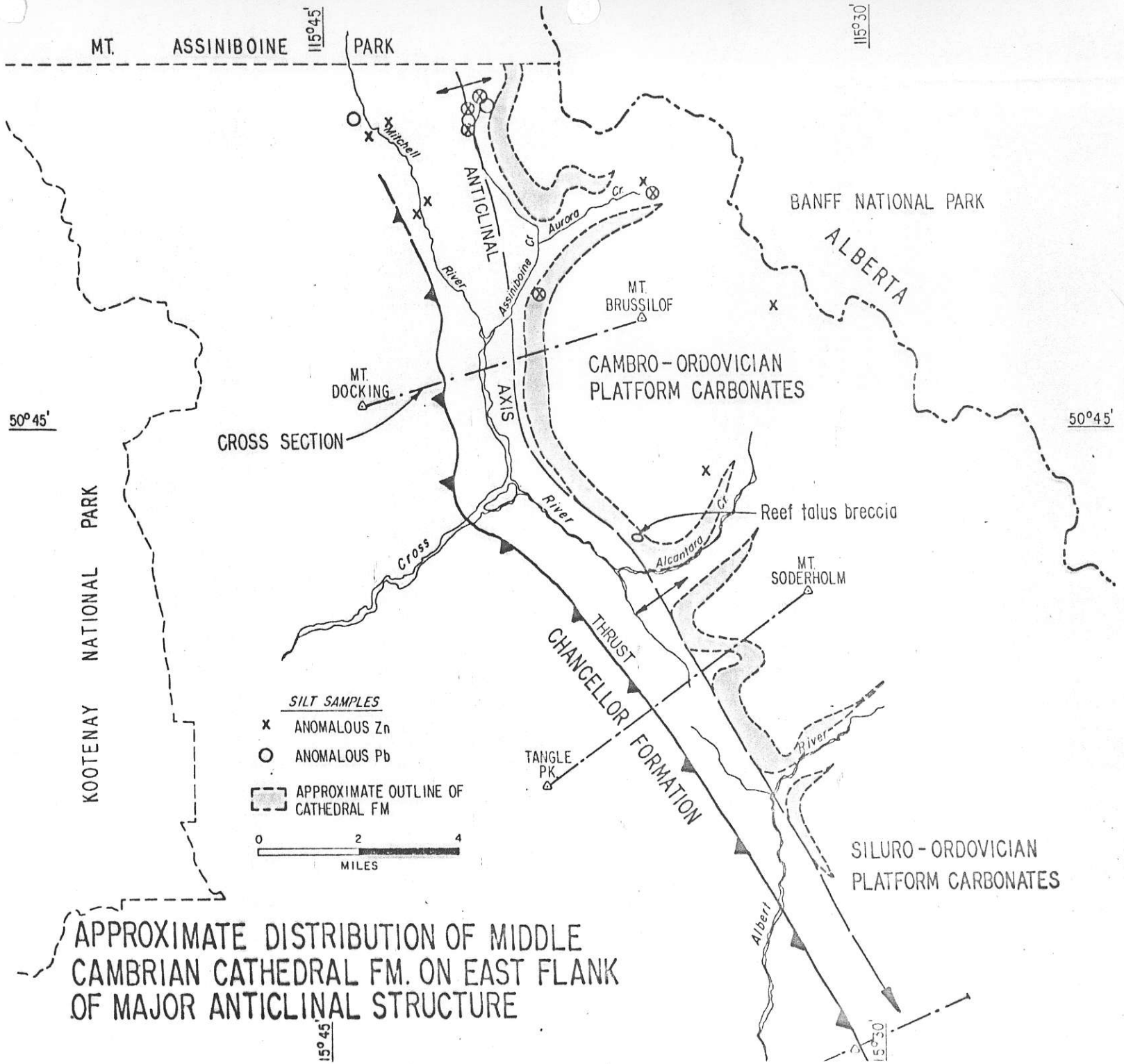
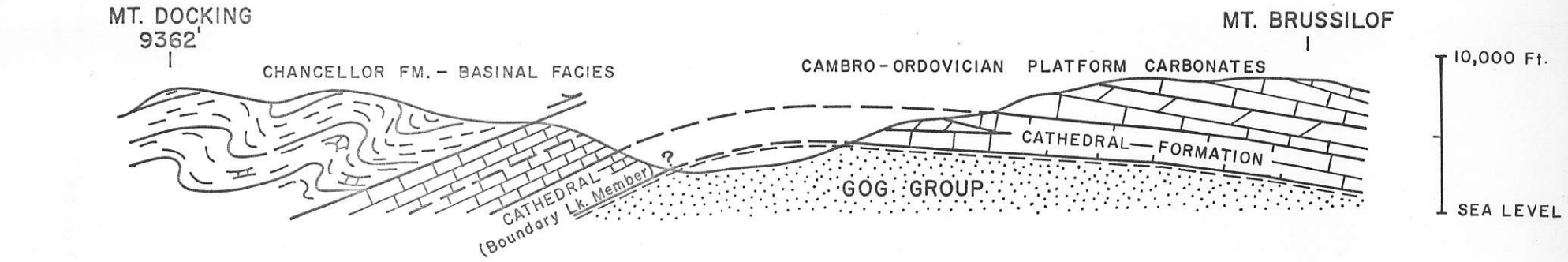
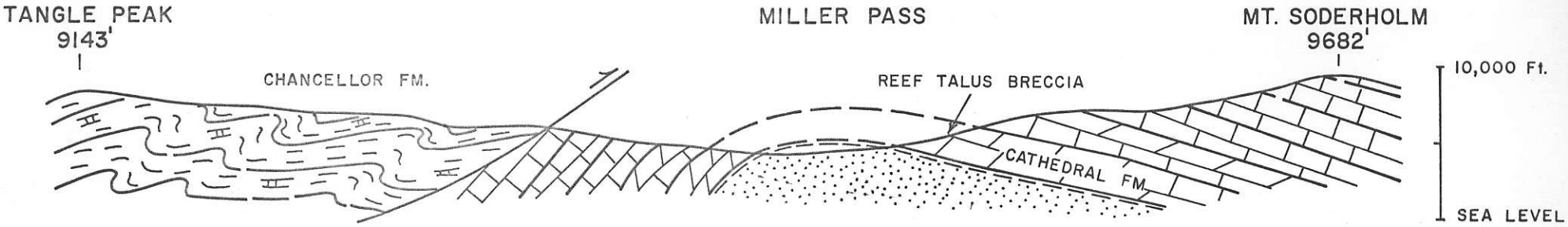
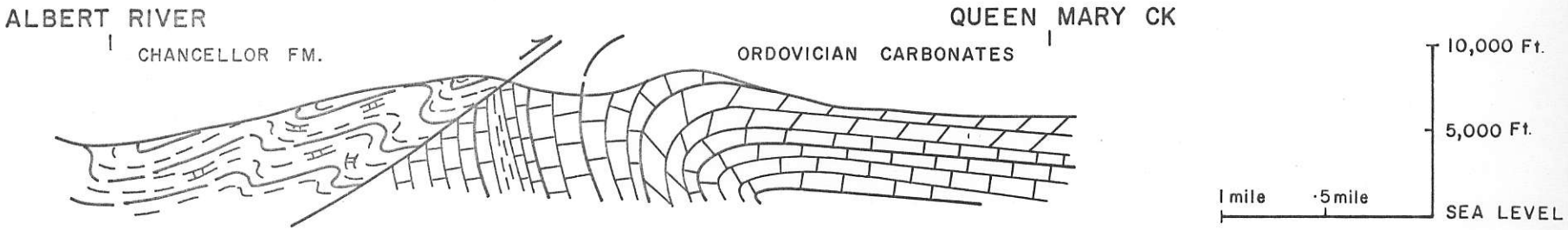

MT. ASSINIBOINE PARK
115°45'
115°30'
Mitchell River
ANTICLINAL AXIS
Assiniboine Cr
Aurora Cr
BANFF NATIONAL PARK
ALBERTA
MT. BRUSSILOF
CAMBRO-ORDOVICIAN PLATFORM CARBONATES
MT. DOCKING
CROSS SECTION
50°45'
KOOTENAY NATIONAL PARK
Cross River
Alcantara Cr
Reef talus breccia
MT. SODERHOLM
THRUST
CHANCELLOR FORMATION
TANGLE PK.
Albert River
SILURO-ORDOVICIAN PLATFORM CARBONATES
SILT SAMPLES
ANOMALOUS Zn
ANOMALOUS Pb
APPROXIMATE OUTLINE OF CATHEDRAL FM
0 2 4
MILES
APPROXIMATE DISTRIBUTION OF MIDDLE CAMBRIAN CATHEDRAL FM. ON EAST FLANK OF MAJOR ANTICLINAL STRUCTURE
115°45'
115°30'

Figure 4.

PROJECT M429







SCHEMATIC STRUCTURAL CROSS-SECTIONS PARK RANGES-SOUTHERN ROCKY MNTS.

Figure 5.

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