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FINAL
GEOLOGICAL REPORT
on
"THE CANYON CREEK AREA"
N.W.T. (Canada)
IMPERIAL OIL LTD.-CANOL PROJECT.
Preliminary Assignment

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Date submitted: February 5, 1944.

Read and accepted by: Ther. Link

Date: 2/8/44

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BIBLIOGRAPHY

LIST OF SPECIMENS

BIBLIOGRAPHY

- (1) Link, T. A. - "Report on the Fort Norman Area, N.W.T." Imperial Oil Ltd. Report 1920.
- (2) Stelck, C.R. - "The Schooner Creek Area", Imperial Oil Ltd. - Canol Project Preliminary Assignment, Final Report, January 1944.

FINAL GEOLOGICAL REPORT

on

" THE CANYON CREEK AREA "

N.W.T. (Canada)

A B S T R A C T

The Canyon Creek area is situated on the southern slope of the Discovery Range about ten miles upstream from Norman Wells. All the rocks are inclined southward, at dips varying from 10 degrees to 35 degrees.

Rocks ranging in age from Silurian to Upper Devonian were examined. The older rocks consist almost entirely of limestones, and dolomitic limestones, with lesser amounts of shale. Upper Devonian rocks were found to be black, platy, slightly bituminous shales and minor fine-grained micaceous sandstones.

No geological features of any economic interest were seen.

INTRODUCTION

General Statement

Mapping in the Canyon Creek area was undertaken by the late W. M. Reid, assisted by J. A. Simons and the writer, during the last ten days of April 1943. The object of this work was to enable the personnel of the party to become familiar with the various formations outcropping in the Norman Wells area, and to establish the stratigraphic sequence of the rocks in the upper part of Canyon Creek. Following the unfortunate illness and subsequent death of Mr. Reid, who was chief of the party, the writer undertook to prepare the map and cross section and complete the report on the area.

Location of the Area

Canyon Creek has its headwaters in the Discovery Range about thirteen miles northeast of Norman Wells. The creek flows southwestward and enters the Mackenzie opposite Ten Mile Island, about ten miles upstream from Norman Wells. The area covered by this report begins about three miles up from the mouth of Canyon Creek and stretches due northward about five miles, over a width of almost four miles.

Previous Work

So far as is known the only detailed work on Canyon Creek, prior to this survey, was that of T. A. Link (1) in 1920. On the survey by the writer and his associates most of the work was done farther up Canyon Creek, on the rocks below the Beavertail - Ramparts limestone where Link's traverse terminated.

Field Work

The party was taken to the area from Herman Wells by muskeg schooner, and a camp was established near the creek just opposite the end of Lake Bandy. From this camp traverses were run up and down Canyon Creek and also across Lake Bandy toward Kee Scarp.

Unfortunately a thick mantle of snow covered the area and concealed most of the outcrops. Traverses were made by snowshoe, and melting conditions slowed travel enough that the field work was somewhat limited by the amount of time available for work between hikes out from and back to the main camp.

Starting on Canyon Creek at the Beavertail - Fort Creek contact, and assuming an elevation of 400 feet (see Link, (1) "Canyon Creek Sheet" - Stations 36, 37), a plane table traverse was run northward up Canyon Creek for about five miles. From the end of the plane table traverse (Plate II, Station 36) a stadia hand-level traverse was carried eastward to the top of the nearest mountain (Station 42).

A second plane table traverse was run down Canyon Creek from the starting point at the Beavertail - Fort Creek contact, but this was stopped at Station 53 because so few outcrops were visible above the snow.

A third traverse was carried from Canyon Creek across Lake Bandy toward Kee Scarp. This was intended to tie in with the survey of Schooner Creek, being conducted by C. E. Stelck (2). Although the tie was never made, the traverse was of considerable help in constructing a map from aerial photographs. Photographs used in the field were C.P.A. verticals, on which the outcrops were plotted directly.

Maps and sections prepared in connection with this report are as follows:

Plate I. Index Map of Northwestern Canada, showing location of the Canyon Creek Area. Scale 1" to 50 miles.

Plate II. Canyon Creek Area Geologic Map. Scale 4" to 1 mile.

Plate III. Geologic Cross Section, Canyon Creek Area. Vertical and horizontal scale 8" to 1 mile.

Plate IV. Composite Columnar Section, Canyon Creek Area. Scale 1" to 100 feet.

TOPOGRAPHY

The Canyon Creek area is located on the southern flank of the Discovery Range and the entire area is on a dip slope of southerly dipping rocks.

Canyon Creek is a relatively small stream and flows south to southwest, generally across the strike of the underlying bed rock. In the upper part the valley is deep and V-shaped, and the stream flows over a number of high waterfalls formed in the hard light-colored limestones. Below this, for about a mile, the valley is broader, with few outcrops, then suddenly narrows into a very deep canyon from which the creek draws its name. The canyon walls are vertical to overhanging and are composed of hard massive limestone. The stream flows along the bottom of the canyon through a series of potholes and waterfalls.

At the lower end of the canyon, where the plane table traverse was begun, the valley widens somewhat, though the walls are still fairly steep and about 250 feet high. Gradually the valley walls become receding and overgrown with trees, and the stream becomes braided and meandering.

Lake Bandy, west of Canyon Creek, is a remnant glacial lake which has been dammed at its western end by the fan delta of Snowshoe Creek flowing out of the mountains.

Except for the higher parts of the mountains of the Discovery Range the area is well covered by a thick growth of spruce.

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Chapter III

STRATIGRAPHY

Since a great deal of the rock normally exposed in the Canyon Creek area was covered with snow at the time of the survey, the stratigraphy of the area cannot be fully described. Although the formation boundaries could not be examined in the field, it was possible to draw contacts fairly accurately from aerial photographs. From the map (Plate II) a cross section (Plate III) and a columnar section (Plate IV) were constructed which, in spite of the lack of detail regarding the lithology of the various formations, facilitate comparisons of thicknesses with the sections in other areas.

TABLE OF FORMATIONS

			Thickness
Quaternary	Recent	Silts and gravels	
	Pleistocene	Glacial drift	---
Upper Devonian	Hosworth	Sandstones and shales	---
	Fort Creek	Black platy shales	900'
Middle Devonian	Beavertail Ramparts	Massive limestone	125'
		Rubbly brown limestone with thin shale breaks	255'
Silurian or Devonian	Bear Rock	Limestone breccia	260'
Silurian	Mount Bonning	Massive siliceous dolomitic limestones	---

Silurian

The oldest formations encountered on the survey of Canyon Creek consist of bedded dolomitic limestones which are regarded as Silurian in age. These rocks are light buff-colored, massive-bedded, dense and crystalline, with an arenaceous appearance. Calcite inclusions are common and chert is sometimes found. Lenses of sandy material occur in the lower part of the section and glauconite is commonly associated with these.

Over 1,000 feet of these rocks are represented, but neither the base nor the top was observed. The contact with the overlying Bear Rock formation was established fairly closely, and the formation boundary was mapped from aerial photographs. This section is correlated with the Silurian rocks described by Stelck (2) on Schooner Creek, and those in turn are correlated by Stelck with the Silurian of Franklin Mountains and Mount Kindle.

Silurian or Devonian - Bear Rock Formation

Overlying the Silurian rocks is a series of brecciated dolomite belonging to the Bear Rock formation. It is not known whether the whole 260-foot interval assigned to the Bear Rock is composed entirely of brecciated material, or if part of the series is bedded as in other areas of the Mackenzie basin.

Middle Devonian - Beavertail-Ramparts.

Confusion has arisen over the nomenclature of the Middle Devonian rocks of the Mackenzie basin because of ambiguity in the definition of the type section of the Beavertail and inadequacy in the definition of the Ramparts formation. For the purpose of this report the writer proposes to refer to the interval representing both of these formations as "Beavertail-Ramparts".

Middle Devonian rocks on Canyon Creek occupy a stratigraphic

interval of slightly less than 350 feet, and can be divided into two parts on the basis of lithology.

The lower part is made up of rubbly brownish-colored limestones with thin shale breaks. The limestone carries a wide variety of fossils (See Appendix). This unit is about 255 feet thick, and has commonly been referred to as the "Lower Ramparts limestone and shale".

The upper part of the Beavertail - Ramparts is made up of about 125 feet of massive, dense, crystalline limestones in which few fossils are found. These rocks are exposed in the canyon of Canyon Creek. They have previously been referred to as Beavertail limestone (1).

Upper Devonian - Fort Creek Formation

The black platy shales of the Fort Creek formation are well exposed in the steep banks of Canyon Creek just downstream from the lower entrance to the gorge. Here they are slaty in appearance, slightly bituminous and burnt to reddish color. Farther down the creek exposures were very poor. The formation boundary between the Fort Creek and the Beaworth was taken from Link's "Canyon Creek Sheet" (1) since it conforms with the topographic expression of the contact as determined from aerial photographs.

The contact of the Fort Creek with the top of the Middle Devonian was not exposed. Nor was there any indication that the Kee Scarp reef limestone found at Kee Scarp (2) occurs on Canyon Creek. In this regard it is pointed out that a very thin bed of this reef limestone was found on the south shore of Edie Lake, which is a small lake west of Lake Bandy, and it is assumed that the Kee Scarp - limestone pinches out before it reaches Canyon Creek.

The Fort Creek formation is about 900 feet thick in this area.

Upper Devonian - Bosworth Formation

Only the lowest beds of the Bosworth formation were examined on Canyon Creek. These were fine grained, light grey to buff, micaceous, massive to thin-bedded. No fossils were found.

Chapter IV

STRUCTURE

The Canyon Creek area lies on the southern flank of the Discovery Range, and all the rocks dip southward. In the southern part of the area the dip is about ten to fifteen degrees, and to the north, farther up in the mountains dips of 35 degrees were recorded. The average strike of the rocks is N 50° W. No flexures or faults of any significance were seen and no indication of structures of any economic importance were discovered.

NOTE: For discussion of Historical Geology, see Reference No. 1, and Reference No. 2.

Chapter V.

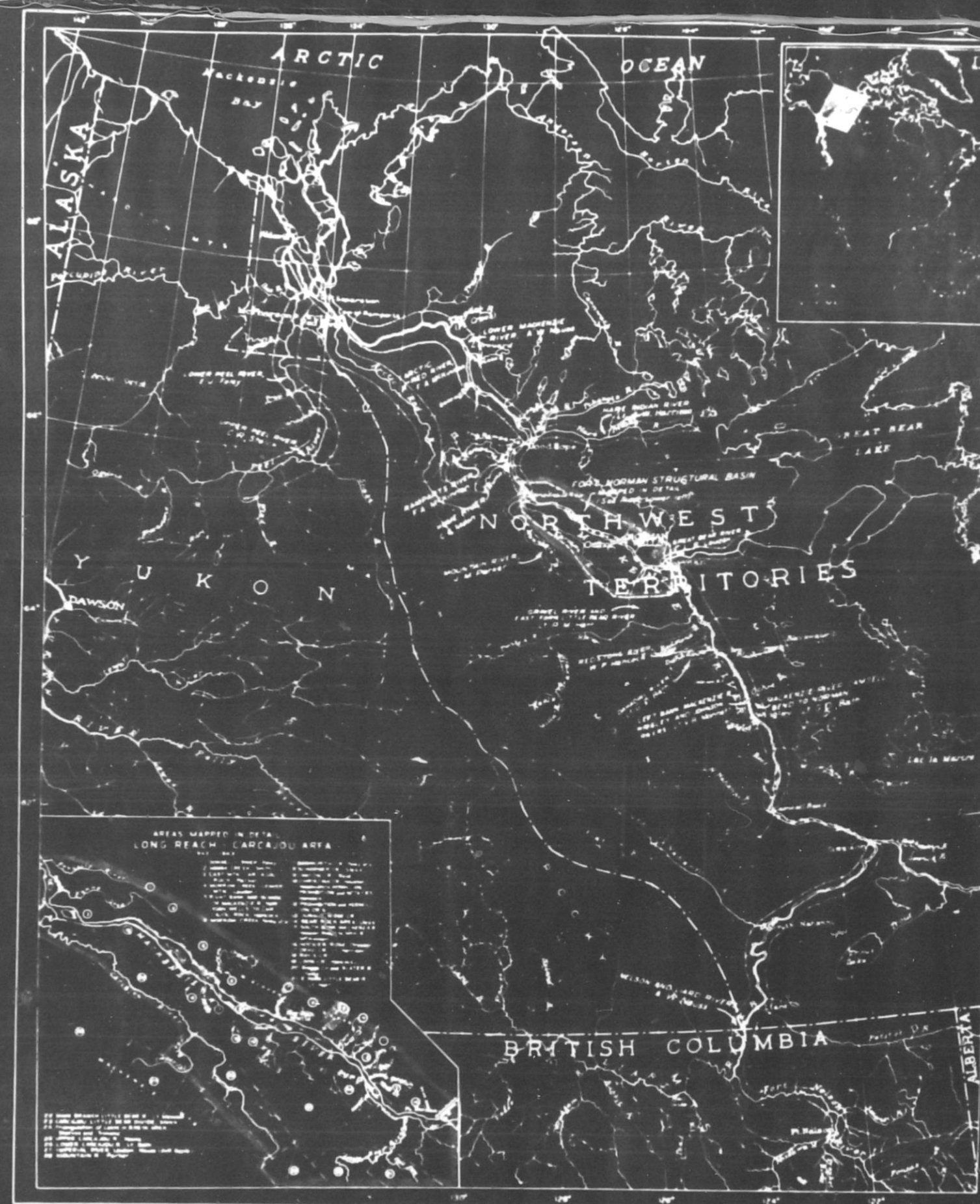
CONCLUSIONS AND RECOMMENDATIONS

Beyond the fact that the basal beds of the Fort Creek formation are slightly bituminous, no geological features of any economic significance were seen in the Canyon Creek area. This survey was conducted primarily for stratigraphic information.

Further work in the area, when the ground is free from snow, would provide more detailed information on the stratigraphy of the locality but there is nothing to indicate that this would provide any data that is not already known in the Norman Wells area. Consequently no further work is recommended.

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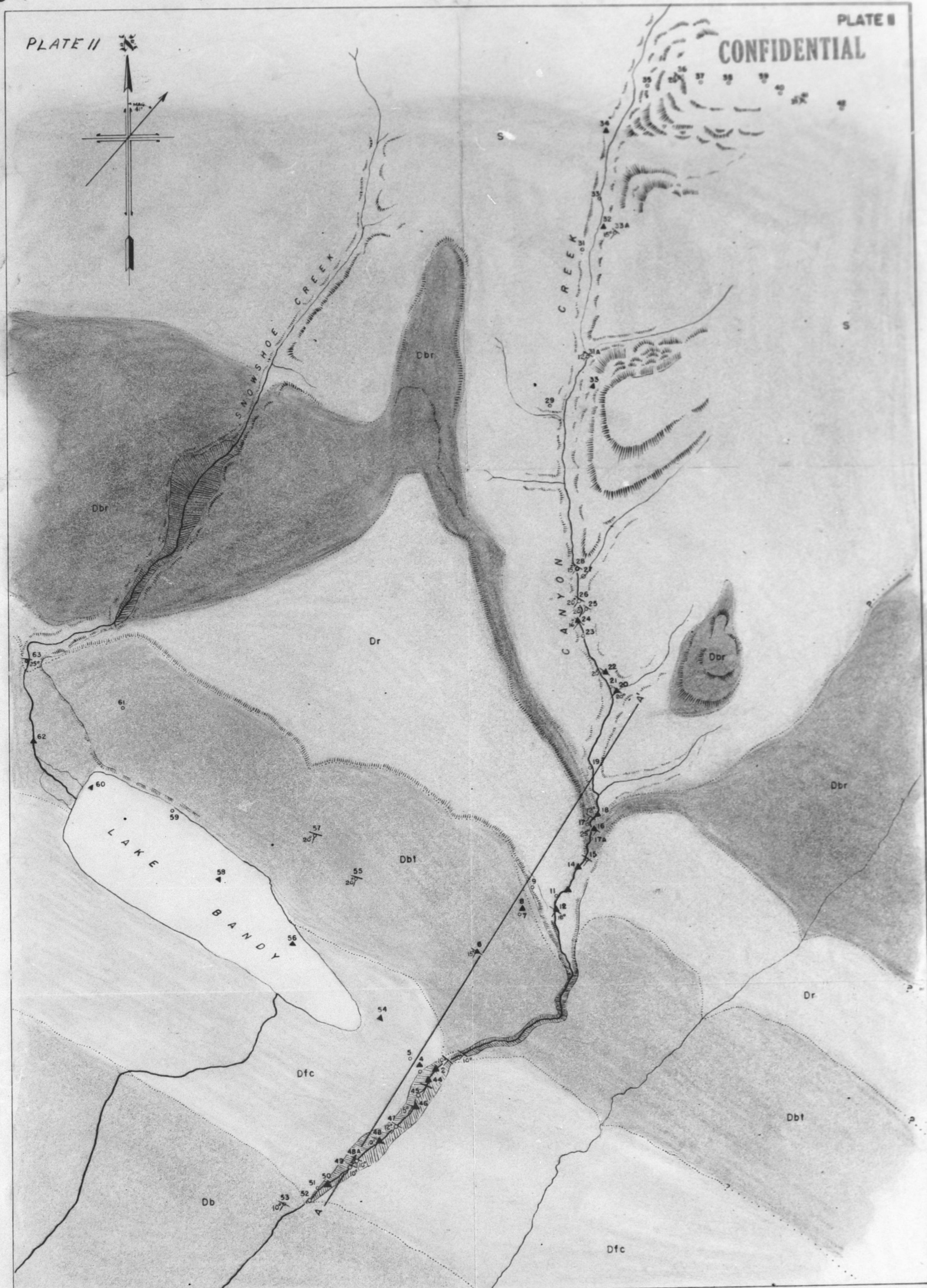


INDEX MAP OF
NORTH WESTERN CANADA SHOWING
LOCATION OF CANYON CREEK AREA



PLATE II

PLATE II
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LEGEND

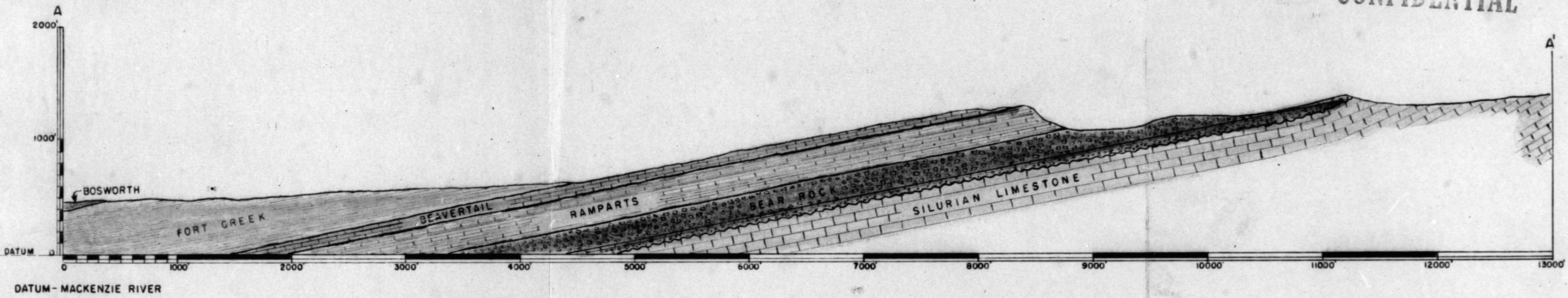
UPPER DEVONIAN	Db	BOSWORTH
	Dfc	FORT CREEK
MIDDLE DEVONIAN	Dbt	BEAVERTAIL
	Dr	RAMPARTS
SILURIAN or DEVONIAN	Dbr	BEAR ROCK
SILURIAN	S	

AREAL GEOLOGY OF
CANYON CREEK
SCALE
0 500 1000 2000 3000 4000 5000 FEET
0 1 2 3 4 5 MILE
Compiled from Plane Table traverse, and from
Aerial Photographs
by
W.M. Reid Geologist
F.A. McKinnon Geologist
J.A. Simons Asst Geologist

KEY

	FORMATION BOUNDARIES
	STRIKE and DIP
	SCARP
	CROSS-SECTION LINE
	PLANE TABLE STATION
	ROD STATION

F2.183



CROSS SECTION : A - A'
To accompany Report on the
CANYON CREEK AREA
SCALE 8" = 1 Mile

W. M. Reid Geologist
F. A. McKinnon Geologist
J. A. Simons Asst. Geologist

COMPOSITE COLUMNAR SECTION CANYON CREEK AREA

SCALE : 1 IN. TO 100 FT.

F. A. MCKINNON

JAN. 1944

