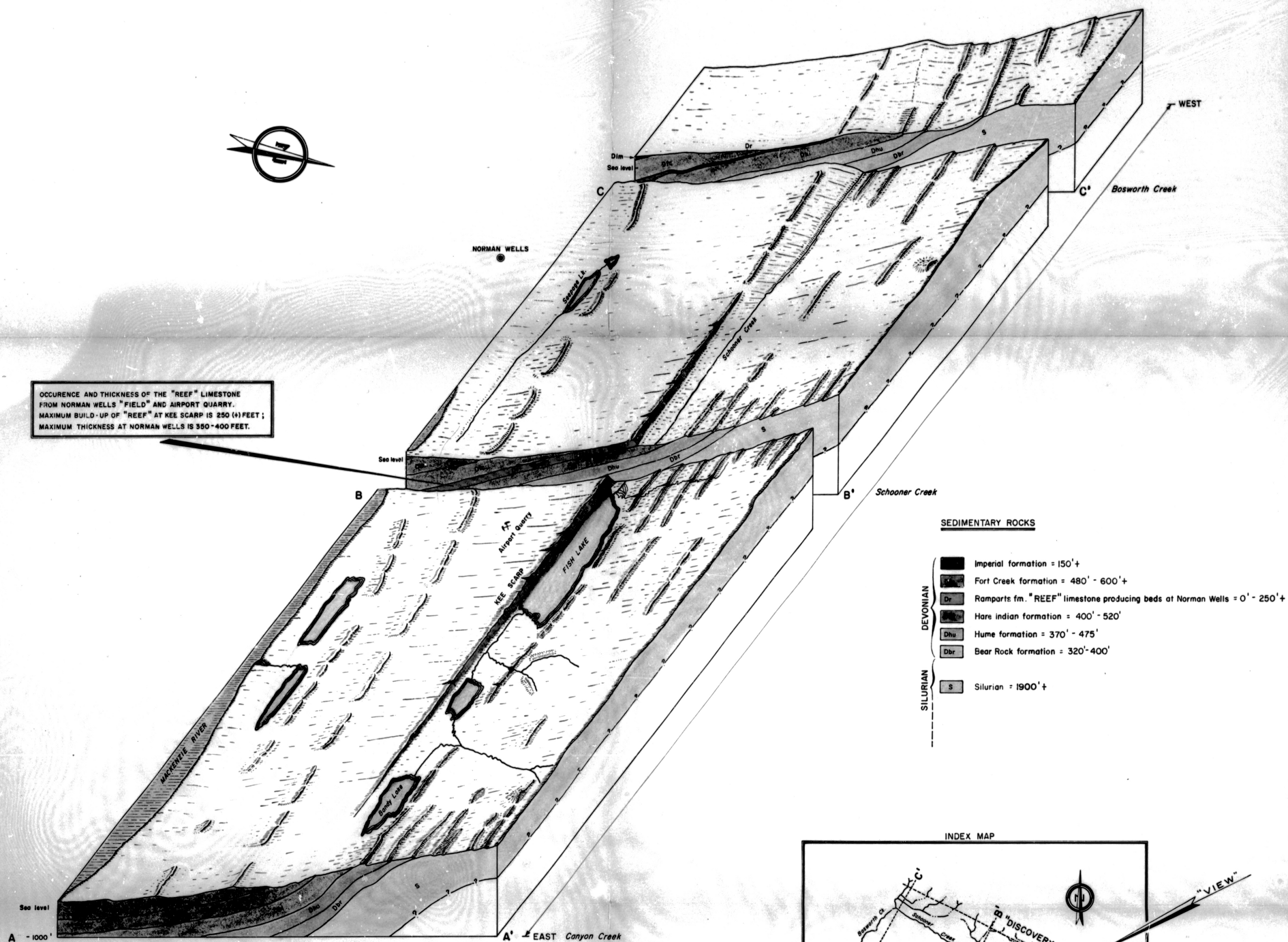
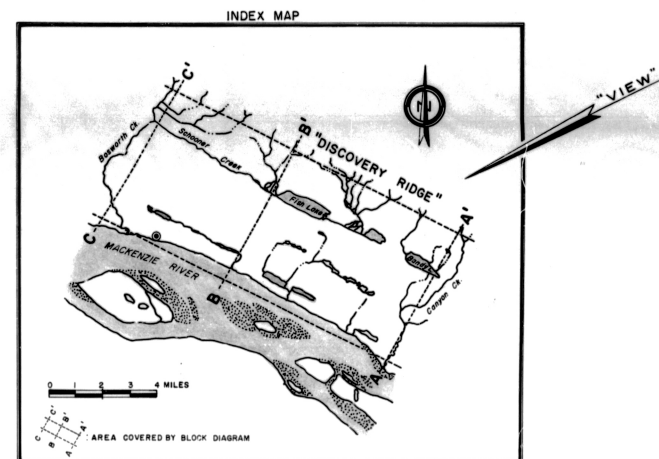


GENERALIZED BLOCK DIAGRAM OF THE "REEF"  
BUILD-UP IN THE RAMPARTS FORMATION AT KEE SCARP,  
JUST NORTHEAST OF NORMAN WELLS, N.W.T.

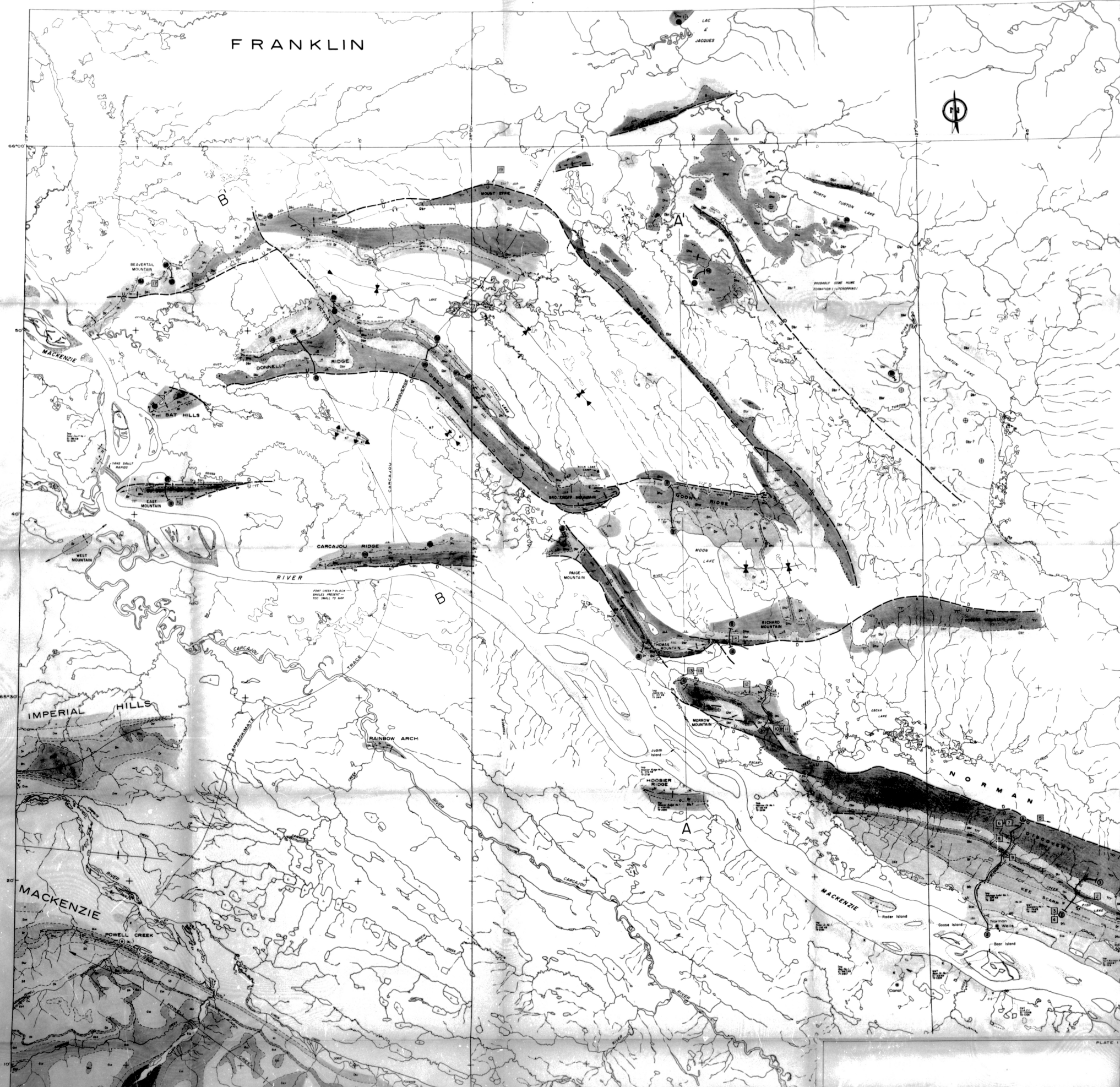


Dip of beds approximate due to difference in horizontal and vertical scales.

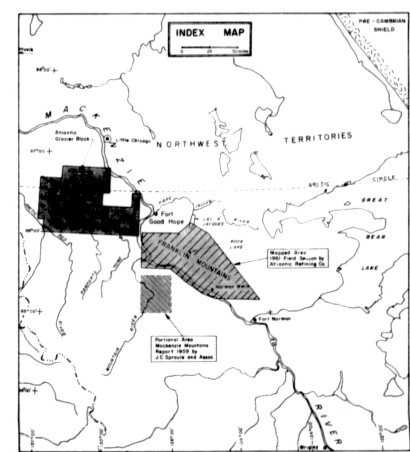
Horizontal scale: 1" = 1 mile  
Vertical scale: 1" = 0.5 mile  
Vertical exaggeration = 2



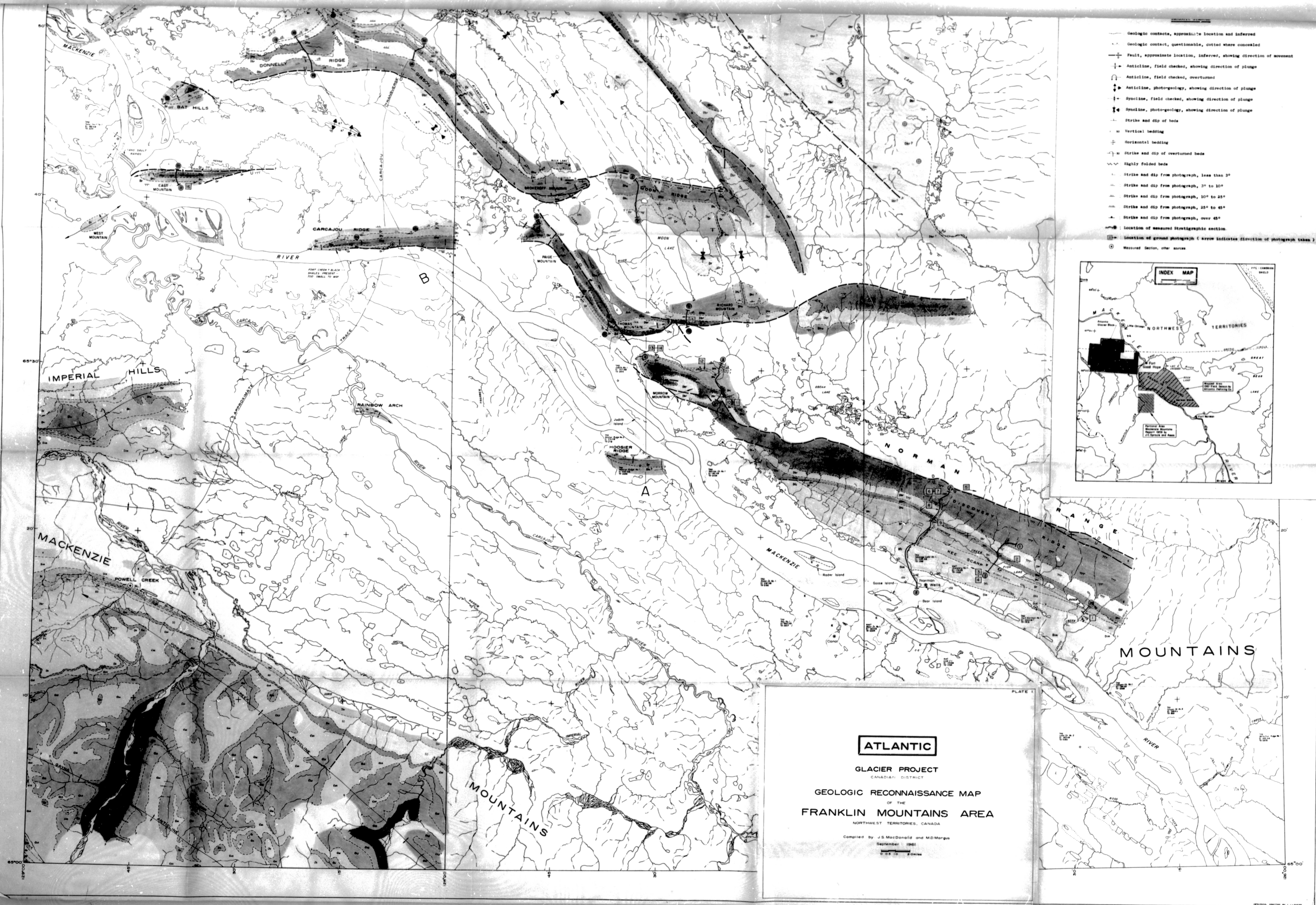




- EXPLANATION**
- SEDIMENTARY ROCKS**
- Lower Cretaceous : Sandstone, Siltstone and Shale
  - Imperial formation : Sandstone and Shale
  - Fort Creek formation : Shale and Siltstone
  - Fort Creek and Hare Indian Formations
  - Hare Indian formation : Limestone
  - Hare Indian formation : Shale and Limestone
  - Hare Indian and Hare Formations
  - Hare formation : Limestone and Shale
  - Bear Rock formation : Limestone, Breccia, Gypsum and Dolomite.
- SILURIAN**
- Silurian Undifferentiated : Dolomite and Limestone
- SILURO-ORDOVICIAN**
- Lower fossiliferous Unit
- ORDOVICIAN**
- Basal Unit
- CAMBRIAN**
- Macdonald Group
- PROTEROZOIC**
- Katherine group Unit 4
  - Unit 3
  - Unit 2
  - Unit 1
- IGNEOUS ROCKS**
- Dike and Sill
- GEOLOGIC SYMBOLS**
- Geologic contacts, approximate location and inferred
  - Geologic contact, questionable, dotted where concealed
  - Fault, approximate location, inferred, showing direction of movement
  - Anticline, field checked, showing direction of plunge
  - Anticline, field checked, overturned
  - Anticline, photo-geology, showing direction of plunge
  - Syncline, field checked, showing direction of plunge
  - Syncline, photo-geology, showing direction of plunge
  - Strike and dip of beds
  - Vertical bedding
  - Horizontal bedding
  - Strike and dip of overturned beds
  - Highly folded beds
  - Strike and dip from photograph, less than 3°
  - Strike and dip from photograph, 3° to 10°
  - Strike and dip from photograph, 10° to 25°
  - Strike and dip from photograph, 25° to 45°
  - Strike and dip from photograph, over 45°
  - Location of measured stratigraphic section
  - Location of ground photograph (arrow indicates direction of photograph taken)
  - Measured Section, other sources









Stratigraphic section No. 26.

# CANYON CREEK SECTION

Approx 1 1/2 miles southeast of Norman Wells.

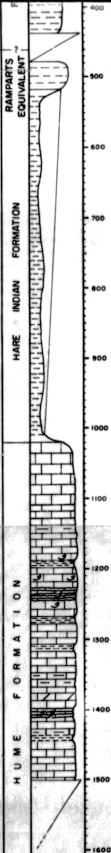
Lat. 65° 15' N, Long. 126° 28' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.S. MacDonald, M.D. Mangus, V.A. Fisher, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
N I A N	U P P E R D E V O N I A N	IMPERIAL FORMATION	000	51FM49	Ss, med-gr-grm, thin-bded, fg to vfg, ang, friable, mic & arg, good por.
			100		
		FORT CREEK FORMATION	200	51FM48	Sh, blk, lam, tab-even bding, med-hd, has conchoidal frac, wthrs in brick-like stacks, has sulphur-yel bloom.
			300		
N I A N	U P P E R D E V O N I A N	FORT CREEK FORMATION	400		
			500	51FM47	Sh, blk, thinly lam, tab-uneven bding, slty, soft, with some concretions of dk-gr-br, very dense ls, has bit. odor, wthrs dull gr-y. Possible lateral equivalent of the Ramparts.
		RAMPARTS EQUIVALENT	600		
			700	51FM46	Sh, lt-gr-grm, thin-bded, wthrs gr-grm; discontinuous outcrops.

# U D E V O N I A N M I D D L E D E V O N I A N H U M E F O R M A T I O N



51FM47

Sh, blk, thinly lam, tab-uneven bding, slty, soft, with some concretions of dk-gr-br, very dense ls, has bit.odor, wthrs dull gr-y. Possible lateral equivalent of the Ramparts.

51FM46

Sh, lt-gr-gm, thin-bded, wthrs gr-gm; discontinuous outcrops.

51FM45

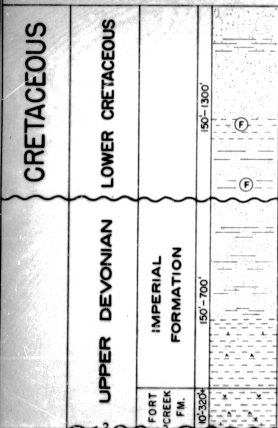
Sh, blk, thin-bded, tab-even, soft, mic, interbedded with sts, blk, thin-bded, hd, mic, and beds of blk ls. Contains some tentaculites.

51FM44

Ls, gr-br to dk-gr-br, thk-bded, tab-even, fg, hd, pelletoid & skeletal, vug por, voids contain calcite and silica; some corals.



# COMPOSITE STRATIGRAPHIC SECTION OF THE FRANKLIN MOUNTAINS

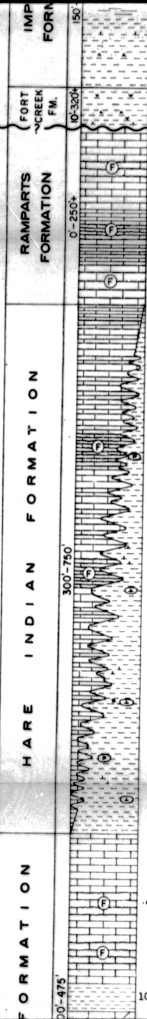


1. Shale, medium grey to black, thin-bedded tabular-even, laminar, parallel-even and micaceous.
2. Sandstone and siltstone, light grey to yellowish-brown, thin-bedded, fine to coarse grained, sometimes argillaceous, locally ripple marked. Contains pelecypods (Inoceramus dowlingi; aff) ammonites (Lemuroceras sp. and Boudanticeras sp.)
3. Sandstone and siltstone; light grey, thin-to-medium-bedded, tabular-even, subrounded, contains carbonaceous specks.
4. Shale, dark grey to black, thin-bedded, fissile, silty and micaceous, becomes more arenaceous up-section.
5. Shale, black, thin-bedded, parallel - even silty and micaceous, may be siliceous, calcareous and bituminous, locally strong petroliferous odor; few dense dark limestone concretions.

# DEVONIAN

## MIDDLE DEVONIAN

### UPPER DEVONIAN



4. Shale, dark grey to black, thin-bedded, fissile, silty and micaceous, becomes more arenaceous up-section.
5. Shale, black, thin-bedded, parallel - even silty and micaceous, may be siliceous, calcareous and bituminous, locally strong petroliferous odor; few dense dark limestone concretions. Weathers sulphur yellow and brick red.
6. Limestone, light grey-brown to dark grey-brown, thin-to massive-bedded tabular even, locally lenticular and nodular, coarse to fine grained, and bioclastic. Has some vuggy and intergranular porosity, voids sometimes contain calcite and bitumen. Some beds are composed entirely of fossils. Fossils are corals, stromatoporoids and brachiopods. Occasionally travertine "case" on weathered surface.
7. Shale, grey-green, calcareous, soft with inter-bedded grey-green, thin-bedded argillaceous limestone. Locally limestone is medium to dark grey-brown, thin bedded, tabular, platy, fine grained and argillaceous. Brachiopods and corals are common.
8. Shale, black, tabular, thinly laminated, micaceous, may contain spherical black limestone and pyrite concretions. Locally very fossiliferous. Contains Tentaculites and spores at base of section
9. Limestone, light to medium grey-brown, medium-bedded, tabular even to nodular, fine to coarse grained, with some vuggy porosity. Locally calcite and bitumen filled voids. May have strong petroliferous odor. Weathers steel-grey. Contains corals, brachiopods, stromatoporoids, some goniatites and trilobites.
10. Minor shale, dark-grey to greenish-grey.

2 of



# DEVON

## MIDDLE

### HUME FORMATION

100'-475'

9. Limestone, light to medium grey-brown, medium-bedded, tabular even to nodular, fine to coarse grained, with some vuggy porosity. Locally calcite and bitumen filled voids. May have strong petroliferous odor. Weathers steel-grey. Contains corals, brachiopods, stromatoporoids, some goniatites and trilobites.
10. Minor shale, dark-grey to greenish-grey.

### HUME FORMATION

11. Limestone, dark grey-brown, thin-to-medium bedded, tabular-even to nodular, fine to medium grained, vuggy porosity, some dolomitic limestone. Voids sometimes contain calcite and bitumen. Weathers steel-grey. Contains corals, stromatoporoids, and brachiopods.

## LOWER DEVONIAN

### BEAR ROCK FORMATION

200'-700'

12. Limestone and dolomite breccia, cemented by matrix of micro-breccia. Locally the Bear Rock may be bedded. Breccia fragments may range from fine grain to boulder size and vary in color from medium to dark-grey-brown. Hoodoo type weathering and a fetid  $H_2S$  odor are common.

Gypsum is present locally and may be found interbedded with dolomite. The gypsum is white to medium grey-brown, thick-bedded, thinly laminated, fine-grained, and silty.

# SILURIAN

L

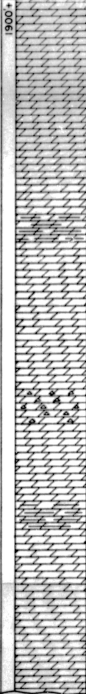
1900+

13. Dolomite light grey-green and purple to medium grey-brown, thick- to thin-bedded, tabular-even, laminated, fine to medium grained, fair vuggy and intergranular porosity; vugs may contain dolomite rhombohedrons. Local irregular rosettes of  $\text{FeCO}_3$  and oolitic chert. Interbeds of dolomite with high argillaceous content.

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5 of 5

Abstracted for  
Geo-Science Data Index

Date \_\_\_\_\_

GLACIER PROJECT

Geological Report of the Franklin Mountains, Norman  
Wells - Fort Good Hope Area, Northwest Territories,  
Canada.

The Atlantic Refining Company



Co-authors:-  
James S. MacDonald  
Marvin D. Mangus

October, 1961.

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#### MEASURED STRATIGRAPHIC SECTIONS

1. Schooner Creek Section, approximately  $5\frac{1}{2}$  miles northeast of Norman Wells (Silurian-Devonian).
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3. Oscar Creek Section, approximately  $20\frac{1}{2}$  miles northwest of Norman Wells (Silurian-Devonian).
4. Morrow Mountain Section, approximately 14 miles southeast of Rock Lake Camp (Devonian).

5. Richard Mountain Section, approximately  $13\frac{1}{2}$  miles southeast of Rock Lake Camp (Silurian-Devonian).
6. Thomas Mountain Section, approximately  $11\frac{1}{2}$  miles southeast of Rock Lake Camp (Silurian-Devonian).
7. Moon Ridge Section, approximately 5 miles east of Rock Lake Camp (Devonian).
8. Paige Mountain Section, approximately 4 miles southwest of Rock Lake Camp (Devonian).
9. South Carcajou Mountain Section, approximately  $13\frac{1}{2}$  miles southwest of Rock Lake Camp (Devonian).
10. Carcajou Ridge Section, approximately  $13\frac{1}{2}$  miles southwest of Rock Lake Camp (Devonian).
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12. Bat Hills Section, approximately  $28\frac{1}{2}$  miles northwest of Rock Lake Camp (Devonian).
13. Loon Roost of Donnelly Ridge Section, approximately 22 miles northwest of Rock Lake Camp (Devonian).
14. Donnelly Ridge Section, approximately 20 miles northwest of Rock Lake Camp (Silurian-Devonian).
15. Victory Ridge Section, approximately 20 miles northwest of Rock Lake Camp (Devonian).
16. Swampy Section, approximately 13 miles northwest of Rock Lake Camp (Devonian).
17. Atlantic Lake Section, approximately  $10\frac{1}{2}$  miles northwest of Rock Lake Camp (Devonian).
18. Wait-Awhile Lake Section, approximately 14 miles northeast of Rock Lake Camp (Devonian).
19. Turton River Section, approximately 20 miles northeast of Rock Lake Camp (Devonian).

20. North Turton Lake Section, approximately 22 $\frac{1}{2}$  miles northeast of Rock Lake Camp (Devonian).
21. Glacial-But Lake Section, approximately 16 $\frac{1}{2}$  miles northeast of Rock Lake Camp (Devonian).
22. East Beavertail Section, approximately 26 $\frac{1}{2}$  miles northwest of Rock Lake Camp (Devonian).
22. Bulldog Lake Section, approximately 30 miles northwest of Rock Lake Camp (Devonian).
24. Beavertail Mountain Section, approximately 31 $\frac{1}{2}$  miles northwest of Rock Lake Camp (Devonian).
25. Lac A Jacques, approximately 29 miles northeast of Rock Lake Camp (Devonian).
26. Canyon Creek Section, approximately 11 $\frac{1}{2}$  miles southeast of Norman Wells (Devonian).

### ABSTRACT

A geologic reconnaissance mapping program was carried out in the Franklin Mountains from Norman Wells to south of Fort Good Hope. The area covered lies roughly within 65°00' to 66°10' north latitude and 126°00' to 129°00' west longitude.

The total sedimentary column present is estimated at 9,000 to 10,000 feet thick. The oldest rocks examined were thought to be of Silurian age, and the youngest Lower Cretaceous. The greatest thickness of total section exposed is approximately 6,000 feet. The Middle Devonian strata, which includes the Norman Wells producing beds, range up to approximately 1,400 feet in thickness.

The Kee Scarp at Norman Wells and the producing "reef" in the Norman Wells oilfield were found to correlate with the "Ramparts" along the Mackenzie River just south of Fort Good Hope. The Ramparts formation thickens considerably off either flank of the northeast trending Carcajou transverse high. This ancestral high was instrumental in initiating lime deposition and reef growth in the Ramparts. It is believed to have also been the barrier or restriction which resulted in the Bear Lake evaporite basin.

There are two major unconformities: 1) between Devonian and Silurian; 2) between Cretaceous and Devonian; and two minor questionable unconformities: 1) between Hume and Bear Lake; 2) between Upper Devonian (Fort Creek) and Middle Devonian (Ramparts).

High-angle reverse faults and asymmetric folds, which trend principally northwest and west, are characteristic of these mountains. The present day structural pattern is the result of compressional Laramide disturbances which followed to some extent pre-existing lines of weakness.

The most favorable formations for petroleum reservoirs are the Devonian Ramparts and Hume formations and the basal sandstone of the Cretaceous Sans Sault group.



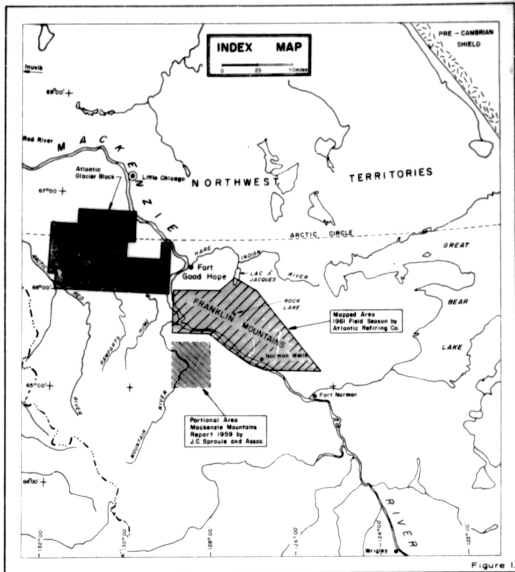


Figure 1

### INTRODUCTION

The area covered in this report roughly lies between 65° 00' and 66° 10' north latitude and 126° 00' and 129° 00' west longitude, and covers an area of approximately 3,500 square miles.

A study of the Norman Wells to Fort Good Hope Area was undertaken to determine the geologic history of the northern Franklin Mountains. The Devonian strata have reef build-ups, and an attempt was made to map reef trends and facies relationships. In particular, there are good exposures of the Devonian Ramparts formation which correlate with the producing beds of the Norman Wells oil field. A detailed sampling of all Ramparts and Hume outcrops was carried out by the field party. The study of the surface geology was begun as an aid in the interpretation of the subsurface geology underlying The Atlantic Refining Company's Glacier Block.

The field party consisted of the following: two Atlantic geologists, two temporary field assistants - Donald Holmes and Victor Fisher; a cook - Richard Chambers; a helicopter pilot - Allen Downey, deceased, (replaced later by J. Chagnollaud) and an engineer - T. Lawrence (replaced later by J. Gorden). The helicopter was supplied by Foothills Aviation, Calgary. The Pacific Western Airlines "Beaver" aircraft based at Norman Wells was chartered, as needed, to move camp supplies and personnel.

A total of 6 weeks, beginning June 9, was spent in the field. The party stayed at the Imperial Oil and P.W.A.'s camps for the first three weeks and then moved to the Rock Lake field camp for the remainder of the season.

This report includes: one geologic map, one generalized stratigraphic section, twenty-six stratigraphic sections, twenty-one photos of typical outcrops and one block diagram of Ramparts Reef, (Kee Scarp).

Previous Investigations. G. S. Hume of the Geological Survey of Canada (1954), summarized the reports of the Lanol project and early geologists in his publication. H. C. Lenz (1959) and H. C. Basset (1960) are the most recent reports available.

Acknowledgements. The fossil determinations were made by Dr. C. H. Crickmay of the Imperial Oil Research Laboratory, Calgary, Alberta. Mr. Jack Trifaux supervised the drafting and gave many helpful suggestions.

### INTRODUCTION

A group of eight sedimentary formations have been mapped in the Norman Wells - Fort Good Hope area of the Franklin Mountains. They range in age from Silurian to Lower Cretaceous and are discussed as follows:

#### TABLE OF FORMATIONS

<u>Age</u>	<u>Formation</u>	<u>Lithology</u>	<u>Maximum Thickness</u> (feet)
MESOZOIC			
Cretaceous			
Lower	Sans Sault group	Sandstone and shale	1,300
- UNCONFORMITY -			
PALAEZOIC			
Devonian			
Upper	Imperial formation	Sandstone and shale	700
	Fort Creek formation	Bituminous shale and siltstone	320 +
- UNCONFORMITY -			

<u>Age</u>	<u>Formation</u>	<u>Lithology</u>	<u>Maximum Thickness</u>
PALEOZOIC (continued)			
Devonian			
Middle	Ramparts formation	Reefoid Limestone	250 +
	Hare Indian formation	Calcareous shale and limestone	750
	Hume formation	Limestone and minor shale	475
- UNCONFORMITY ? -			
Lower	Bear Rock formation	Dolomite, limestone, breccia and gypsum	700
- UNCONFORMITY -			
Silurian	Unnamed	Dolomite	1,900 +

### Silurian

#### Silurian Undifferentiated

Name and Type Locality. The Silurian rocks discussed in this report are the oldest rocks in the mapped area. In the past, these beds were called the Mt. Renning formation by T. A. Link and Canol geologists (Hume, 1954 pp. 14-20), but because of the lack of good faunal evidence and the incorrect correlations that have arisen in the past, the name Mt. Renning was not used for this report.

Distribution. The Silurian rocks are exposed throughout most of the mapped area as long, askew, strike ridges which have been brought to the surface by faulting. These ridges vary from 6 to over 40 miles in length and from one-half to almost 8 miles across the strike.

Lithology and Thickness. Throughout the mapped area the Silurian is composed of relatively uniform dolomite with minor intercalated units of dolomitic limestone. The dolomite is usually light-to medium-grey-green, medium-to massive-bedded, fine-to coarse-grained, hard and sugary. The dolomite weathers a very characteristic steel-to-pinkish-steel-grey and can usually be distinguished from the Devonian carbonates by this property. Scattered sporadically through the dolomite are irregular ropy masses of chert which become more common near the top of the section.

The chert occurs in both the amorphous and oolitic form and varies from white to medium-grey. These cherty masses are several inches to 3 feet in length and one-quarter to 4 inches thick. The top of the section also becomes more vuggy (Photos 6 & 7). The vugs are usually bean or irregular shaped, but it is not uncommon for them to be spherical. They range in size from one-quarter to 2 inches in length, with  $\frac{3}{8}$  inches being the average. In many instances, the vug fillings resemble poorly and partially replaced fossils, the fillings being both coarse carbonates and quartz crystals.

In the Discovery Ridge and Robert Mountain areas, the occurrence of chert and vugs seem more noticeable and they are well exposed at the top of the section. These vugs differ slightly from the above mentioned; they range in size from one-quarter to three-quarters of an inch and are lined with drusy quartz. These vug linings weather out of the rock as sharp, rough protrusions above the surface of the dolomite. Locally, the dolomite shows good porosity, both vugular and intergranular, with field estimates as high as 12 to 15%. Intraformational breccia or conglomerate is also present at the top of the section at these two localities. The breccia consists of angular dolomite fragments that range in size from  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches. The breccia or pebbles are considered to be the same dolomite as the matrix.

Near the top of the section the weathered expression of the smooth dip slopes of the Silurian change sharply. Here the topography becomes rough and hummocky like the overlying Bear Rock formation. From aerial photos, it is very difficult to distinguish the contact between the Bear Rock and Silurian. This change in weathering is thought to be the result of both brecciation and pre-Bear Rock erosion of the Silurian.

The interbedded dolomitic limestone is scattered sporadically throughout the dolomite. The limestone is usually light-greenish-grey to medium-grey-brown, fine-to medium-grained, re-crystallized and very hard. The rocks are thin-to medium-bedded, weather a medium-dove-grey, and are rough and sugary on the surface. The porosity is generally poor in the limestones.

Only partial sections of the Silurian rocks are exposed in the mapped area. The thickest section measured was in the vicinity of Discovery Ridge and along Bosworth Creek. At Discovery Ridge, 1,900+ feet of dolomite and minor dolomitic limestone were measured. A minimum thickness of 400+ feet was measured along a fault on Connelly Ridge, while a minimum of over 1,800+ feet was estimated at Gibson Peak and Mount Effie. We believe it is safe to assume that 2500 to 3000 feet of Silurian is not out of line for the mapped area.

Contact Relationships. The base of the Silurian carbonates was not seen. Neither was the contact between the overlying Devonian Bear Rock breccias and evaporites, but from existing regional evidence of other geologic investigations in adjacent areas and work done by Atlantic in the Mackenzie Mountains, it is assumed that the Silurian is unconformably overlain by the Lower Devonian Bear Rock formation.

Age and Correlation. No paleontological evidence was found in the

Silurian by the writers, but Niagaran age fauna found by Canol geologists (Hume 1954 pp. 14-20) substantiates the age of these beds as Middle Silurian.

It is possible to correlate at least partial equivalents of these beds southwest into and along the Mackenzie Mountains.

Dr. C. H. Crickmay told us that in the Franklins some fauna identified as Niagaran belong more properly to the Ordovician. This may then place much of the "Silurian" section in the Ordovician.

#### Devonian

For the convenience of the readers, a Devonian nomenclature and correlation chart has been incorporated into this report. This chart shows the correlation of the nomenclature used by J. C. Sproule and Associates for the stratigraphy of the Mackenzie Mountain Report, 1960, the nomenclature used by The Atlantic Refining Company in the Richardson Mountains - Knorr Range Report - 1960, and the nomenclature adopted for this report. (Figure 2)

#### Lower Devonian

##### Bear Rock Formation

Name and Type Locality. Canol Geologists (Hume 1954, p. 20) and Atlantic use the name "Bear Rock" to denote strata underlying the Hume formation and overlying the Silurian. The origin of the name is obscure. The type locality is at Bear Rock near Fort Norman at the junction of the Great Bear and Mackenzie Rivers.

Distribution. The Bear Rock formation is present throughout the mapped area. It is best exposed in narrow outcrop pattern along the dip slopes of the anticlinal and fault ridges. Other exposures occur as flat lying strata in the northeast corner of the mapped area.

TABLE OF DEVONIAN NOMENCLATURE

Atlantic Ref. Franklin Mountains Report - 1961	Lithology in report area	J. C. Sproule Mackenzie Mountains Report - 1960	Atlantic Refining Co. Richardson Mtns. - Knorr Range Report - 1960
Imperial Fm. (Dim)	Sandstone and shale	Imperial fm.	Imperial Fm. Upper Fort Creek Fm.
Fort Creek Fm. (Dfc)	Black shale	Fort Creek Fm.	(Lower) Fort Creek Fm.
Ramparts Fm. (Dr )	Reefal limestone and bedded limestone	Ramparts Fm. Upper limestone member Middle shale member Lower limestone member	Not recognized
Hare Indian Fm. (Dhi)	Grey and green shale and some limestone  Black shale		Hare Indian River shales
Hume Fm. (Dhu)	Bedded and reefoid limestone, dark shale		Grey massive bioclastic limestone
Not recognized		Not recognized	Lower Devonian shales <u>Local reefing</u>
Bear Rock Fm. (Dbr)	Dolomite and limestone, breccia and gypsum locally	Bear Rock Fm.	Not recognized in Richardson Mountains In Knorr Range - Bear Rock Fm.
<p>Middle Devonian Faunal Zonation by Dr. C. H. Crickmay</p> <p>Ramparts Fm. - <u>Stringocephalus</u> Hare Indian Fm. - <u>"arctica"</u> Hume Fm. - <u>"verrilli"</u> ( <u>"adoceta"</u> )</p>			



Lithology and Thickness. Three major lithologic divisions of the Bear Rock ... may be mapped are as follows: 1) gypsum and anhydrite beds, 2) carbonate breccia and bedded carbonates, 3) bedded carbonates. The gypsum and anhydrite beds are located mainly east of a line drawn just to the east of Carcajou Ridge and extending in an arc from the northeast to the southeast. The carbonate breccias are present in a transition belt between the evaporite beds and the bedded carbonate beds to the west. The approximate western limit of the breccia is located along a line about 20 miles west of Fort Good Hope and extending southwesterly to a point about 20 miles west of Yadek Lake. West of this line, the Bear Rock is bedded carbonate. (Sproule, 1960, pp. 25-26).

The gypsum outcrops are badly weathered. The gypsum is white to light-grey, thin-bedded, soft and contains minor lenses of hard, micritic, dark-grey dolomite. Underlying the mapped area the brecciated zone consists of angular fragments of limestone and dolomite with dolomite predominating. The size of the individual fragments ranges from fine-grained to boulder. These fragments do not appear to have any particular orientation although some bedding planes are present. The bedding varies from thin to thick and laterally may be obliterated.

An even bedded dolomite may occur at the top of the Bear Rock formation and its thickness may vary from several feet to over 175 feet. This dolomite is usually medium-grey-brown, thin-to medium-bedded, fine-to medium-grained, micritic and hard. The rock weathers light-grey-brown and gritty on the surface.

The breccia is probably a collapse breccia, due partly to leaching

of the interbedded evaporites and partly to tectonism. The Carcajou transverse high occupies a position roughly paralleling the breccia-evaporite boundary. The occurrence of the breccia is coincident with a tectonic belt or zone.

The bedded carbonate unit was not examined in the field by the authors, but Sproule (1959 pp. 25-28) divides the Bear Rock west of the Gayna River into an upper limestone unit and lower dolomite unit. The description is as follows: "An upper limestone unit which is light-grey to brown, thick-to massive-bedded, crypto-crystalline to litnographic, waxy, with scattered grains of white calcite, alternating with intervals of dark-brown, dense, platy limestone which is somewhat argillaceous and bituminous. The more massive beds show fine color lamination. The basal contact of the upper limestone member with the underlying brown, medium-bedded, fine-grained dolomites is locally abrupt, but more commonly is drawn within a zone of alternating brown weathering dolomite and light-grey weathering limestone beds."

The Bear Rock has an  $H_2S$  odor on freshly broken surfaces, and drill stem tests have recovered sulphurous water. Springs of sulphur water associated with the Bear Rock are fairly common throughout the mapped area. Along Moon Ridge, Reece Ridge and between Richard and Robert Mountains many sink holes and collapse features were seen.

In a bottle shaped belt from Norman Wells to East Mountain, the Bear Rock maintains a fairly constant thickness of roughly 300 feet. Outside this belt the Bear Rock thickens to over 600 feet. West of East Mountain there is a rapid basinward thickening of the Bear Rock strata.

Contact Relationships. The contact with the underlying Silurian was not seen, but outside the mapped area the contact is sharp and disconform-

able. The contact with the overlying Hume limestones is distinct and sharp in those regions where the Bear Rock is composed of breccia and gypsum. In those areas where the upper Bear Rock beds are bedded carbonates, the contact with the overlying Hume is picked at the top of the uppermost occurrence of dolomite and the appearance of fossil-bearing beds. The contact with the overlying Hume may be disconformable.

Age and Correlation. No fossils were found in the Bear Rock strata by the field party. A Lower Devonian age or early Middle Devonian was assigned to fauna found in the Mackenzie Mountains. The writers prefer a Lower Devonian age for the Bear Rock. Present information is too limited for broad regional correlations at the present time, but Bear Rock strata were deposited widely throughout the Northwest Territories. These strata extend from the Pre-Cambrian shield into Yukon Territory, southward into Alberta and northeastern British Columbia and north to at least 68° north latitude.

#### Middle Devonian

##### Hume Formation

Name and Type Locality. H. C. Bassett (1860) introduced the name Hume for a succession of Middle Devonian limestone and shale which overlie the Bear Rock formation and underlie the Mare Indian formation. The type section is located on the east branch of the Hume River at 65° 20' 30" north latitude, 129° 58' 00" west longitude. The term Hume superseded the name Lower Limestone member, of the Rapart formation, which has been used in previous company reports (Figure 2).

Distribution. From Norman Wells to East Mountain, in a northwest-southeast direction, the Hume beds have a tabular form and vary in thickness from 200 to 400 feet. These strata cover the mapped area from Lac A Jacques in the

north to Kelly Lake in the south and west to the Mackenzie River.

Lithology and Thickness. A detailed description of the Hume at the type locality is contained in Bassett's report (1963 p. 10).

In outcrop the Hume presents a characteristic undulating profile. In the Norman Wells area the Hume limestone is medium-to dark-grey-brown, sublithographic and locally fossiliferous. Calcite veining is common. The upper part of the section is marked by a cliff-forming limestone approximately 100 feet thick which is medium-to massive-bedded. The underlying beds are composed of predominantly grey shale and interbedded thin-bedded argillaceous limestone. Resting directly on the Bear Rock is a sequence of thin-bedded dark-grey-brown sublithographic limestone.

To the northwest of Moon Lake the strata appear to be more fossiliferous. Corals, stromatopora, brachiopods, gastropods and trilobites are common. The fossil beds may have nodular bedding which in part is due to colonial corals upright in growth position and stromatopora in the shape of cabbage heads. The corals and stromatopora often have a strong bituminous odor and when cracked open the central core may contain bitumen. The massive beds are composed chiefly of bioclastic limestone and are generally fine-grained, medium-to dark-grey-brown and weather steel-grey.

Northwest of Moon Lake, predominantly ridge sections were measured. In the Norman Wells area most of the measured sections occurred along stream cuts. The difference in weathering characteristics contributes to the difference in appearance of Hume outcrops in these two areas.

Over the mapped area the Hume varies in thickness from 100 to 475 feet. The greatest thickness is developed immediately around Norman Wells and in the East Mountain area. West and south of East Mountain the Hume

thickens rapidly. A pronounced thinning occurs in the vicinity of Carcajou Mountain which separates Norman Wells area from East Mountain area.

Contact Relationship. The contact with the overlying Hare Indian is drawn at the base of a sequence of shales or thin bedded argillaceous limestones and the first occurrence of resistant cliff-forming limestone. Immediately overlying the Hume in the Norman Wells area a black shale is common and this contact appears to be sharp and conformable (Photo 9). A common fauna in the basal Hare Indian beds and upper Hume strata suggests these beds may be facies equivalents.

The base of the Hume is drawn at the first appearance of bedded dolomite, breccia or gypsum. The contact may be locally conformable and sharp. Over much of the mapped area the zone of contact is eroded and underlies valleys. In Carcajou Canyon and in the Gambill Mountains the contact with the Bear Rock is sharp, and irregularities along it were interpreted as indicative of a disconformity (Baine 1954, p. 21).

Age and Correlation. A Middle Devonian "verrilli" and "adoceta" fauna are common in Hume strata. The following fauna were collected: 61 FC1 Billingsastrea verrilli, Spinatrypa dysmorphosticta, Atrypa arctica, Spinulicosta aff. stainbrookii. 61 FMGR Atrypa operanta, Schuchertella adoceta, 61 FM20 Billingsastrea trichomisca, Utaratula acupicta, Mesophyllum sp., Bucella sp. 61 FM21 Billingsastrea trichomisca, Favosites cf. helderbergiae aulopora sp., Alveolites sp.n., Atrypa operanta, Spinatrypa andersonensis, Schuchertella adoceta; 61 FM57 Stromatopora sp., Billingsastrea Verrilli spinatrypa sp., Atrypa arctica, Anothyris sublineata bucella, 61 FM70 Madrophyllum sp., Schuchertella adoceta, 61 FM120 Schuchertella

thickens rapidly. A pronounced thinning occurs in the vicinity of Carcajou Mountain which separates Norman Wells area from East Mountain area.

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adoceta, 61 FM 126 Alveolites sp.n., 61 FM131 Acanthophyllum sp., Thamnopora sp., Spinatrypa cf. andersonensis, Atrypa cf. operanta ambothisis sp. Reticularia sp.

The Hume formation is one of the most widespread units of the Devonian. It has been reported in the Anderson River country within the Arctic circle and south in the Nahanni River country of the Southern Territories. These strata may also be traced west from the Franklin Mountains across the Mackenzie Mountains and into the Ogilvies near the Alaskan border. It may be correlated with the Nahanni formation and the Presqu'île dolomite of Great Slave Lake.

#### Hare Indian Formation

Name and Type Locality. Kindle and Bosworth (1921) first described the Hare Indian formation at the Hare Indian River near its junction with the Mackenzie River by Fort Good Hope. Hume (1954) described a more complete section of the same stratigraphic interval from exposures in a canyon of the Mountain River at Imperial Anticline. In this report, Hume's type section is considered to be more representative.

Distribution. The Hare Indian is present throughout the mapped area. Outcrops in the Franklin Mountains are spotty and it underlies a conspicuous valley between cliffs formed by Hume and Ramparts limestones. Along Bosworth and Canyon Creeks there are small outcrops of the basal black shale. In the stream beds, chips of greenish-grey calcareous shale may be found. Along Beavertail Mountain, the Bat Hills and East Mountain there are spotty outcrops of platy argillaceous Hare Indian limestone.

Lithology and Thickness. The Hare Indian shale is soft, grey-green and strongly calcareous and has some interbedded thin-bedded, grey-green, argillaceous, limestone. Many of the highly weathered outcrops have

an abundant Middle Devonian "artica" fauna lying on the surface. In the Beavertail Mountain area a characteristic grey-green platy argillaceous limestone is present. The Hare Indian may have a soft black shale at the base which is present at Bosworth and Canyon Creeks. This shale very often contains Tentaculites. Very few outcrops of this black shale have been preserved. In the lower part of the Hare Indian, spores have been found in subsurface samples.

The thickness of the Hare Indian may vary from 100 to 600 feet. A sausage-shaped thick occurs in the Norman Wells-Judith Island area (from subsurface and surface sections). West of East Mountain, there is a gradual basinward thickening. Between East Mountain and Norman Wells, in the vicinity of Carcajou Mountain, there is a pronounced thinning of the Hare Indian.

Contact Relationships. The contact with the overlying Ramparts is gradational and it is generally placed at the base of a predominantly limestone sequence. In the general area north of Moon Lake and in several sections, the top beds of the Hare Indian consisted of nodular, fossiliferous, thin-bedded limestone. These beds were overlain by a more massive Ramparts limestone of similar lithology. The contact is drawn at the base of the massive limestone where large brachiopods (Stringocephalus chasmognathus) were found.

The contact with the underlying Hume is placed at the base of the Hare Indian black or grey shale and the top of the Hume massive limestone. This contact appears to be generally sharp and conformable, although strata mapped as Hume and as Hare Indian on the basis of their



lithologies were found to contain a common fauna, (i.e. 61 FM130, 61 FM127, 61 FM123, 61 FMg40). Thus, the contact between Hare Indian and Hume may have a similar gradational relationship as the Hare Indian-Ramparts contact.

In the region of Carcajou Mountain and along the trend of the Carcajou transverse high (Plate 1) there appears to be coincident thinning and thickening of the Ramparts, Hare Indian, and Hume formations. It is thought that the Carcajou Transverse high has had a marked influence on sedimentation and initiated facies changes in the Hare Indian.

Age and Correlation. The Hare Indian very often contains a rich Middle Devonian "arctica" fauna. The following fossils were collected: 61 FMg30, Parallelonora sp., Caunopora sp., Favosites sp., Alveolites, Spinatrypa sp., Atrypa arctica, paracyclas sp., Dechenella, 61 FM 130, Favosites cf. helderbergiae, Thamnopora sp., Spinatrypa dysmorphostrota, Atrypa Arctica, 61 FM23A Thamnopora cf. limitaris, Spinatrypa cf. andersenensis, 61 FMg 24, Metriophyllum Thamnopora cf. limitaris, Spinatrypa sp., Ambothisis meristoides, Paracyclas sp., Dechenella sp., 61 FM106 Stromatoporoidea, Caunopora sp., Metriophyllum sp., indet. Spinatrypa sp. indet., 61 FM122 Thamnopora sp., Leiorhynchus sp., Pugnoides sp., Ambothisis meristoides, 61 FM128 Pugnoides sp., Ambothisis meristoides, A. Sublineata.

Regionally, a similar fauna has been collected from bituminous limy shales of the Pine Point formation at its type locality on Great Slave Lake and also in the Hare Indian shales, western Mackenzie Mountains and Knorr Range. It is found as far south as Fort Simpson and may be traced west across the Mackenzies and into the Richardson Mountains. None has been reported north of the 66° latitude and its eastern limit north of Norman Wells is defined roughly by longitude 127°.

### Ramparts Formation

Name and Type Locality. The type section for Ramparts is located at the "Ramparts" along the Mackenzie River just southwest of Fort Good Hope. Hume (1954, p. 27) designated this limestone exposure as "Ramparts". Campbell (Sproule, 1959, p. 20) has given a summary description of the type section in his report. This name will supersede the name Upper limestone member of the Ramparts formation previously used by The Atlantic Refining Company. (Figure 2).

Distribution. The Ramparts extends in a northwesterly direction from Norman Wells in the south to approximately 67° north latitude. These strata occupy a band which is 80 miles wide in the south and tapers to 40 miles in the north.

Lithology and Thickness. In outcrop the Ramparts is usually represented by a massive cliff-forming limestone, which is very often underlain by less resistant thin-bedded nodular limestone. The topographic form is generally lenticular which is an expression of both textural changes and thickness variation in the strata.

The Ramparts formation is thought to be primarily bioclastic and reefoid. The limestone is generally light-grey-brown, thin-to massive-bedded, moderately to very fossiliferous. Some beds consist almost wholly of corals and stromatoporoids and may have numerous very thin black shale partings. The individual fossils or fossil fragments may range in size from pebble to boulder. These beds are probably reefal or represent reef build-ups. The finer bioclastic beds may have grain sizes ranging from very fine-grained to coarse and may possibly represent off-reef bioclastic.

In the Canyon Creek section (No. 26) southeast of Norman Wells the Ramparts limestone is missing. At the same stratigraphic interval as the Ramparts, a black shale is present. The lithology of this shale is similar to the Fort Creek, but because no Ramparts limestone is present it may be a lateral time equivalent of the Ramparts.

The Ramparts is divided into a lower and upper unit. The separation is made on the occurrence of a thin black shale unit. The upper and lower units are similar in lithology and can be correlated from the type locality into the subsurface at Norman Wells.

A maximum build-up occurs in the following two areas: 1) Norman Wells - Judith Island; 2) Powell Creek - East Mountain. The Norman Wells - Judith Island build-up is sausage-shaped and attains a thickness in excess of 400 feet. Within  $\pm$  6.5 miles the Ramparts beds may thin from over 500 to 0 feet. In the Powell Creek - East Mountain area the Ramparts appears to be more tabular and may exceed 500 feet in thickness. Along the Mountain River just south of the Imperial Anticline a thickness of over 800 feet has been reported. This is a structurally complex area and a thickness of over 800 feet may not represent the depositional thickness.

Contact Relationships: The contact between the Ramparts and the underlying Hare Indian shale is generally gradational. The Hare Indian shale grades laterally into limestones with a lithology similar to the Ramparts. The contact has been picked on the occurrence of Stringocephalus cf., chasmognathus and at the base of a predominantly limestone sequence.

The overlying Fort Creek shale has a sharp contact with the Ramparts. The contact is thought to be disconformable. At the Airport Quarry northeast of Norman Wells the Fort Creek shale appears to slightly truncate the Ramparts limestone (Photo No. 3). These strata thin

over the Ramparts "highs" and thicken in the "lows". Downstream from Fort Good Hope and in a wide area north to Little Chicago there is a basal Fort Creek sandstone. In the same general area erosional truncation may be demonstrated. There is, therefore, good regional evidence for a disconformity, (Hume, 1954, pp. 34 - 40).

Age and Correlation. The index fossil Stringocephalus cf., chasmognathus is characteristic of the lower beds of the Ramparts. Fossils collected in the Ramparts are as follows: Stringocephalus cf., chasmognathus; 61 FC1, 61 FM3 25, 61 FM26, 61 FM76, 61 FM108, QW246 Favosites (Sproule 1960) sp., 61 FM325, Alveolites vallorum 61 FM26, 61 FM108 Carverhynchus cf. castanea 61 FM76, Ambothisis meristoides 61 FM76. In addition, the following fauna have been collected: Stromatoporoidea indet., Acanthophyllum sp., Thamnopora sp., Spinatrypa sp., Reticularia sp. n.

The Ramparts beds may be correlated with the Elk Point Group of Northern Alberta and British Columbia.

#### Upper Devonian

##### Fort Creek Formation

Name and Type Locality. The Fort Creek formation was first described and named by Kindle and Bosworth in 1921 on Thunder River (Fort Creek on old maps, Hume 1954 p.34 ). This river joins the Mackenzie River about 120 miles downstream from Fort Good Hope.

The name Fort Creek, as used in this report, is restricted to the black bituminous shales that directly overlie the Ramparts formation.

Distribution. In the mapped area the exposures of Fort Creek occur as very sparse and sporadic stream cuts in glacial mantled lowlands. The best exposures crop out in stream cuts along the south flank of

Discovery Ridge from Canyon to Bosworth Creek. Other exposures examined are located at the "hairpin bend" at Oscar Creek Gap, Carcajou Ridge, and just south of Brokenoff Mountain.

Lithology and Thickness The Fort Creek formation is one of the most distinctive lithologic units in the mapped area. The strata are predominantly black pyritic shales with minor interbeds of hard black siltstone and locally siliceous mudstone. These rock types indicate a very stagnant environment.

In general, the shales are black, fissile, chippy, and hard, with occasional finely disseminated pyrite crystals. Locally, the shale is slightly to moderately calcareous, contains black carbonaceous material, and may emit a strong, pungent, petroliferous odor on heating. Commonly associated with the shale are small ( $\frac{1}{2}$  to 4 inches), hard, discoid, ironstone concretions. The concretions are usually non-calcareous and weather rusty red.

The shales usually weather a light-pearl-grey to black, and along many of the bedding and joint planes small rusty selenite crystals and alum "blossoms" may occur. A very diagnostic feature of the Fort Creek is the way it weathers in the form of cubical stacks or chimneys which are usually covered by a sulphur yellow and white efflorescent bloom. Where the shales have been burned by forest fires, they weather bright brick-red to vermilion.

The associated mudstone is black, micaceous, locally siliceous, and has a metallic tinkle when the rocks and talus are scattered about. The siltstone weathers a buff-grey to medium-light-grey and is silty to sugary on the surface.

The thickest measured section of Fort Creek shale was located on Canyon Creek. This section is 320+ feet. In the Franklin Mountains area the Fort Creek varies in thickness from 100 to 320+ feet. This variation in thickness is mentioned by Boggs in the subsurface at the Norman Wells field (Hume 1954, p. 91). The variation is probably due to the pinching and swelling of the Ramparts, and where the Ramparts limestone reaches its maximum thickness it is very likely that the Fort Creek thins considerably.

Contact Relationships. The lower contact of the Fort Creek was placed at the sharp lithologic break between the black shales and the light colored carbonates of the Ramparts formation. The writers believe this contact is disconformable. From evidence seen in the Airport Quarry, the Fort Creek appears to slightly truncate the top of Ramparts and rest on it with small angular discordance, (Photo 3). Stelick (Canol Report No. 18 p. 16) reports that the contact between the Ft. Creek and Ramparts was seen in this general area and he considers it disconformable. Although not conclusive, this disconformity is also suggested by the sharp break in lithology. In the western Mackenzies and Knorr Range where the Ramparts is missing, the Fort Creek rests with angular discordance ( $\pm 4^\circ$ ) on the Hare Indian formation (MacDonald and Mangus, 1960, pp. 27-28).

The upper contact of the Fort Creek with Imperial is thought to be conformable and gradational, with the contact drawn between the black Fort Creek shales and the dark-gray-green shales of the above formation.

Age and Correlation. Although no conclusive biota has been found in the Fort Creek, it is placed at the base of the Upper Devonian. The reasons for this being two-fold:

1. There is a sharp lithologic and environmental break between the Fort Creek and the underlying Middle Devonian carbonate -- this could be a time break.
2. The Fort Creek underlies rocks of a definite Upper Devonian age.

The Fort Creek can be correlated throughout the mapped area and south and westward along the Mackenzie and Richardson Mountains, and along to Olgivie Mountains to the Alaskan boundary.

Imperial Formation:

Name and Type Locality. The Imperial strata were first named "Bosworth" by Kindle and Bosworth (Hume, 1954, p. 40), but because of poor exposures both a new name and type locality was suggested by T. A. Link. Hume (1954, p. 40) applied the name Imperial to a group of inter-bedded sandstones and shales at a new type locality. This type section is along the northeast flank of the Imperial Hills on the Imperial River, which is about 10 miles southwest of the junction of the Imperial and Carcajou Rivers, Northwest Territories.

Distribution. The Imperial is found outcropping in small isolated exposures throughout the area. Along Canyon and Bosworth Creeks, near their confluence with the Mackenzie River, it is lithologically similar to the Lower Cretaceous, and small outcrops are difficult to differentiate.

Lithology and Thickness. The Imperial formation consists of a rather monotonous sequence of shale, sandstone and siltstone. This formation includes the shale and fine-grained sandstone that were formerly mapped as part of the Fort Creek formation.

The shale is usually dark-grey to olive-grey-green, clayey to silty and soft to hard. The shale is chippy and has a fair amount of fucoidal markings and weathers grey-brown to dark-rusty-brown.

The intercalated sandstone is medium-to dark-grey-green to grey-brown, and is fine-to medium-grained. The rocks are thin-to massive-bedded with much cross-bedding and occasional ripple marks. The sandstone is medium-hard to hard, angular; splitting and breaking into irregular shaped plates and blocks. The rock is dirty and micaceous, with carbonaceous specks; fucoidal marks and flow casts are common. The rocks weather a dark rusty red-brown and fairly rough on the surfaces.

The siltstone is predominantly dark-grey-green to dark-grey, thin-bedded, hard, micaceous and locally siliceous. These strata have a conchoidal fracture and contain flow casts, ripple marks, and fucoidal markings. Occasionally, the siltstone is slightly calcareous. The rock weathers a medium-greenish-grey-brown.

Only an estimation of the thickness was made because of poor exposures of the Imperial. The estimate is 175 to 700 feet. In the Norman Wells field, Boggs, states 437 to 700 feet of Imperial is present in the subsurface (Hume 1960, p. 42). From this variation in thickness, it seems apparent that the change is probably due to erosion in local



areas prior to Lower Cretaceous deposition. Therefore, it is fairly reasonable to assume that such a variation in thickness of the Imperial should be expected over the mapped area, and in places could be locally absent. This local variation in thickness is further substantiated by field work done in the Mackenzie and Richardson Mountains (MacDonald and Mangus, 1960, pp 28-31).

Contact Relationships. The base of the Imperial formation is drawn at the top of the black bituminous shale of the Fort Creek. This contact is both conformable and gradational. Some geologists believe this contact to be disconformable (Basset, 1960, pp. 26-27). If there is a disconformity in which a long hiatus was involved, it probably occurred higher in the section and possibly in the Snake River area and west. (MacDonald and Mangus, 1960 pp 28-31).

The upper contact is considered to be an unconformity, with the Lower Cretaceous beds truncating the Imperial formation.

Age and Correlation. Although no fossils were found in the Imperial by the party, previous work does show Upper Devonian age for the formation. Spirifer distinctus sp., crinoids, plant remains and other Upper Devonian fossils have been found in the area (Hume 1954, p. 41). These sediments can be correlated with similar rocks of the same age in the Mackenzie and Richardson Mountains. (MacDonald and Mangus, 1960, pp. 28-31).

Lower Cretaceous

Sans Sault Group

Name and Type Locality. The Sans Sault group is the name applied by the Canol geologists to the Lower Cretaceous rocks in the Norman Wells - Franklin Mountains area (Hume 1954, p. 47). The type locality is at the Sans Sault Rapids on the Mackenzie River some 70 miles down river from Norman Wells. The name Sans Sault group is used in the report only. The Lower Cretaceous symbol is used in the illustrations.

Distribution. Because most of the time in the field was spent studying the Middle Devonian limestones, only a cursory examination was made of the Cretaceous sediments. For the most part, the Sans Sault rocks are widely scattered and poorly exposed.

Lithology and Thickness. The Sans Sault group is a series of marine shale, sandstone and siltstone.

The best examined outcrops were on the south side of the Mackenzie River in the vicinity of Carcajou Ridge. Here the rocks were predominantly marine shale, with interbeds of sandstone and siltstone.

The shale is dark-grey to black, clayey to silty, chippy, medium-hard and slightly fossiliferous. The rock is slightly to moderately micaceous and contains numerous fucoidal markings. Scattered throughout the shale are hard rusty weathering ironstone concretions, which range in size from 2 to 6 inches. This shale type comprises about 60 per cent of the outcrop.

The intercalated sandstone is medium-grey, thin-to medium-bedded, and very fine-to fine-grained, with poor to very poor porosity. The sandstone is very hard and fractures in angular pieces. It weathers a medium-grey-brown to rusty red. Locally, the sandstone is thinly laminated and cross-bedded.

The siltstone is medium-grey to dark-greenish-grey-brown, thin-bedded, thinly laminated and micaceous. The rock contains numerous fucoidal, oscillation and ripple marks. The siltstone is very hard, locally siliceous, and fractures in hard angular pieces.

From previous surface and sub-surface work the Sans Sault is estimated to be 150 to 1300 feet thick.

Age and Correlation. The age of the Sans Sault group is considered to be Lower Cretaceous. Fossils found by the authors indicate the Albian stage of Lower Cretaceous age. Specimen 61 FM 73F was identified as Inoceramus aff. dowlingi.

These beds are thought to be correlative with some of the Lower Cretaceous rocks in the Peel Plateau and Peel River area. The basal beds of the Sans Sault group are thought to be correlative with the basal sands of Atlantic's Glacier Block and Lower Cretaceous Unit 3, in the Peel River area (MacDonald and Mangus, 1960 pp. 39-40). The upper more shaly units of the Sans Sault group are correlative to Lower Cretaceous Unit 4 in the Peel River area (Mac Donald and Mangus, 1960, pp. 40-41.).

#### STRUCTURAL GEOLOGY

The Franklin Mountains trend northwest from Norman Wells to Carcajou Ridge, and then swing in a westerly arc. These mountains lie between the Interior Plains to the east and the Mackenzie Plain and basin on the west. The present-day arch-like form and structure is the result of compressive stresses which occurred during Laramide disturbances.

The most outstanding topographic form is the long, parallel sinuous ridges which have steep scarp faces bordering one side. These scarps are mainly the result of high angle reverse faults. Some of the ridges are asymmetric anticlines with faulting along the steeply dipping limb. Along the scarp faces remnant outcrops of near vertical beds may be found which represent the remains of steeply-dipping anticlinal limbs. From Carcajou Ridge north to Beavertail Mountain the paralleling folds all plunge westward and at the Mackenzie River disappear under Cretaceous strata.

From photo interpretation two prominent synclines have been mapped between two sets of ridges: Gibson Ridge - Mt. Effie, Reece Ridge and Moon Ridge - Richard Mountain. These synclinal areas are well covered and outcrops are scarce. A thin mantle of Pleistocene covers probable Upper Devonian and Lower Cretaceous strata. No Upper Cretaceous or Tertiary sediments were found in these lowland areas. The covered lowland areas between ridges are in large part synclinal and faulting is probably present.

Some of the principal structures of the Franklin Mountains are thought to be caused by deep seated or basement block faulting. Goodman (1951) mentioned large tilted fault blocks and named in particular the trap-door type and the scissors or pivotal type. The scissors type fault may be seen in the field along Richard-Robert Mountains (Plate 1). In this type of fault, the upthrow passes into a down-throw along strike and on the same side of the fault.

Williams was the first to describe the structural pattern of the Franklin Mountains (Williams 1922) and it was later enlarged upon by Goodman (1951). It is generally believed that the Selwyn Mountains set the structural trend for the Franklin Mountains. The Selwyn Mountains were thought to be formed in Jurassic time and paralleling these mountains Cretaceous geosynclines were formed. These geosynclines probably were developed along newly formed Jurassic fault trends or along pre-existing zones of weakness occurring in the basement complex. The Jurassic mountains were subsequently worn down, furnishing the detritus for the Cretaceous sediments. During Laramide time, the eroded Jurassic mountains and structural features farther north were rejuvenated or modified by yielding to compressional forces along the pre-existing trends. Much overlapping, overriding and displacement could have taken place at depths along these faults without much surface reflection.

Evidence tending to indicate deep seated block faulting is as follows:

1. The Mackenzie Mountains are practically free of "Rocky Mountain" type of imbricate over-thrusting and over-turned folds. With this in mind, it is unlikely that over-thrusting would occur in the distant Franklin Mountains, which are 30 to 60 miles north of the Mackenzie Mountains.
2. With the exception of Imperial Hills, most of the beds are relatively undisturbed between the Mackenzie and Franklin Mountains.
3. The undisturbed nature of these rocks is structurally similar to the Peel Plateau. In both areas, the rocks in the

foreland areas of the Mackenzie and Richardson Mountains are also relatively undisturbed, indicating that most of the compressional forces building these mountains (if of great magnitude) were dissipated along pre-existing zones of weakness (MacDonald, J.S. and Mangus, W.D., 1960, pp. 43-46), rather than being strongly transmitted into the foreland areas.

4. North of the Franklin Mountain fault scarps, the adjacent beds are again flat lying, tending to indicate a dissipation of forces along deep seated block faults.
5. Another indication of ancestral pre-Laramide basement movements is brought out by the basin variations of the Middle Devonian sediments. These show a pronounced thinning over a transverse structural high (Carcajou transverse high).

A major feature of interest is the Carcajou transverse high. The approximate trace of this high from Powell Creek in the Mackenzie Mountains to Mount Effie in the Franklin Mountains is plotted on the geologic map (Plate 1). It also marks the westward change in strike of the Franklin and Mackenzie Mountains. This emergent high has made a marked influence on sedimentation patterns. The Bear Rock evaporite basin lies to the east; the Ramparts bedded lime and reef sequence thickens off both flanks and pronounced thinning of several Middle Devonian intervals is present over the high.

A sharp disconformity is present between the Devonian and Silurian and another between the Lower Cretaceous and Devonian. These disconformities show evidence of long periods of uplift and erosion. A

minor disconformity is thought to separate the Fort Creek and Ramparts formations, and the Hume and Bear Rock formations. The minor disconformities are questionable in the mapped area, but there is regional evidence for their existence.

### GEOLOGICAL HISTORY

The oldest rocks were mapped as Middle Silurian age. Foley (1944) found typical Niagaran fauna in outcrops in the Donnelly River area and Laudon (1944) found similar Niagaran fauna in the Oscar Creek area. These beds consist of marine dolomites and limestones, which are locally cherty and sparsely fossiliferous. The presence of reef building organisms such as corals suggest conditions were favorable for reef growth in the Silurian, but no reefs were found. The close of Silurian time was marked by widespread erosion and the contact with the overlying Devonian is disconformable.

The Silurian uplift and erosion was followed by deposition of the Lower Devonian Bear Rock carbonates and evaporites. The evaporites are limited to a shallow restricted basin bounded on the west by Carcajou transverse high. Over this high the Bear Rock consisted of carbonates with probably some interbedded evaporites. This may be classified as a transitional zone; still somewhat restricted but more open and favorable to carbonate deposition.

The early Middle Devonian was a period favorable for a rich and varied organic life and the deposition of limestones. The thick accumulations of interbedded limestone and reefal limestone with

attendant prolific fauna indicates relatively clear water and littoral, shallow water type deposition. These were periodic influxes of fine muds which interrupted the limestone and reef deposition. The Middle Devonian was followed by a period of non-deposition and in some areas gentle erosion.

An influx of fine clastics followed by coarser clastics marked the beginning of Upper Devonian time. In Upper Devonian, this area was one of subsidence in which marine deltaic sandstones and shales were deposited.

There is a gap in the geologic record from Upper Devonian to Lower Cretaceous. No rocks of this time interval were found in the mapped area. Regional evidence suggests this area was high during the time-gap and a long period of non-deposition and erosion took place.

The beginning of Lower Cretaceous was marked by subsidence and the deposition of a transgressive basal marine sandstone. The deposition of sandstone and shale continued into Upper Cretaceous time. Over the mapped area only Lower Cretaceous (Albian) sediments are found.

In late Upper Cretaceous time, strong compressional movements began which are probably representative of the Laramide orogeny. A long period of severe erosion ensued, interrupted by the deposition locally, of some continental Tertiary sediments. Tertiary beds may be found south of the mapped area in the southeastern Franklin Mountains.

The Franklin Mountains were glaciated during the Pleistocene period.



PETROLEUM POTENTIAL

In the Norman Wells area the previously reported gas and oil seeps are still present along the Mackenzie River and Bosworth Creek. No new gas or oil seepages were found during the field season. Bitumen was found in Ramparts and Hume beds at several localities. The black shales of the Fort Creek and Hare Indian locally have a strong bituminous odor and are excellent source material for petroleum. The Bear Rock beds have a fetid odor which is probably due to sulphate-rich interstitial water.

The Lower Cretaceous basal sandstone would be an excellent reservoir rock if found with sufficient cover to provide an adequate seal. The Ramparts reefal and bedded limestone sequence is the primary objective in this region as these beds produce at Norman Wells. The thickness and permeability varies widely both laterally and vertically. Consequently, the optimum area for oil occurrence would be in those areas of greatest build-up, porosity and permeability. The Hume beds are richly fossiliferous locally, and have minor bituminous shale zones. The Hume contains reef-building organisms and if effective permeability is present these beds offer excellent reservoir potential. A small gas blow was obtained on drill stem test from these beds at the Glacier Ramparts No. 1 well just south of Fort Good Hope. The Bear Rock does not have associated petroleum source material but has excellent permeability and porosity. The Silurian strata have good vuggy porosity developed locally and are disconformably overlain by the Bear Rock. There does appear to be a lack of source beds in the Silurian.

No favorable closed anticlinal structures were noted in the area for drilling. Some hidden closed structures may lie beneath the Oscar Creek and Chick Lake basins, but will only be located by subsurface methods.

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PHOTOGRAPHS

Photo 1: Fort Creek formation  
along Canyon Creek.

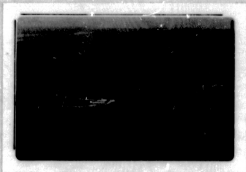


Photo 2: Aerial view looking  
west from Fish Lake  
along Kee Scarp Ridge.

Photo 3: Fort Creek shale overlying  
the Ramparts "reef",  
Airport Quarry. (Wall is  
25 ft. high)



Photo 1: Fort Creek formation  
along Canyon Creek.



Photo 2: Aerial view looking  
west from Fish Lake  
along Red Camp Ridge.

Photo 3: Fort Creek shale overlying  
the Banparts "reef",  
Airport Quarry. (Wall is  
25 ft. high)

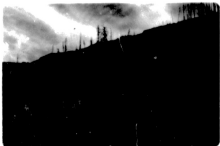


Photo 4: Coralline limestone of  
the Ramparts formation,  
Airport Quarry.

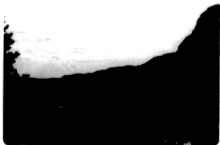


Photo 5: Looking east along  
the fault scarp of  
Discovery Ridge;  
Silurien dolomite.

Photo 6: Vugular Silurian  
dolomites; Discovery  
Ridge (6-inch scale).





Photo 4: Coralline limestone of  
the Harperts formation,  
Airport Quarry.

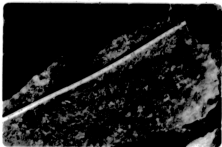


Photo 5: Looking east along  
the fault scarp of  
Discovery Ridge;  
Silurian dolomite.

Photo 6: Vugular Silurian  
dolomites; Discovery  
Ridge (6-inch scale).



Photo 7: Drusy quartz filled vugs in Silurian dolomite; Discovery Ridge (6-inch scale).

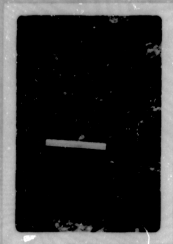


Photo 8: Brecciated dolomite and limestone of Bear Rock formation; Bosworth Creek (6-inch scale).

Photo 9: Bare Indian shale overlying Hume formation; Bosworth Creek.



Photo 7: Drusy quartz filled vugs in Silurian dolomite; Discovery Ridge (6-inch scale).

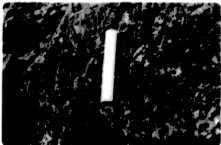


Photo 8: Brecciated dolomite and limestone of Bear Rock formation; Bosworth Creek (5-inch scale).

Photo 9: Hare Indian shale overlying Hume formation; Bosworth Creek.



Photo 10: Hoodoo weathering  
of Bear Rock breccias;  
Oscar Creek Gap.  
(Stacks are 25 ft. high).



Photo 11: Aragonite vein in Bear  
Rock breccias; Oscar  
Creek Gap.



Photo 12: Weathered stromatoporoids and  
corals of the Ramparts for-  
mation; Oscar Creek Gap (6-  
inch scale).

Photo 10: Hoodoo weathering  
of Bear Rock breccias;  
Oscar Creek Gap.  
(Stacks are 25 ft. high).

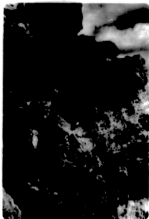


Photo 11: Aragonite vein in Bear  
Rock breccias; Oscar  
Creek Gap.

Photo 12: Weathered stromatoporoids and  
corals of the Ramparts for-  
mation; Oscar Creek Gap (6-  
inch scale).



Photo 13: Weathered reefoid beds of Ramparts formation; west end of Morrow Mountain. (Beds about 25 feet high).



Photo 14: Panoramic view of "reef" beds of Ramparts formation; west end of Morrow Mountain. (Scarp about 50 feet high).



Photo 15: Encrusted gypsum beds of Bear Rock formation; Richard Mountain.

Photo 13: Weathered reefoid beds of  
Ramparts formation;  
west end of Morrow  
Mountain. (Beds about  
25 feet high).



Photo 14: Panoramic view of "reef" beds of Ramparts  
formation; west end of Morrow Mountain.  
(Scarp about 25 feet high).



Photo 15: Encrusted basalt beds of  
Bear Rock formation;  
Richard Mountain.

Photo 15a: Sink holes in gypsiferous  
Bear Rock formation; east  
of Richard Mountain (Sink  
about 150 feet across,  
50 feet deep).

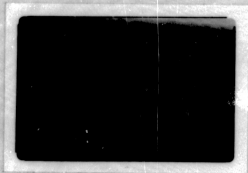


Photo 16: East Mountain  
looking west.

Photo 16a: Fossiliferous unit of  
Hume formation;  
East Mountain.





Photo 15a: Sink holes in gypsiferous  
Bear Rock formation; east  
of Richard Mountain (Sink  
about 150 feet across,  
50 feet deep).



Photo 16: East Mountain  
looking west.

Photo 16a: Fossiliferous unit of  
Maize formation;  
East Mountain.



Photo 17: Platy limestone of Hare  
Indian formation;  
Beavertail Mountain.



Photo 18: Typical exposure of  
fossiliferous Hume  
limestone; Glacial -  
Gut Lake.

Photo 19: Fault scarp at Mount  
Effie; Silurian dol-  
omite; vertical dis-  
placement 1800 -  
2300 feet.

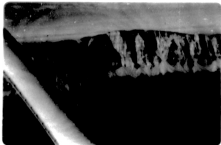


Photo 17: Platy limestone of Hare  
Indian formation;  
Beavertail Mountain.



Photo 18: Typical exposure of  
fossiliferous Hume  
limestone; Glacial -  
Gut Lake.

Photo 19: Fault scarp at Mount  
Effie; Silurian dol-  
omite; vertical dis-  
placement 1000 -  
2300 feet.



STRATIGRAPHIC SECTIONS

ABBREVIATIONS

ang	angular
arg	argillaceous
bd	bed
bded	bedded
bdng	bedding
bit	bituminous
blk	black
bl	blue
blsh	bluish
brch	brachiopod
br	brown
brsh	brownish
calc	calcareous
cg	coarse grain
cht	chert
cse	coarse
dk	dark
dol	dolomite
dolic	dolomitic
est	estimated
fg	fine grain
foss	fossiliferous
frs	fractures
frgs	fragments
gr	grey
gran	granular
grn	green
grnsh	greenish
gyp	gypsum
hd	hard
interg	intergranular
lam	laminated
len	lenticular
lt	light
l	lithographic
ls	limestone

ABBREVIATIONS

mass	massive
mg	medium grain
nod	nodular
peb	pebble
petrol	petroliferous
por	porosity
ppp	pin point porosity
sh	shale
sily	silty
ss	sandstone
ste	siltstone
"stroms"	stromatoporeid
sub-l	sublithographic
subrd	subround
sys	system
tab	tabular
thk	thick
vfg	very fine grain
wh	white
wthred	weathered
wthrs	weathers
y	yellow


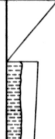
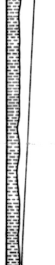

Stratigraphic section No. 1.

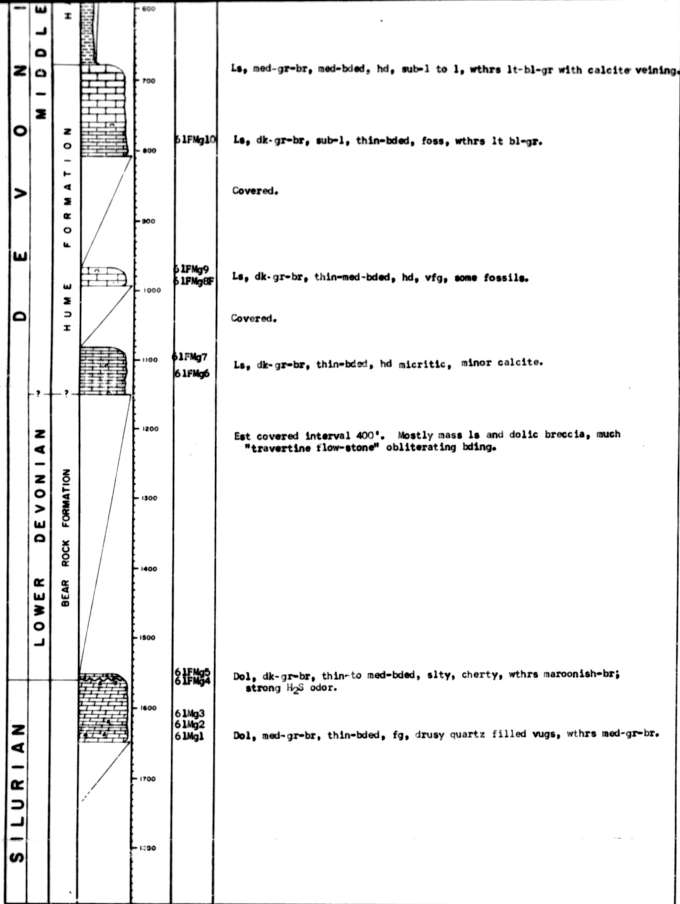
# SCHOONER CREEK SECTION

Approx. 5 1/2 miles northeast of Norman Wells.  
Lat. 65° 19' N., Long. 126° 40' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D. Mangus, J. S. MacDonald.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
ON MIDDLE DEVONIAN	RAMPARTS FORMATION		0-100		Ls, gr-br to dk-gr-br, thin-bded, tab-uneven, fg to cg, hd, highly foss, locally recrystallized calcite, fossils consist of "spaghetti" corals, stromatoperoidea, crinoids, amphipora.
	INDIAN FORMATION		100-200		Covered.
	HARE FORMATION		200-700		Covered, some gr-grn clay boils on surface.
			700-800		Ls, med-gr-br, med-bded, hd, sub-l to l, wthrs lt-bl-gr with calcite veining.
			800	51Fb/10	Ls, dk-gr-br, sub-l, thin-bded, foss, wthrs lt bl-gr.





Stratigraphic section No. 2

# BOSWORTH CREEK

Approx 31 miles north of Norman Wells  
Lat. 65° 20' N. Long. 126° 02' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.S. MacDonald, M.D. Mangus, V.A. Fisher, D.W. Holmes

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
A U P P E R  D E V O N I A N	F O R T  C R E E K  F O R M A T I O N	I M P E R I A L  F M.	000		
			100	61FM29	Ss, lt-gr-bl, tab-even, very thin-bedded, med hd, with submd grains and carb specks.
			200		
			300		
			400	61FM28	Est thickness 800'. Sh, lt-gr-grn, tab-even, mic, carb specks, with interbedded med-br ste. Probably some Imperial formation represented in this covered interval.
			500		
			600		
			700		

# DEVONIAN

RAMPARTS FORMATION

HARE INDIAN FORMATION

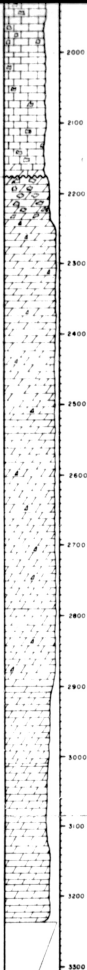
HUME FORMATION

DEVONIAN FORMATION



- 61FM27 Sh, blk to br, very thin-bded, tab-even, sl calc, strong petrol odor; occasional spherical, blk, dense ls concretions.
- 61FM26 Ls, med-gr-br, very thin-bded, nod, fg to cg, hd, with corals. The contact with underlying sh partly covered.
- 61FM25 Ls, lt-gr-grm, very thin-bded, tab-even, soft, with carb specks toward base of unit. Contains tentaculites, spores and fucoidal markings with occasional lentils of shaly, silty ls; wthrd surface lt-br to dk-gr-grm and hackly.
- 61FM23 Sh, blk, tab-even, lam-bded and is soft and mic. Contains tentaculites and other fossils; also scattered spherical blk ls concs.
- 61FM23F Ls, med-gr-br, thin-bded, nod, vfg, hd, micritic.
- Partly covered.
- 61FM22 Ls, lt-gr-br, thk-bded, tab-even, fg to cg, hd, micritic, vug por 5%; has some iron carbonate and calcite filling vugs.
- 61FM21 Ls, med-gr-br, thin-bded, nod, fg to vfg, hd, micritic, vug por 5%; with minor bit. much recrystallized calcite with interbedded lt-gr-grm, lam, calc sh. Fossiliferous and contains brachiopods and corals.
- 61FM20 Ls, med-gr-br, thin-bded, tab-even, internally lam, vfg, hd, micritic; containing minor skeletal brachiopods.
- 61FM19 Ls, dk-gr-br, thin-bded, tab-even, internally lam, vfg, micritic; with minor skeletal brachiopods.
- 61FM18 Ls, lt-gr-br, gran to ag, med-hd, det, ppp and vug por (10%); wthrd surface gr-br, having travertine "case".

Brecciated limestone.



Brecciated limestone.

- 61FM17 Ls, med-gr-br, gran to silt size, med hd, micritic, has vug intery por (10%), and wthrs yol-br and gr.
- 61FM16 Ls and dol, dk-gr-br, thin-bded, tab-uneven, fg to mg, ang, intery por 10%.
- 61FM15 Dol, lt-gr-br, thin-bded, tab-uneven, brecciated, gran to pep size frags, ang, det, part clay matrix with interbbed gr dol.
- 61FM14 Dol, lt-gr-br, thin-bded, tab-even, mg to cg, ang, intery por 10%.
- 61FM13 Dol, lt-gr-br, thin-bded, lam, vfg, micritic, vug por 5%.
- 61FM12 Dol, lt-gr-grn to purple, thin-bded, tab-even, vfg, ang, hd, micritic; por 5%, with 10% oolitic chert in irregular masses, locally irregular rosettes of  $\text{FeCo}_3$ .
- Dol, med-gr-br, thin-bded, tab-uneven, fg, ang, hd.
- 61FM11 Dol, lt-gr-grn, thin-bded, tab-even, vfg, vug, hd, micritic.
- 61FM10 Dol, lt-gr-br, thin-bded, tab-uneven, fg, ang, hd, wthrs br.
- 61FM8,9 Dol, lt-gr-grn, thin, even-bded, internally lam, fg, ang; interbbed with vuggy, mottled red to purple, cg dol, 50' interval with por up to 15%.
- 61FM7 Dol, lt-gr-grn and purple, fg, thin even-bded, internally lam, micritic; scattered tiny vugs with dol rhombs, por 10%.

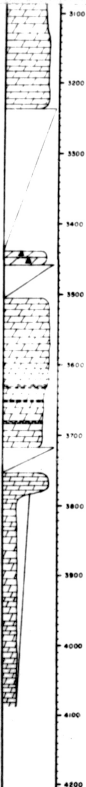
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51FM8,6 Dol, lt-gr-grn, thin, even-bded, internally lam, fg, ang; interbedded with vuggy, mottled red to purple, cg dol, 50' interval with por up to 13%.

51FM7 Dol, lt-gr-grn and purple, fg, thin even-bded, internally lam, micritic; scattered tiny vugs with dol rhombs, por 10%.

51FM6,6 Dol, lt-gr-br, thin even-bded, internally lam, vfg, hd, micritic, with lentils of oolitic chert.

51FM4 Dol, med-gr, very thin even-bded, mg, vug (vugs contain dol rhombs).

Dol, med-gr-br, with interbeds of shaly dol.

51FM3 Dol, med gr-br, very thin, even-bded, internally lam, vfg, hd, micritic.

51FM1 Dol, lt-gr-br, thin even-bded, with thin parallel, even banding, vfg, hd; whrd surface is mottled dk-gr and br.

Partly covered.

Stratigraphic section No. 3.

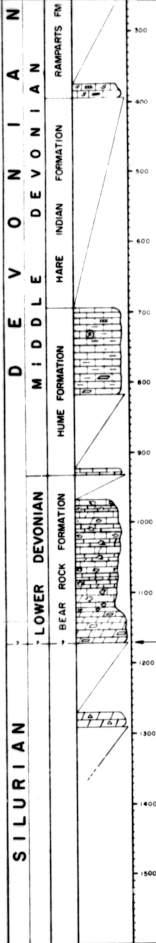
# OSCAR CREEK

Approx. 20 1/2 miles northwest of Norman Wells.  
 Lat 65° 29' N, Long 127° 21' W (Approx)

## FRANKLIN MOUNTAINS AREA

J S MacDonald, M D Mangus, V A Fisher, D W Holmes

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN	UPPER DEVONIAN	FORT CREEK FORMATION	000		Covered.
			100	61FM42	Est. thickness 135' (+). Sh, blk, thin-bed, parallel-even, mic, wthrs out in stacks and has yel-burnished-red color.
			200	61FM39 61FM40 61FM41	Ls, lt-gr-br, thk-bed, tab-even, med-hd; is foss. containing corals, brachiopods, and stromatoporoids; wthrs splotchy grn-gr and br. Has some inter-beds of blk sh, rich in brachiopods, and locally coquinoïd.
MIDDLE DEVONIAN		RAMPARTS FM	300		Est thickness 135' - 200'.
			400	61FM38	Ls, lt-gr-br, thk-bed, tab-even, med-hd, interg por 10% and foss. Foss are corals, stromatoporoids, brachiopods.
		INDIAN FORMATION	500		Est thickness 300' - 600'.
LOWER DEVONIAN		HARE	600		
			700	61FM37 61FM37F	Ls, dk-gr-br, thk-bed, tab-uneven, vfg, hd, arg, micritic, with a few stromatoporoids (?) and brachiopods.



Has some inter-beds of dk sh, rich in bryozoans, and locally coquina.

Est thickness 135' - 200'.

61FM36

Ls, lt-gr-br, thk-bded, tab-even, med-hd, interg por 10% and foss.  
Foss are corals, stromatoporoids, brachiopods.

Est thickness 300' - 600'.

61FM37

Ls, dk-gr-br, thk-bded, tab-uneven, vfg, hd, arg, micritic, with a few stromatoporoids (?) and brachiopods.

61FM37F

61FM36

Ls, med-gr-br, thk-bded, tab-even, vfg, hd, arg, micritic. Has abundant irregular calcite veining.

61FM35

Ls, med-gr-br, thin-bded, tab-uneven, fg, hd, ang, micritic.

Ls and dol, highly brecciated.

61FM34

Ls and dol, dk-gr-br, thin, len-uneven bded, vfg to mg, vug- interg por (15%). Highly brecciated with ang frags varying in size. Wthrd surface is yel-br, hackly, uneven, some aragonite.

61FM33

Dol, dk-gr-br, thin-bded, fg, hd, ang, vug-interg por (15%), minor bit. and veinlets of calcite.

61FM32

Dol, dk-gr-br, thk-bded, fg, hd, vug por (15%), has sulphur odor and wthrd surface is yel-br, hackly.

Contact covered.

61FM31

Dol, lt-gr-purple, thk, tab-even bded, vfg, hd, micritic; contains qtz filled vugs which parallel bedding. Wthrs rough on surface.


Stratigraphic section No. 4.

# MORROW MOUNTAIN

Approx. 14 miles southeast of Rock Lake Camp.  
 Lat. 65° 31' N., Long. 127° 33' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.B. MacDonald, M.D. Mangus, V.A. Fisher, D.W. Holmes.

AGE		FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	MIDDLE	RAMPARTS	FORMATION		51FM43	<p>Ls., lt-gr-br, thin-bded, tab-even, well-jointed, gran. to peb size corals in vfg det matrix; wthrs out into y-tan, brick-like stacks.</p> <p>Ls., dk-gr-br, thin-bded, tab-even, vfg, det with some gran. to peb size corals hd, in part arg, "case" of travertine.</p> <p>Ls., lt-gr-br, thk-bded, tab-even, vfg, with some cg to gran. det.</p> <p>Ls., med-gr-br, thk-bded, nod, gran. to peb size fossils in vfg matrix, skeletal &amp; det and coralline.</p>
	DEVONIAN					






Stratigraphic section No. 9.

# RICHARD MOUNTAIN

Approx. 13 miles southeast of Rock Lake Camp.  
Lat. 65° 33' N. Long. 127° 26' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D. Mangus, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN	HUME FORMATION		0-100	61FMg 14	ls, med-gr-br, thin tab-even beds, thinly lam, hd, ang, vug and interg; wthrs lt-gr, rough, well jointed.
			100-200		Covered, ls talus, med-gr, fg, hd.
	HUME FORMATION		200-300	61FMg 13	ls, dk-gr-br, thin, tab-even beds; thinly lam, vug, ang, hd, slty micritic; wthrs lt-gr.
			300-400		Covered, dol and dollic lms talus; ls, med-gr-br, vfg.
	BEAR ROCK FORMATION		400-500	61FMg 15	Dol, dk-gr-br, thk-bded, thinly lam; slt, hd, ang, micritic; vug-interg por voids contain calcite.
			500-600	61FMg 11	Gyp, lt-gr to wh, thin-even beds, thinly lam, vfg, interg por, soft, ang, v minor dol lenses, med-gr, hd, slty, ang, micritic; dol gypsiferous in parts.
	BEAR ROCK FORMATION		600-700		Covered, but lt-gr to wh gyp talus and gyp bearing mud.
			700-800		Covered, dol talus is believed to be Bear Rock formation.
	BEAR ROCK FORMATION		800-900	61FMg 10	Dol, lt-gr-grn, thk-even bds, thinly lam, mg, hd, ang, micritic; wthred surface dk-gr with scattered wh cht bands and nodules.
			900-1000		



## FRANKLIN MOUNTAINS AREA

M.D. Mangus, O.W. Holmes

AGE	FM	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION	
DEVONIAN	HUME FORMATION		000	61FMg 14	Ls, med-gr-br, thin tab-even beds, thinly lam, hd, ang, vug and interg; wthrs lt-gr, rough, well jointed.	
			100		Covered, ls talus, med-gr, fg, hd.	
	BEAR ROCK FORMATION		200	61FMg 13	Ls, dk-gr-br, thin, tab-even beds; thinly lam, vug, ang, hd, silty micritic; wthrs lt-gr.	
			300		Covered, dol and dolc lms talus; ls, med-gr-br, vfg.	
	BEAR ROCK FORMATION		400	61FMg 15	Dol, dk-gr-br, thk-bed, thinly lam; slit, hd, ang, micritic; vug-interg por voids contain calcite.	
			500	61FMg 11	Gyp, lt-gr to wh, thin-even beds, thinly lam, vfg, interg por, soft, ang, v minor dol lenses, med-gr, hd, silty, ang, micritic; dol gypsiferous in parts.	
	BEAR ROCK FORMATION		600		Covered, but lt-gr to wh gyp talus and gyp bearing mud.	
			700	61FMg 10	Dol, lt-gr-grn, thk-even hds, thinly lam, mg, hd, ang, micritic; wthred surface dk-gr with scattered wh cht bands and nodules.	
	SILURIAN	BEAR ROCK FORMATION		800		
				900		



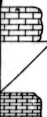
Stratigraphic section No. 6.

# THOMAS MOUNTAIN

Approx. 11/2 miles southeast of Rock Lake Camp.  
Lat. 65° 33' N. Long. 127° 37' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.S. MacDonald, V.A. Fisher.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	RAMPARTS FORMATION		000 100 200 300 400 500 600 700	61FM53	Ls, md-gr-br, thk-bded, tab-uneven, fg, det, hd, calcite & bit. filled vugs, also peb-size skeletal, cherty corals. Traverterine case on outcrop, gr to br, and surf weathers hackly.
	HARE INDIAN FORMATION			61FM54	Ls, med-gr-br, thin-bded, len, with peb-size fossils in fg matrix, soft; contains calcite and corals.  Est. 500'.
	LIME FORMATION			61FM55	Ls, med-gr-br, thk-bded, tab-even, vfg, hd.  Est. 75'.
				61FM56	Ls, med-gr-br, thin-bded, tab-even, vfg, hd, finely filled calcite fractures.



Stratigraphic section No. 7.

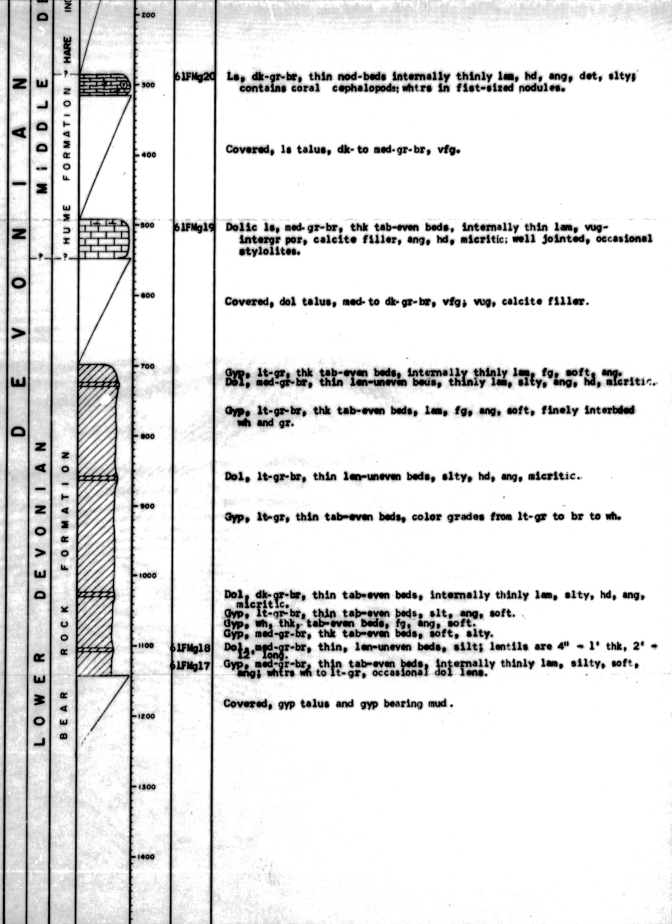
# MOON RIDGE

Approx. 5 miles east of Rock Lake Camp.  
Lat. 68° 40' N., Long. 127° 35' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D. Mongus, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
E V O N	M I D D L E	D E V O N I A N	7 RAMPARTS FM 7 INDIAN FORMATION 7 HARE FORMATION 7 HUME FORMATION		<p>Is, med-gr-br, thin tab-even beds, thinly lam, sg, ang, hd, det, vug- intergr por, hackly wthrg, contains corals, stromatoporoids.</p> <p>Covered, shale in float, dk-gr-grn, slightly calc.</p> <p>Is, dk-gr-br, thin nod-beds internally thinly lam, hd, ang, det, slty; contains coral cephalopods; whtrs in fist-sized nodules.</p> <p>Covered, ls talus, dk- to med-gr-br, vfg.</p> <p>Dolc ls, med-gr-br, thk tab-even beds, internally thin lam, vug- intergr por, calcite filler, ang, hd, micritic; well jointed, occasional stylolites.</p> <p>Covered, dol talus, med- to dk-gr-br, vfg; vug, calcite filler.</p> <p>Oyp, lt-gr, thk tab-even beds, internally thinly lam, fg, soft, ang.</p>
				61FMg20	
				61FMg19	



Stratigraphic section No. 8.


# PAIGE MOUNTAIN

Approx. 4 miles southwest of Rock Lake Camp.

Lat. 65° 39' N. Long. 127° 46' W (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, M. D. Mangus

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	HUME FORMATION		000 100 200	51FM124 51FM123	<p>Ls, med-gr, thk-bded, nod, vfg, secondary calcite, det, a few peb-size brachiopods and goniatites.</p> <p>Ls, dk-gr-br, thk-bded, fg, hd, much secondary calcite, det, locally nod.</p> <p>Ls, med-gr-br, tab-uneven, fg to cg, ang, det, coralline, irreg paper-thin lentils of blk sh; bit.odor, much calcite veining.</p>


Stratigraphic section No. 8.

# PAIGE MOUNTAIN

Approx. 4 miles southwest of Rock Lake Camp.  
Lat. 65° 38' N. Long. 127° 46' W (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, M.D. Mangus

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	HUME FORMATION		000	61FM124	Ls., med-gr, thk-bded, nod, vfg, secondary calcite, det, a few peb-size brachiopods and goniatites.
			100	61FM123	Ls., dk-gr-br, thk-bded, fg, hd, much secondary calcite, det, locally nod. Ls., med-gr-br, tab-uneven, fg to cg, ang, det, coralline, irreg paper-thin lenticles of blk sh; bit. odor, much calcite veining.
			200		

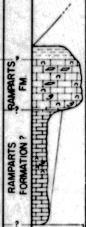
Stratigraphic section No. 9.

# SOUTH CARCAJOU MOUNTAIN

Approx. 13 miles southwest of Rock Lake Camp.  
 Lat. 65° 37' N., Long. 128° 09' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, V. A. Fisher.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
V O N I A N D L E D E V O N I A N E	INDIAN FORMATION		000	61FM54	Sh, blk, thin-bded, tab-even, mic.
				61FM55	Ls, med-gr-br, thk-bded, tab-even, fg, hd, some calcite filled voids.
			100	61FM57	Peb size fossils in fg matrix, corals.
				61FM58	Ls, med-gr, thin-bded, peb size fossils in fg matrix; skeletal; loose
				61FM59	por 12%; contains corals, brachiopods, gastropods.
			200		
			300		
			400		
			500		
			600		
			700		

Est 650'.



# DEVONIAN

MIDDLE DEVONIAN  
HARE INDIAN FORMATION  
HUME FORMATION

RAMPARTS  
FORMATION ?  
FM



0  
100  
200  
300  
400  
500  
600  
700  
800  
900  
1000  
1100

61FM54  
61FM55  
61FM57  
61FM58  
61FM59

Sh, blk, thin-bded, tab-even, mic.  
Ls, med-gr-br, thk-bded, tab-even, fg, hd, some calcite filled voids.  
Peb size fossils in fg matrix, corals.  
Ls, med-gr, thin-bded, peb size fossils in fg matrix; skeletal; loose por 12%; contains corals, brachiopods, gastropods.

Est 690'.

61FM70F  
61FM71  
61FM68  
61FM72  
61FM72F

Ls, med-gr, thin-bded, nod, fg, med-hd, det with peb size fossils, skeletal; contains brachiopods.  
Ls, med-gr, thk-bded, nod, fg, det, with peb size fossil fragments; calcite & bit void fillers, strong petroleum odor, contains corals, stromatopoids, and brachiopods. Inter-bded lenticular blk sh which makes up 10% of unit.

Stratigraphic section No. 10a and 10b.

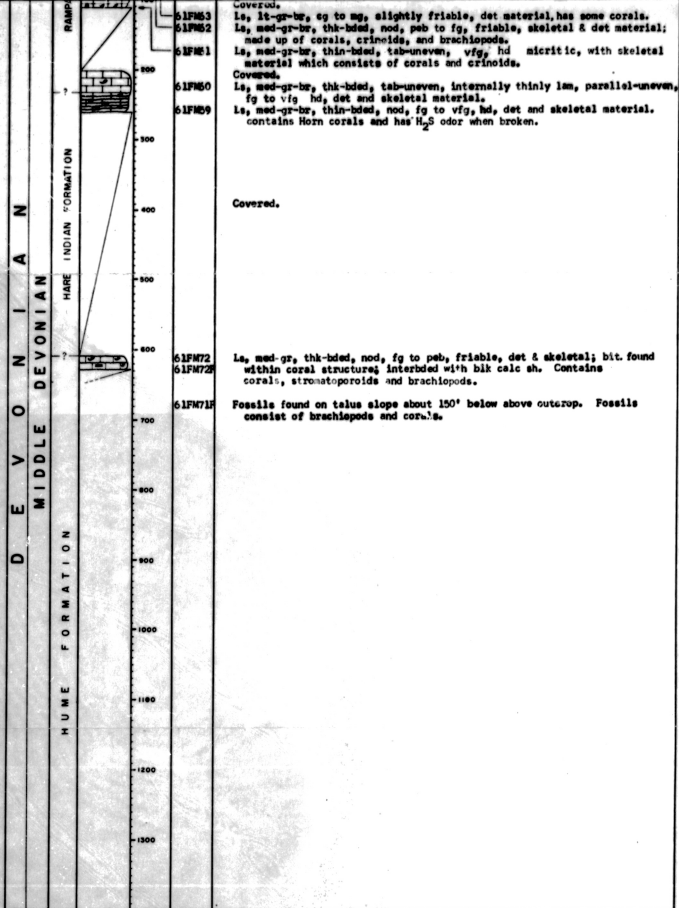
## CARCAJOU RIDGE

Approx. 13 miles southwest of Rock Lake Camp.  
Lat. 65° 38' N, Long. 126° 10' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.S. MacDonald, M.O. Mangus, V.A. Fisher, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
V O N I A N	HARE	INDIAN FORMATION			
				61FMg26F	Ls, med-gr-br, thk-bded, tab-even, made up of thin-lam, parallel-even, vfg, ang, hd, det, containing corals & brachiopods.
				61FMg27F	Ls, dk-gr-br, thk-bded, tab-even, internally thinly lam, parallel-even, vfg, ang, hd, det, with an interg vug por which contains some bit and calcite. Contains brachiopods and corals.
				61FMg3	Covered.
				61FMg2	Ls, lt-gr-br, cg to mg, slightly friable, det material, has some corals.
				61FMg1	Ls, med-gr-br, thk-bded, nod, peb to fg, friable, skeletal & det material; made up of corals, crinoids, and brachiopods.
				61FMg0	Ls, med-gr-br, thin-bded, tab-uneven, vfg, hd micritic, with skeletal material which consists of corals and crinoids.
				61FMg9	Covered.
					Ls, med-gr-br, thk-bded, tab-uneven, internally thinly lam, parallel-uneven, fg to vfg, hd, det and skeletal material.
					Ls, med-gr-br, thin-bded, nod, fg to vfg, hd, det and skeletal material. contains Horn corals and has H <sub>2</sub> S odor when broken.
D D L E D E V O N I A N	HARE	INDIAN FORMATION			
				61FM72	Covered.
				61FM71F	Ls, med-gr, thk-bded, nod, fg to peb, friable, det & skeletal; bit found within coral structure; interbedded with blk calc sh. Contains corals, stromatoporoids and brachiopods.
				61FM71F	Fossils found on talus slope about 150' below above outcrop. Fossils consist of brachiopods and corals.




Stratigraphic section No. 11.

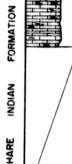
# EAST MOUNTAIN

Approx 2 1/2 miles southwest of Rock Lake Camp  
Lat. 65° 41' N., Long. 128° 41' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D.Mangus, D.W.Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN		000	51FMg35	ls, med-gr-br, thk, tab-even beds made up of thin, parallel-even, mg, ang, hd det; some bit., wthrs lt gr, contains corals, stromatopora; has some bit. sh partings.
			100	51FMg34	ls dk-gr-br, thk tab-even beds, internally thin parallel-even, fg, ang, hd, det, vug-intery por; wthrs light dove gr, contains corals, and stromatopora.
			200	51FMg 32-33F	ls, med-gr-br, thin, tab-even beds, internally thin parallel-even, slty, ang, hd, wthrs buff, contains brachiopods.
			300		
			400		Covered, talus consisting of ls and sh which is thin, gr-grm, calc, and wthrs in large plates.
			500	51FMg 30F-31	ls, med-gr-br, thk, tab-even beds, internally thin parallel-even, fg, ang, hd, det; calcite and bit. filler; wthrs lt-bish-gr, contains stromatopora, corals and brachiopods. Covered, ls talus.
			600	51FMg29	ls, dk-gr-br, thin, nod beds, internally thin parallel-uneven, fg, ang, hd; contains crinoids, corals; mostly nod with some even 1' ls beds.
			700	51FMg28	ls, dolc, dk-gr-br, thin, tab-even beds, internally thin, parallel-even, slty, ang, hd; vug with calcite filler; wthrs bish gr.
			800		Covered, dol talus.
					Dol, dk-gr-br, thin tab-even beds, internally thin-parallel, fg, ang, hd, micritic; wthrs brsh buff; intraformational breccia.

A  
N

61FMg35  
61FMg34  
61FMg  
32-33F

Ls, med-gr-br, thk tab-even beds made up of thin, parallel - even, mg, ang, hd det; some bit. wthrs lt gr, contains corals, stromatoporoidea; has some bit. sh partings.

Ls dk-gr-br, thk tab-even beds, internally thin parallel - even, fg, ang, hd, det, vug-intery por; wthrs light dove gr, contains corals, and stromatoporoidea.

Ls, med-gr-br, thin, tab-even beds, internally thin parallel - even, slty, ang, hd, wthrs buff, contains brachiopods.

Covered, talus consisting of ls and sh which is thin, gr-grn, calc, and wthrs in large plates.

Ls, med-gr-br, thk, tab-even beds, internally thin parallel - even, fg, ang, hd, det; calcite and bit. filler; wthrs lt-bish-gr, contains stromatoporoidea, corals and brachiopods.

Covered, ls talus.

Ls, dk-gr-br, thin, nod beds, internally thin parallel - uneven, fg, ang, hd, contains crinoids, corals; mostly nod with some even 1' ls beds.

Covered, ls talus.

Ls, dolc, dk-gr-br, thin, tab-even beds, internally thin, parallel - even, slty, ang, hd, vug with calcite filler; wthrs bish gr.

Covered, dol talus.

Dol, dk-gr-br, thin tab-even beds, internally thin - parallel, fg, ang, hd, micritic; wthrs brsh buff; intraformational breccia.

Stratigraphic section No. 12.

## BAT HILLS

Approx 28 miles northwest of Rock Lake Camp  
Lat 65° 46' N, Long 128° 42' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J.S.McDonald, V.A.Fisher.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	RAMPARTS FORMATION			
			000	51FM112	Ls, med-gr-br, mass, fg, hd, coral frags, secondary calcite, locally nod and hackly; gr travertine case covers rock features.
			100	51FM113	Ls, med-gr-br, mass, cg to peb size corals in fg matrix of det, "spaghetti" coral; 1% blk bit. paper-thin len-uneven sh.
			200	51FM114	Ls, med-gr, thk-bded, tab-even, fg, arg, det, wthre blk.
			300		

Stratigraphic section No 13


# LOON ROOST OF DONNELLY RIDGE

Approx 22 miles northwest of Rock Lake Camp

Lat 65° 49' N, Long 128° 27' W (Approx)

## FRANKLIN MOUNTAINS AREA

V A Fisher, DW Holmes, J S MacDonald

AGE	FM	LITHOLOGY	THICK- NESS	SAMPLE No	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	RAMPARTS FORMATION		0-100 100-200 200-300 300-400	61FF30 61FF36 61FF14 61FF29	Ls, med-gr-br, thin-bded, nod, vfg to mg, subrd, hd, micritic; det, contains corals, stromatoporoids, and crinoids.
				61FF5- 61FF13	Ls, med-gr-br to lt-gr-br, thk-bded, tab-even, vfg to mg, subrd, hd, micritic & det; contains corals, stromatoporoids & crinoids; upper portion of unit appears to be more hackly.
				61FF1- 61FF4	Ls, blk to med-gr-br, thk-bded, tab-even, fg to cg, subrd, hd, micritic & det; contains corals, stromatoporoids, crinoids and brachs; voids contain bit. and calcite.
					Ls, med-gr-br to dk-br, thk-bded, tab-even, internally thinly lam, parallel-uneven, fg to mg, subrd, hd, micritic; contains corals & stromatoporoids.

Stratigraphic section No. 14.


# DONNELLY RIDGE

Approx. 20 miles northwest of Rock Lake Camp.

Lat. 65° 49' N., Long. 128° 22' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D. Mangus, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN		000	61FMg 77	ls, lt- to med-gr-br, med to mass-bded, "stroms" and corals.
				61FM 62-76	ls, lt- to med-gr-br, med to mass-bded, highly coralline.
			100	61FMg 61	ls, lt-med-gr-br, mass-bded, mostly "stroms".
			200		Covered, found ls talus on slope. Believe break in slope to be close to contact between Hare Indian sh and Ramparts.
			300		
			400		Covered, found some sh, lt-gr-gm and calc.
			500		
			600	61FMg 48-52	ls, med- to dk-gr-br, fg to sub-l, med to mass-bded, foss with "stroms", corals, brachiopods and goniatites; beds wthr hackly.
			700	61FMg 47	Covered. ls, med-gr-br, med-bded, tab, det, rock wthr blsh-gr and rough on surface.
			800	61FMg 46	Covered, ls and dol float, med- to dk-gr-br, fg, also some intra-formational agl. Dol, dk-gr to med-gr-br, med-bded, silty to fg, micritic with rare

1 of

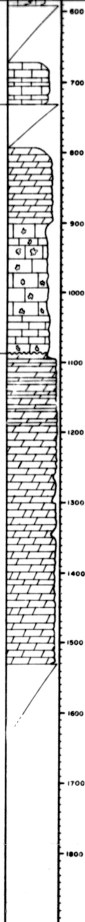


## 30

LOWER DEVONIAN

**BEAR ROCK FORMATION**

TIME FOR



corals, brachiopods and goniatites; beds with neckly.

**Covered.**

61FMg  
47

La, med-gr-br, med-bded, tab, det, rock wthrs blsh-gr and rough on surface.

Covered, ls and dol float, med-to dk-gr-br, fg, also some intra-formational  
col.

6.1FMg

61FMg  
45

Dol, dk-gr to med-gr-br, med-bed, silty to fg, micritic with rare  
ppp. Rock wthra dk-gr-br with gran surface.

6 1FMg

ls, med-gr-br, mass-bding, brecciated vugular wthring, soft with travertine "case" obliterating bding. Has typical "hoodoo" stack wthring. Breccia is both ls and dol.

 ${}^{61}_{43}\text{FMg}$ 

Contact between Bear Rock and Silurian not seen, assumed to be unconformable.  
Dol. med-gr-br, thin-to med-bded, fg, micritic, with some vugular por.

61FMg  
42

Dol. lt-gr-grn, med-to mass-bdied, fg to mg, very hd with ppp.

Covered, near base of high angle reverse fault. The talus is dol, grsh-wh, mg and v hd, some ppp.

Stratigraphic section No. 15.

# VICTORY RIDGE

Approx. 20 miles northwest of Rock Lake Camp.

Lat. 65° 51' N., Long. 128° 18' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald V.A. Fisher.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	RAMPARTS FORMATION		000	61FM86	Ls, lt-gr-br, thk-bded, tab-even to sub-nod, hd, micritic; locally lenses of coral.
			100	61FM87	Ls, med gr-br, thk-bded, nod, fg, det, hd, peb-size skel. material and corals.
			200		
			300		

Stratigraphic section No. 16

# SWAMPY SECTION

Approx. 13 miles northwest of Rock Lake Camp.

Lat. 65° 49' N., Long. 128° 06' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

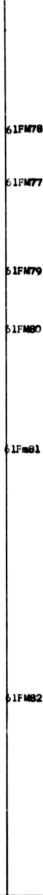
J. S. MacDonald, V. A. Fisher

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
O N I A N	M I D D L E D E V O N I A N	RAMPARTS FORMATION	000	61FM76F 61FM75	Ls, lt-gr-br, thk-bded, tab-even, fg, det, gran to peb size skeletal material, chiefly corals & brachiopods with 1% len blk sh, locally nod.
		HARE INDIAN FORMATION	100 200 300 400 500 600 700 800	61FM78	Ls, med-gr-grn, thin-bded, nod, fg, ang, det, with peb size fossils, and large brachiopods.  Covered, est 750'.  Ls, dk-gr-br, thk-bded, tab-uneven, fg to cg, hd det & skeletal, contains corals and brachiopods; wthrs steel gr.

D E V O N I

— 7 —

## HUME FORMATION



61FM77

6 1FM79

61FMSO

61Fm81

61FM82

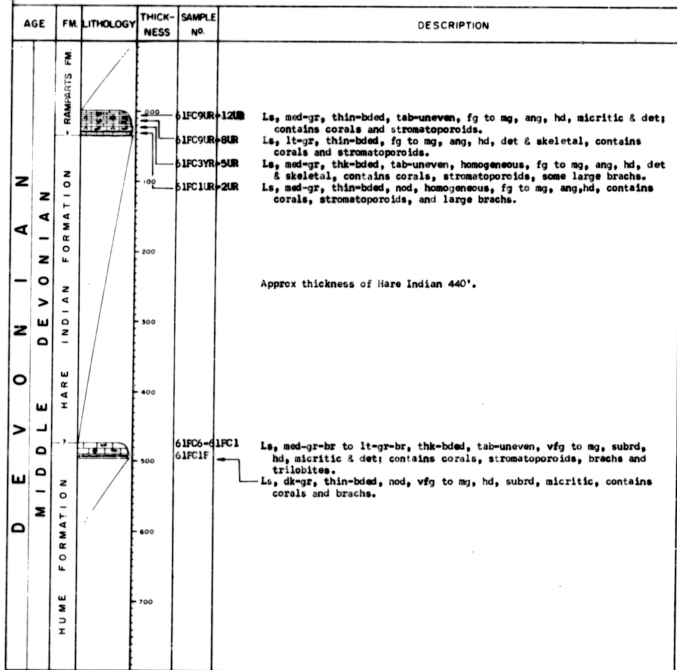
Dol, lt-gr, thk-bdcd, tab-even, fg, interg por 7%.

## ATLANTIC LAKE SECTION

Approx. 10 miles northwest of Rock Lake Camp  
 Lat. 65° 48' N., Long. 128° 01' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

V.A. Fisher, D.W. Holmes, J.S. MacDonald.





Stratigraphic section No. 18.

# WAIT-AWHILE LAKE

Approx. 14 miles northeast of Rock Lake Camp.  
 Lat. 65° 53' N, Long. 127° 30' W (Approx.)

## FRANKLIN MOUNTAINS AREA

M.D. Mongus, D.W. Holmes.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	HUNE FORMATION	000		
			100	51FMg38 51FMg39 51FMg40	Ls, med-gr-br, mass-bded, fg, hackly withring, contains brachiopods, goniatites, trilobites, and stromatoporoids. Ls, same as above.
LOWER DEVONIAN			200		Covered.
	BEAR ROCK FORMATION		300	51FMg37 51FMg36	Dol, dk-gr-br, thin to med-bded, fg, vug por, micritic, with sugary on surface.
			400		Covered, dol, dk-gr-br, mg, talus. Believe this to be Bear Rock.
			500		
			600		

Stratigraphic section No. 19.

# TURTON RIVER

Approx. 20 miles northeast of Rock Lake Camp.  
 Lat. 65° 47' N., Long. 127° 03' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, M.D. Mangue

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	LOWER DEVONIAN	BEAR ROCK FORMATION	000	61FM117	Ls, med-gr, thk-bded, tab-even, vfg; $\pm$ 1% interg por.
				61FM116	Ls, med-gr, thin-bded, tab-even, internally lam, vfg; $\pm$ 15% interg por, arg, platy.
			100	61FM115	Ls, dk-gr, thk-bded, tab-even, fg to mg, ang, hd, interg por $\pm$ 15%, strong bit. odor.
			200		Covered, dol talus.
			300		
			400		

Stratigraphic section No. 20.

# NORTH TURTON LAKE

Approx. 22½ miles northeast of Rock Lake Camp.  
Lat. 65° 56' N., Long. 127° 09' W. (Approx.)

## FRANKLIN MOUNTAINS AREA


J.S. MacDonald, M.D. Mangus.

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
D E V O N I A  L O W E R	MIDDLE DEV.	HUME FORMATION	000	61FM119	Ls, med-gr-br, thk-bded, tab-even, vfg, hd, micritic, scattered peb-size brachiopods, sub-nod.
			100	61FM120	Ls, med-gr-br, thin-bded, tab-even, vfg, micritic, well bded, wthrs like bricks with 15% inter-bded, blk, papery, chippy sh.
	BEAR ROCK FORMATION		200	61FM117	Dol, med-gr-br, thk-bded, tab-even, vfg, ang, hd, interg per 210% micritic; some paper-thin bit, blk sh, strong bit. odor. Many sink holes locally.
			300		Covered, 270° dol talus.
			400		Sulphur spring at base.
			500		



**GLACIAL - GUT LAKE**

**FRANKLIN      MOUNTAINS      AREA**

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE Nº.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	HUME FORMATION		000	61FM53	ls, med-gr-br, mass-bded, rock wthrs hackly and lt-blsh-gr; foss unit of
				61FM56	Hume formation, contains brachiopods, goniatites, corals, and
				61FM57F	stromatoperooids.
			100		
			200		
			300		

Stratigraphic section No. 22.

# EAST BEAVERTAIL

Approx 26 1/2 miles northwest of Rock Lake Camp.  
Lat. 65° 56' N., Long. 128° 27' W (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, M. D. Mangus

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	HASE INDIAN FORMATION	000	61FM129	ls, dk-gr-br, very thin-bedded, platy with a few fossil frags.
			000	61FM128	ls, dk-gr-br, very thin-bedded, tab-eval, vfg, det with some gran to peb size skel. fragments, brachiopods.
			00	61FM127	ls, med-gr-br, mass-bedded, vfg, det with gran to peb size skeletal fragments, brachiopods, corals, stromatoporoids, with 10% len dk-gr-br, bit & arg ls.
			00	61FM126	ls, med-gr-br, mass-bedded, vfg, det with peb size fragments and stromatoporoids, hackly surface.
			000	61FM125	ls, med-gr-br, mass-bedded, nod, fg, det, with some skeletal fragments, corals, hackly surface.
DEVONIAN	MIDDLE DEVONIAN	HUME FORMATION	000		
			000		
			000		
			000		
			000		

## BULLDOG LAKE

Approx 30 miles northwest of Rock Lake Camp.  
Lat 65° 53' N, Long 128° 41' W (Approx)

## FRANKLIN MOUNTAINS AREA

J S MacDonald, V A Fisher

AGE	FM	LITHOLOGY	THICK- NESS	SAMPLE NO.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	INDIAN FORMATION	000	61MF96	Ls, dk-gr, thin-bded, tab-even, vfg, det. occasional peb size fossil frags; wthrs steel gr & br, hackly.
			100		Covered.
				61MF95	Ls, dk-gr-br, very thin-bded, tab-uneven, cg to mg, det & skeletal frags, few stromatoporoids; 7% intery por.
				61MF94	Ls, lt-gr-br, thin-bded, fg to cg, ang, soft, gran, det; intery por 17%; contains corals.
			200	61MF93	Ls, med-gr-br, thin-bded, mg to fg, ang; intery por 15%; skeletal & det, contains corals.
				61MF92	Ls, med-gr-br, thin-bded, tab-uneven, fg, ang, hd; vug por 15%; secondary calcite, wthrs hackly.
			300	61MF91	Ls, med-gr-br, very thin-bded, peb to cg size fossils in fg to cg matrix, det. & skeletal; "spaghetti" corals.
				61MF89	Covered.
				61MF88	Ls, dk-gr, thk-bded, tab-uneven, vfg, ang, with a few peb size brachiopods. Ls, med-gr-br, thin-bded, nod, coarse to peb size corals & brachs in vfg, ang, det, matrix; some secondary calcite and questionable bit.
			400		Covered.
DEVONIAN	MIDDLE DEVONIAN	INDIAN FORMATION		61MF97	Ls, med-gr-br, thin-bded, tab-even, platy, vfg, micritic.
			500		Covered.
				61MF101	Dol, dk-gr, thk-bded, tab-even, vfg, hd, ang.
			600	61MF100	Dol, lt-gr, thk-bded, tab-even, vfg; ppp (15%), some bit. in voids.
				61MF99	Dol, med-gr, thk-bded, tab-even, mg to cg, hd, ang; intery por 10%.
DEVONIAN	MIDDLE DEVONIAN	INDIAN FORMATION			Covered.
			700	61MF98	Ls, lt-gr, brecciated, fg, soft, ang frags variable in size, vug por 17% det.
DEVONIAN	MIDDLE DEVONIAN	INDIAN FORMATION	800		

AGE	FM	LITHOLOGY	THICK- NESS	SAMPLE NO	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	RAMPARTS FORMATION	000	61MF96	Ls, dk-gr, thin-bded, tab-even, vfg, det. occasional peb size fossil frags; wthrs steel gr & br, hackly.
			100		Covered.
				61MF95	Ls, dk-gr-br, very thin-bded, tab-uneven, cg to mg, det & skeletal frags, few stromatoporoidea; 7% interg por.
				61MF94	Ls, lt-gr-br, thin-bded, fg to cg, ang, soft, gran, det; interg por 1%; contains corals.
				61MF93	Ls, med-gr-br, thin-bded, mg to fg, ang; interg por 15%; skeletal & det, contains corals.
				61MF92	Ls, med-gr-br, thin-bded, tab-uneven, fg, ang, hd; vug por 15%; secondary calcite, wthrs hackly.
	LOWER DEVONIAN	BEAR ROCK FORMATION	300	61MF91 90	Ls, med-gr-br, very thin-bded, peb to cg size fossils in fg to cg matrix, det. & skeletal; "spaghetti" corals.
					Covered.
				61MF89	Ls, dk-gr, thk-bded, tab-uneven, vfg, arg, with a few peb size brachiopods.
				61MF88	Ls, med-gr-br, thin-bded, nod, coarse to peb size corals & brachs in vfg, arg, det, matrix; some secondary calcite and questionable bit.
			400		Covered.
				61MF97	Ls, med-gr-br, thin-bded, tab-even, platy, vfg, micritic.
		HUME FM	500		Covered.
				61MF101	Dol, dk-gr, thk-bded, tab-even, vfg, hd, ang.
			600	61MF100 61MF99	Dol, lt-gr, thk-bded, tab-even, vfg; prp (15%), some bit. in voids. Dol, med-gr, thk-bded, tab-even, mg to cg, hd, ang; interg por 10%.
			700	61MF98	Covered. Ls, lt-gr, brecciated, fg, soft, ang frags variable in size, vug por 17% det.
			800		
			900		

## BEAVERTAIL MOUNTAIN

Approx 3 1/2 miles northwest of Rock Lake Camp  
 Lat 65° 53' N, Long 128° 45' W (Approx)

## FRANKLIN MOUNTAINS AREA

J S MacDonald, V A Fisher

AGE	FM	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN	MIDDLE DEVONIAN	RAMPARTS FORMATION	000	61FM112	ls, lt-gr-br, thk-bded, len-uneven, skeletal, with fg matrix, coralline, sub-nod.
			100	61FM111	ls, lt-gr-br, thk-bded, len-uneven, nod, peb to gran size corals in fg matrix.
				61FM110	ls, lt-gr-br, mass-bding, fg, det, varied fracture pattern along strike.
				61FM109	ls, lt-gr-br, thk-bded, tab-even, fg to cg, arg, med - hd, (skeletal debris), well developed frac. system normal to bding planes, wthrs yel-br, hackly.
			200	61FM108	ls, med-gr-br, mass-bding, foss. with vfg matrix, corals & stromatoporoids of gran to boulder size, "spaghetti" coral, crinkly bding; about 5% interbedded blk, len-uneven, bit. sh.
				61FM107	ls & sh, med-gr-br, thk-bded, tab-uneven, peb size foss. in fg matrix; brach & corals, det & skeletal, wthrs gr-br; $\pm$ 25% interbedded blk, thin bded sh. Covered.
	HARE INDIAN FORMATION		300	61FM106	ls, dk-gr-br, mass, tab-even, mg to gran size, foss. in fg matrix, crinoids & corals, det & skeletal, wthrs hackly & yel-tan.
				61FM105	ls, med-gr-br, tab-even, fg to vfg, det, occas. brach; wthrs yel-tan, silic, nod; interbedded w med-gr spec red lenses of fg, blk wthring ls ( $\pm$ 15% of outcrop).
			400	61FM104	ls, dk-gr-br, thin-bded, tab-even, fg, arg, det, blocky to platy, wthrs yel-tan.
				61FM103	ls, med-gr-br, thin-bded, tab-even, vfg, arg, det, fucoidal markings on bding planes; blocky to platy, wthrs yel-tan.
			500	61FM102	ls, dk-gr-br, thin-bded, tab-even, fg to vfg, hd, micritic, few corals; very well bded, blocky to platy, arg.
			600		

Stratigraphic section No. 25


# LAC À JACQUES

Approx. 29 miles northeast of Rock Lake Camp

Lat. 66° 07' N, Long. 127° 32' W. (Approx.)

## FRANKLIN MOUNTAINS AREA

J. S. MacDonald, M.D. Mangus

AGE	FM.	LITHOLOGY	THICK- NESS	SAMPLE No.	DESCRIPTION
DEVONIAN MIDDLE DEVONIAN	HUME FORMATION		000	61FM130	ls, med-gr-br, thin-bded, tab-uneven, vfg, det, with gran. to boulder size fossils, brachiopods, stromatoporoids, corals, goniatites; whrs hackly.
			100		
			200		