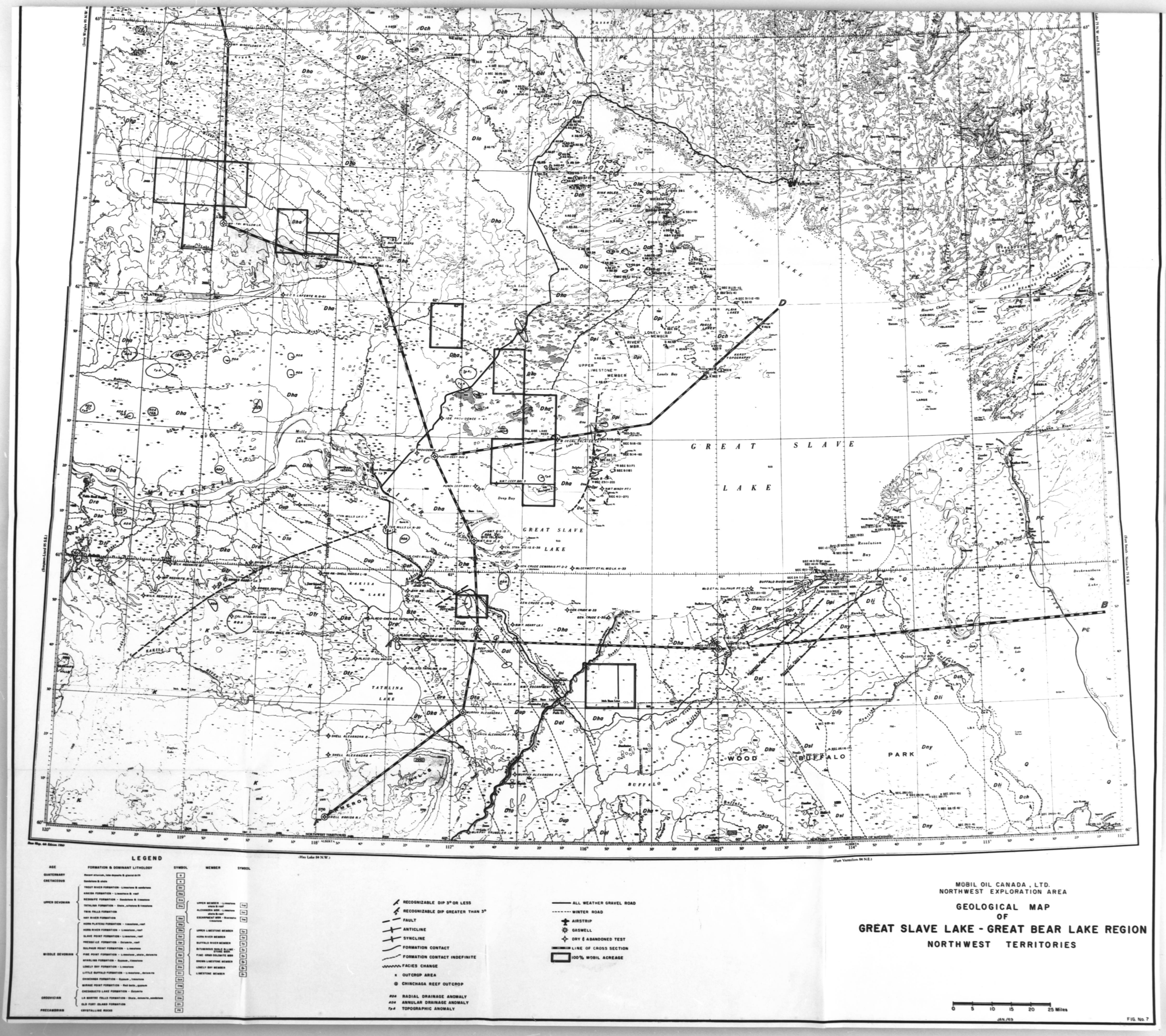
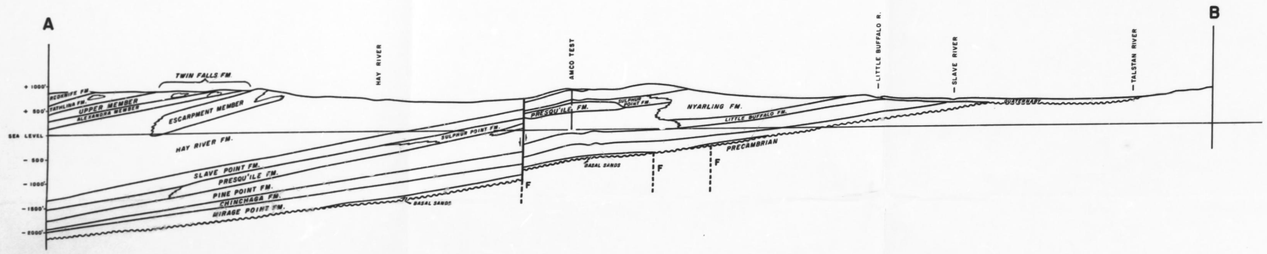
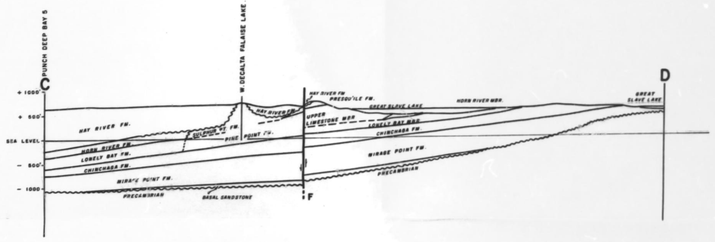
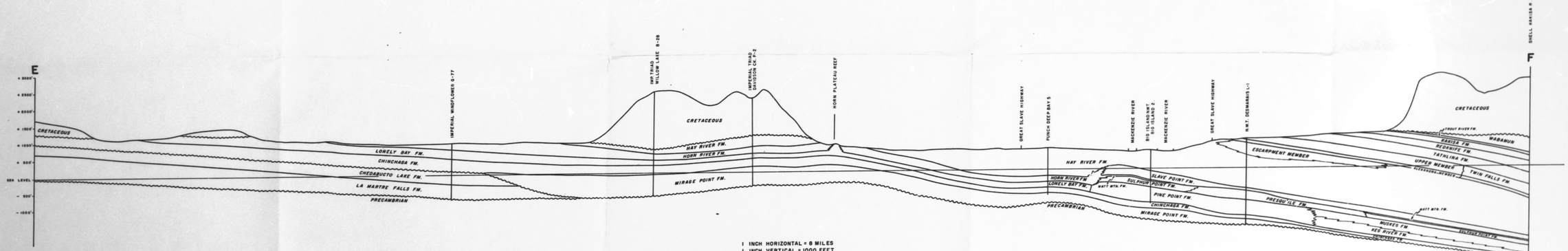

McTAVISH ARM
(GREAT BEAR LAKE)
LATOUR PENINSULA
McVICAR ARM
(Great Bear Lake)
MANTLED
LAC
MARTRE
GRANDOT
LAKE
RIVER
Olm
Ocl
Och
Dho
Dlo
Rdv
PC


GREAT SLAVE LAKE
LEGEND
AGE
FORMATION & DOMINANT LITHOLOGY
SYMBOL
MEMBER
SYMBOL
QUATERNARY
Recent alluvium, lake deposits & glacial drift
CRETACEOUS
Sandstone & shale
UPPER DEVONIAN
TROUT RIVER FORMATION - Limestone & sandstone
KAKISA FORMATION - Limestone & reef
REDKNIFE FORMATION - Sandstone & limestone
TATHLINA FORMATION - Shale, siltstone & limestone
TWIN FALLS FORMATION
HAY RIVER FORMATION
UPPER MEMBER - Limestone shale & reef
ALEXANDRA MBR. - Limestone shale & reef
ESCARPMENT MBR. - Bioclastic limestone
MIDDLE DEVONIAN
HORN PLATEAU FORMATION - limestone, reef
HORN RIVER FORMATION - Limestone, reef
SLAVE POINT FORMATION - Limestone, reef
PRESQU'ILE FORMATION - Dolomite, reef
SULPHUR POINT FORMATION - Limestone
PINE POINT FORMATION - Limestone, shale, dolomite
NYARLING FORMATION - Gypsum, limestone
LONELY BAY FORMATION - Limestone
LITTLE BUFFALO FORMATION - Limestone, dolomite
CHINCHAGA FORMATION - Gypsum, limestone
MIRAGE POINT FORMATION - Red beds, gypsum
UPPER LIMESTONE MEMBER
HORN RIVER MEMBER
BUFFALO RIVER MEMBER
BITUMINOUS SHALE & LIMESTONE MBR.
FINE-GRND DOLOMITE MBR
BROWN LIMESTONE MEMBER
LONELY BAY MEMBER
LIMESTONE MEMBER
ORDOVICIAN
CHEDABUCTO LAKE FORMATION - Dolomite
LA MARTRE FALLS FORMATION - Shale, dolomite, sandstone
OLD FORT ISLAND FORMATION
PRECAMBRIAN
CRYSTALLINE ROCKS
RECOGNIZABLE DIP 3° OR LESS
RECOGNIZABLE DIP GREATER THAN 3°
FAULT
ANTICLINE
SYNCLINE
FORMATION CONTACT
FORMATION CONTACT INDEFINITE
FACIES CHANGE
OUTCROP AREA
CHINCHAGA REEF OUTCROP
RDA RADIAL DRAINAGE ANOMALY
ADA ANNULAR DRAINAGE ANOMALY
TpA TOPOGRAPHIC ANOMALY
ALL WEATHER GRAVEL ROAD
WINTER ROAD
AIRSTRIP
GASWELL
DRY & ABANDONED TEST
LINE OF CROSS SECTION
100% MOBIL ACREAGE
MOBIL OIL CANADA, LTD.
NORTHWEST EXPLORATION AREA
GEOLOGICAL MAP
OF
GREAT SLAVE LAKE - GREAT BEAR LAKE REGION
NORTHWEST TERRITORIES
0 5 10 15 20 25 Miles
JAN./69
FIG. No. 7

2 of 2







1 INCH HORIZONTAL = 8 MILES
1 INCH VERTICAL = 1000 FEET
VERTICAL EXAGGERATION = X 42

CROSS SECTIONS TO ACCOMPANY

REPORT ON GEOLOGY OF GREAT SLAVE LAKE - GREAT BEAR LAKE REGION

FIG. No. 8

57-1-4-53

MIDDLE DEVONIAN STRATIGRAPHY,

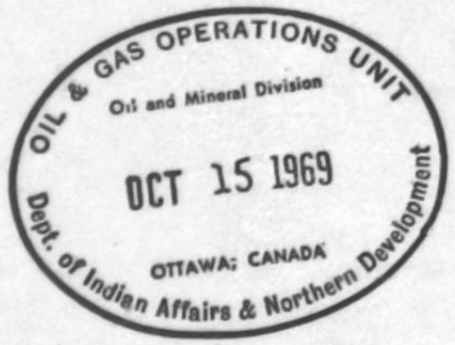
GREAT SLAVE LAKE AREA,

NORTHWEST TERRITORIES

by

D.A. McDONALD

Calgary
Alberta
May 1969



CONTENTS

ILLUSTRATIONS

INTRODUCTION

The Field Party #48 project was designed to obtain detailed stratigraphical and palaeontological information on the Middle Devonian sediments in the area between Great Slave Lake and Great Bear Lake and to use this information to test the correctness of generally accepted correlations in the area.

Location

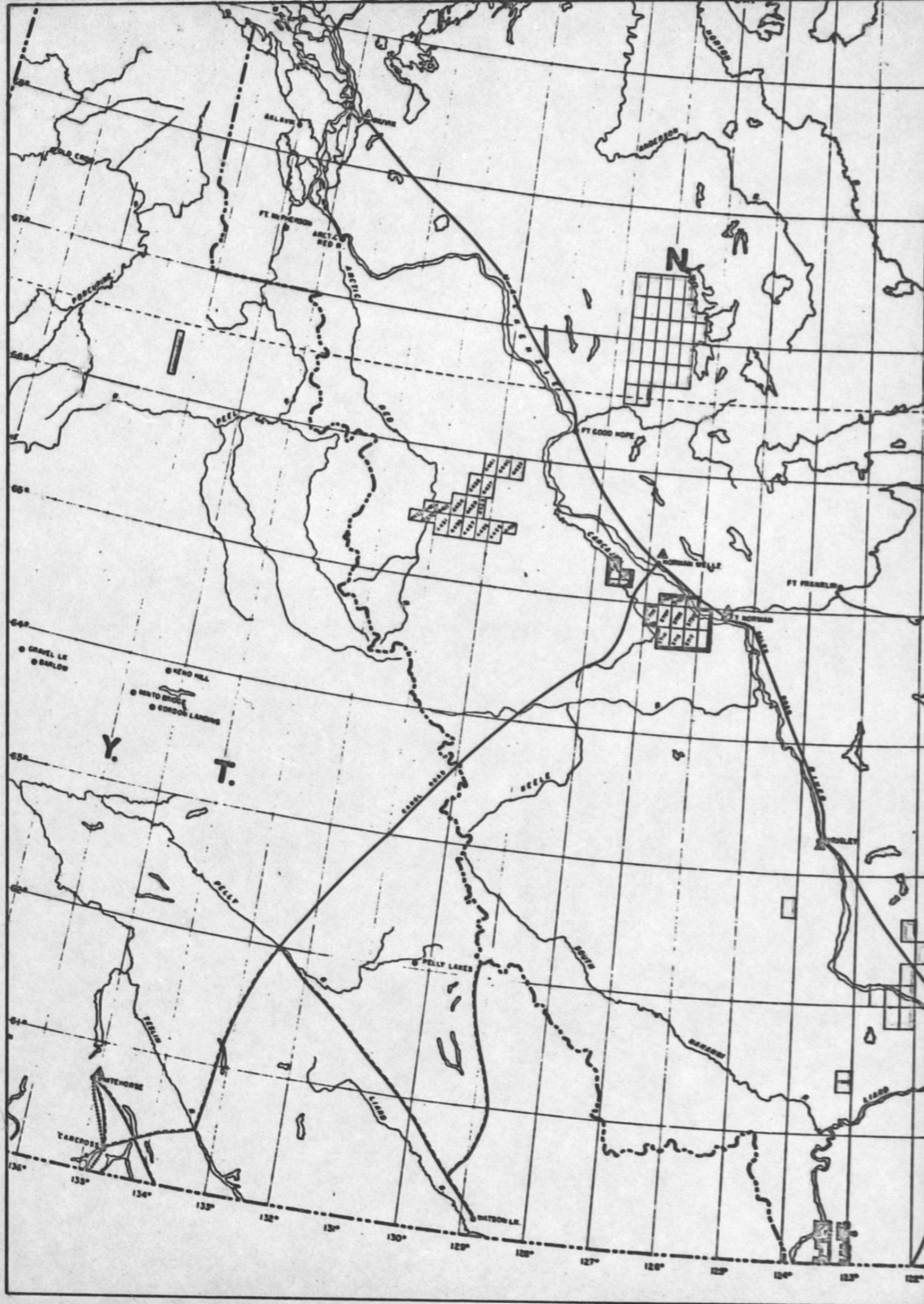
The area which was mapped occupies about 25,000 square miles and its outline is shown on Text-Figure 1. It extends from 60° in the south to 64°40' in the north and is bounded by the Pre-Cambrian Shield in the east and the hills formed by the Cretaceous overstep in the west, as illustrated in Figure 2.

The area is accessible from the south by air, road, and rail. Regular air and coach services connect the towns of Yellowknife and Hay River with Edmonton, and rail services connect Hay River and the mining community at Pine Point with Peace River and Edmonton.

Good all-weather gravel roads connect Fort Smith, Pine Point, and Yellowknife with the town of Hay River which stands at the northern end of the Mackenzie Highway.

Physiography

The area mapped lies within the physiographic province known as the Great Slave Plain, a lowland underlain by Lower Palaeozoic sedimentary rocks dipping gently southwest from

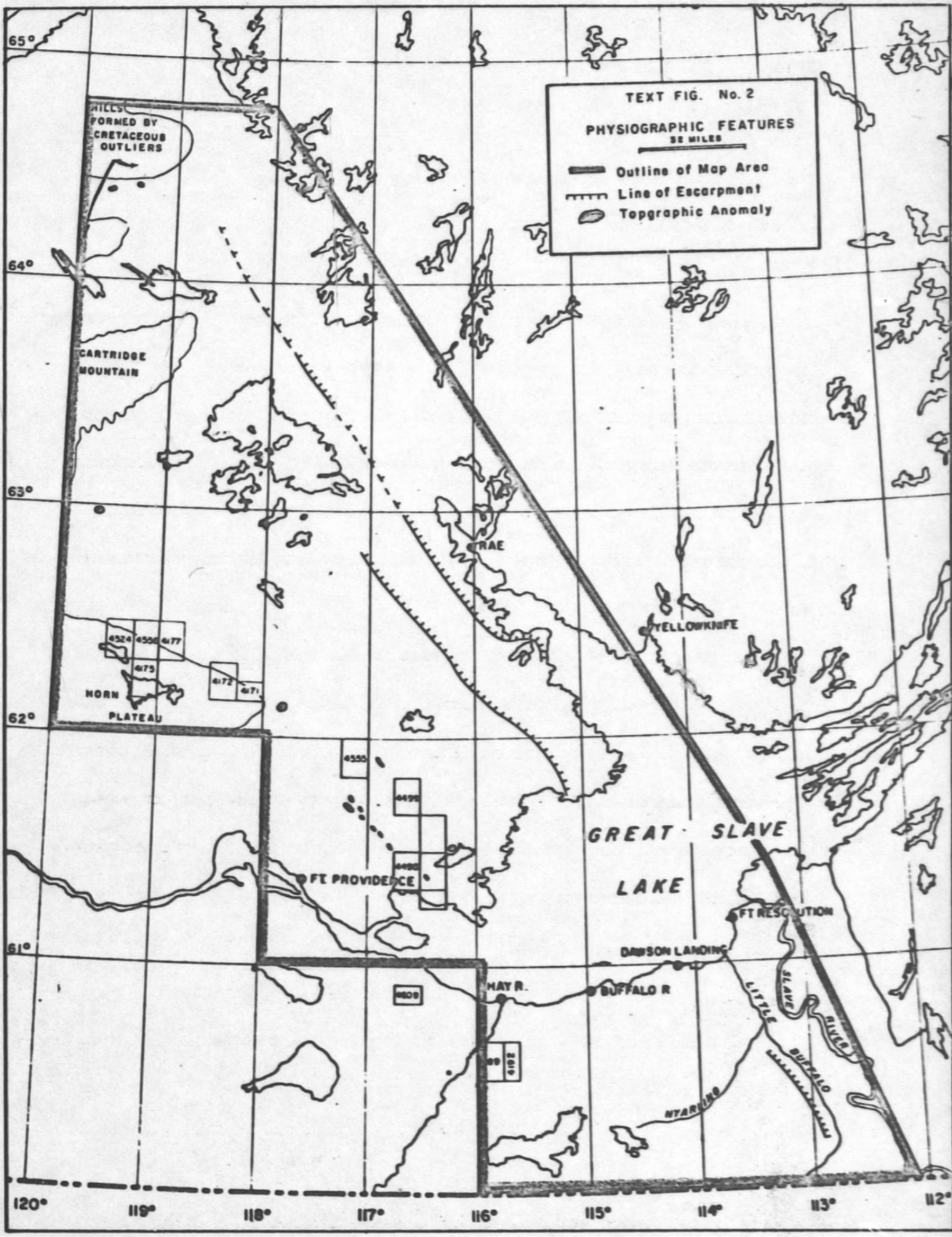

N
Y. T.
ARCTIC RED R.
PEEL R.
ARCTIC
PORCUPINE
RED
PEEL
FT GOOD HOPE
NORMAN WELLS
FT NORMAN
FT FRANKLIN
GRAVEL LK
BARLOW
KEMO HILL
MINTO BRIDGE
GORDON LANDING
CANOL ROAD
PEEL
KELLY
KELLY LAKES
SOUTH
BEAVER
LIARD
WHITEHORSE
CARCROSS
HATSON LK.
ROBERTS
ANDERSON
ARCTIC
MACKENZIE
CANOL
ROAD
ALASKA
HIGHWAY
CARIBOU
136°
135°
134°
133°
132°
131°
130°
129°
128°
127°
126°
125°
124°
123°
122°

a basement of Pre-Cambrian rocks.

The outstanding physiographic features are shown in Text-Figure 2. The principal topographic feature south of Great Slave Lake is a N.W. - S.E. trending, eastward facing escarpment west of, and approximately parallel to the Little Buffalo River. The escarpment fades out in the area immediately south of the confluence of the Nyarling and Little Buffalo Rivers. A similar and possibly corresponding eastward facing escarpment occurs north of Great Slave Lake. It extends northwestward from Lonely Bay and fades out in the area south of Lac La Martre.

A second and more prominent eastward facing escarpment occurs on the north side of Great Slave Lake. It extends from Redrock Point northwestward along the west side of Faber Lake to the area west of Hottah Lake. This escarpment is capped by an Ordovician dolomite whereas the two described earlier are capped by Middle Devonian carbonates which overlie recessive evaporitic beds.

The remainder of the area is largely occupied by a poorly drained muskeg terrain, with occasional local prominences of up to 200 feet relief produced by Pre-Cambrian inliers penetrating the strata between the two escarpments north of Great Slave Lake.


TEXT FIG. No. 2
PHYSIOGRAPHIC FEATURES
Outline of Map Area
Line of Escarpment
Topgraphic Anomaly
HILLS FORMED BY CRETACEOUS OUTLIERS
CARTRIDGE MOUNTAIN
HORN PLATEAU
TRAE
YELLOWKNIFE
GREAT SLAVE LAKE
FT PROVIDENCE
FT RESOLUTION
DAWSON LANDING
MAY R.
BUFFALO R
SLAVE RIVER
LITTLE BUFFALO RIVERS
NTARIRS
65°
64°
63°
62°
61°
120°
119°
118°
117°
116°
115°
114°
113°
112°

Several small elliptical topographical features occur in the area of shale outcrop northwest of Great Slave Lake (Text Figure 2). Although they are no more than gentle eminences which are scarcely discernable on the ground, or indeed on the topographical maps, they present quite marked topographical anomalies on airphotos. The axes of the ellipses generally have a N.W. - S.E. trend and this trend is repeated in the alignment of several of the anomalies.

Field Methods

The field party consisted of a four man geological party and supporting personnel and operated from base camps at Hay River and at the Frank Channel Forestry Station.

Transport.--The main form of field transport was provided by a Bell 47 Super G-2 helicopter chartered from Foothills Aviation Ltd., Calgary. Fixed wing supporting aircraft were chartered locally on the few occasions when it was necessary.

A rented one-half ton truck and a Meteor car owned by Mobil were used to transport men, supplies, and fuel along the gravel roads which cut across the area.

Section Measuring.--Due to the very low relief in the area and the extremely low dip of the beds there are no long, continuous sections anywhere in the area. Only in the face of the escarpments can a continuous section of up to 40 feet be

found and most of the sections described are composite sections built up from scattered outcrops. Nearly all of the outcrops in the area were sampled and plotted on the map so that an accurate surface geological map could be built up. Large faunal collections were made at all fossiliferous exposures. The locations of all of the sections and sampled localities are shown on Figure 3.

Laboratory Methods

Compilation of Strip Logs.--All of the lithological samples were crushed in the field and a preliminary examination carried out. All of the samples were re-examined on return from the field and strip logs were drawn up from the resulting sample descriptions.

Compilation of Faunal Lists.--Faunal identifications were made by the writer who must take sole responsibility for them. About 25 thin sections were made to assist in the identification of corals and other coelenterates.

Previous Geological Work in the Area

Early geological reconnaissance in the Great Slave Lake area was carried out by Dawson (1887), McConnell (1891), and Cameron (1918, 1922), and their reports constitute the geological groundwork on which later investigators built. Several brief geological reports prepared for oil companies are avail-

able on parts of the area, but the most comprehensive recent work is contained in Norris (1965), - a compilation of work done by various officers of the Geological Survey of Canada on Operation Mackenzie.

A subsequent geological report on the Great Slave - Great Bear Lake area by V. Zay Smith Associates Ltd. covers much of the same region as was covered by Operation Mackenzie and restates the general stratigraphic interpretation but does present some additional maps and illustrative cross-sections.

A considerable amount of work has been done by officers of the Geological Survey of Canada on faunal collections from the Middle Devonian in the area, but some of the most valuable contributions to understanding of the faunas have been made by C.H. Crickmay, particularly with reference to the prolific coral-brachiopod faunas in the immediate vicinity of Great Slave Lake. Other contributions referring specifically to faunas from the area were made by Warren and Stelck (1956), and McLaren & Norris (1962 and 1964).

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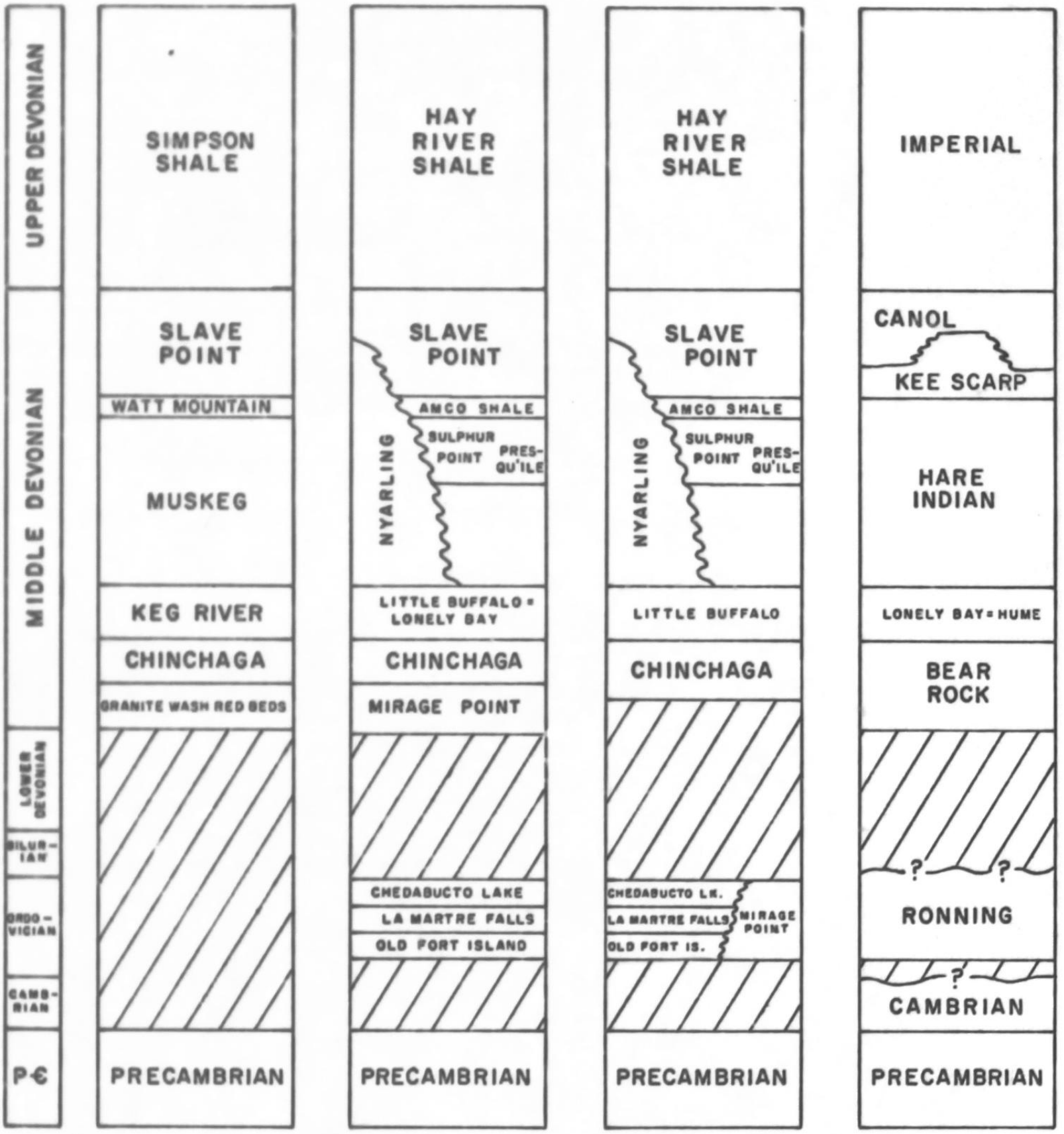
STRATIGRAPHY

The currently accepted correlations of Middle Devonian strata in the northwestern Alberta are largely based on the ideas put forward by Law (1955) in a paper in which he also proposed and defined the formational names: Watt Mountain, Muskeg, Keg River, and Chinchaga. In each case, he chose the type section from the subsurface in the California Standard Steen River #2-22 (22-117-5W6). These formations can be traced quite satisfactorily in the subsurface as far north as the Alberta-N.W.T. border but become tenuous about this point due to lack of well control, and Law correlated the formations somewhat arbitrarily with the most similar parts of the succession at the surface or in the shallow drill holes around Great Slave Lake. He correlated the Watt Mountain Formation of northwest Alberta with the Amco Shale and the underlying beds down to the top of the Presqu'ile dolomite. Taking the Amco Shale as the Watt Mountain equivalent, the correlation between northwest Alberta and the Pine Point area is as shown in Text-Figure 4. If, however, the Watt Mountain Formation is correlated with the E Shales of the Pine Point area, then the correlation could be as shown in Text-Figure 5.

Since the surface geology is already quite well known in a general way through the reports resulting from Operation

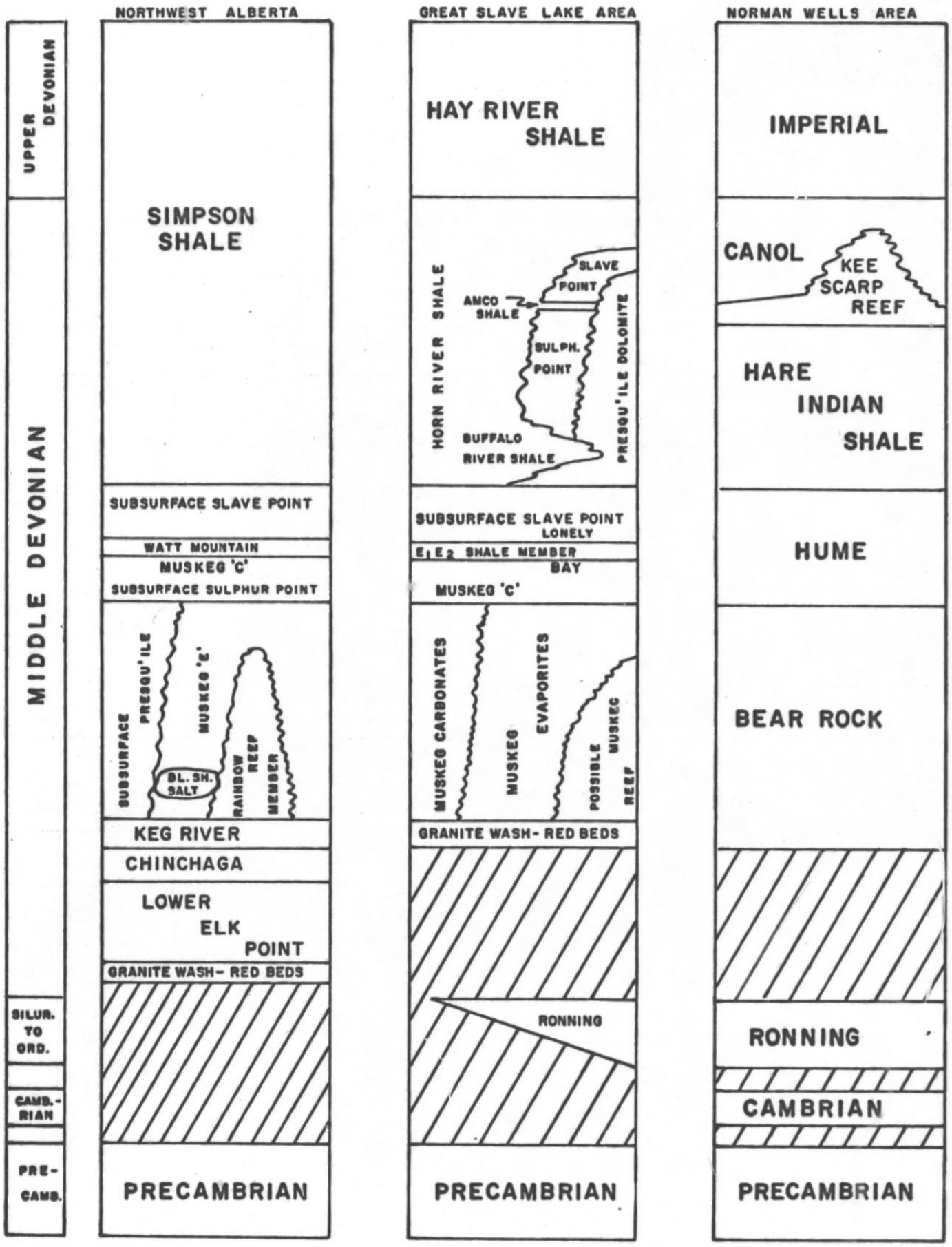
STRATIGRAPHIC CORRELATION CHART

NORTHWEST ALBERTA TO NORMAN WELLS AREA



TEXT FIG. No. 4

STRATIGRAPHIC CORRELATION CHART
(AFTER NIKIFORUK)
NORTHWEST ALBERTA TO NORMAN WELLS AREA



TEXT FIG. No. 5

Mackenzie, and the Middle Devonian faunas are well documented by Warren, Crickmay, McLaren, and Norris, it was hoped that further detailed investigation of the outcrops and of the contained faunas might provide sufficient additional information to resolve which is the correct correlation.

A brief outline of the salient features of each formation and member is given below with a list of the significant fossils which were found in it. A detailed list of all of the fossil determinations is included in Appendix I. A discussion of the relative merits of the alternative correlations follows the stratigraphical review.

Pre-Cambrian

Pre-Cambrian igneous and metamorphic rocks form the eastern margin of the map area, and also occur as inliers within the outcrop belt of Ordovician and Devonian rocks northwest of Great Slave Lake.

Ordovician

A single representative section through the Ordovician was measured in order to have a complete set of samples for comparative purposes, even though it was felt that the sections compiled by V. Zay Smith Associates were adequate to provide a good understanding of the relatively simple Ordovician relationships in the Great Slave-Great Bear Lakes

area.

The Ordovician system includes the Old Fort Island, the La Martre Falls, and the Chedabucto Lake Formations.

Old Fort Island Formation.--The Old Fort Island Formation which rests unconformably on the Pre-Cambrian consists of white or buff quartzose sandstone with very good porosity. The formation ranges in thickness from 0 to 80 feet and it is interpreted to have been beach sands laid down on the eroded and quite variable Pre-Cambrian surface. From the limited well control available it appears that the formation does not occur south of a line joining Horn Plateau and Wrigley Point.

La Martre Falls Formation.--The La Martre Falls Formation consists of a sequence of shale, silty and argillaceous dolomite, and minor evaporites. It overlies the Old Fort Island Formation and is overlain by the Chedabucto Lake Formation. The formation ranges in thickness from 90 feet at Whitebeach Point in the south to over 800 feet in the area southwest of Hottah Lake, thinning to 50 feet at Old Fort Rae over the Fort Rae Arch.

A varied fauna including Desmograptus and Diplograptus serves to establish a Middle Ordovician age for the upper part of the formation, and it is probable that the whole formation

belongs to this period of time.

The similarity in fauna, lithology, and stratigraphic position of the La Martre Formation and the Franklin Mountain division of the Ronning in the region to the west was noted by V. Zay Smith Associates (1966, p. 13).

Chedabucto Lake Formation.--The Chedabucto Lake Formation is a thick bedded, resistant, scarp forming dolomite unit which appears to overlie the La Martre Formation unconformably, and is itself unconformably overlain by the Middle Devonian. The thickness of the formation ranges from zero in the area south of Redrock Point to about 250 feet in the north, west of Faber Lake. From the restricted well control available there appears to be a thickening to the northwest since 485 feet is present in the Imperial Lac Tache well west of Cartridge Mountain. Like the underlying Ordovician rocks the Chedabucto Lake Formation thins in the vicinity of Old Fort Rae so that it can be inferred that the Fort Rae arch was positive throughout the period of Ordovician sedimentation in the area.

An abundant and varied fauna has been collected and identified by G.W. Sinclair of the Geological Survey of Canada (see G.S.C. Memoir 322, p. 26). This fauna points conclusively to an Upper Ordovician age.

The Chedabucto Lake Formation bears a strong faunal and

lithological resemblance to the Mount Kindle Formation of the Franklin Mountains area (as pointed out in V. Zay Smith, 1966 p. 16) and occupies much the same stratigraphic position.

Devonian

The understanding of the relationships of the Devonian strata in the Great Slave-Great Bear Lakes area is confused by two factors. In the first place the correlation of well known rock divisions in northwest Alberta with rock divisions in the Great Slave Lake region is tenuous because of the scanty subsurface information available. Secondly, a Middle Devonian carbonate bank which extends southwest from the western part of Great Slave Lake causes some very rapid facies changes which obscure the relationships between the outcrops on the north and south sides of Great Slave Lake.

Mirage Point Formation.--The name Mirage Point Formation was proposed by Norris (1961, p. 27) for a variable sequence of red beds which were laid down on the eroded Pre-Cambrian surface in the area south of a line joining the Horn Plateau and Redrock Point.

Only the uppermost beds of the Mirage Point Formation crop out along the west shore of Great Slave Lake between Redrock Point and Edgar Point. Here they consist mainly of sandy and argillaceous red dolomites, with interbedded sand-

stones, red and green shales, gypsiferous shales, and gypsum. About 200 feet of the formation occurs in the Northwest Windy Point No. 1 well, including 110 feet of reddish-brown sandstones at the base. In the Pine Point area on the south side of Great Slave Lake the Mirage Point Fm. is much thinner with only 188 feet present in the Cominco G-1 well and 293 feet in the Cominco G-4 well. Thin sandstone sequences also occur in the basal part of both of these wells. The formation thins quite rapidly towards the west and southwest and is altogether absent over the Tathlina uplift.

In the Imperial Triad Willow Lake well 485 feet of Mirage Point *is present but the formation does not occur in any well north of this. V. Zay Smith Associates (1966, p. 21) postulated that the area of Mirage Point deposition was controlled

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* Recently acquired subsurface data and a review of the subsurface stratigraphy presently being carried out by J.M. Drummond suggest that much of the sequence to the immediate south and to the northwest of Great Slave Lake herein referred to as Mirage Point, consists of thick salt beds to which the name Cold Lake Formation could more appropriately be applied.

to the north by an escarpment trending generally east-west from the vicinity of the northern flank of the Horn Plateau, east-southeast over the Fort Rae arch to Redrock Point on the North Arm of Great Slave Lake (see Stratigraphic Cross Section EF).

Norris (1965, p. 29) considered that the Mirage Point Formation in the southern and southwestern parts of the Great Slave Lakes region occupies the stratigraphic interval of the combined Chedabucto Lake and La Martre Falls Formations in the north, and consequently assigned a Middle to Upper Ordovician age to the formation. The Mirage Point Formation is quite unfossiliferous, however, and although it occupies a similar stratigraphic interval to the Ordovician rocks in the north, it also occupies the same stratigraphic interval as the lower part of the Elk Point Group of northern Alberta which is assigned to the Middle Devonian. In addition, it shows a strong lithological and inferred environmental similarity to the lower part of the Elk Point Group, whereas a very rapid and rather improbable facies change must be assumed if it were, indeed, Ordovician in age.

Chinchaga Formation.--The Chinchaga Formation is one of the formational names introduced by Law (1955) for divisions of the Elk Point Group in northwestern Alberta. The name applies to the lower evaporitic unit of the Elk Point and

consists mainly of anhydrite and cryptocrystalline dolomite. According to V. Zay Smith Associates (1966, p. 22) the unit could be traced from northwestern Alberta into the Great Slave Lake region where it had been referred to as the Fitzgerald Formation by Law (1955, Fig. 5). However Norris (1963) had subsequently re-defined Law's Fitzgerald Formation and restricted it to the carbonate overlying the basal sandstones at Stony and Caribou Islands on Slave River. Craig et al (1967) fairly convincingly correlated the lithological unit involved in this restricted sense of the Fitzgerald Formation with the Keg River Formation on the basis of ostracods belonging to Braun's (1966) "b" and "c" microfaunal assemblage. The evaporite sequence which crops out on the Little Buffalo River below the little Buffalo Falls is considered to be the true correlative of the Chinchaga Formation of northwestern Alberta, and the use, in any sense, of the term Fitgerald should be discontinued.

The Chinchaga Formation ranges from 300 to 430 feet in thickness in the outcrop belt south of the lake, and consists mainly of laminated white and grey gypsum interbedded with cryptocrystalline dolomite, argillaceous gypsum, and occasional limestone beds. A brecciated limestone bed about 40 feet thick occurs at the top of the Chinchaga Formation in two

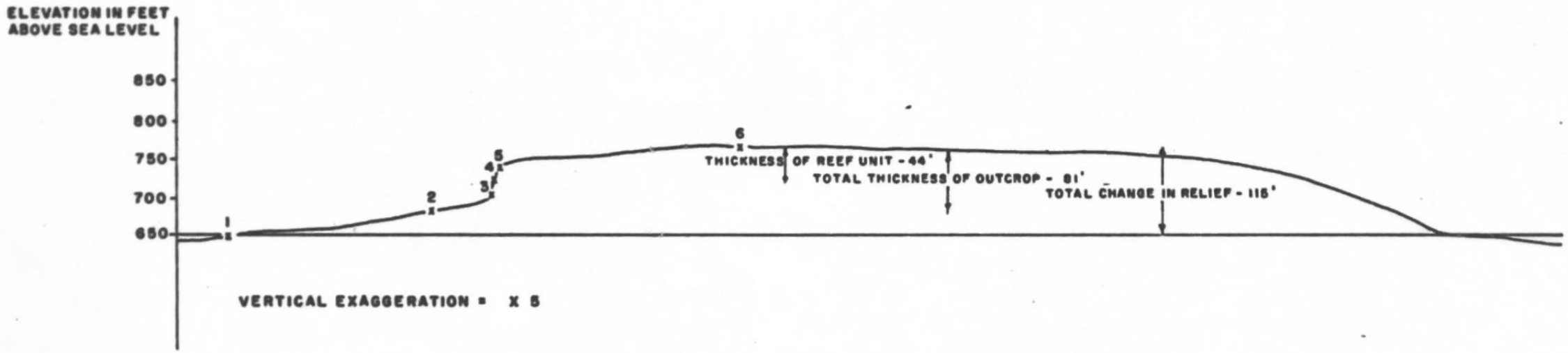
places on the Slave River in the southern part of the area. This unit is referred to as the Hay Camp Member of the Chinchaga Formation and has yielded a single poorly preserved brachiopod suggestive of Emanuella sp. The only other fossils reported from the Chinchaga Formation south of Great Slave Lake are Invertrypa sp. cf. I. andersonensis (Warren), and ? Anatrypa sp. Norris (1965, p. 36) considered that these suggest a possible lower Middle Devonian (Eifelian) age.

In the Cominco Test G-4 well 323.5 feet of laminated anhydrite, argillaceous dolomite, and green shale belonging to the Chinchaga Formation are present, and 307 feet of similar sediments occur in the Cominco G-1 Test well.

Evaporite Sequence North of Great Slave Lake.--An evaporite sequence ranging from 270 to 340 feet in thickness crops out in a belt trending southwest parallel to the North Arm of Great Slave Lake from Hardisty Island in the south to the area north of Lac Grandin where it disappears beneath the overstepping Cretaceous. This sequence is correlated by Norris (1965, p. 34) and V. Zay Smith Associates (1966, p. 22) with the Chinchaga Formation of the area south of the lake, whereas in the correlation shown in Text-Figure 5 it is correlated with the Muskeg Formation of northwestern Alberta.

Almost every exposure within the outcrop belt of the

GENERALIZED PROFILE OF CHINCHAGA ? REEF (SECTION 34)



STATION	ELEVATION	REMARKS
6	763	POINT ON REEF 1/4 MILE NORTH OF STATION 5
5	729	TOP OF SCARP IMMEDIATELY ABOVE STATION 4
4	719	BASE OF "REEF" UNIT
3	700	BASE OF MAIN SCARP - LIMESTONE BRECCIA
2	682	BASE OF LOWEST OUTCROP OF SCARP - A SMALL TERRACE OF LIMESTONE
1	648	CHEDABUCTO LAKE.

TEXT FIG. No. 6

evaporite sequence was examined and composite sections were built up in order to augment those described by Norris (1965) and V. Zay Smith Associates (1966). In the Northwest Windy Point No. 1 well 275 feet of the evaporites are present. They consist of anhydrite and greyish-brown cryptocrystalline dolomitic limestone at the top, and thick gypsum and anhydrite beds at the base. A nine feet thick bed of vuggy limestone occurs at the base of the sequence on Rae Point.

Although the scattered outcrops are principally soft, weathered gypsum, a cluster of five reef build-ups was found in the vicinity of Chedabucto Lake, another about 7 miles west of Alexander Bay, and what may be the base of a seventh about 10 miles west of Bloomfield Bay (see Figure 7). The reefs in the vicinity of Chedabucto Lake occur between 50 and 60 feet above the base of the evaporite sequence. They tend to be roughly annular in plan view; are up to 1½ miles in diameter and have a generalized profile as illustrated in Text-Figure 6.

The elevations were measured using a Keuffel and Esser Surveying Altimeter and great care was taken to make all necessary corrections for temperature and humidity. The thickness of the reefs ranges from 8 to 60 feet, but in every case the top represents the present day erosional level so that it is not possible to know the original thickness of the reef body.

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A detailed lithological description of one of the reef buildups is shown in Section 34. The rocks underlying the reef vary. In several cases they are underlain by light brown, very finely crystalline, laminated, flaggy dolomites; in other cases they rest on brecciated dolomitic limestone. The framework of the reef rock is in every case composed of tangled masses of Amphipora ? angusta Le Compte and Planetophyllum planetum Crickmay in varying proportions, but usually with a preponderance of the former. Occasional Alveolites sp., Favosites sp. ? Euomphalus sp. and indeterminate brachiopods also occur. Although the corals and stromatoporoids are entirely dolomitized, the spaces in between the corallites are completely infilled by coarse sparry calcite. Good intercrystalline porosity occurs in places but this appears to result from removal of the calcite infilling by surface weathering. The organic reef mass passes laterally and vertically into dolomite breccia with angular blocks of reefal dolomite of varying size up to about three feet in diameter in a fine-grained, light brown, dolomitic matrix. It may even pass into patches of fine-grained dolomite without any trace of organic structure.

The presence of these organic reefs is of especial significance since Keg River - Muskeg reef build-ups occur in the otherwise lithologically similar Muskeg formation in northwestern

Alberta. If the correlation shown in Text-Figure 5 is correct, then the evaporitic sequence north of Great Slave Lake is equivalent to the Muskeg Formation and the presence of reef build-ups in both sequences might tend to confirm this.

The principal framework builders in the Great Slave Lake reefs, however, have never been recorded from the Keg River - Muskeg reefs in northwestern Alberta, according to A.E.H. Budwill (personal communication) who has carried out an extensive study of these bodies.

Both Planetophyllum planetum Crickmay and Amphipora ? augusta Le Compte have special definitive value in the dating of the Devonian rocks in the area. The type material for P. planetum was collected from the La Loche Formation on Stony Island, Slave River, and has not been recorded in print from anywhere else save for Warren and Stelck (1962, p. 273) who stated that it also occurs in the Winnipegosan. Crickmay (1960, p.20) considered that the species has a position comparable to that of the "adoceta" zone which he correlates with the Eifelian Stage. The Muskeg Formation would generally be placed much later in the Devonian. A form described as A. cf. angusta has been recorded by Craig et al (1967, p. 131) from a limestone on the east side of the westernmost of the Stony

Islands, Slave River, which they assign to the Keg River Formation. Ostracods which were collected along with A. cf. angusta suggest that the "arctica" zone is present. This also would indicate an earlier age than is usually accorded the Muskeg Formation. It should be pointed out, though, that A. angusta has a range from middle to upper Givetian in Europe. Thus, both of the most abundant fossils in the evaporite sequence north of Great Slave Lake are present in beds south of the lake which are older than the Muskeg Formation, and the fossils have never been recorded from the Muskeg Formation.

Keg River Formation.--The carbonate unit which overlies the Chinchaga Formation in the area south of the Pine Point mining community was named the Little Buffalo Formation by Norris (1965, p. 37) after the little Buffalo River where it is best exposed. Craig et al (1967, p. 128) subsequently referred the beds to the Keg River Formation and this practice is followed in the present report. The formation forms the cap of a resistant eastward facing escarpment which extends north west for over 40 miles from west of Fort Smith and dies out in the area just south of the confluence of the Nyarling and Little Buffalo Rivers. Although patches of the formation are exposed at various points along the crest of the escarpment the only good section through it occurs at the Little Buffalo Falls

about 30 miles west of Fort Smith where the contact with the underlying Chinchaga is exposed. A detailed lithological log is shown in Section 3.

The Keg River Formation is 115 feet thick where it outcrops and consists of a lower dolomite unit which is about 55 feet thick, and an upper limestone and dolomite unit which is about 60 feet thick. The lower dolomite unit is light to medium brown, very fine to medium grained, well laminated in places, with occasional zones of vuggy porosity. The lower 20 feet of the upper limestone and dolomite unit consists of thin bedded, fossiliferous limestone interbedded with argillaceous dolomite; the upper part consists of thin to medium bedded, fine to coarse grained, fossiliferous dolomite. Thin bands in the upper limestone and dolomite unit are almost entirely composed of crinoidal debris.

The upper limestone and dolomite unit yielded an extensive fauna. The fossils in the following list were collected and identified during the present investigation: -

Chonetes? sp.

Desquamatia aff. arctica (Warren)

D. aff. aperanta (Crickmay)

Emanuella ? sp.

Modiomorpha Parvula Whiteaves

Paracyclas elliptica Hall

Spathella ? sp.

Buchelia tyrrelli (Whiteaves)

Mastigospira alata (Whiteaves)

Omphalocirrus ? manitobensis Whiteaves

Straparollus sp.

Gyronaedyceras submamillatum (Whiteaves)

Dechenella sp.

Paraparchites sp.

Pseudobythocypris sp.

Tentaculites sp.

Other fossils recorded by Craig et al (1967 p. 130) and Norris (1965, p. 39) include:

Desquamatia sp. cf. D. perfimbriata (Crickmay)

Desquamatia sp. nov. cf. arctica (Warren)

Emanuella meristoides Meek

Elita sp. indet.

Gypidula sp.

Productella sp. indet.

Spinatrypa sp.

cf. Michelinoceras sp.

Craig et al also recorded ostracods from the lower dolomite unit which are characteristic of the lower part of

the Keg River Formation.

The fauna appears to represent the "arctica" zone of Crickmay (1966) which occurs in the early part of the Givetian Stage.

Lonely Bay Formation.--The Lonely Bay Formation was the name applied by Norris (1965, p. 40) to a resistant carbonate unit conformably overlying the basal evaporitic sequence north of Great Slave Lake and overlain with apparent conformity by shale and limestone of the Horn River Formation. It can be traced northward as an eastward facing escarpment from Lonely Bay to the vicinity of the headwaters of Duport River. In this zone its outcrop belt is characterized by flat, high, well drained ground in contrast to the low, swampy terrain on either side. The Lonely Bay Formation is arbitrarily cut off from the Lonely Bay Member of the Pine Point Formation at a point about 12 miles north of Lonely Bay although, as will be discussed in greater detail later, there is apparent faunal and lithological continuity. Northwest of Duport River the topographical distinctions become less evident and only occasional scattered outcrops occur, but they suggest that the outcrop belt is considerably wider than in the south, and consequently indicate that the formation thickens in this direction. This is confirmed by the subsurface data since the

formation is 180 feet thick in the Imperial Triad Willow Lake well; 190 feet thick in the Imperial Cartridge well; and 190 feet in the Imperial Windflower well.

Everywhere it outcrops the Lonely Bay Formation consists entirely of medium grey and medium greyish-brown, crypto-crystalline limestones with occasional traces of vuggy porosity and, more commonly, patches of drusy calcite which appear to be infillings of vugs. The formation contains an abundant and varied fauna in most places, although it is usually difficult to extract unbroken specimens due to the dense, compact nature of the rock. Some thin shale partings occur near the base of the formation although the limestone is not otherwise argillaceous.

Fossils collected from the Lonely Bay Formation include the following:

Chonetes aurora Hall

Cranaena sp.

Desquamatia arctica (Warren)

D. hormophora (Crickmay)

D. cf. aperanta (Crickmay)

D. aff. perfimbriata (Crickmay)

Devonoproductus cf. primus Crickmay

? Elita sp.

Emanuella cf. meristoides (Meek)

E. richardsoni (Meek)

E. sublineata (Meek)

Invertrypa andersonensis (Warren)

Leiorhynchus cf. castanea McLaren

Orbiculoidea sp.

Productella cf. gulosi Crickmay

P. aff. veracunda Crickmay

Plectospirifer ? compactus (Meek)

Schizophoria sp.

Schuchertella cf. adoceta Crickmay

Coenites sp.

Favosites sp.

Hexagonaria cf. impedita Crickmay

Syringopora sp.

Thamnopora limitaris Rominger

Actinostroma sp.

Clathrodictyon sp.

Aviculopecten sp.

Conocardium ohioense Meek

? Glossites sp.

Edmondia sp.

? Leptosolen sp.

Limnoptera sp.

Orthonota undulata Conrad

Paracyclas elliptica Hall

Bellerophon pelops Hall

Buchelia tyrrelli Whiteaves

Euomphalus sp.

Loxonema antivolvis Whiteaves

Mastigospira alata Whiteaves

Murchisonia cf. turbinata Whiteaves

Naticonema sp.

Naticopsis sp.

Ptychospirina sp.

Soleniscus cf. subcostatus Whiteaves

Straparollus subtrigonalis (Whiteaves)

Adelphoceras sp.

Danaoceras sp.

Michelinoceras cf. hindii (Whiteaves)

Dechenella sp.

Tentaculites sp.

? Pseudobythocypris sp.

In addition Norris (1965, p. 41) recorded the presence of the following:

Alveolites sp.G.

Aulopora sp.

Invertrypa sp. cf. I. lata (Warren)

It appears as if Crickmay's "verrilli" and "arctica" zones are present and possibly also part of the "adoceta" zone, but the Lonely Bay Formation can certainly be confidently dated as lower Givetian.

Pine Point Formation.--Cameron (1918, p. 25-6) used the name Pine Point limestones to refer to beds exposed in the neighbourhood of Fort Resolution and at Pine Point. He considered that these beds constituted the lower part of the Middle Devonian succession in the Great Slave Lake area. A great deal of information about this part of the succession has been obtained by more recent drilling in the area, and Norris (1965, p. 45) defined the Pine Point Formation as the rocks occupying the stratigraphic interval between the top of the evaporites of the Chinchaga Formation and the base of the coarse dolomite of the Presqu'ile Formation or the base of the limestones of the Sulphur Point Formation, considered to be the approximate stratigraphic equivalent of the Presqu'ile Formation.

The Pine Point Formation on both the north and south sides of Great Slave Lake was divided by Norris (1965, p. 46)

on the basis of lithology into a number of members, and each member will be discussed separately below.

Limestone Member.--This unit is incompletely exposed in the neighbourhood of Fort Resolution where it is estimated to be about 110 feet thick. A few feet are exposed as a pavement along the shore near the wharf at Fort Resolution and about 25 feet of the lower beds are exposed in a quarry about half a mile north of Fort Resolution. The rock consists of medium grey and greyish-brown, cryptocrystalline to very fine grained, thin to medium bedded limestone with abundant shale partings in the lower part. Abundant large stylolites are also a feature of the lower part of the limestone. In places the limestone is moderately fossiliferous although it is almost impossible to extract unbroken fossils due to the dense, compact nature of the rock. Those forms which were collected and were identifiable include the following:-

Desquamatia arctica (Warren)

D. aperanta (Crickmay)

D. aff. arctica (Warren)

D. aff. aperanta (Crickmay)

Emanuella aff. meristoides (Meek)

Emanuella sp.

Invertrypa andersonensis (Warren)

Invertrypa sp.

Lingula cf. spatulata Vanuxem

Paracyclas elliptica Hall

Mastigospira alata (Whiteaves)

? Naticonema sp.

indet. cephalopods

Pseudobythocypris sp.

crinoid ossicles

Norris (1965, p. 48) also recorded the presence of stromatoporoids and Tentaculites sp.

The faunal aspect of the rock suggests that the "verrilli" zone is certainly present and possibly also part of the "adoceta" and "arctica" zones.

Several shallow drill holes between Dawson Landing and Little Buffalo River have penetrated the upper part of the limestone and 83 feet of light grey to greyish-brown, crypto-crystalline limestone with shale partings occur in the Cominco Test G-1 well.

Lonely Bay Member.--Although the Lonely Bay Formation is customarily reduced, following Norris (1965, p. 58), to member status within the Pine Point Formation on the northwest side of Great Slave Lake, it appears to be in every sense continuous with the formation, and the cut-off point is selected on a

purely arbitrary basis. The lower part of the Lonely Bay Member crops out along a fairly pronounced east facing escarpment, and upper parts are exposed in a number of sinkholes north of Lonely Bay. The total thickness of the Lonely Bay Member is estimated to be about 120 feet.

The lower beds of the Lonely Bay Member consist of light to medium greyish-brown, cryptocrystalline limestone with numerous argillaceous partings. The more massive beds are sometimes slightly dolomitic. Although the beds are quite fossiliferous it is only from the more shaly, rubbly bedded rock that fossils can be extracted in identifiable condition. A small amount of vuggy and pinpoint porosity was observed in the lower limestone beds and oil staining along fractures has been recorded.

The younger beds of the Lonely Bay Member which are exposed in sinkholes west of the escarpment consist of yellowish brown, cryptocrystalline, massive and in places nodular limestone with scattered fossils which are very difficult to extract.

Fossils collected from the lower beds include the following:

Carinatina dysmorphostrota (Crickmay)

Chonetes sp.

Desquamatia aff. arctica (Warren)

D. aff. speranta (Crickmay)

D. aff. perfimbriata (Crickmay)

Devonoproductus sp.

Emanuella richardsoni (Meek)

E. sublineata (Meek)

Productella aff. gulosi Crickmay

Productella sp.

Cyathophyllum sp.

Syringopora sp.

Actinopteria sp.

? Actinopterella sp.

? Glossites sp.

Paracyclas elliptica Hall

Bellerophon aff. pelops Hall

Bucaniopsis sp.

Buchelia tyrrelli (Whiteaves)

Loxonema antivolvis Whiteaves

Mastigospira alata (Whiteaves)

Murchisonia turbinata Whiteaves

Naticonema sp.

Omphalocirrus ? manitobensis (Whiteaves)

Ptychospirina sp.

Straparollus subtrigonalis (Whiteaves)

Adelphoceras sp.

Michelinoceras cf. pelops Hall

Michelinoceras sp.

coleolids

Dechenella sp.

Paraparchites sp.

Tentaculites sp.

Fossils collected from the upper beds include the following:

Desquamatia cf. aperanta (Crickmay)

Devonoproductus cf. primus (Crickmay)

Emanuella sp.

Invertrypa andersonensis (Warren)

Productella sp.

Orthonota undulata Conrad

Paracyclas elliptica Hall

Murchisonia cf. turbinata Whiteaves

Dechenella sp.

Tentaculites sp.

sponge spicules

The fauna of the lower beds is lower Givetian and Crickmay's "verrilli" and "arctica" zones appear to be present.

Mainly covered, but bits of reddish dolo, rubble, similar to unit b
mainly covered interval to base of escarpment.

Base of escarpment

Exposed all N side of hairpin bend.
Unit 12 = ls in a cliff app. 1.6 mi. N.W. of Fossil Pt.
(Fossil Lgn. 260° TN)
W.S. - dunky red, f.s. - dunky red, w/ greish grn spots, Bedg-nodu, irreg thn beds up to 3" thk, fine calcsh.
v. thin interbs thr out layers, grylsh-grn ptgs.
W.S. - lt greish grn (stnd red) f.s. - v. lt greish grn (stnd red), Bedg - as above, irreg - as above, fine calcsh.
W.S. - lt brnish red, f.s. - dunky red, bedg-nodu, fine, grylsh grn ptgs.
W.S. - brnish, sdsoy red, f.s. - m. red, Bedg, thrbd thn, thly thr to mass grnish-grn ptgs, also numerous irregs, beds of thn. gypsum (½" to 2" thk). ⅓ top of unit, a fair bd. of fib gypsum w/ approx. 5% of gypsiferous sh.

To Base of Formation
? ? ?

2 OF 2

Morris Units (1-9) Sec. 28

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 32

Scale: 1 inch = 10 feet

LOCATION: Approx. 6,° m. W/SW (240° T) From Spruce Pt.

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
								Covered Interval * (not to scale) Approx. 240' covered
					R	8?	2?	W.S. - dunky red, f.s. - m. dunky red w/ red, cx to v. fgr ? The con. pebble ?; Bedg-rubbly, ringy, & discontinuous
								W.S. - lt red grn, f.s. - lt. brn, slty to sandy dolo, Bedg - lm (avg 2"); porius & slightly vuggy. Irreg. vns, stylm, & emboss of wh. gypsum (some up to 5")
					D	4		Dolomite ? gypsiferous, W.S. - lt gry (5Y 6/1), f.s. - v. lt brn Cx to v. fgr, Bedg - irreg, thn (½" to 3") thly
								W.S. - lt grylsh grn, f.s. - slty Bedg, irregs a (2" avg), small v. thn shly ptgs.
					L	4		W.S. - lt gry, f.s. - lt brn, Bedg - m, irreg (2") Irreg - small (¼" to ½") (5Y 7/1), f.s. - v lt brn, Bedg - thn to m (½" to 2") thnly bdd, towards the top, v.f. pelsm strks.

CHERKOSKA FORMATION

CHERKOSKA LIME

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48, 1967

NORTHWEST TERRITORIES

SECTION NO. 39

Scale: 1 inch = 10 feet

LOCATION: E. side of old Ft. Ia., 5.2 mi (Bearing 225° T) from White Beach Pt, and 3.6 mi (Bearing 345° T), from Spruce Pt.

FEET	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
									Approx. 20.0 ' covered to Base of Chinchaga Formation
100		Cx	V			L	4		W.B. - lt grnish gry wh, f.s. - lt brnish gry, Bedd. - m. (½" to 6") Vugs - due to calc. leng, p-g.p. vugs
									Dole - W.B. - lt reddish brn, f.c. - m. reddish brn sl. gran, Bedd - m. (1" to 6"), O/C occurs on lower of 3 terraces
									1 & 2 - occur 5.6 mi (265 T) from Spruce Pt.
3		Cx	V			D	C		W.B. - lt brnish gry w/ reddish stn, f.c. - v. lt brn w/ reddish mottled patches, Bedd - m. (½" to 6"), sl. anco. Vugs - (1/16") lined w/ yel min, Base top of bluff, lies sml,
4		Cx	½			D	C		Dole, sm. f.c. - v. lt brn Vugs - mainly surficial
5		Cx	P			D	C		Dole, sm; sl. anco f.c. - v. lt brn, f.c. - lt brn Occ. p-g.p.
6		⊙ ?	V/P			D	C		W.B. - lt brnish gry, v. lt (½") towards the bottom, Vugs - vugs (¼" to ½")
									Strike & dip = 225° NE, 1° from White Beach Pt. 3.6% occur 3.2 mi (225 T)
7						D	C		W.B. - v. lt brnish gry, f.c. - lt brn, Bedd - m (2") Reddish stng. in upper beds
8		Cx				D	C		W.B. - v. lt brnish gry, f.c. - v. lt brn Bedd - m. irreg. (2"), Pr. brit, hard, frac, comm,
									c/c near top of old Fort Ia. on East side.
									Approx. covered interval

CHINCHAGA FORMATION

LOWER CHINCHAGA FORMATION

1 of

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48, 1967

NORTHWEST TERRITORIES

SECTION NO. 39

Scale: 1 inch = 10 feet

LOCATION: 1.45 mi bearing 331° T from Lonely Pt, & 11.3 mi (bearing 327° T), from Lonely Pt.

FEET	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
3		Cx	V			D	C		W.B. - lt brnish gry w/ reddish stn, f.c. - v. lt brn w/ reddish mottled patches, Bedd - m. (½" to 6"), sl. anco. Vugs - (1/16") lined w/ yel min, Base top of bluff, lies sml,
4		Cx	½			D	C		Dole, sm. f.c. - v. lt brn Vugs - mainly surficial
5		Cx	P			D	C		Dole, sm; sl. anco f.c. - v. lt brn, f.c. - lt brn Occ. p-g.p.
6		⊙ ?	V/P			D	C		W.B. - lt brnish gry, v. lt (½") towards the bottom, Vugs - vugs (¼" to ½")
									Strike & dip = 225° NE, 1° from White Beach Pt. 3.6% occur 3.2 mi (225 T)
7						D	C		W.B. - v. lt brnish gry, f.c. - lt brn, Bedd - m (2") Reddish stng. in upper beds
8		Cx				D	C		W.B. - v. lt brnish gry, f.c. - v. lt brn Bedd - m. irreg. (2"), Pr. brit, hard, frac, comm,
									c/c near top of old Fort Ia. on East side.
									Approx. covered interval
9			9			½ R	M	10	W.B. - lt gry w/ yel, stn, f.c. - lt gry w/ yel stn, shly in calc lam.
10			9			½ R	M	10	W.B. - lt gry w/ yel, stn, f.c. - appr Bedd - m. (2" to 8"), irreg, plnchs & swells, shly lam, at top
11			9			r	P	10	W.B. - m. yel brn, f.c. - lt grnish brn, Bedd - m, thk to appr (6" to 2') Large scale bedds.
									Well: East side of White Beach Pt.

CHINCHAGA FORMATION

LOWER CHINCHAGA FORMATION

2 of 2

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 34

Scale: 1 inch = 10 feet

LOCATION 6.25 mi (Bearing 275° T), from Wrigley Pt.

SAMPLE	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION	DATUM
										763'
7									f.s. = spttld lt ogd m. brn. w.s. = lt brn v wh (var.) Along strike brecciated intvls, or isolated pods of reef, reef breccs. Degree var, most of it is badly leached & difficult to see.	
									Reef - n.s.	
6									W.s. - lt brnish gry, f.s. - lt brn & wh. Bedg - mass. At this point reef along about 25' wk, as it laterally chges into core breco. w/ reefal images, in places fgr, thn bedd intvls.	719'
4									w.s. - lt brn, f.s. - lt brn, grnn to wh. Bedg - mass (6" to 1'). Breco. regime along strike	
3									Dolo. breen. W.s. - lt brn and wh; f.s. (fenes) lt grnish brn; fit % of wh Ca infill (20-25) Matrix - wh. xln Ca infill. Breco'n var. along strike	
2									w.s. - lt brnish gry to wh; f.s. - lt to m brn w/ blk to s. Bedg - thn to m (2" avg.), lam 1" apart	700'
1		Cx							W.s. - lt grnish wh, f.s. - v. lt brn; Ck to fgr. Some c. wh Ca ptchs. Some reddish stng near the top of intvl. No visible poros	682'

CHINCHAGA FM.

1 of

SAMPLE	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION	DATUM
7									Reef - n.s.	
6									W.s. - lt brnish gry, f.s. - lt brn & wh. Bedg - mass. At this point reef along about 25' wk, as it laterally chges into core breco. w/ reefal images, in places fgr, thn bedd intvls.	719'
4									w.s. - lt brn, f.s. - lt brn, grnn to wh. Bedg - mass (6" to 1'). Breco. regime along strike	
3									Dolo. breen. W.s. - lt brn and wh; f.s. (fenes) lt grnish brn; fit % of wh Ca infill (20-25) Matrix - wh. xln Ca infill. Breco'n var. along strike	
2									w.s. - lt brnish gry to wh; f.s. - lt to m brn w/ blk to s. Bedg - thn to m (2" avg.), lam 1" apart	700'
1		Cx							W.s. - lt grnish wh, f.s. - v. lt brn; Ck to fgr. Some c. wh Ca ptchs. Some reddish stng near the top of intvl. No visible poros	682'

CHINCHAGA FM.

BASE OF CHINCHAGA FM. 648'

CHERAHOOTO FM.

CHERAHOOTO FM.

2 of 2

1 of

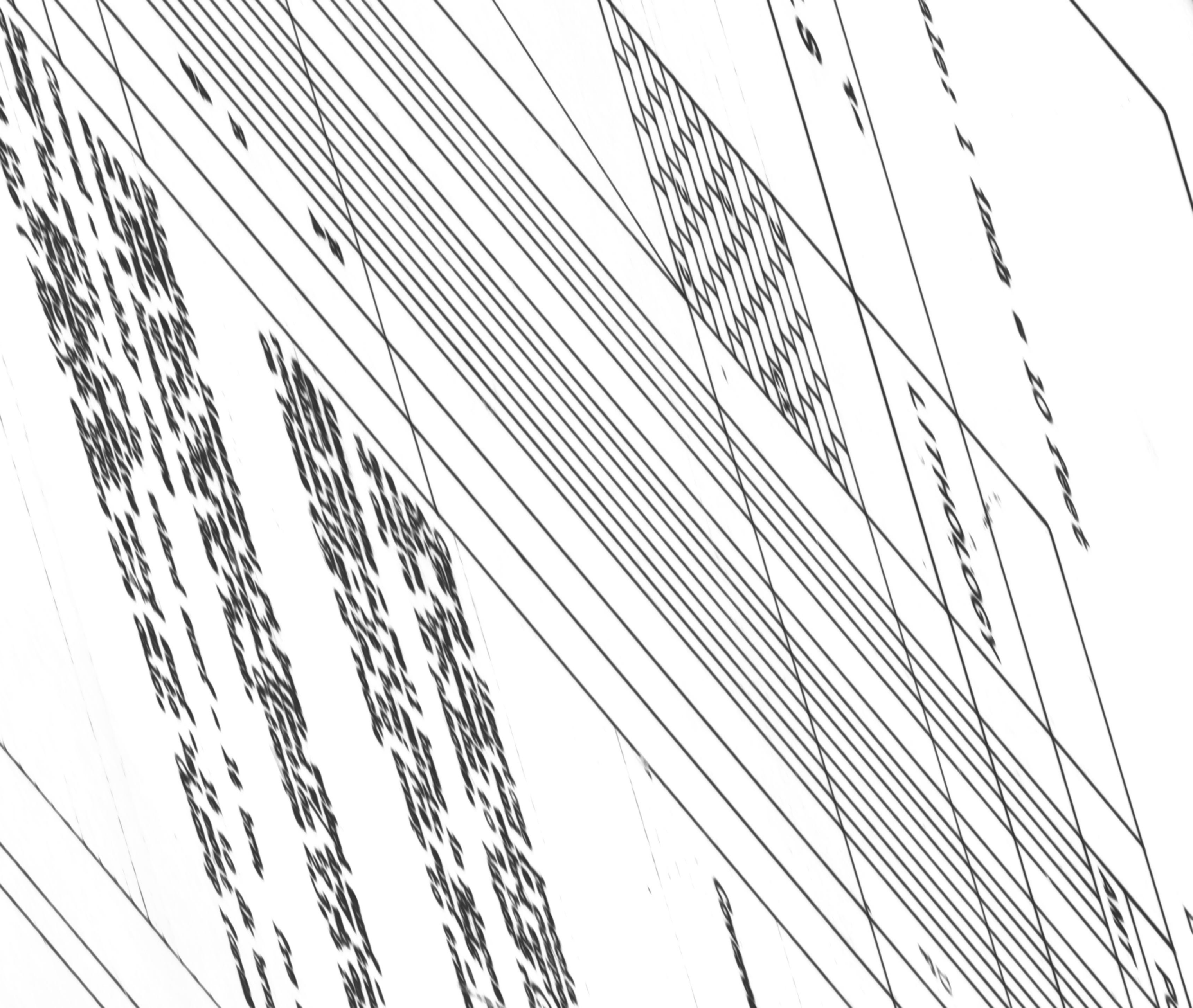
2 of 2

1	Cx				F	2?	3	W.S. - lt gry, f.s. - m. brn, Bedg - mass. Mar breccia - wh Gn infill, surrounding v. foss.	LOWELL BAY FORMATION
2							3	Le sh. W.S. - lt gry, f.s. - m. brn Bedg - mass, fr p, jointed fossils - sh	
3	Cx		V		C_1	3	4	Le sh. W.S. - lt brnish gry f.s. - m. brn, occ. vug w/ wh. cn lining.	
4	Cx	st M			C	2?	2?	Le sh. W.S. - lt brn gry, f.s. - lt to m. brn, vugs	
5	Cx	st	V		F C_1	3 4		Le sh. Bedg - mass, Frac filled w/ wh cn. vuggy - vugs up to ¼"	
6	Cx				F/ C_1	4	5	W.S - lt brnish gry, f.s. - lt brn, Bedg - mass, Large masses of wh. cn infill scr breccia, w/ Le, frags surrounded w/ wh. cn o/c badly frac, & jointed wkly lam, silty	
								Estimated covered interval	
7								W.S - lt grnish brn, f.s. - v. lt brn & wh. Bedg - s (2" ang) 1% ? of wh. gypsum 90% o/c v. crumbly & powdery	CHINCHAGA FORMATION

2 OF 2

1		Cx				F	2?	3	W.S. - lt gry, f.s. - m. brn, Bedd - mass. Mar breccn - wh Gn infill, surrounding v. foss.	JOMEDIAN BAY FORMATION
2								3	Lg sh. W.S. - lt gry, f.s. - m. brn Bedd - mass, fr p, jointed Fossils - sh	
3		Cx		V		C_1	3	4	Lg sh. W.S. - lt brnish gry f.s. - m. brn, occ. vug w/ wh. cn lining.	
4		Cx	st M			C	2?	2?	Lg sh. W.S. - lt brn gry, f.s. - lt to m. brn, [illegible] vugs	
5		Cx	st	V		F C_1	3 4		Lg sh. Bedd - mass, Frac filled w/ wh cn. vuggy - vugs up to ½"	
6		Cx				F/ C_1	4	5	W.S. - lt brnish gry, f.s. - lt brn, Bedd - mass, Large masses of wh. cn infill mar breccn, w/ Lg. frags surrounded w/ wh. cn o/c badly frac, & jointed wkly lam, silty	
									Estimated covered interval	
7									W.S. - lt grnish brn, f.s. - v. lt brn & wh. Bedd - m (2" mag) 1% ? of wh. gypsum occ. o/c v. crumbly & powdery	CHINCHAGA FORMATION

2 OF 2



2 OF 2

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48, 1967

NORTHWEST TERRITORIES

SECTION NO. 37

Scale: 1 inch = 10 feet

LOCATION: 24.5 mi. bearing (195° T) from Ft. Rae.

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
1		Cx						3	W.Gy. - lt to m. gry, f.g. - m. brn; Bedg - thk (1 to 5'), to mass.
2									W.Gy. - lt to m. gry, f.g. - lt brn; Bedg - mass, o/c frac & jointed Wthr: lam. in placed Fract. in places, some pitch of 30° to 45° No visible por.
3A 3B								3 7	Lt Le mi W.Gy. - lt gry, f.g. - m brn; Bedg - very hard to, eggs, mass some poorly preserved foss, wkly lam. dk brn to blk; Along strike it is brecciated. Extremely rough, passes from a m. bedd le into a c. breccia, frags - Le cr size (1/2 to 3"), ang., some frags bedd; matrix : microbreccia, cr Le, v. sh cm.
4									Le brownish cm. Wak. - lt brnish gry, f.g. - sh & brn. Large frags. of bedd Le, & sh cm. Infills, also frags of cr Le (avg. 1" to 3" up to 1")
5									Le brown. m.c. W.G. - lt grnish sh. f.g. - vsp. A few large the bedd. frags of Le, abd. of sh. Cx, some places is solid sh Cx (25% to 30%)

Sample - SA FRAGS
SB WS Cx

JOSEPH BAY FORMATION

CHINCHAGA Fm.

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48, 1967

NORTHWEST TERRITORIES

SECTION NO. 36
Photos: A14364 (36-37)

Scale: 1 inch = 10 feet

LOCATION: 26.25 mi s/sw (188° T) from Ft. Rae

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
1		Cx							Wh. - lt gry, f.s. - lt brnish gry to m. brn. Bedg - rubbly, frac & jointed, mainly m to thk (2" to 6')
2									Le sm. No visible poros.
3		Cx							W.Gy. - lt gry, f.s. - m brn; Bedg - thk to mass (6" to 1') Frac, smooth, O/C frac & jointed, Thinly bedd towards the base (bed 3" to 1' thk)
4									Covered interval is estimated. This covered interval between the Lowermost lonely Bay Scarp & the Chinchaga is true covered making accurate sightings difficult.
4		Cx							W.Br. - lt brnish yel, f.s. - m. brn. Bedg - mass thckly lam, irreg. s/, smoo, has indistinguishable to bedd. Vugs (avg. 1/4) W.Gy. - lt brnish gry, f.s. - v. lt. brn. Bedg - m (15 to 18'), f. lam.
5									
6									W.Br. - lt yel. brn, f.s. - lt brn Vugs - (avg. 1/4, gr. lt brn Le, sng to subang. Wthr: lt grnish brn Le into sandy Bedg - irreg., m. to thk (6" to 30')
7		Cx							W.Br. - lt grnish yel, f.s. - lt brn. Mainly Cx: Bedg (1' to 3'), wkly lam.
8		Cx							W.Br. - yel. brn, f.s. - lt to m. brn; Bedg - m. to thk (2" to 6') wkly lam. Vugs w/wt Cx, Mar brnsh
9									W.Br. - lt yel. brn, f.s. - v lt brnish gry & wh, lt y to wh. (30%) Bedg - mass. Some dk grn, masses of gypsum & the stage of calcn spar (fibrous gypsum) Mar shy pipe & the Sh inbeds

Strike & dips = 320° / 8° S.W. (230°)

JOSEPH BAY FORMATION

CHINCHAGA Fm.

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 39 & AC 45(A-E)

Scale: 1 inch = 10 feet

LOCATION: 1.45 mi bearing 331° T from Lonely Pt, & 11.5 mi (bearing 327° T), from Lonely Pt.

SAMPLES	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
4		Cr		P				2'	W.S. - lt grnish brn, f.s. - m. brn, Bedg - m. to thk (6"), mod. Rnlly frac, jointed Thickness est'd as bed were traced around sinkhole to other side for additional thickness
3		Cx						4'	W.S. - lt yel brn & lt gy , f.s. - lt. to m. brn. Bedg - mass. Sl argil. Strike & Dip - 100° / 10° S.W. (19 0°) Beds on E/SE side are slumped
2		Cx	0?					3'	W.S. - lt yell. brn, f.s. - lt. to m. brn Bedg. mass (1' to 2').
1		Cx	M						W.S. - lt gry to lt brnish yel, f.s. - lt brn, Bedg - thk, mod, irreg, (6" to 14'), Intvl jointed, frac, & frac conch.
									Bottom of sinkhole at water level
AG 45 E		?						2	Using a constant regional dip and relative elev'ns, it was found that Sec. 39 & Steag 45 which are on strike have an overlap of 17'. Also these are no distinct units which may be correlated; therefore, either a covered intvl or overlapping of the sect is possible. A covered intvl is arbitrarily used here since the overlap is only 17'.
AG 45 D		Cx	0?					3	Lm - m.gr, f.s. - m. brn, Bedg - mass. Quite fragmental, could have some pellets?
AG 45 C		Cx	0?					4	Lm-mg V. fragm'l. No visible porosity - II
AG 45 B		Cx						3	Ls - a.g. w.s. - lt brn
AG 45 A		Cr	M 0?					3	W.S. - lt brnish yel, f.s. - lt brnish gry, Bedg - mass (1' to 2'), sl. sucr. O/C on shear face at bottom of sinkhole on S/SE side. V. small pelleal mat'l? No visible poros. - II

LOWER BAT MEMBER

1 of

Scale: 1 inch = 10 feet

LOCATION: 1.45 mi bearing 331° T from Lonely Pt, & 11.5 mi (bearing 327° T), from Lonely Pt.

SAMPLES	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
4		Cr		P				2'	W.S. - lt grnish brn, f.s. - m. brn, Bedg - m. to thk (6"), mod. Rnlly frac, jointed Thickness est'd as bed were traced around sinkhole to other side for additional thickness
3		Cx						4'	W.S. - lt yel brn & lt gy , f.s. - lt. to m. brn. Bedg - mass. Sl argil. Strike & Dip - 100° / 10° S.W. (19 0°) Beds on E/SE side are slumped
2		Cx	0?					3'	W.S. - lt yell. brn, f.s. - lt. to m. brn Bedg. mass (1' to 2').
1		Cx	M						W.S. - lt gry to lt brnish yel, f.s. - lt brn, Bedg - thk, mod, irreg, (6" to 14'), Intvl jointed, frac, & frac conch.
									Bottom of sinkhole at water level
AG 45 E		?						2	Using a constant regional dip and relative elev'ns, it was found that Sec. 39 & Steag 45 which are on strike have an overlap of 17'. Also these are no distinct units which may be correlated; therefore, either a covered intvl or overlapping of the sect is possible. A covered intvl is arbitrarily used here since the overlap is only 17'.
AG 45 D		Cx	0?					3	Lm - m.gr, f.s. - m. brn, Bedg - mass. Quite fragmental, could have some pellets?
AG 45 C		Cx	0?					4	Lm-mg V. fragm'l. No visible porosity - II
AG 45 B		Cx						3	Ls - a.g. w.s. - lt brn
AG 45 A		Cr	M 0?					3	W.S. - lt brnish yel, f.s. - lt brnish gry, Bedg - mass (1' to 2'), sl. sucr. O/C on shear face at bottom of sinkhole on S/SE side. V. small pelleal mat'l? No visible poros. - II

LOWER BAT MEMBER

2 of 2

and an "arctica" fauna is certainly present in the upper beds. Norris (1965, p. 41) noted that a comparison of the fossil list for the Lonely Bay Formation and for the Lonely Bay Member of the Pine Point Formation shows that the most notable difference is the total absence of corals and stromatoporoids and greater abundance of brachiopods, both numerically and in variety, in the latter. This observation was not borne out by the present investigation. A greater variety of brachiopod species was found to be present in the Lonely Bay Formation than in the Lonely Bay Member and locally, at any rate, they are in much greater abundance. Furthermore, although corals are not very common in the Lonely Bay Member they are certainly not totally absent.

Bituminous Shale and Limestone Member.--The Bituminous Shale and Limestone Member of the Pine Point Formation is the typical facies of Cameron's Pine Point Formation (1917, p. 71-2). It crops out discontinuously along the shore between Isle du Mort and o.7 miles east-southeast of Dawson Landing Wharf. It also occurs along the shores of Green and McKay Islands. Because of the discontinuous nature of the exposures and the known presence of folding and faulting it is impossible to make a realistic estimate of the thickness of the member from the surface outcrops, but drill holes about 5 miles south of Pine

Point show that more than 140 feet of the member is present. Facies changes are very rapid in the Pine Point area and the Bituminous Shale and Limestone Member appears to pass south-eastwards into the Fine-grained Dolomite Member.

The Bituminous Shale and Limestone Member consists of interbedded grey, cryptocrystalline limestones and dark grey, calcareous, bituminous shales. The limestone has a highly petroliferous odour and thick tarry deposits occur along fractures. The body cavity of fossils is often party infilled by thick black oil. The beds are richly fossiliferous, particularly the bituminous shales, both in variety and abundance. In places the density of brachiopods is so great that the beds are almost coquinas. The predominance of entire shells of different species of brachiopod suggests that they were not drifted in and there was no great turbulence in the area at the time of deposition.

Fossils identified from the Bituminous Shale and Limestone Member are listed below:

Calvinaria sp.

Chonetes aurora Hall

Cyrtina sp. cf. C. panda Meek

Desquamatia aff. arctica (Warren)

D. cf. hormophora (Crickmay)

D. cf. perfimbriata (Crickmay)

Devonoproductus primus Crickmay

Emanuella richardsoni (Meek)

E. sublineata (Meek)

Hadrorhynchia sandersoni (Warren)

Hypothyridina cameroni Warren

Invertrypa andersonensis (Warren)

Leiorhynchus awokanak McLaren

L. castanea (Meek)

L. cf. castanea (Meek)

Lingula cf. minuta Meek

L. spatulata Vanuxem

Productella cf. veracunda Crickmay

Schizophoria mcfarlanei (Meek)

Tingella cf. franklinii (Meek)

T. timetea Crickmay

Warrenella cf. kirki (Merriam)

Acanthophyllum sp.

Alveolites cf. vallorum

Coenites sp.

Digonophyllum sp.

Thamnopora sp.

Aviculopecten sp.

? Mastigospira sp.

bellerophontid

? Michelinoceras sp.

Dechenella cf. aglida Ormiston

D. cf. bathurstensis Ormiston

Styliolina sp.

Tentaculites sp.

Sphaerospongia tessellata (Phillips)

Norris (1965, p. 52) also listed the following forms:-

Chonetes sp.D.

Emanuella meristoides (Meek)

Nervostrophia sp.I.

leptoinophyllid genus E

metriophyllid coral

Centroceras sp.

? spathiocarid fragments

Although many of the fossils are restricted to the Bituminous Shale and Limestone Member it appears to be a facies rather than a time controlled restriction since they do not occur in almost certainly contemporaneous beds of different facies outcropping elsewhere in the area. Although Stringocephalus was not found at least part of Crickmay's "Stringocephalus" zone is represented and the fauna of the uppermost part is

reminiscent of the "hippocastanea" zone.

The Bituminous Shale and Limestone Member appears to be in part the facies equivalent of the Fine-grained Dolomite Member and in part the equivalent of the Buffalo River Member.

Although the areal extent of the Bituminous Shale and Limestone Member is fairly restricted there can be no doubt that they would provide an excellent source rock for hydrocarbons.

Fine-grained Dolomite Member.--The Fine-grained Dolomite Member forms the most variable part of the Pine Point Formation ranging from 460 feet in the Cominco Test G-1 well in the vicinity of the Pine Point Mines to 237 feet in the Cominco Test G-4 well only 14 miles west-northwest. Subsurface data shows that it also thins rapidly to the west and southwest.

The Fine-grained Dolomite Member of the Pine Point Formation crops out discontinuously along the south shore of Great Slave Lake from the area just east of Dawson Landing to the mouth of the Little Buffalo River. Scattered outcrops are also present on Mission, Round, Bealieu, and Loutit Islands, and the Burnt Islands group. It is impossible to calculate the thickness of the covered intervals between outcrops because of the uncertainty of the structure within the covered intervals.

In the area where the Fine-grained Dolomite Member crops

out at the surface, it consists of yellowish and light greyish brown, very fine to fine grained dolomite with thin interbeds of dolomitic, carbonaceous shale. Although each and every outcrop of dolomite examined possessed some vuggy porosity the amount varied quite widely from poor to very good.

Most of the information concerning the Fine-grained Dolomite Member is obtained from the subsurface. In the eastern part of the Pine Point area where the member is thickest about 85 feet of grey, very fine to fine grained dolomite rests on the dark, argillaceous limestone of the basal Limestone Member of the Pine Point Formation. The basal dolomite unit is overlain by three beds of green dolomitic shale separated by a few feet of brown, argillaceous dolomite. These beds are referred to as the E Shales (E_1, E_2, and E_3). About 310 feet of light brown, very fine to fine grained, sugary textured, porous dolomite occurs between the top of the E_1 Shale, and the base of the Presqu'ile Formation. In the Cominco Test G-4 well fine-grained dolomite overlies the Chinchaga Formation and is overlain by the Bituminous Shale and Limestone Member of the Pine Point Formation. Thus, the Fine-grained Dolomite Member appears to replace the Bituminous Shale and Limestone Member in the south of the Pine Point Concession area. Further south the Fine-grained Dolomite Member seems to inter-

finger with evaporites of the lower part of the Nyarling Formation.

The recrystallization of the dolomite has destroyed most of the fossils which were present although moulds suggestive of Stringocephalus sp. have been recorded by Norris (1965, p. 57). The only place where fossils were collected in any abundance during the present investigation was from a fissile, carbonaceous, dolomitic shale exposure on the southwest island of the Burnt Islands group. The following forms were identified but none could be considered to be in any way diagnostic:-

Chonetes aurora Hall

Desquamatia cf. aperanta (Crickmay)

Emanuella aff. sublineata (Meek)

Hadrorhynchia cf. sandersoni (Warren)

Lingula sp.

Warrenella aff. kirki (Merriam)

Coenites sp.

? Favosites sp.

Thamnopora sp.

Tentaculites sp.

crinoid ossicles

In addition, the following fossils have been reported by other workers:-

Gypidula sp.

Spinatrypa sp.

Stringocephalus sp.

It is not possible to recognize any of Crickmay's zones on the basis of this scanty faunal evidence.

Buffalo River Member.--Campbell (1950, p. 94) proposed the name Buffalo River Formation for more than 100 feet of green shales which were penetrated by drill holes in the area immediately west of the mouth of the Buffalo River. Norris (1965, p. 53) considered the Buffalo River shale to be a member of the Pine Point Formation and designated 185.4 feet of bluish green, fissile shale in the Cominco Test G-4 well as the type section. Because of its soft, easily eroded nature the Buffalo River shale does not outcrop anywhere in the area although it must be close to the surface along the south shore of Great Slave Lake between the east side of Presqu'ile Point and the west side of Isle du Mort.

The Buffalo River shale appears to wedge out southward and it is not known how far the shale extends northward beneath the western part of Great Slave Lake, although it seems probable that it is continuous with the much thinner Horn River Tongue of Norris (1965, p. 59) on the north side of the lake.

Brown Limestone Member.--About 60 feet of medium to dark

brown, very fine to fine grained thin bedded, argillaceous limestone with a strongly petroliferous odour is exposed in the bed of the road between 1 and 1.5 miles southwest of Dawson Landing Wharf. This has been referred to as the Brown Limestone Member of the Pine Point Formation by Norris (1965, p. 54). It is separated from the underlying Bituminous Shale and Limestone Member by a covered interval of about 100 feet, and laterally the beds appear to intertongue with the upper part of the Fine-grained Dolomite Member.

In places the beds are richly fossiliferous with an almost exclusively brachiopod fauna including the following:-

Chonetes ? sp.

Desquamatia cf. perfimbriata (Crickmay)

Devonoproductus primus Crickmay

Emanuella sublineata (Meek)

Leiorhynchus sp.

Tingella cf. franklinii (Meek)

Thamnopora sp.

Dechenella sp.

indet. pelecypod

crinoid ossicles

In addition, Norris (1965, p. 55) listed the following forms:-

Cyrtina sp.

Leiorhynchus awokanak McLaren

L. cf. castanea (Meek)

? Styliolina sp.

The fauna of the Brown Limestone Member can be broadly identified with the "Stringocephalus" zone, part, of Crickmay (1966).

Upper Limestone Member.--A covered interval of about 100 feet probably occupied by shale and argillaceous limestone representing a tongue of the Horn River shale separates the Upper Limestone Member from the basal Lonely Bay Member of the Pine Point Formation on the north side of Great Slave Lake (See p. 38). The Upper Limestone Member consists of about 215 feet of limestone and shale and is discontinuously exposed along the shore on the north side of the lake between Moraine Point and Sulphur Bay, and also as small isolated knobs inland.

The lower beds of the Upper Limestone Member are exposed between Moraine Point and Jones Point where they consist of thin bedded, cryptocrystalline to very fine grained, light brownish-grey limestone interbedded with calcareous mudstone. Worm tracks and ripple marks occur in this part of the sequence suggesting that the beds were deposited in very shallow water conditions. Although individuals are never abundant the beds contain quite a varied fauna. Occasional thin interbeds of

coarse crinoidal limestone occur and these often contain long, undamaged stems suggesting that the beds were deposited in fairly quiet waters.

The upper beds are exposed on the Cranberry Islands and east of Prairie Lake. They consist of thinly bedded, light greyish-brown, cryptocrystalline to fine grained, bioclastic limestone with thin interbeds of grey, calcareous shale. In places the limestone displays quite good earthy porosity. Although the upper beds are much more fossiliferous than the lower beds in terms of abundance the lower beds contain much greater variety.

All of the significant fossils collected from the Upper Limestone Member are listed underneath:

Desquamatia aff. clarkei (Warren)

D. cf. percrassa (Crickmay)

Desquamatia sp.A.

Emanuella caligatae Crickmay

Hadrorhynchia sandersoni (Warren)

Invertrypa cf. coriacea (Crickmay)

Invertrypa cf. lata (Warren)

Leiorhynchus awokanak McLaren

Schizophoria sp.

Spinatrypa sp.

Warrenella kirki (Merriam)

Coenites sp.

Syringopora sp.

Thamnopora sp.

Actinostroma cf. tyrrelli Nicholson

layered stromatoporoid

Paracyclas elliptica Hall

Buchelia tyrrelli Whiteaves

Omphalocirrus sp.

Straparollus sp.

Paraparchites sp.

plant rootlets

crinoid stems and ossicles

"worm" tracks

In addition Norris (1965, p. 62) listed the following forms:-

Cyrtina sp.

Emanuella meristoides (Meek)

Leiorhynchus castanea (Meek)

Productella sp.

Grypophyllum gracile Wedekind

cf. Bellerophon sp.

The fauna contains many elements of Crickmay's "Stringocephalus" zone although no specimen of Stringocephalus

itself was found, and there are also a number of forms in the upper beds reminiscent of the "hippocastanea" zone. The Upper Limestone Member appears to be about the same age as the upper part of the Bituminous Shale and Limestone Member and the Brown Limestone Member on the south side of the lake although, curiously there are very few species common to both the Upper Limestone Member and the Brown Limestone Member.

Nyarling Formation.--Norris (1965, p. 62) proposed the name Nyarling Formation for a thick evaporitic sequence resting on the Little Buffalo Formation (Keg River Fm.) south of Great Slave Lake. Its outcrop belt extends northwest from the Alberta-Northwest Territories border to the area just south of the Pine Point Mines area where it passes, through a rapid facies change, into the Middle Devonian carbonate bank. The zone of Nyarling outcrop is marked by extremely flat, poorly drained terrain with large areas of bog, playa lakes, and sinkholes. Only small scattered exposures of rock occur in the area and, since the outcrop belt is almost wholly within the Wood Buffalo National Park where no drilling is permitted, information relating to the formation is very limited.

Most exposures of the Nyarling Formation consist of white gypsum with occasional beds of light brownish-grey crypto-crystalline to very fine grained gypsiferous limestone and

thin bedded, greyish-brown cryptocrystalline dolomite. In places the carbonate beds display a limited amount of earthy and vuggy porosity.

The Nyarling Formation appears to be the stratigraphic equivalent of most of the upper part of the Pine Point Formation all of the Presqu'ile and Sulphur Point Formations, and in the south it may also be the equivalent of the Slave Point Formation. It corresponds generally to the Muskeg Formation in northern Alberta. V. Zay Smith Associates (1966, p. 32) calculate the thickness of the formation to be 438 feet assuming a southwest regional dip of 13 feet per mile. Data to the north and south suggest that the regional dip may well be greater than this, and if this should be the case then the thickness of the formation could be much in excess of 438 feet. If the correlation shown in Text-Figure 5 is correct then the thickness of the formation might be expected to exceed this figure.

No fossils have been recorded from the Nyarling Formation and from its stratigraphic position alone it is considered to be Middle Devonian.

Presqu'ile Formation.--Cameron (1918, p. 25-6) proposed the name "Presqu'ile dolomites" for strata exposed at Presqu'ile Point and on the Burnt Islands east of Pine Point on the south side of Great Slave Lake. He also included dolomitic beds

exposed near Windy Point and on the shores of Sulphur Bay on the north side of the lake. He later (1922, p. 21-3) included several other localities so that his Presqu'ile Formation included the following three main facies types: -

1. coarsely recrystallized dolomite.
2. limestone and dolomitic limestone, in part the dolomitized equivalent of strata of facies type 1.
3. fine grained granular dolomite typified by strata on the middle island of the Burnt Islands group.

Such an arrangement, while having full rights of precedent, is altogether too unmanageable and for the purposes of this report the nomenclature as used in the sense proposed by Norris (1965, p. 64) will be adopted. The name Presqu'ile Formation is thereby restricted to facies 1 - the coarsely recrystallized dolomite; the limestone and dolomitic limestone equivalent of facies 1 is given the name Sulphur Point Formation; the fine grained dolomite is allotted member status within the Pine Point Formation.

In this restricted sense the Presqu'ile Formation consists of light to medium brown, coarse grained, vuggy, massive dolomite which is generally presumed to have replaced reefal limestone. It outcrops in two main localities in the Great Slave Lake region. A small patch outcrops about 9 miles south

east of Presqu'ile Point and it is known from diamond drilling to underlie a much larger area which is now almost wholly covered by Pleistocene and Recent drift. In this area it lies in the core of two east-northeast trending anticlinal folds (see Fig. 7) the presence of which has been outlined by numerous shallow core holes. A considerably larger outcrop belt occurs on the northwest side of Great Slave Lake where a strip about 4 miles wide extends north from the vicinity of Windy Point for about 20 miles to a point about 9 miles west of Moraine Point. The western edge of this belt is so straight that it seems as if a fault with the downthrown side to the west must be the cause. It is possible that contemporaneous movement along such a fault may have controlled reef growth.

The Presqu'ile Formation has been penetrated by numerous diamond drill holes during exploration programmes seeking base metals in the Great Slave Lake area as well as deeper tests for hydrocarbons further southwest in the area of the Tathlina uplift. These wells indicate that the Presqu'ile Formation underlies an arcuate area beneath and fringing the southwest part of Great Slave Lake. North of the lake the Northwest Windy Point No. 1 well penetrated an incomplete section of 180 feet of Presqu'ile dolomite, and south of the lake in the Pine Point area drill holes have penetrated up to

230 feet. In the Northwest Territories Desmarais Lake No. 1 well 260 feet of dolomites occur whereas 50 miles to the southwest in the Shell Alexandra No. 4 well the formation is not present. A number of thick reef sections have been penetrated in wells beneath the southwest tip of Great Slave Lake but these consist of limestones and, since Norris defines the Presqu'ile Formation as the coarse dolomite facies, these limestone reefs must be referred to the Sulphur Point Formation.

The coarsely crystalline dolomites of the area southwest of Presqu'ile Point are variably vuggy to cavernous and in many places lead and zinc sulphides have replaced the dolomites. The main concentration of galena and sphalerite appears to be along or parallel to vague traces of bedding planes. All of the orebodies discovered in the Pine Point area occur within the dolomitic reef with the exception of the Pyramid orebody which is the largest but actually occurs in an off-reef breccia. Recrystallization has virtually obliterated all traces of fossils in the dolomites south of Great Slave Lake leaving only vague relicts and moulds of what appear to have been corals and brachiopods.

North of Great Slave Lake the dolomitic facies is similarly vuggy and cavernous but, whereas only bitumen occurs lining the pore spaces at Pine Point, free oil here fills the cavities in parts of the reef. Small oil and sulphur seeps are quite common

along the south shore of Windy Bay and along the north shore of Sulphur Bay. In addition to very heavy oilstain, traces of galena and sphalerite can be observed in the cores of Presqu'ile dolomite stacked in the vicinity of the Northwest Windy Point No. 1 well.

The recrystallization of the dolomites north of Great Slave Lake has not affected the fossils to the same extent as on the south side and the fairly varied fauna listed underneath has been recorded:-

Desquamatia spp.

Emanuella meristoides (Meek)

Invertrypa sp. cf. I. lata (Warren)

Productella sp.

?? Stringocephalus sp.-moulds recorded by Norris

? Warrenella sp.

Coenites sp.

indet. corals

stromatoporoids

cf. Megalodon sp.

cf. Paracyclas sp.

cf. Euomphalus sp.

indet. gastropods

indet. trilobite fragments

crinoid ossicles

Sulphur Point Formation.--Norris (1965, p. 68) proposed the name Sulphur Point Formation for the limestone equivalent of the coarse Presqu'ile dolomites. In places a thin wedge of limestone also overlies the Presqu'ile Formation and this is also assigned to the Sulphur Point Formation. Originally Cameron (1918, pp. 25-6) placed the beds currently assigned to the Sulphur Point in the Slave Point Formation and Crickmay (1967, p. 1) clearly considers that they must so remain, but it is evident that Cameron himself (1922, pp. 13-15, 23-4) later revised his opinions and placed the beds in the Presqu'ile Formation. Norris then would appear to have been within the bounds of legality when he advanced the name Sulphur Point Formation.

In many respects it would be more convenient to regard all of the limestone and dolomite underlain by the Pine Point shales and overlain by the Hay River Shales as a single formation, however, precedent and common usage make this virtually impossible.

Norris defined the Sulphur Point Formation as the limestones and in places interbedded limestones and dolomites that overlie various facies of the Pine Point Formation and are, in turn, overlain by limestones of the Slave Point Formation, or locally in the subsurface by interbedded shale and limestone

of the Watt Mountain Formation. The incomplete 153 feet thick section in the Cominco G-4 Test well is the type section for the formation.

Beds of the Sulphur Point Formation outcrop in two areas in the Great Slave Lake region. A thick sequence of Sulphur Point beds is discontinuously exposed along the northwest shore of the lake from near to the contact with the Presqu'ile dolomites near Windy Point to the vicinity of Burnt Point. The lower beds in this sequence consist of light, greyish-brown, cryptocrystalline, thin bedded, dolomitic limestone with a petroliferous odour interbedded with light brown, very fine to fine grained, bioclastic limestone. The upper beds consist of very light brown, cryptocrystalline to fine grained, thin bedded limestones with an abundant and varied fauna.

The Sulphur Point Formation outcrops south of Great Slave Lake near Sulphur Point and at Presqu'ile Point. Here the beds consist of light, greyish-brown, cryptocrystalline to fine grained, argillaceous, fairly fossiliferous limestone.

In the subsurface, beds assigned to the Sulphur Point Formation range from 39 feet in the Northwest Territories Deep Bay No. 4 well to 347 feet in the Northwest Territories Deep Bay No. 1 well. Immediately north of the Deep Bay area the Sulphur Point Formation rapidly changes facies from a

white stromatoporoidal limestone to dark grey shales of the Horn River Formation (as illustrated in stratigraphical cross section EF).

Fossils collected from the prolific fauna of the Sulphur Point beds include the following:-

Emanuella vernilis Crickmay

Emanuella sp.

Invertrypa cf. albertensis (Warren)

Spinatrypa sp.

? Acanthophyllum sp.

? Ceratophyllum sp.

Grypophyllum ? cf. gracile Wedekind

Keriophyllum cf. sp. F. McLaren & Norris, 1962

Coenites sp.

Thamnopora sp. F. McLaren & Norris, 1962

Amphipora ramosa (Phillips)

? Cystostroma sp.

Idiostroma sp.

Stachyodes sp.

Stromatopora hupschii Bargatsky (w/ symbiotic Syringopora)

Trupetostroma coalescens Galloway & St. Jean

Laminate stromatoporoids

Conocardium sp.

Leiopteria cf. rafinesquii Hall

Paracyclas elliptica Hall

Loxonema sp.

Straparollus sp.

Paraparchites sp.

Pseudobythocypris sp.

oncolites encrusting gastropods

In addition, Norris (1965, p. 72) recorded the following:-

Desquamatia cf. perfimbriata (Crickmay).

Hypothyridina cameroni (Warren)

Leiorhynchus sp.

Stringocephalus sp.

Tingella cf. franklinii (Meek)

leptoinophyllid genus E

Aulopora sp.

? Buchiola sp.

The most significant element of this fauna is the presence in abundance of Emanuella vernilis Crickmay. This form is considered by Crickmay (1967, p. 1) to be characteristic of beds which everywhere underlie the "false" Slave Point in boreholes in northwestern Alberta. Other forms such as Invertrypa albertensis (Warren), Hypothyridina cameroni Warren, and

Desquamatia cf. perfimbriata (Crickmay) are strongly suggestive of Crickmay's "hippocastanea" zone.

Watt Mountain Formation.--The name Watt Mountain Formation was proposed by Law (1955, p. 1951) for a variable unit consisting of shale, siltstone, sandstone, limestone breccia, anhydrite, and dolomite, lying between the Muskeg Formation (below) and what Law considered to be the Slave Pt. Formation (above) in the subsurface of northwestern Alberta. The type section of the Watt Mountain Formation is California Standard's Steen River No. 2-22 well (2-22-117-5W6) where it is 58.5 feet thick.

Law (1955, p. 1951) correlated the Watt Mountain Formation of northwestern Alberta with the Amco Shale and the beds underlying the Amco Shale down to the top of the Presqu'ile dolomite in the Pine Point Mining Concession area. Norris (1965, p. 73) subsequently correlated the Watt Mountain Formation with the Amco Shale and placed the underlying beds in the Sulphur Point Formation. It should be pointed out that not all workers unequivocally accepted Law's correlation of the Watt Mountain Formation with the Amco Shale. De Wit (1958, p. 8) regarded the correlation at best as "questionable".

The Amco Shale does not crop out anywhere in the Great Slave Lake region but is present in the subsurface in many

wells where it consists of greenish-grey limestone with shale partings, or greenish waxy shales, or brecciated limestone. It does not provide a very satisfactory division, however, since the Amco Shale cannot be distinguished from the Sulphur Point beds where they also contain green waxy shales - as they frequently do.

The Amco Shale varies from zero to 25 feet thick in the Great Slave Lake region and has been thought to be absent over much of the area. However, the Pine Point geologists believe that the Amco Shale does provide a reliable marker horizon which can indeed be traced throughout the subsurface in the area immediately south of Great Slave Lake (F. Hurley-Chief Geologist, personal communication). This view appears to stem from a very loose interpretation of just what constitutes the Amco Shale since more or less any shale bed above the Presqu'ile dolomite appears to be acceptable.

In the correlation shown in Text-Figure 5 the Watt Mountain Formation is correlated with the E Shales in the Fine-grained Dolomite Member of the Pine Point Formation. Samples of "typical" Amco Shale and E Shales were collected from the cores stored at Pine Point Mines and they were analyzed for their microfloral content. It was hoped that this might provide some definitive evidence on the correct correlation since a

fairly well documented microflora has been collected from the Watt Mountain Formation in northwestern Alberta. Unfortunately, the spores were very poorly preserved, most of them being severely carbonized, and were consequently of no value.

Slave Point Formation.--The name Slave Point limestones was proposed by Cameron (1918) for the upper part of the Middle Devonian succession outcropping on the south side of the lake from Presqu'ile Point to High Point and on Buffalo River; and on the northwest side of the lake at Slave Point and along the shore between Jones and Moraine Points. Cameron himself later restricted the beds which he felt should be assigned to the Slave Point, and later workers, noteably Campbell (1950) and Law (1955), further restricted the formation so that the term Slave Point Formation is of only limited value for reference purposes even in its type area. Furthermore, Crickmay (1967, p. 1) stated the opinion that the Slave Point Formation of the type area everywhere underlies the "false" Slave Point in boreholes in northwestern Alberta. According to the correlation shown in Text-Figure 5, however, the Slave Point in the type area is much higher in the succession than the "false" Slave Point of northwestern Alberta.

The beds assigned by Norris (1965, p. 75) to the Slave Point Formation in the Pine Point area are those between the

Hay River Shales (above) and the Sulphur Point limestones (below). Beds from near the base of the section outcrop along the shore about 2 miles east of Breynat Point and beds from the upper part of the formation outcrop at a number of localities along the Buffalo River. In addition, continuous sections of up to 60 feet occur in a number of sinkholes in the Slave Point outcrop belt further south.

The lower beds of the Slave Point Formation consist of light, greyish-brown, cryptocrystalline to fine grained, slightly dolomitic, brecciated limestone with dark carbonaceous streaks. The upper beds are mainly light brown, cryptocrystalline, silty limestones interbedded with yellowish-brown, silty, very fossiliferous limestones with occasional intercalations of shale. Most of the upper beds of the Slave Point Formation show some vuggy, and occasionally earthy porosity.

Drill holes which penetrate the interval between the base of the Hay River Shale and the base of the Amco Shale immediately west of the lower Buffalo River show that the thickness of the Slave Point Formation is here almost 200 feet. In drill holes to the west and southwest the thickness ranges from 123 feet to over 300 feet.

At Cameron's type locality immediately north of Slave

Point less than 2 feet of very thin bedded, medium grained, dolomitic limestone containing abundant stromatoporoids occur as a pavement just at lake level.

Fossils collected and identified from the Slave Point Formation include the following:-

Desquamatia cf. independensis (Webster)

Desquamatia sp.

Emanuella sp.

Ladjia landesi Crickmay

? Spinocyrtia sp.

Alveolites sp.

Coenites sp.

indet. rugose coral

Amphipora sp.

Stromatopora cf. arcuata Galloway

Stromatopora sp.

actinostromatid

indet. stromatoporoids

? Leiopteria sp.

Megambona sp.

Buchelia tyrrelli Whiteaves

Loxonema cf. antivolvis Whiteaves

Straparollus sp.

NORTHWESTERN ALBERTA (CRICKMAY, 1967, P. 1)	GREAT SLAVE LAKE (CRICKMAY)
"False" Slave Point with L. landesi	Slave Point (as originally defined by Cameron) with E. vernilis in lower part
"True" Slave Point with E. vernilis	Presqu'ile Fm.

NORTHWESTERN ALBERTA (CRICKMAY, 1967, P. 1)	GREAT SLAVE LAKE (McDONALD)
"False" Slave Point with L. landesi	Slave Point Fm. (as amended by Cameron) with L. landesi
"True" Slave Point with E. vernilis	Sulphur Point Fm. with E. vernilis

Text - Figure 9

Paraparchites sp.

algal "crusts"

crinoid ossicles

The most significant fossils appear to be Ladjia landesi Crickmay and Desquamatia cf. independensis (Webster). Crickmay, (1967, p. 1) contended that the "false" Slave Point in northwestern Alberta is characterized by a faunal assemblage dominated by Ladjia landesi, and that this assemblage everywhere overlies the beds with Emanuella vernilis which characterizes the true Slave Point (i.e. the Slave Point in the type area). The present work thus confirms that the beds with L. landesi do overlie the beds with E. vernilis but suggests that the confusion arises because Crickmay insists on applying Cameron's original definition of the Slave Point (which Cameron himself later amended). Since Crickmay collected E. vernilis from the lower part of what he incorrectly considered to be the Slave Point Formation in the type area and did not find L. landesi in the beds which really do belong to the Slave Point Formation in the type area he failed to appreciate the true associations of the beds in the subsurface. These relationships are shown in Text - Figure 9. The presence of D. cf. independensis in association with L. landesi and Coenites cf. sp.C. McLaren & Norris 1962, indicates that the

beds belong to the upper part but not the uppermost part of the Givetian.

Horn River Formation.--The Horn River Formation is the name which Douglas and Norris (1960) proposed for a succession of dark shales interbedded with limestones which overlies the Lonely Bay limestone and is overlain by greyish-green calcareous shale of the Hay River Formation.

Beds belonging to the Horn River Formation crop out in two widely separated areas. About 16 feet of light brownish-grey, cryptocrystalline to very fine-grained, moderately fossiliferous limestone with thin grey shale partings are exposed at several localities along a 4 mile stretch of the upper reaches of the Clive River between 28 and 32 miles due west of Windflower Lake. A second, and stratigraphically higher part of the Horn River Formation is exposed on the Horn River about 2½ miles upstream from the Horseshoe Rapids. Here, 36 feet of medium brownish-grey, non-calcareous, fissile, flaky shales crop out in the bank of the river, and are capped by 10 feet of medium brown, cryptocrystalline, rubbly, abundantly fossiliferous, sometimes nodular limestone.

The Presqu'ile, Sulphur Point, and Slave Point Formations pass abruptly into the Horn River shales suggesting that, in fact, a reef edge is present, and the Horn River Formation is

therefore equivalent to all of these formations in addition to the upper part of the Pine Point Formation. This is borne out in the subsurface.

Fossils collected from the exposures of the Horn River Formation on Clive River include the following:-

Desquamatia cf. arctica (Warren)

D. aff. clarkei (Warren)

Leiorhynchus castanea (Meek)

Productella sp.

Euomphalus sp.

Dechenella sp.

Fossils collected from the upper beds of the Horn River Formation on Horn River include the following:-

Desquamatia cf. arctica (Warren)

D. cf. clarkei (Warren)

Emanuella cf. meristoides (Meek)

Emanuella sp.

Invertrypa cf. lata (Warren)

Leiorhynchus cf. castanea (Meek)

Productella sp.

Warrenella cf. eclecta Crickmay

Paracyclas sp.

Phtomia spp.

Euomphalus sp.

Mastigospira sp.

Dechenella sp.

Tentaculites sp.

sponge spicules

In addition to the above list the following fossils have been recorded by other workers:-

Desquamatia cf. perfimbriata (Crickmay)

Hadrorhynchia sandersoni (Warren)

Invertrypa cf. andersonensis (Warren)

Schizophoria sp.

cf. Ontaria sp.

? Buchiola sp.

The fauna listed above contains no really diagnostic forms although the presence of Desquamatia arctica, Hadrorhynchia sandersoni, and Leiorhynchus castanea in the limestone beds on Horn River, and D. arctica and L. castanea in limestone beds on Clive River suggest a general equivalence to the middle and upper parts of the Pine Point Formation.

Horn Plateau Formation.--Norris (1965, p. 78) proposed the name Horn Plateau Formation for reefal beds, first reported by Douglas and Norris, which appear to overlie the Horn River

Formation and are overlain by the Hay River Formation. The beds are exposed at only one locality, an almost circular hill about one quarter of a mile in diameter, situated about 2.5 miles west of the west side of Fawn Lake. The limestone beds dip out from the center of the hill at between 5 and 10 degrees suggesting a reef or domed structure. The total section present consists of 36 feet of very light brown, cryptocrystalline to medium grained, bioclastic limestone. It is massive bedded where the limestone is fresh and rubbly where it is weathered. The rock shows moderate granular porosity throughout, although it is almost completely cemented in places. The limestone contains an extremely prolific and varied fauna throughout and, in places in the upper beds, the rock is almost wholly composed of corals and brachiopods.

Although the total thickness of the reefal beds of the Horn Plateau Formation is not known the hill rises 90 feet above the surrounding terrain and it is reasonable to assume that the beds are at least that thickness. The reef may be built up on a Lonely Bay limestone platform or, alternatively, on a Horn River Formation limestone platform although these are thin in the only places where they outcrop. If, in fact the reef is built up on a platform of Lonely Bay limestone, it would indicate that the reef is at least 300 feet thick.

Although beds belonging to the Horn Plateau Formation outcrop in only one place there are strong indications that other reefs of the same type are very close to the surface within the area of outcrop of the Horn River shales, and possibly also the Hay River shales. Several topographic and drainage anomalies were reported by V. Zay Smith Associates (1966, p. 42) in the area west and northwest of Great Slave Lake (see Text-Fig. 2). These anomalies are based on airphoto interpretation but the topographic anomalies, at least, can be quite easily picked out on a clear day when flying over them in a helicopter. Unfortunately, all of the anomalies are completely covered so that the surface geology does not provide any clues to their origin. Great Plains Development have recently drilled a well on one of the topographic anomalies just east of Caen Lake but no information is yet available on the results. Although V. Zay Smith Associates appear to favour the idea that the anomalies represent a northward extension of Slave Point limestone it appears more likely that they represent near to the surface carbonate build-ups of the Horn Plateau Formation type.

The surface expression of the Horn Plateau reef bears several points of similarity to the Falaise Lake topographic anomaly. This anomaly is almost 200 feet above the surround-

ing terrain and has been penetrated by the Western Decalta Falaise Lake No. 1 Test hole. Six hundred and ninety-three feet of biogenic and reefal limestones are present, and it seems fairly certain that the Falaise Lake anomaly is the surface expression of a carbonate build-up resting either on the Lonely Bay Formation or younger beds.

The varied and abundant fauna collected from the Horn Plateau Formation included the following:

Ambocoelia cf. umbonata (Conrad)

Athyris aquilonius McLaren & Norris

Camarotoechia sp.

Cranaena cryptonelloides McLaren & Norris

Desquamatia nasuta McLaren & Norris

Devonoproductus sp.

Eleutherokomma implana McLaren & Norris

Emanuella sp.

Gypidula sp.nov.

Hadrorhynchia cf. sandersoni (Warren)

Leiorhynchus matonabbee McLaren & Norris

Leptagonia ? rhomboidalis (Wilckens)

Pentamerella sclavus McLaren & Norris

Schizophoria fascicostella McLaren & Norris

Schizophoria sp.nov.

Schuchertella sp.

Spinatrypa hornensis McLaren & Norris

Spinatrypa sp.nov.

Trematospira sp.

? Warrenella sp.

Atelophyllum nebracis McLaren & Norris

Cyathophyllum (Peripaedium) greteneri McLaren & Norris

Cylindrophyllum gruensis McLaren & Norris

Cystiphylloides spinosum ? McLaren & Norris

Disphyllum salicis McLaren & Norris

Heliophyllum borealis McLaren & Norris

Neostringophyllum craigii McLaren & Norris

Sinospongophyllum cf. planotabulatum Yoh

Stringophyllum (Sociophyllum) redactum McLaren & Norris

Coenites sp.

Favosites sp.

Thamnopora sp.

Conocardium sp.

Platyceras sp.

crinoid ossicles

McLaren & Norris (1964, p. 3,31,32) recorded a few additional

forms including the following:-

Cymostrophia sp.

Hypothyridina cameroni Warren

Longispira whittakeri McLaren & Norris

Pholidostrophia sp.

? Sieberella newtonensis Imbrie

Australophyllum ? cf. thomasae (Hill & Jones

Grypophyllum cornus McLaren & Norris

Lekanophyllum cf. punctatum Wedekind

Siphonophr ntis ? sp.

Dechenella (Basidechenella) sp.

The large proportion of new species present in the Horn Plateau reef makes correlation with other areas in the Great Slave Lake region difficult. The coral assemblage contains nine hitherto unrecorded species, and only three species known from elsewhere. A consideration of the generic ranges led McLaren (1964, p.3) to assign a mid-to-late, but not latest, Givetian age to the Horn Plateau reef.

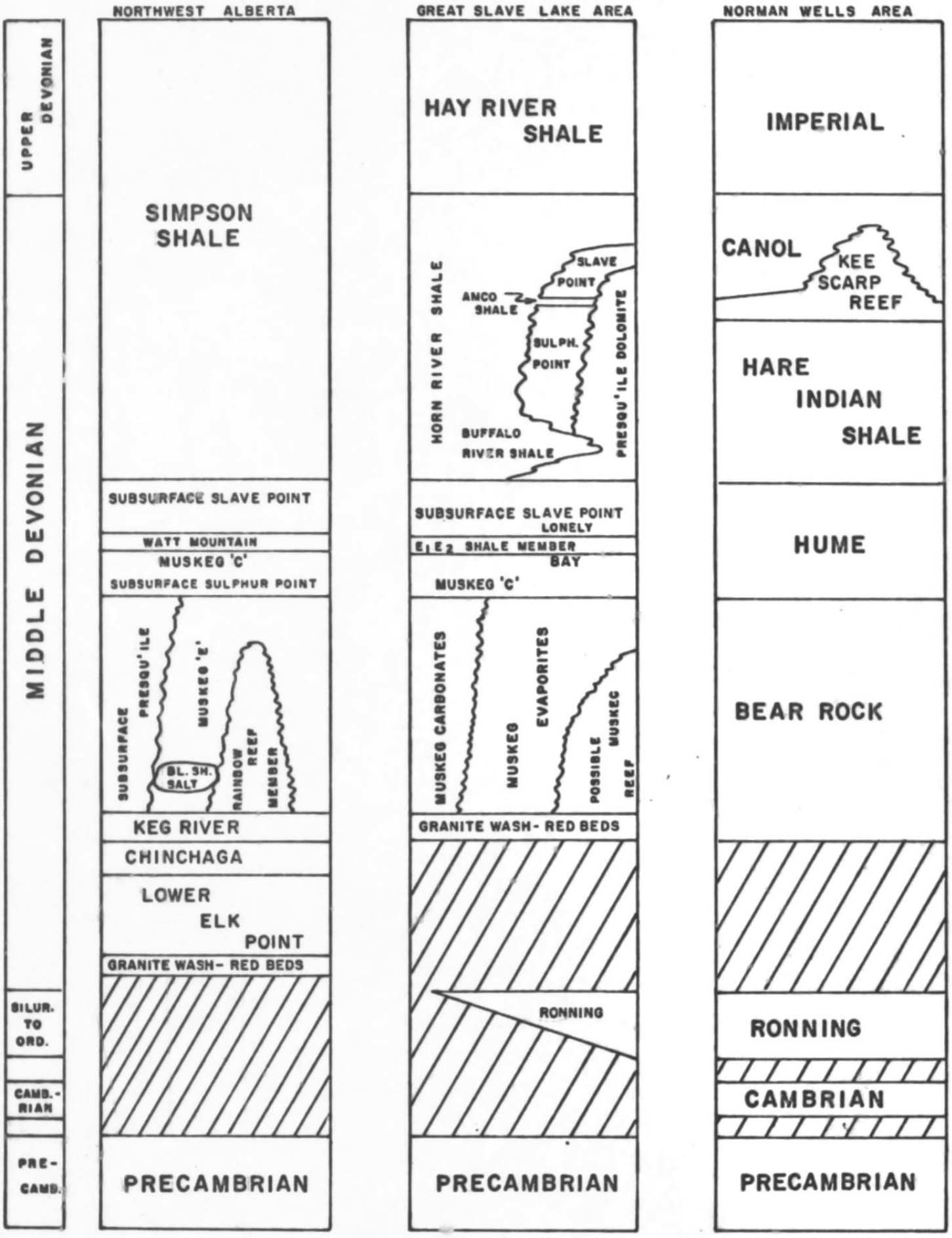
Only three brachiopod species occur elsewhere in the Mackenzie region: Leptagonia ? rhomboidalis (Wilckens), Hypothyridina cameroni Warren, and Desquamatia nasuta, McLaren & Norris. L. rhomboidalis has been reported from Middle Devonian limestones far to the west and northwest, and

H. cameroni has been reported from the Sulphur Point Formation in the vicinity of Presqu'ile Point, and also from the upper part of what is considered to be the Slave Point Formation in the Frobisher Hay River No. 5B well. D. nasuta occurs in the Kee Scarp Formation. From a consideration of these and other brachiopods present Norris (1964, p. 31) concluded that the Horn Plateau Formation is equivalent, or more likely younger than the Sulphur Point, Presqu'ile, and Kee Scarp Formations. It is not possible to establish its relationship to the Slave Point Formation since the two formations are widely separated geographically, and are faunally and lithologically distinct. Some forms display close affinity to, but not identity with, species from the basal Waterways and this indicates, according to Norris, that the Horn Plateau Formation is slightly older than the basal Waterways Formation which marks the base of the early Upper Devonian in Western Canada.

A Critical Review of the Middle Devonian Correlation

The earliest Devonian rocks deposited in the area appear to have been the evaporitic red beds of the Mirage Point Formation. These are restricted to the area south of a line from the Horn Plateau to Redrock Point. The beds are everywhere unfossiliferous and are overlain by a definite Middle Devonian evaporitic sequence on both the south and north side

STRATIGRAPHIC CORRELATION CHART
(AFTER NIKIFORUK)
NORTHWEST ALBERTA TO NORMAN WELLS AREA



TEXT FIG. No. 5

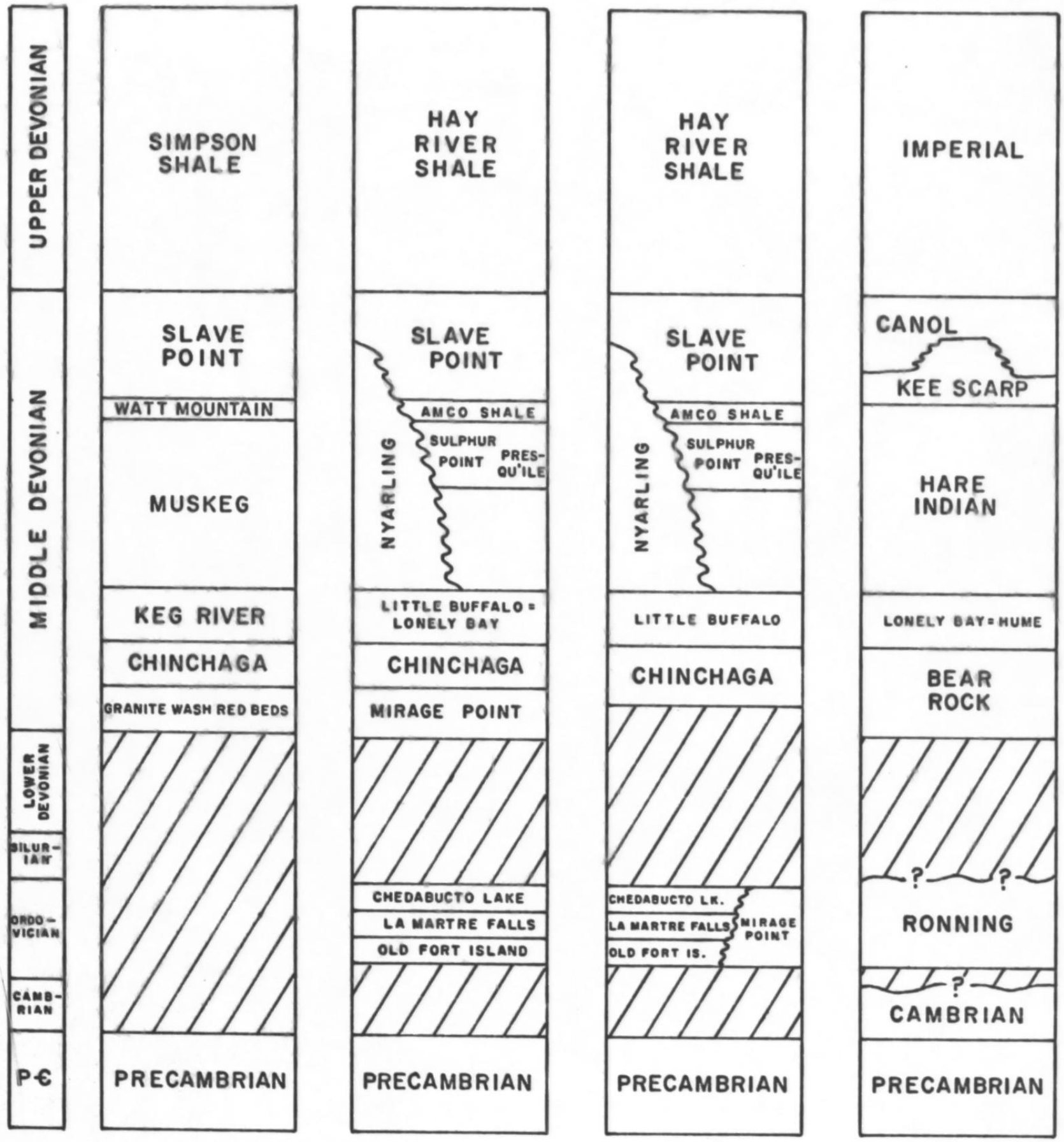
of Great Slave Lake. It is quite possible that the Mirage Point is, in fact, Middle to Upper Ordovician in age as Norris (1965, p. 29) suggested, although it would involve a sudden and rather improbable environmental change from bedded, fossiliferous, open marine dolomite to evaporitic red beds of a restricted environment. It is easier, however, to concur with Grayston et al (1964, p. 50) who correlated the Mirage Point beds with the lower Elk Point beds of central Alberta.

The correlation shown in Text-Figure 5 is based on the assumption that the Tathlina uplift and the area north of the Nyarling River were not inundated until Muskeg time, and correlation of the red beds north and south of Great Slave Lake with the lower Elk Point beds of central Alberta would suggest that this was not so. If the red beds of Alberta can be correlated with red beds north of Great Slave Lake, there is no reason to believe that the less restricted Chinchaga beds would not also be present north of the lake. It should be pointed out however, that the red beds are certainly missing due to non-deposition or subsequent erosion over parts of the intervening area.

The basal Middle Devonian evaporite sequence south of Great Slave Lake either rests directly on the Pre-Cambrian or on an intervening basal red bed sequence. The evaporite

STRATIGRAPHIC CORRELATION CHART

NORTHWEST ALBERTA TO NORMAN WELLS AREA



TEXT FIG. No. 4

sequence south of the lake ranges from 300 to 430 feet in thickness and consists predominantly of bedded gypsum with lesser limestone and dolomite. The evaporite sequence north of Great Slave Lake rests directly on the Pre-Cambrian over a few pre-Devonian topographic highs and on Ordovician or basal red beds elsewhere. It ranges from 270 to 340 feet in thickness and consists of essentially the same lithology as the basal evaporite sequence in the south.

The correlation of Norris (Text-Figure 4) assumes that the evaporite sequences north and south of Great Slave Lake are both Chinchaga and the similarity in thickness, lithology and stratigraphic position would tend to support this idea. The main feature which supports the alternative interpretation, that the sequence in the north is the Muskeg Formation, is the presence of largely dolomitized reefs in a similar setting to those in the Muskeg of northern Alberta and which are so far unrecorded in the Chinchaga of other areas. The two animals which were the principal framework builders in the reefs are Planetophyllum planetum Crickmay and Amphipora cf. angusta Le Compte. P. planetum, a definitive Eifelian fossil has hitherto only been recorded from the La Loche Formation on the Stony Islands in the Slave River. This formation occupies a stratigraphically analogous position to the

Chinchaga Formation in that part of northern Alberta. A. cf. angusta has only been recorded in western Canada from near the base of the Keg River Formation on the Stony Islands in the Slave River, but is known to occur in the middle and upper Givetian of western Europe.

On balance the evidence tends to support a correlation of the evaporite sequence north of Great Slave Lake with the Chinchaga Formation in the south, and indicates an Eifelian age for them both.

The Keg River Formation overlies the Chinchaga Formation south of Great Slave Lake. It is close to 115 feet thick and consists of a lower dolomite unit and an upper limestone and dolomite unit. The Limestone Member of the Pine Point Formation in the eastern part of the Cominco Concession of the Fort Resolution area overlies the Chinchaga Formation and is estimated to be about 110 feet. On the north side of Great Slave Lake the Lonely Bay Member of the Pine Point Formation consists of approximately 120 feet of limestone overlying a Middle Devonian evaporite sequence, and further north the Lonely Bay limestone occupies the same stratigraphic position and appears to be in every sense continuous with the Lonely Bay Member.

From the foregoing it is apparent that there is a considerable degree of stratigraphical and lithological similarity between the lowest carbonate units throughout the area from Fort Smith in the south to Lac La Martre in the north.

The Limestone Member of the Pine Point Formation, the Lonely Bay Formation, and the Lonely Bay Member of the Pine Point Formation display a remarkable degree of faunal resemblance, with few species which are abundant in one and absent in another, with the exception that the Lonely Bay Formation has a much more prolific coelenterate fauna than either of the others. The Keg River Formation is less fossiliferous than the other basal carbonate units and the fauna was collected solely from the upper part. This fauna clearly represents the "arctica" zone of Crickmay (1966). The upper beds of the Lonely Bay Member and the Lonely Bay Formation also contain a fauna which represents the "arctica" zone and it appears as if the fauna from the lower part represents the "verrilli" zone. A fauna representing the "verrilli" zone of Crickmay was collected from the lower part of the Limestone Member of the Pine Point Formation, and it is quite probable that the upper beds represent the "arctica" zone.

It appears as if the upper beds of the lowest carbonate unit on both the north and south sides of Great Slave Lake are fairly close in time as well as appearing to be stratigraphic equivalents. If the correlation shown in Text-Fig. 5 were correct then the Lonely Bay Formation would be equivalent to the subsurface Slave Point and would be much younger than the Keg River Formation.

In the stratigraphic interpretation underlying the correlation shown in Text-Fig. 5 it is thought that the Chinchaga Formation and the Keg River Formation (Little Buffalo Formation) feather out against the Tathlina uplift and are absent north of the Nyarling River. The Keg River Formation forms a prominent escarpment which runs northwest from the region west of Fort Smith to the area south of the Nyarling River where it fades out. The gradual diminishment and final disappearance of the escarpment as it is traced northwest could be interpreted as support for the idea that the Chinchaga and Keg River Formations are not present north of Great Slave Lake. However, a small outcrop (DD1) of fossiliferous limestone which is very similar lithologically and faunally to the upper limestone and dolomite unit of the Keg River Formation, and also to the upper part of the Lonely Bay Formation, was found in the east bank of the Little Buffalo River more than

20 miles northwest of the most northerly outcrop of the Keg River Formation on existing maps.

Although some of the members of the Pine Point Formation are richly fossiliferous it is not possible to correlate in detail the members on the south side of Great Slave Lake with those on the north side save to state that they all fall within the "Stringocephalus" zone undivided. The E Shales, which fall within the Fine-grained Dolomite Member, are correlated with the Watt Mountain Formation in Text-Fig. 5. It was hoped that the correlation might be confirmed palaeontologically since the Watt Mountain Formation in northwest Alberta contains a distinctive microflora, but the E Shales were found to be barren.

In order that the correlation shown in Text-Fig. 5 be possible it must be assumed that the interval occupied by the Nyarling Formation in the area south of Great Slave Lake is stratigraphically equivalent to the Sulphur Point Formation, the Presqu'ile Formation, the upper part of the Pine Point Formation, the "false" Slave Point, the Watt Mountain Formation, the "false" Sulphur Point Formation and the Muskeg Formation. The thickness involved would be much in excess of the 440 feet which it is estimated to be by Norris (1965) and V. Zay Smith Associates (1966) on the basis of a regional dip of 13

feet per mile. However, if the regional dip is greater, as it very likely is, then the thickness occupied by the Nyarling Formation would be considerably greater.

The Sulphur Point Formation contains a prolific fauna representing the "hippocastanea" zone of Crickmay (1966) and the fauna includes abundant Emanuella vernilis Crickmay. This form is considered to characterize the Slave Point Formation according to Crickmay (1967, p. 1) but in fact characterizes the Sulphur Point Formation for the reason explained earlier (p. 58). The Sulphur Point Formation is overlain by beds belonging to the Slave Point Formation which contain a fauna dominated by Ladjia landesi Crickmay. The same relationship exists in northwest Alberta (Crickmay, 1967, p. 1) so that palaeontological reasoning along this line suggests that the Slave Point Formation of the type area and the Slave Point of northwest Alberta are time equivalents.

The conventional interpretation of the Middle Devonian correlation from northwest Alberta into the Great Slave Lake area depends, to a large extent, on the assumed equivalence of the Watt Mountain Formation and the Amco Shale. Samples of the Amco Shale from the diamond drill cores of the Pine Point Mines were found to be barren of microfossils so that no palaeontological judgement could be made.

The fauna collected from the Horn Plateau Formation suggests that it is very close in age to the fauna of the Slave Point Formation although they are quite distinct in composition, having very few common species. The fauna of the Horn Plateau Formation is thought by Norris (1964, p. 31) to be slightly younger than the Kee Scarp Formation of the Norman Wells area, so that the upper part of the reefs in the area around the southwest corner of Great Slave Lake, the Horn Plateau Formation, and the Kee Scarp Formation, all appear to be very close in age.

The palaeontological and stratigraphical evidence tends, on balance, to support the general correlation established by Norris (1965) with only a few minor reservations. All of the more convincing palaeontological evidence serves to confirm the correlation, and the presence of reef build-ups in the evaporite sequence north of Great Slave Lake simply raises the possibility of Chinchaga reefs of the Muskeg type rather than proving the Muskeg age of the sequence. This is inconsequential, however, with respect to the possibility of reef development in the Bear Rock Formation.

STRUCTURE

The structure of the Great Slave-Great Bear Lakes area is relatively simple because the area has been remarkably stable since Pre-Cambrian time. There are two major structural provinces present within the area; the Interior Plains and the Pre-Cambrian Shield to the east. The Interior Plains is a large gentle structural basin, and a wide swathe of sediments along the eastern edge of it falls within the map area. The general regional slope of the Pre-Cambrian is about 20 feet per mile to the southwest.

Two broad areas of uplift have had a considerable influence on the depositional pattern in post-Cambrian time. Ordovician and Silurian rocks are missing over the Tathlina uplift either because of non-deposition or because of late Silurian-early Devonian emergence and erosion. The uplift subsided during the deposition of the early Middle Devonian sediments and appears to have remained tectonically stable in comparison to the surrounding Pre-Cambrian terrain since that time. The second area of uplift, known as the Fort Rae arch, is considerably smaller than the Tathlina uplift but, nonetheless, influenced the depositional pattern during the Ordovician at least. It trends approximately southwest from

the vicinity of Old Fort Rae to near Fort Providence where it seems to merge with the Tathlina uplift. The basal Ordovician beds in the area belonging to the Old Fort Island Formation are missing over the arch, and the overlying La Martre Falls and Chedabucto Lake Formations thin out quite markedly.

Several large southwest trending faults occur in the Pre-Cambrian in the western part of the East Arm of Great Slave Lake (Barwash, 1957; Douglas, 1959). Aeromagnetic data suggests that they can be traced southwestward into the subsurface on the south side of Great Slave Lake. Three major faults are present northeast of the Slave River delta and these can be traced to the western limit of the Pre-Cambrian Shield. A graben is developed along the south shore of the lake. Sikabonyi and Rogers (1959) interpret aeromagnetic anomalies in the Pine Point area as extensions of these structural trends through the Pine Point area southwest towards Buffalo Lake. The southeastern limit of the Middle Devonian carbonate bank corresponds approximately with the east arm tectonic zone and it seems likely that penecontemporaneous movements along this zone controlled the position of the bank. It has also been postulated by Barager (1966) that such a major fault zone would provide easy access to molten rocks at

depth and the lead-zinc mineralization in the Presqu'ile dolomites is, thus, causally associated with the faulting.

Detailed shallow drilling in the vicinity of the Pine Point Mines has revealed numerous closely spaced gentle flexures in the form of anticlines, synclines, domes and basins, and minor faults, all trending between 240° and 245° true. The basement faults projected into the area on the basis of aeromagnetic data from the East Arm of Great Slave Lake trend about 225° true so that it is reasonable to assume, as Norris (1965, p. 88) does, that the basement faults are tectonically unrelated to the Palaeozoic folds.

Other small faults are known to occur in the areas north and south of the lake where a great deal of closely spaced drilling has been done. The western margin of the Presqu'ile dolomites on the northwest side of the lake trends almost north-south, is remarkably straight, and is almost certainly a fault line. The western part of the Presqu'ile beds, however, is known from shallow drilling in the Prairie Lake region to wedge out abruptly into the contemporaneous Horn River shales so that Norris (1965, p. 65) is probably correct when he refers to it as a reef front. A likely explanation of the coincidence of the fault line with the reef front is that movement along the fault before or during Presqu'ile time

controlled the position and extent of reef growth.

Another case of possible fault control of the location of reef growth is mentioned in V. Zay Smith Associates (1966, p. 56). A distinctive south-facing escarpment on the northwest shore of Great Slave Lake was noted. It extends westward for some 30 miles from Gypsum Bay to north of Lonely Bay and is locally as much as 75 feet in height. The western portion is underlain by limestones of the Lonely Bay Member of the Pine Point Formation and lies along a series of sinkholes in that formation. It is thought that the scarp may be the surface expression of a fault which may have controlled the northwestern flank of the Middle Devonian carbonate bank.

GEOLOGICAL HISTORY

Although the earliest sediments known to have been laid down on the deformed and eroded Pre-Cambrian surface within the Great Bear-Great Slave Lakes region are Middle Ordovician in age, it seems quite likely that the Cambrian sediments which are known to the north, south, and west were also deposited over the map area, but were removed by subsequent erosion. The whole map area, however, must certainly have been positive during the Early Ordovician, but towards the end of this epoch the landmass gradually subsided and beach sands of the Old Fort Island Formation were deposited by the encroaching seas. The pre-Ordovician landscape was varied and undulating with hills up to at least 500 feet in height. As the area was progressively submerged by the advancing Middle Ordovician seas, a varied sequence of red and green shales, dolomites and siltstones of the La Martre Falls Formation was deposited in what appears to have been the restricted marine waters of a southerly arm of the Cordilleran trough. The presence of ripple marks, mud cracks, salt casts, and worm burrowings attest to the existence of shallow, warm waters. With further subsidence during the Upper Ordovician genuine open marine conditions developed and biogenic and partly bioclastic carbonates of the Chedabucto Lake Formation were deposited.

Caledonian earth movements during the Silurian or Early Devonian terminated this period of marine deposition, and the area was transformed into a hilly landmass of Pre-Cambrian, Ordovician, and possibly also Silurian rocks. During this period of uplift and erosion all of the Lower Palaeozoic rocks were stripped from the area south of a line from the Horn Plateau to Redrock Point.

When the landmass began to sink again in Early Devonian time sedimentation recommenced in shallow, restricted, possibly non-marine waters under oxidizing conditions. Variable red beds of the Lower Elk Point Group were laid down on top of a basal beach sandstone but, although they flanked the Tathlina uplift, both to the southwest and northeast, they never actually covered the arch.

A great extension of the area of deposition followed the Lower Elk Point, and the evaporites of the Chinchaga Formation were laid down over the whole of the southern Mackenzie basin although they did not quite cover the Tathlina arch. An immense restricted lagoonal basin extended from the site of the present Franklin Mountains in the north to the Peace River arch in the south during the upper Chinchaga. To the west it was partially restricted by the Tathlina arch.

A transgressive marine pulse followed and true open marine

shelf conditions were established over the area with the widespread deposition of the Keg River carbonates. The lower part of the carbonate covered the Tathlina arch whereas higher beds which are present on the flanks are missing over the top, according to Belyea (1967, p. 73), suggesting that the Tathlina arch was still an active tectonic feature.

Regionally, a slight shallowing followed the deposition of the carbonate platform and broad carbonate banks and reefs developed along the platform margin. The carbonate bank persisted from early Pine Point time until late Slave Point time in the Great Slave Lake region. The bank is bounded to the southeast by a line trending from the northwest side of Buffalo Lake northeast to the Pine Point mining area, and to the northwest by a line trending from north of Kakisa Lake northeast beyond Dieppe Lake. Although the carbonate bank is usually thought of as a wide, more or less continuous belt of limestones and dolomites, subsurface data suggests that the bank is divided by channels of shale and could better be described as a series of generally aligned mounds and ridges.

South and southeast of the carbonate bank the circulation was very much restricted with only limited access to the open marine waters to the northwest. A thick succession of Nyarling evaporites accumulated in these waters while further south in

the Rainbow region of Alberta, where subsidence was fairly rapid, a complex of biohermal reefs and carbonate mud banks developed.

During the deposition of the Nyarling Formation in the restricted waters at the back of the carbonate bank biostromes and bioherms developed at several localities on the carbonate bank. The location of these reefs appears to have been related to faulting as suggested by Sikabonyi and Rogers (1959).

A facies of the upper Pine Point Formation is present on the flanks but missing over the crest of the Tathlina arch, according to Belyea (1967, p.73) indicating that there was a period of pre-Sulphur Point erosion and the arch was still an active zone of uplift. Since the uplift of the Tathlina arch was probably the result of reactivation of northeast trending Pre-Cambrian faults it lends substance to the argument that the areas of reef growth were generally localized by faulting.

Much smaller, isolated, carbonate build-ups are known northwest of the carbonate bank within the open marine Horn River shales. Although the Falaise Lake and Horn Plateau buildups are the best known, the topographical anomalies discussed on p. 63 are also thought to be the surface expression of close to the surface reefs of the same type. If this is so then they are very common. These reefs probably developed as

isolated mounds on a limestone platform of the Lonely Bay Formation so that their structural setting was similar to that of the more or less contemporanceous reefs in the Rainbow region of northern Alberta, although the environment of deposition was altogether different.

Regional uplift occurred in northern Alberta following the deposition of the Muskeg Formation and the regressive sandstone and shale unit known as the Watt Mountain Formation was deposited. To the north and northwest the effects of the post-Muskeg uplift diminish and in the Great Slave Lake area it is barely recognizable. Thin waxy shale beds or limestone conglomerate referred to as the Amco Shale which occur within a seemingly continuous Sulphur Point-Slave Point succession are probably the very subdued expression of the Watt Mountain detrital beds in the Great Slave Lake area.

The evaporitic Nyarling in the area southeast of Great Slave Lake passes up into stromatoporoidal limestones of the Slave Point so that during Slave Point time fossiliferous limestones were deposited over both the Nyarling evaporites and the Middle Devonian carbonate bank.

The top of the Middle Devonian is marked by a pronounced and widespread unconformity followed by the deposition of a thick sequence of Upper Devonian Hay River shales in the south Mackenzie region.

OIL & GAS PROSPECTS

Although commercial * hydrocarbons have not been discovered in the Great Slave-Great Bear Lakes area up to the present, the potential of the region must be highly rated since it possesses all the necessary pre-requisites for oil and gas production.

The presence of hydrocarbons in the Great Slave Lake area has been known since the earliest geological reconnaissance in the area by McConnell (1891). Oil seeps are common along the south shore of Windy Bay on the north side of the lake, and diamond drill cores of the Presqu'ile Formation in the vicinity of Horncastle Point are heavily oilstained. The lime-stones and shales of the Pine Point Formation on the south side

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* Several suspended Devonian gaswells have been drilled which may be commercial if and when a pipeline serves the area. They include the following:-

HB Cameron Hills A-5 (60°4'N, 117°30'W)

Briggs Rabbit Lake #1 (60°55', 118°47')

Briggs Rabbit Lake #3 (60°56', 118°45')

of the lake are bituminous and have a strongly petroliferous odour. Often the body cavity of brachiopods is full of heavy black oil. Gas blows have been encountered in the Slave Point Formation during diamond drilling for base metals in the area south of Great Slave Lake, and gas and 2 barrels of oil were recovered from an unspecified Middle Devonian horizon in the IOE Providence K-45 well.

On a regional basis, gas is produced from the Slave Point Formation to the southwest in northeastern British Columbia and is also known from the Bistcho Lake area. Oil is produced from the Rainbow Member of the Keg River Formation in northwestern Alberta whose correlative in the Great Slave-Great Bear Lakes region is the Lonely Bay Limestone. Significant oil and gas occurrences are known from the Middle Devonian in wells to the west of the map area although none is actually in production. To the northwest oil is produced at Norman Wells from the Kee Scarp Formation, reefal beds which are the approximate time equivalent of the Slave Point and Horn Plateau Formations.

Rocks which would provide potential source beds are common and include the basal shale succession of the La Martre Falls Formation, the Bituminous Shale and Limestone Member of the Pine Point Formation, the bituminous shales of the Horn

River Formation, and the shales of the Hay River Formation. Reef carbonates and shales in the Upper Devonian to the southwest of Great Slave Lake could also be regarded as potential source rocks.

A wide variety of possible reservoir beds occur in the map area although much the most attractive are the Middle Devonian reef build-ups.

The basal beach sandstones of the Old Fort Island Formation are extremely porous and permeable and would provide an excellent reservoir rock. They are absent over the topographical highs on the pre-Ordovician landscape so that up-dip wedge-outs might be present and if so they would present ideal traps. However, the formation is thin and no obvious source beds are present with the exception of the fine-grained shales in the overlying La Martre Falls Formation. The Mazenod Member of the La Martre Falls Formation contains porous oolitic dolomite beds which have a similar setting to the Old Fort Island beds and would be rated about the same possibility of being oil-bearing except that the Mazenod beds are much thicker and their distribution more predictable. The upper beds of the Chedabucto Lake Formation display good vuggy porosity in places where the rock is biogenic so that up-dip pinchouts of porous beds may occur in the western part of the map area.

There is also the possibility that reef build-ups may be present since they are known in beds to the west which can be fairly confidently correlated with the Chedabucto Lake Formation.

Oil reservoirs have been found in basal sands or "Granite Wash" to the south in the Red Earth area and near the Peace River arch, and oil accumulations of the same type may occur in the porous basal sandstone unit of the Mirage Point Formation. The scarcity of subsurface data makes it difficult to assess "Granite Wash" possibilities but up-dip pinchouts of basal sandstones will always present secondary targets where deep wells are being drilled in this area.

Limestones and dolomites within the Chinchaga Formation occasionally display limited intercrystalline and vuggy porosity and can be regarded as possible oil reservoirs. Reef build-ups occur in the basal evaporite sequence north of Great Slave Lake which is considered by the writer to be equivalent to the Chinchaga Formation (see p. 17). These reefs occur in an analogous environmental setting to the Muskeg reefs in the Rainbow Field of northwestern Alberta so that similar structures in the area to the west could be regarded as reasonable prospects, even though the reefs found at the surface are not porous.

Limestones of the Lonely Bay Formation which occasionally display a small amount of vuggy porosity appear to have formed a platform for isolated reef masses in the area northwest of the Middle Devonian carbonate bank. Two such carbonate build-ups are known in the Horn Plateau reef and the Falaise Lake build-up, and the topographical anomalies discussed on P. 63 suggest that there are many more. Carbonate build-ups of this type may occur down-dip to the east and southeast where they would be capped by impermeable shales and would present excellent reservoir prospects.

Further oil and gas prospects occur in the Middle Devonian carbonate bank where biostromal and biohermal build-ups such as the Presqu'ile dolomite contain excellent vuggy porosity and are heavily oilstained. Underlying limestones and shales are oilstained and petroliferous and present excellent source beds.

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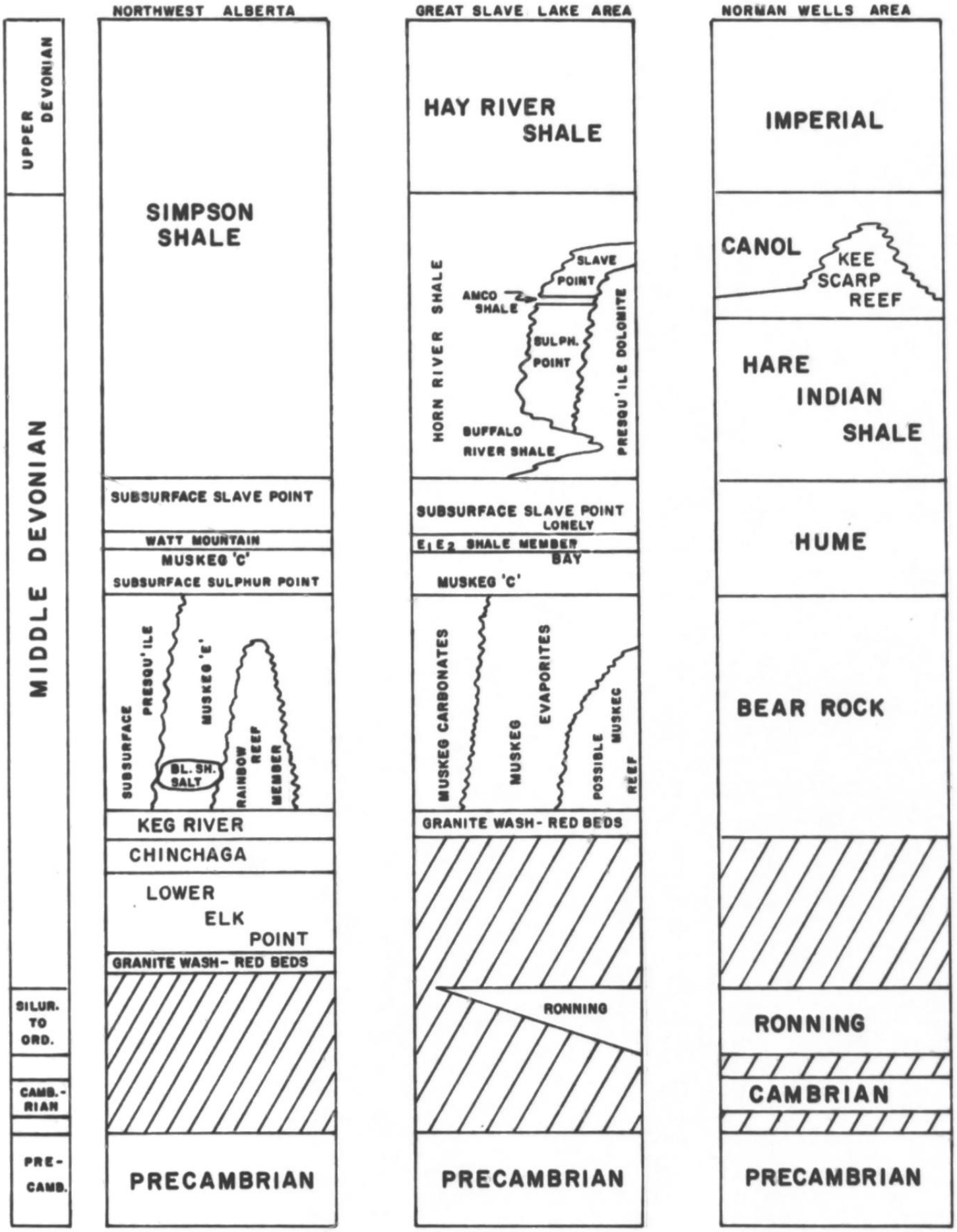
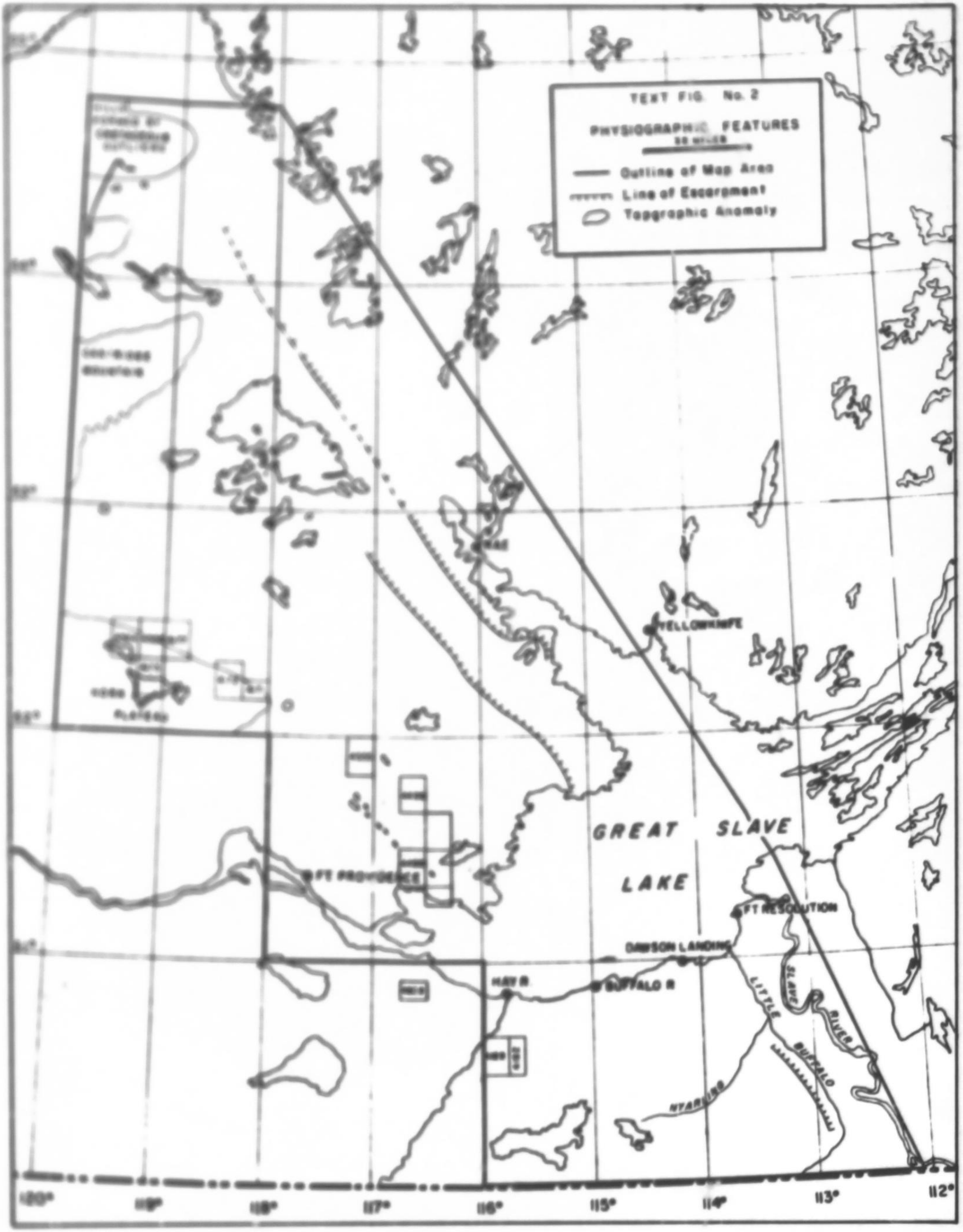
STRATIGRAPHIC CORRELATION CHART
(AFTER NIKIFORUK)
NORTHWEST ALBERTA TO NORMAN WELLS AREA

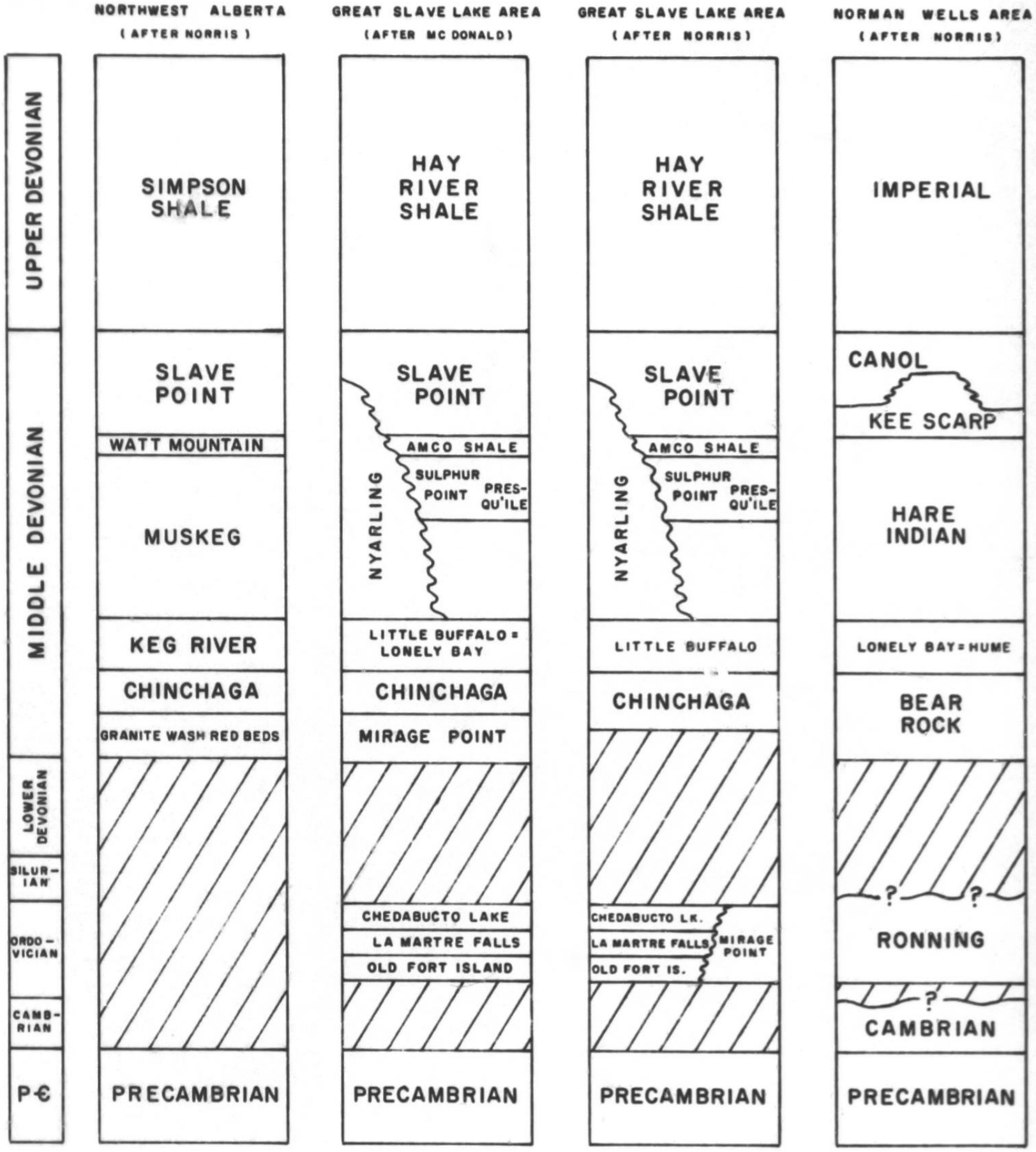


TEXT FIG. No. 5


TEXT FIG. No. 2
PHYSIOGRAPHIC FEATURES
Outline of Map Area
Line of Escarpment
Topographic Anomaly
YELLOWKNIFE
GREAT SLAVE LAKE
FT RESOLUTION
DAWSON LANDING
HAY R
BUFFALO R
SLAVE RIVER
LITTLE BUFFALO RIVER
117°
116°
115°
114°
113°
112°

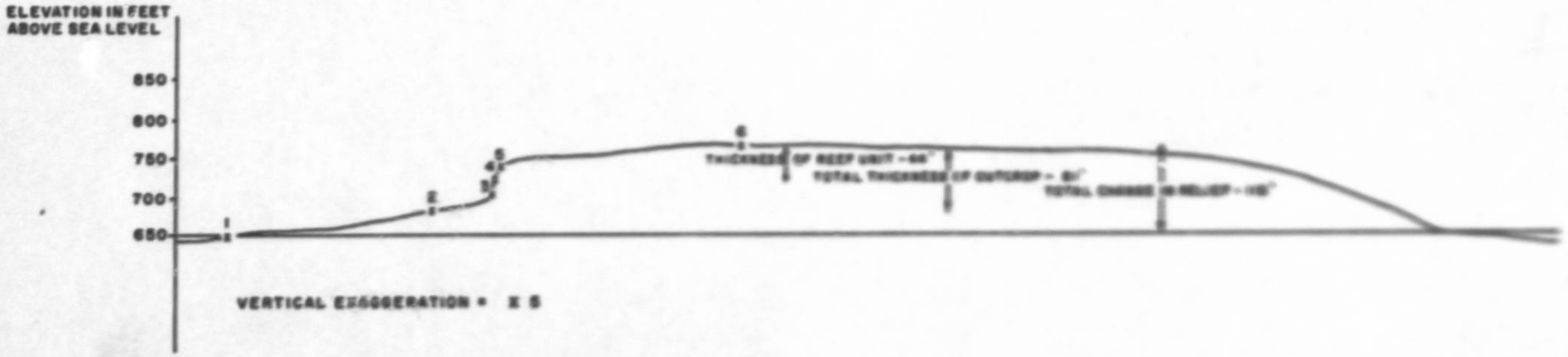
STRATIGRAPHIC CORRELATION CHART

NORTHWEST ALBERTA TO NORMAN WELLS AREA



TEXT FIG. No. 4

GENERALIZED PROFILE OF CHINCHAGA ? REEF (SECTION 34)



STATION	ELEVATION	REMARKS
6	763	POINT ON REEF 1/4 MILE NORTH OF STATION 5
5	729	TOP OF SCARP IMMEDIATELY ABOVE STATION 4
4	719	BASE OF "REEF" UNIT
3	700	BASE OF MAIN SCARP - LIMESTONE BRECCIA
2	682	BASE OF LOWEST OUTCROP OF SCARP - A SMALL TERRACE OF LIMESTONE
1	648	CHEDABUCTO LAKE.

TEXT FIG. No. 6

TEXT-FIG. No. 1

REGIONAL LOCATION MAP

MILES
0 32

All Weather Road
Winter Road
Railroad
Townsite
Airstrip
Mobil Joint Int. Lease
100% Mobil Reservation

N. W. T.

Y. T.

ARCTIC CIRCLE

CORONATION GULF

DEASE STRAIT

KENT PEN.

GREAT BEAR LAKE

GREAT SLAVE LAKE

ARCTIC RED R.

PORCUPINE

PEEL

RED

MACKENZIE R.

ANDERSON

ARCTIC CO

FT MCPHERSON

ARLAVIK

COLD CORN

FT GOOD HOPE

NORMAN WELLS

FT FRANKLIN

FT NORMAN

CANOL ROAD

KEELE

PELLY

LIARD

SOUTH NAHANNI

PELLY LAKES

GRAVEL LK

BARLOW

KENO HILL

MINTO BRIDGE

GORDON LANDING

WHITEHORSE

CARCROSS

WATSON LK

FT SIMPSON

PLANNED ALL WEATHER ROAD TO FT. SIMPSON

FT PROVIDENCE

YELLOWKNIFE

FT RESOLUTION

DAVIDSON LANDING

PINE POINT TOWNSITE

ENTERPRISE

HAY R.

CHINCHAGA R.

ATHABASCA R.

PEACE R.

SLAVE R.

GRANDIN

LA MARTRE

ROSS

ROBERTSON

COPPERMINE

MACKENZIE HWY

ROAD

PEACE RIVER

GRIMSHAW

HINES CREEK

DAWSON CREEK

FORT NELSON

FORT ST. JOHN

ROLLA

BELL ROCK

FORT WHITE

136° 135° 134° 133° 132° 131° 130° 129° 128° 127° 126° 125° 124° 123° 122° 121° 120° 119° 118° 117° 116° 115° 114° 113° 112° 111°

68° 67° 66° 65° 64° 63° 62°

Equiv. in part to Norris Sec. 26

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 40, Spot Checks: AG 4, 5, 48, 50, 52 (Composite Section)

Scale: 1 inch = 10 feet

LOCATION: Dupert R. Area:

SAMPLE	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
AG 52									W.S. - lt brn, has thk soily crust on surface. f.s. - wh. @ 90% Beddg - mass., v. difficult to tell. Wthrs as well rdd. knobs All o/c in this immed. vicinity (Dupert R.) is wh. gypsum. Gypsum is xln, & pure, almost sacc. Loc'n: 26.0 mi, 255 T from Ft. Bae.
		?							
									Not seen refer to Norris Sec. 28, units 12 & 13, SHN 282 NB.
AG 4		Cx		V		Ci	2		WS - M. brnish yel, f.s. - m. to dk brn Beddg - mass contorted ooc, thnly bedd intvl due to wthrg. C. brecd. in places, but brecc'n var, ptchy. Matrix mainly Cx Ls. w/ wh. Ca infill. Main part of unit is CxLs. Ls more lam. towards the base.
		?							W.S. - lt brn, f.s. - blotched wh & gry. Beddg - thk to mass, irreg. (1' to 2' thk) Fe stnd. Gypsum quite pure, dns, comp. V. thn grn sh ptgs. Also clr gypsum Xls & grn stn. Apparent Strike & Dip = 160°/14° SW ?

1

SAMPLE	LITHOLOGY					R	S	DESCRIPTION	
								Not seen refer to Norris Sec. 28, units 12 & 13, SHN 282 NB.	
AG 4	Cx		V			Ci	2	WS - M. brnish yel, f.s. - m. to dk brn Beddg - mass contorted ooc, thnly bedd intvl due to wthrg. C. brecd. in places, but brecc'n var, ptchy. Matrix mainly Cx Ls. w/ wh. Ca infill. Main part of unit is CxLs. Ls more lam. towards the base.	
	?							W.S. - lt brn, f.s. - blotched wh & gry. Beddg - thk to mass, irreg. (1' to 2' thk) Fe stnd. Gypsum quite pure, dns, comp. V. thn grn sh ptgs. Also clr gypsum Xls & grn stn. Apparent Strike & Dip = 160°/14° SW ?	CHINCHAGA FORMATION
AG 5								W.S. - lt brn, f.s. - blotched wh & gry Beddg - thk to mass, irreg (1' to 2' thk) Fe stnd. Gypsum quite pure, dns, comp., v. thn grn. sh. ptgs. Also cl [illegible] AG 4 & 5 - 26.25 mi. (bearing 261°T) From Ft. Bae	
								No sample. Present at foot of escarpment of stns AG4 & AG5, Lakes & slough bottoms contain a mixture of evaporites and soil. (see Norris, Sec. 26, Unit 7)	
AG 50								W.S. - lt brnish gry & wh, f.s. - v. lt brn & wh, approx. 90% wh. Beddg - wthrd thn to m (mainly 1"), rather mass. Rather sacc. to xln o/c occurs on scarp which is quite prominent w/ discontinuous exposures of gypsum (some 10' to 15) thk) along scarp. Norris Loc. 337	

2

SAMPLE	LITHOLOGY			
AG 50				
AG 48	Cx		V	

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NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 4

Scale: 1 inch = 10 feet

LOCATION: WINDY POINT SECT.

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 1

Scale: 1 inch = 10 feet

LOCATION: Dawson Landing to Pine Point

SAMPLE NO.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE 1/16 mm	GRN SIZE 1/4 mm	GRN SIZE 1/2 mm	GRN SIZE 2 mm	R	S	F/F	DESCRIPTION	
		Cx	b										w.s.-lt gry brn f.s. - m. brn Beddg-m., pyr. bit	appear to be going down limb anticline
		Cx											Ls - a.s.	
		Cx	c										w.s.-lt gry brn, f.s.- dk brn, pet od, frag. thn pods of sh at top of O/C	
13B		Cx	B,c										w.s. - dk gry, f.s. - m.brn, beddg - thk.	
13												2	w.s. - lt gry, f.s. - dk gry to brn. Beddg - thn to m, nod, arg.	
12			F,b							c	3	5	w.s.-rusty brn, f.s. - m.brn, d.d. g, vug por.	
11												2	w.s.-lt gry, f.s. - dk brn, beddg - mass to thk, pyribit.	
10		Cx	c, b									3	Ls-sa, only sl. crin, v. thn to m. Beddg. Pyr bit occ. along fracs.	
9		Cx											Ls-sa, foss not abd., beddg - mass	
8			F,C									2	Ls-sa, Sh - w.s. - lt brn, f.s. - blk, plty	
7		Cx										1	w.s. - lt brn, f.s. - dk brn, beddg - thk, nod. Ls-sa, almost a coquin.	
6		Cx										4	Sh, w.s. - lt gry, f.s. - blk, fiss, Beddg- m to thn frag. . Sh w/ nod. figr ls.	
5												2		
4		Cx	C F									4.5	w.s. - lt brn, f.s. - dk brn, Beddg - thn to m.	
3		Cx	P_y, C, B									3	w.s. - lt brn, f.s. - m. brn, Beddg - mass (1.0') pet., col, arg.	
2		Cy	B,C										Ls sa, Sh-w.s. - dk brnish blk, f.s.-blk, Beddg - thn	
1		Cx	P_{yr}, B										w.s. buff, f.s. - m. to dk. brn. Beddg - m. to thk (6" to 1') Intbed Sh 6" thk.	

BITUMINOUS SHALE & LIMESTONE MBR OF PINE Pt FM

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 2

Scale: 1 inch = 10 feet

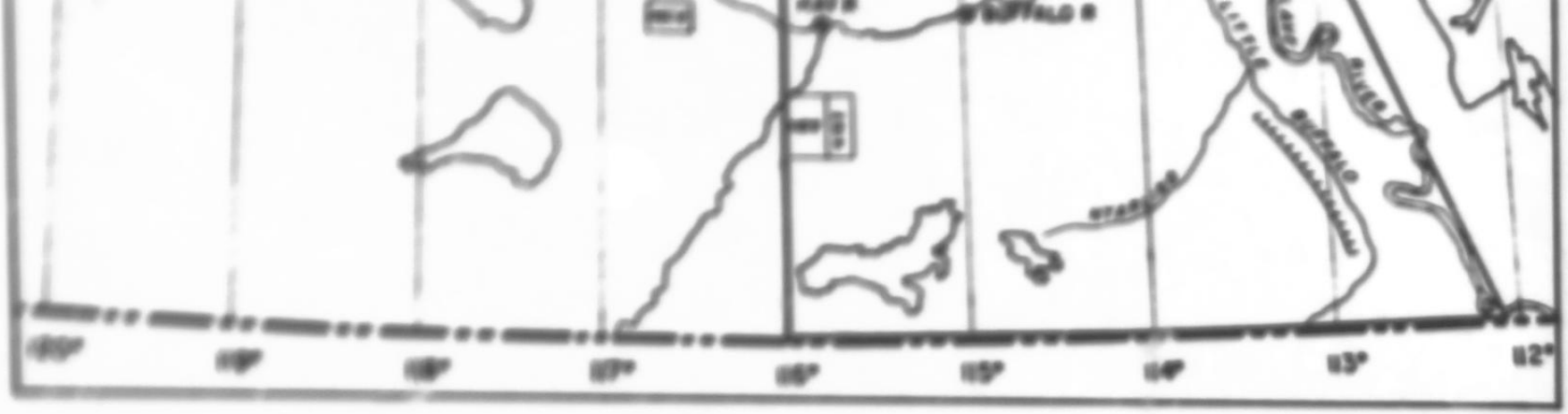
LOCATION: East of Sulphur Point to Sulphur Point

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE 1/8 MM	GRN SIZE 1/4 MM	GRN SIZE 1/2 MM	GRN SIZE 1 MM	R	S	F/F	DESCRIPTION
												COVERED INTERVAL TO BASE OF: ASCO SHALE
		Cx	V						C	3	4-5	Thr surf. lt gry brn, f.s. - m.brn, beddg - thn w.s. - lt gry brn, f.s. - m. brn
		Cx	V									Ls a.a. except more vugs, not foss, Beddg - var - thn to mass.
		Cx Pyr.	V						C	2	6	w.s. - lt gry brn, f.s. - lt brn, Beddg - m. v.v. irreg.
		Cx	V						D	1	8	f.s. - lt gryish brn, f.s. - lt brn, Beddg - sm.
		Cx M	V						D	1		w.s. - lt grn, f.s. - lt grn.
		Cx	E									w.s. - lt grnish brn, f.s. - lt brn, Beddg - mass, lam, pel? Ls-sm, Beddg - thn (1") , carb., str. Ls-sm, Beddg - m. to thk (6" to 1")
		P	E						D	5	6	w.s. - lt brn, f.s. - m. brn, Beddg - thn (1" to 2")
		P	V						D	1	7	Ls-sm, Ca ptchs
			V									Ls - sm, Beddg - mass, pet?
		?										COVERED INTERVAL TO TOP OF EXPOSURE AT PRESQU'ILE PT.

SIDNEY BASIN

POINT FORMATION

1 of

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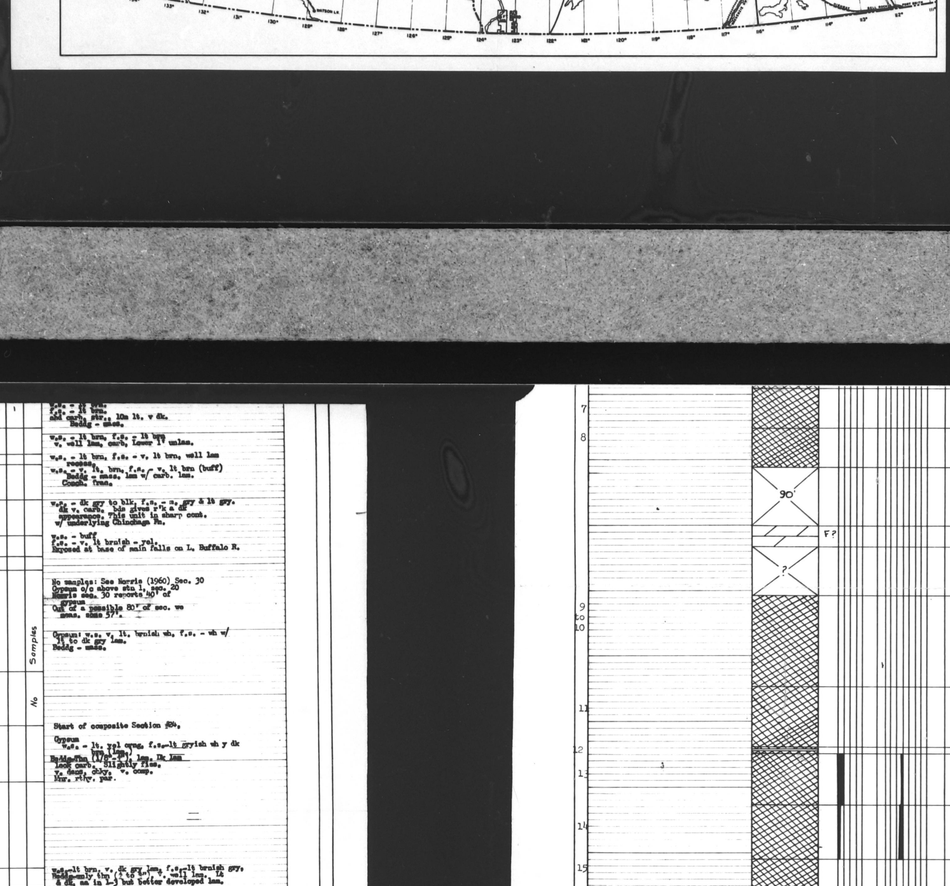
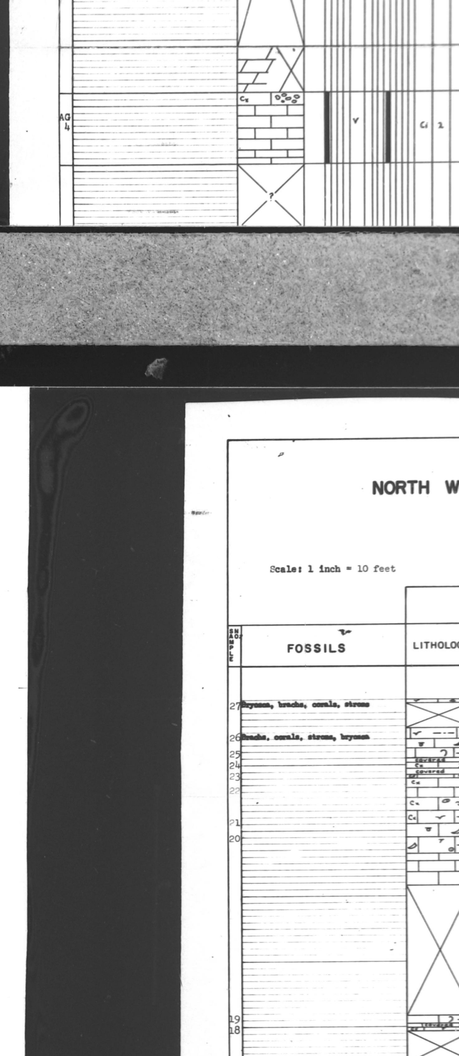
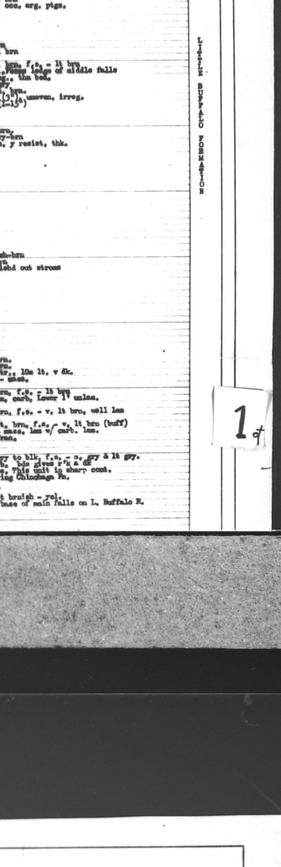
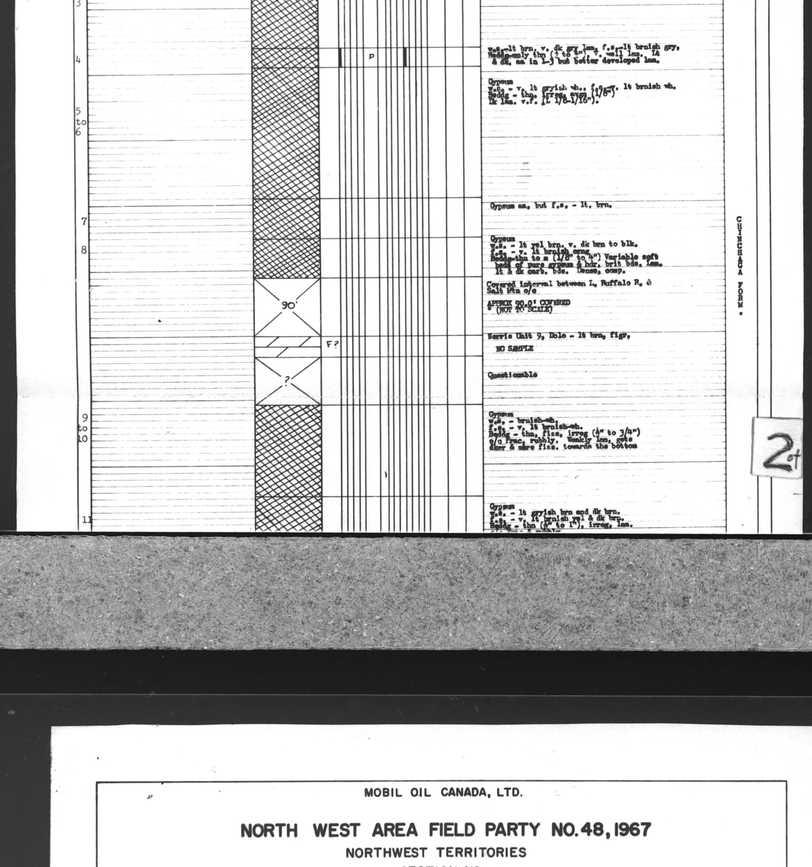
TEXT FIG. No. 4

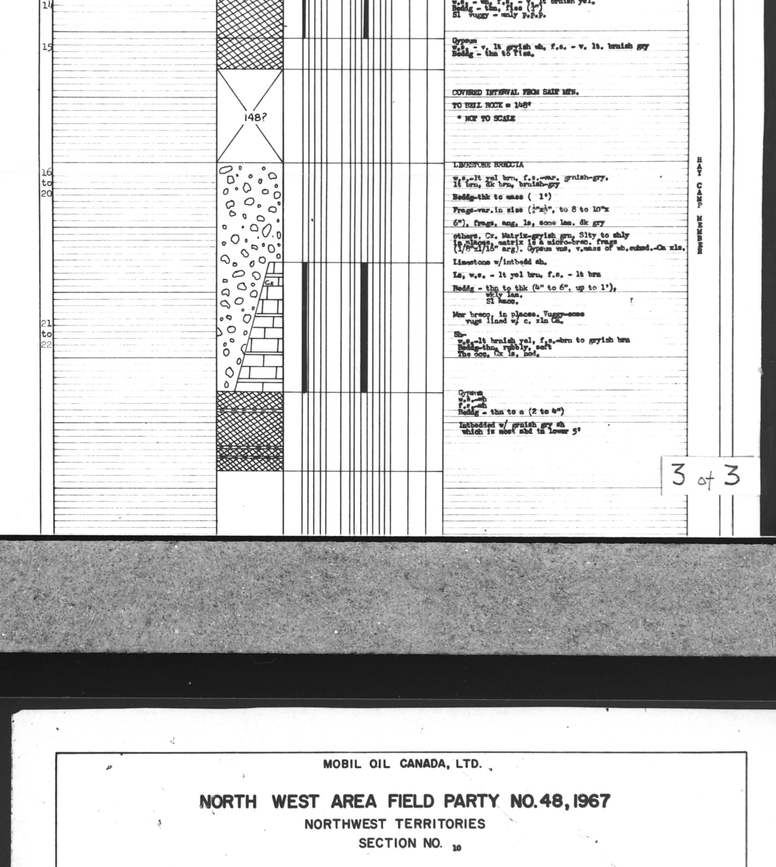
TEXT FIG. No. 6

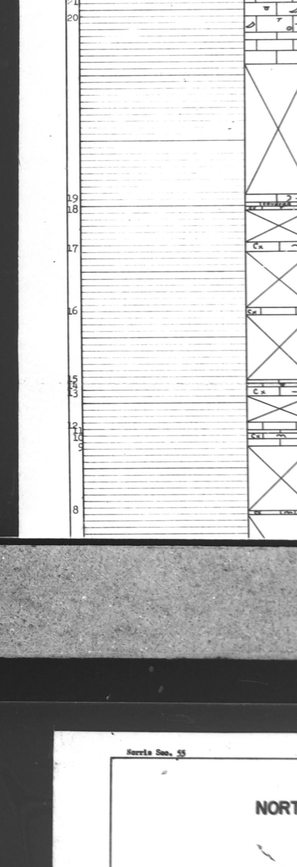












MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 9

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 10

Scale: 1 inch = 10 feet

LOCATION: 60.° st. bearing 1250 ? from Hay River stakhole near water road 3.0 mi. east of Spurling - Scale 1, standale

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48,1967

NORTHWEST TERRITORIES

SECTION NO. 4

Scale: 1 inch = 10 feet

LOCATION: WINDY POINT SECT.

SAMPLE NO.	FOSSILS	R	S	F/F	DESCRIPTION
27	Bryozoa, brachs, corals, stroms				W.S.pale gry, f.s.-lt.brn, beddg-indist.Equiv. Stn.25
26	Brachs, corals, stroms, bryozoa				w.s. v. lt. brn. f.s. dk brn, Beddg -(thin 2") irreg. frac, jted, Equiv. to STN 21
25		D	1	5	w.s. lt gry, f.s. dk brn, Beddg - thn, pet. od. shy pdng, frac, jtd, Equiv. STN 19
24					w.s. lt gry, f.s. - dk brn, beddg - mass as in 23 could be equiv. STN 19
23					w.s. - m. gry, f.s. - m. brn, beddg - thn (3-6"), brit, O/C could occur below unit 21. Galena showings
22					w.s. - lt brn, f.s. - dk gry, beddg - thn, irreg, brit, resist.
21					w.s. - v. lt brn, gry, f.s. - lt brn. beddg - mass, jtd, frac, brit Up low cont transit'nal, some 'crse gr. regions
20		D	2	3	w.s. - v. lt gry brn, f.s. - v. lt brn Beddg - irreg, thn, brit
		D	1	1	w.s. - v. lt gry, f.s. - lt brn, bddg - irreg, thk to mass, dd o. in vugs O/C forms escarp 50' from shore, approx. 5' exposure, RK is britt.
19		D	1	8	w.s. - lt gry, f.s. - m. brn, beddg - mass. pet. od shy, insbeds, jtd, frac.
18		D	2	2	w.s. lt m brn, f.s. - m. brn, beddg - thn, irreg, brit.
17					w.s. - lt brn gry, f.s. - m brn, beddg - thn. Thn bk - sh. insbeds
16					w.s. gry wh, f.s. - m. brn, beddg - thn
15, 14, 13		R	5	7	w.s. 14, 13, w.s. m gry, f.s. - lt brn pet. od.
					w.s. - lt gry, f.s. - v. lt brn, beddg - blocky weak lam
12		D	1	6	w.s.-gryish wh, f.s. - lt gryish brn.
11		x	x	x	w.s. v m. brn, f.s. gry brn, beddg - thn, wk lam.
10		D	1		w.s. lt gryish wh. f.s. - lt to m brn, beddg - thn
9		D	4	7	w.s. gryish wh, f.s. - v. lt brn, Beddg - thk (1')
8					w.s. dk brn, f.s. - lt brn, Beddg - thn (1½"-2")

SULPHUR POINT FORMATION

1 of

w.s.-gryish wh, f.s. - lt gryish brn.
w.s. dk brn, f.s. - lt brn, Beddg - thn (1½"-2")

SAMPLE NO.	R	S	F/F	DESCRIPTION
7	D	2	4	w.s.-lt gry wh. f.s.-lt brn gry, Beddg - thn (½"-1") wh. dol. masses.
6	D	2	1	w.s. lt gry, f.s.-v. lt brn. Beddg - m (8"), pet od
5	D	3	2	w.s.-buff, f.s.-v. lt brn, Beddg thn (½-2"), lam?
4			1	w.s.- m. gry, f.s.- lt brn, Beddg - mass (8"-1') lrg wh. dol masses.
3				w.s. gry wh, f.s. - v. lt brn, galena vns.
2	D	3	2	mly Cx, w.s. - lt to m. brn, f.s. - lt brn, Beddg - thn
			8	PRESQU'ILE REEF

2 of 2

3 of 3

18

17

W.S. - lt gry to buff, f.s.-m. gry to brn, Bedding - mass to thk, O/C brit, hard, resist. Nod. of m. gry cx ls, nod. often lam. lt. Crsn. ls.
W.S. - dk gry brn, f.s. - lt brn, Bedding - mass, towards top of sec, Ls is dkr thco. tex., pel. cd.

M. Crsh. ls.

Covered Interval Bet. Jones Pt & M. Crsn. ls. covered Int. Questionable ?

16

W.S. - lt brn gry, f.s. - lt brn, Bedding - irreg. (1-3")

15

W.S. - lt gry, F.s. - lt brn, Beddingirreg.
Interbeds of cgse bioclastic crn. ls.

14

W.S. - lt brnish-gry, F.S. - lt brn.
Bedding - m, irreg. (2") thn arg. ptgs.
Thn crin intbeds or masses

13

W.S. - lt brn to buff
Ls - lt gry
Bedding - thn & nod.

Thn intbeds of calc. mist and the coccass.
thn bioclastic (crinoidal) intbed.

The coccass. bk carbonac. st.

Not very foss.

12
11
10
9
8
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2
1

Ss. intbeds. of bioclastic ls and mist.
W.S. - lt gry brn, f.s. - gry, Bedding - thn, lam, sli. wvy.
W.S. - lt gry brn f.s. - v. lt brn, lam, Bedding-thn (1")
ss. - arg ptgs.

ss. crinoids unbroken and long.
ss.

ss. foss. not abd.

Moved from N. shore of Caribou Bay to Rame Bay.

W.S. - lt gry, brn f.s. - lt brn, Bedding - irreg, frac. conchoid, carbon
Ls ss. Bedding - thn to med (less than 1"). Frac, rubbly, brit.

Ls ss. Bedding - irreg. thn (1" to 4").

W.S. - lt gry brn, f.s. - brnish gry, thn beds (1 to 2")
Arg. ptgs.

ss. thn bdg (1"). frac. conchoid

2 OF 2

Sec. 37- Norris

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 6

Scale: 1 inch = 10 feet

LOCATION:

Cape Bay, 6 miles West, W. of Long Is.

Aerial Photo: 11372-215-216

SAMPLE NO.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE 1/8 mm	1/4 mm	1/2 mm	1 mm	R	S	F/F	DESCRIPTION
		?											90' covered interval to top of member.
6			MB		C					D	1	1	W.S. - lt gry, f.s. - m. brn. Bedg. - questionable, thn c/c v. rubbled and crumbly.
5													W.S. - lt gry, f.s. - lt brn
4		Cx	MB							D	1	1	W.S. - lt grysh brn, f.s. - m brn. Bedg, mass, wkly bed. tends. top of interval
3			B		C					D	5	2	W.S. - m. brnish gry f.s. - m. brn Bedg - m. (6") frag +1
2		Cx	B										W.S. m. brn gry, f.s. - m. brn, Bedg - thn Irreg. (2")
1		Cx	B		C					D	1	1	W.S. - brnish gry f.s. - lt brnish-gry, Bedg- thk (6") cn vning.
		?											

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 7

Scale: 1 inch = 10 feet

LOCATION 1.0 mi. west of North Head Pk. or 5.0 mi. east of Lonely Pk. (Survey Station 277 BD)

Photos 11372 - 215,216

Strike 70° / 4° N.W.

FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
Stromb, Cheirotrypidina, Bryozoa, fora tuncle crinoid debris, algal limestone microgranular	Ca	ac							W.S.-lt. brn gry, fault to m. brn, Bedg - mass, jtd C/C frac, recist, brit
Orthids, productids, gastropods	Ca	B				D	1	2	W.S.-lt brn gry. vn & lt to m. brn Bedg - thn to m.(2"), irreg & frac.
Trilobites, gast., brachs.	Ca	B		V					W.S. - lt brn, gry f-sm. brn Bedg - mass irreg. thk (76") WEX, 10 m Di 0.

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48,1967

NORTHWEST TERRITORIES

SECTION NO. 9

Scale: 1 inch = 10 feet

LOCATION: Bobbed Forestry Fire Tower : 28⁰ mi., Bearing 170⁰ T From Pine Pt. Airstrip

Strike = 170° / 10° W
Alt. 600'

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
								Strike = 170° / 10° W Alt. 600'
		V P					7	W.S. = lt yel brn, f.s. - lt brn, Buddy - thn (3" to 2'), arg. pkgs.
								No foss. appr.
								W.S. - yel brn, f.s. - lt brn Buddy - thn (3" to 1'), arg. pkgs - calc. silty.
					C	L	2	8	W.S. = grnish brn, Buddy - thk (50") Bdg, f.s. - silty, arg. pkgs. foss. sand v
								W.S. = yel-brn, f.s. - lt brn Buddy - thn (1/2"-3") irregs. ppl.
								W.S. = lt brnish-grn, f.s. - lt brn, Buddy-mass, Sdy lam, shal grnish gry, v. ar.
								W.S. - lt yel brn, f.s. - lt brn, Buddy - m, arg pkgs, frag ss.
					D	L		W.S. grn, brn, f.s. - v. lt brn, Buddy - mass, Chalky zone, at base, as foss.
								W.S. = lt grnish brn and dk brn, f.s. - lt brn, Buddy - thn (2" to 1"), irregs, lam.

SHOW No. FORMATION

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO.48,1967

NORTHWEST TERRITORIES

SECTION NO. 10

Scale: 1 inch = 10 feet

LOCATION: 4½° mi. bearing 128° T from Hay River sinkhole near winter road 2.0 mi. east of Sporting - Steele to sinkhole

Strike = 170° - 180° / 4-6° W
Alt. 580'

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
		F M C	V					W.S. - lt brnish gry, f.s. - lt to m. brn Ck to f. gr, Buddy - thn, wvgs - 1 in clearing.
		C F	VF				6	W.S. - lt gry brn, f.s. - lt brn Buddy - large, chky, foss, m. grain coarse.
		C	V C				8	Lst. W.S. - brnish yell, f.s. - lt brn, Buddy - thn (2") to m. (5+")
		C	C					Sh - calc, f.s. - brnish yel, f.s. - dk brn, gutty fissile, pkty Sm lized vugs
			C					W.S. - brnish yel, f.s. - v. lt brn, Buddy - v. thn (1/8-2") chky pkty, silty, arg. pkgs, almost a calc sh.
			M C				7	A Lst. - W.S. - lt yel-brn, f.s. - yel-brn Buddy - m to thk Sdy lized w/ lam Free to disper. Ck to f. gr. interbred w/
			V				7	B Lst. - W.S. yel-brn, f.s. - lt brn, Buddy - m to thk Ck - mod. sorted, f. sand, a micro breen. vugs l. sat w/ lam.
			V				7	
			V				7	NOTE: Beside Sh. Sh, are of interbed segment of Lst & Sh 15-20 angle, as cut is over 150'.
			F					W.S. - lt brnish gry, f.s. - v. lt brn Buddy - mass Pet, sed, which are probably stroms. Bottom 6" - sh, sed, lam, & crumbly. c, rest, when dissolved in ol.
			V					W.S. - lt brn, f.s. - yel brn Buddy - chky, silty (arg)

SHOW No. FORMATION

Sample Sec. 55

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY

NORTHWEST TERRITORIES

SECTION NO. 9 & 11 (Com

Scale: 1 inch = 10 feet

LOCATION: Section 11 - 5 Miles Pt. Sub.

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
		F S	V F			L	2	8	W.S. - lt Buddy - m sand vug
		C L	F			M	2	6	W.S = lt Buddy - [illegible]
		F L	F			D	2	7	W.S = m lmst fos
		C	V F			C	1-2	5	Ck to c Buddy - chalky Ind lo Sandy c
			P			D	3	3	W.S. - Buddy - silty
									Sec. 9
			V F					7	W.S. - Buddy, Sdy,
		C				C	2	8	W.S. - Buddy,
		d				D	2		W.S. - Buddy,

3 of 3

1 of

2 of 2

Norris Sec. 55

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 9 & 11 (Composite Section)

Scale: 1 inch = 10 feet

LOCATION: Section 11 - 5 Plane Pt. Sec. (Sh Bearing 170.9 from Presqu'ile Pt.)
Skyline Bearing 28° 11E, 0.45°

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
1		Fos	Ve		L	2	8	W.s. - lt brn to buff, f.s. - Buddg - mass, Dest w/ some vug & mass v tky por.
2		C_1	e		R^n	2	6	W.s. - lt brn to buff, f.s. - lt grish-brn Buddg - mainly mass (often thn 8") Grey, vugs to places o, residue,
3		Fos C_1	e		D	2	7	W.s - red brn, f.s. - lt brn, Buddg - thn, thr beds in places, but vgr.
4		C_x	C	½	C	1-2	5	Ck to v. f. gr W.s. - lt red brn, f.g. - lt to m. brn. Buddg - mgbl (½" to 1'), fnes, brits. carbn.stks. Fal in places ? Brach frag.
5			P		D	3	3	W.s. - grnish brn f.s - v. lt brn to buff Buddg - thk to mass, Unkn, slt stand grn.
6								W.s. - blk, f.s. - grey, fine sno, & crumbly, cold
7								W.s - grnish brn, rrr. - m. brn Buddg - mass, sm. bss unit's
								Sec. 9 - Section at Fire Tower.
1		Fos	Ve				7	W.s. - lt red brn, f.s. - lt brn, Buddg - thn (2" to 2') Grey, vugs. No fons. spps.
2		C_x						W.s. - red brn, f.s. - lt brn, Buddg - thn 2½"), ylty brit. thly lam. Ck to v. f. gr. Calcs slty
3		C			C_1	2	8	W.s. - grnish brn, f.s. - lt brn, Buddg - thn (6") - Mrst, fnes, thly, sdy lam. poss. some BI
4		C_x						W.s. - red brn, f.s. - lt brn; Buddg - thn (1/8"-2"), Irreg. bdd, minor beds. lam. carbon, slty laticed.
5		C_x						W.s. - lt brnish grj f.s. - lt brn, Buddg - mass. frag, org. Pkgs every 2" or so,
6		C_x						W.s. - lt yel brn, f.s. - lt brn, Buddg - m. org pkgs, frags.
7		C_x	d		o	2		W.s. - grr brn, f.s. - v. lt brn, Buddg - mass, Smoth rfrm, sl brecc, no fons.
8		C_x						W.s. - lt grnish brn, f.s. - m. brn, sl. brecc, Small Ck frags. Buddg - m. (½" to 2") irreg. Remks. poorly preserved, chits sev.

Norris Sec. 39

MOBIL OIL

NORTH WEST AREA

NORTHWEST

SECT

Scale: 1 inch = 10 feet

LOCATION:

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE
	C_x	O	
	C_x	O	
	C_x	?	
	C_x	O	
	C_x	O	
	C_x	?	
	C_x	O	
	C_x		

Norris Sec. 40

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 13

Scale: 1 inch = 10 feet

LOCATION: Mission Is., Round Is, Loutit Is, Leroux Is, Laity Is, Burnt Is, group

SAMPLE	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
9			V			D	10	8	W.S. - m. gry f.s. - lt g. brn, smoo. vugs lined w/ Ch. pet.-ol. Covered interval between Beaulieu Is. and S.W. Is. of Burnt Is. group is questionable
8		Pyr	V						W.S. - grysih brn, f.s. - lt brn, Bedg - irreg Ch. massep. Some moulds filled w/ blt. w. brit and ml. Some thn intbeds of carb. blk dolo sh. o/c on S.W. shore of Burnt Is.
7			V			D	10	9	W.S. - lt gry brn, f.s. - lt brn, vuggy, pet. o/c on Laity Is, middle Is. of Burnt Is. group Covered Interval between Laity Is. & Leroux Is. of Burnt Is. group
6		Cx	V						W.S. - gry brn, f.s. - lt to m. brn, Bedg - thk? grad to sacc., sl pet. Covered interval is questionable, assuming a regional S.W. dip of 13 feet/mi, covered interval is 35 to 40' ? Between Leroux and Loutit Is.

FINE GRAINED DOLOMITIC MEMBER

1

DOLOMITE MEMBER

5

W.S. - yell brn. f.s. - lt grylsh brn.

4 — C 3 2

W.S. - lt yel brn. f.s. - lt to m. brn. Bedding (½" to 6") c/c on N. side of Round Is.

3 — D 2 9

W.S. - gryish brn. f.s. - m. brn. Bedg - thk (6" to 1') carb ptchs S. side of Round Is.

2

W.S. - lt gry f.s. - v. lt brn. vugs filled w/ crse xls of Cn. Cx to v. f. gr.

1 — F

W.S. - brnish yell. f.s. - lt brn. Bedg - mass, irreg.; crse gr. massive, & wh. dolo vns. shly, blt bed. Cx to v. f. gr.

Service Jan. 68

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 15

Scale: 1 inch = 10 feet

LOCATION: East of Imperial Landing - for approx. 0.7 mi.

FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
					D	Z	Z	W.S. - lt brnish gry, f.s. - lt brn Bedg - thn to m (2" to 6") W.S. - dk gry to blk, f.s. - lt to m. brn, crin, dolomitized W.S. - lt gry, f...s - lt brn, bedg-mass, irreg, frac brit Crin dole. W.S. - lt yel brn, f.s. - lt to m. brn, Bedg - m (2" to 6") W.S. - m. gry to blk, f.s. - dk brnish blk, Bedg - m (6") frac, irreg chg. o/c orbly, & calc fosse, appear calcited, bit.
							Z	W.S. - lt greyish brn, f.s. - lt to m. brn Bedg - mass frac, blk Ck to v.thn W.S. - lt to dk gryi f.s. - dk brn, Bedg - thn flss W.S. - lt brnish gry, f.s. - lt brn; Bedg - m, to thk frac W.S. - lt brnish yel, f.s. - m. brn; Bedg - m to thk (6"), a cog. comb shly ptings.
10 11								W.S lt gry brn, v.s. - lt brn, Bedg, mass (6") o/c frac F. brit crin, dole W.S. - brnish gry, f.s. - m. brn, Bedg - m. thk (6"), silty
12								W.S. - greyish brn, lt to m. brn: - Bedg - m (4" to 6"), a coquina
13								W.S. - m greyish-brn, f.s. - m. brn, Bedg - thn - m (3" to 6") most of o/c under water & no detailed collections could be made.

BITUMEN SHALE & LIMESTONE MEMBER

Norvic Sec. 54

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 16

Scale: 1 inch = 10 feet

LOCATION: East of Bryant Pt. West Bank of Buffalo R. (5.5 mi upstream from south) East Bank (9.0 air miles) upstream, East Bank (10.° airmiles upstream) East Bank (11.° airmiles upstream)

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE (1/8 MM, 1/4 MM, 1/2 MM)	R	S	F/F	DESCRIPTION
11									W.S. - m. gry. f.s. - m. to dk gry. Bedg - irreg (1½" to 4") cgl w/ p up deriual from unit 10
10		Di		e					W.S. - lt-brn to rusty f.s. - lt brn. Bedg - s (2" to 6"), irreg. Appears frag w/ dolo. infill
9		Cx F							W.S. - m. gry. f.s. - lt brn s. - brn. Bedg - mass, intbd w/ grylsh brn. f.s. grns. Ls w/ blk cart. strks (bed 4-5" thk) S/C frac, brit
8		Cx				D	2	2-3?	W.S. - m. grylsh brn. f.s. - lt brn. Bedg - mass. Foss frags are dolo.
7									W.S. - v. lt brn. f.s. - lt brn. Bedg - mass, intbd. at cont.
6		Cx .O. Pyr.		e v					W.S. - lt brnish gry. f.s. - v. lt brn. Bedg - mass, frac, brit wh dolo fosc, could be amphipora
5		Cx							W.S. - m. gry. f.s. - dk brnish blk, s. Ls mod, lam, brit Bedg - thn
4									W.S. - lt brnish gry. f.s. - dk gry (mottled), Bedg - irreg (m. to mass bd) mod appear dsn to strons, pet w/ wh. cn pieks. sly?
3		F M B b?		P e					
2		Cx				D	4	6	W.S. - lt grylsh brn. f.s. - lt brn. Bedg - thk to mass. (6+) s/c frac. infilled w/ wh xln Ca, frac up to 5" wl. Appears to be Cx Ls which is cemented w/ wh. dolo. Almost a micro breco.

SLAVE POINT FORMATION

1 of

6
5
4
3
2
1

Cx
Cx
Cx
Cx
Cx

.O.
Pyr.

F
M
B
bj

e
v

P
e

D 4 6

D 4

W.S. - v. lt brn. f.s. - lt brn, Bedd - mass, sbd. at cont.

W.S. - lt brnish gry. f.s. - v. lt brn: Bedd - mass, frag, brit wh dolo fgms, could be amphipora

W.S. - m. gry. f.s. - dk brnish blk, s. Ls nod, lam, blt Bedd - thn

W.S. - lt brnish gry. f.s. - dk gry (mottled), Bedd - irreg (m. to mass ⊙) nod, appears due to strom. pot w/ wh. cn ptchs. alg?

W.S. - lt grnish brn, f.s. - lt brn. Bedd - thk to mass. (6'+) c/c frag. infilled w/ wh xln Ca, frag up to 4" wl. Appears to be Cx. Ls which is cemented w/ wh. dolo. Almost a micro breco.

Mod westerly o/c of Slave Pt. Formation on south shore of C.S.L. before reaching Beaverhill R. Formation
f.s. - lt grnish brn. w.s. - lt to m. brn, Bedd - m (2" to 6"). Appears that specimen is fragments w/ wh dolo m xx. fossil frag. poorly preserved.

SLAVE POINT NO RE-ENTRY

2 OF 2

Norris Sec. 45

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 17

Scale: 1 inch = 10 feet

LOCATION: From - 11 mi. S of Dawson Ldg. on Road, TD- 1.6 Mi. S. Dawson Ldg. Sec. -

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE (1/8 MM, 1/4 MM, 1/2 MM, 2 MM)	R	S	F/F	DESCRIPTION
									Covered to top of Interval
13									W.S. - v. lt brn, f.s. - m, to dk brn, Beddg - thn, brit, lam. sparsely foss. probably a calc. siltst,
12									W.S. - v. lt brn, f.s. - m, brn, Beddg - rubbly, lam (2.2 mi. from D.L.
11									W.S. - lt grnish brn, f.s. - lt to m. brn, Cx to v. fgr.
10									Beddg - m (2" to 6")
									W.S. - lt grnish brn, f.s. - dk brn, Beddg - thn to m (2"), brit
9									W.S. - lt brnish gry, f.s. - dk brnish blk, Beddg - thn lam.
8									W.S. - lt brnish gry, f.s. - m. brn, Beddg - m (2+") OT
7									W.S. - lt brnish gry, f.s. - m. to dk brn, Beddg - thn plty, brit
6									W.S. - lt gry, brn, f.s. - brnish blk, Beddg - 2", lam, Cx to v. fgr.
5									W.S. - lt grnish brn, f.s. - dk brnish gry, sa;
4									Beddg - m. (2"+), brit, strike - 38°, Dip 2° SE
									W.S. - lt brnish gry, m to dk brn, Beddg - thn, plty, Cx to slty
3									W.S. - lt to m. gry, f.s. - m. to dk brn; Beddg-m lam
2									W.S. - dk brn, f.s. - dk brn, Beddg-thn(¼"-2") thn dolo beds
1									W.S. - v. lt gry, f.s. - m, brn, Beddg - m (4"-6")) lam 1.2 mi from Dawson Ldg.
									Covered interval to beds exposed at Dawson LDG. 95'

BROWN IS. MEMBER Pine Pt. Fm.

Harris Sec. 44

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 18

Scale: 1 inch = 10 feet

LOCATION: From Pine Pt. West along Lake Shore for a distance of 2.5 miles.
Pine Pt. West Sec.

SAMPLE	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
10			F							W.S. - v. lt gry. f.s. - m. brn; Beddg - thn to m ($\frac{1}{2}$" to 2") Chondroid foss.
9			F							W.S. - lt brnish gry. f.s. - dk brn to blk, Beddg - thn $\frac{1}{2}$"
8			F							W.S. - v. lt gryish wh. f.s. - dk brn, Beddg - thn irreg ($\frac{1}{2}$" to $\frac{1}{2}$") Lam, Brit, Pel. oln
7			F							W.S. - lt gryish wh. f.s. - dk brnish blk, Beddg - thn, plty ($\frac{1}{2}$" to $\frac{1}{2}$"), Nod of brnish - blk cx ls.
6			F							W.S. - v. lt gry. f.s. - dk brnish blk, Beddg - thn, plty. irreg. ($\frac{1}{2}$" to $\frac{1}{2}$"). Nod. 6-8" of cx ls.
5			F							W.S. - v. lt gry. f.s. - dk brnish blk, Beddg - thk (>6"). potiod
4		Cx	F, b, d							W.S. - lt gryish wh. f.s. - m. gryish brn, Beddg - thn to m. ($\frac{1}{2}$" to 2") plty. Pipe irreg. lam. Nod. 6" + some thn cx brit, cossh ls beds (2" $\frac{+}{-}$").
3			F							W.S. - v. lt gry. f.s. - dk brnish blk Beddg. thk (6" to 8")
2			c F							W.S. - v. lt gry. f.s. - dk brn, Beddg. - thn, plty ($\frac{1}{2}$")
1		Cx	b							W.S. - lt gryish - wh. f.s. - m brn; Beddg - m (4"), Brit foss. cossh, blt. potiod. o/c immed. west of Pine Pt.

Norris Sec. 58

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 19

Scale: 1 inch = 10 feet

LOCATION: On east flank of Horn Plateau, 72.° mi. SW (227o) from Fort Rae

Horn Plateau Section

SAMPLE NO.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE 1/8 mm	GRN SIZE 1/4 mm	GRN SIZE 1/2 mm	GRN SIZE 2 mm	R	S	F/F	DESCRIPTION
5			F c		g					C	2	5?	W.S. - lt to m gry f.s. - v. lt bnish
4			F		g c					C	1	9	W.S. - m. gry, f.s. - mottled wh & v. lt brn, Beddg - gubbly
3			F c		g					D	2	8	W.S. - lt grnish brn f.s. - m. gry, Beddg - thn, ply similar to stn 4. Very foss, bioclastic
2			F,St,		g					C	3?	6	W.S. - lt to m gry f.s. - lt brn, Cx to ngr, Beddg - mass, crse x'stall Cx & Lc cemented in a mtx of f. gr mat.
1			F,c										W.S. - mottled gry brn, f.s. - lt brn w/ wh, Beddg - mass, some pseudo beddg, near top of unit due to wthring. Cubed xls if wh. on s/c very crumbly

HORN PLATEAU FORMATION

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 20

Scale: 1 inch = 10 feet

LOCATION:

N.W. Sulphur Bay - 0.5 mi. ENE of N shore of Sulphur Bay

SAMPLE NO.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
14							C	2	8	W.S. - m. brn, f.s. - lt brn. Bedd - thn to thk (½" to 6") ; o/c partially covered smoo, tex.
13					g		C	3	7	W.S. - m. grnish - brn, f.s. m. brn, Bedd - thn (¼"), flat, ply. lam, partially covered
12			F, Pyr				C	3	7	W.S. - lt to m. gry. f.s. - v. lt brn. bedd - m. to thk (6" to 8") o/c rubbly, true bedd not appar. ool in places.
11							C	3	8	f.s. lt gry, f.s. - lt brn. bedd - thk (8", irreg ½" in places, pr(., coarse. fmac.
10							R	C	9	W.S. - lt brnish gry. f.s. - lt brn, gran to smoo, bedd - m (8")
9			d		g v		R	C	9	W.S. - m. gry to brnish gry. f.s. - v. lt brn, bedd - smoo.
8			c		v		R	C	8	W.S. - m. gry to brnish gry. f.s. - v. lt brn. bedd - smoo, vugs - up to 1" w/ wh rubol xln dolo & cm.
7			d		v		R	7	8	W.S. - lt brnish orng. f.s. - v. lt brn to wh. bedd - smoo (up to 2") Vugs - irreg lined w/ clear cubed. xln of dolo. smr sld xls ; vugs smaller, av as ¼ to ½".
			d		v g		R	7	7	W.S. f.s. - sm.
6			d		v g		R	C	6.5	W.S. - m. gry to lt brnish orng. f.s. - v. lt brnish wh. Bedd - massj vugs-sml (¼" to 1"), o. stn Gr. ss var. along strike
5			d		v		R	C	7.5	W.S. - brnish orng. f.s. - lt brn; Bedd-massj vugs - (¼" to 1"), bugs lined w/ wh. dolo xls. o. stn.
4			d		v		R	C	6.5	W.S. - lt brnish orng f.s. - lt brn. Bedd - mass fmac. Vugs - lined w/ cubed, dolo. xls Vugs - ¼" to 2", irreg. fmac. lined w/ wh. dolo.
3			d		v		R	7	8	W.S. - lt. brnish orng. f.s. - lt grnish brn. Bedd - irreg, mass, some weathered bedd. ¼" to 1". fmac.
2			Cx		v		R	7	6	W.S. - m. grnish brn, f.s. - m. brn; Bedd - irreg thn wkrnl pods ½" to 2" fmac. Vugs - development sporadic along strike
1			Cx F				R	5	5	W.S. - lt brnish orng; f.s. - m. brn, f. gr to cr. Bedd - thk to mass, bedd caused by stking 2" to 6" thk. vugs - lined w/ cubed wh xls of dolo. (1" to 2")

2 OF 2

Norris Sec. 50

Probably not exactly Norris section

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 21

Scale: 1 inch = 10 feet

LOCATION: 1.2 mi N of NE End of Sulphur Bay

SAMPLE	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
7				½			R	C	7	W.S. - v. lt brnish wh, f.s. - v. lt brn Bedlg - mass vugs - small ($\frac{1}{4}$")
6		Cx		v						W.S. - lt brnish orng, f.s. - v. lt brnish orng. Bedlg - mass c/s frac & brit vugs - $\frac{1}{2}$" lined w/ wh, euhed, dolo. xls, tr. of Cn.
				½						sm, possibly crser grained
5			C	½			R	C	8	W.S. - lt brnish wh, f.s. - v. lt brnish wh. Bedlg - mass vugs - $\frac{1}{8}$" - $\frac{3}{16}$", vugs lined w/ wh Cn. xls and dolo.
				½			R	C	9	sm.
4				v			C	3	7	W.S. - lt grnish orng, f.s. - v lt brn to wh. Bedlg - mass, irreg. euhed wh dolo. & Cn xls. vugs $\frac{1}{8}$" to $\frac{1}{2}$"
3				3			C	2	8	W.S. - lt brnish orng, f.s. - lt brn Bedlg - mass, wh masses of dolo. c. cln.
2			F				C	3.5	6.5	W.S. - lt brnish org f.s. - m. brnish gry. Bedlg - irreg to thk (6") vugs - to $\frac{1}{2}$" caused by weathered out euhdls. Wh xls of dolo., tr. Cn
1							C	4	6	W.S. - lt orng brn, f.s. - lt brn. Bedlg - m to thk. (6" to 1') vugs - ($\frac{1}{8}$" to 1")
										6.5' ± to U. Le Mbr. of Pine Point Formation

Norris Sec. 48

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 22

Scale: 1 inch = 10 feet

LOCATION: Approx. 1.0 mi. North of the Middle of Sulphur Bay

	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE	R	S	F/F	DESCRIPTION
9			F	v			C	1	9	W.S. - lt brnish crng. f.s. - lt brn. Bedds - m. to thk vugs. 2-5%.
8			F	v			C D	3	7	W.S. - m. gry, f.s. - v. lt brn & wh. Bedds - mass. vugs - 2%. ¼" to ½" in size. O/C frac.
7				v g			C D	3.5	6.5	W.S. - v. lt brnish crng., f.s. - v. lt brn. Bedds - mass Vugs - 2%+ ¼ to 1" in size lined w/ calcd. wh. dolo xls. Some c. gr. intervals or ptchs.
6			F	v			C D	2	8	W.S. - brnish crng, f.s. - v. lt brn, Bedds -thk to mass. gran. to sacc. Vugs - lined w/ c. calcd. xls of dolo., ¼ to 3/4", some vugs due to weathering out of corals. odd vug c. stn.
5				v			C D	3	7	W.S. - lt brnish gry, f.s. - lt to m. brn. Bedds - mass to thk (8"). Slightly gran. to sacc. Foss frag. Vugs - 5%, (¼" to ½"), vugs lined w/ c. dolo. xls.
4				v			C D	2	8	W.S. - lt to m. brn, f.s. - m. brn, Bedds - m to thk (2" to 6") granular Vuggy - vugs lined w/ wh. dolo (½ to 1")
3		Cx		v			C D	2		W.S. - m. brnish gry, f.s. - m. brn. Bedds - m (1" to 4"), more thinly bedd at the top wh. dolo ptchs and frac. filled w/ wh dolo vugs (stn 10%), ¼" to ½" in size ex to v. f. gr.
2		Cx		g			C	2		W.S. - m grylsh brn to lt brnish arng. f.s. - lt to m. brn Bedds - m. irreg. (2" to 3") Frac. conch, Brit
1				v			C	1		W.S. - m. grylsh brn, f.s. - m. brn, Bedds - mass (1+) O/C Brit, frac. Porosity - tt.

Covered interval to base of Presqu'ile Formation

PRESQU'ILE FORMATION

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. Z 25

Scale: 1 inch = 10 feet

LOCATION: On Base E: 45 mi (Bearing 2830 T) From Bell Rock

Strike/Dip = 350° / 5° W

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE 1/16 mm	1/4 mm	1/2 mm	2 mm	R	S	F/F	DESCRIPTION
		?										COVERED INTERVAL TO TOP OF FORMATION QUESTIONABLE? AND THEREFORE, WAS NOT DETERMINED
10		Cx		V					D?	C		w.s. - lt brnish gry, f.s. - v. lt. yel. brn. Bddg- thn to m (¼" to 1"), Shlt, hard, clinky, top of escarp.
9												Gypsum - w.s. - lt brnish wh; f.s. - wh Bddg - m (2" to 4" irreg, frac), crumbly Lam - irreg (¼" to 1"). Gypsum xls - Dk gry, up to ½"
8		Cx							D?	C?		w.s. - lt grnish brn; f.s. - vf. lt brn. Bddg - m (2-4"), lam (1/8-¼"), lam. dk & lt, v.f.), wh.dol. ptchs
7												w.s. - v.lt brn to wh, f.s. - wh, Bddg - thn to m (¼" to 2"); Gypsum xls dk gry.
6				V					D?	C		w.s. - lt brnish gry, f.s. - lt brn, Cx to v.f gr., sacc to gran, Bddg - m to thk (2" to 6") Vugs - small (< 1/16")
5 to 3												w.s. - v. lt gry to wh. f.s. - v. lt yel. wh Bddg - thn to m (¼" to 2"), irreg. Frac, mass in places Minr sh.ptgs (¼" thk)
2												Gypsum & Interbedd sh. - Gypsum: w.s. - lt brnish gry. f.s. - v. lt yel wh, Bddg - thn, v.f. lam. sh. w.s. - brnish yel to rusty, f.s. - lt to m. brn Bddg - v. thn, sl. fiss., Non-calc.
1												w.s. - lt, grnish wh w/brn stain; f.s. - v. lt yel. wh. Bddg - thn to m, irreg. Some mnr v. thn lam. Dk gry gypsum xls quite prominent. MFN at base of escarpment

MISSING FORMATION

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 26

Scale: 1 inch = 10 feet

LOCATION: Along Winter Rd new Rd, Sans R. in general vicinity of the Klewi & Sans Rivers

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE 1/8 mm	GRN SIZE 1/4 mm	GRN SIZE 1/2 mm	GRN SIZE 2 mm	R	S	F/F	DESCRIPTION
												* NB Sample No's not in order due to randomness of e/c section has however been ploted in supposed stratigraphic order.
15				e								Gypsum W.S. - lt yel, brnish wh. Le - grvish wh. Bedg - thn, irreg (1/8" to ¼")
		?										
14				v					C	2		W.S. - lt brn, f.s. - v. lt grvish brn v. f. gr. Bedg - thk to mass (thn lam), Saco, gr. m.
												Dole rubble, mainly covered
												No sample
13			P/g						C	2		W.S. - lt brn, f.s. - v. lt brnish gry, Bedg mass thk in places gn at star lk Saco, gran.
12												Gypsum & intbedd sh : W.S. - v. lt brnish wh & dk brn, f.s. - v. lt brn, Bedg - thn (< 1/8", fiss) v. f. lam, shly pkgs. Quite dns, comp.
11			g						C	3?		W.S. - lt brn & wh f.s. - wh. Bedg - thn (¼" to 1"), f. lam Frac, & v. crumbly sugary, Saco.
10		Cx										W.S. - lt brnish gry, f.s. - v. lt brn, Bedg - thn to m (1" to 2"), irreg, brit, frac, sl. argill.
9												Gypsum - W.S. - lt brnish wh, f.s. - wh Bedg - thn, to m, (¼" to 4") thnly bedd towards the top. Saco. (gran) tex
8		Cx							C	2		W.S. - lt brnish gry f.s. - v. lt brn, Bedg - thn to m (¼" to 1"), f. lam, thner bedd at top.
												Calculated covered interval between stn 8 & stn 5 is 42', assuming SW dip of 13 ft/mi

MYRNELLING FORMATION

1 of

Beddg - thk to mass (thn lam), Smco, gran.

Dole rubble, mainly covered

No sample

W.S. - lt brn, f.s. - v. lt brnish gry,
Beddg mass thk in places
gn at star lb
Smco, gran.

Gypsum & intbedd sh : W.S. - v. lt brnish wh &
dk brn, f.s. - v. lt brn, Beddg - thn (< 1/8", flas)
v. f. lam, shly ptgs.
Quite dns, comp.

W.S. - lt brn & wh f.s. - wh.
Beddg - thn ($\frac{1}{2}$" to 1"), f. lam
Frac, & v. crumbly
sugary, smco.

W.S. - lt brnish gry, f.s. - v. lt brn, Beddg - thn to m.
(1" to 2"), irreg, brit, frac, sl. argill.

Gypsum - W.S. - lt brnish wh f.s. - wh
Beddg - thn, to m, ($\frac{1}{2}$" to 4") thnly
bedd towards the top.
Smco. (gran) tex

W.S. - lt brnish gry f.s. - v. lt brn.
Beddg - thn to m ($\frac{1}{2}$" to 1"), f. lam,
thner bedd at top.

Calculated covered interval
between stn 8 & stn 5 is
42', assuming SW dip of 13 ft/mi

W.S. - wh. f.s. - v. lt brnish wh.
Beddg - thn, nlty, sl. lam
s/c rubbly, frac. strike/Sip = 82°/6° S/SE
Lms, comp.

Gypsum & sh. W.S. - dirty grnish gry, f.s. - wh. & dk grn mottled.

Covered 10'. Assuming Regional Dip
of 1j'/mi.

W.S. - lt gryish wh, f.s. - lt brnish gry w/ wh.
masses & vns of wh Ch. Beddg - v. f. dk lam, thn
to m. ($\frac{1}{4}$" to 2"). xls of dk gypsum (1/8" to $\frac{1}{4}$") Str/Dip = 300/2° NE

* Norris calculated A 42' covered, it
seems that approx. 10' is more reasonable ?

W.S. - v. lt brnish wh, f.s. - lt brn
Beddg - M. to thk, wk lam,
brit, Quite impure could be domomitic.
W.S. - lt gryish brn, f.s. - brnish gry, Bedd - into thkl, lam
W.S. - lt gryish brn, f.s. - v. lt brnish wh Beddg - mass
W.S. - lt brnish gry, f.s. - lt brnish gry, Beddg - mass, w/
fine dk lam.

BRADLEING FORMATION

2 OF 2

Norris Sec. 38

V-Zay Smith's Sec. M (Loc'n 102-107)

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 27 & 30 (Composite)

Scale: 1 inch = 10 feet

LOCATION: In a sinkhole Lake, 43 mi. W/SW (260° T) From Ft. Rae

SAMPLE NOS.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE (1/8 MM, 1/4 MM, 1/2 MM, 1 MM)	R	S	F/F	DESCRIPTION
3		Cx ~	M						1	W.S. - lt gryish brn, f.s. - m. brn, Bedg - m. to thk, shly laminae, Frac. comm
2		Cx ~								W.S. - lt grysih brn, W.S. - m. brn Bedg - irreg. nod thn to m (2" to 6") some w. beds of Ch Ls, approx. 4" thk. Shly ptgs. Petid ol.
1		Cx ~								W.S. - m. brnish gry, f.s. - m. brn, Bedg - thk (6" to 8 "), Irreg. Petid ol, Not too foss.
										Covered Interval From Vee Zay Smith's - Sec. M

Loosey Bay Formation

1

						Beginning of Sec of 30 - 25.° az. (250 ?) from N. Mbr
						Gypsum & intbedd sh -
						W.S. m. to dk gry & wh. f.s. - m. gry & wh.
						Bedds - irreg. thn lam. - lt & dk Beds & thk to almost mass. (1' to 2')
						Wh. gypsum occurs as wh. strgs & ptchs.
						Sh - (sep-calc) - W.S. - lt grnish gry f.s. - v. lt grnish gry; Bedds - thn w/ v. crl gyp. filled frac.
						W.S. - v. lt brnish wh; f.s. - wh; Bedds - mass, lam, dun & crmp.
						W.S. - v. lt brn & m. brn; f.s. - v. lt brnish wh.
						Bedds - irreg, thn due to wthrg ; Lam- v. irreg.
						W.S. - v. lt brn & m. brn, f.s. - v. lt . brnish wh. Lam Bedds - irreg, thn due to wthrg, occ. mass
						Strike/ Dip = 120o/1° to 3° SW
						W.S. - v. lt brnish gry, f.s. - m. brn Bedds - extremely var, rubbly & contorted Occ. m. bed & lam, mainly mass; frac. & breco. in places w/ frac. filled . w/ gy wh. 1 xls of Ca (up to 1") Hard to ascertain if all of unit is breco, but in lower portions of unit brecon. is evident.
					Ci	2	2	Ls - mar breco'n ss.

3 of 3

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 29

Scale: 1 inch = 10 feet

LOCATION: On Horn River some 5.5 to 6.0 mi. upstream from south of Ferguson Ck,

SAMPLE NO.	FOSSILS	LITHOLOGY	POROSITY AMT	POROSITY GRADE	GRN SIZE (1/8 mm, 1/4 mm, 1/2 mm, 2 mm)	R	S	F/F	DESCRIPTION
									Covered Interval to top of Formation = ? 50.0 ? (dot to scale)
1		Ck						2	W.S. = v. lt. grish brn, f.-s.; 2.5% brn. Bedg = irreg. calc. m. to thk (1/2" to 2") Some cmnly, v. brit; grades & picks of a. gr. v. biclastic ls.
2									W.S. = lt grylish brn to ruddy brn, f.-s.(1/16" to 1/8") gry. Bedg = thn, crumbly, irreg, thn (1/16" to 1/8") Slig dun f. fr. In places along river, shn bnd, large comby up to 1" diam. (avg. 6")
3									Sh. as:
4									Sh as:
5									Sh as:
									Covered Interval to Base of Horn River Formation = 170.0 ?

FORM 8M68 REVISED

Roughly Equiv. to Norris Sec. 23

MOBIL OIL CANADA, LTD.

NORTH WEST AREA FIELD PARTY NO. 48, 1967

NORTHWEST TERRITORIES

SECTION NO. 31

Scale: 1 inch = 10 feet

LOCATION: Southern area on shore of North Arm of Great Slave Lake 1.25 miles S.W. of midpoint of Baker Bay; N.W. shore of Baker Bay; and Cliff Sec. on Lake Shore approx. 2.0 miles N.W. of Town No.

SAMPLE NO.	FOSSILS	LITHOLOGY		POROSITY AMT	POROSITY GRADE	GRN SIZE 1/8 mm	GRN SIZE 1/4 mm	GRN SIZE 1/2 mm	GRN SIZE 2 mm	R	S	F/F	DESCRIPTION	
1		Cx		vip						C	λ	?	W.S. - lt grayish grn, f.s. - v lt brn, sl. sacc, vuggy (vugs, small 1/16") dol. altst, v. sacc (gran), but fit size. W.S. lt gryish brn, f.s. - lt brn. Bedg - m (avg. 1")	Chiachaga Fm
2				v/g						C	1			
3													Gypsum & intbedd grn sh W.S. - v. lt brn to wh, f.s. - wh Bedg - mass, v. crumbly & unconsolidated, but becomes sl. bedd towards the top. Quite sacc.	
4		Cx		v						D/Fe	8?		W.S. - dusky red, f. s. - m reddish brn Bedg - mass, crumbly, ptchs and inis of grnish gry & wh. gypsum	
													Mainly covered, but bits of reddish dolo, rubble, similar to unit 4 mainly across covered interval to base of escarpment.	
													Base of escarpment	
		?												
5		:		v/o?						C	2	B?	Escarpment at E side of Baker Bay. W.S. - dusky red, f.s. - m. red. either a sdy dol or a v. f. gr. sd ? Bedding irreg thn beds up to 3" rlk bas. lt grnish gry specs, could be argnite ? ?	
6		Cx										2	W.S. - dusky red, f.s. - lt brnish red, Bedding irreg. beds (½") o/o irreg. grylsh wh specs (arg ?)	
7												2	W.S. - lt brnish red w/ grnish gry blotchs, f.s. - v lt brnish red w/ sbl grnish gry specs. Bedg-mass, resist str & stringers of wh satin spar (gypsum), avg 1/8" Sh & satin spar intbedd, sh-beds up to 4" thk, (gypsum-sh, fibrous beds 1" to ½"	
8														
9				g								2	argill. dolo, gypsum & sh Dolo/ w.s.- lt rel. gray w/ occ. lt grn strgs. f.s.- m. rel. Beddgmass w/ closely spaced lam. which become more prominent at base of unit. Argill intvls w/ beds from 1/16" to ½" thk. Satin spar perpendicular to bedg. Thinly lam, flss & dusky red.	
10		T T											Dolo/sh = 90/10; grn-gry specs could be arg. ??	
11		Cx											W.S. - lt brnish red, f.s. - v. lt brnish red, Bedg - thn flss (¼"), w/ thn wh. gypsum lam Argillaceous dolo & gypsum Dolo-sh.:- lt grnish gry, f.s. - v. lt grnish gry. Bedgmass Gypsum (satin spar) - wh, & present as strgs and bds which cut across the bedg. outcrop to recess & chip	

1+