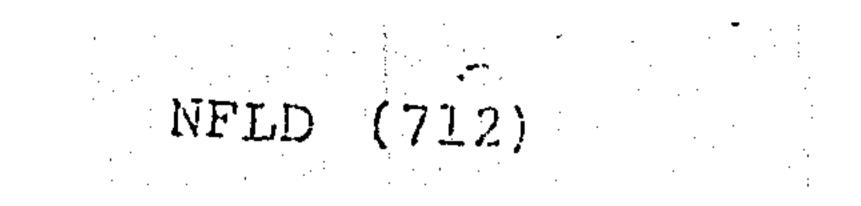


CORKIN, H. (1965)

A Hydrocarbon Evaluation of the Oil Concession in Western Newfoundland; Unpub. report BRINEX G65007





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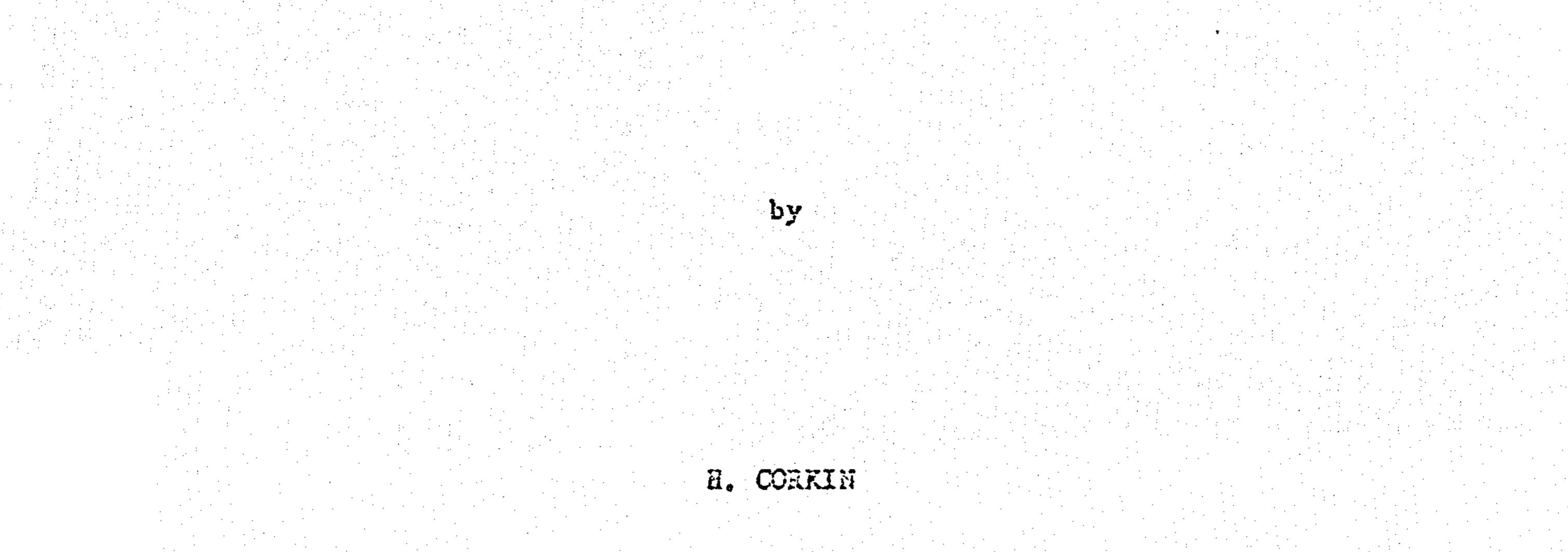
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A NYDROCARBON EVALUATION OF THE OIL CONCESSION

IN WESTERN NEWFOUNDLAND



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November 10, 1965

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RECONDENDATIONS AND CONCLUSIONS



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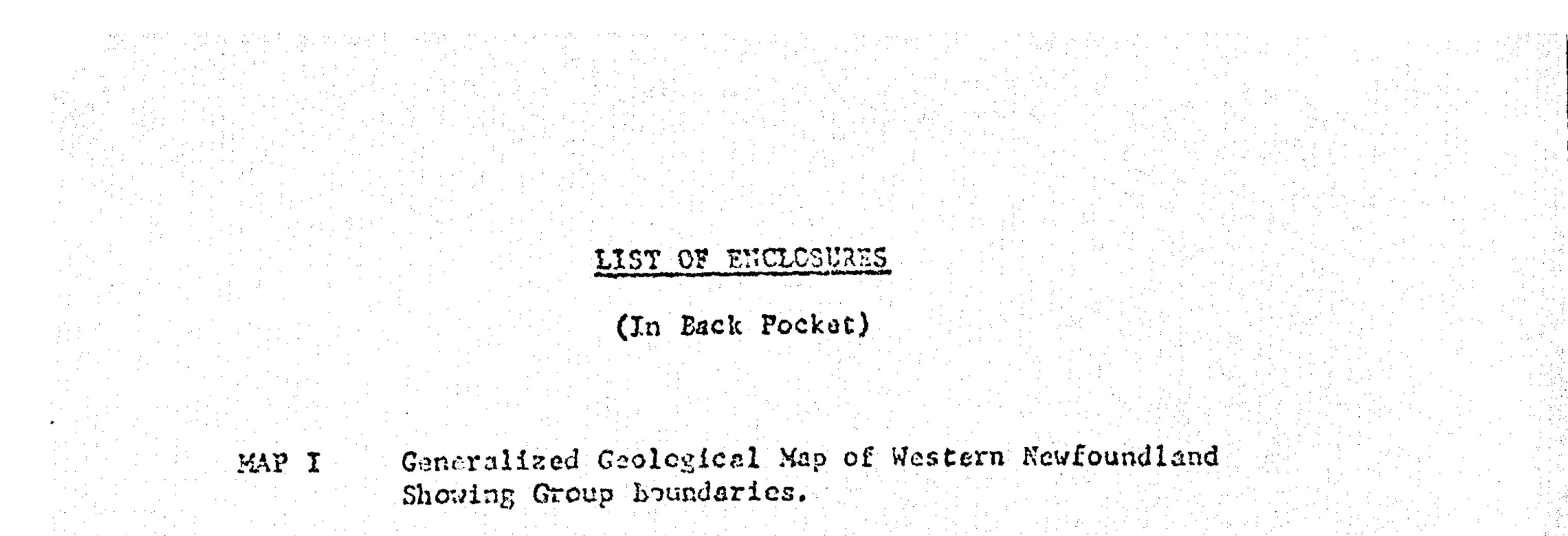
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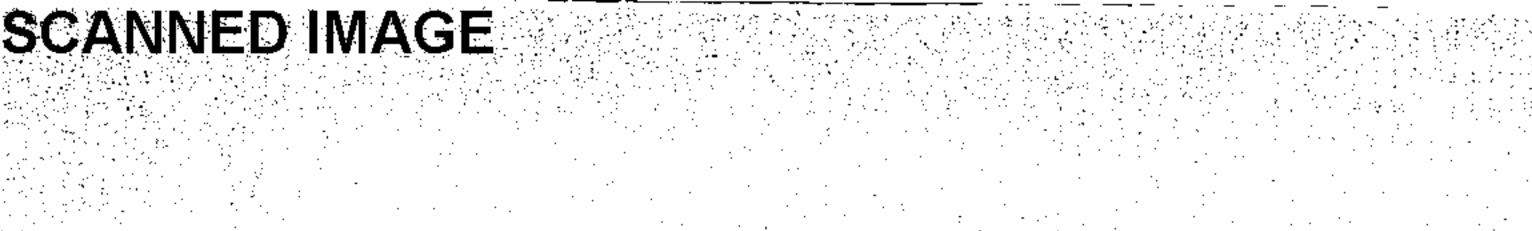
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Northern Palaeozoic Area



Western Newfoundland Showing the Oil Concession Boundary. Indicated are Areas with Hydrocarbon Potential and those regarded as not Prospective.

MAP II



A HYDROCAREON EVALUATION OF THE OIL CONCESSION

IN WESTERN NEWFOUNDLAND

INTRODUCTION

The purpose of this report is to serve as a guide in

delimiting creas within the oil concession in Western Newfound-

land regarded by the writer as unfavourable to the accumulation

of gas and oil and indicate areas where further exploration

could be carried out with the maximum expectance of encouragement.

A recommendation is made to relinguish certain areas on the

grounds that they have no economic hydrocarbon potential based

on present day geologic concepts. The following report, along with the accompanying maps presents the results of the writer's

brief survey of the area.

LOCATION

The precise area of study involved the "Brinex Oil

Concession," which includes the cediments of Western Newfoundland,

(see Map II). Waters of the Gulf of St. Lowrence delimit the

western extension of the observable strats, while to the east the

basin is terminated by crystalline rocks of the Long Range

Mountains.

GENERAL GEOLOGY

A marked unconformity separates the Precambrian from

the overlying sedimentary envelope which ranges in age from Lower Cambrian to Pennsylvanian. Miogeosynclinal limestones, dolomites,

- 2 -

shales, and candstones of Cambrian and Early and Hiddle Ordovician age underlie much of the westcoast north of the Port au Port Peningula. These are overlein by eugeosynclinal black shales.

conglomerates, limestones and volcanic rocks of Middle Ordovician

age. Hississippian and Pennsylvanian continental-type sandstones,

limestones, shales, gypsum, and coal occur south of the Port au

Port Peninsula. Foliated basic and acid intrusive rocks of Pre-Devonien ege make up the Esy of Islands Igneous Complex and

foliated granitic intrusive rocks of Precembrian age constitute

the Indian Head Intrusive Complex. The above two complexes have been intruded into the sedimentary column causing a marked

metastasis effect on the neighbouring rocks. Pre-Carboniferous

and Post-Ordovician acidic to basic intrusive and metamorphic rocks underlie the Long Eange Hountains, with Carboniferous rocks

being finited against this Range in the southern part of the

Concession. Ultrabasic and basic volcanic rocks are interbedded

with and cut upper Humber Arm strata (Middle Ordovician) north of Stephenville.

The structure of the entire area is complex, but the main structural trend is northeasterly as in other parts of

Newfoundland. The Long Range fault extends from the south coast

in a northeasterly direction to the north end of Grand Lake and

probably beyond that to White Bay on the north coast of Newfound-

- 3 -

land, (see Map I). A pronounced offset in the Long Range

Hountains occurs in the region of Lonne Bay. To the south of

Bonne Bay the crystalline rocks of Long Range and the sediments of the Combrian and Ordovician outerop well to the east of the

principal ultrabasic plutons. North of Bonne Boy these rocks are

offect to the northwest parallel to the extension of the Complex.

Due to the time factor it was not possible to investigate and

determine if this offsetting was due to a flexure or a transverse

fault resulting from the thrusting of the Long Range rocks to the

northwest. The trend of the dislocation however is parallel to

those of the major faults within the Complex. Widespread evidence

of minor and major faulting was observed along the entire fault

line scarp of Long Range, but the absence of key beds prevents

an estimate as to their magnitude.

RECOMMENDATIONS AND CONCLUSIONS

Following a short study of the sediments of Western

Newfoundland which is indicated on the two maps accompanying

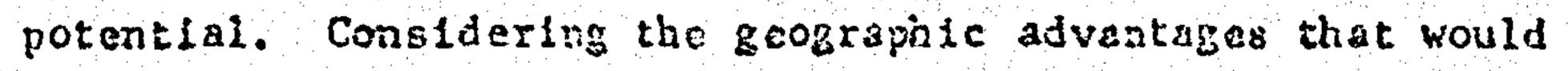
this report the following evaluation and recommendations are

put forward.

Reviewing the scattered field evidence presented at

this time it seems safe to assume that rocks in several of the

areas visited by the writer do have a definite petroleum



- 4 -

- apply to oil and gas reserves in this area the writer believes
- a concentrated effort be made on the areas recommended in this
- report to fully evaluate any possible potential.

Southern Carboniferous Area

(see Map II)

Much of this area has been covered by neromagnetic

and gravity surveys which has been subsequently re-interpreted

for Goldon Eagle by Huntee Limited (1964). The interpretation

of the magnetic data showed a phenomenal sedimentary thickness

which indicates the presence of Early Palaeczoic rocks below

the Carboniferous mantle. It is recommended that lands forming

the southern part of the Carboniferous depositional basin be

retained, (see Map II),

SCANNED IMAGE

St. George's Bay

(see Map II)

This area geologically has petroleum possibilities, but unfortunately the depths of water are beyond the capacity

of most existing offshore drilling equipment. The average

depth of water within the Bay ranges from 20 fathoms (120') to

72 fathoms (432') hence the drilling costs required for operating

in an area such as this would be astronomical. There appears

little justification in retaining this area and tying up explora-

- 5 -

tion money which could be spent profitably elsewhere on the

Westconst of Newfoundland.

Port au Port Peninsula

(see Map II)

Lack of severe faulting in the western half of the

A . . .

Peninsula indicates an area where favourable host and reservoir

conditions exist. The Goodyear Anticline, proved by the writer

to have closure, would be a favourable location for testing.

St. George's - Bonne Bay Inneous and Metamorphic Area

(see Map II)

The presence of much igneous material in this area is

most discouraging. The area in addition is badly faulted and metamorphosed. Ultrabasics and volcanics of the Bay of Islands

Igneous Complex, (Map I) of post-Carboniferous - pre-Ordovician

age have been intruded into the area and it is assumed that all

pre-Carboniferous sediments in their vicinity would be unfavour-

ably affected by these intrusions.

The petroleum possibilities of this area are regarded

as 1.11. The sedimentary, igneous and metamorphic rock types have

been variously deformed and in some measure are locally altered

by contact and hydrothermal metamorphism.

Deer Lake Oil Shales

- 6 -

(see Hap II)

Eituminous shales occur commonly in the vicinity of

Deer Lake and therefore are a potential source of petroleum

using a method of destructive distillation.

Drilling by Clayber Uranium and Oil Limited (1954-57)

reported gas under considerable pressure in diamond drill holes

in the area, which reportedly forced stoppage of drilling. This

gas suggests that accumulations of oil may occur at depth. It

is for these reasons that the writer considers the area warrants

further investigations.

Bonne Eay - Forcland Creek Area

(see Map II)

Numerous thrust faults within the area have mashed the

section and allowed the escape of reservoir pressures. Most of

the strata in the area are tilted at an acute angle often close

to vertical. Should an economical discovery be made, develop-

ment drilling would present a problem as geological interpreta-

tions are impossible to construe. No company would feel justified in spending exploration dollars in an area where every subsequent test would have to be regarded as a wildcat. Further work is not recommended and it is suggested that the area be relinquished

from the concession.

Northern Palaeczoic Arei

- 7. -

(see Map II)

The existence of brosd open folds, the development of

vuggy porosity in the upper 200 feat of the St. George's dolo-

mite and the presence of Cryptozoon reafal developzents in both

the Cambrian and Ordovician makes this area most interesting

from a petroleum aspoct. The petroliferous Green Point group

is not present in surface outcrop but possibly doss occur in

the subsurface.

area:

The following recommendations are used concerning this

(1) A study of dolomitization of the Table Head lima-

stone near faults to ascertain if porosity increases occur.

(2) Traverse the entire crea with particular attention

being given to reefal developments and porosity.

(3) A study of the Cambrian beds on Doctors Brook

inland from St. John Bay to ascertain if porosity is developed

to any extent. Particular attention should be given to oil

staining and reefoid structures. These points should aid in establishing if the Cambrian sediments have possible host and/or reservoir potentialities.

(4) An aerial magnetic survey of the area would estabilah

the thickness of the sedimentary column which is of the utmost

importance. In addition such a survey would outline basement

11100

highs upon which well developed reefs may occur.

DETAILED GEOLOGY OF THE VARIOUS AREAS

The petroleum possibilities and geology will be dis-

cussed, commancing from the southwest coast and will be continued

in a northerly direction along the Westcoast to the tip of the

- 8 -

Great Korthern Peninsula.

Southern Carboniferous Area

No attempt is made by the writer to alaborate on studies

of the Carboniferous sediments made by P. R. Cote (1961) and a similar paper by the above author and D. M. Baird (1963). The

reader is referred to these above works with which the present

writer is in general agreement. A few consents may aid however

in the appraisal of the Carboniferous sediments. Due to the terrestrial nature of the Pennsylvanian, Barachois group its only

importance from a petroleum aspect would be as an overlying cap rock. Similarly, the continental nature of the Mississippian, Anguille group whose sediments are poorly corted and often indurated makes the presence of source and reservoir beds extremely doubtful. The presence however of marine limestones within the

Codroy group enhances the chances for petroleum production in

comparison with other terrestrial derived deposits of the Carboni-

ferous. In evaluating the presence of source material and porosity,



one must consider the limestones within this group as being the

- 9 -

only beds within the series possessing both the. . factors.

Sediments belonging to the Carboniferous suite of formations

are predominantly terrestrial in nature. Marine faunas are at

a minimum and the possibility of preservation and rapid burial

during accumulation of this continental series of sandstones

are remote.

A re-interpretation of the available aeromagnetic and

gravity data covering Southwestern Newfoundland was carried out on behalf of Golden Eagle by Huntee Limited (1964). The con-

clusions derived from this study indicated the southern

(Carboniferous) sedimentary area, (see Map I) to contain an extremely thick sedimentary section, which is marred somewhat

in the northern portion only by a large shallow anorthosite

sheet. This intrusive varied in depth from zero to 2,500 feet

below the surface and extends a few miles inland from the mouth

of Robinsons River in the south to Flat Bay Brook in the north. Depth of basement to the south and within the intervening area between this feature and the western side of the Long Range fault, are considered to be in the order of 15,000 to 30,000 feet below surface. A sedimentary section of such magnitude must contain in addition to Carboniferous rocks a thick interval of Devonian, Silurian, Ordovician and Cambrian sediments. With such sedimentary thicknesses being indicated by the existing aero-



magnetic and gravity data it is strongly recommended that lands

- 10 -

forming part of the Carboniferous depositional basin be retained,

(see Map II).

St. George's Bay

This area geologically has petroleum possibilities, but

unfortunately the depths of water would make drilling costs

phenomenal. Reference to the Codroy Road to Bear Head, Hydrographic

chart number 4660 indicates the 10 fathom isobath (60') occurs

within a mile of the coastline. The majority of the Esy is in

excess of 20 fathoms (120'). With such great depths of water it

would be many years before drilling could be contemplated so at

the present time there seems very little justification for tying

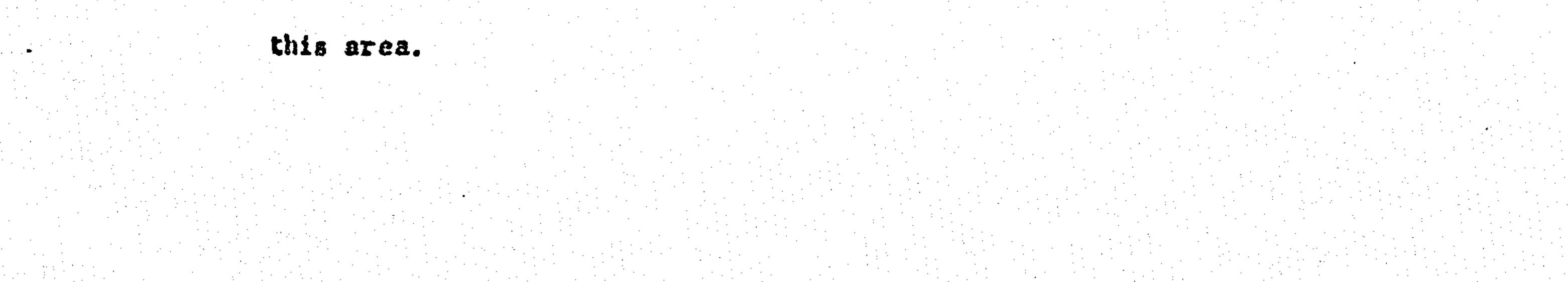
up exploration money which could be spent more profitably elsewhere

on the Westcoast of Newfoundland.

Port au Port Peninsula

The Fort au Port Peninsula is regarded by the writer as the prime area within the concession for petroleum possibilities. The geology and oil potential of this area was covered by the writer in a report dated March 1965. Oil seepages coupled with a lack of severe faulting in the western half of the Port au Port Peninsula indicates an area where favourable host and reservoir conditions exist. The Goodyear Anticline, proved by the writer

to have closure would be a favourable location for testing within





St. George's - Boone Ray Igneous and Metamorphic Area

- 11 -

A large sheet of anorthosite occurs along the west well

of the Long Range in the vicinity of St. George's, (see Map I).

The longer axis of the cass which excends in a north-south direc-

tion terminates at the edge of the escarpment in a ro-entrant

made by the St. Ceorge's River and continues couthward beyond

Flat Ray Brock to Fischells Ercok. The morthosite cheet shows

well developed foliations, and a constant strike not varying more

then 10° from the normal N. 30° E. direction.

Cambrian and Ordovician sedimentary and volcanic rocks

occupy a broad re-entrant in the crystalline rocks of the Long

Range between Port au Fort Peninsula and Ronne Eay, (see Hap I).

The Humber Arm group in this area includes clastics and volcanic rocks of middle to late Ordovician age whose occurrence on the

Westcoast of Newfoundland is mainly restricted to this area. The

sediments of this group constitute a typical eugeosynclinal

association, composed of clastic sedimentary rocks and basic

volcanic rocks that have been folded and cut by ultrabasic gabbroic, and dioritic intrusions. It appears that this immediate area has undergone several periods of folding, intrusion, faulting, uplift, and peneplanation, to constitute the most disturbed and distorted area on the westcoast.

During the course of this reconnaissance the crystalline

igneous and metamorphic rock found between Port au Port Peninsula

- 12 -

and Bonne Bay received but scant attention as the main purpose of

the investigation was to delineate areas unfavourable to the accumulation of hydrocarbons. Nevertheless, many opportunities

to observe them on traverses in search of contacts plus motivation

due to curlosity has made the writer familiar with the major rock

types. Information so gained is recorded here but the reader

should bear in mind that the limits of the various rock units aro

approximations, and locations referred to are without pretense

of exactness.

The Indian Head Range Intrusive Complex, situated northeast of the Port au Port Peninsula is a northerly trending ridge 18 miles long which is composed of a complex series of igneous

and metamorphic rocks of Precambrian sge, (see Map I). The

complex is isolated from the Long Range on the south and west by

a 12 mile wide basin filled with glacially derived sands and

gravels of Pleistocene age; to the north by Ordovicien rocks.

The Indian Head rocks lousist predominantly of enorthoaite,

granice, gneiss, granite pegnatite and doleritic basalt dykes

which constitute highly altered igneous rocks. The distribution

of basic rocks are concentrated in the southern part of the complex while the scidic variaties are common in the northern half of the

area.

Precambrian rocks form a basement complex upon which



lower Cambrian phyllites and gneisses rest unconformably at the

- 13 -

south end of Deer Lake and in the eastern section of the gorge

of the Lower Humber River. The rocks here are chiefly granitized meta-sediments or schists, cut by stringers of quartz and peg-

matites composed almost entirely of light-coloured orthoclass

and quartz. The greatest percentage of the mass is granitized.

An anticlinal structure plunging northeast with a strike close

to the regional trend (N. 30° E.) was noted in the vicinity of

South Brook and appears to be a major structural feature of some

importance. Lower Palacozoic sediments were detected to lie

against both flanks north of Deer Lake. In the castaru section of the gorge of the Lower Humber River in the vicinity of Corner

Brook the rocks of the St. George's group are progressively

altered to grey, pink, and variegated marbles. Here the strata

has lost much of the identity of the more typical St. George's

sequence because of the attendant metamorphism. East and north-

east of the southern half of the Bay of Islands Igneous Complex, the beds of the St. George's group as well as those that follow in succession are strongly deformed with vertical to overturned strata that form broken and croded folds east of two crumpled anticlines and synclines. The basal limestones of the easternmost anticling are exposed on the eastern flank of the promontory

at Linestone Station, (the site of an abandoned marble quarry).

The road from Deer Lake to Lociond passes through a gap



excavated into Cambrian rocks. On either side, crystalling rocks

- 14 -

form high bluffs and are by stratigraphic position Precambrian

in oge since Lower Cambrian addiments rest on them in normal

sedimentary contact. Immediately south of the highway at the

north end of Bonne Bay Pond, a hill composed of coarse-grained

pegmatitic granice outcrops. This granita is composed of ortho-

clase, quartz, and biotite with concentrations of rutile crystals.

The Eay of Islands Igneous Complex, portions of which

occur on both sides of the Bay of Islands, is a north-northeasterly

trending, discontinuous belt of layered ultrabasic and gabbroic

rocks, 60 miles long and up to 10 miles wide. The unit may be

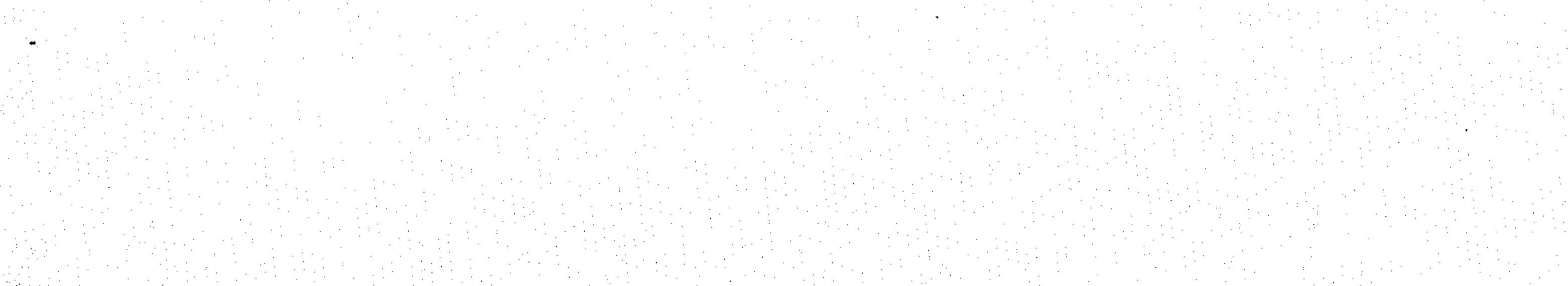
described in general terms as an uplifted, deeply dissected peneplane bound by steep slopes. The principal members of the

Complex, from south to north, are known as the Levis Hills, Blow

Me Down Mountain, North Arm Mountain and Table Mountain plutons,

(see Map I). Each has a thick basel ultrabasic zone consisting

mainly of dunite and peridotite which in turn is covered by banded and massive gabbroic rocks. The four above mentioned plutons have westerly dipping floors that are generally conformable with the underlying Ordovician sedimentary and volcanic rocks. These latter rocks are metamorphosed to amphibolite and hornfels near their contacts with the intrusive rocks. Northwesterly-trending tear faults cut the ultrabasic rocks in many places, notably in Blow Me Down Mountain, which is bound by them. Serpentine Valley





2

probably represents a wide transverse fault zone that has split

- 15 -

s once-continuous ultrabasic body into two separate units. The

North Arm Mountain pluton and the Table Mountain pluton found immediately to the north of the Bay of Islands appear to have

been a once-continuous mass now offset by the Trout River trans-

verse fault.

A striking feature within this immediate area is the

fact that most of the motamorphic rocks, (the writer was unable

to identify any that were not) appear to be members or formations belonging to the Number Arm group that were altered by the ultra-

basic and gabbroic rocks. The Humber Arm sediments located

between Corner Brook and Bonne Eay show ample evidence of moderate to high-grade thermal metamorphism and metasomatism related to

intrusion. In the Bonne Bay area retrograde effects produced by

mechanical deformation have almost obliterated the evidence of

thermal metamorphism. At the northern extremity of the Bay of

Islands Complex a pronounced offset in the Long Range crystalline

rocks is apparent, and has been referred to previously in this

report.

The presence of much ignoous material in this area is

most discoursging. Also, eugeosynchinal type sediments are common and as usually is the case with such material, reworking by

current ection to bring about sorting (and hence porosity) would

be minimal. Petroleum possibilities are regarded as nil.



It is the writer's recommendation that the area located

- 16 -

between St. George's, Bonne Bay, the coast-line and the Long Range Mountains be eliminated from the concession. The area covered by the oil shales, (discussed below) is considered to be

of interest and should be retained until a more detailed evaluation

is completed.

Deer Lake Oil Shales

(sea Map II)

Oil chales outcrop at surface in the Deer Lake Region. Deer Lake lies in the course of the Humber River which flows in a south-westerly direction through west central Newfoundland. The oil shales of Mississippian age are located mainly along the

northwest end of Deer Lake, and for a distance of approximately 18 miles in a northeasterly direction on both sides of the in-

flowing Upper Humber Arm River. Grey sandstones, siltstones,

shales, dark grey oily calcareous shales and medium grey limestones make up the Mississippian section. These beds in turn are over-

lain by thick arkosic sandstones and conglomarates of either uppermost Mississippian or Pennsylvanian age.

The oil shales are distinctive in appearance being a bright yellowish grey on the weathered surfaces and a dark grey or black on the fresh surface. The shales are typically thin

bedded, highly calcareous, and give a dark brown bituminous streak.

The structure of the area is extremely complicated so for economy

- 17 -

of space it is suffice to say that the area of the shales lie in

a trough of an asymmetrical syncline, the axis of which trends

generally northeastward.

In the Deer Lake region in the exposures examined by

the writer, no beds of oil shale greater than five feat thick

were observed. Most average about one and a half feet thick and no beds of high quality were seen. It is thought from the observations of the outcrops round Deer Lake and the Upper Humber Valley that no beds of oil shale of sufficient thickness or richness for exploitation occur in this area. From surface indications it would appear that commercial deposits do not occur in the area, but a possibility of increased oil content may exist at depth.

Recent drilling by Claybar Uranium and Oil Limited (1954-57)

reported gas under considerable preasure in diamond drill holes

in the area. Gas was also reported in some of the original holes drilled in the district. Thus the basin, although relatively small in area contains several beds of oil shale which are a potential source of petroleum, using a method of destructive distillation. The pockets of gas encountered during drilling suggest that accumulations of oil may also occur at depth. It is for these reasons that the writer considers the area warrants further investigations. The oil shales are confined to the



northwest end of Deer Lake and extend in a northeasterly direction

- 18 -

along the Upper Humber River for 18 miles; an east-west limit of

10 miles either side of the Upper Humber River would encompass the area of interest, (see Hap II).

Ronne Bay - Fortland Creek Area

North of the Lomond Road at Bonne Bay Pond, the southern

and of the Plateau rises in sheer cliffs from the Palaeozoic

lowland. These hills represent the south end of the Long Range

Plateau of the Great Northern Peninsula.

The prominent ridge east of the thick lower Cambrian section of sedimentary rocks that lines the shore of East and Deer Arms of Honne Bay is assumed to be composed of grey coloured

gneiss. The rocks appear light on the weathered surface, but

freshly broken faces are dark grey and resemble the grey blotite-

hornblende gneisses found farther east. In this area the rocks

are shattered and it is likely that the nearby valley of the brook

is entrenched along the locus of a fault zone striking east and

west. North of Gros Morne (2651'), a great transverse fault, the Bakers Brook Fault, has offset the escarpment for more than a mile

to the west; a glacial trough with towering walls, 2,000 feet high is excavated in the zone of weakness along an east-west line.

Coarse-grained, reddish, biotite granite, only moderately gneissic in structure, is exposed in the north wall. Granite appears to be



the sole rock type present in the face of the escarpment at the

- 19 -

outer end of Western Brook Gorge, situated ten miles north of

Bakers Brook, but light grey, banded gaeisses vera observed in

the cliffs of the inner pond.

Along the inner shores of St. Faul's Inlet as well as

in valleys of large streams draining from the escarpment, the

rocks of the plateau may be examined more conveniently. Gneiss and granite prove to be the prevailing types, but pegmatites

and dykes cut through or are differentiates of the granite.

Gneieses outerop everywhere in cliffs and cirque walls rimning

the east shore of Person's Fond, but the escarpment face to the south of the Pond is veneered with more than 2,000 feet of

brown weathered quartzites and quartz-biotite schists that

presumably belong with the crystalline complex rather than with

the lower Palaeozoic strata because of the high degree of meta-

morphism. The shores of Inner Portland Creek Pond show no

appreciable change in lithology, except for the absence of the schists and quartzites; contorted and shattered gneisses form the bluffs on both sides of the Fond, and granite, a minor constituent in this crea, invades the gneiss.

From Bakers Brook to Portland Creek & distance of 35 miles, beds of the St. George's group are never found in normal sequence with either the older Cambrian or younger

Ordovician rocks. Large masses, several hundred feet in thickness

end up to a mile in length, appear as great fault blocks either in close proximity to, or adjacent to the granice gneiss of the

- 20 -

Long Range Plateau. The most notable occurrences are exposed

on the north shore of Western Brook Pond, in the valley of East Brook of St. Paul's Inlet, and the northeastern end of Parsons

Pend. Each of the above blocks are of great size, variously

tilted and structurally discordant to the enclosing sediments.

The dips vary from overturned and vertical to nearly horizontal.

It appears that these are remants that were caught in the overthrust zone during the period of Long Range faulting. The

largest, single fault block in the area lies at the foot of

Long Range south from Portland Creek Pond. The topographic

expression of the erea is such that it seems likely to be a

northward continuation of the dolomites exposed in the White

Hills east of Parsons Fond.

The area between Bonne Bay and Portland Creck is

greatly faulted, the degree of which has no comparison anywhere

on the west coast. Divergence of dip directions over small areas suggest that the region has also been tightly folded. The possibility of the existence of petroleum in commercially extractable quantities in this area is regarded as nil by the writer. When one considers the great deal of faulting evident in this area, it is not surprising that drilling here (e.g.

St. Paul's Inlet and Parsons Pond) lead to discouraging regults.



Numerous thrust faults have undoubtedly mashed the section allow-

- 21 -

ing the ascape of reservoir pressures, thus it is recommanded

that the area be dropped from the concession. A study of the section on the north side of Parsons Pond has convinced the

writer that the existing oil in the area is not generated from

the Green Point group but is migrating from either the St. George's

or Cambrian strata below. This factor makes the area to the north

of Portland Creek Pond of great interest.

Northern Palseozoic Aree

(see Map II)

Thrust slices extending throughout the Parsons Pond

area progressively diminish north of Portland Creek Pond. Gentle

dips of 5 to 15 degrees occur throughout the erea and the

existence of broad open folds and reefal developments in both

the Ordovician and Cambrian makes this area most encouraging

from a petroleum aspect.

Orogenic disturbances did not affect the Cambrian end Lower Ordovician sediments in this area to any great extent. Dips average from 5 to 15 degrees which may represent deposition over basement irregularities more than subsequent folding. The petroliferous Green Point group is not present in surface outcrop but it is possible that the lower St. George's may develop into a shaly facies north of Daniels Harbour. Inland from the shore



between Portland Creek Pond and the River of Ponds, the foreland

- 22 -

is largely swamp covered and exposures are rare. Scattered

outcrops found along the drift-covered coast reveal the presence

of a light brown, mottled linestone which contains the fossil

Hormotoma augustina (Billings) establishing its Lower Table

Head affinities. Inmediately north of Pond Lake an extensive

width of St. George's doloaites gently undulating in large open

folds is seen to be resting on Cambrian Hawke Bay quartaites.

From the River of Fonds to Port Sauders located on the north shore of Ingornachoix Eay the fossiliferous upper section of the St. George's group as well as the lowest Table

Head lizestone are well exposed and the contact between the two

groups can be seen in several places. Characteristic features

of the uppermost 200 feet of the St. George's dolomite in this

area are the presence of Cryptozoon reefal developments and

vuggy porosity which are encouraging from a petroleum point of view. To the north of Port Saunders, Point Riche at the south end of St. John Bay area to Cape Norman (tip of the Great Northern Peninsula) is of considerable interest as here is found Richardson's original type section of the St. George's group. The type section for this group was later transferred by Schuchert and Dunbar to the Port au Fort Peninsula. In the St. John Bay area the contact between the cream-coloured dolomite of the St. George's and the greyish limestone of the Table Head

is most striking and the contact therefore appears sharp and

distinct. The lower contact is exposed on the apex of a small

- 23 -

asymmetrical anticline located at a point where Casters River

enters Castors Harbour. The contact is sharp and irregular.

indicating a histus. This contact is observed again on the

northeast end of Ten Mile Lake in low, broad, westwardly pitch-

ing anticlines and synclines. The Cape Norman and Pistolet Eny

areas contain a faulted and folded, incomplete sequence of

rocks belonging to the St. George's group. In general rocks belonging to the upper portion of the St. George's group are

exposed in almost continuous ledges that form the shoreline between Point Riche and Cape Norman. Here the strata strikes east-northeast and dips at a low angle to the southeast. A

gently folded descending section is exposed at right angles to

the strike between Cape Norman and Norman Cove.

North of Castors River a pinkish grey pegmatized acidic gneiss is exposed containing in some places barren quartz voins and lenses. Beyond this area, the Long Range Hountains become considerably subdued and dip under the early Palaeozoic sediments to re-appear as the northernmost limits of the crystalline rocks at St. Anthony. The area between Pistolet and Hare Bay has been metamorphosed by the intrusion of ultrabasic rocks. In addition, the sequence in this area is com-

plicated by minor folds and some faulting is evident. The



relationship of these ultrabasic rocks to the Bay of Islands

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Complex is open to speculation.

This entire erga north of Portland Creek is only

slightly faulted and broad open folds are typical, with dips

in excess of 15 degrees being seldom obtained. Those factors

in conjunction with vuggy porosity in the upper St. George's

dolomites and the existence of Cryptozoon reefoid developments

in both the Ordovician and Cambrian makes this area extremely

interesting. It is recommended that this Northern Palaeozoic

area be recained for further evaluation.

Calgary, Alberta

November 10, 1965

H. CORKIN



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