PALAEONTOLOGY

of

SOGEPET-AQUITAINE-KASKATTAMA No. 1 WELL

by

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SUMMARY

The Sogepet-Aquitaine-Kaskattama No. 1 well at the mouth of Kaskattama River in the central Hudson Bay Lowland near latitude 57°N and longitude 90°W was drilled in late 1966 to a depth of 2880 feet before temporary suspension. Preliminary palaeontology indicates that Devonian, Silurian and Ordovician strata were penetrated as follows:

0' - 423'	Lower Middle Devonian limestone - probably Abitibi River Formation
423' - 1083'	Upper Silurian? reddish siltstone - probably Kenogami River Formation
1083' - 1290'	Middle Silurian reefal limestone - Attawapiskat Formation
1290' - 1814'	Middle Silurian limestone - probably Ekwan River and Severn River Formations
1814' - 2002'	Silurian limestone - not correlated
2002' - 2279'	Lower? Silurian limestone - probably Fort Nelson Formation
2279' - 2597'	Upper Upper Ordovician limestone - Churchill River Group
2597' - 2838'	Ordovician limestone - not correlated
2838' - 2880'	Upper Middle or Lower Upper Ordovician limestone - Bad Cache Rapids Group

----------base of well----------

Depth of basement is estimated at 3200 feet or less, if strata older than Red Cache Rapids Group do not appear.

INTRODUCTION

The Sogepet-Aquitaine-Kaskattama No. 1 well, hereafter referred to as the Kaskattama well, was spudded on September 16, 1966, and drilled to a depth of 2880 feet before temporary suspension on December 12, 1966. The well was drilled for Sogepet Ltd. and Aquitaine Company of Canada by Big Indian Drilling Company Ltd. with Banff Oil Ltd. as operator. It is situated on the west shore of Hudson Bay in the central Hudson Bay Lowland at the mouth of Kaskattama River near latitude 57°N and longitude 90°W.

The present report is concerned with the palaeontology of this well. It is preliminary only. The fossil identifications are to be considered as tentative and may be subject to change with more detailed work. The conclusions reached as to age and correlation, however, are considered valid.

Nearly all of the Kaskattama well was cored using a 3-inch and later a 2-inch bit. Because this size of core gives little chance of obtaining good fossils it was decided to increase recovery by systematically breaking at close intervals. The Siluro-Devonian interval from 0 to 2279 feet was split where possible at ½ to 1 inch intervals. The Ordovician from 2279 to 2880 was broken at closer intervals of ½ inch or less because of its rather unfossiliferous nature, and the importance in predicting when basement would be reached.

Each specimen was examined under binocular microscope and generally wetted to bring out organic remains. It is estimated that about 40,000 pieces of core were thus examined, and nearly 5,000 fossils extracted.

As stated above this report is concerned with the tentative

identification of these fossils, and because of the time factor only those considered most diagnostic or important have been considered. Over 200 fossils were thus identified. Because of lack of time one very important group, the stromatoporoids, have not been included in this report. These are quite common in the Silurian - about 300 specimens were collected - but it was felt that the necessary expenditure of time to identify them was not commensurate with the stratigraphic information that might be gained.

Dr. L. Hills of The University of Calgary studied promising samples for spore analysis. Most of these were from the Kenogami River Formation, although one was from the thin conglomerate within the Devonian limestone at 398 feet, and the other from grey Devonian limestone rubble at the mouth of Kaskattama River. Except for the conglomerate which yielded plant fragments, no sign of spores, or plants other than algal debris, was found.

Monsieur J. LeFevre of the Societie Nationale des Petrole d'Aquitaine in Pau, France, extracted microfossils from the Devonian limestones: mainly conodonts, ostracods and tentaculitids. This work was done for the Aquitaine Company of Canada and the pertinent parts are incorporated in this report.

STRATIGRAPHY

The lithologic succession in the Kaskattama well can be divided into five very broad lithologies. In descending order these are

(1) 0 - 170'. Limestone, light grey, microcrystalline, fragmental with numerous unidentifiable fossil fragments.

This limestone is dated as Early Middle Devonian and correlated with the Abitibi River Formation of the southern Hudson Bay Lowland.

(2) 170-423'. Limestone, light grey, microcrystalline to fine grained.

Although the lithologic description is similar to the limestones between 0 to 170 feet, the aspect is quite different. The most apparent difference is the lack of fragmental material, and the denseness of rock. This limestone is typically unfossiliferous but some microfossils suggest that it is Devonian related in age to the overlying limestones between 0 and 170 feet.

(3) 423 - 1083'. Siltstone with some shaly and sandy portions, mainly reddish with minor green colouration, often gypsiferous and salty.

This interval is completely unfossiliferous. It is tentatively correlated with the Late? Silurian Kenogami River Formation of the southern Lowland on the basis of stratigraphic position and lithology.

Samples were taken from this unit when the lithology showed promise of bearing spores. No indication of these or plant fragments, however, was found and the unit shows little promise of bearing flora or fauna because of its gypsiferous and salty nature.

(4) 1083 - 1290'. Limestone, very light grey, porous, intensely reefal, with stromatoporoids and favositid corals as most apparent fossils.

This unit stands out because of its very light colour and porous reefal nature. It is the obvious correlative of the Attawapiskat Formation of the Hudson Bay Lowland and is considered Middle Silurian in age.

(5) 1290 - 2880' (bottom of hole). (a) Limestone and dolomite, nodular to well bedded, often laminated, brownish to brownish grey, fine grained calcarenite, very coarsely bioclastic; alternating with (b) limestone and dolomite, brownish grey to brown, cryptocrystalline, finely fragmental. Lithology (b) is dominant.

As indicated in the above description the interval from 1290 to 2880 feet is a complex of rather similar alternating lithologies. If an outcrop formational nomenclature had not already been in use these strata would probably have been considered as one rock unit even though they cross the Ordovician-Silurian boundary.

The interval from 1290 to 2279 feet is Silurian and considered to contain temporal equivalents of the Early? Silurian Port Nelson and the Middle Silurian Severn River and Ekwan River Formations (see Figure 1 in pocket). About the only noteworthy lithologic aspect of this Silurian sequence is that stromatoporoids are so common between 1290 and 1700 feet as to suggest this part may have been fairly reefal.

The Ordovician-Silurian contact is placed at a marked grey shale break at 2279 feet, although similar shales appear above and below here. The Ordovician continues to the present bottom of the well and contains faunal equivalents of the Upper

Upper Ordovician Churchill River Group and the Lower Upper or Upper Middle Ordovician Bad Cache Rapids Group of the northern Lowland.

PALAEONTOLOGY

Introduction

Fossils collected from the Kaskattama well are referred to six faunal assemblages; separated in three places by intervals which palaeontologically cannot be assigned to a known horizon, either because they are unfossiliferous or lack diagnostic fossils (see figure 1, in pocket). In descending order these are:

ASSEMBLAGE	SERIES	CORRELATION	INTERVAL
ABITIBI RIVER ASSEMBLAGE	Lower Middle Devonian	Abitibi River Formation	0 - 423
Unassigned Interval A	Completely unfossiliferous: lithology suggests Upper Silurian Kenogami River Formation		423 - 1083
ATTAWAPISKAT ASSEMBLAGE	Middle Silurian	Attawapiskat Formation	1083 - 1290
EKWAN RIVER - SEVERN RIVER ASSEMBLAGE	Middle Silurian	Ekwan River and possibly Severn River Formation	1290 - 1814
Unassigned Interval B	Cannot be correlated, but possibility of Severn River correlation is suggested. No fossils identified in this report.		1814 - 2002
PORT NELSON ASSEMBLAGE	Lower? Silurian	Tentatively to Port Nelson Formation	2002 - 2279
CHURCHILL RIVER ASSEMBLAGE	Upper Upper Ordovician	Churchill River Group	2279 - 2597
Unassigned Interval C	Not correlated at present with either Churchill River or Bad Cache Rapids Group		2497 - 2838
BAD CACHE RAPIDS ASSEMBLAGE	Upper Middle or Lower Upper Ordovician	Bad Cache Rapids Group	2838 - 2880

Abitibi River Assemblage

The Abitibi River assemblage is sparsely fossiliferous. The diagnostic fauna occurs in the grey, somewhat fragmental limestones from 0 to 170 feet, but the extremely unfossiliferous, unfragmental limestones, with different lithologic aspect, between 170 and 423 feet are also considered to be the same age.

Except for Thamnopora sp., cf. T. martisoni Fritz, Lemon and Norris at 100 - 102 feet, which is suggestive of an Abitibi River correlation the other macrofossils are not diagnostic, except to indicate a Devonian age for the assemblage. Plant fragments were found by Dr. L. Hills of The University of Calgary in a thin conglomerate bed at 398 feet within the unfragmental limestones between 170 and 423 feet. These could not be identified but suggest a very late Silurian, or more probably a Devonian age.

The microfauna, consisting mainly of tentaculitids, ostracods and conodonts, however, is more diagnostic. These were extracted and identified by J. LeFevre in France and his conclusions and identifications are used in this report. Fossils identified at 102 and 106 feet are considered by LeFevre to indicate an age from (1) Emsian to Frasnian (Late Early to Early Late Devonian) with (2) a very possible date of Late Emsian to Eifelin (Late Early to Early Middle Devonian) and (3) a possible one within the Eifelian Age. Monsieur LeFevre considered that tentaculitids from 398 - 399 feet, in the lower unfragmental limestones, also approximated these ages.

Thus the interval from 0 to 170 feet and probably that down to 423 feet is Early Middle Devonian. This age would suggest a correlation to the Abitibi River Formation of the southern Hudson Bay Lowland.

The Devonian surface rubble in the area about the Kaskattama well is of two main lithologies. One is grey fragmental limestone lithologically

very similar to that between 0 and 170 feet in the well. The other is a reddish, shaly limestone reminiscent of the strata now referred to the completely unfossiliferous Silurian Kenogami River Formation between 423 and 1083 feet. Both the red and the grey rubble are fossiliferous and bear a fauna of Late Middle or Early Late Devonian age which correlates to the Williams Island Formation of the southern Lowland (see Nelson and Johnson, 1967, p. 562).*

When the Kaskattama well first penetrated grey Devonian limestone down to 423 feet and then went into the reddish silty beds between 423 and 1083 feet the coincidence was so strong that it was assumed the well was passing through the grey and the red lithologies of the surface rubble, and that the strata down to 1083 feet was actually Late Middle Devonian and correlative with the Williams Island Formation.

As noted earlier the microfauna of the grey limestone between 0 and 423 feet, however, is probably Early Middle Devonian and definitely older than the grey limestone rubble at the surface of Williams Island age.

Thus future drilling in the Hudson Bay Lowland should take into account that Williams Island strata may be present in subcrop and that grey and red lithologies may be penetrated, not temporally related to the grey and red lithologies in the Kaskattama well between 0 - 423 and 423 - 1083 feet, respectively.

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* Nelson and Johnson (1967) admitted the possibility that this rubble could actually be coeval with the Abitibi River, rather than Williams Island Formation. Dr. W. Norris of the Geological Survey of Canada, however, recently examined it and is of the opinion that the dating and correlation is correct, i.e. it is Late Middle Devonian and correlates with the Williams Island Formation.

Unassigned Interval A

This interval extends from 423 to 1083 feet and consists mainly of reddish siltstone which is often gypsiferous and salty. It is completely unfossiliferous both micro- and macrofaunally. As noted earlier no trace of spores was seen. Furthermore, the lithology is such that it is not likely to preserve them.

The interval is correlated with the Upper? Silurian Kenogami River Formation of the southern Hudson Bay Lowland on the basis of its lithologic and stratigraphic similarity.

Attawapiskat Assemblage

The Attawapiskat assemblage occurs in one of the most easily recognizable lithologic units in the Hudson Bay Lowland. This, of course, is the reefal and porous very light grey Attawapiskat Formation. In the Kaskattama well it occupies a 207-foot interval from 1083 to 1290 feet.

Although the interval is relatively fossiliferous, bearing mostly poorly preserved Favosites and stromatoporoids, the only diagnostic fossil is Pycnostylus guelphensis Whiteaves. This species relates the interval to the outcrop Attawapiskat where it is rare but nevertheless very characteristic.

The assemblage is considered Middle Silurian in age, although the writer feels that considerable work is necessary before it can be more accurately dated.

Ekwan River - Severn River Assemblage

The Ekwan River - Severn River assemblage extends from 1290 to 1814 feet. The assemblage, of course, is considered to occupy the stratigraphic position of the combined Severn River and Ekwan River Formations of the Hudson Bay Lowland.

In outcrop the Severn River Formation is rather unfossiliferous and bears nothing which the writer considers diagnostic for that unit. What fossils there are in outcrop suggest a genetic relationship with the overlying Ekwan River Formation which is the most fossiliferous Silurian unit in the Hudson Bay Lowland. It is stressed that the Kaskattama well fossils in the 1290 to 1814 interval are most closely related to those of the outcrop Ekwan River Formation and that perhaps this interval actually correlates only with that unit. The Severn River Formation, however, is very tentatively included in the correlation because faunally it is genetically related to the Ekwan River and the possibility exists that laterally, as perhaps in the Kaskattama well, it may become fossiliferous and indistinguishable from the overlying Ekwan.

The Ekwan River - Severn River assemblage from 1290 to 1814 feet is very fossiliferous although it does not bear any species which the writer considers truly diagnostic. The favositid coral Multisolenia is the most characteristic fossil. In outcrop this is confined to the Ekwan River Formation, but in the Kaskattama well it extends into the overlying Attawapiskat Formation.

The assemblage is probably Middle Silurian in age.

Unassigned Interval B

This interval from 1814 to 2002 is sparsely fossiliferous, and cannot be palaeontologically correlated. It was noted above that the Ekwan River - Severn River assemblage actually is faunally much more closely related to the Ekwan River. Since the Severn River Formation is relatively unfossiliferous in outcrop perhaps this unassigned interval may correlate here, and by its unfossiliferous nature reflect that unit. The dangers in

the logic of such correlation are obvious and need not be discussed here.

No fossils have been identified from this interval for the preliminary report.

Port Nelson Assemblage

The name given to this assemblage should be treated with a great deal of caution as it is by no means certain that the contained fossils are characteristic of the Port Nelson Formation.

The assemblage is most easily identifiable and fossiliferous between 2002 and 2184 feet but the strata down to the Ordovician-Silurian contact near 2279 are also considered to belong here. The assemblage between 2003 and 2184 feet is characterized by Tryplasma gracilis (Whiteaves) and Virgiana decussata (Whiteaves) both of which are in fair abundance. ? Angopora manitobensis* is associated with these species and occurs by itself in the lower strata down to 2270 feet.

The assemblage is termed Port Nelson because of its stratigraphic position at the base of the Silurian, and the fact that within the Silurian succession of the Lowland Virgiana decussata occurs in abundance only in the Port Nelson Formation. The latter needs qualification: V. decussata does not occur in type Port Nelson, which is completely unfossiliferous, but in nearby rubble assumed to come from this formation (Nelson, 1964, p. 34; Nelson and Johnson, 1967, p. 553).

The Port Nelson assemblage is definitely Silurian and in southern

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* Specimens referred to ? Angopora manitobensis are spinose favositid corals more characteristic of Silurian than Ordovician. Time did not allow positive identification and it should be noted that they are also closely related to the spinose Palaeofavosites groenlandicus Poulsen, P. poulseni Teichert and P. kirki Stearn. Whatever the identification a stratigraphic position low in the Silurian is suggested. Angopora manitobensis is confined to the Stonewall Formation of southern Manitoba, and the three species of Palaeofavosites generally occur in the lower part of the Interlake Group.

Manitoba is diagnostic of the lower portion of the Silurian succession. Virgiana decussata is abundant in the Fisher Branch Formation of the Interlake Group, and Tryplasma gracilis in the Stonewall Formation, a unit hitherto questionably referred to the Ordovician (Stearn, 1956). If the occurrences of T. gracilis in strata of the Stonewall Formation and Kaskattama well are coeval, then the Stonewall should now be considered Silurian.

Since the Red Head Rapids Formation in the northern Hudson Bay Lowland was questionably correlated with the Stonewall this may indicate that the former is also now Silurian rather than Ordovician (see Nelson, 1963, 1964; Nelson and Johnson, 1967).

The age of the Port Nelson assemblage is generally considered Middle Silurian. In northern British Columbia and the Northwest Territories, however, Llandoverian graptolites have been found associated with Virgiana decussata and hence the assemblage is here tentatively referred to Early Silurian.

Churchill River Assemblage

This assemblage extends from 2279 to 2597 feet although truly diagnostic fossils do not appear until 2303 feet. Strata bearing this assemblage are considered to be the accurate temporal and, in a general way, the lithologic correlatives of the Churchill River Group on Churchill River. There the group attains a total thickness of about 220 feet in contrast to the 318 feet thickness in the well. In the Kaskattama well the assemblage is separated from the older one of the Bad Cache Rapids by the 241 foot Unassigned Interval C, which although fossiliferous, bears no diagnostic fossils.

The uppermost beds of the Churchill River assemblage are marked

by prominent thin beds of shale bearing a fauna consisting almost entirely of poorly preserved inarticulate brachiopods questionably referred to Lingula sp. These shale beds, occurring intermittently within the 2279 to 2400 foot interval are assigned to Ordovician because their appearance here is so markedly similar to the stratigraphic position of the "oil shale interval" at the top of the Ordovician on Southampton Island (Nelson and Johnson, 1967). The latter shales are markedly bituminous and bear a graptolite and trilobite fauna. Those in the Kaskattama well, however, are not bituminous, and the only fossils found, after intensive search, were the ? Lingula sp. referred to above.

The diagnostic elements of the Churchill River assemblage are Bighornia bottei Nelson, B. patella (Wilson), Lobocorallium trilobatum (Whiteaves) and various species of Palaeofavosites. At present the fauna cannot be used for more refined correlation with the outcrop Caution Creek and Chasm Creek Formations of the Churchill River Group. However the presence of Plaesiomys occidentalis (Okulitch) in the 2444 to 2597 interval very tentatively suggests for that part a correlation to the type Caution Creek and lower Chasm Creek Formations.

The age of the Churchill River assemblage is definitely Late Ordovician and considered within the Richmondian and/or Gamachian interval (see Nelson, 1963).

Unassigned Interval C

This interval extends from 2597 to approximately 2838 feet. It is fairly fossiliferous with mainly strophomenid brachiopods (not identified in this report), and some corals.

It is emphasized that at present this interval cannot be assigned to either the Bad Cache Rapids or the Churchill River assemblage although

one questionably identified Deiracorallium sp. at 2705 feet is suggestive of the latter assemblage.

Bad Cache Rapids Assemblage

The Bad Cache Rapids assemblage is identified only by one poorly preserved cross-section through the gastropod Maclurites sp., cf. M. manitobensis (Whiteaves) at 2838 feet. It is stressed that this is the only evidence for this assignment.

The writer feels that although the fossil is poorly preserved considerable emphasis can be placed upon it. The genus Maclurites is a fairly common and characteristic member of the Bad Cache Rapids Group in the Hudson Bay Lowland, and in coeval strata over much of western Canada and parts of the United States. Except for two anomalous occurrences, however, it has never been recognized in the younger Churchill River Group or equivalent strata. One of these occurrences is the Maclurites acuta Parks described from Gods River in the central Lowland (Parks, 1915). The gastropod at 2838 feet is not related to this species. The other is a possible Maclurites extracted by the present writer from the Churchill River Group on Churchill River some 17 years ago. It was destroyed during preparation so that no comparison can be made with the Maclurites from the Kaskattama well.

Because of the abundance of Maclurites in strata coeval with the Bad Cache Rapids Group the chances strongly favour this correlation for the interval about 2838 feet. Within the group Maclurites is common in the Portage Chute and very rare in the overlying Surprise Creek Formation. The writer, however, feels that this distribution is related only to facies and prefers not to assign a more discrete correlation at present.

The age of the Bad Cache Rapids assemblage is near the Middle-

Late Ordovician boundary. Some authorities consider it to be Late Middle Ordovician; others Early Late Ordovician (see Nelson, 1963, p. 21-26).

DEPTH OF BASEMENT

Calculations for depth of basement are made by assuming that the Bad Cache Rapids Group in the Kaskattama well shows an increase in thickness from outcrop proportional to the increase between outcrop and subcrop of the Churchill River Group. The table below shows the calculations, which are based upon the assumption (1) that the Red Head Rapids Formation is Silurian and thus not included in the computation; and (2) that the Bad Cache Rapids Group in the well rests directly on Precambrian basement as in outcrop. The latter assumption should be treated with caution as there is a possibility of a thick basal sandstone development (see Nelson & Johnson, 1967, p. 573) equivalent to the Winnipeg Formation of southern Manitoba, and perhaps older strata.

The table below shows the outcrop thickness of the Bad Cache Rapids and Churchill River Groups on Churchill River. The minimum and possible maximum thickness of the Churchill River Group in the Kaskattama well is indicated and the estimates of minimum (x^1) and maximum (x) for the Bad Cache Rapids Groups are calculated.

The minimum thickness of the Churchill River Group is based upon the known thickness of 318 feet from 2279 to 2597. The maximum assumes that the 241 feet of Unassigned Interval C also belongs here.

	Bad Cache Rapids Group	Churchill River Group	Total Thickness
Outcrop thickness	139	222	361
Minimum well thickness	x^1=200'±	318'	518
Maximum well thickness	x =350'±	559	909

$x^1 = \frac{139\ (318)}{222}$ = 200' app.

$x = \frac{139\ (559)}{222}$ = 350' app.

By adding the combined Silurian and Devonian thickness of 2279 to these total minimum and maximum Ordovician thicknesses, one reaches a minimum depth to basement of 2797 feet and a maximum of 3188. The first figure is absurd as the well has already reached the 2880 mark. It would seem that the figure of 318' for the Churchill River Group is too small and that perhaps the lower boundary of the group is somewhere within Unassigned Interval A. The second figure of 3188 is fairly close to Nelson and Johnson's (1967, p. 570) basement estimate of 3250 feet for Kaskattama River.

Thus if the Bad Cache Rapids Group thickens in the well at the same rate as the Churchill River Group, basement may be expected around 3200 feet or less.

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FOSSIL IDENTIFICATIONS

ABITIBI RIVER ASSEMBLAGE
(Lower Middle Devonian)

60'

? Atrypa sp.
? Cranaena sp.

67' (1-1)

Atrypa sp., cf. A. scutiformis Stainbrook
Atrypid brachiopod ex gr. Spinatrypa mascula (Stainbrook)

67 - 72' (1-1)

Productella concentrica (Hall)
Atrypa sp., cf. A. rustica Stainbrook

85'

Astraeospongium-like spicule

85 - 90'

Immature Cranaena-like brachiopod

93 - 100' (2-1)

? Cranaena sp.
Atrypid brachiopod ex gr. Spinatrypa mascula (Stainbrook)

100 - 102' (3-1)

Thamnopora sp., cf. T. martisoni Fritz, Lemon and Norris
? Cranaena sp.

102 - 106'

Viriatellina? sp. 2
Kirkbyella sp.?
Icriodus sp.
? Acontiodus sp.
Angulodus sp.
Hindeodella sp.
Polygnathus linguiformis Hinde
Oneatodus sp.?

- identified by LeFevre

110'

Immature Cranaena-like brachiopods

120 - 125'

Immature Atrypid brachiopod ex gr. Spinatrypa mascula (Stainbrook)

Immature Hormotoma-like gastropod

125'

Immature Cranaena-like brachiopod

130' Immature atrypid brachiopod, ex gr. Spinatrypa mascula (Stainbrook)

145'

Immature ? Atrypa sp.

168 - 169'

Viriatellina? sp. 2

- identified by LeFevre

270'

? Atrypa sp.

315'

Immature atrypid brachiopod ex gr. Spinatrypa mascula (Stainbrook)

398' (8-1)

Plant debris suggestive of very late Silurian or more probably Devonian age.

398 - 399'

Viriatellina? sp. 1
V.? sp. 2

- identified by LeFevre

ATTAWAPISKAT ASSEMBLAGE
(Middle Silurian)

1133' (22-1)

Synamplexoides varioseptatus Stearn

1134' (22-1)

Favosites sp., ex gr. F. favosus (Goldfuss)

1136' (22-1)

Synamplexoides varioseptatus Stearn

1139' (22-2)

Lyellia affinis (Billings)

1157' (23-1)

? Multisolenia tortuosa Fritz

1180' (24-1)

Favosites sp., cf. F. niagarensis Hall

1193' (25-2)

Favosites sp., cf. F. niagarensis Hall

1197' (25-3)

Pycnostylus guelphensis Whiteaves
? P. guelphensis Whiteaves

1202' (25-4)

? Pycnostylus guelphensis Whiteaves

1203' (25-4)

? Pycnostylus guelphensis Whiteaves

1204' (1201)

? Pycnostylus guelphensis (Whiteaves)

1207' (26-1)

Pycnostylus guelphensis Whiteaves

1212' (26-2)

Pycnostylus guelphensis Whiteaves?

1219' (26-4)

Favosites gothlandicus Lamarck?

1226' (26-4)

Halysites sp., ex gr. H. nexus Davis

1227' (27-1)

Synamplexoides varioseptatus Stearn

1228' (27-1)

Halysites sp., ex gr. H. sussmilchi Etheridge
H. sp.

1243' (27-4)

Pentamerid? brachiopod

EKWAN RIVER-SEVERN RIVER ASSEMBLAGE
(Middle Silurian)

1302' (28-2)

Halysites magnitubus Buehler

1311' (28-4)

Halysites sp.

1313' (28-5)

Halysites sp.

1318' (29-1)

Halysites spp.

1319' (29-1)

Halysites sp., ex gr. *H. latus* Tchernychev

1327' (29-2)

Alveolites sp., cf. *A. labechei* Milne-Edwards & Haime

1339' (30-1)

Alveolites sp., cf. *A. labechei* Milne-Edwards & Haime

1353' (30-4)

Alveolites sp., cf. *A. labechei* Milne-Edwards & Haime

1369' (31-1)

Halysites sp., ex gr. *H. agglomeratus* Hall

1373.3 - 1374.1 (31-2)

Halysites sp., cf. *H. agglomeratus* Hall

1380' (31 - 3)

Synamplexoides varioseptatus Stearn

1446' (33-3)

Favosites sp., cf. F. niagarensis Hall

1495' (34-1)

Halysites sp., ex gr. H. nexus Davis

1499' (34-2)

Favosites gothlandicus Lamarck

1503' (34 - 3)

? Multisolenia tortuosa Fritz

1573' (38-4)

Favosites sp., cf. F. niagarensis Hall

1609' (36-1)

? Multisolenia tortuosa Fritz

1612' (36-2)

Favosites sp., cf. F. favosus (Goldfuss)

1643' (47-5)

Favosites sp., cf. F. niagarensis Hall

1645' (37-5)

Favosites gothlandicus Lamarck

1664' (38-3)

Favosites hisingeri Milne-Edwards & Haime?

1665' (38-3)

Favosites sp., cf. F. niagarensis Hall

1667' (38-3)

Multisolenia tortuosa Fritz

1670' (38-4)

Favosites sp., cf. F. niagarensis Hall

1675' (39-1)

Favosites hisingeri Milne-Edwards & Haime?
F. sp., cf. F. hisingeri Milne-Edwards & Haime

1677' (39-1)

Favosites sp., cf. F. niagarensis Hall

1691' (39-4)

? Multisolenia tortuosa Fritz

1701' (40-2)

Favosites sp., cf. F. niagarensis Hall
Favosites hisingeri Milne-Edwards and Haime?
Favosites sp., cf. F. favosus (Goldfuss)

1703' (40-2)

Synamplexoides varioseptatus Stearn
Favosites hisingeri Milne-Edwards and Haime?

1707' (40-3)

Catenipora sp., ex gr. C. gothlandica (Yabe) - Silurian type
Halysites sp.

1717' (41-1)

Favosites sp., cf. F. favosus (Goldfuss)

1718' (41-1)

Favosites hisingeri Milne-Edwards & Haime?
F. sp., cf. F. niagarensis Hall
F. sp., cf. F. favosus (Goldfuss)

1747' (42-1)

Halysites sp., ex gr. H. catenularius (Linnaeus)

1748' (42-2)

Halysites sp., ex gr. H. catenularius Linnaeus
H. sp.

1777' (43-4)

Multisolenia tortuosa Fritz

1779' (43-4)

Halysites sp.

1780' (43-4)

Favosites sp., cf. F. hisingeri Milne-Edwards and Haime

1814' (45-3)

Favosites sp., cf. F. niagarensis Hall

PORT NELSON ASSEMBLAGE
(Lower? Silurian)

2002' (58-2)

Multisolenia confluens Stearn
? Angopora manitobensis Stearn

2003' (55-1)

Virgiana decussata (Whiteaves)

2033' (56-3)

Favosites sp., cf. F. niagarensis Hall

2039' (57-1)

Favosites sp., cf. F. niagarensis Hall

2079' (59-1)

? Angopora manitobensis Stearn

2080' (59-1)

? Angopora manitobensis Stearn

2082' (59-2)

? Angopora manitobensis Stearn
Pentamerid brachiopod fragment

2084' (59-2)

Pentamerid brachiopod fragments

2087' (59-3)

Brachiopod fragment: probably pentamerid

2080' (59-3)

? Angopora manitobensis Stearn

2089' (59-3)

Virgiana decussata (Whiteaves)

2091' (59-4)

Palaeofavosites sp., cf. P. prolificus (Billings)

2091' (59-5)

Tryplasma gracilis (Whiteaves)

2098' (60-1)

Tryplasma gracilis (Whiteaves)
Virgiana decussata (Whiteaves)?

2099' (60-1)

Virgiana decussata (Whiteaves)?

2101' (60-2)

Tryplasma gracilis (Whiteaves)
Virgiana decussata (Whiteaves)
Pentamerid brachiopod fragment

2103' (60-2)

? Angopora manitobensis Stearn
Tryplasma gracilis (Whiteaves)

2106' (60-3)

Catenipora spp. - Silurian types

2108' (60-3)

Tryplasma gracilis (Whiteaves)

2111' (60-4)

Tryplasma gracilis (Whiteaves)

2113' (60-4)

Tryplasma gracilis (Whiteaves)

2114' (60-4)

Tryplasma gracilis (Whiteaves)

2115' (60-3)

Tryplasma gracilis (Whiteaves)
Favosites sp., cf. F. niagarensis (Hall)

2116' (60-5)

Tryplasma gracilis (Whiteaves)
Multisolenia tortuosa Fritz
? M. tortuosa Fritz
Palaeofavosites prolificus (Billings)?
Favosites sp., cf. F. niagarensis Hall

2117' (60-5)

Favosites sp., cf. F. niagarensis Hall

2118" (60-5)

Catenipora sp., cf. C. simplex (Lambe) - Silurian type

2121' (60-6)

Virgiana decussata (Whiteaves)?
Pentamerid brachiopods

2122' (60-6)

? Virgiana decussata (Whiteaves)
Pentamerid brachiopod fragment

2123' (60-6)

? Virgiana decussata (Whiteaves)
Pentamerid brachiopods

2125' (60-6)

Virgiana decussata (Whiteaves)

2127' (61-1)

? Virgiana decussata (Whiteaves)
Pentamerid brachiopod fragments

2128' (61-1)

Favosites sp., cf. F. niagarensis Hall

2128' (61-1)

Pentamerid brachiopod fragment

2129' (61-1)

Pentamerid brachiopod fragments

2131' (61-2)

? Virgiana decussata (Whiteaves)

2133' (61-2)

Favosites sp., cf. F. niagarensis Hall

2138' (61-3)

? Angopora manitobensis Stearn

2141' (61-4)

Pentamerid brachiopod fragment

2142' (61-4)

Pentamerid brachiopod
Catenipora sp. - Silurian type
Favosites sp., cf. F. niagarensis Hall

2143' (61-4)

Virgiana decussata (Whiteaves)?

2144' (61-4)

Pentamerid brachiopod fragments

2148' (61-5)

Virgiana decussata (Whiteaves)?

2150' (61-5)

? Virgiana decussata (Whiteaves)

2154' (62-1)

Multisolenia confluens Stearn

2184' (63-1)

Pentamerid brachiopod fragments

2260' (67-1)

? Angopora manitobensis Stearn

2263' (67-2)

? Angopora manitobensis Stearn

2264' (67-2)

? Tryplasma gracilis (Whiteaves)

2270' (67-3)

? Angopora manitobensis Stearn

CHURCHILL RIVER ASSEMBLAGE
(Upper Upper Ordovician)

2279' (68-1)

? Lingula sp.

2280' (68-1)

? Lingula sp.

2281' (68-2)

? Lingula sp.

2289' (68-3)

? Lingula sp.

2291' (68-4)

? Lingula sp.

2292' (68-4)

? Lingula sp.

2303' (69-2)

? Megamyonia sp.

2309' (69-4)

Palaeofavosites prolificus (Billings)?
? Thaerodonta sp.

2314' (69-4)

Palaeofavosites prolificus (Billings)
P. prolificus (Billings)?
? Megamyonia sp.

2316' (70-1)

Palaeofavosites prolificus (Billings)
P. sp., cf. P. poulseni Teichert
? Deiracorallium sp.
Thaerodonta sp., ex gr. T. sericea (Sowerby)

2318' (70-1)

? Bighornia sp.

2319' (70-2)

Catenipora sp.

2320' (70-2)

Palaeofavosites alveolaris (Lonsdale)?

2321' (70-2)

Lobocorallium trilobatum (Whiteaves)
? L. trilobatum (Whiteaves)

2337' (71-4)

Lingula sp.

2363' (72-4)

? Lingula sp.

2364' (72-4)

? Lingula sp.

2365' (72-4)

Lingula sp.
? L. sp.

2366' (72-5)

Lingula sp.

2367' (72-5)

? Lingula sp.

2402' (75-3)

? Deiracorallium sp.

2414' (75-3)

Bighornia patella (Wilson)?

2416' (75-4)

Palaeofavosites alveolaris (Lonsdale)?

2417' (75-4)

Bighornia sp., cf. B. patella (Wilson)

2423' (76-1)

Deiracorallium sp.
? D. sp.
Megamyonia nitens (Billings)

2426' (76-2)

? Bighornia sp.

2432' (76-2)

Bighornia sp.

2439' (76-3)

Bighornia bottei Nelson

2441' (77-1)

Bighornia patella (Wilson)?

2444' (77-2)

? Plaesiomys occidentalis (Okulitch)

2446' (77-2)

Catenipora robusta (Wilson)

2447' (78-4)

Bighornia sp., cf. B. patella (Wilson)

2448' (77-3)

Palaeofavosites alveolaris (Lonsdale)?
Bighornia sp., cf. B. bottei Nelson

2449' (77-3)

Bighornia sp., cf. B. bottei Nelson
Bighornia sp., cf. B. patella (Wilson)

2450' (77-3)

Deiracorallium sp., or immature Lobocorallium trilobatum (Whiteaves)
? Lobocorallium trilobatum (Whiteaves)
? Bighornia sp., ex gr. B. patella (Wilson)
? B. sp.

2454' (77-4)

? Bighornia sp.

2458' (78-1)

Bighornia sp.
Palaeofavosites prolificus (Billings)?
? P. prolificus (Billings)

2462' (78-1)

Catenipora sp., ex gr. C. robusta (Wilson)

2464' (78-1)

Bighornia bottei Nelson
? Megamyonia nitens (Billings)
Strophomena sp.
S. sp. ex gr. S. arcuata Shaler

2465' (78-2)

Megamyonia nitens (Billings)?

2474' (78-4)

Catenipora sp., ex gr. C. robusta (Wilson)

2485' (79-2)

? Deiracorallium sp.

2486' (79-2)

Palaeofavosites alveolaris (Lonsdale)?
? Bighornia patella (Wilson)

2488' (79-3)

Bighornia sp., cf. B. patella Wilson

2490' (79-3)

Deiracorallium manitobense Nelson
Bighornia sp., ex gr. B. patella (Wilson)

2491' (79-4)

? Plaesiomys occidentalis (Okulitch)

2492' (79-4)

Lepidocyclus sp., cf. L. perlamellosus (Whitfield)

2493' (79-4)

Bighornia patella (Wilson)?

2499' (80-1)

Megamyonia nitens (Billings)?

2503' (80-2)

Bighornia sp., cf. B. patella (Wilson)

2507' (80-3)

? Plaesiomys occidentalis (Okulitch)

2514' (80-4)

Lobocorallium trilobatum (Whiteaves)

2537' (82-1)

Catenipora foerstei Nelson

2538' (82-1)

Megamyonia nitens (Billings)

2554' (82-4)

Megamyonia sp.

2555' (82-4)

? Plaesiomys occidentalis (Okulitch)

2557' (83-1)

Megamyonia sp.

2562' (83-2)

Plaesiomys occidentalis (Okulitch)?
? P. occidentalis (Okulitch)

2575' (84-1)

? Plaesiomys occidentalis (Okulitch)

2582' (84-2)

Plaesiomys occidentalis (Okulitch)

2589' (84-3)

Bighornia bottei Nelson

2597' (85-1)

Plaesiomys occidentalis (Okulitch)

Unassigned Interval C

2688' (89-4)

Catenipora sp.

2690' (90-1)

? Calapoecia sp.

2695' (90-2)

Catenipora sp., ex gr. C. agglomeratiformis (Whitfield)

2698' (90-2)

? Palaeophyllum sp.

2705' (90-4)

? Deiracorallium giganteum Nelson
? D. sp.

2781' (95-1)

Coral fragment: may be either Bighornia or Grewingkia

2796' (96-3)

Catenipora sp., ex gr. C. robusta (Wilson)

2808' (97-2)

Catenipora sp., ex gr. C. robusta (Wilson)

2836' (98-4)

Catenipora sp.

BAD CACHE RAPIDS ASSEMBLAGE
(Upper Middle or Lower Upper Ordovician)

2838' (98-4)

Maclurites manitobensis (Whiteaves)?

2870' (100-3)

Gastropod: possibly medium sized Hormotoma or large Fusispira. Destroyed during extraction.

	AGE AND CORRELATION	ASSEMBLAGE	METERS	FEET	CRITICAL FOSSILS	IMPORTANT SUPPLEMENTARY FOSSILS
			0	0		
DEVONIAN	EARLY MIDDLE DEVONIAN ABITIBI RIVER FORMATION	ABITIBI RIVER ASSEMBLAGE			– *Viriatellina ?* sp. 1, *V. ?* sp. 2, *Kirkbiella* sp.? *Icriodus* sp., *Acontiodus* sp., *Angulodus* sp., *Kindeella* sp., *Polygnathus linguiformis, Oneotodus* sp. ? (102-106)	– ? *Atrypa* sp., ? *Cranaena* *Atrypa* cf. *scutiformis*, *A.* cf. *rustica*, ex gr. *Spinatrypa mascula*, *Productella concentrica* – ex gr. *Spinatrypa mascula*, *Thamnopora* cf. *martisoni*
					– *Viriatellina ?* sp. 2. (168-169)	? ex gr. *Spinatrypa mascula*
			100 M.			– ? *Atrypa* sp. – ex gr. *Spinatrypa mascula*
	423'				*Viriatellina ?* sp. 1, *V. ?* sp. 2, plant debris (398-399)	
SILURIAN ?	LATE SILURIAN? KENOGAMI RIVER FORMATION (Completely unfossiliferous: age and correlation is based solely upon stratigraphic position and lithology.)	UNASSIGNED INTERVAL A	200 M.	500'		
			300 M.	1,000'		
	1,083'					
	MIDDLE SILURIAN ATTAWAPISKAT FM.	ATTAWAPISKAT ASSEMBLAGE			*Pycnostylus guelphensis* (1191-1212)	– *Favosites* ex gr. *Favosus*, *Lyellia affinis*, *Synamplexoides varioseptatus*, – *Multisolenia tortuosa* – *Favosites* cf. *niagarensis* – *Favosites* cf. *niagarensis* – *Favosites gothlandicus* – *Halysites* cf. *nexus*, *H.* cf. *sussmilchi*, *Synamplexoides varioseptatus*
	1,270'					
	MIDDLE SILURIAN EKWAN RIVER AND SEVERN RIVER FORMATIONS (Most of this interval may correlate with Ekwan River, rather than Severn River Formation.)	EKWAN RIVER–SEVERN RIVER ASSEMBLAGE	400 M.			– *Halysites magnifubus*, *H.* sp. – *Halysites* sp. *H.* ex gr. *latus* – *Alveolites* cf. *labechi* – *Alveolites* cf. *labechi* – *Halysites* ex. gr. *agglomeratus* – *Synamplexoides varioseptatus*
				1,500'		– *Favosites* cf. *niagarensis* – *Halysites* ex gr. *nexus*, *Favosites gothlandicus* – *Multisolenia tortuosa*,
			500 M.			– *Favosites* cf. *niagarensis* – ? *Multisolenia tortuosa*, *Favosites* cf. *favosus* – *Favosites* cf. *niagarensis*, *F. gothlandicus* – *Favosites hisingeri* ?, *F.* cf. *niagarensis* – *Multisolenia tortuosa*, *Favosites hisingeri* ? *F.* cf. *niagarensis* – *Multisolenia tortuosa* – *Favosites hisingeri* ? *F.* cf. *niagarensis*, *F.* cf. *favosis* – *Halysites* sp., *Catenipora* ex gr. *gothlandica*, *Synamplexoides varioseptatus* – *Favosites hisingeri* ?, *F.* cf. *niagarenis* *Halysites* sp. *H.* ex gr. *catenularis* – *Multisolenia tortuosa*, *Halysites* sp., *Favosites* cf. *hisingeri* – *Favosites* cf. *niagarenis*
	1,814' app.					
	This interval has relatively few fossils. It may correlate with Severn River Formation.	UNASSIGNED INTERVAL B	600 M.			
	2,002' app.			2,000'	*Virgiana decussata* (2003)	– *Multisolenia confluens*, *Angopora manitobensis* – *Favosites* cf. *niagarensis*
	EARLY ? SILURIAN -very tentatively to the Port Nelson and Red Head Rapids Formation.	PORT NELSON ASSEMBLAGE			*Tryplasma gracilis* (2091-2116) *Virgiana decussata* (2085-2121) *Virgiana decussata* (2125-2150) *Pentamerid brachiopod fragments* (2184)	– *Angopora manitobensis* – *Palaeofavosites* cf. *prolificus*, ? *Angopora manitobensis* – ? *Angopora manitobensis* – *Catenipora* sp. – *Catenipora* cf. *simplex*, *Multisolenia tortuosa*, *Palaeofavosites prolificus*, *Favosites* cf. *niagarensis* – *Favosites* cf. *niagarensis* – *Favosites* cf. *niagarensis*, ?*Angopora manitobensis*
	2,279'		700 M.		? *Angopora manitobensis* (2270) *Lingula* sp. (2279-2292)	– *Tryplasma gracilis* (identification very uncertain)
ORDOVICIAN	LATE LATE ORDOVICIAN (RICHMONDIAN and/or GAMACHIAN) CHURCHILL RIVER GROUP (Interval from 2444 to 2597 may correlate with Caution Creek and lower Chasm Creek Formations.)	CHURCHILL RIVER ASSEMBLAGE			*Bighornia* sp. (2318) *Deiracorallium* sp. ? (2316) *Megamyonia* sp. (2303) *Thaerodonta* sp. (2309) *Catenipora* sp. (2319) *Labocorallium trilobatum* (2514)	– *Palaeofavosites prolificus* ? – *Catenipora* sp., *Palaeofavosites prolificus*, *P.* cf. *poulseni*, *P. alveolaris* ?, *Labocorallium trilobatum*, – *Lingula* sp. *Bighornia* sp., *Deiracorallium* sp., *Thaerodonta* ex gr. *sericea* *Megamyonia* sp. – ? *Lingula* sp.
					Bighornia patella ? (2414) *Bighornia bottei*, *B. patella* ? (2441) *Bighornia bottei* (2464) *Bighornia patella* ? (2493), *Deiracorallium manitobensis* (2490)	– ? *Deiracorallium* sp. – *Palaeofavosites alveolaris* ? *Bighornia* cf. *patella*, *Deiracorallium* sp. *Megamyonia nitens*, *Catenipora robusta*, *Palaeofavosites alveolaris* ? *P. prolificus*, *Bighornia* cf. *patella*, *B.* cf. *bottei*, *B.* sp. ? *Labocorallium trilobatum*, *Megamyonia nitens* ?, *Strophomena* ex gr. *arcuata*, *Plaesiomys occidentalis* *Catenipora* ex gr. *robusta*, *Bighornia* cf. *patella*, *Megamyonia nitens* ?, *Strophomena* ex gr. *arcuata*, *Palaeofavosites alveolaris* ?, *Bighornia* ex gr. *patella*, ?*Deiracorallium* sp., *Plaesiomys occidentalis*, *Lepidocyclus* cf. *perlamellosus*
	2,597' app.			2,500'	*Labocorallium trilobatum* (2514)	– *Catenipora foerstei*, *Bighornia* cf. *patella*, *Megamyonia nitens* ?, *Plaesiomys occidentalis*
			800 M.		*Bighornia bottei* (2589) *Plaesiomys occidentalis* (2582) *Plaesiomys occidentalis* (2591)	– *Megamyonia* sp., ? *Plaesiomys occidentalis* – *Plaesiomys occidentalis* – ? *Plaesiomys occidentalis*
	This interval is fossiliferous, but the fauna is not diagnostic enough to allow assignment to either the Churchill River or Bad Cache Rapids Groups.	UNASSIGNED INTERVAL C			? *Deiracorallium* sp. (2305)	– *Catenipora* sp., ? *Calapoecia* sp. – *Catenipora* ex gr. *agglomeratiformis*, ? *Palaeophyllum* sp. – ? *Deiracorallium giganteum*
	2,838' app.					– *Catenipora* ex gr. *robusta* *Catenipora* ex gr. *robusta* – *Catenipora* sp.
	LATE MIDDLE OR EARLY LATE ORDOVICIAN BAD CACHE RAPIDS GROUP (Identification of interval based solely upon a poorly preserved *Maclurites manitobensis*.)	BAD CACHE RAPIDS ASSEMBLAGE	900 M.		*Maclurites manitobensis* ? (2838)	
			Drilling suspended at 2880'	3,000'		

FIGURE 1

TENTATIVE PALAEONTOLOGIC INTERPRETATION OF SOGEPET-AQUITAINE-KASKATTAMA Nº 1 WELL

SAMUEL J. NELSON — MARCH 1967

GROSS LITHOLOGY

- Limestone; light grey, microcrystalline, fragmental.
- Limestone, light grey, microcrystalline to fine grained.
- Siltstone, dominantly red with minor green, gypsiferous and salty.
- Porous reefal limestone.
- Limestone and dolomite, brownish grey to brown, cryptocrystalline to fine grained, often bioclastic, nodular to well bedded. Occasional thin shale interbeds.