

MICROFILMED

TO

HERE

June/1979

**DEVONIAN OF THE NORTHERN HUDSON BAY LOWLAND,
CAPE TATNAM REGION, MANITOBA AND ONTARIO**

by

Samuel J. Nelson, P. Geol.

A report submitted to

SOGEPET LIMITED

(Societe Generale des Petroles)

December, 1964

DEVONIAN OF THE NORTHERN HUDSON BAY LOWLAND
CAPE TATNAM REGION, MANITOBA AND ONTARIO

Samuel J. Nelson, P. Geol.

SUMMARY

Fossiliferous rubble along the lower portions of the Hayes, Kaskattama, Black Duck and Niskibi rivers of the Cape Tatnam region of the northern Hudson Bay Lowland indicates that Devonian strata underlie the eastern part of this Lowland. The rubble is predominantly limestone and probably correlates with the lower portion of the Williams Island Formation of the James Bay area, considered to be Early Upper Devonian in age.

INTRODUCTION

During September 1964 R. D. Johnson and the writer made a brief examination of the lower portions of the Hayes, Kaskattama, Black Duck and Niskibi rivers of the northern Hudson Bay Lowland. The first two rivers are in Manitoba; the Black Duck along the Manitoba-Ontario border; and the Niskibi in Ontario (see figure 1, in pocket). All flow eastward across the Lowland and drain into Hudson Bay. Figures 2 to 10 show the general character of the country.

The lower thirteen and one-half miles of the Kaskattama River was studied by means of canoe, and amphibious penguin traverses. The Hayes, Niskibi and Black Duck rivers were reached by float plane. Ordinarily the last two rivers would not be accessible by this method

because of low water but abnormal September flood conditions facilitated their study.

Except for a very small Devonian? exposure along the Kaskattama River, 12½ miles from the north, the lower portions of all four rivers appear devoid of outcrop. Geologic interpretation of necessity therefore had to be confined to rubble studies. All previous geologic maps (e.g. Geological Survey of Canada Map 1045A) have shown the region between these rivers as Silurian, although so far as the writer knows there has been no evidence for this assumption other than the work done by Savage and Van Tuyl (1919) in areas considerably removed.

The present study has shown that the fossiliferous rubble along the lower parts of the Kaskattama, Black Duck and Niskibi rivers is almost entirely of Middle and/or lower Upper Devonian age. The remainder - a very small percentage - is Upper Ordovician and Silurian.

From this it is concluded that Devonian strata underlie the lower portions of these three rivers and possibly extend westward a considerable distance. Devonian strata are thought to be present under the lower part of the Hayes and Nelson rivers. The fact that drilling by Manitoba Hydro has indicated probable Silurian dolomites along Nelson River at Gillam Island only a short distance from the mouth, however, suggests that Devonian is very thin and may disappear north of this river.

DEVONIAN SYSTEM

Devonian rubble along the four rivers can be grouped into two broad lithologies. The first is a light grey weathering, light

grey, generally microcrystalline, partly pelmatozoan limestone. This grey lithology is subject to considerable variation but the above description represents the more common and normal occurrences. The general aspect is Silurian and the present writer was led to date it as such until Devonian fossils were found.

The composite fauna from this lithology from all four rivers is listed below:

Amhipora sp., cf. A. ramosa (Phillips)

Thamnopora martisoni Fritz, Lemon and Norris

Favosites abitibiensis Fritz, Lemon and Norris

Hexagonaria williamsoni (Fritz, Lemon and Norris)

H. sp.

Billingsastrea sp., cf. B. tapetiformis (Crickmay)

Lingula sp.

Atrypa n. sp., cf. A. scutiformis Stainbrook

A. sp., cf. A. rustica Stainbrook

A. sp., ex. gr. rustica Stainbrook

Spinatrypa mascula (Stainbrook)

S. bellula

Emanuella richardsoni (Meek)

Productella concentrica (Hall)

?Stringocephalus sp.

Craenaena sublingulata Stainbrook

C. lata Stainbrook

?Buchelia sp.

The second lithology is a very easily recognizable light pink to brick-red weathering, microcrystalline generally dark red to dark

reddish-brown shaly limestone. Although the fauna is not so varied as above, it is nevertheless closely related. The following is a composite list of species from this lithology:

Amphipora sp., cf. A. ramosa (Phillips)

Thamnopora martisoni Fritz, Lemon and Norris

Favosites abitibiensis Fritz, Lemon and Norris

Hexagonaria sp.

Atrypa sp.

A. sp., cf. A. rustica Stainbrook

A. sp., ex. gr. A. rustica Stainbrook

The fauna from both kinds of rubble is definitely Devonian and probably of a high Middle and/or low Upper Devonian age. The closest fauna correlatives are found in the James Bay Lowland Devonian succession tabled below:

Upper Devonian	Long Rapids Formation		285'	shale, calcareous shale
		Upper Member	120'	limestone, cal- careous shale
Middle or Upper Devonian	Williams Island Formation	Middle Member	32'	gypsiferous shale
		Lower Member	149'	shale

		Upper Member	48'	limestone, coral reef
Middle Devonian	Abitibi Formation			
		Middle (Moose River) Member	254'	limestone, gypsum, shale, sandstone
		Lower Member	42'	cherty limestone, sandstone
Lower Devonian	Sextant Formation		90'	conglomerate, arkose, siltstone, shale - probably continental

Of the Devonian fauna collected from rubble of the four rivers Hexagonaria williamsi, Thamnopora martisoni and Favosites abitibiensis have been described from the lower beds of the Williams Island Formation (Fritz, Lemon and Norris, 1957), a unit considered high Middle or low Upper Devonian in age. Of the remaining fauna Productella concentrica has been reported from the high Middle Devonian Dawson Bay Formation of southern Manitoba, and Emanuella richardsoni from both this unit and the overlying lower Upper Devonian Souris River Formation (McCammon, 1960). Spinatrypa mascula, S. bellula, Cranaena lata and C. sublingulata occur in the Cedar Valley Formation of Iowa, a unit considered low Upper Devonian in age (Stainbrook, 1941). The remainder of the fauna cannot be used in accurate dating other than to indicate a Devonian age although the poorly preserved ?Stringocephalus sp. is suggestive of Middle Devonian. Thus the writer considers that the age of the fauna is low Upper Devonian or less likely high Middle Devonian. Strati-

graphically the closest correlations appear to be the lower part of the Williams Island Formation.

ORDOVICIAN SYSTEM

The meagre Ordovician rubble dates as Upper Ordovician. Species collected are Receptaculites sp., Catenipora aequabilis (Teichert), C. foerstei Nelson and Palaeophyllum halysitoides (Wilson). The first two are diagnostic for the Bad Cache Rapids Group of the northern Hudson Bay Lowland, a unit considered lower Upper Ordovician (Nelson, 1963). Palaeophyllum halysitoides range through both the Bad Cache Rapids and the overlying upper Upper Ordovician Churchill River Group. Catenipora foerstei has so far been reported only from the latter group, although in the writer's opinion its amorphous nature is such that it could also be a Bad Cache Rapids species. Thus the writer dates the rubble as Upper Ordovician and considers most of it as being from the Bad Cache Rapids Group.

SILURIAN SYSTEM

The Silurian fossils collected consist of ?Halysites sp., ?Trimerella sp., and poorly preserved moulds of pentamerids and strophomenid brachiopods and ostracods. These are not complete enough to make intra-Silurian correlations. Indeed they are barely sufficient to determine the System.

CONCLUSION AND DISCUSSION

Figure 1 (in pocket) shows the location of the various rivers

and the general setting of the area. In view of the recognition of Devonian, previous geologic maps must be considerably revised and the possible geology is thus indicated on the figure. It cannot be too strongly stressed that this is merely a geologic sketch map - we shall probably have to await intensive drilling before systemic boundaries can be made anywhere near accurate.

Aeromagnetic and reflection surveys by the Geological Survey of Canada have suggested that the Palaeozoic strata of the northern Hudson Bay Lowland may thicken east and northward and possibly approach a thickness of 10,000 under the Hudson Bay. The recognition of Devonian, along the east edge of the Lowland is suggestive that such a basinal thickening is conceivable, although it cannot, of course, indicate the amount of thickening.

One thing that impressed the writer was the relative paucity of Silurian rubble. Considering that this system is areally adjacent to the Devonian it might be expected that there would be more rubble than that of the more distant Ordovician. Instead it is almost equally divided between these two systems. No answer can be given for this at present although the possibility exists that the Devonian may overlap considerably westward over the Silurian and that much of the latter is blanketed.

Another problem is how much of the Devonian rubble owes its position to glaciation. Could the Devonian rubble have been brought in from distant areas, and thus not at all reflect the underlying bed rock? It has been the writer's experience in the northern Hudson Bay Lowland that the preponderant rubble nearly always reflects

the underlying bed rock - this appears to be the case where river transport and/or glaciation has taken place.

REFERENCES

- McCammon, H., 1960, Fauna of the Manitoba Group in Manitoba: Manitoba Dept. Mines Nat. Resc., Mines Branch Pub. 59-5, pp. 1-109, pls. 1-13.
- Fritz, M. A., Lemon, R. R. H., and Norris, A. W., 1957, Stratigraphy and Paleontology of the Williams Island Formation: Geol. Assoc. Canada Proc., vol. 9, pp. 21-40, pls. 2-4.
- Nelson, S. J., 1963, Ordovician Paleontology of the Northern Hudson Bay Lowland: Geol. Soc. America, Mem. 90, pp. 1-152, pls. 1-37.
- Savage, T. E., and Van Tuyl, F. M., 1919, Geology and Stratigraphy of an Area of Paleozoic rocks in the vicinity of Hudson and James Bays: Geol. Soc. America, Bull., vol. 30, pp. 339-378.
- Stainbrook, M. A., 1941, Terebratulacea of the Cedar Valley Beds of Iowa: Jour. Paleont., vol. 15, no. 1, pp. 42-55, pls. 7, 8.

FOSSIL IDENTIFICATIONS

The identifications listed below are based upon rubble collected from the Hayes, Kaskattama, Black Duck and Niskibi Rivers. Within time limits all available fossils were collected at each locality and the species are listed as Devonian, Silurian or Ordovician. Devonian species are listed as "red" and/or "grey" to indicate the dominate lithology. Numerically Silurian and Ordovician species are about equal and form only a very small percentage of the rubble.

It should be stressed that in view of the extreme confidentiality of the subject matter, the writer has not worked with type material for fear of alerting the various holding institutions. Thus all identifications have been based upon literature study. The

writer feels, however, that most identifications are correct although he reserves doubts regarding the atrypid fauna.

HAYES RIVER, MANITOBA

York Factory

Devonian? Species

?Douvillina sp. ... grey

Silurian? Species

?Trimerella sp.

12 miles above mouth near Rainbow Island

Devonian Species

Atrypa sp., cf. A. rustica Stainbrook ... red

KASKATTAMA RIVER, MANITOBA

lower three miles of river

Devonian Species

Amphipora sp., cf. A. ramosa (Phillips) ... red

Thamnopora martisoni Fritz, Lemon and Norris? ... red and grey

Favosites abitibiensis Fritz, Lemon and Norris ... red and grey

Hexagonaria williamsi (Fritz, Lemon and Norris) ... grey

H. sp. ... red and grey

Productella concentrica (Hall) ... grey

?Stringocephalus sp. ... grey

Atrypa n. sp., cf. A. scutiformis Stainbrook ... red and grey

A. sp., cf. A. rustica Stainbrook ... grey

A. sp., ex. gr. A. rustica Stainbrook ... red

Spinatrypa mascula (Stainbrook) ... grey

S. bellula (Stainbrook)? ... grey

Emanuella richardsoni (Meek) ... grey

Silurian? Species

Ostracods: indet. (Silurian aspect)

Ordovician Species

Receptaculites sp.

9½ miles above mouth (locality called "Kaska-1")

Devonian Species

Emanuella richardsoni (Meek) ... grey

Atrypa n. sp., cf. A. scutiformis Stainbrook ... grey

A. sp., cf. A. rustica Stainbrook ... grey

10 miles above mouth

Devonian Species

Lingula sp. (probably Devonian) ... grey

Productella concentrica (Hall) ... grey

Emanuella richardsoni (Meek)? ... grey

Atrypa sp. ... red

11 miles above mouthDevonian Species

Amphipora sp., cf. A. ramosa (Phillips) ... red and grey

12 miles above mouthDevonian Species

Favosites abitibiensis Fritz, Lemon and Norris ... grey

12½ miles above mouth (locality called "Kaska 2")Devonian Species

Favosites abitibiensis Fritz, Lemon and Norris ... grey

Hexagonaria sp. ... grey

Atrypa n. sp., cf. A. scutiformis Stainbrook ... grey

Spinatrypa mascula (Stainbrook) ... grey

13 miles above mouthDevonian Species

Amphipora sp., cf. A. ramosa (Phillips) ... red

Favosites abitibiensis Fritz, Lemon and Norris ... grey

Atrypa sp., cf. A. rustica Stainbrook ... grey

Cranaena lata Stainbrook ... grey

C. sublingulata Stainbrook ... grey

?Buchelia sp. ... grey

Silurian Species

Pentamerid brachiopods: indet.

Ordovician Species

Catenipora aequabilis (Teichert)

13½ miles above mouthDevonian Species

Amhipora sp., cf. A. ramosa (Phillips) ... red

Atrypa sp., cf. A. rustica Stainbrook ... red

Ordovician Species

Receptaculites sp.

BLACK DUCK RIVER, ONTARIO-MANITOBA BORDERabout 5 miles from mouthDevonian Species

Thamnopora martisoni Fritz, Lemon and Norris? ... red

Favosites abitibiensis Fritz, Lemon and Norris ... grey

Hexagonaria williamsi (Fritz, Lemon and Norris) ... grey

H. sp. ... grey

Billingsastrea sp., cf. B. tapetiformis Crickmay ... grey

Silurian Species

Halysites sp.

Strophomenids indet. (Silurian aspect)

Ordovician Species

Catenipora foerstei Nelson

Orthocone phragmocone (Ordovician aspect)

NISKIBI RIVER, ONTARIO2 miles above mouthDevonian Species

Amphipora sp., cf. A. ramosa (Phillips) ... red

Thamnopora martisoni Fritz, Lemon and Norris ... red

Atrypa sp. ... red

Ordovician Species

Palaeophyllum halysitoides (Wilson)



Figure 2. Lower portion of Kaskattama River, Manitoba taken from base camps.



Figure 3. Rapids on lower portion of Kaskattama River, Manitoba.



Figure 4. Lower Portion of Kaskattama River, Manitoba.

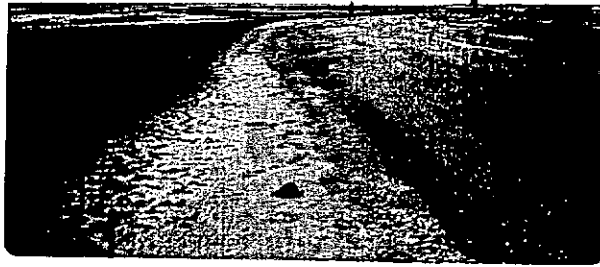


Figure 5. Shore of Hudson Bay near mouth of Kaskattama River, Manitoba.



Figure 6. View looking toward mouth of Kaskattama River and Hudson Bay, Manitoba.



Figure 7. View of country several miles inland from Hudson Bay, near Kaskattama River, Manitoba.



Figure 8. View of mudflats along shore of Hudson Bay near Niskibi River, Ontario. Note myriad snow geese.



Figure 9. Lower portion of Black Duck River, Ontario-Manitoba border.

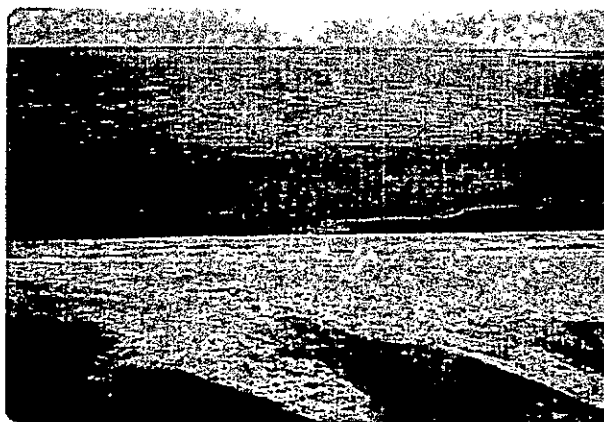
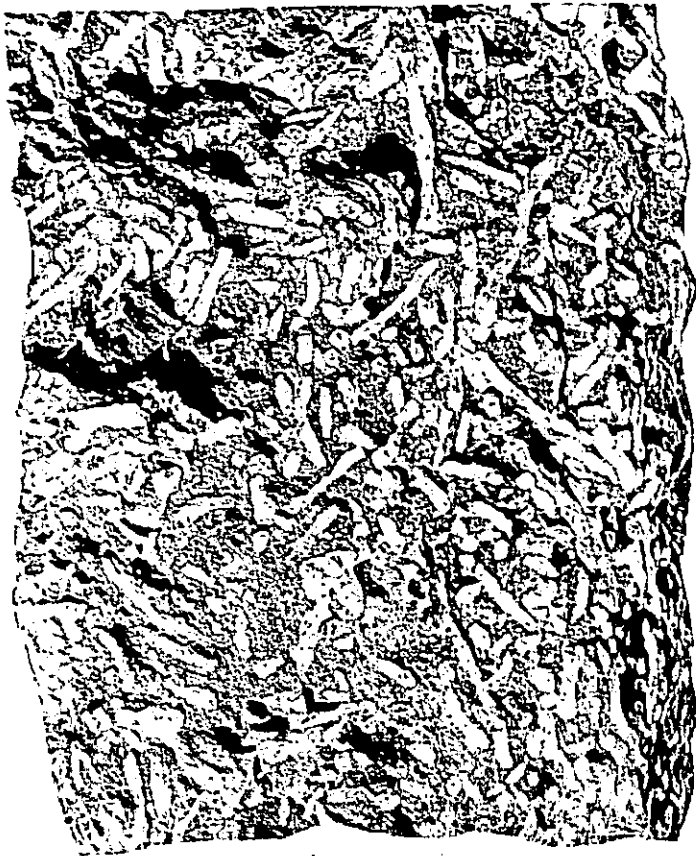


Figure 10. Shore of Hudson Bay, south of Kaskattama River, Manitoba.

PLATE 1

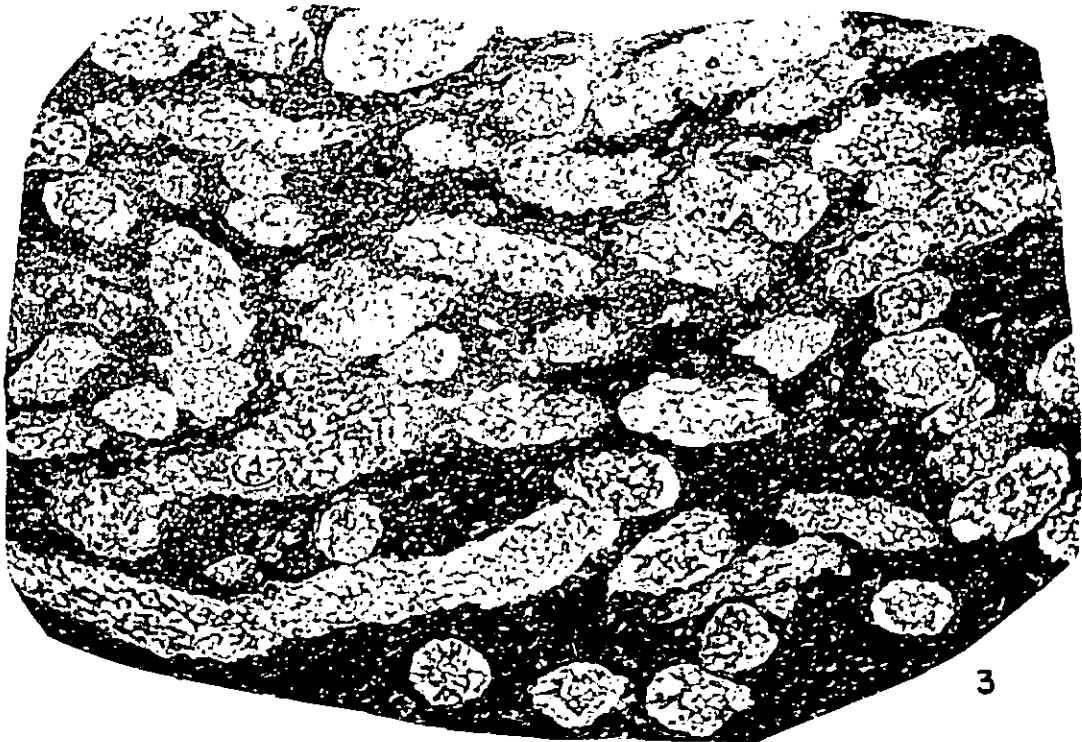
- Figure 1. Amphipora sp., cf. A. ramosa (Phillips). Devonian, lower Niskibi River, Ontario. Surface of specimen (X1).
- Figure 2. Thamnopora martisoni Fritz, Lemon and Norris?. Devonian, lower Black Duck River, Ontario-Manitoba border. Surface of specimen (X1).
- Figure 3. Amphipora sp., cf. A. ramosa (Phillips). Devonian, Kaskattama River, Manitoba: 13½ miles above mouth. Thin section (X4).



1



2

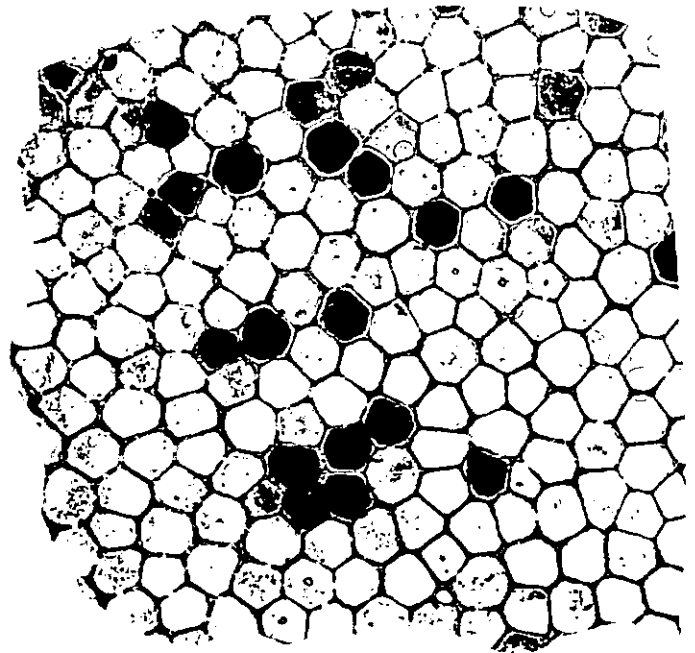
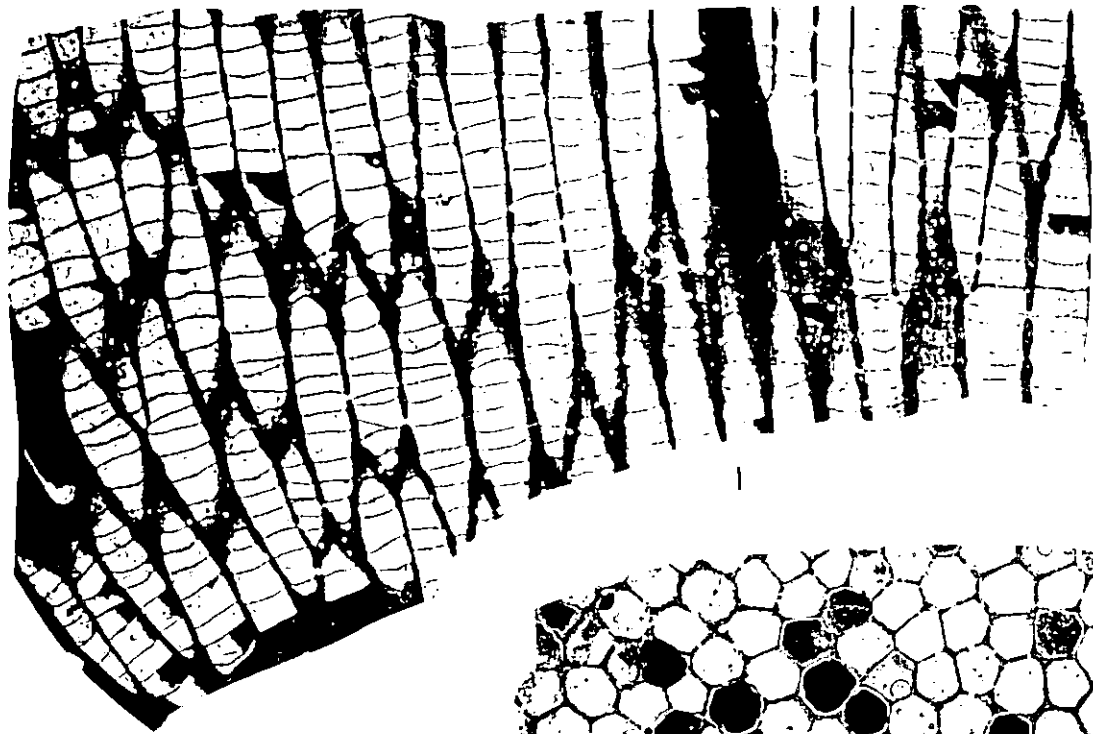


3

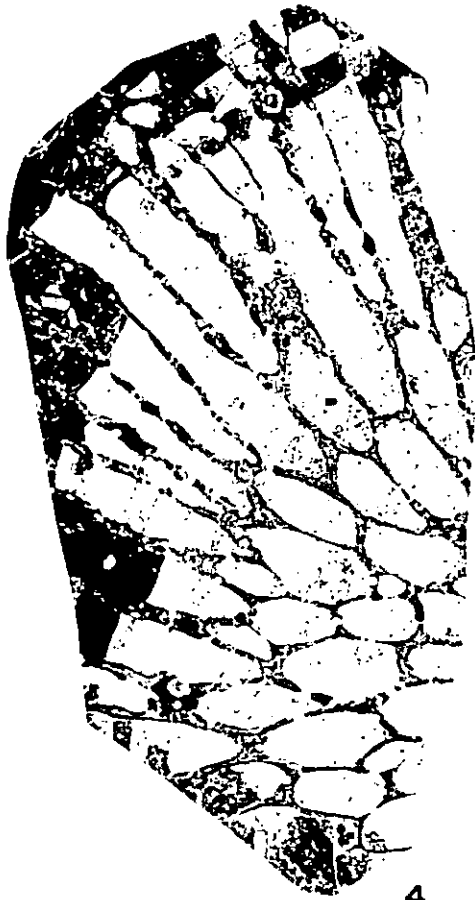
PLATE 2

Figures 1, 2. Favosites abitibiensis Fritz, Lemon and Norris. Devonian, Kaskattama River, Manitoba: lower three miles of river. Longitudinal and transverse sections (X4).

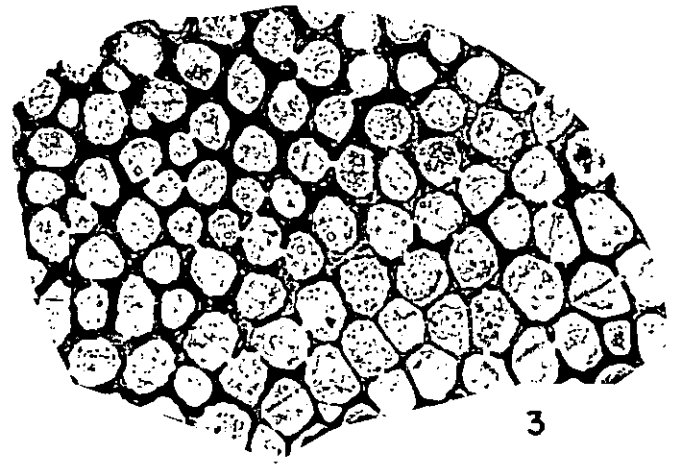
Figures 3, 4. Favosites abitibiensis Fritz, Lemon and Norris. Devonian, lower Black Duck River, Manitoba. Transverse and longitudinal sections (X4).



2.



4



3

PLATE 3

- Figure 1. Hexagonaria williamsi (Fritz, Lemon and Norris). Devonian, Kaskattama River, Manitoba: lower three miles of river. Transverse section (X4).
- Figures 2, 3. Billingsastraea sp., cf. B. tapetiformis Crickmay. Devonian, lower Black Duck River, Ontario-Manitoba border. Longitudinal and transverse section (X4).
- Figure 4. Hexagonaria williamsi (Fritz, Lemon and Norris). Devonian, lower Black Duck River, Ontario-Manitoba border. Longitudinal section (X4).

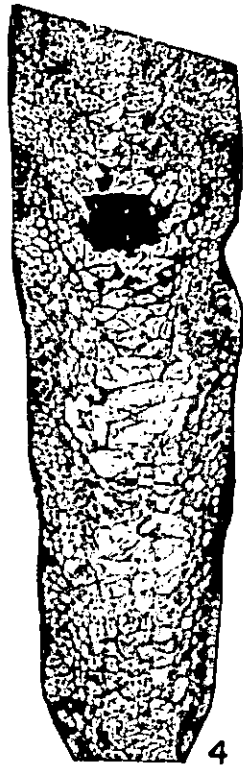
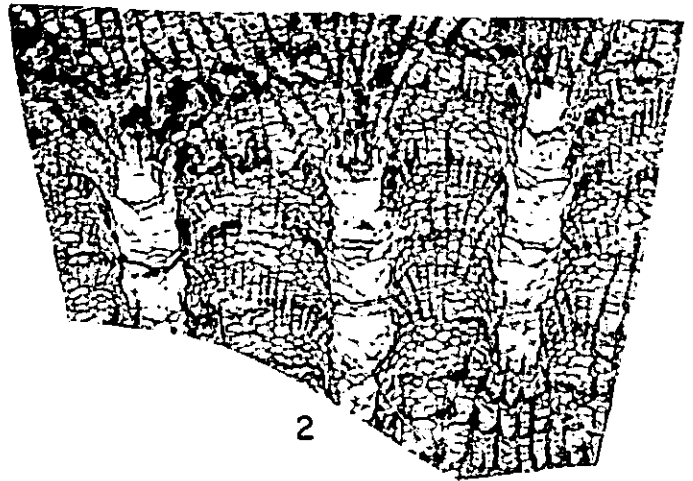
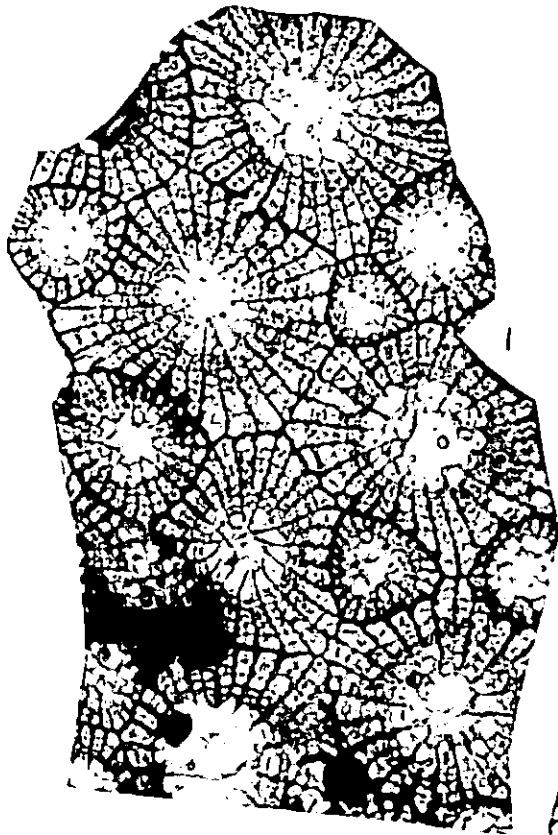


PLATE 4

- Figure 1. Hexagonaria williamsi (Fritz, Lemon and Norris). Devonian, Lower Black Duck River, Ontario-Manitoba border. Transverse section (X4).
- Figure 2. Palaeophyllum halysitoides (Wilson). Ordovician, lower Niskibi River, Ontario. Transverse section (X4).
- Figure 3. Catenipora foerstei Nelson. Ordovician, lower Black Duck River, Ontario-Manitoba border. Transverse section (X4).

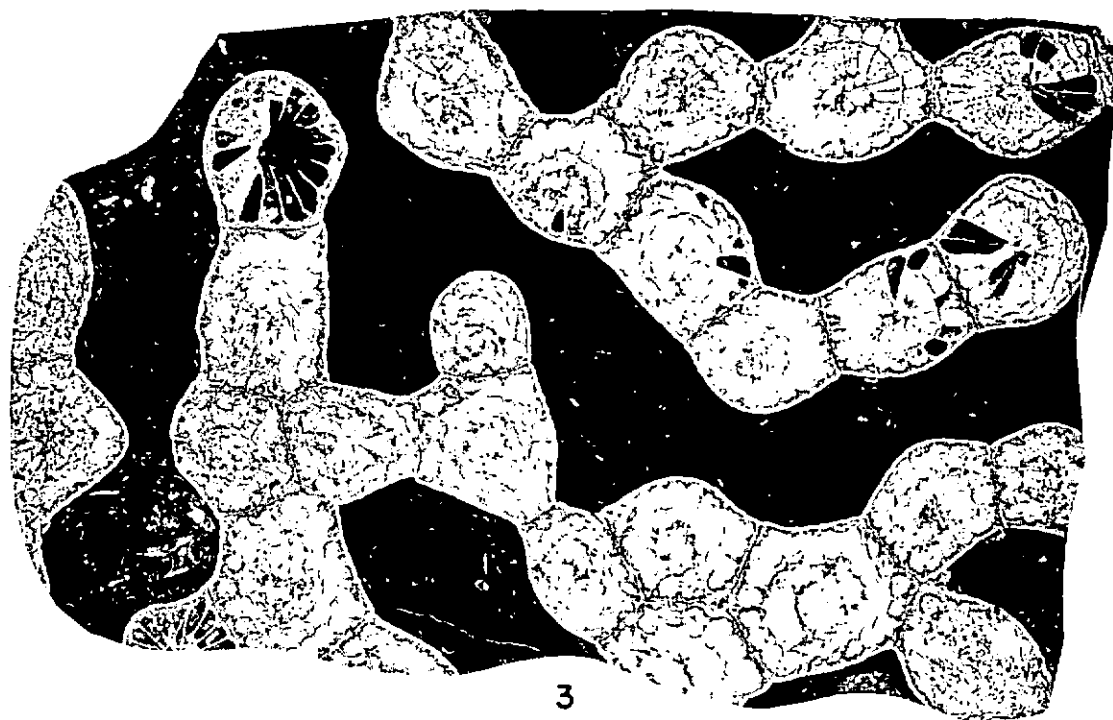
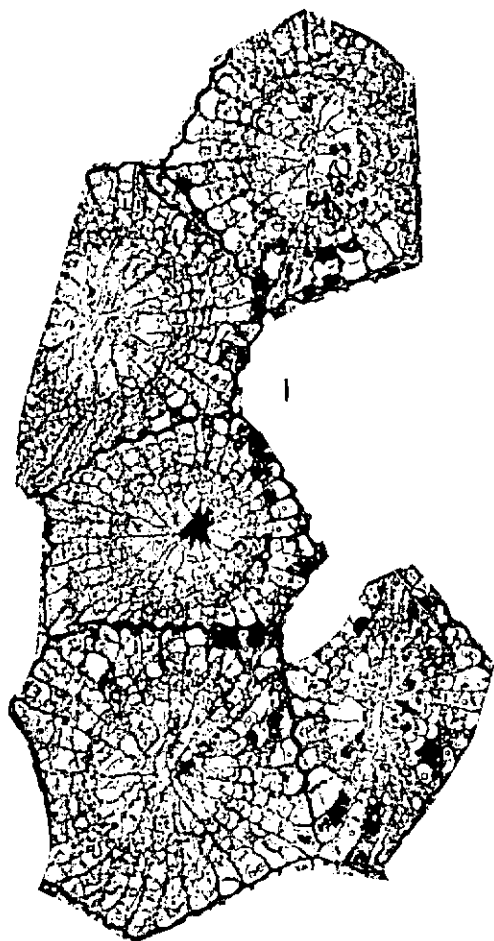


PLATE 5

Figure 1. Craenaena sublingulata Stainbrook. Devonian, Kaskattama River, Manitoba: 13 miles above mouth. Ventral view (X2).

Figures 2-4. Craenaena lata Stainbrook. Devonian, Kaskattama River, Manitoba: 13 miles above mouth. Dorsal, ventral and wide views (X2).

Figures 5-7. Emanuella richardaoni (Meek). Devonian Kaskattama River, Manitoba: 9½ miles above mouth. Ventral, dorsal and side views (X3).

Figures 8-10. ?Stringocephalus sp. Devonian, Kaskattama River, Manitoba: lower three miles of river. Side, dorsal and ventral views (X1½).

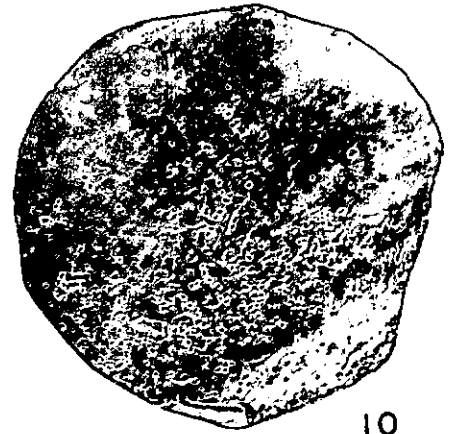
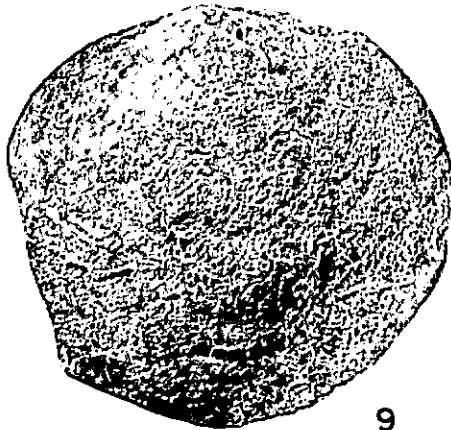
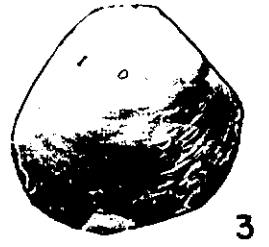
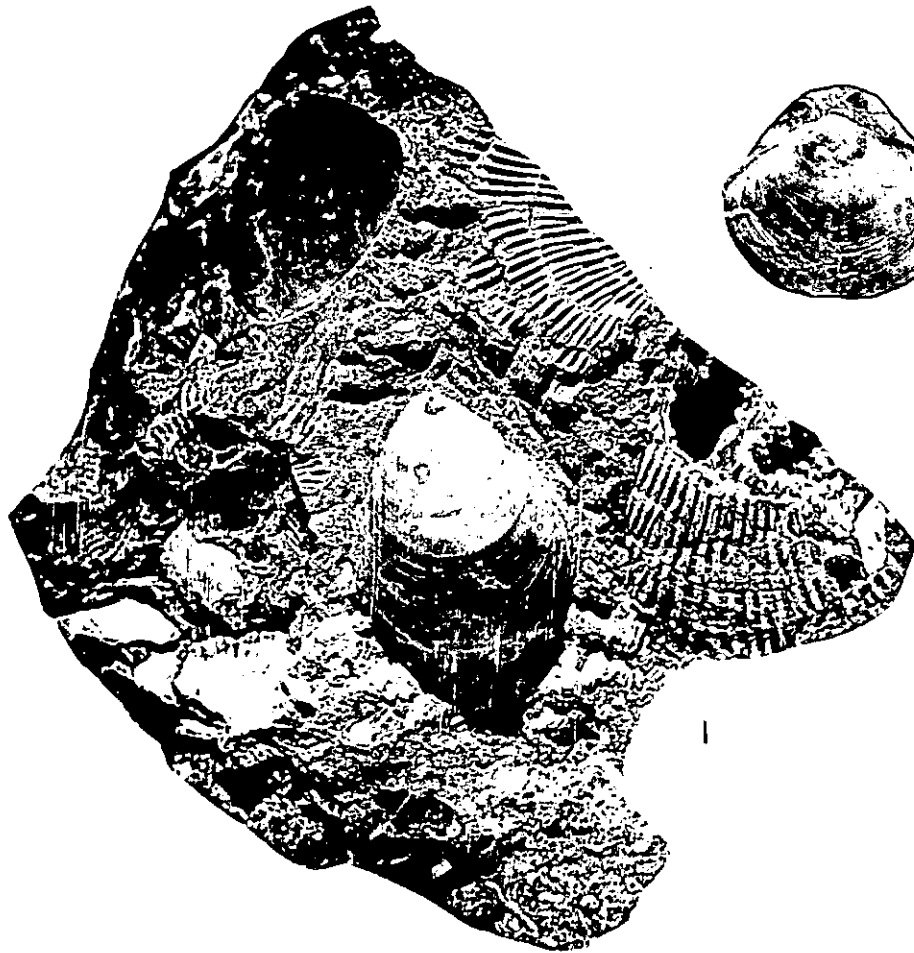


PLATE 6

- Figures 1-3. Atrypa sp., cf. A. scutiformis Stainbrook. Devonian, Kaskattama River, Manitoba: 12½ miles above mouth. Ventral, dorsal and side views (X2).
- Figures 4, 5. Atrypa sp., cf. A. scutiformis Stainbrook. Devonian, Kaskattama River, Manitoba: 12½ miles above mouth. Ventral and side views (X2).
- Figure 6. Spinatrypa mascula (Stainbrook). Devonian, Kaskattama River, Manitoba: 12½ miles above mouth. ?Dorsal view (X2).
- Figure 7. Spinatrypa bellula (Stainbrook)? Devonian, Kaskattama River, Manitoba: lower three miles of river. Dorsal view (X2).
- Figures 8, 9. Spinatrypa mascula (Stainbrook). Devonian, Kaskattama River, Manitoba: lower three miles of river. Dorsal and side views (X2).

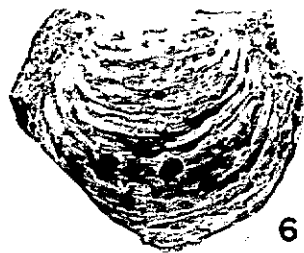
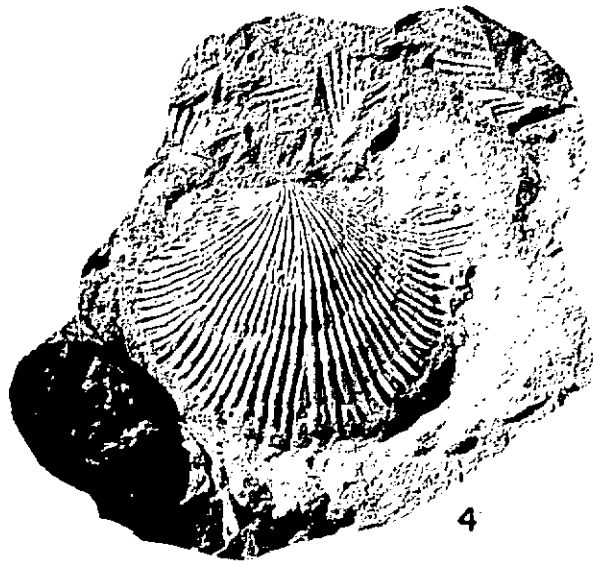
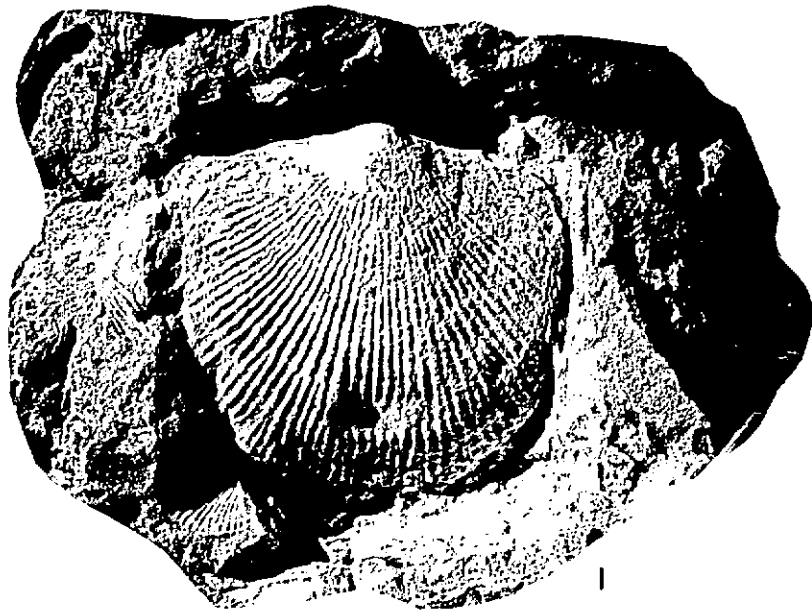
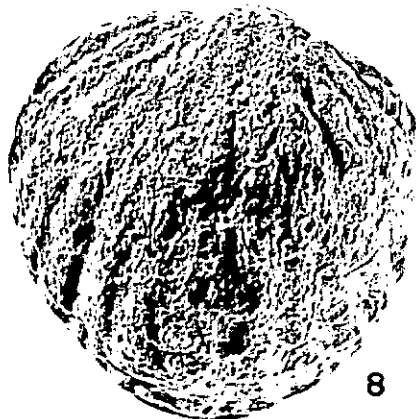
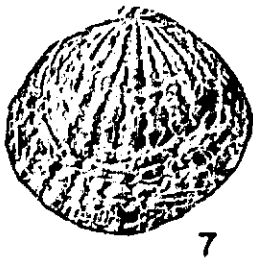
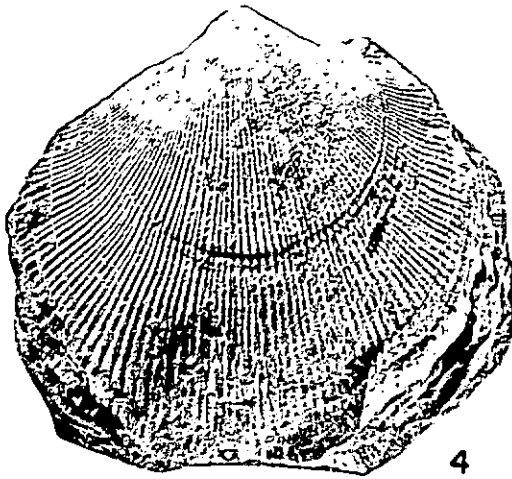
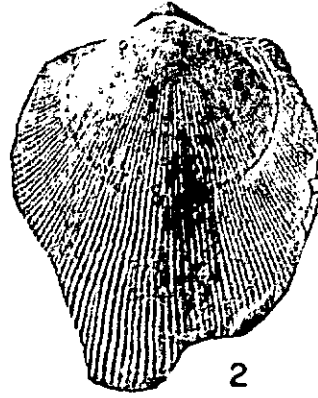


PLATE 7

- Figure 1. Atrypa sp., cf. A. rustica Stainbrook. Devonian, Hayes River, Manitoba: 12 miles above mouth. Ventral view (X2).
- Figures 2, 3. Atrypa sp., cf. A. rustica Stainbrook. Devonian, Kaskattama River: 9½ miles above mouth. Side and ventral views (X2).
- Figure 4. Atrypa sp., cf. A. rustica Stainbrook. Devonian, Kaskattama River, Manitoba: 13 miles above mouth. Ventral view (X2).
- Figure 5. Atrypa sp., cf. A. rustica Stainbrook. Devonian, Kaskattama River, Manitoba: 13 miles above mouth. Dorsal view (X2).
- Figure 6. Productella concentrica (Hall). Devonian, Kaskattama River, Manitoba: 10 miles above mouth. Ventral view (X2).
- Figure 7. ?Trimerella sp. Silurian? York Factory, Manitoba (X1).



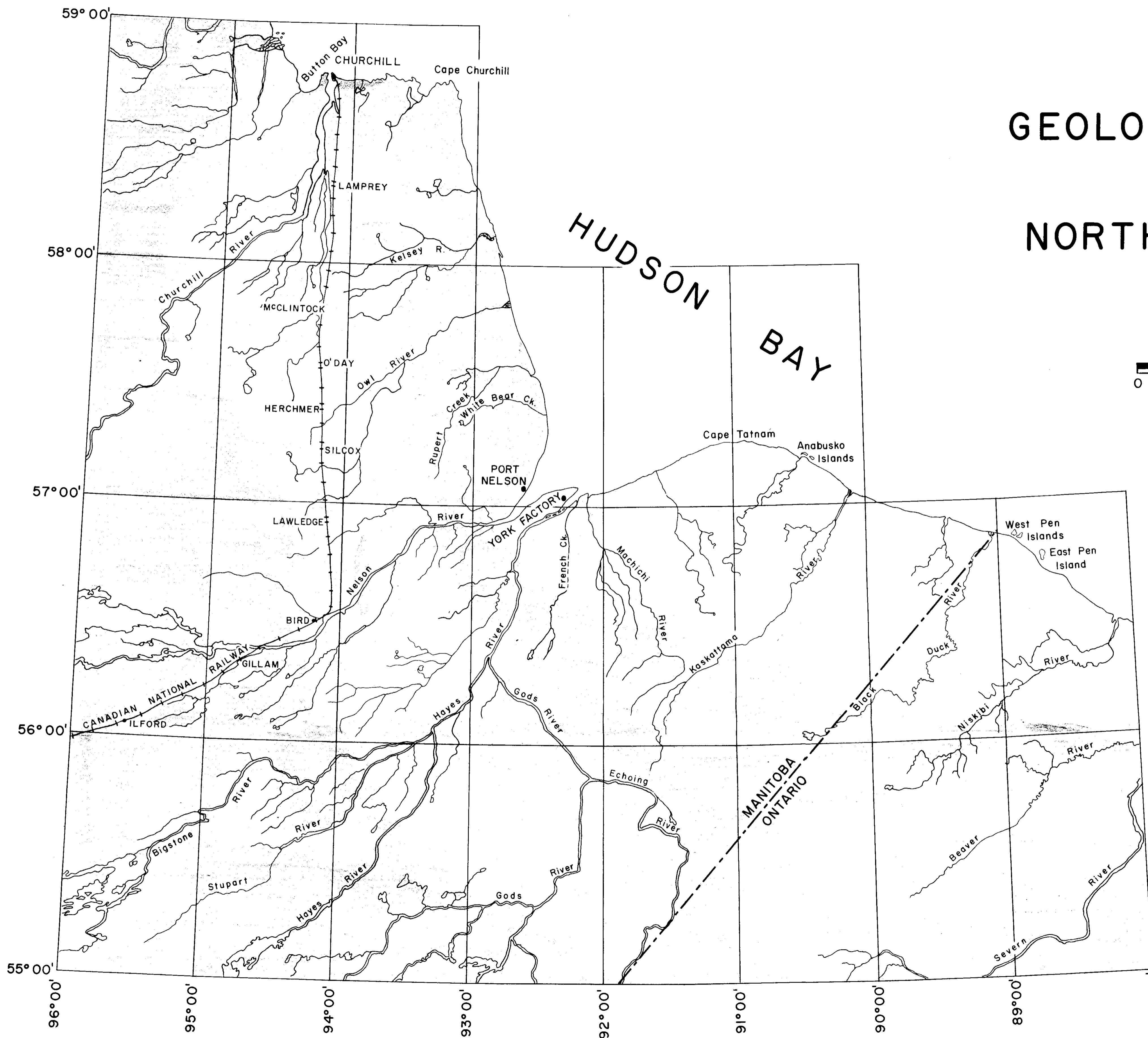
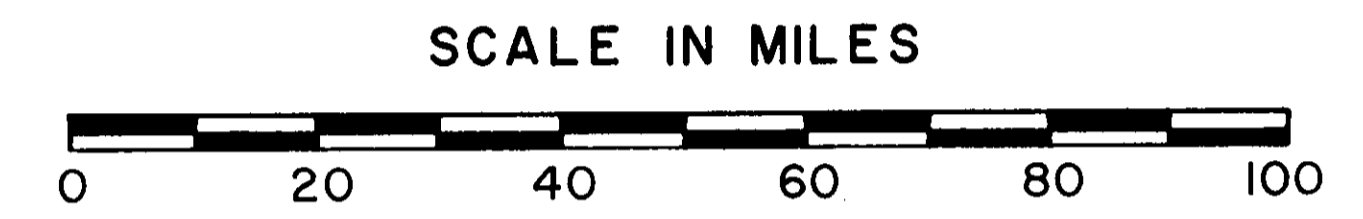




Figure I.
**GEOLOGICAL SKETCH MAP
 OF
 NORTHERN HUDSON BAY
 LOWLAND.**



LEGEND

-  DEVONIAN
-  SILURIAN
-  UPPER ORDOVICIAN
-  PRE-CAMBRIAN CRYSTALLINES