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PAPER

THREE NEW LOWER PALEOZOIC FORMATIONS OF THE BOOTHIA PENINSULA REGION, CANADIAN ARCTIC ARCHIPELAGO.

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Abstract

Three newly named lower Paleozoic formations on Boothia Peninsula nonconformably overlie the Canadian Shield and include, for this region, the oldest bedded rocks of the Interior Platform. The lower Paleozoic strata are preserved on the flanks of Boothia Uplift and as outliers within the Precambrian terrane. The outliers are made up largely of the lower two formations, whereas the upper formation underlies large areas east and west of the Boothia Precambrian belt.

The basal unit, the Boothia Felix Formation, comprises sandstone and sandy dolomite, is about 350 feet (110 m) thick, and contains Middle Cambrian fossils. Overlying is the Netsilik Formation of silty and sandy dolomite, dolomite, and intraformational conglomerate and breccia; this unit is about 500 feet (150 m) thick and has yielded Lower Ordovician fossils. The youngest unit is the Franklin Strait Formation, which comprises dolomite and sandy dolomite, is more than 2,000 feet (600 m) thick, and probably ranges in age from Middle Ordovician to Middle Silurian.

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INTRODUCTION

Boothia Peninsula is the northernmost extremity of the mainland of North America and extends more than 200 miles (340 Km) into the southern part of the Canadian Arctic Archipelago. Neighbouring islands of the archipelago include King William and Prince of Wales Islands to the west, Somerset Island to the north, and Baffin Island to the east (Fig. 1). A narrow, topographically high belt of Precambrian basement trends north-northwest through the region, dominating the geology of Boothia Peninsula, eastern Prince of Wales Island, and western Somerset Island. Lowlands and plateaus to the east and west are underlain by gently deformed lower Paleozoic[1] carbonate and clastic rocks (Fig. 1). This report names and defines the three oldest Paleozoic rock units in the Boothia region[2], and discusses the distribution and correlation of these units.

[1] The term, lower Paleozoic, is used here to include Cambrian, Ordovician, Silurian, and Devonian rocks.

[2] Boothia region, as used in this report, refers to the area covered by Operation Prince of Wales, namely: Boothia Peninsula, King William, Prince of Wales, and western Somerset Islands.

Field Work

This report is based on field work carried out in the summer of 1962 during Operation Prince of Wales, an air-supported project led by R.G. Blackadar (1967). The writer, a member of the project, was responsible for the study of the lower Paleozoic rocks of the Boothia Peninsula region, and his party was supported mainly by a Piper Super Cub aircraft equipped with oversize, low-pressure tires to allow landings on unprepared terrain. In the course of Operation Prince of Wales the writer's studies ranged over Boothia Peninsula and King William, Prince of Wales, and Somerset Islands (Christie, 1963; 1967a).

Access to the region is usually by aircraft via Cambridge Bay in the western Arctic. The small settlement of Spence Bay, on the west side of Boothia Isthmus, includes a Hudson's Bay store, a nursing station, a Royal Canadian Mounted Police detatchment, Territorial government offices and school, and church missions. Heavy freight from the south for Spence Bay is usually carried by ship via the Mackenzie River and coastal shipping route.

Early Geological Work

Boothia Peninsula was discovered and named by Capt. John Ross (1835) of the Royal Navy during one of the early attempts to find the Northwest Passage. From 1829 to 1831, Ross wintered his ship Victory in harbours on the east coast of Boothia Peninsula. It was during this time that Ross's nephew, James Ross, made an extended overland journey to the west coast of the peninsula where he discovered the north magnetic pole and gathered considerable geological data. Other contributions to the geology of the region in the nineteenth century include that of Leopold M'Clintock (1857; 1859). The observations by the Rosses and by M'Clintock formed a significant contribution to the Reverend Samuel Haughton's classical account (Haughton, 1857, 1859) of the geology of the Arctic Islands.

Virtually no new geological information was obtained from the Boothia region until the Geological Survey of Canada began systematic studies in the Arctic Islands in 1947.

Recent Geological Studies

Recent earth-science studies in the Boothia region began in 1947 when Y.O. Fortier of the Geological Survey of Canada accompanied a Dominion Observatory party that carried out a geomagnetic reconnaissance of much of the northern mainland and some of the southern islands of the archipelago in an R.C.A.F. amphibious Canso aircraft. A landing was made at Agnew River, on the east side of Boothia Peninsula (about lat. 70° 38' N, long. 92° 40' W), and the rocks and glacial features were examined.

Fortier (1948, pp. 8-10) provided a general description of the geological structure and the physiography of the region.

A reconnaissance study of the physiography of Boothia Isthmus was carried out by J.K. Fraser in 1953. The distribution of the crystalline and the overlying Paleozoic rocks was described in some detail, as were many glacial features and deposits (Fraser, 1958).

The geology of the northern parts of Prince of Wales and Somerset Islands was examined during Operation Franklin, an airborne reconnaissance project of the Geological Survey of Canada. Ordovician and Silurian fossils were collected from beds flanking the Boothia Precambrian belt, and it was noted that these beds apparently pre-date the Boothia Uplift.

A latest Silurian or early Devonian date for the start of tectonism in the Boothia region was established, as was the synorogenic nature of the clastic Peel Sound Formation (Thorsteinsson and Tozer, 1963, pp. 120,121,125).

In 1962, as noted earlier, the Geological Survey of Canada carried its program of geological reconnaissance into the Boothia region as Operation Prince of Wales. The general geology of the region deriving from this and earlier field work has been described in the following publications: the basement complex, by R.G. Blackadar (1967); the surficial geology of the Boothia region, by B.G. Craig (1964); and the general stratigraphy and tectonic history, by J. W, Kerr and R.L. Christie (1965). Two of the formations named in the present report were noted, and some characteristics described, by Christie (1963, 1967 a).

Paleozoic formations of Boothia region were studied on Somerset and Prince of Wales Islands in the course of petroleum exploration in 1959 and following years. Ordovician and Silurian fossils were collected from the zone of upturned beds on the west flank of the Precambrian belt; these beds had been, during Operation Franklin, tentatively assigned a Proterozoic age from the presence of (adjacent) layered rocks with basic dykes.

Field parties from the University of Ottawa, headed by D.L. Dineley, have carried out geological work on Somerset and Prince of Wales Islands on a continuing basis since 1964 (see Dineley, 1965, 1966). Considerable petrological, paleontological, and structural data on the Precambrian and lower Paleozoic rocks were collected by this group. Interpretation of the Precambrian and early Paleozoic tectonic history of the Boothia Uplift was achieved through study of the geometry, both macroscopic and microscopic,

of structural cross-sections of the basement rocks (Brown, et al., 1969). The origin and tectonic relationships of the overlying, basal clastic and carbonate rocks were considered by Tuke, Dineley, and Rust (1966), who favoured a lower Paleozoic age assignment for sill- and dyke-bearing units (Aston and Hunting Formations) and correlation with the basal Paleozoic beds of Boothia Peninsula. Sections of the Aston Formation on Prince of Wales Island were measured by O.A. Dixon, Williams, and J. Dixon (1971), and from the lithology they concluded that the detritus was derived from contemporary land areas on the site of the present Boothia Uplift. The youngest of the lower Paleozoic units, the Peel Sound Formation, was studied by A.D. Miall (1970a, 1970 b), who described in detail the alluvial and deltaic characteristics of the unit.

The nature and relationships of all the cover rocks, from possibly Proterozoic to Cretaceous-Tertiary ages, were outlined by B.R. Rust (in Brown, et al., 1969). A limited area of Cretaceous-Tertiary beds on Somerset Island, described by Dineley and Rust (1968), provides evidence for relatively late tectonic subsidence in the Boothia region.

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STRATIGRAPHY

General Statement

Boothia Peninsula and the nearby islands lie within the Interior Platform structural-stratigraphic province, a region characterized by generally horizontal or gently dipping lower Paleozoic strata and by relatively thin formations. The Paleozoic beds in the Boothia region form two basinal areas that are separated by an uplifted belt. The basins are: M'Clintock Basin, to the west; and Prince Regent Basin, to the east (see Christie, 1972, pp. 50-53). The intervening tectonic high is the Boothia Uplift, a belt of Precambrian, mainly gneissic rocks and flanking Cambrian to Devonian disturbed sedimentary rocks that extends northward from the Canadian Shield into the Paleozoic lowlands of the Arctic Archipelago (see Christie, 1972, pp. 73-77; Thorsteinsson, 1970, p. 549; Kerr and Christie, 1965). Cambrian clastic and carbonate beds, the oldest known rocks of the cratonic basins flanking the Boothia Uplift, are exposed along the margins of the basins and as downfaulted outliers on the uplift (see Fig. 1). Overlying Ordovician to Silurian

dolomite beds are widely exposed both in basinal regions and in outliers. The Silurian Read Bay Formation of thin-bedded limestones overlies the dolomites and is widely exposed in the basinal regions. The latest Silurian or younger Peel Sound Formation of conglomerate and sandstone overlies the Read Bay Formation on Prince of Wales and Somerset Islands to form the youngest lower Paleozoic unit.

The clastic and carbonate beds underlying the Read Bay Formation of the Boothia region are here recognized as three new units: the Boothia Felix, Netsilik, and Franklin Strait Formations.

The lowermost unit consists of clastic and carbonate beds with Middle Cambrian fossils, and is here named the Boothia Felix Formation; overlying clastic and carbonate beds with Lower Ordovician fossils are named the Netsilik Formation; and light-grey weathering dolomite beds form the uppermost of the new units, here named the Franklin Strait Formation.

Because of the general similarity of beds here assigned to the Boothia Felix and Netsilik Formations they were earlier regarded as one map-unit: unit 8 of Geological Survey of Canada Map 36-1963 (Christie, 1963). Subsequent determination of Early Ordovician fossils in the upper part of the map-unit indicates, however, that two lithological units are involved (See Table of Formations, below).

Moveover, the absence of Upper Cambrian fossils in a thin interval of beds between Middle Cambrian and Lower Ordovician fossils suggests that the units are separated by a profound hiatus.

The Franklin Strait Formation was recognized and mapped during Operating Prince of Wales as map-unit 9 of GSC Map 36-1963 (Christie, 1963).

Table of Formations

	Christie, 1963	This paper	Lithology & thickness
Silurian and ? Devonian	Peel Sound	Peel Sound	conglomerate, sandstone
Silurian	Read Bay	Read Bay	limestone, limy dolomite, shaly dolomitic limestone, silty limestone
Ordovician and Silurian	Map-unit 9	Franklin Strait	dolomite, sandy dolomite, dolomitic sandstone
Lower Ordovician	Map-unit 8	Netsilik	silty and sandy dolomite, dolomite, intraformational conglomerate and breccia
D I S C O N F O R M I T Y ?			
Middle Cambrian		Boothia Felix	sandstone, sandy dolomite, shaly dolomite, intraformational conglomerate
Proterozoic			diabase dykes and sills
	Hunting, Aston	Hunting, Aston	dolomite, sandy dolomite quartzite
Archean and Proterozoic			gneiss, schist, granite, ultrabasic rock

Precambrian

The 'crystalline basement' of the Boothia region is a varied assemblage of gneisses and granitoid rocks of the Churchill Structural Province (see Stockwell, 1970). Rocks characteristically present include: banded lit-par-lit gneisses, migmatite, amphibolite, pyroxene- and biotite-rich gneisses, quartz-microcline gneisses with more or less garnet, and granite. Potassium-Argon age determinations of 1,635 ± 50 and 1,670 ± 50 m.y. were obtained for gneisses, and 1660 m.y. for a specimen of granite. An Aphebian age (closing with the Hudsonian Orogeny, mean K-Ar age: 1735 m.y.) for the latest period of metamorphism is indicated (Blackadar , 1967).

A strong northerly structural trend is apparent in the Precambrian rocks, the 'grain' due primarily to modified compositional banding. The internal structure of the gneisses seems uniform and simple, and was thus described from a reconnaissance study (see Blackadar, 1967, pp. 32-36) . A more detailed study by Brown and Dalziel on Somerset Island confirmed an essential unity of metamorphic grade and homogeneity of structural style. Detailed structural traverses, also revealed, however, the presence of numerous macroscopic folds with axes sub-horizontal and consistent in trend (Brown, et al., 1969, pp. 527, 528).

The Precambrian gneisses of the Boothia region are nonconformably overlain at scattered localities by unfossiliferous quartzites and dolomites, which have been mapped and described as the Aston and the Hunting Formations, respectively the lower and upper units (see Blackadar, 1967, pp. 26,27); Tuke et al., 1966; Dixon, et al., 1971). The Aston Formation includes mainly light to dark grey, yellow, and red quartzites, and the Hunting Formation, mainly light grey to yellow dolomite. The total thickness of the two units may be 10,000 feet (3,000 m). This sequence of beds is overlain on northern Somerset Island by dolomites with Ordovician fossils, and no evidence of a sedimentary discontinuity was observed during studies of the contact (Tuke, et al., 1966). The Aston and Hunting Formations are usually assigned a Precambrian age from their similarity to presumed late Precambrian rocks elsewhere in the Arctic Islands and from the presence of intruded diabasic sills and dykes, which nowhere in the Arctic Interior Platform region are known to intrude Paleozoic rocks.
However, Tuke and others (op. cit. p. 710) have concluded that a Middle Cambrian to Ordovician age is possible for the Aston-Hunting sequence, and tentatively correlate the beds with the Middle Cambrian and younger units described in this report.

Sills and dykes of tholeiitic diabase cut the gneisses and granites and the overlying Aston and Hunting Formations. The dykes trend northwest on Boothia Peninsula (Blackadar, 1967, pp. 27-31; and see Map- 2-1967). A whole-rock K-Ar age determination of 607 ± 75 m.y. was obtained from the "chilled basalt" margin of a diabase dyke; this age is thought to represent the approximate age of intrusion (Determination Number: GSC 67-53 in Wanless, et al., 1970, p. 31). The diabase dykes thus represent a relatively late period of intrusion in the Canadian Shield, probably correlating with younger diabases of northwest Baffin Island (639 ± 25 m.y. and younger; see Blackadar, 1970, pp. 68-78) and Victoria Island (635 m.y. and 640 m.y.; see Christie, 1964). The younger diabases may have been contemporaneous with Hadrynian extrusive rocks such as those of the Natkusiak Formation of Victoria Island (Thorsteinsson and Tozer, 1962; Christie, 1964).

Middle Cambrian

Boothia Felix Formation

Definition

The original name given by Sir John Ross for what is now Boothia Peninsula is proposed for a thin assemblage of mainly clastic beds that rests nonconformably on the basement gneissic rocks. The clastic unit is overlain with structural conformity by the Ordovician Netsilik Formation. Good exposures of the Boothia Felix Formation occur in outliers on the Boothia Uplift and in river canyons along the eastern border of the Boothia Precambrian belt.

Boothia Felix, now a disused name, was given by Ross (1835, pp. 733, 734, and chart facing p. xxv) to the isthmus and peninsula in honour of his friend and the patron of the expedition, Sir Felix Booth.

Distribution and Thickness

About 350 feet (110 m) of Boothia Felix strata was measured at the type locality, which is the irregular strip of land separating Kangikjuke and Jekyll Lakes, about latitude 69° 50' N, longitude 93° 45' W (locality 1, Fig. 1). Beds of this basal Paleozoic formation make up the lower parts of the sedimentary outliers of southern Boothia Peninsula. Basal clastic beds exposed along the western margin of the Boothia Precambrian belt are presumably correlative, as are similar beds exposed in a narrow zone along the entire eastern Precambrian margin.

The basal contact of the Boothia Felix Formation was nowhere observed. However, debris from the lowermost beds was evident in the section measured at 'Lost River'; the basal rock there is impure, fine-grained, thinly laminated sandstone with fucoid traces and ripple-marks on some bedding surfaces.

The upper beds of the formation appear conformable with overlying Ordovician beds at the type section. The top of the unit, not exposed, is presumed to lie at the base of scarp-forming, brown-weathering dolomite beds with inarticulate brachiopods.

During field wok work in 1962, as noted earlier, the basal clastic beds were distinguished as a separate map-unit (see maps in Christie, 1963). No fossils were obtained from sections of these beds exposed along the eastern flank of the Boothia Precambrian belt, and lithological variation from section to section renders correlation difficult. It is now unclear whether Cambrian or Lower Ordovician beds, or both, are represented by the basal map-unit of the eastern flank. The problem is rendered the more difficult in that at each measured section there appeared to be only 400 to 500 feet (120-150 m) of basal clastic beds, while the aggregate thickness of the Boothia Felix and Netsilik Formations is evidently at least 800 feet (240 m).

Detailed study may demonstrate the presence of both formations in the basal map-unit, or the presence of the Netsilik Formation in the overlying beds. In this writer's opinion, both the Boothia Felix and the Netsilik Formations are present, perhaps thinned compared to the type sections.

Lithology

The Boothia Felix Formation consists mainly of sandy dolomite and sandstone with thin beds of dolomite intraformational conglomerate or breccia.[1] The unit is characteristically thin-bedded, with dark-weathering, brownish colours. These features contrast with the greys and green-greys of the overlying Netsilik Formation, and the thick-bedded, light grey-weathering dolomites of the Franklin Strait Formation.

The overall lithological character of the Boothia Felix Formation is uniform throughout its areal extent, but in detail the formation varies from section to section. In general, a three-fold subdivision appears to characterize most exposures of the formation. These are, in upward order: 1. basal sandstone or dolomitic sandstone beds, in places fossiliferous; 2. dark, thin-bedded, shaly carbonate-rocks; and 3. sandy dolomite, dolomite, and dolomite intraformational breccia.

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[1] In this report, 'conglomerate' contains relatively rounded fragments, while the fragments in 'breccia' are mainly angular. There is a continuous gradation, in the Boothia region, between conglomerates and breccias, and the two names apply to rocks of the same origin: penecontemporaneous beds broken up and redeposited.

The sandstones of the Boothia Felix Formation are fine- to coarse-grained, with well-rounded grains. Bluish quartz grains were observed in some basal beds. Some beds are pure sandstone, brownish on a fresh surface but weathering white. A carbonate matrix is characteristic of the unit.

The dolomites are usually thinly laminated, silty, and brown-weathering. Sandy varieties of dolomite grade into dolomitic sandstone. Massive dolomite is grey to brown on the fresh surface, medium- to fine-grained, and sugary in texture. Thin beds of dolomite or sandy dolomite-matrix intraformational conglomerate or breccia are present in all sections. The flakes are usually flat and angular, although rounded 'corners' also were observed. Flake diameter is usually about 3 inches.

Shale beds are greenish and crumbling. Some silty and sandy beds have shaly partings and these rocks, too, crumble to fine debris at the outcrop.

The type section of the Boothia Felix Formation, between Kangikjuke (locality 1, Fig. 1) and Jekyll Lakes, is in a region of low relief but with light overburden; the section is moderately well exposed. The more resistant beds stand out as scarps; bedding dips gently northeast. Brachiopod fossil determinations in the following description are by A.J. Rowell of the University of Nottingham, England; other fossils were determined by J.W. Cowie, University of Bristol, England, and by A.W. Norris, Geological Survey of Canada.

This section, as others reported in this paper, was measured using a graduated staff and aneroid altimeter. Some intervals were estimated by eye.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Type Section of Boothia Felix Formation at Kangikjuke Lake (Locality 1)		
	Netsilik Formation: Top of section: eroded		
17	Dolomite; pale grey-brown, pale brown-weathering, with some purplish mottling; fine-grained,[1] in some beds silty or sandy; thick-bedded. Inarticulate brachiopods preserved.	20	378
16	Dolomite, sandstone, intraformational breccia; mainly dolomite; grey-brown, light brown-weathering, fine to medium-grained; some beds of brown, medium-grained sandstone with dolomite matrix. About middle of unit, a bed of light grey intraformational breccia with flat dolomite flakes up to 8 cm diameter	25	358
	Top of Boothia Felix Formation.		
15	Covered interval; about in middle, float of light grey dolomite with bioclastic debris.	50	333
14	Dolomite, sandy dolomite; grey-brown, grey-brown weathering; medium to fine-grained; silty and sandy banding	25	283
13	Covered interval	50	258
12	Shale; crumbling, green-grey. In uppermost part, thin beds of pale brown, buff-weathering fine intraformational breccia; fragments sharp, up to 20 mm diameter; fragments reddish brown dolomite; matrix green-flecked (glauconite?), green-grey, sandy.	30	208

[1] In this text, the "grain" of a crystalline rock refers to the fineness or coarseness of the crystallinity.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
11	Covered interval, estimated	10	178
10	Dolomite; brown, light brown-weathering, medium-grained	3	168
9	Covered interval, estimated	15	165
8	Sandstone; brown and white-weathering; coarse-grained, with fossil fragments; dolomite matrix. Fossils (GSC loc. 51208) reported by A.W. Norris as: ?Hyolithes sp.; undet. genal spines; cf. Glossopleura sp.; cf. Elrathia sp. Age: Middle Cambrian. (Thickness estimated)	20	150
7	Covered interval, estimated	10	130
6	Dolomite intraformational breccia; sharp, thin flakes up to 3 cm broad of dark grey and light brown dolomite in a grey, sandy dolomite matrix	5	120
5	Dolomite; mottled pale green-grey, light brown-weathering, very fine-grained silty dolomite	10	115
4	Sandstone; pale brown, brown-weathering; fine-grained, finely laminated; carbonate matrix; thin-bedded	5	105
3	Dolomite; pale grey-brown, brown-weathering; medium-crystalline; some beds vuggy. Thickness estimated	20	100

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
2	Sandstone; dolomitic, pale brown, white-weathering; medium-grained; well-rounded grains in white dolomite matrix. Fossil (GSC loc. 51546) cephala reported by J. W. Cowie to be very similar to a form indicated as cf. Elrathia sp. of GSC loc. 51208 and almost certainly conspecific.	20	80
1	Sandstone; grey and white, fine-grained, with carbonate matrix. Upper beds only well exposed; basal beds determined from float. Thickness estimated.	60	60
	An exposure of this unit about 10 miles south-southwest of the type section displays broad ripple-marks and some contorted, slumped bedding.		
	Underlying: crystalline rocks of the Canadian Shield		0

Origin and Environment

The Boothia Felix Formation evidently represents a marine transgression on a stable platform. The presence of ripple-marks and intraformational breccia and conglomerate indicates shallow water conditions. The faunas, carbonate-rock, and carbonate matrix of the clastic rocks suggest a marine environment. The abundance of clastic material suggests a source at moderate distance, presumably the exposed Canadian Shield to the south. The uniform sorting of the sand fraction, the rounding and frosting of the larger sand grains, and the thinness of the unit indicate very stable conditions, characteristic of an interior, cratonic locale.

Age and Correlation

The fossil collections (GSC locs. 51208 and 51546) from the type section of the Boothia Felix Formation were identified by A.W. Norris, who states that the trilobites Glossopleura and Elrathia indicate a Middle Cambrian age. According to Dr. Norris a correlation is indicated with the Bear Point Formation of Dundas Harbour (see Kurtz, McNair, and Wales, 1952).

A fauna (GSC loc. 51550) obtained from a sandstone bed in an outlier about 10 miles southwest of Kangikjuke Lake (locality 1) and estimated to occur about 50 feet (15 m) above the base, includes : "hyolithid indet. and cf. Elrathia sp." These fossils were studied by J.W. Cowie, and dated also as Middle Cambrian.

The Boothia Felix Formation evidently is correlative with Middle Cambrian beds, or beds tentatively identified as such, at many localities of the Arctic Interior Platform (Table 1). Sandstone, siltstone ,and dolomite beds of this age are widespread and represent a major transgression of the early Paleozoic seas. Late Lower or Middle Cambrian beds are present in southern Ellesmere Island (Christie, in preparation); Lower and Middle Cambrian beds are present in southern Devon Island (Kurtz, McNair, and Wales, 1952); and formations are tentatively assigned to Lower and Middle Cambrian series on Baffin Island (Trettin, 1969, p. 20). Also, trilobite fossils from basal Paleozoic beds in northern Victoria Island (collected by Bernard Plauchut and identified by W. Fritz, Geological Survey of Canada) have been assigned to the late Lower Cambrian. It appears that the Boothia region remained positive, possibly as a north-trending peninsula of Canadian Shield rocks, while flanking areas of the Arctic Interior Platform were inundated by late Early Cambrian seas.

Lower Ordovician

Netsilik Formation

Definition

Dark grey to green-grey clastic and carbonate beds overlying the Boothia Felix Formation on Boothia Peninsula are here named the Netsilik Formation. The name is taken from Netsilik Lake and River, which lie on Boothia Isthmus south of the type section. The Boothia and surrounding regions are the home of the Netsilingmiut Eskimos - 'people of the seal'.

The Netsilik Formation is dominated by grey- or green-grey-weathering rocks. There is a superficial resemblance to the Boothia Felix Formation in the presence of sandy and silty beds and in the brownish weathering colour of some beds. Overlying the Netsilik Formation are beds of a markedly contrasting lithological character: light-weathering, massive, and thick-bedded. The overlying beds are herein assigned to the Franklin Strait Formation.

The Netsilik Formation is well exposed in a shallow canyon on Lord Lindsay River on Boothia Peninsula, and this is chosen as the type section. The section was measured from about latitude 73° 02' N, longitude 93° 23' W up river to latitude 73° 07' N, longitude 93° 25' W (locality 2, Fig. 1).

At both the lower and the upper contacts, the Netsilik Formation appears conformable with adjacent beds. The lower contact is tentatively and arbitrarily placed (in the type section of the Boothia Felix Formation) at the base of the lowest beds containing Lower Ordovician fossils. A major disconformity and hiatus, representing much of late Cambrian time, must be represented by a surface near that separating the Netsilik and the Boothia Felix Formations.

The upper contact is placed at the base of thick, scarp-forming dolomite beds characteristic of the Franklin Strait Formation. The lithological change from thin-bedded, green-grey carbonates to thick-bedded, light grey- or yellow-grey-weathering dolomite is abrupt.

Distribution and Thickness

The Netsilik Formation is established, at present, only on the inliers in the vicinity of Kangikjuke Lake and Lord Lindsay River on Boothia Peninsula. (120 m) About 400 feet of beds was measured at the type section on Lord Lindsay River, where, however, the base of the unit is not exposed. At least 100 feet (30 m) of strata in adjacent outliers is included in the unit and assumed to underlie the lowest beds of the type section, so that a total thickness of at least 500 feet (150 m) may be present.

Grey- and green-grey-weathering shale beds characteristic of the Netsilik Formation were observed in a section near Mount Oliver, southern Somerset Island. It appears probable that the Netsilik Formation is present in the eastern Paleozoic belt of the Boothia region, but, as explained above, further field study will be required to separate the underlying, basal Paleozoic unit and the overlying, somewhat similar clastic unit.

Lithology

The Netsilik Formation consists mainly of thin-bedded, dark grey to green-grey weathering sandy and shaly dolomites. Grey sandstone with dolomite matrix is prominent in the lower parts of the type section, and recessive, dark, argillaceous carbonate-rock in the upper parts. Interbeds of thicker-bedded, more resistant dolomite occur throughout, but are more prominent near the middle. Intraformational breccia occurs as thin and thick beds throughout the section. Nodules of iron sulphide are present in some beds. Ripple-marks and cross-bedding are evident in thin beds overlying the lower, sandy units.

The type section of the Netsilik Formation on Lord Lindsay River is described below.

Bedding at the type section is gently undulating, but with an overall slight north-westward dip so that successively higher beds are encountered as one follows the river upstream. Brachiopod fossil determinations in the following description are by A.J. Rowell; other fossils were determined by J. W. Cowie.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	Type Section of Netsilik Formation on Lord Lindsay River (Locality 2, Fig 1)		
	Franklin Strait Formation:		
11	Dolomite; basal 40 feet medium-bedded, less resistant than unit 10; abrupt basal contact; colour variable: brown, grey-brown whitish; uniform crystallinity but vague bands apparent. The lower beds pass gradationally into an upper 50 feet of competent, dark grey, medium grained dolomite; weathering dark brown. The upper-most beds form a prominent scarp.	90	527
10	Dolomite; scarp-forming, pale yellowish grey, massive; medium crystallinity; medium to thick-bedded; weathers light yellow in canyon walls. Upper-most bed is distinctive, whitish to brownish, medium-grained, with abundant large white patches of earthy material.	100	437
	Top of Netsilik Formation.		
9.	Dolomite, limestone; the lower 25 feet is alternating resistant, pale brown dolomite and recessive, dark shaly limestone with abundant dark markings; chert lenses up to 4 inches are present, and some lenses nearly coalesce to form chert beds.		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	The lower beds pass upward without sharp break, into about 60 feet of recessive, very thin-bedded, yellow-grey weathering, green-grey shaly carbonate rock. Minor thin competent carbonate beds and beds of intraformational breccia are present; some channels underlying beds are breccia-filled. Iron sulfide pods are scattered in some beds about 50 to 65 feet above the base. The sulfide (pyrite or marcasite) occurs as rounded forms and as streaks or bars up to 2 mm size.	85	337
8	Dolomite: Thin-bedded, near-massive, and fine-grained; weathering pale brown; some very closely spaced parting; characterized by round and slit-shaped vugs up to 3 mm, and by dark (carbonaceous?) specks and streaks. The uppermost bed contains some white-weathering flint nodules up to 2 inches in diameter	35	252
7	Dolomite: medium to thick-bedded, massive, fine-grained, pale brown, weathering yellowish grey. The uppermost beds are marked by thin bedding or horizontal parting.	37	217
	Covered interval	10	180
6	Intraformational breccia: tabular carbonate-rock fragments in a light grey-brown sandy dolomite matrix; fragments range from 1/4 to 4 inches, but generally		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	are about 1/2 to 2 inches in size; bedding surfaces are undulating, suggesting broad ripple-marks with an amplitude of 2 inches and a wavelength of 10 to 14 inches	25	170
5	Dolomite; medium to thick-bedded, grey-brown weathering, massive, with nodular bedding surfaces; small mud-cracks and ripple-marks evident; thin intraformational conglomerate and breccia layers form some bedding surfaces; marcasite nodules up to 2 mm evident. Articulate and inarticulate brachiopods and graptolites collected (GSC locs. 51567, 51553, 51554): Schizambon sp.; articulate brachipod indet. - probably orthid; anisograptid indet.; Dendrograptus sp.	30	145
4	Sandstone and dolomite; thinbedded, interbedded. Lower 3 feet (15) fine-grained grey sandstone with thin, platy interbeds of grey, fine-grained dolomite; ripple-marks and lensy bedding evident. Upper 7 feet (15) fine-grained silty dolomite with iron sulfide nodules and disseminated specks; some cross-bedding. Dolomite intraformational conglomerate beds with maximum fragment size variously 1/4 inch to 3 inches are present. One trilobite (GSC loc. 51547) collected: ptychopariid (? cf. Hardyoides)	10	115

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
3	Sandstone; dolomitic, medium-grained, light grey-brown, medium to thick-bedded; well-rounded quartz grains in dolomite matrix; cross-bedding common, with direction of transport evidently extremely varied; some lensoid interbeds of sandy dolomite and dolomite; minor porous sandstone without carbonate matrix.	30	105
2	Sandstone; dolomitic or sandy dolomite; fine to coarse-grained, pale brown; medium-bedded; well- rounded quartz grains in light-coloured dolomite matrix. Lower 15 feet well-sorted and medium to fine-grained; upper 15 feet of beds coarser, impure sandstone with intraformational conglomerate containing dolomite and sandstone fragments; uppermost bed contains whole and fragmented inarticulate brachiopods (GSC loc. 51551):	45	75
	Schiza mbon sp. cf. S. pennsylvanicum, Ulrich and Cooper; ? obolid indet.		
1	Sandstone; dolomitic; medium-bedded, medium-grained, dark grey to brown; well-rounded grains in a grey carbonate matrix; nodules of a dark green mineral scattered.	30	30
	Present also: some thin beds of sandy dolomite. Inarticulate brachiopod fossils observed.		
	Lower beds not exposed.		

The uppermost beds (units 16, 17) of the section at Kangikjuke Lake are assumed to be part of the Netsilik Formation from paleontological evidence. These beds include dolomite, sandstone, and intraformational conglomerate. Fossil inarticulate brachiopods were found (GSC loc. 51549) in light grey, grey to buff-weathering, fine-crystalline dolomite about 70 feet (20 m) above the presumed base of the formation.

Origin and Environment

The numerous fossils and the carbonate lithology indicate a marine environment. From the abundance of clastic material and the underlying, deduced hiatus, it may be assumed the unit represents a second early Paleozoic marine transgression following a widespread regression; The clastic material is probably a mixture of reworked Cambrian sediment and material derived, during Early Ordovician time, from exposures of the Canadian Shield. The ripple-marks and intraformational breccia are evidence of shallow water.

Like the Boothia Felix Formation, the Netsilik Formation evidently represents stable platform conditions of sedimentation: thin sedimentary units with abundant reworked sediment. The grey and green-grey colours of some beds suggest incorporation, with little reworking, of chloritic and other dark debris from a terrain such as that of the Canadian Shield.

Age and Correlation

Several small collections of Early Ordovician fossils were obtained from the type section of the Netsilik Formation. J. W. Cowie identified the graptolites and trilobites; his age assignments are as follows: GSC loc. 51567: Lower Ordovician; GSC loc. 51533, Upper Cambrian to Lower Carboniferous?; GSC loc. 51554, probably post-Cambrian; GSC loc. 51547, ?Lower Ordovician; GSC loc. 51551, Lower Ordovician.

The Netsilik Formation is approximately the same age as several other formations in the Arctic Interior Platform province. Confident correlation with any of them cannot be made; however, there are reasonable lithological similarities with the Ship Point Formation of Baffin Island (Trettin, 1969, p. 20-25). The Ship Point Formation is thought to span both Early and early Middle Ordovician ages.

Some significant lithological features shared by the Netsilik and the Ship Point Formation are: predominantly dolomitic; grey and green weathering colours; presence of authigenic pyrite; and presence of dolomitic intraformational conglomerate or breccia. Trettin notes that the Ship Point Formation is relatively rich in sandy dolomite, dolomitic quartz sandstone, and intraformational conglomerate in the southern part of the field area examined - that is, toward Foxe Basin. This region is about the latitude of the type section of the Netsilik Formation.

On Jens Munk Island, also at the same latitude as southern Boothia Peninsula, R.G. Blackadar (1963, p. 16) collected two species of Didymograptus from limestone with shaly interbeds. The graptolites were thought to be of Lower Ordovician (Arenigian) age. These beds appear to be correlatives of the Netsilik Formation.

Middle and Upper Ordovician, Silurian

Franklin Strait Formation

Definition

A sequence of dolomite and calcareous dolomite, at least 2,200 feet (670 m) thick, that overlies the Netsilik Formation and underlies the Read Bay Formation is herein named the Franklin Strait Formation after the prominent strait that separates Prince of Wales Island and Boothia Peninsula. Franklin Strait rocks are typically medium- to thick-bedded and topographically prominent.

The significance of the Ordovician-Silurian dolomites beds of the Arctic Interior Platform was recognized by Samuel Haughton at the earliest stage of geological exploration, and the succinct description given by Haughton (1860, p. 54) might almost serve as a definition of the Franklin Strait Formation:

> "One of the most remarkable facts brought to light by M'Clintock's geological exploration of the Arctic regions during the Voyage of the "Fox", is the occurrence of dolomite or magnesian limestone, covering large areas in almost horizontal beds. It abounds in fossils; and is an almost pure dolomite, or union of carbonates of lime and magnesia, in equal atomic proportions. To my mind this fact is of as much, if not more, importance in identifying the Silurian strata of Boothia Felix, King-William's Land and Prince-of-Wales Land, as any identification of fossils could possibly be.. . . . ."

It should be noted that the Silurian as used by Haughton predated Lapworth's introduction, in 1879, of the term Ordovician for the lower part of the former 'Silurian' sequence.

Distribution and Thickness

The Franklin Strait Formation is widespread in the Boothia region, where it is exposed in broad, north-northwest trending belts both east and west of the Boothia Uplift. On the east, the formation is separated from the Precambrian terrain by a narrow belt of darker grey- and brown-weathering basal units, but on the west the basal beds are generally absent due to faulting related to the uplift. The formation was described and mapped as Map-unit 9 during Operation Prince of Wales (Christie, 1963).

The Franklin Strait Formation underlies large areas of neighbouring Victoria Island, where it constitutes Map-unit 10b of Thorsteinsson and Tozer (1962).

The thickness of the Franklin Strait Formation is uncertain: 2200 feet (670 m) or more is present at Young Bay on eastern Prince of Wales Island, and about 1300 feet (400 m) was measured at the type section on the west side of Boothia Peninsula. None of the measured sections are complete.

The type section of the Franklin Strait Formation is near Pasley Bay on western Boothia Peninsula, at about latitude 70° 36' N, longitude 95° 32' W (locality 3). Neither the basal nor the upper contacts are exposed at Pasley Bay: the lowest beds are missing due to faulting, and the upper beds, though probably present, are poorly exposed.

From a study of the several stratigraphic sections measured it appears that an interval of more than 400 feet (120 m) but less than 1,000 feet (300 m) of strata lies between the top of the type section and the base of the overlying Read Bay Formation.

A second, moderately well exposed section was measured on 'Lost River', on the east side of Boothia Peninsula (locality 4, about latitude 71° 25' N, longitude 93° 40' W), and is here designated as a reference section. The Franklin Strait Formation at 'Lost River' apparently rests with structural conformity upon basal Paleozoic beds, but the upper contact may be a fault or an unconformity.

The Franklin Strait Formation rests with apparent conformity upon the uppermost unit of the Netsilik Formation. The basal beds of the Franklin Strait Formation are generally thick scarp-formers that contrast sharply with the underlying, relatively recessive units. The Read Bay Formation conformably overlies the Franklin Strait Formation. The upper contact was examined in only one section: on Lang River, on the eastern side of Boothia Uplift. There, a zone about 100 feet (30 m) thick comprises silty, thin-bedded dolomite and limestone that appears transitional between the thick-bedded, massive Franklin Strait dolomites and the thin-bedded, silty-argillaceous limestones with irregular bedding surfaces characteristic of the Read Bay Formation. Fish remains were found at three levels in the upper 80 feet (24 m) of the transition zone, and this part is assigned to the Read Bay Formation.

Lithology:

The Franklin Strait Formation comprises mainly pale brownish or yellowish grey to grey, medium- to thick-bedded dolomite with some sandy dolomite and sandstone. The formation is characterized by its resistance to weathering and its light weathering colours; the weathered surfaces are often nearly white to pale yellow-brown, and lumpy and breccia-like, though breccia structure is rarely apparent on the fresh surface. Many beds are vuggy, and others contain scattered chert nodules or irregular chalky white dolomite patches. Many beds are conspicuously stromatolitic, dominated by undulating and domal layered structures. The dolomites characteristically give off a petroliferous odour on breaking. Sand grains are typically very well rounded.

The type section of the Franklin Strait Formation near Pasley Bay was measured by W.W. Nassichuk. The section crosses vertical to steeply dipping, north-northwest trending beds, the beds up-ended during Silurian-Devonian movement along a major fault bordering the Precambrian rocks to the east. Tops, as determined from graded bedding nearby, are to the west. Fossil determinations listed in the following section are by G. W. Sinclair, formerly of the Geological Survey of Canada.

Unit	Lithology	Thickness (feet)	Height Above Base (feet)

Type Section of Franklin Strait Formation near Pasley Bay (Locality 3)

Top of section: rubble-covered upland.

12 Dolomite; a remarkably large and homogeneous unit; brownish grey to grey, weathering buff to light grey; fine to medium crystallin ; mainly thick-bedded. Beds with scattered small to scattered large chert nodules occur in the lower 150 feet of the unit. Fossiliferous beds occur about 280 feet above the base of the unit, and higher. At 280 feet (GSC loc. 51761): Calapoecia sp., Streptelasma sp., Omospira sp.; Diestoceras sp., and orthoceroconic cephalopods. About 330 feet above the base, an interval about 42 feet thick of distinctive, light-grey-weathering, micro-crystalline dolomite beds is richly fossiliferous (GSC loc. 51783 ; fossils from this locality are listed separately). Within the fossiliferous beds, cephalopods occur only in a 3 foot interval about 30 feet above the base, whereas the other fossils occur

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	throughout the 42 foot interval. Fossils are present, but scattered above GSC loc. 51783. About 500 feet above the base of unit 12 (GSC loc. 51768): Calapoecia sp. Streptelasma sp., Maclurites sp., Cyclendoceras sp.	508	1,285
11	Dolomite; silty, light brown, weathering greyish yellow; fine- to medium-grained; thin-bedded, with silty laminae visible on the weathered surface; upper 17 feet recessive . . .	47	777
10	Covered interval	22	730
9	Silty dolomite; light brown, weathering to greyish yellow; fine-grained, thin-bedded, with distinct silty laminae visible on the weathered surface. Recessive	13	708
8	Dolomite; light brownish grey, weathering light grey with brown streaks; finely crystalline, with scattered chert nodules; thick-bedded, but with bedded parting providing platy debris and producing a thin-bedded appearance; about 10 feet of		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	silty and shaly dolomite about 150 feet above the base of the unit; siliceous fragmental beds at the top of the unit	230	695
7	Dolomite; light grey, weathering light grey with buff-coloured mottling and streaks; siliceous; ovoid to irregular nodules of yellow- to buff-weathering chert are 5 to 25 mm in diameter. Poorly exposed	50	465
6	Dolomite; brownish grey, weathering light grey; fine-crystalline, thick-bedded, slightly siliceous. Poorly exposed	40	415
5	Covered interval	45	375
4	Sandy dolomite, dolomitic sandstone, dolomite; mainly sandy dolomite; light brownish grey, weathering light grey to buff; grain of both dolomite and sand fine to medium. Sand grains well rounded, uniformly sized. Bedding indistinct to massive. Sand ratio increases upward. Some stromatolitic dolomite units about middle of unit; stromatolitic dolomite is micro- to fine-crystalline	130	330
3	Covered interval	110	200
2	Sandy dolomite and dolomitic sandstone; buff-weathering; some intraformational breccia:		

Unit	Lithology	Thickness (feet)	Height Above Base (feet)
	flakes of dolomite 5 to 10 mm in diameter		
	in dolomite matrix	30	90
1	Dolomite; brownish grey, buff-weathering; sandy in upper part; finely crystalline; slightly silty; thick,		
	indistinct beds	60	60
	Base of section faulted		0

An exposure of light brownish grey, fossiliferous dolomite was examined at a locality south of the measured section described above. The dolomite weathers irregularly to whitish grey with grey patches to give a brecciated appearance. The rock is partly fragmental, mainly fine-crystalline, and breaks into platy slabs. Fossils from this locality (GSC loc. 51745) are listed below. Bedding at this locality is inconspicuous, but appears to dip gently (less than 5°) to the west. A low angle of dip is in marked contrast to the steep dips of the measured section, and evidently a zone of abrupt flexure lies immediately east of the fossiliferous locality. Locality 51745 is about 1,000 feet (300 m) west of the projected strike of the uppermost beds of the measured section, but is probably only a few hundred feet higher in the stratigraphic section.

The reference section of the Franklin Strait Formation at 'Lost River', measured by W.W. Nassichuk, in part crosses rounded hills adjacent to 'Lost River' and in part follows the shallow river canyon. The beds dip northeastward at angles ranging from nearly flat to about 15°.

The section is designated because of the relatively simple structural style of the east flank of the Boothia Uplift; it may be possible to obtain a complete stratigraphic section in the vicinity. A description of the section follows. Collected fossils were determined by G.W. Sinclair and by B.S. Norford, Geological Survey of Canada.

Section of the Franklin Strait Formation at 'Lost River' (Locality 4, Fig. 1)

Unit	Lithology	Thickness (feet)	Height above base (feet)
	Overlying beds: Read Bay Formation		
17	Covered interval: fault zone or unconformity	70	
16	Dolomite; light grey; fine-crystalline; well-bedded, beds 2 inches to 2 feet thick; from appearance of weathered surface, may be fragmental; greenish weathering colours in upper part	40	1,010
15	Dolomite; very light grey; fine-crystalline; mainly well bedded, beds less than 1 foot thick	170	970
14	Covered interval	30	800
13	Dolomite; light grey; some thin bedding in lower part, and upper part thick-bedded	60	770
12	Dolomite; light grey, weathering light grey; some soft, white nodules; some beds are fine dolomite breccia, the breccia structure evident on a nearly white weathered surface. Fossil brachiopod, echinoderm, gastropod, and aseptate solitary coral remains were collected (GSC loc. C-24149)	110	710
11	Dolomite; very light grey; thin silty laminae; well-bedded, beds 2 inches to 1 foot thick	100	600
10	Dolomite; medium-grey, weathering buff grey; vuggy, but otherwise massive; resistant and cliff-forming	40	500
9	Dolomite; light grey, weathering buff-grey; beds 4 inches to 2 feet thick	60	460
8	Fragmental dolomite; light grey and chalky, weathering light grey; thick-bedded; abundant soft, white nodules; poorly preserved brachiopod fossils present	30	400

Unit	Lithology	Thickness (feet)	Height above base (feet)
7	Covered interval	20	370
6	Dolomite; light grey to whitish, weathering very light grey; fine-crystalline, massive. Maclurites and long orthoceroconic cephalopods scattered. Fossils collected include (GSC loc. 50720): Armenoceras sp., Bumastus aff. B. billingsi Raymond and Narraway (identified by G.W. Sinclair)	55	350
5	Fragmental dolomite; light brownish grey, weathering light grey; distinctive 'graphic' pattern on weathered surface due to fragments in the rock. Interbedded: thin-bedded, pale yellow-grey calcareous dolomite with nodules and irregular stringers of porous white dolomite. Fossils collected (GSC loc. C-24148), identified by B.S. Norford) include Maclurites sp., Grewingkia sp., and Receptaculites sp. In the field, Halysites sp. and orthoconic nautiloids were recognized by W.W. Nassichuk	30	295
4	Dolomite; poorly exposed; rubble light grey, weathering light grey, and blocky	180	265
3	Silty dolomite; light grey, weathering light grey; finely crystalline; thick bedded and topographically prominent; distinctive, yellow-weathering irregular to ovoid chert nodules 1/4 inch to 1 inch long, and abundant, occur in lower 20 feet	50	85
2	Covered interval	25	35
1	Dolomite; light grey, very finely crystalline, homogeneous; weathers light grey; slightly sandy and forms sharp talus	10	10
	Underlying beds: stromatolitic dolomite, shaly dolomite weathering light grey		0

Origin and Environment

The dominance and uniformity of carbonate rocks and the associated sandy rocks with well-rounded quartz grains suggest deposition in a stable marine platform environment. Extreme uniformity of conditions and rate of subsidence is indicated by the thick, massive beds; occasional floods of quartz debris presumably reflect tectonic events in distant source areas of the Canadian Shield, the sand derived from the granitoid rocks and from elevated, late Precambrian sandstones. Absence of evaporites in the stratigraphic column indicates open circulation with the oceans. Intraformational breccias are present as thin, uniform beds but in minor amounts. From the absence of associated ripple-marks, mud-cracks, or other subaerial features it can be suggested that the breccias were storm-drived, and that shallow, but not intertidal, depths of deposition prevailed.

Age and Correlation

Fossils collected from beds between 330 and 372 feet above the base of unit 12 of the measured section east of Pasley Bay were examined by G. W. Sinclair, who reported as follows:

(GSC loc. 51783)

Streptelasma cf. trilobatum Whiteaves
S. cf. rusticum Billings
Calapoecia sp.
Catenipora sp.
favositid coral
stromatoporoid
Dalmanella sp.
Fusispira cf. inflata Meek and Worthen
Maclurites sp.
Trochonema sp.
Ephippiorthoceras sp.
Oncoceras sp.
Probillingsites sp.
Cyrtogomphoceras sp.

To these beds (GSC loc. 51783), and to those of GSC locs. 51761 and 51768 of unit 12 of the type section, and to 50720 of unit 6 of the reference section, Sinclair assigns an age equivalent to the Red River Formation of Manitoba. The fauna is thus representative of the 'Arctic Ordovian' fauna, which occurs in the upper part of the Cornwallis Group (Thumb Mountain and Irene Bay Formation) and the basal part of the Allen Bay Formation of Cornwallis and Ellesmere Islands (Thorsteinsson, 1958, p. 38-42; Kerr, 1968, p. 47-56). "Arctic Ordovician" is the name commonly given to the assemblage characterized by abundant and large-sized Maclurites, Receptaculites, nautiloids, halysitid corals, and certain other forms. The term is applied broadly to American Ordovician faunas considered to be

of boreal origin and especially typified by the faunas of the Red River Formation of Manitoba, Cape Calhoun Formation of Greenland, and Bighorn Formation of Wyoming (Thorsteinsson, 1958, p. 39, 40). These fossils range through several hundred feet of strata, and the precise age, or ages, of the fossils in terms of the type section of Europe or even of the standard North American sections of the Ordovician is in considerable doubt. There are reasons to believe they are late Caradocian and/or Ashgillian in age. Thorsteinsson (1958, p. 90) has suggested that the contact of the Cornwallis Group and the Allen Bay Formation may be accepted tentatively as corresponding to the Caradocian/Ashgillian boundary until a better basis for dating them has been obtained, and this convention has been followed here (see Table).

Fossils collected at GSC locality 51745, south of the section at Pasley Bay, were examined by T. E. Bolton, Geological Survey of Canada, who reported as follows:

cup coral indet.
Favosites sp.
cf. 'Reticularia ?' undulata Poulsen from Rowley Island and Greenland
"Schuchertella" sp.
Brachyprion sp. cf. B. philomena (Billings) from Southampton Island
gastropod indet. - low spired
Calymene sp. - fragment
Phacops (Portlockia) sp.

A Silurian age is indicated for this collection.

From structural considerations it appears that the beds of locality 51745 represent an upper part of the Franklin Strait Formation. Thus the Franklin Strait Formation clearly includes beds equivalent to at least part of the Allen Bay Formation of Cornwallis Island (see Table 1).

Fossils from unit 5 of the reference section on 'Lost River' (GSC loc. C-24148) are assigned an Ordovician, about late Caradocian (Eden-Maysville) age by Norford, who suggests a probable correlation with the Bad Cache Rapids Group of northern Manitoba. A late Middle Ordovician to Silurian, probably Silurian age is suggested for fossils of GSC loc. C-24149, unit 12 of the same section.