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INVESTIGATIONS OF LOWER PALEOZOIC GEOLOGY, FOXE BASIN, NORTHEASTERN MELVILLE PENINSULA, AND PARTS OF NORTHWESTERN AND CENTRAL BAFFIN ISLAND

H. P. Trettin

1975

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PREFACE

One of the principal aims of the Geological Survey is the estimation of the potential abundance and probable distribution of mineral and fuel resources available in Canada. Such estimates depend on the availability of information concerning the geological framework. In this report, measured stratigraphic sections and reconnaissance studies of the geological structure in widely separated areas of Foxe Basin, Melville Peninsula, and Baffin Island are integrated with the detailed study of a diamond drill core from the centre of Foxe Basin. A standard section has been established for most of the Ordovician succession in Foxe Basin, although some problems remain concerning the older and younger strata. The author interprets depositional environments and basin development on the basis of petrographic analyses, documented with photographs.

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ABSTRACT

The lower Paleozoic strata in Foxe Basin and adjacent parts of Melville Peninsula and Baffin Island are preserved in an extensive and complex but shallow depression bounded by normal faults. The depression is flanked by uplifted belts of Precambrian rocks - the Coastal Uplift of Baffin Island on the northeast, and the Melville Arch on the west. Structural relief on the top of the Precambrian surface is in the order of 2,500 feet (800 m) between northeastern Melville Peninsula and the Rowley Island well.

The lower Paleozoic succession totals more than 1,900 feet (580 m) in the centre of Foxe Basin and is divided into four major units: Admiralty Group (pre-late Early Ordovician, possible Cambrian); Ship Point Formation (late Early and early Middle Ordovician); map-unit O_{1s} (late Middle and Late Ordovician); and map-unit OS_{cb} [latest Ordovician(?) and Early Silurian]. Admiralty Group, Ship Point Formation, and map-unit O_{1s} are separated by disconformities and represent three, increasingly extensive marine transgressions. An Early Silurian (early Llandoverian) disconformity recognized in other parts of the craton has not yet been established in the present area. Both the Admiralty Group and Ship Point Formation are divisible into a basal sandy unit of littoral origin (Gallery Formation and member A, Ship Point Formation) and an upper dolomitic and clastic unit of shallow subtidal to intertidal aspect (Turner Cliffs Formation and member B, Ship Point Formation). Map-unit O_{1s} is a monotonous succession of bioturbated, variably dolomitic, cryptocrystalline limestones with a rich and diverse fauna. It was deposited in subtidal environments of an extensive epicontinental sea. On northeastern Melville Peninsula, a reefal facies (map-unit O_{rf}) developed in latest Middle or Late Ordovician time. Map-unit OS_{cb}, restricted to the centre of Foxe Basin, consists of a variety of dolomitic limestones and dolostones suggestive of shallow subtidal to supratidal depositional environments.

There is no evidence indicating that the present Foxe Basin, a shallow, post-glacial sea, was the site of a separate sedimentary basin in early Paleozoic time. Admiralty Group and Ship Point Formation are thickest in northwestern Baffin Island and wedge out toward the southeast, and the upper Middle and Upper Ordovician succession either retains an essentially uniform thickness over wide areas or thins slightly toward the cratonic interior. Lithological variations showing that water depth was greater over Foxe Basin than most other parts of the Arctic Platform also are lacking. There are, however, indications that the Melville Arch was positive relative to northwestern Baffin Island and Foxe Basin in latest Middle or Late Ordovician time, and perhaps also during the Middle Cambrian-early Early Ordovician interval.

The present structural depression in Foxe Basin and adjacent parts of Baffin Island cannot be dated more precisely than post-Early Silurian but is considered to have formed simultaneously with Baffin Bay and the Coastal Uplift of Baffin Island. The faults bordering the Melville Arch,

RÉSUMÉ

Les séries du Paléozoïque inférieur du Bassin Foxe et des parties adjacentes de la presqu'île de Melville et de l'île de Baffin sont conservées dans une vaste dépression. Cette dépression peu profonde, limitée par des failles normales, est entourée par des zones soulevées - tels la chaîne côtière de l'île de Baffin au nord-est et le Melville Arch à l'ouest - où les séries cambriennes affleurent. Entre la partie nord-est de la presqu'île de Melville et le puits de l'île Rowley, le relief structural maximum au toit du Précambrien est de l'ordre de 2,500 pieds (800 m).

La série paléozoïque inférieure a plus de 1,900 pieds (580 m) d'épaisseur au centre du Bassin Foxe, et se compose de quatre unités principales: le groupe Admiralty (d'âge inconnu mais déposé avant la fin de l'Ordovicien inférieur, peut-être même d'âge cambrien); la formation Ship Point (fin Ordovicien inférieur et début Ordovicien moyen); l'unité cartographique O_{1s} (fin Ordovicien moyen et Ordovicien supérieur); et l'unité cartographique OS_{cb} [fin Ordovicien supérieur (?) et Silurien inférieur]. Le groupe Admiralty, la formation Ship Point et l'unité cartographique O_{1s} sont séparés par des discordances, et représentent trois séries marines de plus en plus transgressives. Une discordance d'âge Silurien inférieur (Llandoverien inférieur), reconnue à d'autres endroits du craton, n'a pas encore été observée dans la région étudiée. On peut subdiviser le groupe Admiralty et la formation Ship Point en deux parties: à la base, une unité sableuse d'origine littorale (formation Gallery et niveau A, formation Ship Point); au dessus une unité dolomitique et détritique (formation Turner Cliffs et niveau B, formation Ship Point). Cette unité dolomitique et détritique semble s'être déposée en milieu subtidal peu profond à intertidal. L'unité cartographique O_{1s} représente une série monotone de calcaires cryptocristallins à faune riche et variée, bioturbés et plus ou moins dolomitiques. Cette unité s'est déposée dans la zone subtidale d'une mer épicontinentale très étendue. Un facies récifal (l'unité cartographique O_{rf}) s'est développé durant la fin de l'Ordovicien moyen et l'Ordovicien supérieur dans le nord-est de la presqu'île de Melville. L'unité cartographique OS_{cb}, que l'on ne trouve qu'au centre du Bassin Foxe, se compose de calcaires dolomitiques et de roches dolomitiques suggérant un milieu de dépot subtidal peu profond à supratidal.

Rien n'indique que le Bassin Foxe, aujourd'hui occupé par une mer postglaciaire peu profonde, n'ait été un bassin sédimentaire individualisé au début du Paléozoïque. Le groupe Admiralty et la formation Ship Point sont plus épais dans le nord-ouest de l'Ile de Baffin, et se bisautent vers le sud-est. La partie supérieur de l'Ordovicien moyen et l'Ordovicien supérieur conservent la même épaisseur à peu près partout sauf vers l'intérieur du craton où un léger amincissement s'observe. Aucune variation lithologique n'indique que la profondeur de l'eau était plus grande dans le Bassin Foxe que sur la Plateforme de l'Arctique. Il y a cependant quelques indices qui permettent de croire que le Melville Arch était plus élevé que le nord-ouest de l'Ile de Baffin ou le Bassin Foxe durant la fin de l'Ordovicien moyen et l'Ordovicien supérieur, et peut-être

however, could have had earlier movements, for example during the Early Devonian.

Potential reservoir rocks for hydrocarbons are common in Foxe Basin, and potential traps also are present, but promising source beds are scarce or absent.

aussi durant le Cambrien moyen et le tout début de l'Ordovicien.

L'actuelle dépression structurale du Bassin Foxe et des parties adjacentes de l'Ile de Baffin a un âge postérieur au début de l'Ordovicien. Aucune datation plus précise n'est possible, cependant on pense qu'elle s'est formée en même temps que la Baie de Baffin et la chaîne côtière de l'Ile de Baffin. Les failles qui bordent le Melville Arch résultent de mouvements antérieurs (début Dévonien, par exemple) à ceux qui sont responsables de la formation de la dépression structurale du Bassin Foxe.

Du point de vue pétrolier, il y a de nombreuses roches réservoir et de bons pièges dans le Bassin Foxe, mais les roches mère sont rares ou absentes.

INVESTIGATIONS OF LOWER PALEOZOIC GEOLOGY, FOXE BASIN, NORTHEASTERN MELVILLE PENINSULA AND PARTS OF NORTHWESTERN AND CENTRAL BAFFIN ISLAND

INTRODUCTION

LOCATION, SETTLEMENTS, AND ACCESSIBILITY OF PROJECT AREA

The project area, in the most restricted sense, comprises the lower Paleozoic terrains of Foxe Basin, Baird Peninsula (west-central Baffin Island) and northeastern Melville Peninsula lying between latitudes 67°10' and 70°00' north and longitudes 74°45' and 83°20' west (Fig. 1). Both stratigraphic studies and reconnaissance mapping were done by the writer in this region in 1968 and 1973. Additional stratigraphic work and some map revisions were carried out in that part of northwestern Baffin Island north of latitude 70° north and west of longitude 80° west, an area investigated in 1963, in the course of Operation Admiralty (*see* below). Also included in the present stratigraphic study are lower Paleozoic outliers in northwestern Baffin Island north of 70° north and east of 80° west that were mapped by G.D. Jackson (1969) in 1968 in the course of Operation Bylot. The following remarks will be restricted to the region south of 70° North Latitude.

The main settlements in the project area are the Eskimo villages Igloolik on Igloolik Island (Pl. 8) and Hall Beach on northeastern Melville Peninsula. Hall Beach has a weather station of the Canadian Department of the Environment and is headquarters for a sector of the DEW line. An active DEW station is located at Longstaff Bluff on west-central Baffin Island, and abandoned sites are present on Bray and Rowley Islands.

Hall Beach and Igloolik are served by Nordair with regular flights originating at Frobisher Bay on southern Baffin Island; Frobisher Bay, in turn, receives flights from Montreal and Resolute Bay, Cornwallis Island. Heavy freight is moved to Hall Beach, Igloolik and other points in Foxe Basin by sea from Montreal, usually in August or September.

Earlier exploration was done with the aid of dogs and sledges, canoe, boat, or motor vessel. Although much of Foxe Basin is unfrozen in the later part of the summer, navigation with small vessels is difficult because of drift ice. Helicopters and fixed-wing aircraft have been used for geological exploration since the early sixties. Small STOL-planes, such as the Piper Super Cub, and the De Havilland Otter and Beaver can land on most of the lower Paleozoic terrains if equipped with balloon tires.

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PHYSIOGRAPHY

The lower Paleozoic terrains of the project area, along with those in southeastern Baffin Island, are included in a physiographic division known as Foxe Plain (Bostock, 1970, and *in* Douglas, 1970, p. 19). Foxe Basin (in the geographic sense) is a very shallow epicontinental sea linked with the Labrador Sea through Hudson Strait and Foxe Channel, and with the Gulf of Boothia through Fury and Hecla Strait. The basin contains numerous islands, the largest of which are Prince Charles, Air Force, Bray, Rowley, Koch, and Jens Munk. Prince Charles Island is about 80 miles (130 km) long and 60 miles (100 km) wide.

Two major factors account for the present physiography: the bedrock geology, and the late Pleistocene and Recent history.

The horizontal attitude of the relatively thin, lower Paleozoic succession has resulted in a plain-type physiography with some mesas and buttes. The topographic relief is between 200 and 300 feet (60-90 m) on the islands of Foxe Basin, between 400 and 500 feet (120-150 m) on northeastern Melville Peninsula, and slightly above 600 feet (180 m) on Baffin Island, west of Steensby Inlet. Fractures and faults in Precambrian basement and lower Paleozoic cover locally are expressed as rectilinear coast lines, drainage patterns and minor escarpments.

"It is generally agreed that there was an ice dome over Foxe Basin at some stage during the last major glaciation" (Prest *in* Douglas, 1970, p. 747). The dome evidently was an extension of the Wisconsin Laurentide ice sheet of northeastern North America but, in Prest's opinion, maintained its own sphere of influence. When the ice disintegrated, Foxe Basin and adjacent parts of Melville Peninsula and Baffin Island were invaded by the sea about 7,500 to 7,000 years ago (op. cit., p. 748). Extensive beach complexes with numerous terraces (e.g. *see* King, 1969) were formed when the sea retreated, owing to isostatic rebound of the land. The highest reported beaches in the project area (northeastern Melville Peninsula) are now at an altitude of about 480 feet (146 m) (Prest, Grant and Rampton, 1968).

TECTONIC SETTING

The project area forms part of a broad belt on the northwestern margin of the North American craton characterized by uplifted and deeply eroded areas of lower Proterozoic and older metamorphic rocks, and intervening regions in which unmetamor-

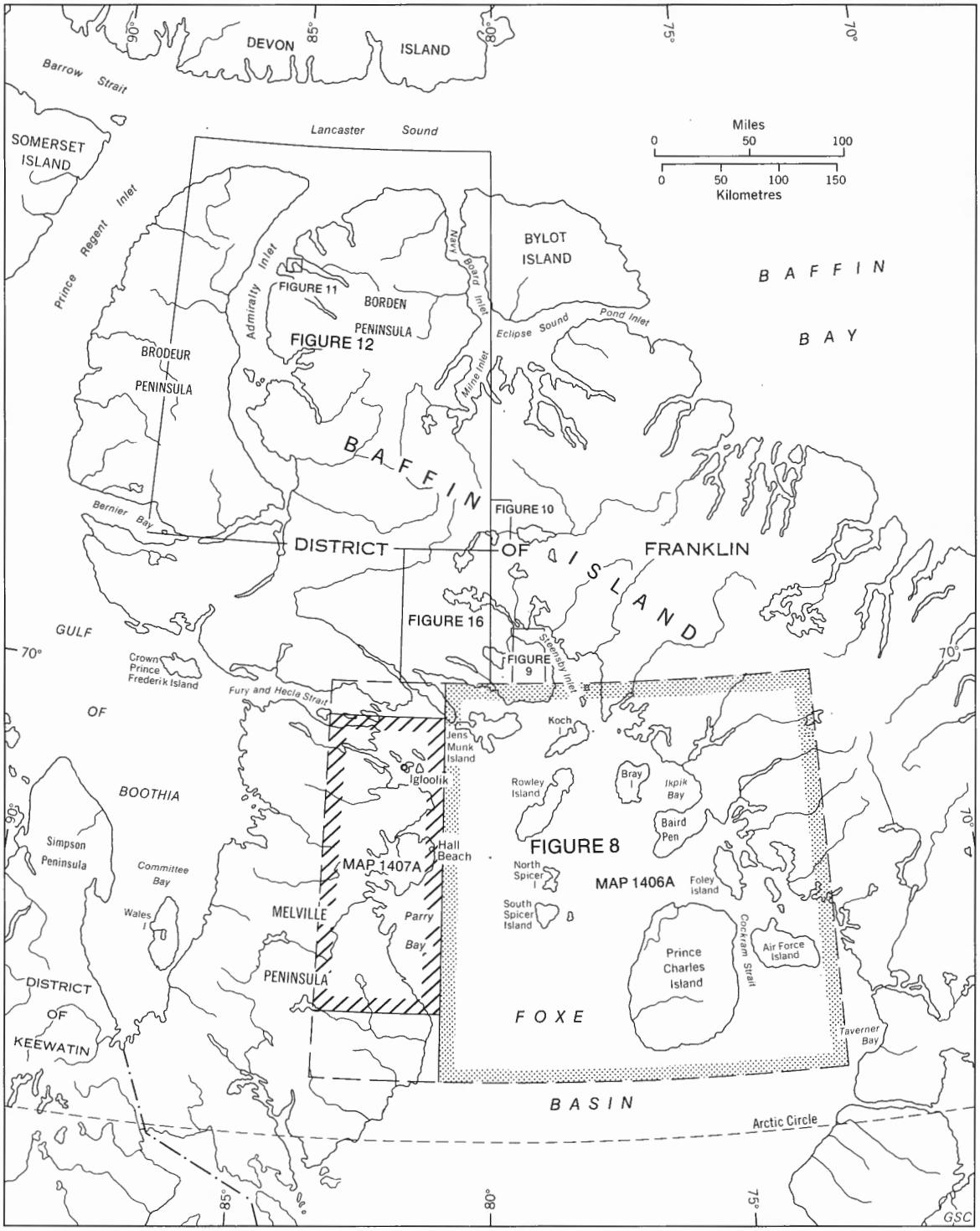


Figure 1. Index map showing locations of geological maps and figures

phosed middle Proterozoic to Cenozoic successions are preserved; the latter are referred to collectively as the Arctic Platform (Douglas, 1970). The supracrustal successions of the Arctic Platform are flat-lying or only slightly deformed, relatively thin, and marked by numerous disconformities. They taper toward the centre of the craton and grade northward and northwestward into thick, deformed, geosynclinal successions of the Innuitian tectonic province.

The tectonic term, Foxe Basin, was applied by Christie (1972) to a discontinuous belt of lower Paleozoic outcrop areas extending from central northwestern Baffin Island through Foxe Basin to south-central Baffin Island and including parts of northeastern Melville Peninsula. The lower Paleozoic strata are preserved in a complex series of southeast-trending half-grabens, grabens, and related structural depressions. In the present report, the informal name, Foxe-Baffin structural depression, will be used for the entire lower Paleozoic outcrop belt in order to avoid confusion with the (less extensive) geographic Foxe Basin. The term structural depression designates downwarping relative to the bounding uplifts and not necessarily relative to sea level. The term basin, if used in a geological context, will be restricted to sedimentary basins (inferred from lithofacies or isopachous maps or from stratigraphic cross-sections) such as the early Paleozoic Admiralty Basin of northwestern Baffin Island. As pointed out below (Summary of basin development), there is no evidence that the present Foxe Basin was a separate sedimentary basin in early Paleozoic time.

The Foxe-Baffin structural depression is flanked by two fault-bounded uplifts composed of Precambrian crystalline rocks: a major uplift on the northeast which includes most of northeastern Baffin Island and culminates in the coastal ranges of the island (the Coastal Uplift of Christie, 1972); and a more subdued but extensive uplift on the west which includes most of Melville Peninsula and an adjacent part of northwestern Baffin Island (the Melville Arch of Christie, 1972).

The Precambrian crystalline rocks in the project area recently have been assigned to two major structural subdivisions of the Churchill Province named Committee and Foxe Fold Belts (Jackson and Taylor, 1972). They are characterized by southeasterly to predominantly northeasterly trends that strike across the boundaries of the younger uplifts and depressions, and by middle to late Proterozoic K-Ar ages.

The age of the faulting is problematic and discussed in a later section. At this point it can be stated only that it postdates the youngest known lower Paleozoic strata in the area which are Early Silurian.

PREVIOUS GEOLOGICAL INVESTIGATIONS OF PROJECT AREA AND NORTHWESTERN BAFFIN ISLAND

The earliest information about the lower Paleozoic geology of the region has come from Parry's second and third Arctic voyages in 1821-1823, and 1824-1825 (Parry, 1824; 1826). Parry and his men reported carbonate rocks on northeastern Melville Peninsula, Igloolik Island, and Brodeur Peninsula, and collected fossils that have been studied by various paleontologists (Teichert, 1937). It was about one hundred years later that geological exploration was resumed by the Danish Fifth Thule Expedition. Field observations and extensive fossil collections by T. Mathiassen and P. Freuchen enabled Teichert (1937) to prepare a fairly accurate geological sketch map of Melville Peninsula, northwestern Baffin Island, and adjacent parts of Foxe Basin and an important monograph on the Ordovician and Silurian faunas. The next contribution was made by C.A. Burns (1952) who participated in an exploration cruise of James Bay, Hudson Bay, and Foxe Basin, conducted by T.H. Manning in the M.V. Nauja in 1949. In the present region, Burns visited Prince Charles, Air Force, Rowley, Foley, North Spicer, and Igloolik Islands, Baird Peninsula of central Baffin Island, and Cape Jermain of northeastern Melville Peninsula, making valuable fossil collections at most of these localities.

In 1954, R.G. Blackadar and R.R.H. Lemon investigated the geology of the coasts of Admiralty Inlet, northwestern Baffin Island. On the basis of detailed sections by Lemon (Lemon and Blackadar, 1963), they established a stratigraphic framework for the Proterozoic and Paleozoic, which included the Gallery, Turner Cliffs, and Ship Point Formations of the present report. A year later, A.W. Norris (*in* Fortier *et al.*, 1963, p. 150-155) studied the Silurian strata of northwestern Brodeur Peninsula in the course of Operation Franklin, the first airborne geological reconnaissance project in the Arctic. R.G. Blackadar (1958a, b; 1963) extended his reconnaissance mapping into the Fury and Hecla Strait and Foxe Basin North map-areas in 1956 and 1957 where he discovered some significant lower Paleozoic fossil localities.

The mapping of northwestern Baffin Island was completed in 1963 in the course of Operation Admiralty, an aircraft-supported project directed by R.G. Blackadar (Blackadar, Davison, and Trettin, 1968a to h). The writer was responsible for the lower Paleozoic geology and applied a modified and extended version of Lemon and Blackadar's stratigraphic framework to the entire region (Trettin, 1969).

For information on the Precambrian geology, the reader is referred to comprehensive reports by Heywood (1967), Blackadar (1970), Jackson and Taylor (1972), Fahrig, Irving and Jackson (1973), and Geldsetzer (1974).

CURRENT STUDIES

This report is based on a full field season by the writer in 1968; brief field work by Sanford, Bolton, and Trettin on northeastern Melville Peninsula in 1973; detailed studies of the well Aquitaine *et al.* Rowley M-04; and some revised data obtained in 1963.

The 1968 field work included not only the project area but also parts of the area covered in 1963, a belt some 450 miles (725 km) long and up to 180 miles (290 km) wide, extending from northern

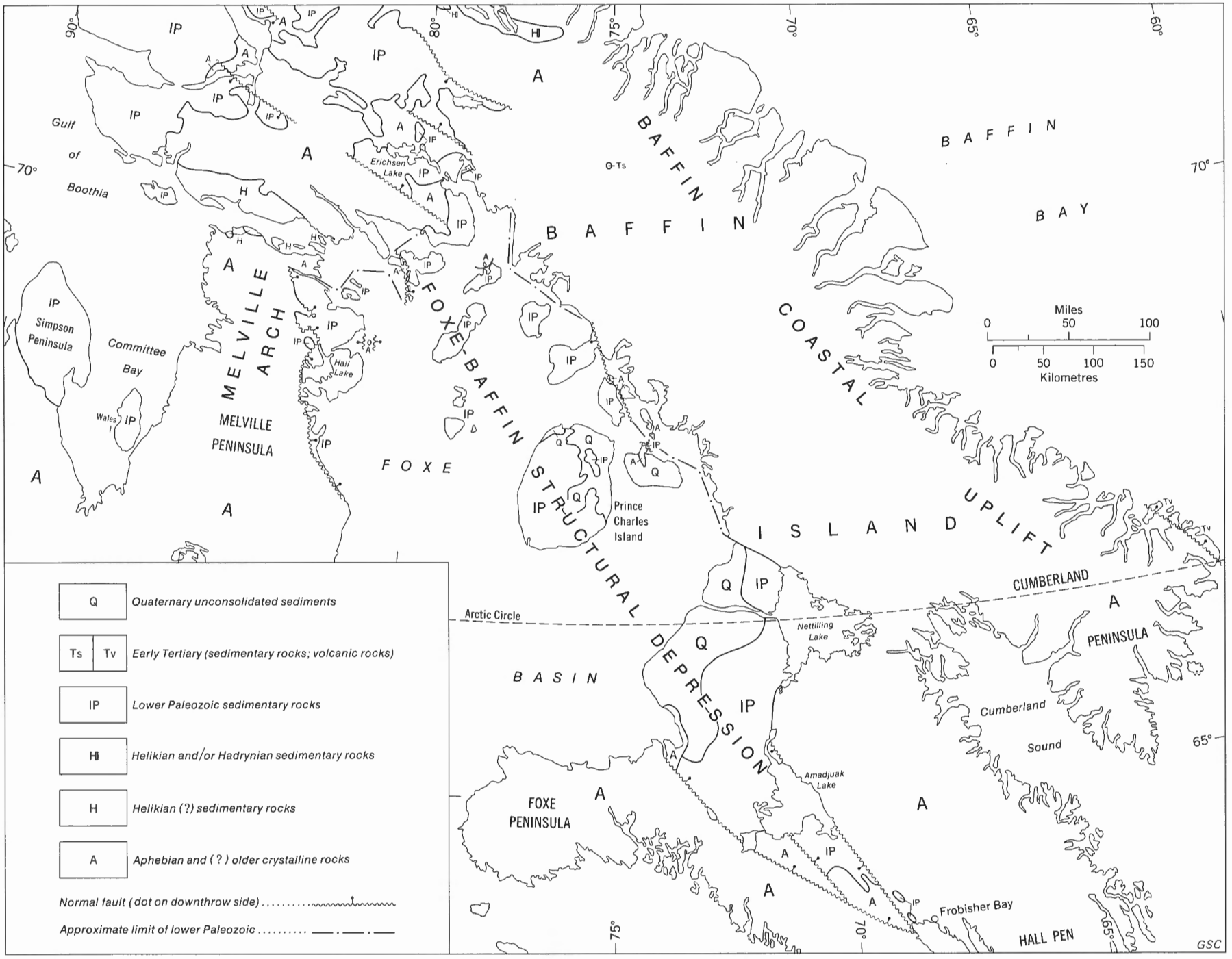


Figure 2. Tectonic setting of project area

Brodeur Peninsula to southern Prince Charles Island. The work was done with the aid of a Piper Super Cub equipped with balloon tires and leased from Bradley Air Services, Ottawa. It consisted of the examination of widely spaced outcrops and stratigraphic sections, mostly from fly camps. The party of three was based at Igloolik. Several adverse conditions made the field work in the Foxe Basin region difficult and less effective than the earlier studies on northwestern Baffin Island: outcrop is poor in general and significant stratigraphic sections are scarce; the formations are composed of carbonate rocks that are difficult to distinguish on aerial photographs; expanses of open water had to be crossed with a single-engine aircraft, often under difficult weather conditions; and much of the available flying time had to be used to establish gas caches in order to reach the more distant points.

The 1973 field work was carried out in the course of a helicopter-supported reconnaissance of the Precambrian terrains of Melville Peninsula directed by W.W. Heywood. Sanford and Bolton did about five days of field work in late July and early August during which they discovered and explored - along with W.W. Heywood - the reefal unit here referred to as map-unit O_{rf}. The writer completed the reconnaissance mapping of the lower Paleozoic terrains during five days in the later part of August.

A stratigraphic testhole was drilled by Aquitaine Company of Canada and others on southern Rowley Island in August, 1971. It extends from Lower Silurian strata at the surface into the Precambrian basement and was cored from a depth of 450 feet (137 m) to the bottom (at 1,750 ft.; 533 m). P.A. Monahan of the Aquitaine Company prepared a careful description and interpretation of this well (unpubl. ms., 1972), correlated it with the surface stratigraphy as outlined by the writer (1969; 1971), and suggested some revisions in the stratigraphic framework. This manuscript was available to the writer who accepted most conclusions and suggestions. A detailed re-study, involving various petrographic techniques as well as identifications of macro- and microfossils and a K-Ar age determination, however, was undertaken because this core provides a stratigraphic standard for a large region.

ACKNOWLEDGMENTS

For hospitality and technical assistance at Igloolik, Hall Beach, and Arctic Bay, the writer is indebted to the following officers of the Department of Indian and Northern Affairs; H. Bartels, J.B. Haining, D. Nygard, W. Paterson, and J. Wemiwang. Pilot D. Hemby and radio operator T. Pollon are thanked for their capable performance during the 1968 season. Thanks are extended to W.W. Heywood for support and advice during the 1973 field work and to B.V. Sanford and T.E. Bolton for valuable field observations and interpretations. For fossil identifications, the writer is indebted to B.S. Norford, M.J. Copeland, C.R. Barnes (University of Waterloo), and A.J. Boucot (Oregon State University); A.E. Foscolos, assisted by A.G. Heinrich and others, was responsible for the X-ray diffraction analyses, and L.R. Snowdon for the determinations of carbon content. The manuscript was critically read by B.V. Sanford and G.R. Davies who made numerous helpful suggestions for improvement. G.R. Davies also advised on petrographic problems and T.E. Bolton on biostratigraphic problems. Special thanks are extended to P.A. Monahan (Aquitaine Company of Canada) for the use of his valuable report.

STRATIGRAPHY AND SEDIMENTOLOGY

The strata of the present area range in age from Early Ordovician or Cambrian to Early Silurian (late Llandoverian). The Cambrian(?) to lower Middle Ordovician succession resembles that of the Admiralty Inlet region of northwesternmost Baffin Island and, therefore, the stratigraphic nomenclature established there (Gallery, Turner Cliffs, and Ship Point Formations) has been used. Only one significant modification of that nomenclature is introduced here: a sandy unit, previously included in the uppermost Turner Cliffs Formation, is assigned now to the Ship Point Formation because a major disconformity appears to lie above rather than below it.

The upper Middle Ordovician to Lower Silurian succession of the project area is comparable, to some extent, to that of the Hudson Platform but, also, there are significant differences. A new formational nomenclature is required for these strata but is not introduced here because of uncertainties about contact relationships, lack of type sections, etc. Instead of formational names, therefore, informal map-units are used. Map-unit O_{ls} designates an upper Middle and Upper Ordovician limestone unit comparable to the combined Bad Cache Rapids and Churchill River Formations of the Hudson Platform; map-unit O_{rf}, upper Middle or Upper Ordovician reefal and interreefal strata of northeastern Melville Peninsula; and map-unit OS_{cb}, carbonate rocks (limestone, dolostone, etc.) of Early Silurian and possibly latest Ordovician age that are comparable to the combined Ekwan and Severn River Formations of the Hudson Platform and may include, also, equivalents of Red Head Rapids and Attawapiskat Formations. Map-unit O_{ls} is lithologically identical with the Ordovician part of member B of the Baillarge Formation of northwestern Baffin Island.

A description of the various rock units is followed by a brief, interpretive summary of basin development.

ADMIRALTY GROUP

The name, Admiralty Group, was introduced by Blackadar (1956) for the entire lower Paleozoic succession of the Admiralty Inlet region including the Gallery, Turner Cliffs, Ship Point and Baillarge Formations. The term was restricted to the Gallery and Turner Cliffs Formations by Trettin (1969) because of a probable disconformity between Turner Cliffs and Ship Point Formations, and a proven disconformity between Ship Point and Baillarge Formations.

During the 1963 field work, the Admiralty Group was recognized in three parts of northwestern

NOTES TO ACCOMPANY FIGURE 3

(1) Ordovician series boundaries based on North American usage, Silurian on European usage.

(2) Standard section, based on Thorsteinsson and Kerr (1968), Kerr (1968), and Barnes (1974). Silurian is valid for Cornwallis Island and environs only.

(3) The Irene Bay Formation is considered as extending into the early Richmondian by Barnes (1974).

(4) Trilobites of probable early Late Cambrian (Dresbachian) age recently have been discovered in the Panarctic-Deminex Cornwallis Centre Dome K-40 well by G.R. Davies (identification by W.H. Fritz). The presence of a hiatus involving the entire Late Cambrian throughout the miogeosyncline therefore is doubtful (*see* also Dixon, 1974).

(5) Based on Kurtz *et al.* (1952) with modifications of Ordovician stratigraphy by Christie (1973, Table 2).

(6) Disconformity inferred by writer from absence of Baumann Fiord evaporites and presence of sandstone at base of Nadlo Point Formation.

(7) Based on Trettin (1969).

(8) Based on Heywood and Sanford (in press), Norford (1971), and T.E. Bolton (pers. com., 1974).

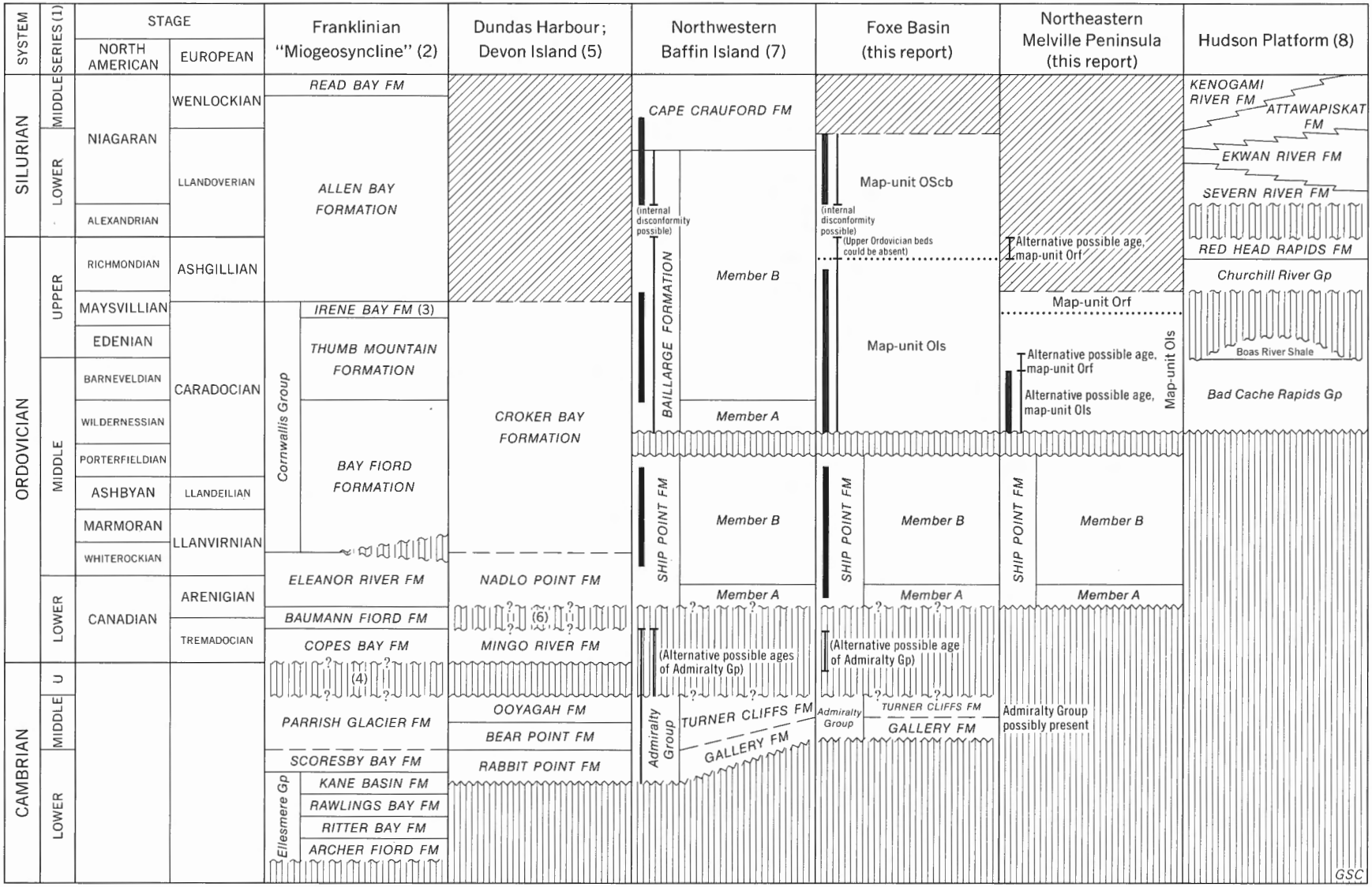


Figure 3. Correlation chart

Baffin Island: (1) northern Borden Peninsula north of Adams Sound; (2) southern Borden Peninsula and adjacent Brodeur Peninsula south of the entrance of Moffet and Milne Inlets; and (3) a central part of the eastern coast of Brodeur Peninsula (*see* Trettin, 1969, Fig. 2). During the present investigation, it was identified only in the Inuktorfik Lake region (Fig. 10, locs. 14 to 17) but probably also is present southwest of Erichsen Lake (locs. 58, 59). The occurrences in these two areas represent extensions of the outcrop area on southern Borden Peninsula mentioned above.

The lower two stratigraphic units in the Rowley Island well are correlated with the Gallery and Turner Cliffs Formations of the Inuktorfik Lake area on the basis of their stratigraphic position (between Precambrian crystalline basement and Ship Point Formation) and lithology (*see* Figs. 5 and 15), but are separated from that area by a gap in outcrop of 150 miles (240 km). They have not been recognized at the surface in Foxe Basin but may underlie the shelf northwest of Koch Island (*see* discussion of Koch and Rowley Islands in Appendix 1).

Lithology and depositional environments

Gallery Formation

Admiralty Inlet-Borden Peninsula

The name Gallery Formation was given by Blackadar (1956) to a predominantly arenaceous unit occurring at the base of the lower Paleozoic succession. The type section is near the Gallery, a remarkable group of stacks, caves, arches and near-vertical cliffs on the east coast of central Brodeur Peninsula. On eastern Brodeur Peninsula and Borden Peninsula, the formation is composed mainly of quartzose sandstone with local basal conglomerate, dolostone, and shale. Medium- to large-scale cross-lamination, of both planar and trough type, is common. The lower part of the formation is predominantly red and the upper part greyish, but red and grey beds are commonly interstratified. Recorded thicknesses range from about 20 to 1,125 feet (7-340 m). The formation is considered to be mainly fluvial in origin with some littoral and shallow marine strata.

Northeast of Inuktorfik Lake

At the stratigraphic section Inuktorfik-northeast I (Appendix 1 and Fig. 15), 49 feet (15 m) of strata are assigned to the Gallery Formation. The lower few tens of feet or less (10 m or less) of strata, and the contact with the Precambrian crystalline basement are covered, and covered intervals, totalling 19 feet (6 m), also occur in the measured part of the formation. The lowermost exposed unit consists of 14 feet (4 m) of sandstone that is very fine to coarse, but mainly medium grained, partly quartz-cemented, and partly dolomitic, and slightly calcareous. The microcrystalline to medium crystalline dolomite is abundant (peak height ratio quartz: dolomite = 34:60) and represents a sedimentary matrix rather than a cement. The overlying sandstone is fine to very coarse grained and nondolomitic. The terrigenous fraction of the Gallery sandstone is composed mainly of subrounded to rounded quartz with trace amounts of feldspar. Horizontal lamination and cross-stratification of both planar and trough type with trough axes up to three feet (1 m) long, are characteristic of the quartz-cemented strata, whereas some bioturbation was noted in the dolomitic beds. The rocks are mainly light grey or yellowish grey with rare patches of dusky red.

The dolomitic sandstone in the lowest unit probably is of very shallow marine origin but the quartz-cemented sandstone may be the result of fluvial deposition. The azimuth of 12 trough axes ranges from 330° to 48° and averages 354°. Because of the spoon-shaped geometry of the troughs - with the shallow part on the north end - it is inferred that they were formed by northerly flowing currents.

Rowley Island well

In the Rowley Island well (Appendix 2 and Fig. 13), the lowermost 65.8 feet (20 m) of strata resting unconformably on Aphebian gneisses are assigned to the Gallery Formation and divided into 25 units. The Rowley Island well, although divisible into numerous minor units (234 in this report), is characterized by recurrent lithological assemblages. These assemblages appear to represent a continuous spectrum of depositional environments that range from nonmarine to subtidal and have been numbered in that order. The lithology of the Gallery Formation can be discussed in terms of four, nonmarine to shallow marine assemblages designated 1, 2A, 2B, and 2C.

Assemblage 1 is limited to the lower 0.2 feet (6 cm) of the Gallery Formation (unit 1) and consists of sandy and slightly argillaceous pebble conglomerate. The pebbles, which range in diameter up to 3.5 cm, are composed of quartz and quartz-feldspar aggregates derived from metamorphic or igneous rocks and veins. The sandy matrix, very fine to very coarse grained, consists of subrounded to subangular quartz and minor feldspar with small amounts of biotite and trace amounts of muscovite and zircon.

This compositionally immature rock type is probably nonmarine in origin and may represent bottom deposits of a fluvial channel.

The assemblages numbered 2 (2A, 2B, 2C) are dominated by very fine to very coarse grained sandstone but include several other rock types.

Assemblage 2A is restricted to an interval of about 18 feet (5.5 m) in the lower part of the Gallery Formation (units 2 to 5). It consists mainly of pebbly sandstone with lesser amounts of sandstone and small amounts of siltstone. The sandstone units range in grain size from very fine to very coarse and are generally quartz-cemented, porous, and friable. Horizontal and cross-lamination prevail and bioturbation is relatively weak (Pl. 44). Sets of cross-laminae range in thickness up to about 2.5 centimetres. The sandstone is composed mainly of subangular to rounded quartz and minor feldspar with trace amounts of muscovite, biotite, tourmaline, and zircon. Some coarse and very coarse sand grains are composite, as are the pebbles. Very small amounts of epigenetic calcite and dolomite occur in the upper part of the interval. Streaks of epigenetic phosphate probably were derived from linguloid brachiopod

fragments. The siltstone is micaceous and in part slightly calcareous and dolomitic.

This assemblage, also, is compositionally immature and, because of the absence of carbonate matrix (in a carbonate-dominated succession) and algal structures, and the near-absence of invertebrates, it is inferred to be largely or entirely of nonmarine origin. The linguloid shell remains may indicate nearshore marine conditions if they are *in situ* (*see* Ziegler and Boucot, 1970) but could be supratidal storm deposits.

Assemblage 2B forms three units (6, 14 and 24) in the lower, middle and upper parts of the formation. It consists of very fine to coarse- or very coarse grained, quartz-cemented sandstone and is similar to assemblage 2A but lacks pebbles and siltstone. The horizontal and cross-lamination, with sets to about 2 centimetres and co-sets to about 4 centimetres in thickness, is mostly undisturbed. Phosphatic material (comparable to that in assemblage 2A) is restricted to unit 6.

The absence of carbonate matrix and algal materials and near-absence of invertebrates (except for possible linguloid brachiopod remains) suggest that this assemblage, also, is nonmarine. The close stratigraphic association with the shallow marine assemblage 2C (in the Gallery as well as in the Ship Point Formation), however, indicates proximity of a shoreline. Beaches and subaerial bars are the most probable depositional environments.

Assemblage 2C occurs in three major intervals (units 8 to 13; 15 to 23; 25 to 26) in the middle and upper parts of the formation. In the Gallery Formation, this assemblage consists mainly of very fine to very coarse grained sandstone that is predominantly dolomitic and, to a lesser extent, quartz-cemented; minor amounts of dolostone and dolomitic flat-pebble conglomerate or isolated flat pebbles occur also. Horizontal and cross-lamination, with sets of cross-laminae to about 2.5 centimetres, have been obliterated partly by bioturbation and brecciation. The sandstone strata are composed mainly of quartz with lesser amounts of feldspar, and trace amounts of zircon, tourmaline, and muscovite. The quartz and feldspar mainly are rounded to subrounded but more angular where marginally replaced by the carbonate matrix. Glauconite was observed only in a sandy dolostone at the top of the Gallery Formation. The dolomite in the sandstone units, which is microcrystalline to finely crystalline and relatively abundant, forms a sedimentary matrix rather than a cement. The calcite, on the other hand, is generally secondary and commonly ferroan. Pyrite is rare and mostly oxidized. Coated grains are fairly common in the dolomitic sandstone, ooids less abundant, and oncolites rare.

This assemblage is considered to be very shallow marine, perhaps mainly high intertidal, in origin on the basis of the dolomite content and coarse grain size of the sandstone, algal structures, ooids, and bioturbation.

Turner Cliffs Formation

Admiralty Inlet-Borden Peninsula

The name, Turner Cliffs Formation, was introduced by Blackadar (1956) for a clastic and dolomitic unit occurring between the Gallery and Ship Point Formations. Six members were recognized in the type section at the Turner Cliffs, west-central Brodeur Peninsula (Lemon and Blackadar, 1963): (1) edgewise conglomerate member (60 ft., 18 m); (2) lower sandstone member (85 ft., 26 m); (3) second edgewise conglomerate member (40 ft., 12 m); (4) thin-bedded argillaceous dolostone[1] member (120 ft., 37 m); (5) third edgewise conglomerate member (50 ft., 15 m); (6) upper sandstone member (90 ft., 27 m). The edgewise conglomerate members were described as consisting of interbedded dolomitic siltstone, silty dolostone, laminated argillaceous dolostone, and thin beds of flat, tabular argillaceous dolomitic fragments. The sandstone members included dolomitic and quartz-cemented sandstone and sandy dolostone.

Because of poor exposure, the writer generally could not distinguish the edgewise conglomerate members from the argillaceous dolostone members in the interior of Borden Peninsula during the 1963 field work. The rocks of the Turner Cliffs Formation, therefore, were assigned to two major lithological assemblages: a predominantly dolomitic assemblage including dolostone (in part argillaceous, silty, and sandy) and dolomitic flat-pebble conglomerate; and a sandy assemblage including dolomitic and quartz-cemented sandstone. In the northern part of Borden Peninsula, four dolomitic members (informally referred to as members D1, D2, D3, and D4) and three intercalated sandy members (S1, S2 and S3) were established. In the southern half of Borden Peninsula, however, where the formation thins markedly, only member S3 (upper sandstone member of Lemon and Blackadar, ibid) was recognized; the underlying succession consists mainly of dolomitic strata with minor sandy units that could not be traced with confidence from one section to the next (*see* Fig. 5).

The upper contact of the formation was placed at the top of member S3 in conformity with the previous usage; this is at the top of a very thin, recessive dolostone unit that differed in appearance from the Ship Point dolostone. It was considered possible, however, "that member S3 is separated from the lower parts of the Admiralty Group by a major hiatus and represents the basal unit of the (late) Lower Ordovician transgression; if so, members S3 and D4 should be included with the Ship Point Formation" (op. cit., p. 16). The age of the Admiralty Group (*see* below) is uncertain but there is some evidence suggesting that it must be older than Arenigian. If so, the occurrence of conodonts not older than Arenigian in strata of the Rowley Island well equivalent to member S3 would support the second alternative. Consequently, the original member S3 of the Turner Cliffs Formation now is regarded as the basal, sandy deposit of

[1] The authors used the term "dolomite", but "dolostone" will be substituted for "dolomite" throughout the following discussion.

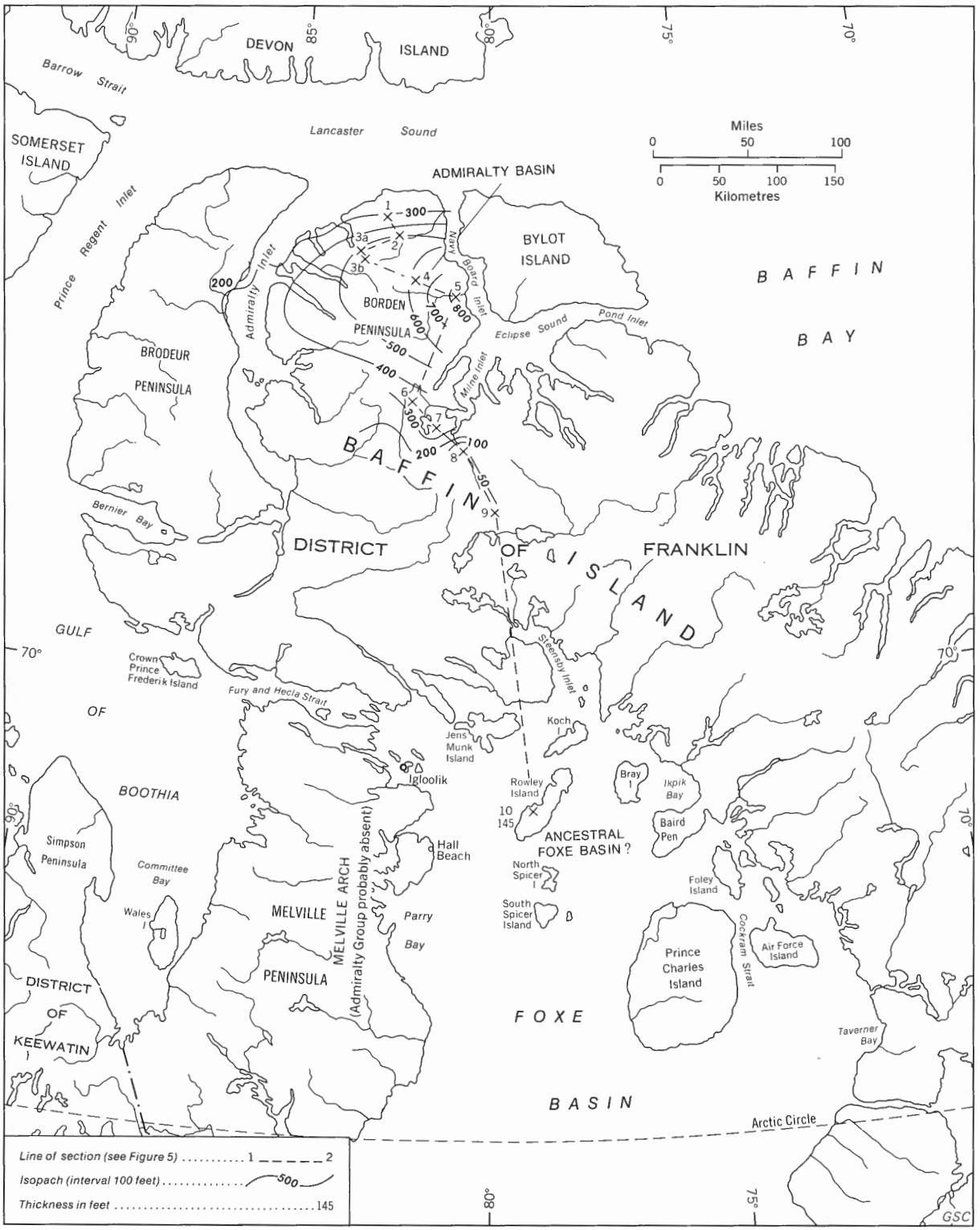


Figure 4. Isopach map, Turner Cliffs Formation and location of cross-section, Figure 5

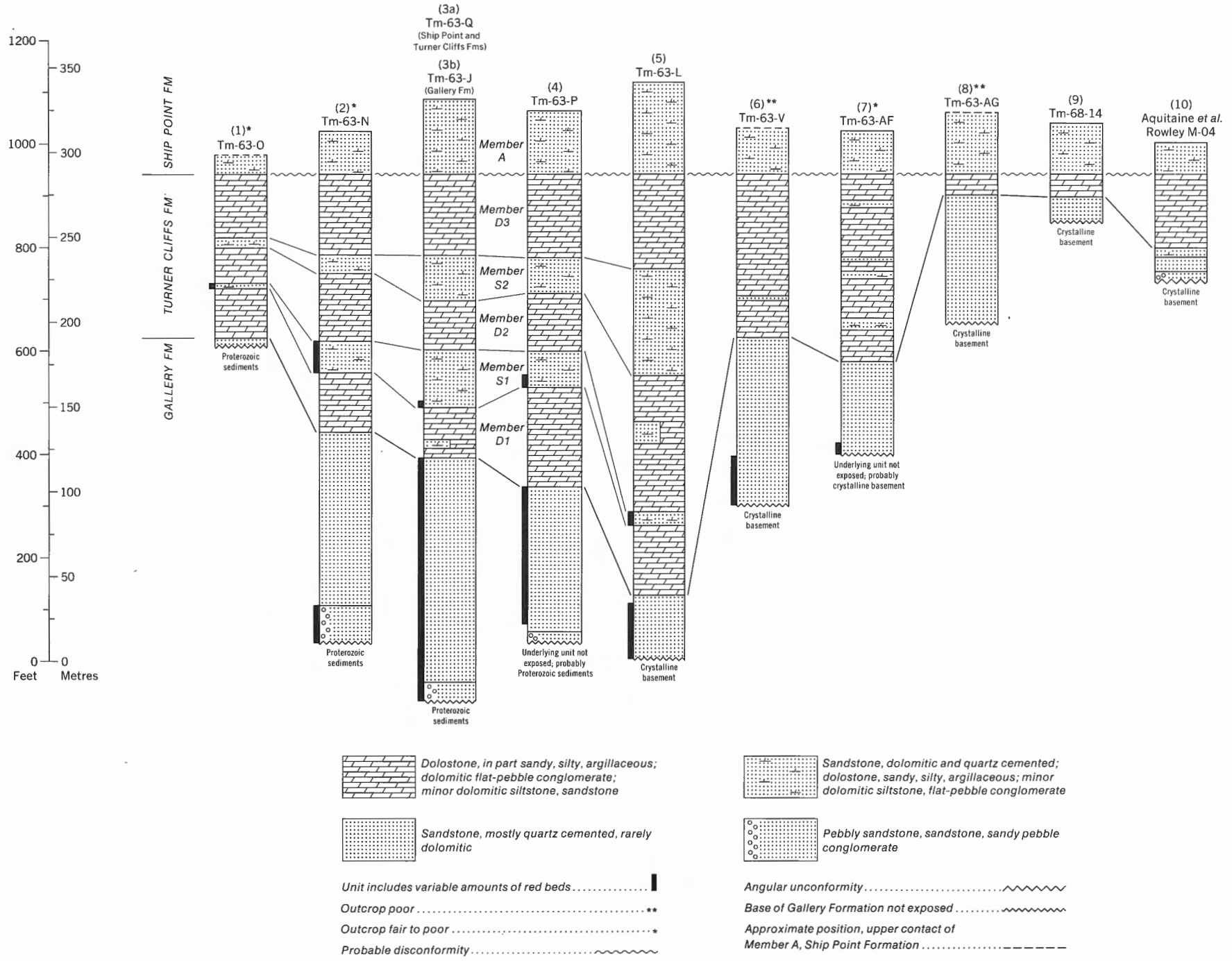


Figure 5. Generalized stratigraphic cross-section of Admiralty Group and Member A of Ship Point Formation

GSC

a new marine transgression and designated member A of the Ship Point Formation. [Inclusion of these strata in the Ship Point Formation also was proposed by Monahan (1972)]. A revised isopach map of the Turner Cliffs Formation (without the former member S3) is presented as Figure 12.

The difference in stratigraphy between the northern and southern parts of Borden Peninsula is problematic and two alternative explanations were envisaged: a facies change; or a truncation of all units above the lowermost member, D1, by a disconformity at the base member S3. A third possibility was emphasized by Monahan (op. cit.): the Turner Cliffs Formation may ascend in age in a southward direction so that the strata in southern Borden Peninsula (and the Rowley Island well) may be correlative with member D3 in northern Borden Peninsula. In this case, the underlying Gallery sandstone strata also would be younger than the Gallery Formation of northern Borden Peninsula and time-equivalent to middle parts of the Turner Cliffs Formation in that region. This hypothesis has been adopted in the present correlation chart (Fig. 3).

Northeast of Inuktorfik Lake

The Turner Cliffs Formation in this area is comparable in lithology to occurrences in southern Borden Peninsula but thinner and lacking in resistant sandstone beds. At the section Inuktorfik-northeast I (Appendix 1 and Fig. 15), it probably is represented by a recessive interval, 43 feet (13 m) thick, that is partly covered and occurs between Gallery-type sandstone below and other resistant sandstone, assigned to member A of the Ship Point Formation above. Talus in the lower 13 feet (4 m) of the interval includes: silty, very fine grained sandy, and glauconitic dolostone; very fine grained dolomitic sandstone; and dolomitic flat-pebble conglomerate. The covered middle and upper parts of the unit probably are underlain by similar rocks.

Rowley Island well

In the Rowley Island well (Appendix 2 and Fig. 13), the Turner Cliffs Formation is 144.7 feet (44 m) thick and divided into 45 units that represent two depositional assemblages, 3A and 3B, both composed of dolomitic rocks.

Assemblage 3B is discussed first because it includes all but three units in the upper part of the formation. It consists mainly of dolostone with lesser amounts of dolomitic flat-pebble conglomerate and breccia, and small amounts of dolomitic siltstone and sandstone (Pl. 45).

The dolostone is mainly light olive-grey and less commonly light greenish grey or medium grey. It consists of finely crystalline to predominantly microcrystalline dolomite with variable, generally small amounts of "floating" silt and very fine to fine-grained sand of quartz and minor feldspar. Glauconite occurs in some beds, and trace amounts of mica (muscovite or green and brown biotite) occur in others. Authigenic pyrite is relatively common. Molds of gypsum(?) were observed in unit 61. The rocks (unless bioturbated) are laminated to thinly laminated, and the lamination is due to vertical variations in the content of submicroscopic carbonaceous and argillaceous impurities. Horizontal stratification is prevalent, but lenticular and cross-stratification, commonly on a scale of millimetres, also occur. Undulations in the laminae in many cases are due to burrowing and subsequent differential compaction. Bioturbation is less well developed than in the Ship Point Formation and is limited to lower (units 27 to 35) and upper (units 65 to 68) parts of the formation. Branching columnar stromatolites occur in the uppermost part of the formation but other algal structures and invertebrates have not been observed.

Fourteen units, comprising about six per cent by volume of the Turner Cliffs Formation, are composed of flat-pebble conglomerate. The mean thickness of those flat-pebble conglomerates that have been recorded separately is 0.625 feet (19 cm), and the range is from 0.1 to 1.7 feet (3 to 52 cm). The intervening intervals have an average thickness of 9.7 feet (2.96 m) and a range of 2.045 to 20.45 feet (0.62 to 6.23 m) but include some scattered flat pebbles or very thin conglomerates that have not been recorded separately. The flat pebbles are composed of dolostone that is partly silty or sandy, and are enclosed in a similar sedimentary matrix. They range in length to about 5 centimetres, are horizontal to steeply inclined, and commonly have darker margins, perhaps indicators of former algal coatings. Most fragments in the conglomerates appear to have been transported but some (e.g. a specimen from unit 54 at about 1,510.4 ft., 460.4 m) seem to represent laminae that have been warped and disrupted *in situ*. The disruption could be due to a variety of processes such as drag by currents on the sea bed, sliding on channel banks, and desiccation. A horizontal layer of dolomitic siltstone in unit 37 (at 1,561.1 ft., 475.8 m) shows downward tapering fractures filled with the overlying silty dolostone (Pl. 45). The fractures are due to horizontal tension, possibly the result of shrinkage. The transported flat pebbles probably were derived partly from such disrupted strata. At least one flat-pebble conglomerate overlies laminated dolostone with an abrupt contact that could be interpreted as a minor disconformity.

Dolomitic siltstone, usually light orange-grey, is fairly common, but very fine to fine-grained dolomitic sandstone is limited to upper parts of the formation (units 51 and 61). Lenticular and cross-stratification on a scale of millimetres are characteristic of these rock types.

Assemblage 3B is thought to be shallow marine in origin with a range from intertidal to perhaps shallow subtidal. The horizontally laminated dolostone and associated dolomitic siltstone and sandstone appear to have been deposited in very shallow, protected lagoonal settings that were inimical to most invertebrates except for some burrowing organisms. The flat-pebble conglomerates are interpreted as storm deposits derived from intertidal to supratidal regions in which some desiccation and lithification had occurred.

Assemblage 3A, restricted to units 68 and 70 in the upper part of the formation, is composed of

similar dolostone and silty dolostone as assemblage 3B, but contains chert. The chert occurs as a lamina, 8 millimetres thick, as a lens or large clast, as replacement, and as vug filling. It may be comparable in origin to inorganic Recent chert precipitated in seasonal lagoonal lakes of southern Australia (Peterson and von der Borch, 1965). There, it is associated with dolomite, magnesite, and magnesian calcite and forms plates and dried-up, mud-cracked sediments. The chert in the upper part of the Turner Cliffs Formation, therefore, may indicate a temporary marine regression that caused prolonged subaerial exposure and seasonal drying of lagoons that normally were submerged.

Admiralty Basin and ancestral Foxe Basin(?)

The Admiralty Basin is a three-sided sedimentary basin or embayment on Borden Peninsula, northwestern Baffin Island, that is outlined by isopachs of the Turner Cliffs Formation and apparent, also, from paleocurrent patterns of the Gallery Formation.

The thickness of the Gallery Formation (Fig. 12) changes in a rather irregular fashion on a local scale, and this is due probably to irregularities in the erosion surface on which it was deposited. On a regional scale, however, it thins markedly in northwesterly, southwesterly and southerly directions. The depocentre lay on west-central Borden Peninsula. Reduced thicknesses in the east-central part of the basin may be related to the Navy Board Structural High, a structural feature with a record of intermittent positive movements extending from Cambrian or earlier to Tertiary time (cf. Trettin, 1969, Figs. 3 and 29). In the northern half of the basin, the paleocurrent directions are mainly to the southeast, and in the southern half, mainly to the north. If the strata in the extreme southern parts are younger than those in the centre and north, then the basin would have received sediments both from the northwest and south during an earlier phase of its development, and from the south alone during a later phase.

The isopachs of the Turner Cliffs Formation (Figs. 4 and 12) outline a relatively regular, easterly plunging embayment with a depocentre on east-central Borden Peninsula. Lithological evidence for greater water depth in the centre of the basin than at the basin margins is lacking; sedimentation, therefore, appears to have kept pace with differential sinking so that the surface of the sediments probably remained close to mean sea level most of the time.

There is some tenuous evidence that another basin may have existed at the site of the present (geographic) Foxe Basin. The Gallery and Turner Cliffs Formations are slightly thicker in the Rowley Island well than northeast of Inuktorfik Lake and may be absent from northeastern Melville Peninsula. If the suggested ancestral Foxe Basin was real, it certainly was a minor feature compared with the Admiralty Basin because the deposits within it are an order of magnitude thinner.

Age and correlation of Admiralty Group

Linguloid brachiopods are the only invertebrate fossils found so far in the Admiralty Group. Those in the Admiralty Inlet-Borden Peninsula region all came from the lower dolomitic member of the Turner Cliffs Formation. The most diagnostic form is a species of *Lingulella* that cannot be restricted within the Early Cambrian to Middle Ordovician age range of the genus (A.J. Rowell *in* Trettin, 1969).

The age assignment of the Admiralty Group on the present correlation chart (Fig. 3) is tentative and somewhat problematic. The Gallery Formation of northern Borden Peninsula is correlated with the upper Lower Cambrian Rabbit Point sandstone of Dundas Harbour, Devon Island (Kurtz *et al.*, 1952), and the Turner Cliffs Formation with the combined Bear Point and Ooyagah Formations of Dundas Harbour (op. cit.) and Boothia Felix Formation of Boothia Peninsula (Christie, 1973) - all three mixed carbonate and clastic units of Middle Cambrian age. It is assumed, furthermore, that the southward thinning of the Turner Cliffs Formation and the disappearance of the sandstone members within it are due to southward transgression and related diachronism; i.e. the Gallery and Turner Cliffs Formations are shown as ascending in age in that direction.

On Devon Island and, presumably, also on Boothia Peninsula, the Middle Cambrian strata are separated from lower Lower Ordovician beds by a hiatus that apparently involves all of Late Cambrian time. The hiatus narrows toward the axis of the geosyncline (early Late Cambrian fossils are now known from the subsurface of Cornwallis Island; G.R. Davies, pers. com.), and it is assumed here that it widens toward the centre of the craton, embracing the early Early Ordovician (Tremadocian) in Baffin Island and Foxe Basin.

The proposed correlation attempts to make the best possible match with formations of established age in the adjacent parts of the Arctic Platform. The most serious objection to the present scheme, however, lies in the fact that field evidence for a disconformity is relatively weak (*see* below). Therefore, it could be proposed alternatively that the Turner Cliffs Formation is lower Lower Ordovician and the Gallery Formation, Upper Cambrian. The southeastward paleocurrent directions in the Gallery Formation, however, militate against an early Early Ordovician (Tremadocian) assignment of that unit. During the Tremadocian, the Arctic Platform north and northwest of Baffin Island appears to have been an extensive marine shelf on which carbonate units such as the Copes Bay, Mingo River, and Canrobert Formations were deposited (*see* Chart IV by Thorsteinsson and Tozer *in* Douglas, 1970) and not a landmass from which clastic sediments could have been derived.

SUB-SHIP POINT DISCONFORMITY(?)

Evidence for a disconformity between the Turner Cliffs and Ship Point Formations is tenuous as neither stratigraphic truncation nor an ancient weathering surface have been demonstrated so far.

There are, however, three lines of evidence suggesting that an erosional interval occurred between Turner Cliffs and Ship Point sedimentation.

(1) The Turner Cliffs Formation is considered to have been deposited in an intertidal to shallow subtidal environment, and member A of the Ship Point Formation is thought to be a transgressive unit that commences in littoral, probably nonmarine beds. If this interpretation is correct, then a regression has occurred between Turner Cliffs and Ship Point sedimentation; cherty beds near the top of the Turner Cliffs Formation (*see* above, Assemblage 3A) may indicate the beginning of that regression. Thus, sedimentary evidence is compatible with a disconformity although it does not prove it.

(2) The regional stratigraphic relationships discussed below (Admiralty Group, age and correlation) suggest that the Turner Cliffs Formation may be Middle Cambrian in age. If so, it would be separated from the Ship Point Formation by a major hiatus.

(3) Stratigraphic relationships with the Franklin Geosyncline suggest that a disconformity should exist at the base of the Ship Point Formation, even if the Turner Cliffs were early Early Ordovician in age and correlative with the Copes Bay Formation, rather than Middle Cambrian as suggested above. The lower part of the Ship Point Formation is correlative with the Eleanor River Formation on the basis of conodont collections. On Ellesmere Island, Copes Bay and Eleanor River Formations are separated by evaporites, carbonates, and red beds of the Baumann Fiord Formation. The Baumann Fiord Formation undoubtedly was deposited in an intertidal and sabkha-type basin margin setting (Mossop, 1973a, b) and probably was bordered by a region of nondeposition and erosion on the cratonic side. The absence of beds comparable to the Baumann Fiord Formation, therefore, probably indicates a hiatus.

SHIP POINT FORMATION

The Ship Point Formation was defined originally as a dolomitic unit lying between the Turner Cliffs and Baillarge Formations (Blackadar, 1956). The type section at Ship Point, at the confluence of Admiralty Inlet and Baillarge Bay, contains about 900 feet (274 m) of dolostone that is, in part, slightly silty and sandy. Small proportions of dolomitic sandstone, mudstone, and flat-pebble conglomerate were observed at other localities. Sparse fossil collections (probably from the upper part) suggested an early Middle Ordovician age (Lemon and Blackadar, 1963).

The Ship Point Formation is redefined here to include the original "upper sandstone member" (Lemon and Blackadar, 1963) or "member S3" (Trettin, 1969) of the Turner Cliffs Formation. This unit will be referred to as member A, and the original Ship Point Formation as member B.

This formation appears to have covered all of northwestern Baffin Island, the islands of Foxe Basin, and northeastern Melville Peninsula. On the northwest it evidently was contiguous with the Nadlo Point Formation on Devon Island (Kurtz *et al.*, 1952), the Netsilik Formation of Boothia Peninsula (Christie, 1973), and the Eleanor River of the Franklinian Geosyncline (Kerr, 1968). It appears to have wedged out somewhere south of Foley Island and Cape Joseph Brown, central eastern Melville Peninsula, because it does not appear to be present on southeastern Baffin Island (Blackadar, 1967) and the Hudson Platform (Cumming, 1971; and others).

The redefined Ship Point Formation has a total thickness of about 1,000 feet (305 m) (Lemon and Blackadar, 1963) at the original type section at Ship Point, and of 337.6 feet (102.9 m) in the Rowley Island well. The log of that well (Appendix 2 and Fig. 13) provides the most complete and detailed record of the unit and may serve as the lithological standard both for northwestern Baffin Island and Foxe Basin. The exposures in the present project area have provided additional information on variations in lithology and thickness, and fossil collections establishing a late Early to early Middle Ordovician age range.

Lithology and depositional environments

Member A

Rowley Island well

Member A is 60.7 feet (18.5 m) thick in this well and has been subdivided into 20 units (units 73 to 92; Appendix 2 and Fig. 13). The lower 33 feet (10 m) consist mainly of sandstone, and the upper 28 feet (9 m) mainly of sandy dolostone. These strata have been assigned to the lithological assemblages 2B and 2C, introduced in the discussion of the Gallery Formation.

Assemblage 2B occupies two intervals in the lower part of the unit (units 73 and 79 to 81). It consists of very fine to very coarse grained quartz sandstone that is generally quartz-cemented but contains minor amounts of calcite in some strata. The calcite appears to be partly pseudomorphous after dolomite. The lower half of the lower interval is bioturbated; the upper half shows horizontal and cross-lamination, and sets of cross-strata are as much as 3 centimetres thick. The upper interval is characterized by horizontal lamination.

The assemblage is interpreted to be a predominantly marine nearshore deposit (*see* Gallery Formation).

Assemblage 2C comprises one minor interval in the lower part of the member (units 74 to 78) and the entire upper part (units 82 to 92). Units 74 to 78 are composed of shale, dolomitic mudstone, and fine- to medium-grained, bioturbated sandstone that is cemented by quartz or calcite, the calcite being partly pseudomorphous after dolomite. The shale and mudstone are rich in illite (or mica) and contain authigenic pyrite. Intraclasts of silicified oolitic sediment occur in unit 75.

The lower part of the upper interval (units 82 and 83) consists of very fine to very coarse grained sandstone that is cemented by quartz, dolomite, and calcite. The rocks are mostly massive

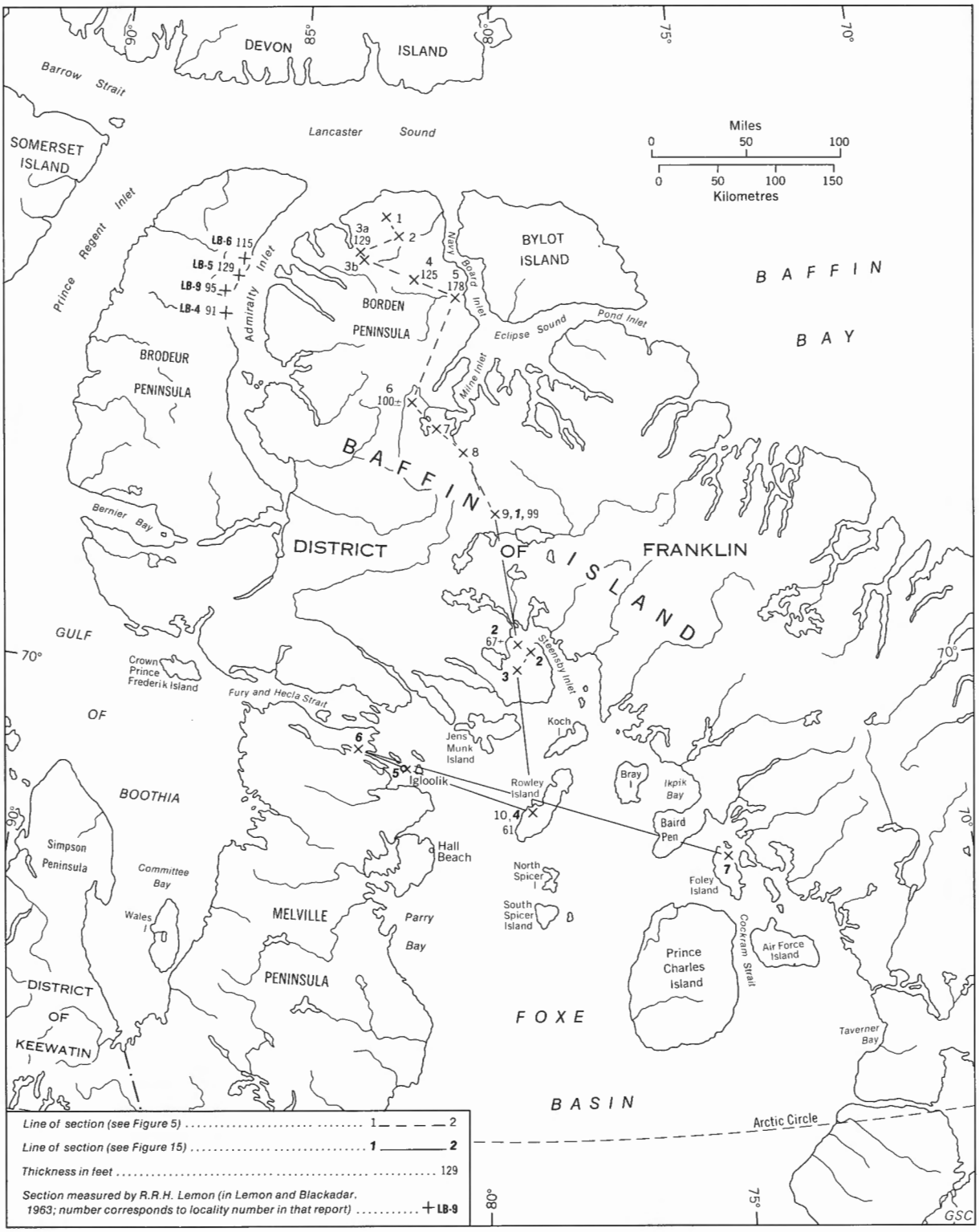


Figure 6. Measured thicknesses of member A, Ship Point Formation and location of stratigraphic cross-sections, Figures 5 and 15

and brecciated, although the lamination is preserved in unit 83.

The upper part of the interval (units 84 to 92) is composed mainly of sandy and silty dolostone and dolomitic sandstone with lesser amounts of flat-pebble conglomerate and breccia (Pl. 46). The terrigenous fraction of the sediments consists mainly of quartz with less feldspar and trace amounts of muscovite and biotite. The organic fraction includes gastropods, echinoderms, conodonts, grains with algal coatings, and at least one domal stromatolite. Other notable features are molds of crystals (perhaps gypsum) and ooids. The predominantly horizontal lamination is to some extent brecciated and bioturbated.

Assemblage 2C (*see* Gallery Formation, Rowley Island well) is considered to be mainly high intertidal in origin on the basis of its dolomitic composition, invertebrate and algal remains, ooids, and considerable bioturbation.

Northeast of Inuktorfik Lake

Member A is about 100 feet (30 m) thick at section Inuktorfik-northeast I. The basal 9 feet (2.7 m) consist of very fine to very coarse grained, quartz-cemented sandstone showing trough-type cross-lamination, the troughs being up to two feet long. These strata are perhaps nonmarine and comparable to assemblage 2B in the Rowley Island well. The overlying succession is composed of quartz-cemented and dolomitic sandstone, sandy dolostone, and dolostone, comparable to assemblage 2C. Domal stromatolites, coated grains, and ooids occur in the uppermost part of the member.

Peninsula west of Steensby Inlet

At the stratigraphic section, Steensby-north, 67 feet (20 m) of beds are assigned to member A of the Ship Point Formation. The lower contact is not exposed and it is unknown how much of the lower part is missing. The lower few feet of the section consist of very fine to very coarse grained, quartz sandstone that is cemented with calcite and dolomite and shows some steeply inclined cross-lamination with co-sets up to 15 centimetres thick; these strata represent either assemblage 2B or assemblage 2C. The overlying succession, characterized by alternating dolomitic sandstone, sandy dolostone, and dolostone, and containing fairly abundant coated grains, some domal stromatolites, and rare ooids, is characteristic of assemblage 2C. Stromatolitic dolostone near the top of the member is replaced partly by chert.

Member B

Rowley Island well

In the Rowley Island well, 276.9 feet (84.3 m) of strata, divided into 129 units (units 93-222), are assigned to member B of the Ship Point Formation (Pls. 47-60). The bulk of the member consists of strata included in assemblage 3B; mainly dolostone, less dolomitic flat-pebble conglomerate and minor amounts of dolomitic siltstone and very fine grained sandstone. Cherty beds, included in assemblage 3A, are limited to an eight-foot (2.4 m) thick interval in the lower part of the member (units 105-109); and sandy dolostone and dolomitic sandstone with very fine to very coarse grained quartz, assigned to assemblage 2C, are limited to the lower middle part (units 121-130).

Assemblage 3B. The predominant rock type of this assemblage, and of the entire member, is a microcrystalline to very finely crystalline dolostone (Pl. 30) that contains varying, but generally minor amounts of clastic impurities ranging from silt to very fine sand grade. The rocks are mainly light olive-grey and less commonly light greenish grey, medium light grey or medium grey. Some slightly argillaceous strata are medium bluish grey, and silty and sandy strata, yellowish or brownish. Clastic impurities consist mainly of quartz, less feldspar and rare muscovite and biotite. X-ray diffraction analyses indicate that the clay mineral content is very low, but strata with moderate gamma ray anomalies have been described as slightly argillaceous in the log of the well. The original stratification, mainly a horizontal lamination with some small-scale cross-lamination, has been disturbed or destroyed, to a considerable extent, by burrowing; much more so than in the Turner Cliffs Formation. The burrows are horizontal, vertical, or inclined and differ considerably in diameter and preservation. The writer has not attempted to interpret them specifically but, from their geometry and depositional environment (*see* below), it can be inferred that many were produced by suspension-feeding and scavenging animals (*see* Walker, 1972; and others). Another significant difference to the Turner Cliffs Formation is the sporadic occurrence of dolomitized invertebrate remains such as gastropods, trilobites, echinoderms, and ostracodes that generally have conodonts associated with them. Algal remains are relatively rare: they include domal and branching stromatolites; crinkled, horizontal laminations suggestive of algal mats; and coated grains.

A total of 38 units of flat-pebble conglomerate, comprising 11 per cent by volume of the member, have been recorded. The thickness of these conglomerates ranges from 0.05 to 4.5 feet (1.5-137 cm) and averages 0.82 feet (25 cm). The intervening units (which include some flat pebbles and very thin conglomerates) have an average thickness of 6.46 feet (1.97 m) and a range from 0.65 to 44.5 feet (20-1,360 cm). The pebbles range from less than 1 millimetre to more than 6.5 centimetres in length and are horizontal to moderately inclined. They are composed mainly of dolostone and to a lesser extent of dolomitic siltstone and sandstone. The flat pebbles are comparable in colour to the dolomitic sediments from which they were derived but commonly have darker rims. The matrix of the conglomerates consists mainly of dolomite, ranging from cryptocrystalline to medium crystalline, and variable amounts of silt and sand. Fine vugs are common in the matrix. Dolomitized invertebrate fossils are associated with flat-pebble conglomerate in the uppermost part of the member, and also form fragmental beds without lithic clasts. Some flat-pebble conglomerates are texturally gradational with breccias, and at least one breccia (unit 139) shows deformation indicative of desiccation. Several conglomerates have abrupt, probably erosional lower contacts.

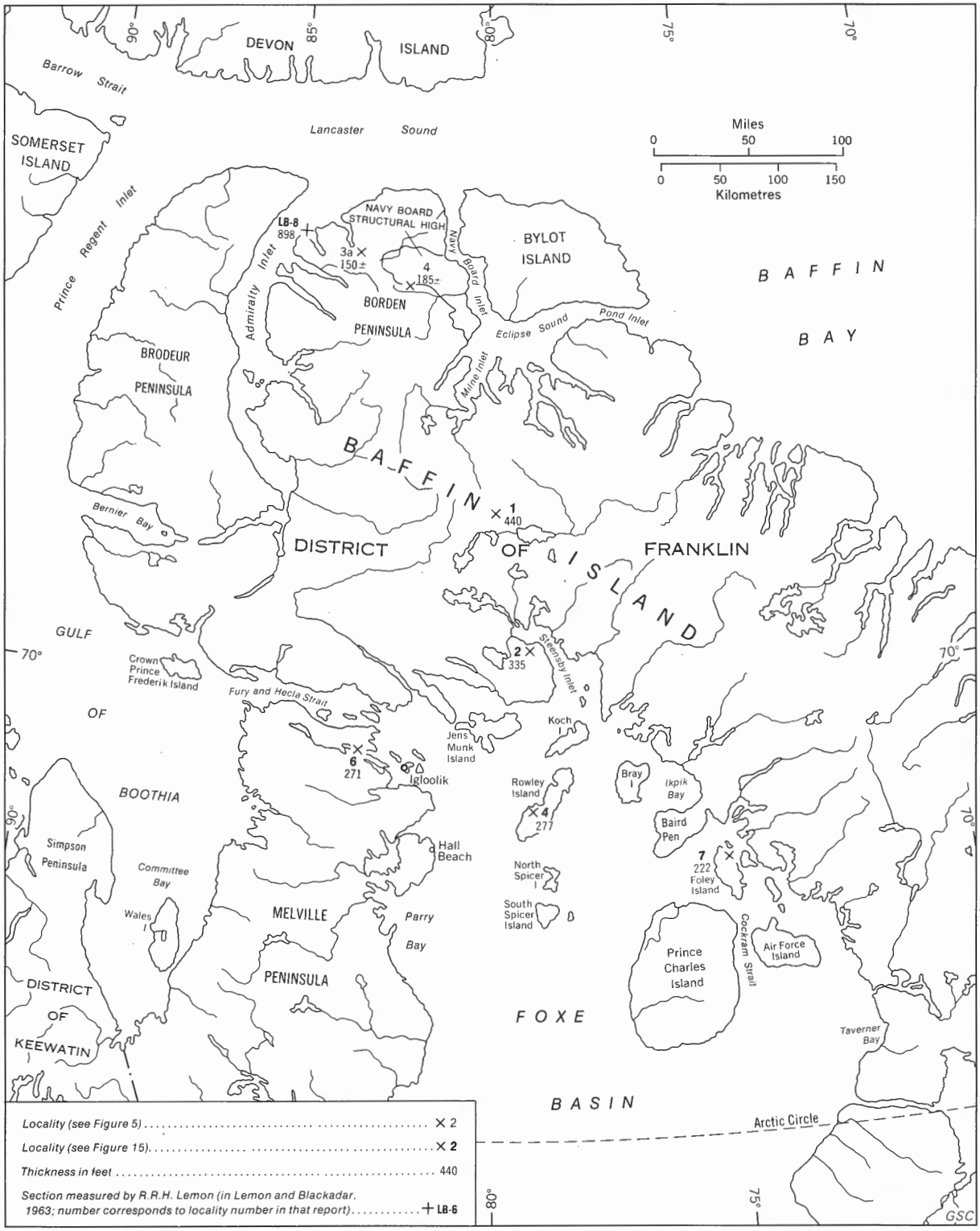


Figure 7. Measured thicknesses of member B, Ship Point Formation

Dolomitic siltstone and sandstone form only a small part of assemblage 3B. The terrigenous fraction consists mainly of quartz with minor amounts of feldspar, and trace amounts of muscovite and rare biotite. The sand in this assemblage is limited to the very fine or fine grades, in contrast to assemblage 2C where it includes medium to very coarse grains. The strata generally are pale yellowish brown or yellowish grey. Small-scale cross-lamination and lenticular lamination are much more common in these rock types than in the dolostone.

Assemblage 3B (*see* Turner Cliffs Formation) is considered to be of shallow marine, probably mainly intertidal to shallow subtidal origin. This interpretation is based on its dolomitic composition, scarce invertebrate fauna, very fine to fine grain size of the clastic materials, and on the abundance of flat-pebble conglomerate. Abrupt internal contacts representing minor "disconformities" (Pls. 52, 55, 56) are compatible with that environment.

Assemblage 3A. Minor amounts of chert occur in silty dolostone of unit 105. Laminated dolomitic strata in unit 109 that include gastropods and ostracodes are replaced almost completely by chert. The chert may indicate evaporite conditions caused by a minor regression (*see* Turner Cliffs Formation).

Assemblage 2C comprises silty and sandy dolostone, dolostone, dolomitic sandstone and siltstone, and dolomitic flat-pebble conglomerate. The most characteristic feature of the assemblage is the relatively coarse grain size of the contained sand. Gastropod fragments and molds of a bladed, perhaps evaporitic mineral were observed. Bioturbation is marked. The assemblage probably is high intertidal in origin (*see* above) and suggestive of a minor regression.

Surface sections

The surface sections of member B demonstrate a southward decrease in thickness from about 440 feet (134 m) northeast of Inuktorfik Lake through about 335 feet (102 m) west of Steensby Inlet, to about 222 feet (68 m) on Foley Island (*see* stratigraphic cross-section, Fig. 15).

None of these sections is exposed completely, but the lithological observations made are in accord with those from the Rowley Island well. Strata in the uppermost few tens of feet in the Rowley Island well, at Igloolik, west of Steensby Inlet, Quilliam Bay, and Foley Island show the following similarities. (1) The rocks are fossiliferous, and the faunas generally are richer and more varied than in the rest of the formation. (2) Almost identical conodont faunas were obtained from samples from those four localities (Igloolik, west of Steensby Inlet, Foley Island, Rowley Island well). (3) Considerable bioturbation is characteristic of the localities discussed (Pls. 22, 23), and also of the uppermost strata of the Ship Point Formation west of Hall Beach (loc. 406a). (4) Flat-pebble conglomerate is common both in the Rowley Island well and at Igloolik. These features, whatever their respective origin may be, suggest that the beds discussed are correlative.

Other vertical changes observed in the surface sections cannot be correlated with certainty from one section to the next.

Another notable feature is the presence of small algal mounds observed by B.V. Sanford in member A or the lower part of member B on northeastern Melville Peninsula about 14 miles (22.5 km) southwest of Lailor Lakes (near loc. 411a). The mounds are about six feet (1.8 m) wide at the base and four to five feet (1.2-1.5 m) high.

Age and correlation

Member A

The only diagnostic fossils obtained from this unit are conodonts of unspecified late Early (Arenigian) to early Middle Ordovician age, occurring at 1,416.3 and 1,430.5 feet (431.7 and 436 m), respectively, in the Rowley Island well. The following taxa were identified by C.R. Barnes:

Acodus auritus Harris sensu formae
Acontiodus cf. *A. staufferi* Furnish sensu formae
Drepanoistodus cf. *D. homocurvatus* Lindström
Scandodus sp. sensu formae
Scolopodus quadraplicatus Branson and Mehl
Stolodus stola Lindström

Member B

Member B ranges from late Early Ordovician to early Middle Ordovician (Portersfieldian?) in age, but early Middle Ordovician fossils are restricted to the uppermost part.

A late Early Ordovician age is indicated by the following macrofossils:

- extensiform didymograptids from eastern Jens Munk Island (*see* Blackadar, 1963; and this report);
- the gastropod *Ophileta* sp. from an unnamed island north of Koch Island (GSC loc. C-2821); and the gastropod operculum *Ceratopea* aff. *C. keithii* Ulrich (with a possible age range from middle to late Canadian) from the Anderson Bluff section on Foley Island (GSC loc. C-2842), probably about 97 feet (30 m) above the base of the member (total thickness of member 222 feet, 68 m);
- the brachiopods *Diaparelasma* sp. and *Tritoechia* (2 spp.) from the same section, 193 feet (58.8 m) above the base of the member (GSC loc. C-2843).

Late Early Ordovician conodonts were obtained from Foley Island, about 82 feet (25 m) above the base of the member (GSC loc. C-2674). In his most recent summary, Barnes (1974) states that the fauna is:

> ...dominated by three conodont groups: scolopodans (e.g. *Scolopodus cornutiformis*, *S. gracilis*, and *S. quadraplicatus* Branson and Mehl), drepanodans (e.g. *Drepanodus* sp. cf. *D. homocurvatus* s.f., *D. simplex* s.f.), and hyaline acodans (e.g. *Acodus auritus* transition series).

This compares closely with a fauna from the lower Eleanor River Formation assigned by him to the late Arenigian (late Canadian).

The early Middle Ordovician age of the upper part of the formation is apparent from macrofossils collected at the type section (Lemon and Blackadar, 1963) and from conodonts obtained from the present area. Two faunas can be distinguished. The older is represented in a specimen from an unnamed island north of Koch Island (GSC loc. C-2673) and includes the following diagnostic taxa:

New Genus A (of Sweet *et al.*, 1971) (Pl. 1, Figs. 4, 5)
New Genus B sensu formae (of Sweet *et al.*, 1971) (Pl. 1, Fig. 9)
Oistodus multicorrugatus Harris sensu formae (Pl. 1, Fig. 7)
O. pseudomulticorrugatus Mound sensu formae

These elements suggest an age equivalent to Fauna 2 of Sweet *et al.* (1971).

The youngest fauna occurs in collections from the uppermost part of the formation in the Rowley Island well (GSC locs. C-23082, C-23083, C-23084), at Igloolik (GSC loc. C-2620); west of Steensby Inlet (GSC loc. C-10017); and on Foley Island (GSC loc. C-10060). Barnes (1974, p. 230) states that these samples are characterized by a more diverse fauna:

> The scolepodans and drepanodans, more typical of the late Arenigian, are absent or rare as are New Genus A, and the *Oistodus multicorrugatus* transition series. New components include:
>
> *Belodella* n. sp. s.f. (Pl. 1, Fig. 11)
> *Chosonodina?* sp. A s.f. of Sweet *et al.* (1971) (Pl. 1, Fig. 15)
> Hyaline prioniodiform transition series elements (Pl. 1, Fig. 14)
> *Multioistodus compressus* Harris and Harris (Pl. 1, Fig. 12)
> *Oulodus* n. sp. (Pl. 1, Fig. 13)
> *Phragmodus* n. sp. A (of Sweet *et al.*, 1971) (Pl. 1, Fig. 10)
>
> This association suggests assignment to Fauna 4 of Sweet *et al.* (1971, Fig. 1) although some elements of both Faunas 3 and 5 are present too. This fauna is known elsewhere from the Lehman Formation of Utah, the upper Antelope Valley (*Anomalorthis* Zone of the Whiterock Stage), Monitor Range, Nevada, and the Everton Formation of northern Arkansas and southeastern Missouri (Sweet *et al.*, 1971). The new species of *Belodella* and *Phragmodus* reported from strata of Marmor to Porterfield age in the Appalachians by Bergström (1971, Fig. 10) are probably those listed from the upper Ship Point Formation. Recently, *Phragmodus* n. sp. has been reported from the Siberian Platform (Moskalenko, 1972) in Volginsky beds (middle to upper Llanvirnian). Thus, the conodonts favour an age for the upper Ship Point Formation of upper Whiterockian to Porterfieldian (including Chazyan) i.e. upper Llanvirnian to lower Caradocian.

MID-ORDOVICIAN DISCONFORMITY

A disconformity between the Ship Point Formation on the one hand, and Baillarge Formation and map-unit O_{1s} on the other hand is inferred from the following evidence.

(1) The contact between the Ship Point Formation and these two units is marked everywhere by an abrupt change in lithology.

(2) Vuggy breccias, apparently produced by mid-Ordovician weathering, were observed at the top of the Ship Point Formation at two localities on north-central Borden Peninsula (Trettin, 1969, p. 23). Solution cavities containing clastic sediments of silt to very coarse sand grade also occur in the uppermost parts of the formation in the Rowley Island well [units 222 and 220; 0-0.3 ft. (9 cm) and 1.5-5.3 ft. (0.46-1.61 m), respectively, below the top of the formation].

(3) Quartz pebbles and cobbles to 7.5 cm in diameter (Pl. 24) occur locally in the uppermost strata of the Ship Point Formation at Igloolik Island. This is a very unusual lithology in Baffin Island and Foxe Basin; only the basal strata of the Gallery Formation are known to include terrigenous conglomerates and breccias at some localities.

The stratigraphic interval removed from the Ship Point Formation by mid-Ordovician erosion is variable in thickness. Considerable erosion seems to have occurred in the vicinity of the Navy Board Structural High on north-central Borden Peninsula where member B of the Ship Point Formation is only 150 to 185 feet (46-56 m) thick. This compares with about 900 feet (274 m) at the type section. In the present area, on the other hand, strata of similar lithology and fauna occur in the uppermost part of the formation at various localities, suggesting that very little erosion has occurred. The gradual southeastward decrease in thickness probably is a depositional feature.

Faunal evidence suggests that the hiatus was of relatively short duration. Conodont faunas from the uppermost Ship Point Formation are probably as young as Porterfieldian, and macrofossils from map-unit O_{1s} as old as Wildernessian; so the gap probably involves no more than parts of Porterfieldian and/or Wildernessian time.

MAP-UNIT O_{1s}

The informal name, map-unit O_{1s}, is applied here to a monotonous succession composed of variably dolomitic limestone that disconformably overlies the Ship Point Formation. On northeastern Melville Peninsula, the unit appears to be restricted to the late Middle Ordovician and is overlain by a reefal unit of late Middle or Late Ordovician age referred to as map-unit O_{rf}. In that area, the

upper part of map-unit O_{1s} is dolomitized to a greater extent than normal and locally has been mapped as map-unit O_{1sd}. The contact between map-units O_{1s} and O_{1sd} on the one hand, and map-unit O_{rf} on the other hand has not been seen. It may be conformable because the two units appear to be close in age. In the central part of Foxe Basin, map-unit O_{1s} ranges in age from late Middle to Late Ordovician and is overlain by dolomitic limestone and dolostone of latest Ordovician or Early Silurian age referred to as map-unit OS_{cb}. The nature of that contact also is uncertain, but possibly disconformable.

Map-unit O_{1s} is contiguous with the Baillarge Formation of northwestern Baffin Island, and divided into two members, A and B. The boundary with that formation is placed where the lower member, A, is no longer recognizable. It has not been mapped yet but must lie somewhere northwest of Steensby Inlet and west of Inuktorfik Lake. The regional relationships with the Baillarge Formation and correlative units of the Hudson Platform are discussed below in more detail.

The only complete section known of map-unit O_{1s} is the Rowley Island well. There it is 679.7 feet (207 m) thick and represented mainly by core, except for the upper 45 feet (14 m) which are represented by cuttings (Fig. 14). Surface sections at Quilliam Bay and Igloolik, west of Steensby Inlet, and on Foley Island comprise less than 100 feet (30 m) of the lowermost part.

Lithology

The following summary description is based mainly on the log of the Rowley Island well but has been supplemented by petrographic studies of specimens from other localities. A total of 66 specimens were studied in some detail in thin section or acetate peel (Appendix 3, Table 1). In the Rowley Island well, the strata of map-unit O_{1s} are assigned to assemblage 4, which consists of three rock types designated dolomitic limestone type 1, dolomitic limestone type 2 and dolomitic mudstone, but only the first mentioned is quantitatively significant. In addition to these three, a calcareous dolostone has been mapped locally on northeastern Melville Peninsula and also is represented by specimens from other localities.

Dolomitic limestone type 1 is characterized by the following features discussed below in more detail:

- a cryptocrystalline calcite matrix;
- a variable, but generally large proportion of mud-supported skeletal fragments, mostly of sand grade;
- a variable but, in general, moderately small proportion of predominantly microcrystalline dolomite that is scattered throughout the matrix and concentrated in burrows and solution zones;
- abundant solution zones, enriched in argillaceous matter;
- a large amount of bioturbation that has obliterated any primary stratification that may have been present originally; and
- two sets of colour: (1) pale yellowish brown with irregular patches of pale to greyish orange; and (2) light olive-grey with patches of greenish grey and, in some strata, with concentric patches of medium grey.

Fossils: The bioclastic material in the 66 specimens studied (Appendix 3, Table 1) ranges from silt to coarse sand size. Much larger skeletons, ranging up to 30 centimetres or more in maximum diameter, occur in the fossil collections but volumetrically are insignificant. The fossil content, ranging from a few per cent to probably more than 30 per cent, is highly variable; it is mostly above 10 per cent, the lower limit of Dunham's (1962) wackestones. The most abundant and ubiquitous fossil groups identified are echinoderms and trilobites, followed by cyclocrinitid algae, brachiopods, and gastropods (Pls. 32 to 35). Bryozoans and ostracodes are sporadic, and few pelecypods and sponges have been recorded. A large fraction of the silt- and sand-size debris, however, could not be identified. Most of this material consists of undiagnostic fragments composed of clear, anhedral calcite that probably has replaced skeletal aragonite. It probably represents two main groups: relatively large molluscs (i.e. parts of gastropods, pelecypods, and cephalopods) and certain types of algae. The major fossil groups distinguished do not show significant vertical variations that would indicate changes with time in the depositional environment. The only exception is the apparent absence (or scarcity?) of cyclocrinitid algae in the lower 70 to 80 feet (20-25 m) of the formation in the Rowley Island well. Whereas most of the material studied in thin section is broken and clearly not *in situ* (with the exception of very small organisms such as ostracodes and some cyclocrinitid algae), some intact colonial corals and *Receptaculites* observed in the field appeared to be in growth position.

Dolomite: The ratio of dolomite/dolomite + calcite, inferred from peak heights of X-ray diffractograms, ranges from 1.8 per cent (uncorrected value) or 4.1 per cent (corrected value) to 21.6 or 23.9 per cent and averages 8.7 or 11.0 per cent, respectively. The dolomite occurs as very finely crystalline to predominantly microcrystalline rhombohedra that are scattered throughout the rock and concentrated in burrows and solution zones. Extinction patterns under the petrographic microscope and impurities within the crystals suggest that they formed by the replacement of cryptocrystalline calcite. Some dolomite crystals are zoned.

Solution zones: On polished sections cut perpendicularly to bedding (Pl. 38), these zones are characterized by greenish stringers that undulate, break up into finer strands, or re-combine in a horsetail fashion (Mossop, 1972). Under the petrographic microscope (Pl. 37), the strands, in turn, are seen to be composed of innumerable finer wisps, about 0.8 to 3 millimetres thick and from less than one millimetre to more than one centimetre in length that branch and re-combine in a similar fashion. The dark colour is due to a concentration of argillaceous and carbonaceous matter. The wisps and stringers mostly show fine undultions, and rarely the zig-zag patterns characteristic of stylolites. They are generally subparallel

with bedding but also cut across it at moderate to large angles. This cross-cutting relationship shows clearly that they are not argillaceous sedimentary laminae but zones in which the insoluble material has been enriched by selective removal of calcium carbonate. Silt- and sand-size quartz and feldspar, and relatively resistant fossil fragments, such as echinoderm columnals, also are concentrated in the solution zones, but the latter may show signs of corrosion. The differences between the maximum and minimum widths of the "horse tails" provide an estimate of the amount of calcium carbonate removed at the constriction (*see* Mossop, op. cit.). Relatively large concentrations of argillaceous matter in the stratigraphic column (apparent, for example in gamma ray anomalies of map-unit O_{1s}, *see* Fig. 14) indicate either an originally relatively large content of argillaceous matter in the rocks or a high degree of calcium carbonate solution. The first alternative is supported by the apparently wide lateral extent and constant thickness of recessive argillaceous units in surface exposures (*see* Pl. 11). Such recessive intervals - regarded as original sedimentary units - are decimetres or metres in thickness, in contrast to the much thinner solution zones discussed here. It is interesting to note that horsetail-type solution zones are characteristic of somewhat argillaceous limestones whereas stylolites are characteristic of pure limestones (Mossop, op. cit.). It must be emphasized, however, that the argillaceous content of the present rocks is small in absolute terms (*see* X-ray analyses in Appendix 3, Table 1).

Burrows: More or less distinct burrows were recognized in about two thirds of the rock specimens studied, and there can be little doubt that the massive character of the unit as a whole is due to bioturbation. Three kinds of features were observed: (1) cross-sections of relatively small burrows; (2) longitudinal sections of relatively small burrows; and (3) longitudinal sections of relatively large burrows.

The cross-sections of the small-scale burrows range from 0.5 to 5 millimetres, and commonly are between 2 and 4 millimetres in diameter. Most are circular but elliptical, and triangular forms with rounded corners also are represented. The following types of concentric layering were observed:

- a core of sparry calcite, or of sparry calcite and micrite is surrounded by relatively dark micrite enriched in argillaceous and carbonaceous matter (Appendix 3, Table 1, nos. 48, 52);
- a core of relatively pure micrite is surrounded by micrite enriched in carbonaceous and argillaceous matter (no. 47);
- several concentric layers of micrite differ in the concentration of argillaceous and carbonaceous matter (no. 20);
- a core of micrite alone is visible that is enriched in opaque matter;
- concentrations of skeletal matter occur at the periphery of a concentric structure (nos. 19, 38); this material may show a crudely circular, or a spiral arrangement (no. 42); and
- sparry calcite marks the periphery of a circular structure (no. 13).

The micrite in all these cases represents the original matrix of the rock that has been reworked or pushed aside, and the sparry calcite probably represents open spaces produced by the burrowing.

The longitudinal sections of the small-scale burrows commonly are around 10 millimetres long but range from about 7 to 20 millimetres. They are horizontal, inclined, or vertical and characterized by a layering that is about perpendicular to the wall of the burrow, and convex in the presumed direction of advance (e.g. Appendix 3, Table 1, no. 17; Pl. 35).

The large-scale burrows referred to were seen only in a specimen from Foley Island (no. 51; Pl. 31). They are up to 7 millimetres in diameter, 45 millimetres in length, and horizontal to slightly inclined.

Because of the density and geometry of the burrows, and the inferred deeper subtidal depositional environment of the map-unit, it is apparent that they probably were produced by deposit-feeding animals (*see* Walker, 1972).

Silicate impurities: The silicate content of the limestone appears to be very small in thin section, but silt- and clay-size minerals commonly are masked by the more birefringeant carbonates. Quartz and minor feldspar of silt to very fine sand grade occur here and there but are far less abundant than in the Ship Point Formation or map-unit OS_{cb}. Illite and chlorite, judging from peak height ratios, do not comprise more than a few per cent of the rocks. Chert is rare and, in at least one section (Tm-68-246-1), is related to sponges.

Carbonaceous impurities: Three specimens from northeastern Melville Peninsula (from locs. 36a, 36b and 37) were submitted to L.R. Snowdon for analysis of organic carbon. One specimen (from loc. 36a) had a content of 0.0088 per cent (average of duplicate analyses); in the other two, the organic carbon was below detection limits.

Rock colour and iron sulphides: Polished surfaces show several colour combinations that correspond to variations in the state and relative abundance of the iron sulphide minerals, which are mainly (or entirely) pyrite, as follows:

- the cryptocrystalline calcite matrix is pale yellowish brown and the dolomitic areas are pale orange to greyish orange; in these rocks, the iron sulphide appears to be oxidized and partly altered to limonite;
- the cryptocrystalline calcite matrix is light olive-grey and the dolomitic areas are light greenish grey to greenish grey; the pyrite appears to be unaltered and perhaps is slightly more abundant than in the brown and orange rocks;
- the olive-grey to greenish grey rocks as described above have irregular patches of medium light grey to medium dark grey, commonly related to burrows and solution zones, and showing concentric patterns; iron sulphide appears to be relatively abundant in the darker areas.

Brown and orange colours characterize the upper 61 feet (18.6 m) of the Rowley Island core [from the top of the core between 505 and 566 feet (154-173 m)] but occur only sporadically in the middle and lower parts. Of 16 surface specimens collected from various parts of the project area, 10 are brown, 5 olive-grey, and one is of mixed colour. These specimens probably all came from the lower 100 feet (30 m) or so of the map-unit, an interval that is mostly olive-grey in the subsurface. These observations permit the conclusion that the original rock colour was generally olive-grey, and that the brown colour is due to alteration at or near the surface. A substantial proportion of the surface rocks, however, has escaped this alteration and, on the other hand, some alteration also is observed at considerable depth. It follows that, although much of the alteration probably is related to Cenozoic uplift and weathering, some of it may have occurred early, before the sediments became buried deeply.

The calcareous dolostone is essentially a limestone type 1 that contains more than 50 per cent dolomite. This lithology has been mapped as unit O_{1sd} on northeastern Melville Peninsula where it directly underlies map-unit O_{rf}. It is represented also by two specimens from Igloolik and Koch Islands (Appendix 3, Table 1, nos. 54 and 66); both have (corrected) dolomite/dolomite + calcite ratios of about 60 per cent.

Dolomitic limestone type 2 was recognized only in the interval between 1,050.45 and 1,051.1 feet (320.1-320.4 m) of the Rowley well, about 29 feet (8.8 m) above the base of map-unit O_{1s} (unit 228). The limestone consists of calcareous burrow fills in an argillaceous, calcareous, and dolomitic matrix. The burrow fills are composed of cryptocrystalline calcite and fairly abundant fossil fragments. The matrix consists of cryptocrystalline calcite, clay-size detrital material, and lesser amounts of microcrystalline dolomite, and silt-size quartz and muscovite with scarce fossil fragments and some opaque material (*see* Appendix 3, Table 1, no. 37). Dolomite is more abundant in the matrix than in the burrow fillings, in contrast to limestone type 1 where the opposite is the case. Argillaceous matter is concentrated on the outside of the burrows suggesting that some of the surrounding calcium carbonate has been removed. Probably the burrow fillings were originally more widely spaced and have been concentrated by selective solution of the matrix.

Dolomitic mudstone is limited to the interval between 1,078.5 and 1,078.85 feet (328.7-328.8 m) of the Rowley well, i.e. about 50 feet (15 m) above the base of the map-unit (unit 224). The rock is greenish grey and appears to have a vague horizontal lamination. It consists mainly of quartz and dolomite with lesser amounts of calcite, muscovite (and illite), chlorite, and feldspar (*see* Appendix 3, Table 1, no. 40).

Depositional environments and diagenesis

Map-unit O_{1s} differs from all other stratigraphic units in the region in lacking any features suggestive of supratidal, intertidal, or agitated, shallow subtidal depositional environments (e.g. algal mats, mudcracks, intraformational conglomerates, oolites, spar-cemented grains, etc.). The presence of a cryptocrystalline calcite matrix and of a rich and diverse marine fauna, on the other hand, probably indicates quiet subtidal shelf environments. Some additional information can be obtained from the abundant cyclocrinitid algae. Comparable Recent calcareous algae (Nitecki, 1970) may occur at depths anywhere from the tidal zone to 90 metres or more (provided the water is clear) and are not useful as indicators of water depth. They are, however, indicative of quiet waters, near or below wave base or in protected settings, as the weakly calcified, delicate skeletons cannot survive much wave action. Furthermore, they do not tolerate muddy waters, an inference supported by the relative purity of the limestone, and they flourish only in tropical environments or in temperate zones that are under the influence of warm currents.

Criteria that may be taken as evidence of "deeper" subtidal environments are the great areal extent of these limestone types and the lack of significant vertical and lateral variations (*see* Laporte, 1971). Deposits characteristic of a shelf margin (e.g. barrier reefs), submarine slope, and basin (e.g. laminated calcisiltites and argillaceous limestones, turbidites, mass flow deposits, shales), however, are not known to be present in Baffin Island and Foxe Basin. The term, deeper subtidal, thus merely signifies shelf settings below the tidal range.

The origin and age of the dolomite in map-unit O_{1s} is a complex, little understood problem, and only the most obvious relationships are pointed out here.

(1) The relatively large amount of dolomitization in the uppermost part of map-unit O_{1s} on northeastern Melville Peninsula suggests some kind of genetic relationship with the overlying reefal unit O_{rf}, and with positive movements of the Melville Arch relative to Foxe Basin. The stromatolitic carbonates of map-unit O_{rf} would seem to indicate shallow water conditions (*see* below) but it is unknown whether the arch actually was emergent.

(2) The relatively intensive dolomitization observed in the basal part of map-unit O_{1s} suggests a genetic relationship with the underlying disconformity (i.e. preceding emergence). Perhaps some shoals remained during the earlier phases of the late Middle Ordovician submergence, and perhaps the dolomitization was related to these postulated highs.

(3) With the exception of the two cases mentioned, however, there is no evidence of a relationship between the dolomitization of map-unit O_{1s} and shoals or landmasses; to the contrary, it appears to have occurred mainly in an open marine environment hundreds of miles from any kind of topographic high. This suggests that the dolomitization is due mainly to diagenetic processes within the sediments that were independent of paleogeographic setting. This conclusion is supported by the concentration of dolomite crystals in solution zones. The solution zones obviously were avenues of migration of connate waters during compaction, prior to lithification of the rocks, and the dolomite crystals

within them may have formed from the same solutions. (For a thorough study of the dolomitization of the correlative Thumb Mountain Formation, based on a petrographic investigation, *see* Morrow, 1973).

Age and correlation

Faunas of three age ranges are represented in map-unit O_{1s}.

(1) The oldest fauna was found only in the lowermost part of the unit at the Anderson Bluff section on Foley Island. A collection about 5 feet (1.5 m) above the base of the formation (GSC loc. C-2838) included:

Labyrinthites (Labyrinthites) *chidlensis* Lambe

of probable Wildernessian age; and a collection about 9 feet (2.7 m) above the base of the formation (GSC loc. C-2840):

?Hesperorthis sp.
asaphid trilobite
?Cybeloides sp.
?Pliomerops sp.

of unspecified Chazyan to Barneveldian age.

The same fauna also was discovered by Bolton at two localities on northeastern Melville Peninsula in 1973. Two species of *Gonioceras* occurred in the escarpment southwest of Quilliam Bay, and *Labyrinthites chidlensis* Lambe was collected from talus near the Roche Bay section.

This fauna is considered as Wildernessian on the basis of the index fossils *Gonioceras* and *Labyrinthites chidlensis* Lambe which are known to be associated at several key localities (Bolton, 1965). It also occurs on southeastern Baffin Island (Blackadar, 1967), in the lower Bad Cache Rapids Group of Southampton Island (T.E. Bolton, pers. com., 1974), and in the Baillarge Formation (Lemon and Blackadar, 1963, p. 73).

(2) The intermediate fauna is most abundant in the surface collections. Collections from Baird Peninsula (GSC loc. C-2846), Bray Island (GSC loc. C-2845), southwestern Koch Island (GSC locs. C-2817, C-2818), Roche Bay (GSC locs. C-2826, C-2827), Igloolik Island (GSC loc. C-2847), and west of Steensby Inlet (GSC loc. C-2820) include:

Algae:	*Receptaculites* sp.
Rugose corals:	*Foerstephyllum* sp. *Grewingkia* sp. *Palaeophyllum* sp.
Tabulate corals:	*Calapoecia* cf. *C. coxi* Bassler *Calapoecia* sp. *Catenipora* sp. *Coccoseris* cf. *C. astomata* Flower *Propora* sp. *Trabeculites maculatus* Flower
Brachiopods:	*Austinella* sp. *Glyptorthis* sp. *Hesperorthis* sp. *Resserella* cf. *R. sillimani* (Roy) *Resserella* sp. *Rhynchotrema* sp. *Thaerodonta* sp.
Gastropods:	*Maclurites* sp.
Cephalopods:	*Probillingsites* sp.
Trilobites:	*?Calymene* sp. *?Calyptaulax* sp. *Dolichoharpes* sp. *Illaenus* cf. *I. lacertus* Whittington *Remipyga* sp.

In the Rowley Island well, the intermediate fauna occurs in the depth interval 772.5 to 1,066 feet (235-325 m), i.e. 64 to 357 feet (20-109 m) above the base of the unit. Only one coral, identified as *?Chaetitopora* sp., was collected below this interval; it occurred at 1,124.5 feet (342.7 m), i.e. about 4 feet (1.3 m) above the base of the unit. It is not diagnostic and is either of the same age or somewhat older than the fauna discussed here. In the well, the intermediate fauna includes the following taxa:

Rugose corals:	*Grewingkia robusta* *Grewingkia* sp.
Tabulate corals:	*Catenipora* cf. *C. stearni* *Catenipora* sp.
Gastropods:	*Maclurites* sp.

Characteristic of this fauna, according to B.S. Norford, are the common occurrence of *Receptaculites*, *Grewingkia*, *Glyptorthis*, *Resserella*, *Rhynchotreme*, and *Maclurites*, and the absence of such diagnostic corals as *Bighornia*, *Lobocorallium*, *Favosites*, and *Palaeofavosites*. It occurs in the Red River Formation and Bad Cache Rapids Group of Manitoba; on Silliman's Fossil Mountain in southeastern Baffin Island; in the lower part of member B of the Baillarge Formation of northwestern Baffin Island, and in the Thumb Mountain and Irene Bay Formations of the Franklinian Geosyncline. It is found also in Faunal Division A of the Sogepet-Aquitaine Kaskattama Province No. 1 well of northern Manitoba, which is 323 feet (98 m) thick (Norford, 1970). That thickness is comparable to the correlative interval in the Rowley Island well which may range in thickness from 293 to 357 feet (89-109 m).

This fauna (Norford, 1971) is considered as late Caradocian in European terms and Barneveldian to early Maysvillian in North American terms, but the upper limit in terms of North American stages is somewhat uncertain.

(3) At the surface, the youngest fauna has been found only in northeastern Rowley Island (GSC loc. C-2813) where it includes the tabulate corals:

Catenipora sp.
Palaeofavosites sp.
Protrochiscolithus sp.

In the Rowley Island well, it extends from 701 to at least 600 feet (214-183 m) in depth or from 429 to 530 feet (131-162 m) above the base of the unit. There it is represented by:

Rugose corals:	*Bighornia parva* Duncan
	Bighornia sp.
	Deiracorallium manitobense Nelson
	Deiracorallium sp.
	Palaeophyllum sp.
	?Lobocorallium sp.
Tabulate corals:	*Catenipora* aff. *C. rubra* Sinclair and Bolton
	Catenipora sp.
Trilobites:	*Bumastoides* sp.

In his report, Norford (Appendix 2) states that this fauna is characteristic of the lower part of the Churchill River Group of Manitoba (Caution Creek and basal Chasm Creek Formations) and of the lower part of Faunal Division B in the Kaskattama Province No. 1 well. Faunal Division B is 293 feet (89 m) thick and that part of map-unit O_{1s} above the intermediate fauna is about 323 feet (98 m) thick but, as mentioned, only the lower 100 feet (30 m) have yielded diagnostic fossils. This suggests that the upper 150 feet (46 m) of map-unit O_{1s} are correlative with the upper part of the Churchill River Group, an age assignment supported by lithological similarities. The Churchill River Group is assigned to the lower and middle Richmondian (Nelson, 1963, 1964; Norford, 1970; Cumming, 1971).

Relationship with the Baillarge Formation

The strata of map-unit O_{1s} are similar to much of the Baillarge Formation of northwestern Baffin Island and were contiguous with that formation prior to Cenozoic erosion. It is necessary, therefore, to review the Baillarge Formation, and to clarify its relationship with map-unit O_{1s}.

The name Baillarge Formation was used by Blackadar (1956) to designate a limestone unit overlying the Ship Point Formation. It was the youngest formation encountered by Lemon and Blackadar (1963) in their survey of the coasts of Admiralty Inlet, and their type section, which contained only 382 feet (116 m) of strata, is bounded at the top by the present-day erosion surface. Trettin (1969) extended the formation upward to the first significant and mappable change in lithology and established a complete reference section on the east coast of Brodeur Peninsula, about 16 to 17 miles (26-27 km) southeast of Cape Crauford.

Member A, characterized by recessive slopes, is about 460 feet (140 m) thick at the reference section and generally poorly exposed. It consists of: dolomitic, shaly and silty limestone; calcareous, dolomitic and silty shale; and variably calcareous dolostone. Local desiccation breccias and rhythmically alternating, interlaminated limestone and dolostone suggest that at least parts of the member are intertidal in origin. Shale, siltstone, and dolostone give way to slightly argillaceous limestone east of Brodeur Peninsula, and the thickness of the unit decreases in an easterly direction. It must pinch out somewhere west and north of the present project area because it is not recognized at Inuktorfik Lake, nor on the peninsula west of Steensby Inlet.

Member B, about 1,135 feet (346 m) thick at the reference section, consists mainly of cryptocrystalline limestone that is variably dolomitic and fossiliferous. Cliff-forming intervals of relatively pure limestone are separated by recessive intervals of slightly argillaceous limestone. An abundantly fossiliferous, recessive unit, occurring about 284 to 349 feet (87-106 m) above the base of the member, tentatively has been correlated with the Irene Bay Formation of the Franklinian Geosyncline (Kerr, 1968) on the basis of fauna and argillaceous content but could not be mapped separately. Fossil collections indicate that the age of the lower part of the member is late Middle and Late Ordovician and the upper part Llandoverian, with the Ordovician-Silurian boundary located somewhere between 920 and 1,120 feet (280 and 335 m) above the base of the formation, i.e. 460 to 640 feet (140-195 m) above the base of the member. The Silurian part of the member is similar but differs in some details such as the presence of a thin evaporite solution breccia(?), stromatoporoidal and favositid patches in growth position, and a higher degree of dolomitization.

The Baillarge Formation is overlain by the Cape Crauford which is comparable in some respects to the Baillarge but characterized by evaporite solution breccias, stromatolitic beds, and a large dolomite content. The base of the Cape Crauford Formation was placed at the base of the lowest major evaporite solution breccia.

Map-unit O_{1s} is composed almost entirely of the same cryptocrystalline, fossiliferous, and slightly dolomitic limestone that makes up the bulk of member B of the Baillarge Formation. The main differences are (1) that member A is absent, and (2) that map-unit O_{1s} is limited to the Ordovician. The absence of member A could be explained by nondeposition, erosion at a disconformity, or a facies change. The occurrence of Wildernessian fossils on Foley and southeastern Baffin Islands supports the hypothesis of a facies change.

MAP-UNIT O_{rf}

A sequence of partly reefal dolomitic limestone and calcareous dolostone that overlies map-unit O_{1s} (and facies O_{1sd}) on northeastern Melville Peninsula is referred to here as map-unit O_{rf} (rf for reefal). The strata are late Middle or Late Ordovician in age and the youngest known Paleozoic rocks on Melville Peninsula. The lower contact is not exposed and its nature is uncertain, but it is presumed to be conformable because there is no biostratigraphic evidence for a hiatus. The main outcrop area of the unit is located about 30 miles (48 km) northwest of Hall Beach, and a minor outlier occurs northwest of Cape Jermain. The first is known from a few reconnaissance landings by Sanford, Bolton, and the writer, and the second from a brief landing by the writer. Both localities deserve more thorough study.

Lithology

Northwest of Hall Beach

About 23 carbonate mounds have been identified on aerial photographs (and partly on the ground) in this region (*see* geological map) but numerous others probably are present. The mounds are round or oval in outline with maximum diameters between 1,000 and 5,000 feet (300-1,500 m) and commonly around 2,000 feet (600 m). Some oval mounds trend northwest, parallel with faults and fractures in the region. The massive core of these mounds generally is more resistant to weathering than the surrounding strata and, therefore, the present relief provides a minimum estimate for their heights.

Different kinds of framework-builders and internal structures were observed in the hasty reconnaissance of three characteristic mounds. The core of a reef at locality 405a, standing a few tens of feet (perhaps 10 m) above the surrounding lowlands, is composed of massive dolomitic limestone that shows only vague remnants of a crudely layered organic structure in thin section. Algae may have been the sediment-binding organisms since there is no evidence of corals, stromatoporoids, or bryozoans. The core is overlain by interlaminated microcrystalline limestone and dolostone that shows stromatolitic and teepee-type structures (Pls. 12-14). A large-scale domal stromatolite is about 15 feet (5 m) wide and 2 feet (6.6 m) high. Stratigraphically, this mound seems to occur in the lower part of the unit.

A reef at locality 405c with a present relief of between 50 and 100 feet (15-30 m) may occur higher in the stratigraphic section, but this is not certain. A framework of favositid corals, a few tens of feet (in the order of perhaps 10 m) in diameter, is exposed at the top of the mound, but the height of this coralline core is unknown. It is surrounded by massive to thick-bedded, locally brecciated, calcareous dolostone ranging from microcrystalline to predominantly very finely crystalline. These rocks are overlain, at the flanks of the mounds, by interlaminated microcrystalline limestone and dolostone with some small-scale domal stromatolites. The flanks dip away from the core at small to moderate angles.

A favositid coral overlain by an encrusting alga (Pl. 40) was collected from the interior of a mound at locality 525c, but a coherent organic framework was not apparent; perhaps erosion had not cut deep enough to reveal the core. The flanking strata of variably dolomitic limestone showed regular outward dips up to some twenty degrees.

The inter-reefal areas are underlain by interlaminated microcrystalline limestone and dolostone (Pl. 39). Crenulations seen in at least one specimen suggest that these strata were bound by algal mats (*see* Gebelein and Hoffman, 1973).

Northwest of Cape Jermain

Reefs have not been identified in the small outlier northwest of Cape Jermain but, as mentioned, the area was visited only briefly. Two specimens of laminated microcrystalline limestone and dolostone are comparable to the inter-reefal rocks northwest of Hall Beach; the origin of a specimen of brecciated limestone is uncertain.

Depositional environment

Much more detailed information is required before the depositional history of this unit can be understood. It is unknown, for example, whether or not the reefs rise from about the same stratigraphic level, and whether their relief can be equated with water depth. On the other hand, there can be little doubt that the stromatolitic and teepee-structures at the top of the mound at locality 405c formed in high intertidal or shallow marine water (e.g. Davies, 1970; Burri *et al.*, 1973; Purser and Evans, 1973; Evamy, 1973), and the same may apply to the inter-reefal laminated beds if they were bound by algal mats.

Age and correlation

Conodonts (*see* below) and stratigraphic position indicate that map-unit O_{rf} is either late Middle or Late Ordovician in age, but the precise position within this range is uncertain. The available evidence may be summarized as follows:

Stratigraphic position and contact relationships. The underlying strata of map-unit O_{ls}, so far, have yielded only Bad Cache Rapids-type faunules of Wildernessian to Barneveldian aspect (T.E. Bolton, pers. com., 1974). Between the highest fossil collection from map-unit O_{ls} (at localities Tn-73-405d and 405e; to be published by T.E. Bolton) and the base of map-unit O_{rf}, however, there is a largely covered interval, between 100 and 200 feet (30-60 m) thick that has not been searched for fossils. The contact relationships between map-unit O_{ls} (including facies O_{ls}) and map-unit O_{rf} are uncertain. If the contact is conformable, map-unit O_{rf} would be correlative with strata in the middle part of map-unit O_{ls} in the Rowley Island well and either with upper parts of the Bad Cache Rapids Group or with lower parts of the Churchill River Group of the Hudson Platform. If there is a major disconformity, map-unit O_{rf} could be correlative with younger units such as upper parts of the Churchill River Group or the Red Head Rapids Formation of Southampton Island.

Macrofossils. The macrofauna consists mainly of favositid corals with some undiagnostic brachiopods and algae. *Favosites* sp. was identified by B.S. Norford in a collection from locality 525c, and *Palaeofavosites* sp. by T.E. Bolton in a collection from locality 405c (pers. com., 1974). These two corals are characteristic of the Churchill River Group as well as the overlying Silurian formations, but have not been reported from the Bad Cache Rapids Group.

Conodonts. Conodonts extracted by Bolton (pers. com., 1974) from a collection south of locality 525c were examined in a preliminary fashion by C.R. Barnes. They are restricted to the Ordovician but are far-ranging taxa that do not permit a more precise assignment.

Conodonts from locality 525c, identified by T.T. Uyeno, included the diagnostic species *Polyplacognathus ramosus* Stauffer, characteristic of the middle to late Middle Ordovician (late Chazyan to late Barneveldian). This form also has been identified by C.R. Barnes in a collection from map-unit O_{ls} made by Bolton near Hall Beach, but was not encountered by him in Upper Ordovician collections from Manitoba and the Arctic. These conodonts, therefore, would support a correlation with the (upper) Bad Cache Rapids Group. This assignment is compatible with the stratigraphic setting of the unit as described above but conflicts with the established age range of the corals. A sample mistake is not known to have occurred but cannot be ruled out; therefore this evidence is not conclusive.

Comparison with Red Head Rapids Formation. The Red Head Rapids Formation of Southampton Island (Heywood and Sanford, in press) is divisible into three major units as follows: (1) laminated limestone and dolostone up to 175 feet (53 m) thick with interbedded stromatolites and minor amounts of flat-pebble conglomerate, breccia, and very thin, petroliferous shale; (2) massive limestone and dolostone of algal origin, up to 20 feet (6 m) thick; (3) microcrystalline limestone with algal reefs as much as two miles (3 km) in diameter and 75 feet (23 m) high. The Red Head Rapids Formation overlies the Churchill River Group with a gradational, conformable contact and is considered to be Late Ordovician (late Richmondian) in age on the basis of stratigraphic position and contained conodonts (op. cit.).

The Red Head Rapids Formation is the only unit known in the broader region that is comparable to map-unit O_{rf} and may be correlative with it. The following significant differences, however, must be kept in mind. (1) The Red Head Rapids Formation, as mentioned, overlies the Churchill River Group with a conformable contact, but that unit has not been recognized to this date on northeastern Melville Peninsula. (2) The reefs in the Red Head Rapids Formation are not known to contain favositid corals. (3) The conodont *Polyplacognathus ramosus*, if indeed from map-unit O_{rf}, would rule out a late Richmondian age for map-unit O_{rf}.

On the correlation chart (Fig. 3), map-unit O_{rf} has been placed tentatively between strata equivalent to the Bad Cache Rapids and Churchill River Groups - a compromise between the age ranges of the corals and *P. ramosus* - but alternative possible age ranges also are shown. The problem could probably be solved by additional samples and conodont analyses from locality 525c.

MAP-UNIT OS_{cb}

Map-unit OS_{cb} comprises dolomitic limestone and dolostone with minor amounts of breccia and flat-pebble conglomerate that overlie map-unit O_{ls} in the central parts of Foxe Basin. (The suffix cb stands for carbonate rocks). The fossils collected from this unit are all Early Silurian (Llandoverian) in age but it is possible that Upper Ordovician (upper Richmondian or upper Ashgillian) strata also are present. The nature of the lower contact is unknown. The lower 450 feet (137 m) of strata are represented by cuttings from the Rowley Island well. Stratigraphic sections of the overlying succession generally are no more than a few tens of feet (less than 15 m) thick, and the total thickness of this interval is difficult to establish; it probably exceeds 240 feet (73 m), the topographic relief of Prince Charles Island, since the strata there have a low regional dip. An extensive Early Silurian hiatus of the North American craton and other regions (possibly related to a glaciation in the Sahara; Berry and Boucot, 1973) has not yet been established in the present area. If the base of map-unit OS_{cb} is Late Ordovician in age, it would occur within the lower part of the unit; if it is middle Llandoverian, between map-units O_{ls} and OS_{cb}.

Lithology

Middle Llandoverian and (?)older strata in the Rowley Island well

The upper 450 feet (137 m) of strata penetrated by the Rowley Island well are assigned to map-unit OS_{cb} on the basis of a thin-section study of 162 drill cuttings (Appendix 3, Table 2). These beds are underlain by fossiliferous dolomitic limestone of map-unit O_{ls}, considered as probably Richmondian in age (*see* above). The contact is either abrupt or transitional through an interval of about 10 feet (3 m) or less; its nature, whether conformable or unconformable, could not be established from the cuttings. At the surface, these 450 feet (137 m) are overlain by fossiliferous limestone of early or middle, probably middle Llandoverian age (*see* below). The section discussed, 450 feet (137 m) thick, therefore, is either entirely Llandoverian, or Llandoverian and late Richmondian.

The unit consists mainly of limestone (about 75%), less dolostone (about 25%) and trace amounts of sandstone. More than half of the limestone fragments contain microcrystalline dolomite, and a minor proportion is cherty. Cryptocrystalline to microcrystalline textures prevail in the limestone, but a few per cent of the cuttings have microcrystalline to medium crystalline textures. The cryptocrystalline to microcrystalline fragments commonly are fossiliferous (about 50%), and to a lesser extent pelletal (about 20%); fossils are associated with pellets in about 15 per cent of the chips. Brachiopods and echinoderms are the most commonly recognized fossils, whereas algae, sponge spicules, and ostracodes appear to be considerably less abundant. The dolostone, cryptocrystalline to predominantly microcrystalline in texture, is partly calcareous (about 25%) and rarely cherty. Only about 15 per cent of the dolostone contains fossils. Sandstone was observed only in the interval between 100 and 110 feet (30-34 m). A sandstone fragment observed in thin section is very fine grained, moderately well sorted, and composed mainly of quartz with about 10 to 20 per cent feldspar. The subrounded to subangular clasts are tightly cemented by quartz. Silt-size quartz is present in less than 1 per cent of the limestone and dolostone cuttings.

Middle Llandoverian exposures

Exposures near Fife Point, on the east-central coast of Rowley Island, have not yielded any fossils. Because they occur north of fossiliferous middle Llandoverian exposures at the former DEW site and at somewhat lower topographic levels, they are probably slightly older than the latter but have in common with them a characteristic sandy dolostone with coated grains that has not been seen elsewhere. The following rock types were recorded:

- breccias of limestone and dolostone with fragments up to 10 centimetres in diameter; they may be evaporite solution breccias because evidence of faulting was not seen;
- dolostone, cryptocrystalline to microcrystalline, and microcrystalline to very finely crystalline, in part cherty;
- dolostone composed of dolomitic coated grains with very fine to coarse-grained quartz and minor feldspar;
- limestone, microcrystalline, horizontally laminated; calcite partly pseudomorphous after dolomite(?) (Pl. 43).

The strata at the former DEW site include the following rock types:

- limestone, cryptocrystalline, fossiliferous and pelletal, slightly dolomitic, with vague horizontal lamination;
- dolostone, composed of coated grains, silt to very coarse sand of quartz and minor feldspar, and intraclasts (Pl. 42).

Fossiliferous middle Llandoverian strata in northwestern Prince Charles Island (loc. 43) comprise cryptocrystalline to very finely microcrystalline dolostone that is partly algal in aspect but also includes pellets, intraclasts, and fossil fragments.

Middle to late Llandoverian exposures

Strata in northwestern Prince Charles Island occurring at slightly higher topographic levels than the middle Llandoverian rocks mentioned above contain a transitional fauna with both middle and late Llandoverian elements. The rock is a limestone characterized by a cryptocrystalline to very finely crystalline calcite matrix with fossil fragments, pellets, intraclasts, and roughly 10 to 20 per cent microcrystalline to very finely crystalline dolomite.

Strata in central western Prince Charles Island have yielded fossils of unspecified Llandoverian ages only. They occur half-way between the middle and middle to late Llandoverian rocks of northwestern Prince Charles Island and the late Llandoverian rocks of southwestern Prince Charles Island and probably occupy a corresponding, intermediate stratigraphic position. The following rock types were observed:

- stromatolitic dolostone;
- dolostone, cryptocrystalline to finely crystalline, in part fossiliferous;
- dolomitic flat-pebble conglomerate (Pl. 41).

Late Llandoverian exposures

A few feet of late Llandoverian strata in southwestern Prince Charles Island consist mainly of fossiliferous and pelletal dolostone ranging from cryptocrystalline to very finely crystalline. They evidently formed by replacement of cryptocrystalline limestone, remnants of which are preserved.

Depositional environments

Map-unit OS_{cb} represents a spectrum of depositional environments ranging approximately from shallow subtidal to high intertidal or supratidal. The fossiliferous cryptocrystalline limestone and related dolostone are comparable in some aspects to the predominant rock of map-unit O_{ls} but differ because of the common occurrence of pellets and a larger dolomite content; they are considered, therefore, as somewhat shallower in origin. Intertidal environments are suggested by flat-pebble conglomerate and stromatolites, and supratidal environments by possible evaporite solution breccias. These rock types seem to alternate throughout the composite section suggesting various transgressions and regressions, but some vertical variation observed in the composite section also may be due to facies changes.

Reefs were not observed in map-unit OS_{cb} during the 1968 field work, but airphoto interpretations made in 1973 suggest that carbonate mounds, comparable to those of northeastern Melville Peninsula, are present on Prince Charles Island (*see* Appendix 1, Prince Charles Island).

Age and correlation

Three different faunas are distinguished in map-unit OS_{cb} by B.S. Norford (*see* Appendix 1, Prince Charles Island).

(1) The oldest, characterized by *Virgiana decussata*, occurs on northwestern Prince Charles Island (GSC loc. C-2835) and probably also on southern Rowley Island (GSC loc. C-2819) where it is represented by a "smooth virgianid of *Pentamerus borealis* type", a "new, strongly plicate virgianid" and a "clorindid of Ashgill-Llandovery aspect" (A.J. Boucot, Appendix 1, Rowley Island). Undiagnostic elements of this fauna include *Palaeofavosites* sp., a stromatoporoid, and solitary corals.

(2) A transitional fauna of middle to late Llandoverian aspect in northwestern Prince Charles Island (GSC loc. C-2834) contains both *Virgiana decussata* and *Multisolenia tortuosa* Fritz. Undiagnostic tabulate corals such as *Favosites* sp. and *Palaeofavosites* sp. and a stromatoporoid also are present.

(3) The late Llandoverian fauna of southwestern Prince Charles Island (GSC locs. C-2829, C-2830) is characterized by the brachiopods *Multisolenia tortuosa* Fritz, *Glassia* cf. *G. variabilis* Whiteaves, (?)*Pentamerus* sp. and (?)*Eostropheodonta* sp. Undiagnostic tabulate corals such as *Catenipora* sp., *Favosites* sp. and *Palaeofavosites* sp. are common.

On the basis of these collections, map-unit OS_{cb} is correlated with the upper part of member B of the Baillarge Formation, and with lower parts of the Cape Crauford Formation of northwestern Baffin Island. The Severn River, and possibly the Ekwan River and Attawapiskat Formations are correlative units of the Hudson Platform. It is unknown whether strata of late Richmondian age are present. If present, they would be correlative with the Red Head Rapids and Port Nelson Formations of the Hudson Platform, and probably be separated from the Severn River equivalents by a hiatus involving the early Llandoverian (cf. Norford, 1971; Heywood and Sanford, in press).

SUMMARY OF BASIN DEVELOPMENT

LATE EARLY CAMBRIAN TO EARLY EARLY ORDOVICIAN

This interval, or a part of it, is represented by the Admiralty Group, which has not yielded diagnostic fossils. The group is tentatively considered as late Early and Middle Cambrian in age on the basis of lithological correlations with Dundas Harbour, Devon Island but may include Upper Cambrian and lowermost Ordovician strata as well. There are indications that the sediments transgressed southward and that the base of the unit is diachronous, but the age range involved in this diachronism is uncertain.

Outcrops of the Admiralty Group are restricted to northwestern Baffin Island. In the Foxe Basin region, it has been recognized only in the Rowley Island well, but probably also underlies an adjacent shelf area. A regional stratigraphic cross-section (Fig. 15) suggests that it is absent from northwestern Melville Peninsula but exposures are too poor to be certain about this.

The Admiralty Group is divisible into a lower sandstone unit with local conglomerate beds and small amounts of shale - the Gallery Formation, and an upper dolomitic and clastic unit with abundant flat-pebble conglomerate - the Turner Cliffs Formation. The Gallery Formation is considered to be of nonmarine to very shallow marine origin and the Turner Cliffs Formation of shallow marine (intertidal to perhaps shallow subtidal) origin.

Variations in the thickness of the Gallery and Turner Cliffs Formations in northwestern Baffin Island (Figs. 4, 12) outline an easterly plunging basin or embayment. The depocentre of the Gallery Formation lay on east-central Borden Peninsula, near Arctic Bay, where it attains a thickness of 1,125 feet (343 m), and the depocentre of the Turner Cliffs Formation on east-central Borden Peninsula where it attains a thickness of 800 feet (244 m). Studies of crossbedding show that the currents depositing the Gallery sands flowed in southeasterly to easterly directions in the northern part of the Admiralty Basin, and in northerly directions in the southern part of the basin (Fig. 12).

It is uncertain whether the strata of the Gallery and Turner Cliffs Formations represented in the Rowley Island well were contiguous with those of the Admiralty Basin or whether they represent a separate basin or embayment. If an ancestral Foxe Basin existed, it was a minor feature compared with the Admiralty Basin, because the Gallery Formation is only about 66 feet (20 m) thick and the Turner Cliffs Formation 145 feet (44 m) thick. The apparent absence of the Admiralty Group from northeastern Melville Peninsula could be taken as the earliest known manifestation of the Melville Arch but, as mentioned, this absence has not been firmly established.

The Admiralty Group appears to be separated from the overlying Ship Point Formation by a disconformity but the magnitude of the corresponding hiatus is unknown. If the proposed correlations are correct, it would involve the entire Late Cambrian to mid-Early Ordovician interval. It may well be restricted, however, to the mid-Early Ordovician, an interval represented in the Innuitian region by the Baumann Fiord Formation, a basin-margin (sabkha) type evaporite unit (Mossop, 1973) absent from Baffin Island, Foxe Basin, and Melville Peninsula.

LATE EARLY TO EARLY MIDDLE ORDOVICIAN

A second marine transgression is represented by the upper Lower to lower Middle Ordovician Ship Point Formation. It is divisible into a sandy and dolomitic lower member deposited in nonmarine to shallow marine paralic environments; and a predominantly dolomitic upper member that is variably sandy and silty, rich in flat-pebble conglomerate and was deposited in intertidal to shallow subtidal environments. This transgression overlapped northwestern Baffin Island, northeastern Melville Peninsula and Foxe Basin but apparently did not extend far south of the present project area since Ship Point equivalents have been reported neither from southeastern Baffin Island nor from the Hudson Platform. Measured thicknesses of member A decrease from a maximum of 178 feet (54 m) in the centre of the Admiralty Basin to 61 feet (19 m) in the Rowley Island well (Fig. 6), and measured thicknesses of member B from a maximum of 898 feet (274 m) at Ship Point, Admiralty Inlet to 222 feet (68 m) on Foley Island (Fig. 7). In general, therefore, the Ship Point Formation appears to form a southeastward-tapering wedge. Exceptions to this, however, are thicknesses of only about 150 and 185 feet (46 and 56 m) in the vicinity of the Navy Board Structural High on Borden Peninsula. These anomalously small thicknesses perhaps are not depositional but related to erosion at the sub-Ship Point disconformity (*see* Trettin, 1969, p. 23). There is no evidence, then, that Foxe Basin was a separate sedimentary basin during this interval nor that the Melville Arch was active.

The deposition of the Ship Point Formation was followed by a brief withdrawal of the sea in the middle part of the Middle Ordovician.

LATE MIDDLE AND LATE ORDOVICIAN

A third marine transgression in the late Middle Ordovician covered not only Foxe Basin, Melville Peninsula, and most or all of Baffin Island but also extensive regions of the cratonic interior including the Hudson Platform. Wildernessian faunas, so far,

have been found only in some of these regions and it is possible, therefore, that islands remained in the vast epicontinental sea during that interval; fossil collecting, however, has not been extensive and systematic enough to outline the postulated land areas. The transgression appears to have been completed by about Barneveldian time as "Arctic Ordovician" faunas of Bad Cache Rapids- or Red River-type are ubiquitous in these regions. The lower deposits of this transgression, perhaps Wildernessian to early Barneveldian in age, can be assigned to three major facies: (1) calcareous, dolomitic, argillaceous and silty sediments of Brodeur Peninsula that are partly intertidal in aspect; (2) argillaceous, dolomitic limestone (wackestone) in adjacent parts of northwestern Baffin Island that probably is mainly subtidal in origin; and (3) slightly argillaceous dolomitic limestone (wackestone) in the remaining parts of Baffin Island, Foxe Basin, and Melville Peninsula that also is mainly subtidal. Local dolomitic facies may be of shallower-water origin. Facies (1) and (2) have been assigned to member A of the Baillarge Formation (Trettin, 1969), and facies (3) has been included in map-unit O_{ls} of this report.

The upper Middle and Upper Ordovician strata overlying these three facies in northwestern Baffin Island and Foxe Basin consist of slightly argillaceous and variably dolomitic limestone (wackestone) similar to facies (3). These beds are assigned to member B of the Baillarge Formation in those parts of northwestern Baffin Island where facies (1) and (2) are recognized, and to map-unit O_{ls} in the remaining areas. From the lithology, fauna, and lack of lateral and vertical variation it is concluded that they are of "deeper subtidal" origin (in the sense of Laporte, 1971).

Remarkable facies changes occurred on northeastern Melville Peninsula in latest Middle or Late Ordovician time - probably simultaneously with the deposition of map-unit O_{ls} in central Foxe Basin, but possibly slightly later and simultaneously with the deposition of the oldest part of map-unit OS_{cb}. On Melville Peninsula, tracts of oval or circular reefs developed that have a core of calcareous (and dolomitic) algae(?) at some localities and of favositid corals at others. The mounds are overlain and flanked by stromatolitic beds (including domal stromatolites), and the inter-reefal areas are characterized by interlaminated limestone and dolostone that, in part, may represent algal mats. The setting of these strata, which are assigned to map-unit O_{rf}, is not well understood, but there can be little doubt that the stromatolites represent shallower environments than the correlative(?) wackestone of map-unit O_{ls} in Foxe Basin. This facies development, as well as a large amount of dolomitization in the immediately underlying strata of map-unit O_{ls}, suggests that the eastern margin of the Melville Arch subsided less rapidly than Foxe Basin. It is unknown whether central parts of the arch were emergent at this time.

During this interval, Foxe Basin was submerged below the tidal range, but there is no lithological evidence (e.g. basinal shales) to indicate that it was deeper than other parts of the Arctic Platform (except for the Melville Arch), nor is there any indication that the rate of sedimentation was higher in this region than elsewhere. The second statement is based on comparisons of the recorded thickness of the upper Middle and Upper Ordovician succession on northern Brodeur Peninsula, in the Rowley Island well, and in the Kaskattama Province No. 1 well, at the southeastern margin of Hudson Bay tabulated below:

(1)	Approximate thickness of upper Middle and Upper Ordovician succession on northwestern Brodeur Peninsula (Ordovician parts of Baillarge Formation; Trettin, 1969)		900-1,100 ft. (274-335 m)
(2)	Map-unit O_{ls} in Rowley well	680 ft. (207 m)	
	Uppermost Ordovician and/or Lower Silurian strata in Rowley well	450 ft. (137 m)	
	Total thickness of upper Middle and Upper Ordovician ..		680-1,130 ft. (207-344 m)
(3)	Total thickness of Faunal Divisions A, B, and C in Kaskattama Province No. 1 well (Norford, 1970)		723 ft. (220 m)

The tabulated thicknesses include some uppermost Ordovician strata discussed in the following section, but this does not alter the overall picture.

LATEST ORDOVICIAN(?) AND EARLY SILURIAN

Strata of these ages are preserved only in two widely separated regions: Brodeur Peninsula and the central parts of Foxe Basin. On Brodeur Peninsula, deposition of slightly argillaceous and variably dolomitic limestone (wackestone) continued into the Early Silurian including the middle Llandoverian. These rocks are similar to the Upper Ordovician strata and, accordingly, have been included in member B of the Baillarge Formation. Somewhat shallower conditions, however, are suggested by a larger dolomite content in parts of the section and one breccia that could be interpreted as an evaporite solution breccia. Also, *in situ* colonies of corals and stromatoporoids are present that could be regarded as small patch reefs. Evidence for an early Llandoverian hiatus has not been seen, but the possibility that there is a disconformity within the upper part of the Baillarge Formation cannot be excluded.

The Baillarge Formation is overlain by the Cape Crauford Formation, which has yielded fossils of approximately late Llandoverian and Wenlockian ages but may extend into the Ludlovian. It is composed of three lithological assemblages: (1) wackestone, similar to the predominant rock in member B of the Baillarge Formation, but richer in pellets

and poorer in fossils; (2) interlaminated limestone and dolostone; and (3) evaporite solution breccias formed in strata of assemblage (2) with interbedded stromatolitic beds. The wackestones are considered to be of shallow subtidal origin and the strata of assemblages (2) and (3) to be of intertidal to supratidal origin. The three assemblages are replaced to varying extent by a later generation of dolomite, and the degree of dolomitization is high in the middle and upper parts of the succession. The formation, which is about 1,340 feet (408 m) thick at the northeastern extremity of Brodeur Peninsula, is the youngest preserved lower Paleozoic unit in the region.

In the central parts of Foxe Basin, Upper Ordovician limestone of map-unit O_{ls} is overlain by a succession mainly of dolomitic limestone and calcareous dolostone with minor amounts of breccia and flat-pebble conglomerate that represent shallow subtidal to intertidal depositional environments. These rocks are referred to collectively as map-unit OS_{cb}. The unit yielded middle and late Llandoverian faunas but may include strata as old as latest Ordovician. The early Llandoverian hiatus recognized in other parts of the craton has not yet been established in this area.

A comparison of the stratigraphic successions of Foxe Basin and Brodeur Peninsula indicates that, in both regions, a phase of deeper subtidal deposition was followed by alternating shallow subtidal and intertidal to supratidal conditions. In Foxe Basin, this change appears to have occurred between Late Ordovician and middle Llandoverian time whereas, on northern Brodeur Peninsula, it occurred somewhat later, in middle to late Llandoverian time. This, perhaps, may be explained by a general lowering of sea level with superimposed fluctuations, including a possible withdrawal of the sea in the early Llandoverian. Even during the preceding phase of relatively deep submergence in the late Middle and Late Ordovician, water depth may have been less in Foxe Basin than on Brodeur Peninsula because it is closer to the cratonic interior and farther from the continental margin. The postulated lowering of sea level, therefore, would have manifested itself earlier in Foxe Basin than in the regions bordering the Franklinian Geosyncline.

STRUCTURAL GEOLOGY

The lower Paleozoic strata of the project area (Fig. 8) are in fault contact with Precambrian terrains on the northeast and southwest and preserved in an extensive, complex, but relatively shallow structural depression. Bounded by normal faults on both sides, the depression is comparable to a graben, but is broader and more complex than typical grabens. The overall distribution of formations indicates low basinward dips, and the structurally deepest part is marked by extensive outcrop areas of Silurian strata on Prince Charles, Rowley and(?) the Spicer Islands. The structural relief between the Rowley Island well, where the top of the Precambrian occurs at an elevation of about 1,520 feet (463 m) below sea level, and northwestern Melville Peninsula, where it locally rises to between 900 and 1,000 feet (275 and 300 m) above sea level, is in the order of 2,500 feet (750 m). The Precambrian basement probably is at a greater depth beneath southwestern Prince Charles Island where the youngest known lower Paleozoic rocks are exposed at the surface.

Western boundary faults. A conspicuous zone of normal faults bounds the lower Paleozoic outliers of Melville Peninsula on the west. This zone extends for about 140 miles (225 km) from north of Quilliam Bay to Cape Jermain and locally coincides with the coast line. The overall trend of the zone is about S16°E (with respect to the 82°W meridian) but individual faults show considerable variation in strike, which ranges from east through south to southwest. Many of these faults are seen to extend into the adjacent Precambrian terrains and probably are controlled by weaknesses in the crystalline rocks such as pre-existing fractures, faults, and schistosities. The vertical separation on the faults in general increases from northwest to southeast. The separation probably is in the order of a few tens of feet or less in the area about 50 miles (80 km) northwest of Hall Beach where the Precambrian rocks are in contact with member A of the Ship Point Formation. On the other hand, a minimum separation of about 1,000 feet (300 m) can be inferred in the area about 9 miles (14 km) northwest of the northern extremity of Amitioke Peninsula, where the Precambrian terrain is in fault contact with the upper part of member B of the Ship Point Formation (Pl. 2). This estimate is based on two observations:

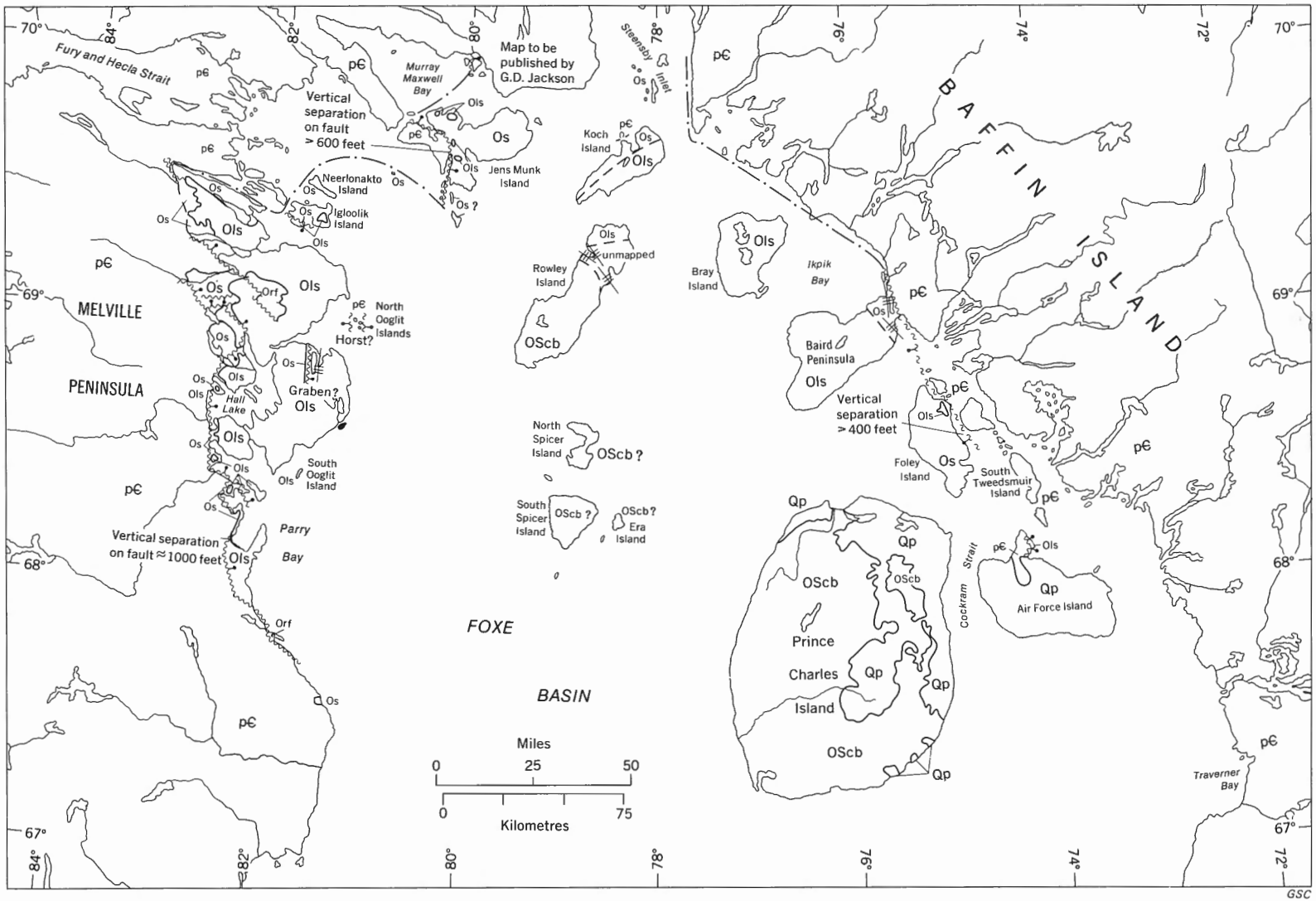
(1) Upper or middle parts of member B of the Ship Point Formation are exposed at sea level, and the base of the lower Paleozoic succession probably is somewhat more than 100 feet (30 m) below sea level (compare Roche Bay section).

(2) The Precambrian rocks immediately southwest of the boundary fault form a plateau that rises to between 900 and 1,000 feet (275-300 m) in altitude. The plateau probably represents the elevated, exhumed and eroded surface on which the lower Paleozoic succession was deposited. The vertical separation must be greater still in the vicinity of Cape Jermain where the Precambrian rocks are in fault contact with map-unit O_{ls} at sea level.

A minor normal fault, subparallel with the major break, has been observed on the peninsula south of Roche Bay, and it also steps down to the east. Strong lineaments suggest that a similar fault may be present farther east on the same peninsula.

The lower Paleozoic rocks adjacent to these faults are generally horizontal to slightly inclined, but intermediate dips, and even a vertical attitude have been observed locally (e.g. at loc. 409c).

A major normal fault, comparable to the boundary fault on Melville Peninsula, separates the Precambrian rocks in westernmost Jens Munk Island from the lower Paleozoic terrains on the northeast and east. This fault probably continues through the Calthorpe Islands, which are underlain by lower Paleozoic rocks in the east and Precambrian rocks in the west. The vertical separation on Jens Munk



Qp — *Quaternary unconsolidated sediments (marine pelites?)*

OScb — *Uppermost Ordovician (?) and Lower Silurian dolomitic limestone, calcareous dolostone, etc.*

Orf — *Upper Middle or Upper Ordovician reefal and inter-reefal carbonate rocks*

Ols — *Upper Middle and Upper Ordovician dolomitic limestone, etc.*

Os — *Upper Lower and lower Middle Ordovician Ship Point Formation*

pЄ — *Precambrian metamorphic and sedimentary rocks*

Normal fault, defined, assumed (dot on downthrow side)

Lineament

Approximate limit of lower Paleozoic in offshore region (may be faulted)

Geological boundary (defined, assumed)

Figure 8. Geological sketch map of project area

Island probably exceeds 600 feet (180 m), a figure derived from the relief of the Precambrian rocks on the west (400 ft., 120 m), and the probable depth of the base of the lower Paleozoic succession on the east (about 200 ft. or more, 60 m).

Northeastern boundary faults. The northeastern boundary fault is apparent as a drift-covered lineament just east of the base of Baird Peninsula in central Baffin Island. The Precambrian rocks east of the lineament attain altitudes of more than 600 feet (180 m) a few miles away from the lineament, and they are bounded by the Ship Point Formation on the west. Subparallel lineaments on Baird Peninsula may indicate subsiduary normal faults within the lower Paleozoic succession with relative downward movement toward the west.

A major fault zone, possibly linked with the fault east of Baird Peninsula, separates the lower Paleozoic strata on Foley Island from Precambrian rocks exposed near the northeastern extremity of Foley Island, and on Anderson and North Tweedsmuir Islands. The vertical separation on this fault probably exceeds 400 feet (120 m), which is the topographic relief of the Precambrian rocks on North Tweedsmuir Island.

Complexities. The Precambrian exposures (inferred from aerial photographs) on the North Ooglit Islands, about 15 miles (24 km) north of Hall Beach, seem to constitute a major structural anomaly. They are tentatively considered to be part of a horst bounded by north-trending faults.

Other structural complexities are a possible graben about 11 miles (18 km) west of Hall Beach, and possible normal faults on Fee Peninsula, Air Force Island that step down to the north and east (*see* Appendix 1). The structures west of Hall Beach are poorly exposed and those on Fee Peninsula have not been examined on the ground.

Possible ages of deformation. The youngest known deformed rocks in the project area are late Llandoverian in age, and the oldest undeformed beds are Pleistocene. Two major phases of deformation are known to have occurred in the general region during that long interval and both may have affected the project area or parts of it.

The Boothia Uplift, subparallel with the Melville Arch, had a long history of positive tectonic behaviour during the Paleozoic with the major deformation occurring in the Early Devonian. Because there is some evidence for positive behaviour of the Melville Arch during the Ordovician, it may be that the fault zone on the east side of Melville Peninsula is old and was active, for example, during the Early Devonian. In contrast to the Boothia Uplift, however, syntectonic clastic sediments related to such movements are not preserved in the present area. Early Devonian epeirogenic movements also affected parts of the Hudson Platform (Sanford and Norris, 1973).

Vertical movements of considerable areal extent occurred in the Innuitian Province and the environs of Baffin Bay and Parry Channel in late Mesozoic to middle Tertiary time. There seems to be general agreement that the subsidence and possible seafloor spreading in Baffin Bay, the formation of major uplifts on the northeastern coast of Baffin Island, and the development of grabens in and around Parry Channel took place during this interval of time. The fault zones bounding the Coastal Uplift of Baffin Island on the southwest are identical with those bounding the Foxe-Baffin structural depression on the northeast. If the northeastern boundary faults of the depression were active during the late Mesozoic to early Tertiary, it is probable that the southwestern fault zones also were active at that time.

Algal limestone strata of early Tertiary age in central Baffin Island (Andrews *et al.*, 1972) are the nearest preserved post-Paleozoic rocks in the region and permit some conclusions as to the late Mesozoic-early Tertiary deformation. They rest directly on the Precambrian crystalline basement at an altitude of 2,343 feet (730 m), and are thought to have been deposited in a freshwater marsh or swamp. This region almost certainly was covered previously by lower Paleozoic strata which must have been removed prior to their deposition. If they were formed in a coastal setting, the limestone beds must have been elevated some 2,300 feet (700 m). They clearly predate the present topography and were formed in a warmer, temperate climate.

PETROLEUM GEOLOGY

Results of the present investigation relevant for petroleum exploration may be summarized as follows.

Porosity. Quartz-cemented sandstone of the Gallery and Ship Point Formations, reefal dolostone and limestone of map-unit O_{rf}, and certain dolostone units of map-unit OS_{cb} have sufficiently high porosities to constitute potential reservoir rocks.

Traps. Reefs of map-unit O_{rf} are the most obvious potential stratigraphic traps. The mounds on northeastern Melville Peninsula, however, are too close to the surface to have retained unoxidized petroleum.

Potential stratigraphic traps formed by pinchouts of the Gallery Formation and by lenses of quartz-cemented sandstone within the Ship Point Formation probably would be difficult to detect.

Structural traps, such as doubly-plunging anticlines have not yet been discovered, but may be present and detectable by seismic surveys.

Source beds. Shale or carbonate rocks sufficiently rich in organic carbon to constitute potential source rocks are scarce. Admiralty Group and Ship Point Formation were deposited in shallow, oxygenated waters in which the organic carbon was almost entirely destroyed. Map-unit O_{ls}, although deposited in deeper water, also is very deficient in organic carbon, probably as a result of the intensive reworking by deposit-feeding animals. Map-unit OS_{cb} is of shallow subtidal to littoral origin and generally lacking in organic matter but includes a bituminous limestone in northeastern Prince Charles

Island with an organic content of 5.8 per cent. The organic carbon in this rock probably was preserved in a reducing lagoonal environment.

Maturation of organic matter. Studies of organic metamorphism have not been made because of the low organic content of the rocks in general. The depth of burial, also, is unknown because it is impossible to establish from the available stratigraphic information how thick a column of post-Llandoverian strata has been removed.

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APPENDICES 1-4

APPENDIX 1. Notes on areal geology and stratigraphic sections.

APPENDIX 2. Log of Aquitaine *et al.* Rowley M-04 well.

APPENDIX 3. Tabulation of some petrographic data.

APPENDIX 4. Terminology and presentation of X-ray diffraction analyses.

APPENDIX 1

NOTES ON AREAL GEOLOGY AND STRATIGRAPHIC SECTIONS

ISLANDS OF FOXE BASIN AND BAIRD PENINSULA, WEST-CENTRAL BAFFIN ISLAND

This region was investigated in 1968 by landing a Piper Super Cub aircraft at widely spaced localities. The resulting map (Map 1406A; scale 1:500,000), which also includes information obtained by Burns (1952), is no more than a first, reconnaissance-type appraisal of the regional geology. Petrographic descriptions of nearly all specimens collected are included in these notes in order to facilitate future reinterpretations of the regional geology.

Prince Charles Island (NTS 36N, O; 37A, B)

Prince Charles, the largest of the islands in Foxe Basin, has a maximum relief of about 240 feet (73 m), but local relief is in the order of only a few tens of feet (10 m) or less, and significant stratigraphic sections are not exposed.

Burns (1952) visited the southwestern and northern extremities of the island. In the southwest he collected loose fossils from the beach which included an abundant Silurian fauna and a single Ordovician graptolite. In the northern part he noted outcrop of "buff-weathering dolomitic limestone and a consolidated breccia-type of similar dolomitic rock ..., the latter probably the result of cementation of material that was fractured and slightly disturbed, but not transported". A loose fossil picked up on the beach was identified as *Receptaculites* cf. *arcticus* Etheridge of Ordovician age (op. cit., p. 7).

The writer visited four areas located in the northeastern, northwestern, central western, and southwestern parts of the island respectively. All four are characterized by dolostone, calcareous dolostone, dolomitic limestone and limestone including flat-pebble conglomerate, breccia, and stromatolitic beds. These strata are characteristic of map-unit OS_{cb}, and the outcrop reported by Burns at the northern extremity of the island also conforms with the lithology of that unit. Fossils of Early Silurian (Llandoverian) age were collected in the three western areas mentioned. The oldest collection, of probable middle Llandoverian age, occurs in the northwest, close to the 100-foot (30 m) contour, and the youngest, of probable late Llandoverian age in the southwest, not more than a few tens of feet (10 m) above sea level. This indicates a small southerly dip-component of the Silurian succession.

From these field observations, it is concluded that most, if not all of Prince Charles Island is underlain by map-unit OS_{cb}. The Ordovician graptolite found by Burns at the southwestern extremity almost certainly is drift derived from a different area. Map-unit O_{ls}, if present at all, probably is limited to the northern extremity of the island where *Receptaculites* was found by Burns, and where the oldest rocks are supposed to be present. Reefs comparable to those on northeastern Melville Peninsula were not discovered during the 1968 field work. Airphoto interpretation, however, done after the 1973 field work, revealed oval to circular structures in the central and southwestern parts of the area that are comparable to those on Melville Peninsula. The most diagnostic oval structure occurs about 7.5 miles (12 km) north of Gravell Point, the southwestern extremity of the island [aerial photographs A-16019-49, 50; 0.85 inches (2.2 cm) ESE of centre of #49], and has a maximum diameter of about 1,750 feet (533 m).

The lower Paleozoic carbonate rocks are concealed by vegetation and mud in the eastern and northeastern parts of the island. The study of aerial photographs suggests that the pelitic sediments are related to those covering most of Air Force Island and also the "Great Plain of the Kodjuak" on central eastern Baffin Island. They are assigned to map-unit Q_p, tentatively interpreted as a post-glacial marine deposit. Vegetation-covered flats north of locality 40c appear to be underlain by thinly laminated dolostone and limestone that are recessive. It is unlikely, however, that the mud-covered areas are underlain everywhere by such recessive rocks.

The present map, based on airphoto interpretation, is not an outcrop map but emphasizes the lower Paleozoic carbonate rocks. Map-unit OS_{cb} thus includes: (1) bedrock and bedrock weathered *in situ*; (2) raised beaches composed of carbonate materials; and (3) covered areas characterized by a light grey tone and somewhat hummocky topography. Map-unit Q_p, on the other hand, is characterized by darker tones and smooth topography. Very regular, oval to circular lakes and dried-up lakes, probably the result of partial melting of the permafrost (thermokarst; O.L. Hughes, pers. com.), and a non-dendritic, "consequent" drainage system composed of innumerable minor creeks that are parallel or subparallel, nearly straight, and perpendicular to the coast line are characteristic of this unit.

Northwestern Prince Charles Island (NTS 37B)

UTM co-ordinates

Loc. Tm-68-41: zone 18W; 7556250N; 443400E
Loc. Tm-68-42: zone 18W; 7555600N; 444700E
Loc. Tm-68-43: zone 18W; 7555900N; 446300E
Loc. Tm-68-43b: zone 18W; 7555800N; 445700E

Notes

A few feet (approx. 1 m) of bedrock are exposed at localities 41, 42 and 43, and rubble representing bedrock weathered in place at locality 43b. Localities 41 and 42 are on a ridge, 43 is in an adjacent creek valley, and the topographic

relief between them is more than a few tens of feet but less than 100 feet (30 m). The stratigraphic interval represented probably is in the same order of magnitude since the bedding attitude is nearly horizontal. The topographically and stratigraphically lowest locality, 41, has yielded the middle Llandoverian index fossil *Virgiana decussata*. A middle to late Llandoverian transition fauna was collected from the topographically and stratigraphically higher locality 42. It includes *Virgiana decussata*, as well as *Multisolenia tortuosa*, which normally is associated with late Llandoverian faunas.

Lithological descriptions

Spec. 41-1 (5 cm) Pol. sect., thin sect. Limestone; fossils (ostracodes, echinoderms, bryozoans, brachiopods), intraclasts (to 1 cm), and pellets in matrix of cryptocrystalline to very finely crystalline calcite with scattered microcrystalline to very finely crystalline dolomite. X-ray dol./dol. + cal. = 0.16 (18±6%) [for explanation, *see* Appendix 3, items (31) and (32)]

Spec. 41-2 (3 cm) Pol. sect., thin sect. Limestone; fossils (bryozoans, echinoderms, ostracodes, algae?), pellets, and intraclasts in matrix of mainly cryptocrystalline calcite with scattered microcrystalline dolomite; greyish orange to moderate yellowish brown. X-ray dol./dol. + cal. = 0.09 (11±6%)

Spec. 43a (4 cm) Pol. sect., thin sect. Dolostone; matrix of anhedral, cryptocrystalline dolomite, cloudy with submicroscopic organic impurities, criss-crossed by intricate network of microcrystalline dolomite which is euhedral and relatively clear but shows relict cryptocrystalline texture; network appears to follow outlines of pellets, fragments of algal laminations, intraclasts, and rare echinoderm(?) fragments; vugs to about 1 mm; dark yellowish grey. X-ray dol./dol. + cal. = 1.00

Spec. 43b (4 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to very finely microcrystalline; very thin, slightly undulating laminae differing in content of submicroscopic organic impurities may represent algal mats. X-ray dol./dol. + cal. = 1.00

Identification of macrofossils by B.S. Norford

GSC loc. C-2835
Field no. Tm-68-43
indeterminate brachiopods
Virgiana decussata (Whiteaves)
age: Silurian, middle Llandoverian

GSC loc. C-2834
Field no. Tm-68-42
stromatoporoid
Favosites sp.
Multisolenia tortuosa Fritz
Palaeofavosites sp.
Virgiana decussata (Whiteaves)
age: Silurian, middle Llandoverian

GSC loc. C-2833
Field no. Tm-68-41
straight cephalopod
gastropod
indeterminate and pentamerid brachiopods
Eostropheodonta sp.
age: Silurian, probably Llandoverian

Northeastern Prince Charles Island
(NTS 37A)

UTM co-ordinates

Loc. Tm-68-44: zone 18W, 7550300N; 480250E
Loc. Tm-68-44b: zone 18W; 7552000N; 478750E
Loc. Tm-68-44c: zone 18W; 7551500N; 479400E

Notes

A stratigraphic interval, about five feet (1.5 m) thick, is exposed in this area, and the composite section of this interval, based on traverse notes, is given below. Stromatolites occur locally, but invertebrate fossils (except for rounded drift of *Palaeofavosites*) have not been found.

Height above base of section and thickness (feet)	General lithology Description of selected specimens
Unit 4	Limestone, thinly laminated, in part bituminous, recessive
4.5-5± (0.5±)	Spec. 44c-1 (3 mm) Thin sect. Limestone, cryptocrystalline, with some radiating sheaves of calcite fibres, 30-100 microns long; bituminous; very thin horizontal laminae differ in

Height above base of section and thickness (feet)	General lithology Description of selected specimens
	content of organic matter and of calcite fibres; dark gray, medium light grey weathering
	Induction furnace analysis: 5.8% organic carbon
	Spec. 44c-2 (5 mm) Thin sect. Limestone, microcrystalline to finely crystalline; some subhedral to euhedral calcite crystals appear to be pseudomorphous after dolomite; thin horizontal lamination; pinkish to brownish grey; some laminae are pale reddish brown. X-ray dol./dol. + cal. = 0.00
Unit 3	Limestone, massive, brecciated, and stromatolitic; resistant unit, forming land surface in most of the area
1.5-4.5 (3)	Spec. 44-3 (4 cm) Pol. sect., thin sect. Breccia; fragments of cryptocrystalline to microcrystalline limestone cemented by microcrystalline to medium crystalline calcite with minor amounts of microcrystalline dolomite; vugs to 3 mm; fragments pale dark brown, matrix pale orange. X-ray dol./dol. + cal. = 0.01 ($3^{\pm}$3-6%)
	Spec. 44-4 (4.5 cm) Pol. sect., thin sect. Domal stromatolite, 10 cm in diameter, 5 cm high; built of laminae of cryptocrystalline dolomite with small amounts of calcite and submicroscopic organic impurities; clear calcite and dolomite, microcrystalline to finely crystalline, occur in open spaces between wrinkled and warped laminae and in numerous veinlets; laminae are yellowish grey, greyish yellow, and pale yellowish brown
Unit 2	Dolostone, aphanitic, laminated, parting 0.5-1 cm (spec. 44-1, pol. sect.)
0.5-1.5± (1±)	
Unit 1	Dolostone, aphanitic, blocky weathering
0-0.5 (0.5)	Spec. 44-2 (4 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to predominantly microcrystalline; vugs to 0.5 mm; greyish orange. X-ray dol./dol. + cal. = 1.00

Central-western Prince Charles Island
(NTS 36N)

UTM co-ordinates

Loc. Tm-68-39a: zone 18W; 7524200N; 429300E
Loc. Tm-68-39b: zone 18W; 7524200N; 428500E
Loc. Tm-68-40: zone 18W; 7524700N; 433700E

Notes

Rubble of dolostone at localities 39 and 40 represents bedrock weathered in place. Domal stromatolites, two to three inches (5-7 cm) high, occur at localities 39b and 40.

Lithological descriptions

Spec. 39b (3.5 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline and microcrystalline with echinoderm fragments; vugs to 1 mm; greyish orange to very pale orange

Spec. 40-1 (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline; fine vugs to about 0.1 mm; discontinuous, undulating lamination; very pale to greyish orange. X-ray dol./dol. + cal. = 1.00

Spec. 40-3 (3.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline, probably bioturbated; greyish orange and very pale orange. X-ray dol./dol. + cal. = 1.00

Spec. 40-4 (6 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate, pebbles to 2.5+ cm are horizontal to moderately inclined, partly laminated and composed of microcrystalline dolomite; matrix is microcrystalline to medium crystalline dolomite; vugs to 2 mm; greyish orange to pale yellowish brown (Pl. 41). X-ray largely dolomite with trace amounts of calcite

Identification of macrofossils by B.S. Norford

GSC loc. C-2831
Field no. Tm-68-39a
gastropod
?Eostropheodonta sp.
age: probably Silurian, probably Llandoverian

GSC loc. C-2832
Field no. Tm-68-40
ostracode
gastropod
Propora sp.
undetermined brachiopods
age: Middle Ordovician to Late Silurian

Identification of ostracodes by M.J. Copeland

GSC loc. C-2832
Field no. Tm-68-40
Ostracoda: leperditiid indet.

Southwestern Prince Charles Island (NTS 36N)

UTM co-ordinates

Loc. Tm-68-38a: zone 18W; 7465800N; 444600E
Loc. Tm-68-38b: zone 18W; 7465600N; 441800E
Loc. Tm-68-38b2: zone 18W; 7464750N; 442000E
Loc. Tm-68-38b3: zone 18W; 7464200N; 442200E

Notes

Flat-lying dolostone and limestone with fairly abundant fossils are exposed over much of this area. They probably represent a stratigraphic interval of only a few feet (about 1 m) since there is practically no topographic relief. Areas that appear dark on aerial photographs are covered with a thin layer of soil and vegatation. The numerous, irregular ponds are very shallow.

Lithological descriptions

Spec. 38a-1 (3 cm) Pol. sect., thin sect. Dolostone; fairly abundant, mud-supported fossils (trilobites, brachiopods, ostracodes, echinoderms) and pellets in cryptocrystalline to microcrystalline dolomite matrix; vugs to 2 mm; very pale orange to yellowish grey

Spec. 38a-2 (5 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline, fossiliferous, interfingering with limestone, cryptocrystalline, fossiliferous; mud-supported, partly dolomitized fossils include: ostracodes, brachiopods, trilobites, gastropods, echinoderms; very pale orange, greyish orange, and pale yellowish brown

Spec. 38a-3 (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with a few, poorly preserved brachiopod fragments; pale yellowish orange to pale orange

Spec. 38b-1 (4 cm) Pol. sect., thin sect. Dolostone, fairly abundant, mud-supported fossils (echinoderms, gastropods, brachiopods, ostracodes) and some pellets in cryptocrystalline dolomite matrix; considerable quartz and chert as replacement and open space filling; pale yellowish orange. X-ray dol./dol. + cal. = 0.84 (86±6%)

Spec. 38b-2 (7 mm) Pol. sect., thin sect. Dolostone; fairly abundant, mud-supported fossils (mainly brachiopods, also echinoderms, ostracodes) and pellets in matrix of cryptocrystalline dolomite and minor calcite with scattered microcrystalline dolomite; wavy bedding plane controlled by brachiopod shells; greyish orange. X-ray dol./dol. + cal. = 0.69 (71±6%)

Identification of macrofossils by B.S. Norford

GSC loc. C-2829
Field no. Tm-68-38a

bryozoan, ostracode, clam, gastropods, stromatoporoid
trilobite, undetermined brachiopods
Catenipora sp.
Favosites sp.
Multisolenia tortuosa Fritz
Palaeofavosites sp.
Glassia cf. *G. variabilis* Whiteaves
age: Silurian, probably late Llandoverian

GSC loc. C-2830
Field no. Tm-68-38b
echinoderm debris, bryozoan, ostracode, gastropod, solitary coral, trilobites
Catenipora sp.
?Eostropheodonta sp.
?Pentamerus sp.
age: Silurian, probably late Llandoverian

Identification of trilobites and ostracodes by M.J. Copeland

GSC loc. C-2829
Field no. Tm-68-38a
Trilobita: *Encrinurus* sp.
"Acernaspis" sp.
Ostracoda: leperditiid indet.
Herrmannina
Apatobolbina
age: "This appears to be an early Middle Silurian assemblage" (in North American terms, i.e.

probably late Llandoverian -- B.S. Norford) "with similarity to those from lower Clinton strata of North America."

Air Force Island
(NTS 36-O, P; 37A)

Air Force Island was not visited by the writer and the following remarks are based on notes by Burns (1952) who landed at the northern extremity, by G.D. Jackson (pers. com, 1974) who reconnoitered the Precambrian rocks, and on airphoto interpretation. Precambrian crystalline rocks extend from Fee Peninsula southward to the centre of the island where they form a ridge slightly more than 100 feet (30 m) high. On Fee Peninsula, these rocks are bordered on the northeast and east by "buff-weathering dolomitic limestone" exposed at the northeastern point of the peninsula (Burns, 1952). *Receptaculites* cf. *arcticus* Etheridge occurred as talus on the beach (op. cit). This fossil and the reported lithology suggest that the rocks are upper Middle Ordovician strata of map-unit O_{ls}. The linear contacts with the Precambrian rocks are thought to be normal faults because the Precambrian crystalline terrain rises above the lower Paleozoic beds. The remaining parts of the island are covered by map-unit Q_p.

Foley Island
(NTS 37A)

Foley Island, generally flat, attains a relief of about 270 feet (82 m) in the Anderson Bluff, which occupies its northeasternmost parts. Most of the island appears to be underlain by the Ship Point Formation, but some thirty feet (9 m) of limestone (map-unit O_{ls}) cap the bluff, and Precambrian crystalline rocks are exposed on the tidal flats on the northeastern side of the island (Pl. 1).

Exposures on the northeastern side of Anderson Bluff are important because they represent the only reasonably extensive stratigraphic section in the eastern part of Foxe Basin, and also because they have yielded significant fossil collections: the Ship Point Formation yielded conodonts of both late Early Ordovician and early Middle Ordovician ages, and macrofossils of late Early Ordovician age. Fossils in map-unit O_{ls} are probably late Middle Ordovician in age.

The Anderson Bluff section commences at a stratigraphic level tentatively assigned to the uppermost part of member A of the Ship Point Formation, and Precambrian pegmatite on the tidal flats to the northeast rises (topographically) to about that level. This suggests that the section is bounded by a normal fault with relative downdrop on the southwest. This inferred fault probably forms part of a major fault zone separating the lower Paleozoic rocks on Foley Island from the Precambrian rocks on Anderson and North Tweedsmuir Islands. The latter rise to altitudes of about 400 feet (122 m).

Stratigraphic section, Anderson Bluff

UTM co-ordinates

Loc. Tm-68-45

GSC loc. C-2674: zone 18W; 7617750N; 497400E
GSC loc. C-2840: zone 18W; 7616750N; 497500E

Summary

Map-unit O_{ls} (incomplete)	33 ft. (10 m)
Ship Point Formation	
Member B	222 ft. (68 m)
Member A? (incomplete)	8 ft. (2.4 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of ridge; level within lower part of map-unit O_{ls}	
	MAP-UNIT O_{ls}	
Unit 22 246-274 (28)	Dolomitic limestone as in unit 21, represented by rubble, more or less in place; moderately steep slope; bench mark at 274 ft. Fossil collections: GSC locs. C-2839, C-2840	5-33

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 21 241-246 (5)	Limestone, cryptocrystalline, slightly dolomitic; slightly silty and very fine grained sandy; small amounts of argillaceous matter concentrated in discontinuous, wavy laminae (solution zones); some chert replacement with minor chalcedony; burrowed; fairly abundant mud-supported fossils; ledge-forming unit	0-5
	Fossil collection: GSC loc. C-2838	
	Lithological descriptions: Appendix 3, Table 1, no. 51, 52 (Pl. 31)	
	SHIP POINT FORMATION	
	Member B	
Unit 20 237-241 (4)	Recessive slope, covered with talus from units 21 and 22	218-222
Unit 19 234-237 (3)	Dolostone, aphanitic, intensely bioturbated, parting thickness 5-20 cm; moderately steep slope	215-218
	Fossil collections: GSC locs. C-2844, 10060	
	At 237 ft. (7 cm) Pol. sect., thin sect. Dolostone, microcrystalline with small amounts of silt and very fine grained sand of quartz and less feldspar; thin streaks of limonite may represent organic matter replaced by oxidized iron sulphide; trace amounts of pyrite; intense bioturbation has converted rock into a mass of lumps, a few mm to a few cm long, with irregular, curving outlines; matrix is richer in limonite than fragments and vuggy weathering; vugs to 3 mm; yellowish to light olive-grey (Pl. 22). X-ray dolomite: 98; quartz: 1; feldspar: 1; calcite: tr; chlorite: tr	
Unit 18 202-234 (32)	Rubble, more or less in place, of dolostone, aphanitic, laminated; moderate slope	183-215
	At 202-234 ft. (2.5 cm) Pol. sect., thin sect. Dolostone, predominantly microcrystalline, with minor amounts of silt-size quartz and feldspar; laminated to thinly laminated; laminae differ in concentration of quartz and submicroscopic organic impurities; yellowish grey to light olive-grey	
Unit 17 195-202 (7)	Dolostone, aphanitic, and dolomitic flat-pebble conglomerate; rare echinoderms and brachiopods; some bioturbation; moderately steep slope	176-183
	Fossil collection: GSC loc. C-2843	
	At 202 ft. (4 cm) Pol. sect., thin sect. Dolostone, very finely crystalline to predominantly microcrystalline, with minor quartz silt; stratification destroyed by bioturbation; burrows marked by relatively coarse and clear dolomite; pale yellowish brown to yellowish grey; burrowed areas yellowish grey	
	At 201 ft. (2 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate with minor silt and very fine grained sand of quartz and feldspar; dolomitized fossil fragments (echinoderms,	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	ostracodes?); dolomite of flat pebbles is microcrystalline to very finely crystalline and cloudy; matrix dolomite is clearer and coarser (commonly finely crystalline); flat pebbles to 3+ cm, horizontal and gently inclined, yellowish grey to dusky yellowish grey, partly with pale red-purple to greyish red-purple rims; matrix yellowish grey	
Unit 16 133-195 (62)	Generally covered with rubble of dolostone; outcrop of dolostone, aphanitic to medium crystalline with coated grains, intraclasts, and chert at 180-181 ft.; talus of aphanitic dolostone at 135 ft. is fossiliferous; moderately steep slope levels at 158 ft., then steepens again	114-176
	At 181 ft. (6 cm) Pol. sect., thin sect. Dolostone, microcrystalline to medium crystalline with small amounts of coated grains, intraclasts, and trace amounts of silt-size quartz and minor feldspar, subrounded to subangular; coated grains, contained in single crystals of euhedral dolomite, are outlined by ellipsoidal shells of impurities; chert and radiating chalcedony occur in the core of some; vague horizontal lamination; yellowish grey	
	At 135 ft. (4.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline; highly recrystallized fossil fragments (gastropods?, echinoderms?); trace amounts of silt and very fine grained sand of quartz	
Unit 15 128-133 (5)	Dolostone, aphanitic; parting thickness 2-7 cm; cliff-forming	109-114
Unit 14 114-128 (14)	Rubble of dolostone, aphanitic; level terrace passes upward into gentle rise	95-109
Unit 13 112.5-114 (1.5)	Dolostone as below; parting thickness 2-7 cm; ledge-forming	93.5-95
Unit 12 95-112.5 (17.5)	Dolostone, aphanitic, parting thickness 5-7 cm; interbedded with dolostone, silty, and siltstone, dolomitic, parting thickness 1-2 cm; rare cephalopods, echinoderms, partly silicified; moderately resistant	76-93.5
	Fossil collection: GSC loc. C-2842	
	At 100 ft. (2 cm) Pol. sect., thin sect. Mainly dolostone, microcrystalline with minor amounts of silt and very fine grained sand of quartz and feldspar; thinly interlaminated siltstone, dolomitic, is less abundant; lamination is horizontal; yellowish grey with very thin, discontinuous streaks of pale red-purple	
	At 98 ft. (3.5 cm) Pol. sect. Dolostone, aphanitic, with minor amounts of quartz silt and fine grained sand; extremely bioturbated; few very fine vugs; yellowish grey to light olive-grey	
Unit 11 93.5-95 (1.5)	Dolostone, aphanitic, sandy, with domal stromatolites; parting thickness about 10 cm; moderately resistant	74.5-76
	At 94.9 ft. (3 cm) Pol. sect. Dolostone, aphanitic, with poorly	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	preserved fossil fragments (including gastropods?) and scattered quartz up to very coarse grained; vuggy weathering; vugs to 3 mm; stratification not apparent; yellowish grey	
Unit 10 91-93.5 (2.5)	Dolostone, aphanitic; parting thickness 1-2 cm; moderately resistant	72-74.5
Unit 9 84-91 (7)	Covered with rubble of dolostone, aphanitic; gentle slope	65-72
Unit 8 76-84 (8)	Dolostone, aphanitic, with gastropods; parting thickness 1-30 cm; cliff-forming unit Fossil collections: GSC locs. C-2841, C-2674 At 80 ft. (4.5 cm) Pol. sect., thin sect. About 1.5 cm of dolostone, microcrystalline, with trace amounts of quartz silt; overlain by 3 cm of dolostone, microcrystalline to finely crystalline with fairly abundant pellets, some fossil fragments and intraclasts, and minor amounts of quartz silt; pellets and fossils highly recrystallized; laminated to thin bedded with ripple-marks at top of pelletal interval; yellowish grey and pale yellowish brown	57-65
Unit 7 74-76 (2)	Dolostone as below, interbedded with sandstone, quartzose and dolomitic; unit is laminated to thin bedded with some ripple-marks; parting thickness 1-4 cm; relatively steep slope	55-57
Unit 6 39-74 (35)	Relatively steep slope, covered with talus	20-55
Unit 5 30-39 (9)	Covered with dolomitic rubble and vegetation; gentle rise at 31-34 ft., then flat	11-20
Unit 4 22-30 (8)	Dolostone, aphanitic; parting thickness 1-30 cm At 29-30 ft. (3 cm) Pol. sect., thin sect. Dolostone, very finely crystalline to predominantly microcrystalline with minor amounts of quartz silt; burrow casts, elliptical to sausage-shaped in section, comprise more than 3/4 of rock; stratification obliterated by burrowing; burrow casts yellowish grey; matrix pale to dark yellowish brown (Pl. 21) At 27.5 ft. (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline, with minor quartz silt; vague, partly discontinuous horizontal lamination; yellowish grey	3-11
Unit 3 19-22 (3)	Gentle rise, covered with dolomitic rubble and vegetation	0-3

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Member A(?)	
Unit 2 11-19 (8)	Dolostone, aphanitic to coarsely crystalline, silty, sandy; parting thickness 2.5-30 cm; moderately steep slope flattens at top of interval	
	At 19 ft. (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to coarsely crystalline with possible relicts of pellets and intraclasts; quartz and minor feldspar range from silt to coarse-grained sand; well rounded to subangular, partly replaced by dolomite; vuggy weathering; vugs to 2 mm; stratification not apparent; yellowish grey	
Unit 1 0-11 (11)	Very gentle rise, covered mainly with rubble of dolostone with some Precambrian erratics Base of section: flats strewn with boulders of Precambrian gneiss, etc.	

Identification of macrofossils by B.S. Norford

GSC loc. C-2839
Map-unit O_{1s}, unit 22 of section; talus
echinoderm, sponge and trilobite debris
orthid brachiopod
age: Paleozoic

GSC loc. C-2840
Map-unit O_{1s}, unit 22 of section; rubble, nearly in place, about 250 ft. (76 m) above base of section
echinoderm debris
indeterminate bryozoan, straight cephalopod, brachiopod and trilobite
?Hesperorthis sp.
asaphid trilobite
?Cybeloides sp.
?Pliomerops sp.
age: probably Middle Ordovician, Chazyan to Barneveldian

GSC loc. C-2838
Map-unit O_{1s}, unit 21 of section; in place
echinoderm debris
straight cephalopod
Labyrinthites (Labyrinthites) chidlensis Lambe
age: Middle or Late Ordovician, probably late Middle Ordovician, Wildernessian

GSC loc. C-2844
Ship Point Formation; unit 19 of section; 237 ft. (72.2 m) above base of section
fragmentary brachiopod
age: Phanerozoic

GSC loc. C-2843
Ship Point Formation, unit 17 of section; 200 ft. (61.0 m) above base of section
undetermined brachiopod
Diparelasma sp.
Tritoechia 2 spp.
age: Early Ordovician, late Canadian

GSC loc. C-2842
Ship Point Formation, unit 12 of section; 105 ft. (32.0 m) above base of section
straight cephalopod
Ceratopea aff. *C. keithi* Ulrich
age: Early Ordovician, Middle or late Canadian

GSC loc. C-2841
Ship Point Formation, unit 8 of section; 83 ft. (25.3 m) above base of section
indeterminate high-spired gastropod
age: Phanerozoic

Identification of conodonts by C.R. Barnes

GSC loc. 10060
Ship Point Formation, unit 19 of section; 236-237 ft. (71.9-72.2 m) above base of section

Weight dissolved: 600 grams. Conodonts were so abundant that several hundred remain picked but unsorted. The following list of form species is believed to be fully representative, and the number of specimens to reflect an approximate relative abundance.

Species (form-taxa)	No. of Specimens
Belodella n. sp. 1	7
Belodella n. sp. 2	21
Chosonodina n. sp.	2
Dichognathus sp. aff. *D. brevis* Branson and Mehl	90
Drepanodus homocurvatus Lindström	40

Species (form-taxa)	No. of specimens
Drepanodus suberectus Branson and Mehl	9
"Ligonodina" sp. (hyaline)	9
Multioistodus subdentatus Cullison	11
Oistodus sp. aff. *O. abundans* Branson and Mehl	108
O. inclinatus Branson and Mehl	23
O. linguatus bilongatus Harris	16
O. sp. aff. *O. venustus* Stauffer	11
Oulodus n. sp. 1	9
O. n. sp. 2	4
Phragmodus n. sp.	119
Scandodus? n. sp. (hyaline)	30
Trichonodella n. sp.	28
n. gen., n. sp. (hyaline)	11
TOTAL	548

age: early Middle Ordovician, possibly Chazyan

Comments: This conodont fauna is closely comparable to those from Igloolik Island (GSC loc. C-2620) and west of Steensby Inlet (GSC loc. C-10017) and can likewise be considered as a number of associations:

1. The new multi-element species of *Phragmodus* n. sp. (*P.* n. sp., *Dichognathus* sp. aff. *D. brevis*, and *Oistodus* sp. aff. *O. abundans*) does not contain second blade dichognathiform element found in post-Chazyan *Phragmodus* species. *Phragmodus* is not known from Lower Ordovician strata.

2. The multi-element species *Drepanodus homocurvatus* (*D. homocurvatus*, *D. suberectus*, *Oistodus inclinatus*) ranges throughout the Middle and Upper Ordovician.

3. The fibrous and hyaline elements, *in toto*, suggest a Chazyan age.

4. There is insufficient knowledge of *Belodella* species as yet to use these biostratigraphically, but these specimens do compare closely with belodelliform elements from the Whiterockian Mystic Conglomerate of Quebec (Barnes and Poplawski, 1973). *B.* n. sp. 1 and *B.* n. sp. 2 comprise the apparatus of *Belodella*.

GSC loc. C-2674
Ship Point Formation, unit 8 of section, 82-83 ft. (25.0-25.3 m) above base of section

Weight dissolved: 1,775 grams

Species (form-taxa)	No. of specimens
Acontiodus? sp.	1
Drepanodus homocurvatus Lindström	15
D. pandus (Branson and Mehl)	1
D. subarcuatus Furnish	9
D. suberectus (Branson and Mehl)	2
Oepikodus quadratus (Graves and Ellison)	5
Oistodus delta Lindström	15
Scolopodus cornutiformis Branson and Mehl	5
Scolopodus emarginatus Barnes and Tuke	1
S. gracilis Ethington and Clark	2
S. multicostatus Barnes and Tuke	2
S. quadraplicatus Branson and Mehl	53
S. n. sp. (same as in GSC loc. C-2673)	3
Ulrichodina prima Furnish	2
fibrous conodont (erismodid)	1
TOTAL	117

age: late Early Ordovician; probably equivalent to Zone G of the Canadian sequence in Utah and Nevada

Comments: This fauna includes some elements found in the sample from GSC loc. C-2673 (island in Steensby Inlet). Most of the other elements, however, indicate an older age. The dominance by scolopodids is common in upper Canadian strata and characterizes Fauna D of Ethington and Clark (1971) which they report from the Fillmore Formation of Utah and Nevada. The presence of *Oepikodus*, a characteristic element of their Fauna E from the Ninemile Formation in Nevada, may indicate equivalence more with the upper part of the Fillmore Formation. Dominance by similar scolopodids was found in the fauna from the St. George Formation of northern Newfoundland (Barnes and Tuke, 1970). St. George fauna was of early Arenigian age and correlated with Zone G of a Lower Ordovician reference section of Utah (e.g. Ross, 1968; Hintze *et al.*, 1968; Hintze, 1973).

Spicer Islands (NTS 37B)

The Spicer Islands were not visited by the writer because they are separated from the mainland and other islands in Foxe Basin by expanses of open water that were too wide to be crossed with a single-engine aircraft under the prevailing weather conditions; boats capable of reaching the island were not available. A brief landing, however, was made by Burns (1952, p. 12) at a small bay on the east side of the northern island. Identifiable fossils from loose limestone cobbles included Silurian brachiopods such as *Rhipidium* sp. and cf. *Brachyprion* sp. Because of the central position of the Spicer Islands in the Foxe-Baffin structural depression, it is probable that they are underlain by Silurian rocks, perhaps equivalents of the Severn River Formation of Southampton Island, which commonly contains *Brachyprion* in its lower part (B.V. Sanford, pers. com., 1974).

Baird Peninsula (NTS 37A, B, C, D) and Ullit Island (NTS 37D)

UTM co-ordinates

Loc. Tm-68-47: zone 18W; 7675600N; 475250E
Loc. Tm-68-48: zone 18W; 7660900N; 480200E
Loc. Tm-68-49: zone 18W; 7620000N; 445000E

Notes

The eastern part of Baird Peninsula is underlain by poorly exposed strata of the Ship Point Formation. The contact with the Precambrian terrain on the east is not exposed but is considered to be a normal fault because the Precambrian rocks rise above the lower Paleozoic strata; it also is marked by a topographic lineament. The Ship Point Formation was examined near the fault at locality 48. There, large slabs of silty and sandy dolostone with a parting thickness of one to two feet (0.3-0.6 m) are exposed that seem to represent bedrock weathered in place. The contact between the Ship Point Formation and map-unit O_{ls} farther to the west is concealed. The southern part of this contact probably is marked by a north-trending, rather weakly developed escarpment that may indicate a fault; the northern part does not appear to have a topographic expression, and its location is uncertain.

Map-unit O_{ls}, which underlies the central and western parts of Baird Peninsula, probably is exposed only on the southwestern coast, but could be recognized in the other parts from the air by the light grey tone of soil and raised beaches. It was examined at locality 49 where about 10 feet (3 m) of strata crop out. They consist of abundantly fossiliferous, cryptocrystalline limestone with dolomitic mottling. Colonies of chain corals occur in growth position. The fauna is probably late Middle Ordovician in age.

Ullit Island is underlain mainly by the Ship Point Formation, represented at locality 47 by about 10 feet (3 m) of outcropping dolostone, overlain by about 15 feet (4.5 m) of dolomitic rubble that is more or less *in situ*. The dolostone shows the intense bioturbation characteristic of the uppermost Ship Point Formation. It is overlain by about 10 feet (3 m) of limestone rubble assigned to map-unit O_{ls}.

Lithological descriptions

Spec. 47 (2.5 cm) — Pol. sect., thin sect. Dolostone, microcrystalline, with some oxidized iron sulphide; very vague discontinuous lamination; probably bioturbated; yellowish grey to greyish orange

Spec. 48 (6 cm) — Pol. sect., thin sect. Dolostone, microcrystalline to medium crystalline with moderate amounts of silt to fine-grained sand of quartz and minor feldspar; strongly bioturbated; some very vague, discontinuous, wavy lamination; very pale to greyish orange

Identification of macrofossils by B.S. Norford

GSC loc. C-2846
Field no. Tm-68-49
- echinoderm debris
- solitary coral
- indeterminate gastropod
- *Maclurites* sp.
- *Receptaculites* sp.
- *Catenipora* sp.
- *Calapoecia* sp.
- *Foerstephyllum* sp.

age: late Middle or Late Ordovician, probably late Middle

Bray Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-46: zone 18W; 7684800N; 406600E

Notes

A brief aerial reconnaissance indicated that most or all of Bray Island is underlain by map-unit O_{ls}. In the interior of the island, this unit is represented by grey-weathering limestone rubble on raised beaches, but outcrop occurs on the western coast. About 10 feet (3 m) of abundantly fossiliferous, cryptocrystalline limestone with dolomitic mottling, parting 1 to 2 centimetres, occurs in a creek bed at locality 46. *Receptaculites* and corals are abundant, and trilobites, brachiopods and orthocone siphuncles also are present. The outcrop is overlain by several tens of feet of limestone gravel. The partly rounded phenoclasts, 3 to 10 centimetres in diameter, include many corals.

Identifications of macrofossils by B.S. Norford

GSC loc. C-2845
Field no. Tm-68-46
- straight cephalopods
- *Receptaculites* sp.
- *Calapoecia* cf. *C. coxi* Bassler
- *Coccoseris* cf. *C. astomata* Flower
- *Palaeophyllum* sp.
- *Propora* sp.
- *Trabeculites maculatus* Flower

age: late Middle Ordovician

Maneetok, Koch, and Rowley Islands
(NTS 37C, B)

This group of islands is underlain by a Precambrian to Lower Silurian succession that is poorly exposed at the surface but almost completely represented in the Rowley Island well. Precambrian basement, observed from the air, is exposed on Maneetok Island. Admiralty Group and member A of the Ship Point Formation probably underlie the shelf between Maneetok and Koch Islands. Member B of the Ship Point is represented, mainly by rubble and rarely by outcrop, along most of the northwestern coast of Koch Island. The contact between Ship Point Formation and map-unit O_{ls} has been established accurately at the southwestern extremity of the island only; in the remaining parts it has been drawn arbitrarily in a northeasterly direction, about parallel with the long axis of the island. Map-unit O_{ls} underlies the southern and eastern parts of Koch Island, and northern parts of Rowley Island, and map-unit OS_{cb} underlies the central and southern parts of Rowley Island. The location of the contact between map-units O_{ls} and OS_{cb} is unknown. If the contact is normal, it probably trends in a northeasterly direction somewhere

between localities 19 and 20; if faulted, it may coincide with one of the margins of a linear depression that trends across northern Rowley Island in a southeasterly direction.

Map-unit O_{1s} yielded fossils of probable late Middle Ordovician age in southern Koch Island, and of Late Ordovician age in Rowley Island. Fossils from map-unit OS_{cb}, from southern Rowley Island, are Early Silurian (early or middle Llandoverian) in age.

Central northwestern Koch Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-21a: zone 17W; 7729000N; 597800E
Loc. Tm-68-21b: zone 17W; 7727700N; 597200E
Loc. Tm-68-28: zone 17W; 7724500N; 593900E

Notes

Rubble, more or less in place, of member B of the Ship Point Formation, extends along the coast of central northwestern Koch Island from locality 28 to locality 32. Ground observations were made at localities 28 and 21; locality 32 marks the approximate end of this belt as determined from the air. The minimum thickness of dolomitic strata at locality 21 is about 100 feet (30 m).

Lithological descriptions

Spec. 21a-1, 2, 3 (2.5-4 cm): 3 pol. sects. Dolostone, aphanitic, with gastropod fragments; vugs to 4 mm are in part gastropod molds; a burrow, 2x2 cm, contains dolomite and fine- to coarse-grained quartz sand, rounded, poorly sorted; yellowish grey, greyish orange, and moderate yellowish brown

Spec. 21b-1 (3.8 cm): Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline, with small amounts of quartz and minor feldspar of silt to very find sand grade; vague horizontal and ripple-lamination; greyish orange to pale yellowish brown

Spec. 28 (2.5 cm): Pol. sect., thin sect. Dolostone, cryptocrystalline to microcrystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar; streaks of oxidized iron sulphide probably represent replaced organic matter; yellowish grey

Identification of macrofossils by B.S. Norford

GSC loc. C-2814
Field no. Tm-68-21a
indeterminate high-spired gastropod
age: Phanerozoic

Northeastern Koch Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-22: zone 18W; 7729500N; 385500E

Notes

Dense and uniform limestone rubble, characteristic of map-unit O_{1s} (spec. 22-1) occurs near the shore, and dolostone talus, characteristic of the Ship Point Formation (spec. 22-2) at the higher levels. The limestone rubble probably represents the underlying bedrock whereas the dolostone detritus probably represents drift.

Lithological descriptions

Map-unit O_{1s}

Spec. 22-1 *see* Appendix 3, Table 1, no. 53

Ship Point Formation (probably drift)

Spec. 22-2 (4 cm): Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline, silty, with interlaminated siltstone, composed of quartz, minor feldspar, and trace amounts of muscovite with a large proportion of dolomite; some oxidized iron sulphide; horizontal and slightly inclined cross-lamination; yellowish grey. X-ray dolomite: 55; quartz: 33; feldspar: 11; "illite": 1

Southwestern Koch Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-23: zone 17W; 7713200N; 585200E

Notes

About 100 feet (30 m) of strata are present here, but exposure is poor. The Ship Point Formation underlies the lower levels up to (and including) a broad ledge marked by a small pond, and map-unit O_{1s} underlies the upper levels. The dolomite content of the lowest strata assigned to map-unit O_{1s} is higher than normal.

Lithological descriptions

Map-unit O_{1s}

Spec. 23 *see* Appendix 3, Table 1, no. 54

Ship Point Formation

Spec. 23-1 (4 cm): Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar and with poorly preserved skeletal matter; vugs to 3 mm; bioturbated; pale to dark yellowish brown

Spec. 23-5 (2.5 cm): Pol. sect. Dolostone, aphanitic, horizontally laminated, probably bioturbated; yellowish grey to light olive-grey

Identification of macrofossils by B.S. Norford

GSC loc. C-2817
Field No. Tm-68-23-F3; map-unit O_{1s}
Maclurites sp.
Receptaculites sp.
age: Middle or Late Ordovician

GSC loc. C-2818
Field no. Tm-68-23-F4
Propora sp.
age: Middle Ordovician to Late Silurian, probably late Middle Ordovician

Northeastern Rowley Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-20a: zone 17W; 7698400N; 606800E
Loc. Tm-68-20b: zone 17W; 7697800N; 606100E
Loc. Tm-68-20c: zone 17W; 7697400N; 607300E

Notes

The area is underlain by dolomitic limestone of map-unit O_{1s}.

Identification of macrofossils by B.S. Norford

GSC loc. C-2813
Field no. Tm-68-20c
echinoderm debris
straight cephalopod
Catenipora sp.
Palaeofavosites sp.
Protrochiscolithus sp.
age: Late Ordovician

Fife Point, central western Rowley Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-19: zone 17W; 7678500N; 585500E to 7677900N; 585400E

Notes

Some twenty feet (6 m) of dolostone and limestone exposed south of Fife Point are assigned to map-unit OS_{cb}. They include a calcareous and dolomitic breccia (specs. 19-1, 2), several feet (about 1 m) thick, with fragments to 10 centimetres in diameter.

Lithological descriptions

Spec. 19-1 (2 cm) Pol. sect., thin sect. Dolostone breccia; angular fragments to 2 cm in diameter composed of dolomite, cryptocrystalline to finely crystalline and cemented by both dolomite and ordinary calcite with veinlets of ferroan calcite. X-ray dol./dol. + cal. = 0.71 (73±6%)

Spec. 19-2 (3.5 cm) Pol. sect., thin sect. Limestone breccia; angular fragments to 1.5 cm composed partly of cryptocrystalline (original) calcite, but mainly of microcrystalline to finely crystalline, subhedral to euhedral calcite that appears to be pseudomorphous after dolomite; yellowish grey to greyish yellow. X-ray dol./dol. + cal. = 0.0

Spec. 19-4 (2.3 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to predominantly microcrystalline; quartz and minor chert occur mainly as replacements; minor amounts of detrital quartz

Spec. 19-5 (7 mm) Pol. sect., thin sect. Limestone, composed mainly of microcrystalline to finely crystalline, subhedral to euhedral calcite that appears to be pseudomorphous after dolomite; small amounts of microcrystalline dolomite are associated with it; a few, very thin, horizontal laminae, composed of cryptocrystalline calcite, contain stylolites; some pellets; mainly yellowish grey, stylolitic layers pale reddish brown. (Pl. 43) X-ray dol. dol. + cal. = 0.01 (3±3-6%)

Spec. 19-14 (2.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline; thin streaks of oxidized iron sulphide probably represent replaced organic matter; probably bioturbated; pale yellowish grey

Spec. 19-21 (2 cm) Pol. sect., thin sect. Dolostone composed of coated grains and very fine to coarse-grained sand of quartz and minor feldspar in matrix of microcrystalline dolomite; coated grains have one to three very thin, commonly discontinuous and abraded shells of cryptocrystalline dolomite; interior consists of microcrystalline dolomite commonly surrounding a grain of quartz; some coarse quartz grains are composite (vein quartz); stratification not apparent; pale yellowish brown (Pl. 42). X-ray dolomite: 55; quartz: 43; feldspar: 2

Airstrip of former DEW site,
southern Rowley Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-24: zone 17W; 7663000N; 576900E

Notes

The rock specimens and fossils described below were collected from coarse, angular, and rather uniform rubble scraped up by a bulldozer. They almost certainly represent the underlying bedrock and are assigned to map-unit OS_{cb}. The favositid coral fragment is from a large, intact colony occurring

as drift a few hundred feet (about 100 m) to the east; this fossil probably also is related to the underlying bedrock. The Rowley Island well was drilled near this locality in 1971, subsequent to the field work by the writer.

Lithological descriptions

Spec. 24-1 (4 cm) Pol. sect., thin sect. Limestone; abundant pellets and lesser amounts of skeletal matter in matrix of cryptocrystalline to very finely crystalline calcite (partly pseudomorphous after dolomite) and minor microcrystalline dolomite; skeletal matter includes brachiopods, trilobites, echinoderm columnals, ostracodes and gastropods; vague horizontal lamination; pale yellowish brown to greyish yellow. X-ray dol./dol. + cal. = 0.03 (5±5-6%)

Spec. 24-2 (4 cm) Pol. sect., thin sect. Dolostone; quartz and minor feldspar, coated grains, and intraclasts in matrix of microcrystalline to very finely crystalline dolomite; quartz and feldspar range from silt to very coarse sand grade, poorly sorted, generally rounded except for marginal replacement by dolomite; intraclasts ranging to 2.2 cm are cryptocrystalline to microcrystalline, in part silty and sandy, and partly coated; other coated grains have shells of cryptocrystalline dolomite, interior of microcrystalline dolomite with or without core of quartz. X-ray dolomite: 58; quartz: 41; feldspar: 1; calcite: tr

Identification of macrofossils by B.S. Norford

GSC loc. C-2819
stromatoporoid
solitary coral
Palaeofavosites sp.
age: Silurian

Identification of brachiopods by A.J. Boucot

GSC loc. C-2819
smooth virgianid of *"Pentamerus" borealis* type
new, strongly plicate virgianid
possible plicate virgianid
clorindid of Ashgill-Llandovery aspect
strophonellid fragment
age: Silurian, pre-late Llandoverian

Comments: The material is fragmentary, and it may be worthwhile collecting more for description, but such description may not refine the age determination. The collection is roughly equivalent to collections from Baffin Island containing plicate pentamerids (Baillarge Formation, assemblages II and III of Table I, Trettin, 1969, p. 34).

Jens Munk Island
(NTS 37C, 47D)

Most of Jens Munk Island is underlain by Ordovician strata (mainly the Ship Point Formation) except for the southwestern extremity where the Precambrian crystalline basement is exposed. A lower part of the Ship Point Formation was examined at the eastern extremity of the island, and the uppermost strata in the western part where several outliers of basal map-unit O_{1s} have been mapped. Other outliers may be present in the interior of the island.

Easternmost Jens Munk Island
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-54a: zone 17W; 7732800N; 564200E

Notes

Locality 54a is of special importance because late Early Ordovician (Arenigian) graptolites (extensiform didymograptids) were found here by R.G. Blackadar (1963, p. 16, 17). They must have been extremely rare, however, because no further specimens were found by the writer in spite of a prolonged search, and because the lithology is unusual for a host sediment of graptolites. The foreshore flats are underlain by variably silty dolostones that are partly laminated and partly bioturbated (specs. 54a, 1-4), and similar rocks occur on the shore where between 10 and 20 feet (3-6 m) of strata are exposed (specs. 54a, 5, 6). These beds are assigned to the lower part of the Ship Point Formation (probably member B). Ship Point dolostone, weathered *in situ*, also occurs about 2 miles (3 km) northwest of locality 54a at an elevation of about 100 feet (30 m).

Lithological descriptions

Spec. 54a-1 (9.2 cm) Pol. sect., thin sect. Dolostone, microcrystalline, with small amounts of silt to very fine grained sand of quartz and feldspar; horizontal laminae differ in crystal size, silt content, and content of submicroscopic impurities; yellowish grey

Spec. 54a-2 (5 mm) Pol. sect., thin sect. Dolostone, microcrystalline, slightly argillaceous; very thin, horizontal lamination; fissile; light olive-grey. X-ray dolomite: 90; quartz: 8; feldspar: 2; "illite": tr. Insol. res. 20.5±0.1%

Spec. 54a-3 (1.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar; horizontal lamination; some bioturbation; solution zone; pale yellowish brown. X-ray dolomite: 92; quartz: 6; feldspar: 2

Spec. 54a-4 (1.7 cm) Pol. sect., thin sect. Dolostone, microcrystalline, with very small amounts of silt to very fine grained sand of quartz and minor feldspar and muscovite; vague horizontal lamination; trace fossils on bedding plane; yellowish grey to pale yellowish brown

Spec. 54a-5 (2.5 cm) Pol. sect. thin sect. Dolostone, cryptocrystalline to microcrystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar; some pyrite; bioturbated; pale olive to yellowish grey. X-ray dolomite: 92*; quartz: 6; feldspar: 1; "illite": 1. Insol. res. 13.1±0.2%

Spec. 54a-6 (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline with trace amounts of silt to very fine grained sand of quartz and feldspar; horizontal laminae differ in crystal size; light olive-grey to yellowish grey

Western Jens Munk Island
(NTS 47D)

UTM co-ordinates

Loc. Tm-68-53a: zone 17W; 7725100N; 532200E
Loc. Tm-68-53b: zone 17W; 7728200N; 530100E

Notes

Most of the lower Paleozoic terrain in this area is underlain by the Ship Point Formation, but outliers of map-unit O_{1s} occur at a few localities. Specimen 1 from locality 53a represents a basal stratum of map-unit O_{1s}, and specimen 2 the underlying uppermost Ship Point Formation. A disc-shaped, considerably recrystallized coral(?) is common in the lowermost part of map-unit O_{1s}, but diagnostic fossils were not found. The lower Paleozoic terrain is bounded on the west by a normal(?) fault with probably more than 400 feet (120 m) of vertical displacement.

Lithological descriptions

Spec. 53a-2 *see* Appendix 3, Table 1, no. 55

Spec. 53a-3 (3.5 cm) Pol. sect.; thin sect. Dolostone, cryptocrystalline to very finely crystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar; streaks of oxidized iron sulphide; bioturbated; light greenish grey and greyish orange. X-ray dolomite: 92; quartz: 5; feldspar: 1; calcite: 1; "illite": tr; chlorite: tr

Identification of macrofossils by B.S. Norford

GSC loc. C-2849
Field no. Tm-68-53b; map=unit O_{1s}
Receptaculites sp.
age: Middle Ordovician to Middle Devonian

Islands in Steensby Inlet
(NTS 37C)

UTM co-ordinates

Loc. Tm-68-29: zone 17W; 7751200N; 611800E to 7750600N; 611200E
Loc. Tm-68-30: zone 17W; 7752000N; 608200E
Loc. Tm-68-31: zone 17W; 7764200N; 605500E

Notes

All three of the islands visited are underlain by member B of the Ship Point Formation. A collection of fossils was made from a locality (loc. 30), discovered by Blackadar (1963, p. 16); it yielded Early Ordovician gastropods that indicate a stratigraphic position in the lower part of the member. A fossil collection of early Middle Ordovician age, on the other hand, was obtained from the island adjacent on the east. This fauna, and the associated rock (spec. 29-6) indicate a stratigraphic position in the upper part of the member.

Lithological descriptions

Spec. 29-1 (3.7 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with trace amounts of silt and very fine grained sand of quartz; "ghosts" of recrystallized ooids; horizontal lamination; greyish orange

Spec. 29-2 (2.7 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with trace amounts of quartz silt; horizontal to slightly undulating laminae differ in crystal size and content of submicroscopic impurities; light olive-grey to pale yellowish brown

Spec. 29-3 (1.5 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to microcrystalline with small amounts of silt to very fine grained sand of quartz and feldspar and small amounts of pyrite; a few vugs are less than 1 mm in size; bioturbated; light grey. X-ray dolomite: 96; quartz: 3; feldspar: 1

Spec. 29-5 (3.5 cm) Pol. sect., thin sect. Dolostone, composed of oolites with minor coated grains; ooids are mostly dolomitic but partly replaced by chert and rimmed by chalcedony; they range from very fine to coarse sand grade; coated grains to 3 mm; pale yellowish brown

Spec. 29-6 (2 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate, bioturbated, with poorly preserved shell fragments (echinoderms, trilobites?); flat pebbles to 1.7 cm in diameter, horizontal and slightly inclined, microcrystalline to very finely crystalline; yellowish grey. X-ray dolomite: 95; quartz: 3; feldspar: 2; chlorite: tr; "illite": tr

Spec. 30-1 (3 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar; some pyrite; somewhat bioturbated; light olive-grey to pale yellowish brown. X-ray dolomite: 95; quartz: 3; feldspar: 2; chlorite: tr; "illite" tr

Spec. 30-2 (6 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate; flat pebbles to 5.5 cm long are horizontal to slightly inclined; consist of dolomite, microcrystalline to very finely crystalline with varying amounts of silt-size quartz and minor feldspar and are partly laminated; matrix consists of microcrystalline to medium crystalline dolomite with silt to fine-grained sand; yellowish grey to greyish orange; flat pebbles have brownish rims (Pl. 20)

Spec. 31-1 (3.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline with small amounts of silt to very fine grained sand of quartz and minor feldspar and trace amounts of muscovite; vague lamination, some bioturbation; pale brown to light olive-grey

Identification of macrofossils by B.S. Norford

GSC loc. C-2821
Field no. Tm-68-30
echinoderm fragments
indeterminate high-spired gastropod
Ophileta (Ophileta) sp.
age: Early Ordovician (Canadian)

Identification of conodonts by C.R. Barnes

GSC loc. C-2673
Field no. Tm-68-29

Weight dissolved: 885 grams

Species (form-taxa)	No. of specimens
Drepanodus homocurvatus Lindström	18
D. subarcuatus Furnish	28
D. suberectus (Branson and Mehl)	2
Multioistodus sp.	2
Oepikodus quadratus (Graves and Ellison)	5
Oistodus sp. cf. *O. delta* Lindström	7
O. sp. cf. *O. inclinatus* Branson and Mehl	4
O. sp. cf. *O. linguatus bilongatus* Harris	21
O. longiramis Lindström	2
O. multicorrugatus Harris	24
O. pseudomulticorrugatus Mound	24
O. scalenocarinatus Mound	14
O. spp.	22
Scolopodus emarginatus Barnes and Tuke	7
S. gracilis Ethington and Clark	78
S. n. sp.	20
Ulrichodina sp. cf. *U. prima* Furnish	4
n. gen. A (of Sweet, Ethington and Barnes, 1971)	16
n. gen. B (of Sweet, Ethington and Barnes, 1971)	10
n. gen. 1, n. sp. 1	2
TOTAL	310

age: Whiterockian (early Llanvirnian)

Comments: The fauna contains elements from Faunas 1 and 2 of Sweet, Ethington, and Barnes (1971). *Oepikodus quadratus*, *Oistodus longiramis*, n. gen. A, and n. gen. B are indicative of Fauna 1, but the presence of *Oistodus multicorrugatus*, *O. pseudomulticorrugatus*, and *O. scalenocarinatus* is indicative of Fauna 2. Fauna 1 is known from strata on which the basal Whiterock Stage is based, and both Faunas 1 and 2 occur in the lower part of the Antelope Valley Formation, Manitou Range, Nevada. The fauna is comparable to a collection from the upper Eleanor River Formation of Hawker Bay, Devon Island (Barnes, 1974).

NORTHEASTERN MELVILLE PENINSULA AND IGLOOLIK ISLAND

The spacing of geological control points in this region (investigated by means of a Piper Super Cub in 1968 and by helicopter in 1973) is denser than in the eastern parts of Foxe Basin, and it has been possible to prepare a reconnaissance map at the scale 1:250,000. The following notes, therefore, generally are restricted to stratigraphic sections, fossil localities, and outcrops that are of special stratigraphic or structural interest. It must be emphasized, however, that control still is insufficient for the southeastern extremity of the area, in the vicinity of Cape Joseph Brown and Cape Jermain.

Barrow River map-area (NTS 46P)

Cape Joseph Brown

Co-ordinates

Loc. HF-351: Lat. 67°32'N; Long. 81°20'W

Notes

Undiagnostic high-spired and low-spired gastropods were collected from lower Paleozoic carbonate rocks near Cape Joseph Brown by W.W. Heywood in 1964 (GSC loc. 66727 - identification by G.W. Sinclair). The host rock, examined in thin section by the writer, is pale yellowish brown, mainly microcrystalline to finely crystalline dolomite. It is bioturbated and contains dolomitic veinlets, as well as small amounts of silt to fine-grained sand of quartz and minor feldspar. The lithology is suggestive of the Ship Point Formation, and the fossils also are compatible with that interpretation because gastropods, without any other diagnostic fossils, are characteristic of the Ship Point Formation more than any other unit in the project area. The structure of this outlier is difficult to determine on aerial photographs but tentatively has been considered as a minor down-faulted block. This is the southernmost reported occurrence of lower Paleozoic rocks on eastern Melville Peninsula.

Vicinity of Cape Jermain

UTM co-ordinates

Loc. Tm-73-408a: zone 17W; 7520250N; 465000E

Notes

An outlier of lower Paleozoic strata at Cape Jermain is in fault contact with Precambrian rocks on the southwest and west. Outcrop of brecciated limestone (spec. 408a-1), and rubble, nearly *in situ*, of microcrystalline dolostone and interlaminated microcrystalline dolostone and limestone (specs. 408a-2, 3) were observed at the upper levels of a butte, about 3 miles (5 km) northwest of the cape. The lithological assemblage in general, and the interlaminated dolostone and limestone in particular, are comparable to those of the reefal area bebetwen Lailor Lakes and Foster Bay, northwest of Hall Beach. The rocks described, therefore, are assigned tentatively to map-unit O_{rf}. Airphoto interpretation suggests that these strata overlie map-unit O_{ls}, but the contact has not been located with certainty.

The present interpretation is supported perhaps by loose fossils collected by Burns (1952, p. 15) in the vicinity of the cape. These fossils, identified by Alice Wilson, apparently are of two different ages. An Arctic Ordovician (Red River) fauna is represented by *Streptelasma robustum* Whiteaves, and *Maclurina (Maclurites)* cf. *cuneatus* Whitfield. *Favosites gothlandicus* (Fought) and *Favosites hisingeri* Edwards and Haime, on the other hand, were assigned to the Silurian but may be Ordovician (T.E. Bolton, pers. com., 1974). The geological setting suggests that both fossil assemblages may have been derived from the lower Paleozoic strata underlying this general area.

Lithological descriptions

Spec. 408a-1 (4 cm) Thin sect. Limestone breccia; fragments to 1.7 cm are cryptocrystalline to finely crystalline with burrows and vague pellets(?); matrix is clear calcite, microcrystalline to finely crystalline, anhedral to subhedral; vugs to 5 mm; very pale orange to greyish orange

Spec. 408a-2 (3 cm) Thin sect. Dolostone, microcrystalline, with trace amounts of silt and very fine grained sand of quartz; thin horizontal laminae, alternating yellowish grey and light grey, differ in concentration of submicroscopic organic impurities

Spec. 408a-3 (3.5 cm) Thin sect. Dolostone, microcrystalline, variably calcareous, interlaminated with limestone, microcrystalline, dolomitic; calcite is partly euhedral and apparently pseudomorphous after dolomite; lamination is mainly horizontal with some soft-sediment deformation; very pale orange to greyish orange

Hall Lake map-area
(NTS 47A)

Peninsula south of Roche Bay

The lower Paleozoic rocks on this peninsula are in fault contact with the Precambrian crystalline terrain on the west and are themselves broken by one or more faults stepping down to the east. Poorly exposed strata of the Ship Point Formation underlie low-lying areas in the eastern part of the peninsula. A butte rising from the lowlands is capped by resistant limestone of map-unit O_{ls} (Pls. 2, 3). The Roche Bay section comprises much of the Ship Point Formation (thickness determined photogrammetrically because of low topographic relief) and the lower part of map-unit O_{ls}. That unit is repeated in the central part of the peninsula where it was examined at locality Tm-68-36. The unit yielded late Middle Ordovician fossils at both localities.

Roche Bay section

UTM co-ordinates

Loc. Tm-68-35
Top of section and fossil loc.: zone 17W; 7582500N; 441600E
Base of photogramm. section: zone 17W; 7584200N; 442500E

Summary

Map-unit O_{ls} (incomplete)	69 ft. (21 m)
Map-unit O_{ls} and Ship Point Formation undivided	31 ft. (9.4 m)
Ship Point Formation (incomplete)	130 ft. (40 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)

Top of section: top of butte; level in lower part of map-unit O_{ls}

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	MAP-UNIT O_{1s}	
Unit 9 223-230 (7)	Talus of dolomitic limestone as below, parting 2-3 cm	62-69
Unit 8 216-223 (7)	Scattered outcrop of limestone, cryptocrystalline, variably dolomitic; small amounts of argillaceous matter concentrated in discontinuous, wavy laminae (solution zones); burrowed; mud-supported fossils; parting 1-3 cm	55-62
	Lithological description: Appendix 3, Table 1, no. 60	
Unit 7 208-216 (8)	Covered with talus of limestone from above	47-55
Unit 6 199-208 (9)	Cliffs of limestone as in unit 8, parting 1 cm; *Maclurites* and *Receptaculites* common	38-47
	Fossil collection: GSC loc. C-2826	
Unit 5 175-199 (24)	Covered with talus from above	14-38
Unit 4 174-175 (1)	Limestone as above but more recessive and argillaceous; parting 1-2 cm	13-14
Unit 3 161-174 (13)	Cliffs of limestone as above, parting 1-15 cm; trace fossils on bedding planes	0-13
	Lithological description: Appendix 3, Table 1, no. 59	
	SHIP POINT FORMATION AND/OR MAP-UNIT O_{1s}	
Unit 2 130-161 (31)	Steep, talus-covered slope	
	SHIP POINT FORMATION	
Unit 1 1-130 (130)	Dolostone, aphanitic, parting 1-8 cm; some flat-pebble conglomerate; minor dolomitic sandstone and sandy dolostone	
	At 56 ft. (1.7 cm) Pol. sect. Dolostone, aphanitic, slightly silty; possibly burrowed; vague horizontal lamination; yellowish grey to pale yellowish brown. X-ray dolomite: 88; quartz: 8; feldspar: 3; calcite: 1	
	At 48 ft. (2.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline with silt to very fine grained sand of quartz and minor feldspar and trace amounts of muscovite; a few burrows; horizontal laminae vary in clastic content and grain size; pale orange to pale yellowish brown. X-ray dolomite: 93; quartz: 5; feldspar: 2; calcite: tr	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)

At 36 ft. Dolostone with echinoderm columnals

At 28 ft. (1 cm) Pol. sect. Dolostone, aphanitic with minor oxidized pyrite; very pale orange to greyish orange. X-ray dolomite: 97; quartz: 2; feldspar: 1

At 12-16 ft. Large slabs of dolomitic sandstone and sandy dolostone weathering in place

At 16 ft. (4 cm) Thin sect. Sandstone, dolomitic, fine grained; composed mainly of quartz with minor feldspar, trace amounts of muscovite, and a high proportion of microcrystalline dolomite; quartz and feldspar rounded to subangular, moderately well sorted; bioturbated; very pale orange to yellowish grey

At 15 ft. (4 cm) Pol. sect. Dolostone, aphanitic, silty and very fine grained sandy; extremely bioturbated; yellowish to light olive-grey. X-ray dolomite: 70; quartz: 14; feldspar: 14; calcite: 2

At 14 ft. (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline with high proportion of silt to fine-grained, rarely coarse-grained sand of quartz and minor feldspar, subangular; bioturbated; very pale orange and pale yellowish brown. X-ray dolomite: 58; quartz: 33; feldspar: 7; calcite: 2

Base of section: gentle slope, vegetation covered, about 90 feet (27 m) above sea level

Identification of macrofossils by B.S. Norford

GSC loc. C-2826
Map-unit O_{1s}, unit 6, 199-206 ft. (60.7-62.8 m) above base of section
- echinoderm debris
- ostracode
- straight cephalopods
- *Maclurites* sp.
- *Receptaculites* sp.
- indeterminate brachiopods
- *Rhynchotrema* sp.
- *Thaerodonta* sp.
- *?Illaenus* sp.
- age: Middle or Late Ordovician

Identification of ostracodes by M.J. Copeland

GSC loc. C-2826
stratigraphic position as above
- Ostracoda: *"Bythocypris"* sp.
- leperditiid indet.
- age: Paleozoic - too poorly preserved for more specific indication

Two miles (3 km) east of Roche Bay section

UTM co-ordinates

Loc. Tm-68-36: zone 17W; 7583600N; 445750E

Notes

Map-unit O_{1s} here forms two sets of cliffs, separated by a recessive interval, as in the Roche Bay section. These cliffs, however, commence at sea level, rather than at an altitude of about 200 feet (60 m) as at the more westerly locality. A fault with a vertical displacement of about 200 feet (60 m) is inferred because there is no evidence of an eastward dip.

Identification of macrofossils by B.S. Norford

GSC loc. C-2827
Field no. Tm-68-36; map-unit O_{1s}, from upper cliffs
- echinoderm debris
- bryozoans
- ostracode
- straight cephalopods
- *Maclurites* sp.
- *Receptaculites* sp.
- *?Grewingkia* sp.
- *Catenipora* sp.
- indeterminate brachiopods and trilobites
- *?Austinella* sp.
- *Resserella* cf. *R. sillimani* (Roy)
- *?Thaerodonta* sp.
- *Dolichoharpes* sp.
- *?Illaenus* sp.
- *Remipyga* sp.
- age: late Middle Ordovician

Identification of ostracodes by M.J. Copeland

GSC loc. C-2827
Field no. and location as above
Ostracoda: leperditiid indet.
age: Paleozoic - too poorly preserved for specific identification

Escarpments west of Hall Lake

UTM co-ordinates

Loc. Tm-68-406a: zone 17W; 7625800N; 474600E

Notes

About 9 to 10 miles (14-16 km) west of Hall Beach, two facing linear escarpments extend from the southern coast of Foster Bay southward for about 10 miles (16 km). The eastern escarpment is covered with talus of map-unit O_{1s}. A narrow strip of Ship Point Formation, not more than a few tens of feet (about 10 m) thick, occurs along the western escarpment. It was examined at locality 406a, where it dips about 3 degrees west and is conformably overlain by map-unit O_{1s}. The bioturbated strata are comparable to those observed at the top of the Ship Point Formation at Igloolik and Quilliam Bay. Bedrock weathered *in situ* suggests that the Ship Point Formation is bordered on the east by map-unit O_{1s}, and this contact must be faulted. The outcrop belt of the Ship Point Formation terminates not far south of locality 406a. The meagre outcrop does not permit a conclusive structural interpretation. The simplest model would be a graben developed on a slightly asymmetrical arch that brings the Ship Point Formation close to the surface.

Macrofossils were collected by T.E. Bolton 18 to 25 feet (5.5-7.6 m) above the base of map-unit O_{1s}. His collection, which includes *Kochoceras* sp., *Maclurites* sp. and an isotelid brachiopod, probably is late Middle Ordovician (about Barneveldian) in age (pers. com., 1973).

Two miles (3 km) northeast of head of Hall Lake

UTM co-ordinates

Loc. Tm-73-411h: zone 17W; 7648200N; 449700E

Notes

Bedrock weathered in place consists of burrowed, fossiliferous, cryptocrystalline limestone with a relatively large proportion of dolomite (about 40%). An insoluble residue analysis did not yield any conodonts.

Igloolik map-area
(NTS 47D)

Four miles (6 km) west of Foster Bay

UTM co-ordinates

Loc. Tm-73-405e: zone 17W; 7656100N; 464600E

Notes

Limestone of map-unit O_{1s}, exposed on the banks of a creek (Pl. 11), has yielded a fairly abundant Bad Cache Rapids-type fauna of probable Barneveldian age (T.E. Bolton, pers. com., 1974).

Nine miles (14 km) west of Foster Bay

UTM co-ordinates

Loc. Tm-73-526a: zone 17W; 7656200N; 464600E

Notes

This area is covered with talus *in situ* and some outcrop of flat-lying dolostone that is yellowish grey, as map-unit O_{rf}, but less resistant. A thin section of a typical rock specimen represents an original cryptocrystalline limestone that has been replaced by more than 60 per cent microcrystalline to very finely crystalline dolomite. The specimen shows both the rich fauna and the concentric burrows characteristic of map-unit O_{1s}. Identifiable fossils include echinoderm columnals, brachiopod fragments, and cyclocrinitid algae. It is concluded that these rocks are more akin to map-unit O_{1s} than to map-unit O_{rf}, although the large dolomite content would be unusual. The rocks, therefore, are assigned to a dolomitic facies of map-unit O_{1s} (facies O_{1sd}). Etched samples from this locality did not yield any conodonts.

Eleven miles (18 km) west of Foster Bay

UTM co-ordinates

Loc. Tm-73-405a: zone 17W; 7654800N; 461300E

Notes

An oval carbonate mound, assigned to map-unit O_{rf}, is about 1,700 feet (520 m) long, 900 feet (275 m) wide, and 30 to 40 feet (about 10 m) high. The core consists of yellowish grey, extremely dolomitic limestone to remarkably calcareous dolostone. A thin section of this rock (spec. 405a-1) consists mainly of microcrystalline to finely crystalline calcite and dolomite showing a mottled pattern, but irregular, wavy stringers of cryptocrystalline calcite with submicroscopic (carbonaceous?) impurities are preserved. These stringers are probably organic and possibly algal in origin, but cannot be interpreted more closely.

Well-exposed stromatolites occur at the top of the mound. A large-scale domal stromatolite is about 15 feet (5 m) wide, and two feet (60 cm) high, and has steeply dipping flanks (Pls. 12, 13). It overlies beds that form a teepee structure about one foot (0.3 m) high (Pl. 14). A thin section of a specimen from the flank of the stromatolite (spec. 405a-2) consists of alternating, slightly crenulated laminae of calcareous dolostone that is microcrystalline to finely crystalline, and markedly dolomitic limestone that is cryptocrystalline to finely microcrystalline. The laminae are about 0.5 to 6 millimetres thick. Some undulating laminae

are composed of calcite prisms that are about 20 to 30 microns high and perpendicular to the layering. Prismatic calcite also lines a vug about 0.6 millimetres long.

The low-lying area between this mound and similar mounds to the northwest is covered with rubble of greyish orange, horizontally laminated carbonate rock that is nearly in place. A thin section of this rock (spec. 405b) consists of variably calcareous, microcrystalline dolostone (Pl. 39). The proportion of calcite varies vertically from 0 to close to 50 per cent but remains fairly constant laterally. The microcrystalline calcite may be in part pseudomorphous after dolomite. Analogy with specimens from locality 405c (*see* below) suggests that the rock may be stromatolitic, but distinctive algal structures, such as crenulations, are not apparent.

Five miles (8 km) southeast of Lailor Lakes

UTM co-ordinates

Loc. Tm-73-405c,
Core of carbonate mound: zone 17W; 7671750N; 450400E

Notes

At this locality, also included in map-unit O_{rf}, an oval reef is exposed that is about 2,200 feet (670 m) long, 1,000 feet (300 m) wide, and between 50 and 100 feet (15-30 m) high. Its long axis trends northwest, approximately parallel with faults bounding map-unit O_{rf} on the southwest, although other reefal structures in the vicinity do not show such an orientation. The core of the mound consists of an *in situ* framework of favositid corals (mainly *Palaeofavosites* sp.; T.E. Bolton, pers. com., 1974), exposed at its top. Massive to thick-bedded, calcareous dolostone immediately northeast of the core and topographically below it dips northeast at small to moderately large angles. A thin section of this rock (spec. 405c-1) is composed of microcrystalline to predominantly very finely crystalline, euhedral dolomite with a lesser proportion of similar calcite that appears to be partly pseudomorphous after the dolomite. Locally, the massive dolostone is brecciated and extremely calcareous (spec. 405c-3). Stromatolitic laminations and laterally linked hemispheroids occur lower and farther outward on the northeastern flank of the mound. They are composed of interlaminated dolomitic limestone and calcareous dolostone (spec. 405c-3) similar to the stromatolitic beds at locality 405a. Horizontally laminated limestone and dolostone occur on the flats between the present mound and another major structure to the north. A thin section of a representative specimen consists of microcrystalline limestone and microcrystalline to predominantly very finely crystalline dolostone that are interlaminated in a crude, irregular fashion. A finer, crenulated lamination, suggestive of original algal mats, is outlined by carbonaceous impurities within the limestone.

Eight miles (13 km) south of Mogg Bay

UTM co-ordinates

Loc. Tm-73-525c,
Centre of carbonate mound:
zone 17W; 7667900N; 458300E
Loc. Tm-73-525d: zone 17W; 7668300N; 457900E

Notes

A reefal structure, assigned to map-unit O_{rf}, is oval in plan, about 2,000 feet (600 m) long, 1,200 feet (350 m) wide, and trends northerly. The topographic relief is probably less than 30 feet (10 m). The interior is characterized by nearly horizontal stratification, and the flanks have moderately steep dips, up to about 20 degrees. The mound consists of variably dolomitic limestone that is sparsely fossiliferous. A specimen of *Favosites* sp., encrusted by an unidentified alga (Pl. 40), was found, but an organic framework was not detected. Brachiopods, ostracodes, trilobites, echinoderm columnals, stromatolites and pellets also were noted. The crystal size of the calcite in the limestone ranges from cryptocrystalline to very finely crystalline, and grain growth evidently has occurred. The dolomite ranges from microcrystalline to finely crystalline.

Adjacent to the reef, an extremly calcareous dolostone (or dolomitic limestone), that is greyish yellow and vaguely laminated, is exposed at locality 526d. A thin section shows that it consists of microcrystalline dolomite poikilitically enclosed in patches of calcite, several millimetres across, that have uniform optical orientation but very vague outlines. Some smaller single-crystal grains with distinct outlines may represent echinoderm fragments. The lamination is due to rather irregular variations in dolomite content.

Identification of macrofossils by B.S. Norford

GSC loc. C-26536
echinoderm and trilobite fragments
Favosites sp.
undetermined brachiopods
age: Late Ordovician to Middle Devonian

Identification of conodonts by T.T. Uyeno

GSC loc. C-26536
Polyplacognathus ramosus Stauffer
age: Middle Ordovician; late Chazyan to late Barneveldian
weight of sample etched: 6,506 grams

Because the age of the conodont appears to be considerably older than that of the coral, the writer suspected that the sample submitted for etching may have included mislabelled material from another locality, and the conodonts therefore have been discarded. On reconsideration, however, the age assignment does not conflict with available field evidence. There is, furthermore, no other supporting evidence to suggest that samples have been mixed. The conodonts, therefore, probably came from the locality indicated, and the apparent

conflict with the coral identification stems from uncertainty about the full range of the fossils concerned.

South of Lailor Lakes

UTM co-ordinates

Loc. Tm-43-405d: zone 17W; 7679500N; 441400E to 7679000N; 440400E

Notes

A Bad Cache Rapids-type fauna of probable Barneveldian age (T.E. Bolton, pers. com., 1973) was collected from the northwestern banks of a river flowing into Lailor Lakes.

South of Quilliam Bay

A stratigraphic succession extending from the Precambrian basement to a horizon in the lower part of map-unit O_{1s} is exposed south of Quilliam Bay (Pl. 4). The lower part of the Ship Point Formation was studied in an escarpment immediately southeast of Quilliam Bay where member A is largely covered, but member B fairly well exposed. The upper part of the Ship Point Formation, and the lower part of map-unit O_{1s} were studied in a second escarpment, about 11 to 12 miles (18-19 km) to the south, that provides good exposures. Photogrammetric analysis indicates that the strata are virtually horizontal and that the top of the southern section (Quilliam Bay I) corresponds approximately to the base of the northern section (Quilliam Bay II), but marker beds that would permit a precise correlation have not been observed. The Ship Point Formation yielded indeterminate gastropods. Map-unit O_{1s} is fossiliferous, but systematic collections have not been made.

Stratigraphic section Quilliam Bay I

UTM co-ordinates

Loc. Tm-68-33, centre of section: zone 17W; 7710100N; 425800E

Summary and remarks

Ship Point Formation
Member B (incomplete) ..... 95 ft. (29 m)
Member A (approximate thickness) ..... 56 ft. (17 m)

Stratigraphic assignments in the very poorly exposed lower part of the section (units 1 to 4) are somewhat uncertain. Thus, the covered interval, unit 4, could either be underlain by member A of the Ship Point Formation or by member B (or both), and equivalents of the Admiralty Group also may be present. The present interpretation, however, seems to conform best with the regional stratigraphic relationships apparent from the cross-section (Fig.15).

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of land surface; level within member B, Ship Point Formation	
	SHIP POINT FORMATION	
	Member B	
Unit 14	Dolostone, sandy, in part cross-laminated; parting 1-10 cm	92.5-95
148.5-151 (2.5)	At 150 ft. (3 cm) Thin sect. Dolostone, microcrystalline to medium crystalline, with small amounts of quartz and feldspar ranging from silt to coarse sand grade; very pale orange to yellowish grey. X-ray dolomite: 98; quartz: 2; calcite: tr	
	At 149 ft. (12.2 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with varying amounts of quartz and minor feldspar of silt to medium sand grade; laminated, in part thinly; very pale orange to pale yellowish brown. X-ray dolomite: 98; quartz: 1; feldspar: 1	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 13 146-148.5 (2.5)	Lens of sandstone, quartz-cemented, porous, friable, weathering to small nodules; exposure is only about 5 ft. wide At. 148 ft. (3 cm) Thin sect. Sandstone, quartz-cemented, porous, friable; mainly medium grained, but ranging from silt to coarse sand grade, poorly sorted; composed entirely of quartz, subrounded to rounded; poorly stratified, bioturbated(?); yellowish grey	90-92.5
Unit 12 140-146 (6)	Cliff-forming dolostone, aphanitic to medium crystalline with interbedded sandstone, dolomitic; sandy units 1 mm to 15 cm thick; some cross-lamination; some flat-pebble conglomerate At 144 ft. (2.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to medium crystalline with small amounts of quartz ranging from silt to fine-grained sand; thin horizontal lamination is vague; very pale orange At 142 ft. (6.2 cm) Pol. sect., thin sect. Mainly dolostone, microcrystalline with interlaminated sandstone, very fine grained, composed of quartz, minor feldspar, and a large proportion of dolomite; thin horizontal and cross-lamination; set of cross-laminae 1.7 cm thick; very pale to greyish orange. X-ray sandstone - quartz: 63; dolomite: 36; feldspar: 1; dolostone - dolomite: 93; quartz: 6: feldspar: 1 At 141 ft. (6 cm) Pol. sect., thin sect. Sandstone, partly quartz-cemented, with some interstitial microcrystalline dolomite; composed mainly of quartz and small amounts of feldspar, fine grained, well sorted, subrounded to rounded; vague horizontal lamination; yellowish grey to medium light grey	84-90
Unit 11 120-140 (20)	Gentle slope covered with rubble of dolostone, aphanitic, and dolomitic and sandy flat-pebble conglomerate	64-84
Unit 10 114-120 (6)	Cliff-forming dolostone, silty and sandy, parting 1-3 cm At 117 ft. (2.7 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with large proportion of quartz and minor feldspar of silt to fine sand grade and trace amounts of muscovite; thin horizontal lamination is partly vague; greyish orange to pale yellowish brown. X-ray dolomite: 83; quartz: 13; feldspar: 4	58-64
Unit 9 102-114 (12)	Ledge, about 100 ft. (30 m) wide, covered with rubble of dolostone, aphanitic, generally parting about 1 cm	46-58
Unit 8 97-102 (5)	Cliff-forming unit of dolostone, relatively pure; parting thickness in lower part about 12 cm, in upper part 1 cm At 98 ft. (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with trace amounts of quartz, silt to very fine sand grade; yellowish grey. X-ray dolomite: 95; quartz: 4; feldspar 1	41-46

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 7	Rubble of dolostone, parting 3 mm to 1 cm	27-41
83-97 (14)	At 85 ft. (1 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline; horizontal lamination is vague; pale to moderate yellowish brown	
Unit 6	Rubble of dolostone, aphanitic, parting a few millimetres to 3 centimetres	8-27
64-83 (19)	At 80 ft. (8 mm) Pol. sect. Dolostone, aphanitic; vague horizontal lamination; light olive-grey. X-ray dolomite: 4; quartz: 4; feldspar: 2. Insol. res. 20.5±0.1%	
	At 72 ft. (1.7 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with trace amounts of chert and quartz; vague horizontal lamination; pale yellowish brown	
Unit 5	Recessive ledge, covered with rubble of dolostone, aphanitic	0-8
56-64 (8)		
	Member A(?)	
Unit 4	Slope covered with vegatation and talus from above	40-56
40-56 (16)		
Unit 3	Slope covered with light grey quartz sand; probably derived from underlying bedrock	30-40
30-40 (10)		
Unit 2	Sandstone, quartz-cemented, porous, friable; horizontal and cross-lamination at large angles; sets of cross-laminae about 15 cm thick	27-30
27-30 (3)	At 29 ft. (2.4 cm) Thin sect. Sandstone, quartz-cemented, porous, friable; bimodal, very fine to fine and medium to very coarse grained; poorly sorted; composed mainly of quartz, with muscovite in a composite grain; subrounded; two cycles of rounding and cementation are apparent from the texture; poorly stratified, bioturbated(?); very light grey	
Unit 1	Slope covered with quartz sand	0-27
0-27 (27)		
	Base of section: vegetation-covered slope; base of a section is approximately at same height as top of Precambrian crystalline rocks exposed a few hundred feet to the south	

Stratigraphic section Quilliam Bay II

UTM co-ordinates

Loc. Tm-68-34, centre of section: zone 17W; 7706400N; 426200E

Summary

Map-unit O_{1s} (incomplete)	94 ft. (29 m)
Ship Point Formation	
Member B (incomplete)	176 ft. (54 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: plateau; level within map-unit O_{1s}	
	MAP-UNIT O_{1s}	
Unit 19 266-270 (4)	Limestone, cryptocrystalline, variably dolomitic; small amounts of argillaceous matter concentrated in discontinuous, wavy laminae (solution zones); burrowed; mud-supported fossils; ledge-forming unit marks top of plateau	90-94
Unit 18 258-266 (8)	Partly covered, but probably underlain by same limestone as units 17 and 19	82-90
Unit 17 252-258 (6)	Limestone as in unit 19	76-82
Unit 16 246-252 (6)	Covered, probably underlain by same limestone as units 15 and 17	70-76
Unit 15 234-246 (12)	Limestone as in unit 19; 50-ft. ledge at 234 ft. Lithological description: Appendix 3, Table 1, no. 63	58-70
Unit 14 214-234 (20)	Same limestone as in unit 19; parting thickness about 1 cm; cliffs begin to recede Fossil collection: GSC loc. C-2824	38-58
Unit 13 204-214 (10)	Limestone as in unit 19; parting about 2 cm; *Receptaculites in situ* at 210 and 212 ft.	28-38
Unit 12 187-204 (17)	Limestone as in unit 19; at 187 ft. break in slope and rubble-covered ledge about 200 ft. wide	11-28
Unit 11 176-187 (11)	Bluff of limestone as in unit 19; large orthocone cephalopods, trilobite appendages, small brachiopods (Pl. 32)	0-11

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	SHIP POINT FORMATION	
	Member B	
Unit 10 157-176 (19)	Recessive slope, talus-covered	
Unit 9 139-157 (18)	Dolostone, aphanitic, parting 2-30 cm, commonly more than 6 cm; in part laminated; burrows common in lower part, which is somewhat brecciated and vuggy weathering; cliff-forming unit; resembles unit 5 at Igloolik	
	At 151 ft. (6 mm) Thin sect. Dolostone, microcrystalline to finely crystalline with small amounts of silt-size quartz and feldspar; thinly laminated; greyish yellow-green. X-ray dolomite: 90; quartz: 5; feldspar: 5; chlorite: tr; "illite": tr	
	At 141 ft. (4.3 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline, with small amounts of silt and very fine grained sand of quartz; bioturbated; burrows, 4-10 mm in diameter, lined with pyrite; light olive-grey	
	At 140 ft. (3 cm) Pol. sect. Dolostone, aphanitic, bioturbated, brecciated, vuggy weathering; poorly preserved skeletal material includes echinoderm columnals and (?)trilobite appendages; yellowish grey, greyish orange, and pale red	
Unit 8 134-139 (5)	Covered; probably same lithology as unit 7	
Unit 7 123.5-134 (10.5)	Dolostone, aphanitic, parting about 30 cm; laminated; some intraformational brecciation; resistant unit	
	At 131 ft. (3.1 cm) Pol. sect. Dolostone, aphanitic, slightly silty; iron sulphide occurs in stringers and blobs; pale olive. X-ray dolomite: 96; quartz: 3; feldspar: 1. Insol. res. 12.8±0.1%	
	At 128 ft. (2 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to microcrystalline with small amounts of silt and very fine grained sand of quartz and minor feldspar; very thin horizontal lamination; lenticular bedding, and cross-lamination on microscopic scale marked by vertical variations in crystal size, quartz content, and concentration of submicroscopic (organic?) impurites; burrow is outlined by halo of microcrystalline pyrite	
Unit 6 118-123.5 (5.5)	Dolostone, aphanitic, laminated and dolomitic flat-pebble conglomerate (about 30%); parting thickness generally more than 8 cm; cliff-forming unit	
	At 123 ft. (10 cm) Pol. sect. Dolostone, aphanitic; thin, somewhat wavy lamination is partly brecciated; very fine vugs contain calcite; yellowish grey to light olive- grey	
Unit 5 116.5-118 (15.)	Dolostone, aphanitic, partly laminated; vugs parallel with lamination; domal stromatolites, 10 cm high and about 15 cm in diameter; some brecciation; cliff-forming unit	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	At 118 ft. (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with small amounts of quartz and minor feldspar, silt-grade; ghosts of pellets?; stromatolitic or birds-eye texture; vugs lined with ferroan calcite; greyish yellow to yellowish grey. X-ray dolomite: 89; calcite: 6; quartz: 4; feldspar: 1	
	At 117.5 ft. (4 cm) Thin sect., pol. sect. Dolomitic breccia; fragments to 2 cm tilted at various angles; composed of microcrystalline to very finely crystalline dolomite with silt and very fine grained sand of quartz	
Unit 4 107-116.5 (9.5)	Dolostone, aphanitic, pure, in units 1-8 cm thick, interstratified with dolostone, silty, a few mm to about 1 cm thick with polygonal mud cracks	
	At 116 ft. (3.5 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to microcrystalline, silty, interlaminated with siltstone, sandy, extremely dolomitic; terrigenous material consists mainly of quartz; less feldspar, and trace amounts of muscovite; very thin lamination is horizontal to slightly undulating; lenticular bedding on mm-scale; some burrows; light olive-grey and yellowish grey	
	At 110 ft. (3 cm) Pol. sect., thin sect. Upper surface of hand specimen shows polygonal mud cracks, 1-2 cm across. Dolostone, microcrystalline, with minor amounts of silt and very fine grained sand of quartz and minor feldspar; bioturbated; burrows marked by haloes of iron sulphide; pale olive to light olive-grey. (Pls. 17, 18)	
Unit 3 88-107 (19)	Recessive slope, covered with talus	
Unit 2 68-88 (20)	Dolostone, aphanitic, as in unit 1, commonly silty to very fine grained sandy, parting 2-5 mm; minor dolomitic flat-pebble conglomerate	
	At 87 ft. (2.5 cm) Pol. sect. Dolomitic flat-pebble conglomerate; pebbles to 2.5 cm long, horizontal to moderately inclined, commonly thinly laminated; vugs to several mm filled with clear calcite; yellowish grey	
	At 86 ft. (8 mm) Pol. sect., thin sect. Dolostone, cryptocrystalline to microcrystalline with silt and very fine grained sand of quartz, less feldspar, and trace amounts of muscovite; bioturbated, surface appears to be mud-cracked; yellowish grey to pale olive. X-ray dolomite: 77; quartz: 16; feldspar: 6; "illite": 1	
	At 85 ft. (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline, silty to very fine grained sandy, with interlaminated siltstone, sandy, highly dolomitic; terrigenous fraction consists mainly of quartz, less feldspar, and trace amounts of muscovite; dune-like ripple-mark underlain by intraformational breccia; set of cross-laminae about 2 cm thick; yellowish grey to light olive-grey	
Unit 1 0-68 (68)	Dolostone, aphanitic, commonly laminated, parting 2-3 cm; parting caused by greenish silty (and very slightly argillaceous) laminae; trace fossils in some beds (including black streaks of organic carbon); gastropods in two beds; flat-pebble conglomerate common	
	At 67 ft. (3.5 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate with casts of gastropods and gypsum(?); flat pebbles	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)

to 1.5+ cm are dolostone, microcrystalline, silty, and dolomitic siltstone; specimen is bioturbated; fine vugs lined with ferroan calcite. X-ray dolomite: 80; calcite: 12; quartz: 7; feldspar: 1

At 15 ft. (6 mm) Thin sect. Dolostone, microcrystalline to finely crystalline with small amounts of quartz silt; thin horizontal laminae differ in crystal size; yellowish grey to pale olive (Pl. 30)

At 14 ft. (6 cm) Pol. sect. Flat-pebble conglomerate composed of dolostone, aphanitic; horizontal to slightly inclined pebbles to 2.5+ cm long are probably nearly *in situ*; vugs to 1 mm; yellowish grey. X-ray dolomite: 95; feldspar: 3; quartz: 2

At 11 ft. (2.5 cm) Pol. sect. Dolostone, aphanitic, with some pyrite; vague, discontinuous, undulating lamination probably is bioturbated; yellowish grey to pale yellowish brown.

Fossil collections: GSC locs. C-2822, C-2823

Base of section: vegetation-covered flats; level within member B of Ship Point Formation

Identification of macrofossils by B.S. Norford

GSC loc. C-2824
Map-unit O_{ls}, unit 14; 233-234 ft. (71.0-71.3 m) above base of section
Maclurites sp.
age: Middle or Late Ordovician

GSC loc. C-2823
Ship Point Formation, unit 1; 67 ft. (20.4 m) above base of section
indeterminate gastropod
age: Phanerozoic

GSC loc. C-2822
Ship Point Formation, unit 1; 14 ft. (4.3 m) above base of section
indeterminate gastropod
age: Phanerozoic

Igloolik and Neerlonakto Islands

Igloolik Island has a relief of about 170 feet (52 m). It is underlain mainly by member B of the Ship Point Formation, and locally by map-unit O_{ls}, which is best exposed in a down-dropped fault block in the southwestern extremity of the island.

Two stratigraphic sections were measured and correlated, using as a marker an exceedingly bioturbated, cliff-forming unit (unit 5) at the top of the Ship Point Formation. That unit forms a prominent ledge directly above the settlement of Iglooklik and also underlies the graveyard, located on a butte (Pls. 7, 9, 10) northeast of the settlement. Unit 5, which contains poorly preserved macrofossils has yielded a prolific conodont fauna of early Middle Ordovician age. Fossils of late Middle Ordovician age were collected from the lower part of map-unit O_{ls} at locality 51. The stratigraphic sections, which are short and in part poorly exposed, have been supplemented by descriptions of specimens from the Ship Point Formation collected at other localities. Noteworthy are stromatolites from locality 56a (Pl. 16), flat-pebble conglomerate from locality 56b (Pl. 19), and dolostone with quartzite pebbles and cobbles from locality 50 (Pl. 24). The latter occur at the top of the Ship Point Formation and appear to be related to the disconformity that separates it from the overlying map-unit O_{ls}.

Neerlonakto Island, as observed from the air (Pl. 7), appears to be underlain by the Ship Point Formation. This island has a relief of only about 63 feet (19 m).

Stratigraphic section Igloolik I

UTM co-ordinates

Loc. Tm-68-37, centre of section: zone 17W; 7594200N; 465400E

Summary

Map-unit O_{1s} (incomplete)	31 ft. (9 m)
Ship Point Formation	
Member B (incomplete)	27 ft. (8 m)

Note: Unit 5 of this section is correlated with unit 5 of section Igloolik II; the present section therefore begins with unit 4 rather than unit 1.

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of ridge; level in lower part of map-unit O_{1s}	
	MAP-UNIT O_{1s}	
Unit 11 47-58 (11)	Rubble of dolomitic limestone	20-31
Unit 10 43-47 (4)	Limestone, cryptocrystalline, variably dolomitic; small amounts of argillaceous matter concentrated in discontinuous, wavy laminae (solution zones); burrowed; mud-supported fossils including brachiopod fragments; parting 1-2 cm	16-20
Unit 9 28.5-43 (14.5)	Covered with talus from unit 10	1.5-16
Unit 8 27-28.5 (1.5)	Limestone as in unit 10 Lithological description: Appendix 3, Table 1, no. 64	0-1.5
	SHIP POINT FORMATION	
	Member B	
Unit 7 25-27 (2)	Dolostone, aphanitic, fossiliferous, slightly silty, bioturbated, parting 1-15 cm At 25.5 ft. (2.2 cm) Pol. sect., thin sect. Dolostone, microcrystalling to finely crystalline with quartz and minor feldspar ranging from silt to coarse-grained sand; some oxidized iron sulphide; rare skeletal matter includes bryozoans; bioturbated; yellowish grey to light greenish grey	
Unit 6 15-25 (10)	Gentle, rubble-covered slope; appears to be underlain by dolostone, aphanitic At 21 ft. (1.5 cm) (rubble) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with trace amounts of quartz and feldspar, silt to very fine sand grade; bioturbated; pale olive to yellowish grey. X-ray dolomite: 95; quartz: 2; feldspar: 3	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 5	Dolostone, sparsely fossiliferous, aphanitic, intensely bioturbated, ledge-forming	
4-15 (11)	At 15 ft. (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline, with small amounts of silt to very fine grained sand of quartz and minor feldspar; oxidized iron sulphide; horizontal burrows, commonly 3-4 mm in diameter; vugs to 1 mm	
	At 11 ft. (7 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with small amounts of silt to very fine grained sand of quartz and feldspar, and trace amounts of muscovite; some oxidized iron sulphide; echinoderm columnals, bryozoans	
Unit 4	Dolostone, aphanitic, parting 1-2 cm, recessive	
0-4 (4)		
	Base of section: base of outcrop; level in uppermost part of Ship Point Formation; corresponds to unit 4 of Section Igloolik II	

Stratigraphic section Igloolik II

UTM co-ordinates

Locs. Tm-68-1, 3, 5, and 7, centre of section: zone 17W; 7696500N; 468300E

Summary

Ship Point Formation
Member B (incomplete) ..... 144 ft. (44 m)

	Top of section: top of ledge-forming dolostone; corresponds to top of unit 5 in Section Igloolik I	
	SHIP POINT FORMATION Member B	
Unit 5	Dolostone, aphanitic, sparsely fossiliferous, bioturbated, parting 1-15 cm, ledge-forming	
137-144 (7)	Specs. 1-6. Pol. sect., thin sect. Dolostone, mainly microcrystalline to very finely crystalline, rarely microcrystalline to medium crystalline; variable, generally minor amounts of quartz and feldspar ranging from silt to very fine grained sand; some oxidized iron sulphide; relatively rare skeletal matter includes echinoderm columnals, bryozoans, trilobite appendages, brachiopods (Pl. 23)	
Unit 4	Steep slope, covered with talus from unit 5	
119-137 (18)		
Unit 3	Gentle slope, covered with vegetation	
104-119 (15)		

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 2 96-104 (8)	At top of unit a few centimetres of dolostone, silty and sandy (spec. 7-3); underlain by laminated dolomitic sandstone Spec. 7-3 (1.5 cm) Pol. sect., thin sect. Dolostone, cryptocrystalline to predominantly microcrystalline, silty to very fine grained sandy; terrigenous fraction consists of quartz with minor feldspar and trace amounts of muscovite; horizontal laminae differ in clastic content; small amounts of oxidized pyrite; yellowish grey. X-ray dolomite: 67; quartz: 24; feldspar: 8; "illite": 1 Spec. 7-1 Pol. sect., thin sect. Dolomitic sandstone composed mainly of coated grains, medium to coarse, elongate to round, simple and compound; coatings of cryptocrystalline dolomite, core commonly of quartz; and less abundant quartz and minor feldspar, without coatings, fine grained, well sorted, subrounded; ferroan calcite in minor vugs; horizontal and cross-lamination at low to moderate angles; greyish orange to moderate yellowish brown (Pls. 25, 26)	
Unit 1 0-96 (96)	Gentle slope, covered with vegetation Base of section: sea level; horizon in member B of Ship Point Formation	

Other localities on western Igloolik Island

UTM co-ordinates

Loc. Tm-68-3: zone 17W; 7696200N; 467700E
Loc. Tm-68-5: zone 17W; 7695100N; 468250E
Loc. Tm-68-50: zone 17W; 7693300N; 465200E
Loc. Tm-68-51: zone 17W; 7692700N; 467500E
Loc. Tm-68-56a: zone 17W; 7697900N; 464700E
Loc. Tm-68-56b: zone 17W; 7698600N; 464900E

Lithological descriptions

Spec. 56a (5.5 cm) Pol. sect., thin sect. Domal stromatolites, dolomitic, strongly brecciated; 3.5-8 cm in diameter; relief on individual laminae 1.5 cm; built of laminae that are alternatingly microcrystalline and microcrystalline to finely crystalline; minor amounts of quartz, fine to coarse grained, subrounded to rounded, poorly sorted; trace amounts of muscovite; intraclast of cryptocrystalline limestone(?); vugs to 5 mm; very pale orange and pale yellowish brown (Pl. 16). X-ray dolomite: 92; quartz: 6; calcite: 2

Spec. 56b (4 cm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate; flat pebbles to 2.7 cm long are horizontal and slightly inclined; very thinly laminated; composed of dolomite, very finely crystalline with anomalous felted texture (replacement of evaporites?); matrix of dolomitic sandstone composed of quartz and minor feldspar, silt to fine sand grade, moderately sorted, subrounded, with dolomite, microcrystalline to finely crystalline; fragments pale yellowish brown, mostly with greyish red-purple rims; matrix yellowish grey (Pl. 19).

Spec. 50a (5 cm) Hand spec. Dolostone, aphanitic, silty to medium grained sandy, slightly micaceous, contains pebbles of vein quartz and quartzite, 1-7.5 cm in diameter, unsorted; yellowish grey (Pl. 24)

Fossil identifications from western Igloolik Island

Identification of macrofossils by B.S. Norford

GSC loc. C-2847
Field no. Tm-68-51; map-unit O_{1s}
echinoderm debris
bryozoan
ostracode
straight cephalopod
Probillingsites sp.
?Maclurites sp.
Receptaculites sp.
Grewingkia sp.
Glyptorthis sp.

Hesperorthis sp.
Rhynchotrema sp.
Thaerodonta sp.
?Calymene sp.
Illaenus cf. *I. lacertus* Whittington
age: late Middle Ordovician

GSC loc. C-2806
Field no. Tm-68-3-2; Ship Point Formation; unit 5 of Igloolik sections
echinoderms and bryozoan fragments
orthid brachiopod
age: Paleozoic, probably later than Early Ordovician

GSC loc. C-2807
Field no. Tm-68-3-3; unit and location as for GSC loc. C-2806
echinoderm, bryozoan and trilobite fragments
strophomenid brachiopod
age: probably Middle or Late Ordovician

Identification of ostracode by M.J. Copeland

GSC loc. C-2847
Field no. and location as above
leperditiid, possibly *Eoleperditia?*
age: Paleozoic

Identification of conodonts by C.R. Barnes

GSC loc. C-2620
Field no. Tm-68-5; Ship Point Formation, unit 5 of Igloolik sections

Weight dissolved: 1,490 grams

Species (form-taxa)	No. of specimens
Belodella n. sp. 1	23
B. n. sp. 2	50
Chirognathus spp.	7
Chosonodina n. sp.	3
Dichognathus sp. cf. *D. brevis* Branson and Mehl	9
Drepanodus homocurvatus Lindström	77
D. suberectus	16
Erismodus sp.	3
Multioistodus? sp.	13
Oistodus sp. aff. *O. robustus* Bergström	43
O. inclinatus	11
O. n. sp.	6
Oulodus n. sp.	8
Phragmodus n. sp.	85
Polycaulodus sp.	3
Scolopodus sp.	2
Trichonodella? sp.	26
indet. fibrous conodonts	27
TOTAL	412

age: early Middle Ordovician, possibly Chazyan

Comments: The fauna is composed of elements that are poorly known or new. Three main groups are present:

1. Fibrous and hyaline elements that suggest a Chazyan age.

2. The *Drepanodus homocurvatus, D. suberectus, Oistodus inclinatus* multi-element association. This ranges throughout most of the Middle and Upper Ordovician.

3. *Belodella* n. sp., *B.* n. sp. 2, *Phragmodus* n. sp., *Dichognathus* sp. cf. *D. brevis* and *Oistodus* sp. aff. *O. robustus*. These comprise two multi-element associations. *Belodella* is extremely rare in the Ordovician, likely occurring in a limited paleotectonic belt.

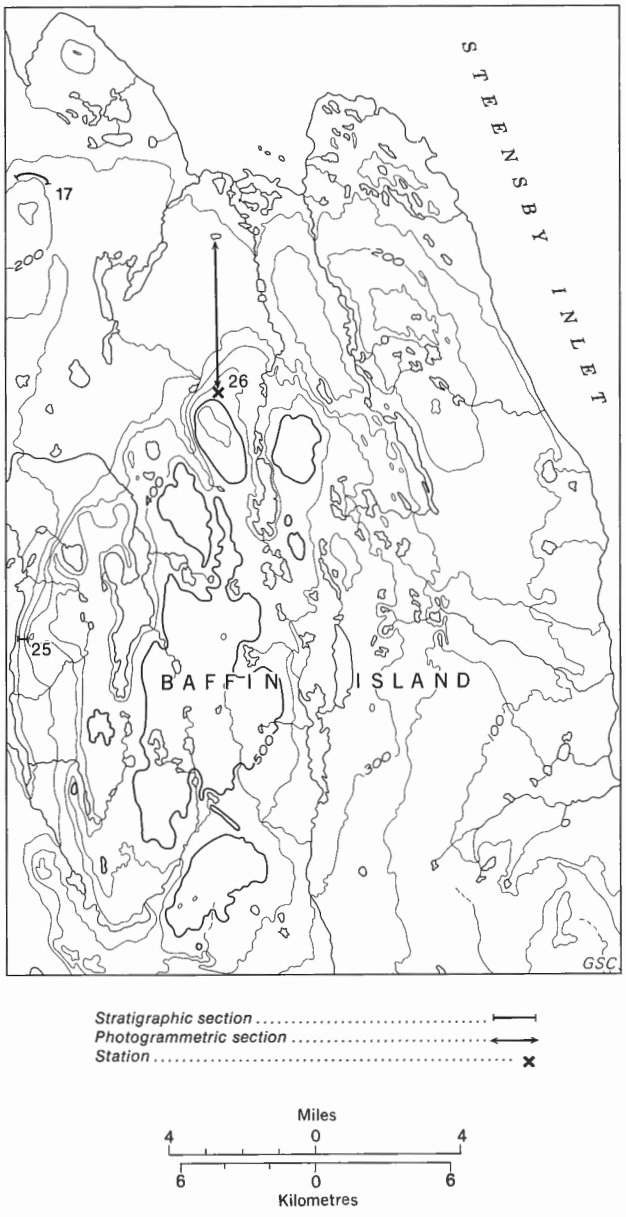

Figure 9. Map showing photogrammetric section, stratigraphic sections and station on peninsula west of Steensby Inlet. (NTS 37C)

NORTHWESTERN BAFFIN ISLAND
EAST OF 80°W LONGITUDE

This area was mapped by G.D. Jackson and others in 1968, and the writer's work was limited to stratigraphic investigations west of Steensby Inlet and in the Inuktorfik Lake region.

West of Steensby Inlet
(NTS 37F)

The central parts of the unnamed peninsula west of Steensby Inlet (Fig. 9) are occupied by a mesa that is capped by resistant limestone of map-unit O_{1s} and underlain by member B of the Ship Point Formation (Pl. 5). A partial section of map-unit O_{1s} and of member B of the Ship Point Formation was measured on the west side of the mesa at locality 25 (section Steensby-southwest). A photogrammetric section on the north side (section Steensby-centre) includes all of member B, and about 40 feet (12 m) of member A of the Ship Point Formation. A butte on the northern extremity of the peninsula provided a reasonably well exposed section of member A that may be nearly complete (section Steensby-north). The surrounding drift-covered lowlands are underlain mainly by member A of the Ship Point Formation, to a lesser extent by member B and, locally, perhaps also by the Admiralty Group. The minimum thickness of the Ship Point Formation is about 400 feet (120 m). Conodonts were obtained from the top of the Ship Point Formation at locality 26, and macrofossils from map-unit O_{1s} at locality 25.

Stratigraphic section Steensby-north

UTM co-ordinates

Loc. Tm-68-27, base of section: zone 17W; 7801500N; 558250E
top of section: zone 17W; 7801250N; 560250E

Summary

Ship Point Formation
Member B (incomplete) ..... 34 ft. (10 m)
Member A (incomplete) ..... 67 ft. (20 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of present land surface; level within lower part of member B, Ship Point Formation	
	SHIP POINT FORMATION	
	Member B	
Unit 16	Dolomitic flat-pebble conglomerate	33-34
100-101 (1)		
Unit 15	Dolostone, aphanitic, parting 1-3 cm	22-33
89-100 (11)	At 92 ft. (1.6 cm) Pol. sect. Dolostone, microcrystalline; thin streaks of reddish weathering material, a few mm long, probably represent organic material replaced by oxidized iron sulphide; discontinuous, undulating lamination; light olive-grey. X-ray dolomite: 93; quartz: 4; feldspar: 3; "illite": tr	
Unit 14	Slope; lower part (to about 77 ft.) covered with vegetation, upper part with talus probably derived from unit 15	0-22
67-89 (22)		

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Member A	
Unit 13	Recessive, nearly flat interval, underlain by sandstone, dolomitic, bioturbated with burrow casts on bedding planes, parting 1-3 cm	
66-67 (1)	At 66.5 ft. (2.5 cm) Pol. sect., thin sect. Sandstone, highly dolomitic, composed of quartz, very fine to very coarse grained, poorly sorted, mostly rounded; dolomite is very finely to finely crystalline; oxidized pyrite; bioturbated; yellowish grey	
Unit 12	Cliff-forming dolostone, stromatolitic, brecciated, cherty	
63-66 (3)	At 64+ ft. (6 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with minor floating quartz silt to medium-grained sand; partly replaced by chert; vug lined with chalcedony and filled with quartz; vague lamination forms brecciated hemisphere, about 11 cm in diameter; pale yellowish brown	
	At 65 Ft. (4 cm) Pol. sect., thin sect. Dolostone, microcrystalline to coarsely crystalline; vague brecciation; vugs to 0.7 mm; pale yellowish brown	
Unit 11	Gentle slope, covered	
61-63 (2)		
Unit 10	Sandstone, dolomitic, and dolostone, sandy, with coated grains; parting 1-3 cm; dolomitic domal stromatolites, about 8 cm in diameter; gentle slope	
55-61 (6)		
	At 58 ft. (1.5 cm) Hand spec., thin sect. Dolostone, microcrystalline to very finely crystalline with coated grains and high proportion of quartz, fine to coarse grained, poorly sorted, rounded to subrounded (more angular where replaced by carbonate matrix); trace amounts of zircon; vague, discontinuous lamination appears bioturbated; greyish orange to pale yellowish brown. X-ray dolomite: 79; quartz: 21	
Unit 9	Rubble, more or less in place, of sandstone, dolomitic, with coated grains, and dolostone, sandy; parting 1-30 cm; horizontal and small-scale cross-lamination; some brecciation	
47-55 (8)		
	At 53 ft. (3.5 cm) Pol. sect., thin sect. Sandstone, highly dolomitic, very fine to very coarse grained, poorly sorted, rounded to subrounded, with dolomitic coated grains in abundant matrix of dolomite, micro-crystalline to very finely crystalline; vague, discontinuous lamination is horizontal to slightly inclined; greyish orange to pale yellowish brown. X-ray quartz: 58; dolomite: 42; feldspar: tr; "illite": tr	
Unit 8	Gentle slope, covered	
44-47 (3)		
Unit 7	Sandstone, quartz-cemented, calcareous and dolomitic with coated grains	
38-44 (6)	At 43 ft. (1 cm) Hand spec., thin sect. Sandstone, highly dolomitic, fine to coarse grained, poorly sorted, composed of quartz, rounded, commonly coated (with dolomite), and dolomitic coated grains; cemented by dolomite, microcrystalline to very finely crystalline; very thin bedded; greyish orange	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	At 38 ft. (5 cm) Hand spec., thin sect. Sandstone, calcareous, very fine to very coarse grained, moderately sorted; composed of quartz and trace amounts of feldspar, rounded to subrounded, cemented by quartz and calcite with minor dolomite; vaguely laminated; very light grey to yellowish grey. X-ray quartz: 71; calcite: 25; dolomite: 4; feldspar: tr	
Unit 6 33-38 (5)	Gentle rise, covered	
Unit 5 26-33 (8)	Cliff-forming dolostone, sandy, parting 1-2 cm, with stromatolites, domal, about 8 cm in diameter; at 33 ft., ledge, about 100 ft. wide	
Unit 4 14-26 (12)	Covered slope	
Unit 3 5-14 (9)	Sandstone, quartz-cemented, calcareous, and dolomitic; minor dolostone, sandy with ooids and coated grains; bedding mostly vague; parting 0.5 to 30 cm; some cross-lamination; sets 15-30 cm thick; ripple-marks 5-8 cm in amplitude, 30 cm in half-wave length; extensive plateau at 14 ft.	
	At 11 ft. (2.5 cm) Hand spec., thin sect. Sandstone, calcareous, medium to coarse grained, moderately sorted; composed of quartz and trace amounts of feldspar, rounded to subrounded; cemented by calcite and minor dolomite; dolomite is microcrystalline to very finely crystalline; stratification not apparent; yellowish grey. X-ray quartz: 71; calcite: 25; dolomite: 4; feldspar: tr	
	At 10 ft. (2.5 cm) Hand spec., thin sect. Dolostone, microcrystalline, with abundant quartz and coated grains, and minor ooids; quartz very fine to coarse grained, unsorted, rounded to subrounded; coated grains in part composite; stratification not apparent; yellowish grey to medium light grey	
	At 7 ft. (1.5 cm) Hand spec., thin sect. Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained, poorly sorted, composed of quartz with trace amounts of feldspar, rounded to subrounded; some oxidized pyrite; lamination vague; very light grey. X-ray quartz: 99; feldspar: 1; chlorite: tr	
Unit 2 2.5-5 (2.5)	Covered flat	
Unit 1 0-2.5 (2.5)	Sandstone, calcareous and dolomitic, very fine to coarse grained; some steeply inclined cross-lamination; co-sets about 15 cm thick	
	At 1 ft. (2.5 cm) Hand spec., thin sect. Sandstone, calcareous and dolomitic, very fine to coarse, mainly medium grained, poorly sorted; composed mainly of quartz with trace amounts of feldspar, subrounded (but more angular where matrix replacement has occurred); cemented by calcite and less abundant dolomite; dolomite is microcrystalline to finely crystalline; vague horizontal lamination; yellowish grey	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)

Base of section: vegetation-covered flats; level within lower part of member A of Ship Point Formation or at its base

Stratigraphic section Steensby-centre

UTM co-ordinates

Base of photogrammetric section:
zone 17W; 7798800N; 567750E
Top of section (Loc. Tm-68-26a, b):
zone 17W; 7792000N, 568000E

Summary and remarks

Ship Point Formation
Member B ..... 335 ft. (102 m) (approximate thickness; photogrammetry combined with reinterpretation of field notes)
Member A (incomplete) .. 40 ft. (12 m)

This is the longest section of the Ship Point Formation in the area; it is bounded, however, at the base by a minor fault and therefore incomplete. Exposure is poor in the lower part, and the section, furthermore, is too extensive horizontally to be measured on the ground with sufficient accuracy; it therefore was measured photogrammetrically. The contact between members A and B is placed between the flat-lying terrain showing rectangular jointing and the first terrace rising from it. The uppermost strata of member B, covered at section Steensby-southwest, are exposed at locality 26. Specimens 26a-2 to 4, described below, are from unfossiliferous strata; specimen 26b is from an overlying, ledge-forming fossiliferous dolostone that contains an early Middle Ordovician conodont fauna. This ledge was originally thought (in the field) to be the base of map-unit O_{1s}, but now is considered to be equivalent to unit 5 of the Igloolik section, and to unit 201 of the Rowley Island well, 23 and 25 feet (6.9 and 7.5 m), respectively, below the top of the Ship Point Formation.

Lithological descriptions

Spec. 26a-2 (5.5 cm) Pol. sect., thin sect. About 5 mm of dolostone, cryptocrystalline to finely microcrystalline with abundant quartz and minor feldspar of silt to fine sand grade and trace amounts of muscovite; very thin, discontinuous horizontal lamination, undulating on a microscopic scale, and marked by concentrations of submicroscopic organic matter, may represent original algal mat; remainder of rock is intraformational conglomerate or breccia composed of: (1) flat to round clasts, to about 2.5 cm long, of dolostone, microcrystalline, in part silty, and containing coated grains, partly laminated; (2) coated grains in part multiple, and commonly with core of quartz; (3) fragments of thinly laminated dolostone, contorted, probably representing fragmented algal mat; cement is dolomite, microcrystalline, relatively clear; very pale orange to pale yellowish brown

Spec. 26a-3 (2.2 cm) Pol. sect., thin sect. Dolostone, mainly microcrystalline with large proportion of quartz and minor feldspar of silt grade and trace amounts of muscovite; irregular patches of cryptocrystalline to very finely microcrystalline dolomite; thinly laminated, light grey. X-ray dolomite: 82; quartz: 15; feldspar: 3

Spec. 26a-4 (3.5 cm) Pol. sect., thin sect. Dolostone, composed of: ellipsoidal intraclasts and (?)pellets, 0.2-10 mm; minor coated grains, in part multiple; and minor amounts of quartz ranging from silt to fine sand grade; matrix of microcrystalline dolomite; pale yellowish brown

Spec. 26b (4 cm) Pol. sect., thin sect. Dolostone, microcrystalline, with abundant but poorly preserved fragments of trilobites, bryozoans, etc.; highly bioturbated; skeletal material is pale to dark yellowish brown, matrix very pale orange to pale greenish yellow

Identification of conodonts by C.R. Barnes

GSC loc. C-10017
Field no. Tm-68-26b

Of the 1,440-gram sample submitted, the 980 grams that dissolved yielded a prolific fauna. Although several hundred conodonts remain picked but unsorted, the following list of species is considered to be complete and the abundance figures to give a realistic guide to relative abundance of form species.

Species (form-taxa)	No. of specimens
Acontiodus sp.	1
Belodella n. sp. 1	4
Belodella n. sp. 2	75
Chosonodina n. sp.	4
Dichognathus sp. aff. *D. brevis* Branson and Mehl	70
Drepanodus homocurvatus Lindström	45
D. suberectus Branson and Mehl	9
Erismodus sp.	8
"Ligonodina" sp. (hyaline)	19
Multioistodus subdentatus Cullison	2
Oistodus sp. aff. *O. abundans* Branson and Mehl	103
O. inclinatus Branson and Mehl	11
O. linguatus bilongatus Harris	11
O. sp. aff. *O. venustus* Stauffer	12
Oulodus n. sp. 1	11
Oulodus n. sp. 2	12
Phragmodus n. sp.	153
Ptiloconus gracilis (Branson and Mehl)	1
Scolopodus n. sp.	41
Trichonodella n. sp.	12
n. gen., n. sp. (hyaline)	12
TOTAL	616

age: early Middle Ordovician, possibly Chazyan

Comments: The abundant conodont fauna can be considered as a number of associations:

1. The new multi-element species of *Phragmodus* n. sp. (*P.* n. sp., *Dichognathus* sp. aff. *D. brevis*, and *Oistodus* sp. aff. *O. abundans*) does not contain second blade dichognathiform element found in post-Chazyan *Phragmodus* species. *Phragmodus* is not known from Lower Ordovician strata.

2. The multi-element species *Drepanodus homocurvatus (D. homocurvatus), D. suberectus, Oistodus inclinatus)* ranges throughout the Middle and Upper Ordovician.

3. The fibrous and hyaline elements, *in toto*, suggest a Chazyan age.

4. *Scolopodus* n. sp. appears to be a shorter, more recurved descendant of *S. gracilis* Ethington and Clark found in Canadian and Whiterockian strata. Such scolopodiform elements are unknown in post-Chazyan strata.

5. There is, as yet, insufficient knowledge of *Belodella* species for it to be useful biostratigraphically, but these specimens do compare closely with belodelliform elements from the Whiterockian Mystic Conglomerate of Quebec (Barnes and Poplawski, 1973). *Belodella* n. sp. 1 and *B.* n. sp. 2 comprise the apparatus of *Belodella*.

The fauna is essentially identical with that recovered from locality 5 on Igloolik Island (GSC loc. C-2620).

Stratigraphic section Steensby-southwest

UTM co-ordinates

Loc. Tm-68-25, base of section: zone 17W; 7781250N; 559700E
top of section: zone 17W; 7781250N; 560100E

Summary

Map-unit O_{1s} (incomplete)	23 ft. (7 m)
Ship Point Formation and/or map-unit O_{1s}	89 ft. (27 m)
Ship Point Formation Member B (incomplete)	100 ft. (30 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of ridge; level within lower part of map-unit O_{1s}	
	MAP-UNIT O_{1s}	
Unit 14 196-122 (16)	Limestone as in unit 13; fairly abundant mud-supported fossils and some trace fossils; parting 1-2 cm; resistant, cliff-forming unit	96-112

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Fossil collection: GSC loc. C-2820	
	Lithological description: Appendix 3, Table 1, no. 57	
Unit 13 189-196 (7)	Limestone, cryptocrystalline, slightly dolomitic, slightly silty and very fine grained sandy; small amounts of argillaceous matter concentrated in discontinuous, wavy laminae (solution zones); burrowed; parting 1-8 cm; resistant, cliff-forming unit	89-96
	Fossil collection: GSC loc. C-2820	
	Lithological description: Appendix 3, Table 1, no. 56	
	SHIP POINT FORMATION AND/OR MAP-UNIT O_{1s}	
Unit 12 100-189 (89)	Steep slope, covered with talus from units 13 and 14	0-89
	Contact not exposed	
	SHIP POINT FORMATION	
	Member B	
Unit 11 74-100 (26)	Gentle grassy slope	
Unit 10 62-74 (12)	Gentle slope, covered with rubble of dolostone, aphanitic, laminated, parting 1-4 cm	
	Spec. 12 (4 cm) Pol. sect. Dolostone, aphanitic; some oxidized pyrite; thin streaks of oxidized iron sulphide probably represent replaced organic matter; vague horizontal lamination; very pale to greyish orange. X-ray dolomite: 94; quartz; 4; feldspar: 1; calcite: 1	
Unit 9 46-62 (16)	Dolostone, aphanitic; trace fossils common (spec. 9); parting 0.3-1 cm; unit ascends in four steps; uppermost few feet form broad ledge (spec. 10)	
	Spec. 10 (1 cm) Pol. sect. Dolostone, aphanitic, with streaks of oxidized iron sulphide; bioturbated; very pale orange to pale yellowish brown	
	Spec. 9 (1.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with trace amounts of quartz silt; some oxidized pyrite; bioturbated; greyish orange to pale yellowish brown. Hand spec. Burrow casts on bedding plane to 6 cm long, 3 mm wide; gastropod shell fragment	
Unit 8 35-46 (11)	Rubble in place of dolostone, aphanitic; more recessive than underlying and overlying units	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 7 31-35 (4)	Dolostone, aphanitic, parting 1-2 cm; lighter in colour than units 1-6; cliff-forming unit Spec. 7 (1.5 cm) Pol. sect. Dolostone, aphanitic; some oxidized pyrite; bioturbated; very pale orange	
Unit 6 24-31 (7)	Rubble, probably in place, of dolostone, aphanitic, in part silty and sandy Spec. 6 (2.5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with about 20% silt to fine-grained sand of quartz and feldspar; bioturbated; pale yellowish brown to very pale orange	
Unit 5 12-24 (12)	Five step-like ledges, each about 8 to 15 cm thick, underlain by dolostone, aphanitic, parting 5-8 cm, containing fossils, trace fossils (spec. 3) and chert nodules; separated by dolostone, aphanitic, laminated, parting 1-2 cm; about one mile (1.6 km) to the south, domal stromatolites in this unit are about 30 cm in diameter and 5 to 8 cm high Spec. 3 (8 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with gastropods and ostracodes(?); partly laminated, partly brecciated and bioturbated; parting 8 cm; pale yellowish brown and very pale orange	
Unit 4 7-12 (5)	Grass covered	
Unit 3 4-7 (3)	Dolostone, aphanitic, laminated; parting about 2 cm Spec. 2 (2.3 cm) Dolostone, microcrystalline with trace amounts of quartz silt; thin horizontal lamination shows some soft-sediment deformations; laminae are alternately pale yellowish brown and greyish orange	
Unit 2 2-4 (2)	Covered with grass and moss	
Unit 1 0-2 (2)	Rubble of dolostone, laminated; raised beach Spec. 1 (3 cm) Pol. sect. Dolostone, aphanitic, horizontally laminated; some laminae are discontinuous; laminae are alternately pale yellowish brown and greyish orange	
	Base of section: vegetation-covered flats; level within member B of Ship Point Formation	

Identification of macrofossils by B.S. Norford

GSC loc. C-2820
Map-unit O_{1s}, units 13 and 14 of section
straight cephalopods
Maclurites sp.
Receptaculites sp.
Grewingkia sp.
Calapoecia sp.
undetermined coral
indeterminate and strophomenid brachiopods
Resserella sp.
Rhynchotrema sp.
Thaerodonta sp.
undetermined trilobites
?Calyptaulax sp.
?Remipyga sp.
age: late Middle Ordovician

Identification of ostracode by M.J. Copeland

GSC loc. C-2820
Ostracoda: leperditiid
age: Paleozoic - too poorly preserved for specific identification

Inuktorfik Lake region
(NTS 37G)

Outcrop is generally poor in this area (Fig. 10), but a fairly well exposed section of the Admiralty Group was measured 6.5 miles (10.5 km) northeast of Inuktorfik Lake (section Inuktorfik-northeast I). The total thickness of the Ship Point Formation was determined photogrammetrically about 13 miles (21 km) northeast of Inuktorfik Lake (Inuktorfik-northeast II). A section just south of Inuktorfik Lake, which probably includes the Admiralty Group and parts of member A of the Ship Point Formation, could not be subdivided into formations.

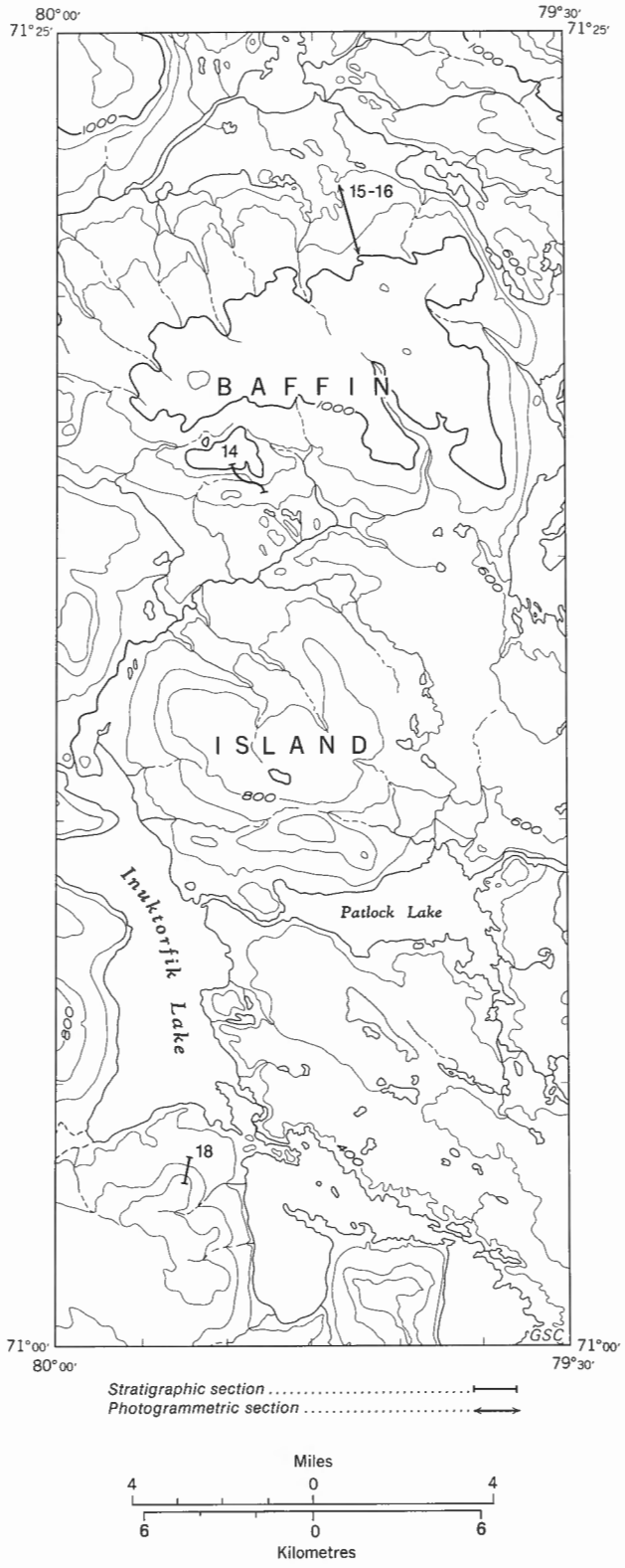

Figure 10. Map showing photogrammetric section and stratigraphic section in Inuktorfik Lake region (NTS 37G).

Stratigraphic section Inuktorfik-northeast I

UTM co-ordinates

Loc. Tm-68-14, centre of section: zone 17W; 7908400N; 542200E

Summary

Ship Point Formation	
Member B (incomplete)	29 ft. (9 m)
Member A	99 ft. (30 m)
Turner Cliffs Formation	43 ft. (13 m)
Gallery Formation (probably incomplete)	49 ft. (15 m)

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of ridge; corresponds to level within member B, Ship Point Formation	
	SHIP POINT FORMATION	
Unit 19	Recessive interval; some rubble of dolostone, aphanitic, silty and sandy, parting thickness 1-2 cm	23-29
214-220 (6)	At 220 ft. (1 cm) Pol. sect., thin sect. Dolostone, microcrystalline (in part finely), with silt and very fine grained sand of quartz and minor feldspar; very thin, undulating wisps of organic matter, a few tens of microns long, altered by oxidized iron sulphide; thin lamination is horizontal and slightly undulating; between greyish orange and pale brown. X-ray dolomite: 84; quartz: 11; feldspar: 4; "illite": 1	
Unit 18	Covered; more recessive than unit 19; rubble suggests similar lithology	19-23
210-214 (4)		
Unit 17	Ledge of dolostone, aphanitic, in part silty, laminated; parting thickness 0.5 to 12 cm	15-19
206-210 (4)	At 208 ft. (5 cm) Pol. sect., thin sect. Dolostone, microcrystalline to finely crystalline with very thin lenses of dolomitic siltstone to 0.75 mm long, containing quartz, feldspar, and trace amounts of muscovite; stratification very vague, probably bioturbated; pale yellowish brown with streaks of orange. X-ray dolomite: 95; quartz: 3; feldspar: 2	
Unit 16	Recessive interval; rubble of dolostone, aphanitic; parting thickness 1-2 cm	3-15
194-206 (12)	At 197 ft. (2 cm) Pol. sect., thin sect. Dolostone, microcrystalline; laminae differ in crystal size and content of submicroscopic impurities; lamination discontinuous, vague, horizontal and undulating; yellowish grey to pale yellowish brown	
Unit 15	Dolostone, aphanitic, laminated and dolomitic flat-pebble conglomerate; more recessive than unit 14	0-3
191-194 (3)	At 194 ft. (3.5 cm) Pol. sect. Dolostone, aphanitic, laminated with intraclasts to 3 mm and oxidized pyrite; laminae horizontal and moderately inclined; vugs to 3 mm are partly mineral molds; greyish orange to yellowish grey	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Member A	
Unit 14 180-191 (11)	Sandstone, fine to coarse grained, partly quartz-cemented, porous, friable, partly dolomitic with some ooids and coated grains; dolostone, aphanitic laminated; dolomitic stromatolites, in part brecciated; dolomitic breccia; moderately resistant unit	88-99
	At 188 ft. (6 cm) Pol. sect. Dolostone, aphanitic with streaks of rusty weathering pyrite; thin, horizontal lamination; pale orange to greyish orange	
	At 185 ft. (5 cm) Pol. sect. Domal stromatolite composed of laminae of dolostone that are alternately finely microcrystalline and coarsely microcrystalline to finely crystalline with small amounts of quartz silt and sand; laminae much disrupted; relief on individual laminae about 2 cm; greyish orange-pink. X-ray dolomite: 98; quartz: 1; feldspar: 1	
	At 183 ft. (4 cm) Pol. sect., thin sect. Dolomitic breccia; fragments to 2.5 cm have irregular outlines, both rounded and angular; some, showing undulating laminae that differ in crystal size, may be stromatolitic; interstices filled with dolomitic sandstone; quartz ranges from silt to coarse sand, poorly sorted, well rounded; microstylolites common; rock is greyish orange	
	At 182 ft. (3 cm) Pol. sect., thin sect. Three interlaminated lithologies: (1) sandstone, quartz-cemented; (2) sandstone, dolomitic; (3) sandstone, dolomitic, with coated grains and ooids; quartz ranges from very fine to coarse grained, moderately to poorly sorted, rounded (except for matrix replacement); trace amounts of feldspar; dolomite microcrystalline to very finely crystalline; some cryptocrystalline dolomite and/or calcite in coated grains; rock is very pale orange to greyish orange (Pl. 29)	
Unit 13 175-180 (5)	Covered, recessive	83-88
Unit 12 146-175 (29)	Rubble, more or less in place, of: (1) dolostone, sandy with horizontal and cross-lamination; (2) sandstone, dolomitic and quartz-cemented, porous, friable; horizontal and cross-lamination, partly of trough-type; (3) dolomitic flat-pebble conglomerate and breccia, in part silty and sandy	54-83
	At 168 ft. (9 cm) Pol. sect. Fragments of dolostone, aphanitic, to 2.2 cm and sandstone, dolomitic, very fine to coarse grained, in abundant matrix of dolomite, aphanitic; mostly bioturbated with some thin lamination preserved; very pale orange and pale yellowish brown	
	At 166 ft. (3.8 cm) Pol. sect. Dolomitic sandstone with fragments of dolostone to 8 mm; quartz is fine to coarse, mainly medium grained, poorly sorted; stratification absent owing to bioturbation; very pale orange to pale orange to pale yellowish brown	
	At 158 ft. (3.5 cm) Pol. sect., thin sect. Flat-pebble conglomerate; flat pebbles of dolostone, aphanitic, in part silty and very fine grained sandy with matrix of dolomitic sandstone, very fine to very coarse, mainly medium grained, rounded to subrounded (except for matrix replacement); composed mainly of quartz with trace amounts of	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	feldspar; flat pebbles to 2 cm, moderately inclined; pale yellowish brown to greyish orange. X-ray quartz: 66; dolomite: 33; calcite: 1; feldspar: tr; "illite": tr	
Unit 11 117-146 (29)	Covered interval; lower part recessive; upper part moderately steep	25-54
Unit 10 115-117 (2)	Sandstone, quartzose; cross-laminations are planar, concave up, or trough-type; troughs to 2 ft. long At 116 ft. (2 cm) Hand spec. Sandstone, quartz-cemented, porous, friable; fine to coarse, mainly medium grained, moderately well sorted; very vague, undulating, horizontal lamination; greyish orange	23-25
Unit 9 111.5-115 (3.5)	Covered, recessive	19.5-23
Unit 8 92-111.5 (19.5)	Three units of sandstone, quartz-cemented, porous, friable, fine to coarse grained; cross-laminated with troughs to 2 ft. long (about 72%); interbedded with two units of sandstone, dolomitic and dolomite, sandy, mostly fine to coarse grained; trough cross-lamination At 107 ft. (3.5 cm) Pol. sect. Sandstone, dolomitic, fine to coarse grained, poorly sorted, massive, probably bioturbated; composed mainly of quartz in dolomitic matrix; possibly with some coated grains; moderate yellowish brown to greyish orange At 104 ft. (2.5 cm) Pol. sect., thin sect. Sandstone, quartz-cemented, porous, friable, very fine to coarse grained, poorly sorted; stratification not apparent; composed mainly of quartz with minor microcline; very light grey Contact not exposed	0-19.5
	ADMIRALTY GROUP TURNER CLIFFS FORMATION	
Unit 7 49-92 (43)	Covered, recessive; rubble from 49-62 ft. contains: dolostone, silty and very fine grained sandy, in part glauconitic; sandstone, dolomitic, very fine grained; dolomite, very fine grained; and dolomitic flat-pebble conglomerate At 50-62 ft. (7 cm) Pol. sect., thin sect. Dolostone, sandy, interlaminated with sandstone, dolomitic, very fine grained; sand consists of quartz, minor feldspar and glauconite, and trace of tourmaline; horizontal laminae 0.05-0.075 mm thick; pale yellowish grey to light grey. X-ray dolomite: 67; quartz: 26; feldspar: 7; "illite": tr At 55 ft. (2.2 cm) Pol. sect. Dolostone, aphanitic, slightly calcareous, containing very fine grained quartz and glauconite; laminae, about 0.04-0.24 mm apart, are horizontal or slightly undulating; pyrite altered to limonite; pale to greyish olive Contact not exposed	0-43

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	GALLERY FORMATION	
Unit 6 41-49 (8)	Sandstone, quartz-cemented, porous, friable, fine to very coarse grained; trough cross-laminated; troughs to 3 ft. long; also planar cross-lamination; mostly light grey with patches of dusky red	41-49
	At 46 ft. (2 cm) Hand spec. Sandstone, quartz-cemented, porous, friable; mainly very coarse grained, moderately sorted, with some very fine grained laminae; composed mainly of quartz, partly coated with iron oxide; horizontal, minor slightly inclined cross-lamination; yellowish grey with some moderate red	
	At 45 ft. (2 cm) Hand spec. Sandstone, quartz-cemented, slightly calcareous, porous, friable, fine to medium grained, moderately sorted; composed mainly of quartz; stratification not apparent; yellowish grey	
Unit 5 24-41 (17)	Covered, recessive	24-41
Unit 4 20-24 (4)	Sandstone, quartz-cemented, porous, friable; upper part shows trough cross-lamination, lower part horizontal lamination; mostly light grey with rare patches of dusky red	20-24
	At 22 ft. (1 cm) Hand spec. Sandstone, quartz-cemented, porous, friable, fine to medium grained, moderately sorted; composed mainly of quartz; stratification not apparent; yellowish grey	
Unit 3 18-20 (2)	Covered, recessive	18-20
Unit 2 14-18 (4)	Sandstone, quartz-cemented, porous, friable; horizontal and trough cross-lamination; pronounced parting parallel with bedding; recessive	14-18
	At 17 ft. (4.5 cm) Hand spec. Sandstone, quartz-cemented, porous, friable, fine to medium grained, moderately well sorted; horizontal and cross-lamination; set of cross-laminae 2 cm thick; composed largely of quartz; yellowish grey	
Unit 1 0-14 (14)	Sandstone, dolomitic and quartz-cemented, porous, friable, predominantly medium grained; horizontal lamination rare, trough cross-lamination predominant; troughs a few inches to about 1.5 feet long; parting parallel with bedding, not pronounced; bluff-forming unit; mostly light grey, with patches of dusky red	0-14
	At 10 ft. (3.5 cm) Pol. sect., thin sect. Sandstone; quartz and trace amounts of feldspar in abundant matrix of dolomite and minor calcite; quartz ranges from silt to very coarse grained sand, mainly medium grained; rounded to subrounded except for matrix replacement; dolomite microcrystalline to medium crystalline; brecciated and poorly stratified, probably owing to bioturbation. X-ray dolomite: 60; quartz: 34; calcite: 6	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	At 8 ft. (3 cm) Hand spec. Sandstone, quartz-cemented, porous, friable; mainly medium to coarse grained, moderately sorted; composed of quartz; stratification not apparent; yellowish grey	
	Base of section: base of exposures; air photo interpretation indicates that base of section is not more than a few tens of feet above Precambrian crystalline basement	

Stratigraphic section Inuktorfik-northeast II

UTM co-ordinates

Locs. Tm-68-15, 16
Photogrammetric section, top:
zone 17W; 7916200N; 546300E
Photogrammetric section, base:
zone 17W; 7918800N; 545500E

Summary

Ship Point Formation
Member B ..... 440 ft. (134 m) (photogrammetric determination)

The Admiralty Group and member B of the Ship Point Formation are not well enough exposed for stratigraphic section work. Member B of the Ship Point Formation, on the other hand, is fairly well exposed and its contacts are well defined on aerial photographs. The unit was traversed between one-half mile and two miles east of the photogrammetric section where it has essentially the same lithology as at the other sections and localities described in this report. Map-unit O_{ls}, examined about 2,500 feet (750 m) east of the top of the photogrammetric section, consists of slightly dolomitic cryptocrystalline limestone with *Receptaculites* and other fossils; the recessive member B of the Baillarge Formation is not developed here (Pl. 6).

An unusual structural feature is a slight northwesterly dip of the Ship Point Formation (about 1°35' according to photogrammetric analysis). It appears to be related to a major fault zone that bounds the lower Paleozoic terrain on the east.

Stratigraphic section Inuktorfik-south

UTM co-ordinates

Loc. Tm-68-18, centre of section: UTM zone 17W; 7883700N; 540900E

Summary

This section has not been subdivided into formations because of poor outcrop and uncertainties of correlation. The outcrop is limited mainly to sandy units which appear as light grey bands on aerial photographs. The upper part, possibly above unit 16 (299 ft., 91 m) probably represents the Ship Point Formation, and the lower part the Admiralty Group. Undiagnostic linguloid brachiopods, collected by W.C. Morgan from the lowermost part of the section (probably unit 2) may have come from Turner Cliffs strata because such fossils have been found in the Turner Cliffs Formation at several localities in the Admiralty Inlet region (*see* Trettin, 1969, p. 18).

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: top of ridge; corresponding to level within Ship Point Formation	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 22 380-394 (14)	Covered interval; gentle rise	
Unit 21 350-380 (30)	Covered with rubble of dolostone, sandy, and sandstone, dolomitic; lower part nearly flat, upper part gently rising Spec. 24-1 (3.5 cm) Pol. sect. Dolostone, aphanitic, in part silty, vuggy when weathered, bioturbated, overlain by sandstone, dolomitic, very fine to coarse grained, showing lenticular lamination; very pale to orange-pink	
Unit 20 334-350 (16)	Gentle rise, less steep than unit 19, mostly covered; at 350 ft. extensive ledge with talus of dolostone, sandy and stromatolitic Spec. 23 (4 cm) Pol. sect. Dolostone, aphanitic, with lenses and stringers of quartz, very fine to coarse grained; vague horizontal stratification; probably bioturbated; yellowish grey to greyish orange	
Unit 19 318-334 (16)	Gentle rise, covered with till	
Unit 18 306-318 (12)	Broad ledge, covered with till	
Unit 17 299-306 (7)	Outcrop of dolostone, sandy, and sandstone, dolomitic; horizontal and cross-lamination of trough-type; minor dolomitic flat-pebble conglomerate and breccia Spec. 20 (2 cm) Pol. sect., thin sect. Breccia composed of angular fragments of dolostone to 2.5 cm; composed mainly of dolomite, microcrystalline, with quartz and minor feldspar, very fine to very coarse grained; greyish orange	
Unit 16 270-299 (29)	Steeper slope, drift covered	
Unit 15 250-270 (20)	Broad ledge; lower 2 ft. have outcrop of dolostone, aphanitic and dolomitic flat-pebble conglomerate Spec. 13 (1 cm) Pol. sect., thin sect. Dolostone, very finely crystalline to predominantly microcrystalline with trace amounts of silt and very fine grained sand of quartz and minor feldspar; vague horizontal lamination; very pale orange Spec. 12 (6 mm) Pol. sect., thin sect. Dolomitic flat-pebble conglomerate; flat pebbles with oxidized rims, 1 mm to 1 cm long, are horizontal and slightly inclined; composed mainly of dolomite, aphanitic with some silt and very fine grained sand; dolomitic matrix contains quartz to medium grained; greyish orange to moderate yellowish brown. X-ray dolomite: 84; quartz: 14; feldspar: 2; "illite": tr	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
Unit 14 233-250 (17)	Narrow ledge, then moderately steep rise	
Unit 13 229-233 (4)	Cliff of sandstone, quartzose, slightly dolomitic, mainly medium grained; steeply inclined cross-lamination; sets of cross-strata about 1 ft. thick; minor flat-pebble conglomerate; pebbles to several inches long	
	Spec. 11 (2 cm) Hand spec., thin sect. Sandstone, dolomitic, fine to very coarse grained, poorly sorted, subrounded to rounded; composed mainly of quartz and trace amounts of feldspar; vague lamination is horizontal and slightly inclined; yellowish grey	
Unit 12 210.5-229 (18.5)	Steep slope, covered	
Unit 11 191-210.5 (19.5)	Steep cliffs; mainly sandstone with dolostone, sandy; sandstone is variably calcareous and dolomitic, in part friable, fine to coarse grained, and partly nodular weathering; large-scale trough cross-laminations	
	Spec. 8 (3 cm) Pol. sect., thin sect. Sandstone, dolomitic, very fine to very coarse, mainly fine to medium grained, moderately sorted, rounded to subrounded; composed mainly of quartz and trace amounts of feldspar with interstitial dolomite, microcrystalline to very finely crystalline; vague cross-lamination; greyish yellow; weathering in nodules about 4 cm in diameter (Pl. 27)	
	Spec. 6 (1 cm) Pol. sect. Dolostone, aphanitic, with about 20% quartz, fine to medium grained, rounded to subrounded, poorly sorted; laminated to very thin bedded; yellowish grey	
	Spec. 5 (5 mm) Hand spec., thin sect. Dolostone, finely microcrystalline with small amounts of quartz and minor feldspar, fine grained, subrounded; thinly laminated; yellowish grey. X-ray dolomite: 97; quartz: 2; feldspar: 1	
Unit 10 180-191 (11)	Moderately steep slope, snow covered	
Unit 9 168-180 (12)	Broad ledge, gently rising, drift covered	
Unit 8 163-168 (5)	Moderately steep slope, vegetation covered	
Unit 7 159-163 (4)	Cliff of sandstone, quartz-cemented, porous, friable, fine to very coarse grained; high-angle cross-lamination; sets to 30 cm	
	Spec. 4 (3 cm) Hand spec. Sandstone, quartz-cemented, porous,	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	friable; bimodal, fine and coarse grained; vague lamination is mainly horizontal; light grey to yellowish grey	
Unit 6 155-159 (4)	Covered slope; steeper than unit 5	
Unit 5 142-155 (13)	Broad ledge, gently rising, drift covered	
Unit 4 44-142 (98)	Moderately steep rise, covered with vegetation and till	
Unit 3 36-44 (8)	Gentle rise, vegetation covered	
Unit 2 17-36 (19)	Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained; high-angle planar and trough cross-lamination; co-sets to 60 cm; light grey and moderate red weathering; inarticulate brachiopods collected by W.C. Morgan probably came from this unit	
	Fossil collection: GSC loc. C-2812	
	Spec. 3 (2 cm) Hand spec., thin sect. Sandstone, quartz-cemented, porous, friable; bimodal, mainly very fine to medium grained with lesser amounts of very coarse grains; rounded to subrounded; composed mainly of quartz with minor muscovite and trace amounts of tourmaline; vague horizontal lamination; greyish orange	
	Spec. 2 (2.5 cm) Hand spec., thin sect. Sandstone, quartz-cemented (with some iron ozide), porous, friable, very fine to very coarse grained with granules, poorly sorted, subrounded to subangular; composed mainly of quartz with minor amounts of feldspar; vague cross-lamination; moderately red weathering. X-ray quartz: 97; feldspar: 2; hematite: 1; dolomite: tr; calcite: tr	
	Spec. 1 (4 cm) Hand spec., thin sect. Sandstone, quartz-cemented, porous, friable, fine to very coarse, mostly medium grained, with granules, poorly sorted; composed mainly of quartz, rounded to subrounded, with very small amounts of feldspar and muscovite; vague horizontal lamination; moderate reddish orange; moderate red weathering	
Unit 1 0-17 (17)	Rise, vegetation covered	
	Base of section: vegetation-covered flats, probably underlain by Precambrian crystalline rocks	

NORTHWESTERN BAFFIN ISLAND, WEST OF 80°W LONGITUDE

The lower Paleozoic geology of this region was investigated, by the writer, in a reconnaissance fashion in 1963. Minor amounts of additional work were done in 1968 in the Erichsen Lake and Arctic Bay regions and on northern Brodeur Peninsula.

Eastern half of Erichsen Lake map-area (NTS 47E)

This region, remote from the base camp at Admiralty Inlet, and relatively poor in outcrop, was investigated in 1963 (Blackadar, Davison and Trettin, 1968h) only in a very hasty fashion. In 1968, a stratigraphic section was measured southwest of Erichsen Lake, and a traverse was made northwest of Neergard Lake (loc. Tm-68-57).

A revised map of the lower Paleozoic geology in the eastern half of Erichsen Lake area is included in this report. It is based mainly on air-photo interpretation and differs from the earlier version mainly in two regards: (1) Large areas covered with generally unconsolidated sandy sediments now are interpreted to be underlain by lower Paleozoic clastic sediments that have weathered in place rather than as essentially Precambrian terrains with a Quaternary veneer. (2) The lower Paleozoic rocks now are assigned to the undivided Ship Point Formation and Admiralty Group. The Admiralty Group, although difficult to identify positively, probably is present in the area southwest of Erichsen Lake and may underlie other parts as well. Some additional changes were made in the thickly covered northeastern extremity of the map-area, but that area remains poorly known.

Southwest of Erichsen Lake

Two sections were measured. The short section I either underlies section II or overlaps with its lowermost part. The uppermost part of section II (unit 10, and possibly some underlying strata) represents member B of the Ship Point Formation. The remaining part of the succession either is entirely in the Ship Point Formation or represents member B of the Ship Point Formation plus the Admiralty Group.

Stratigraphic section Erichsen Lake I

UTM co-ordinates

Loc. Tm-68-59, base of section: zone 17W; 7834500N; 494250E

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: extensive banks; level within Admiralty Group or member A, Ship Point Formation	
Unit 3	Steep slope covered with light grey sand	
6-40 (34)		
Unit 2	Sandstone, cross-laminated	
4-6 (2)	Between 4 and 6 ft. (3.5 cm) Hand spec. Sandstone, quartz-cemented, porous, friable, composed mostly of quartz, medium grained, moderately well sorted; lamination is vague; greyish yellow	
Unit 1	Slope covered with light grey sand	
0-4 (4)		
	Base of section: creek bed	

Stratigraphic section Erichsen Lake II

UTM co-ordinates

Loc. Tm-68-58, centre of section: zone 17W; 7835750N; 496700E

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	Top of section: near top of butte; level within Ship Point Formation	
Unit 10	Cliffs of dolostone, aphanitic, in part silty and sandy	
199-203 (4)	At 203 ft. (3 cm) Pol. sect., thin sect. Dolostone, microcrystalline to very finely crystalline with large proportion of silt to very fine grained sand of quartz and minor feldspar and trace amounts of muscovite; some oxidized pyrite; vague horizontal lamination, some bioturbation; yellowish grey to pale yellowish brown. X-ray dolomite: 53*; quartz: 35*; feldspar: 11; "illite": 1	
Unit 9	Covered, mostly with rubble of dolostone, pure, silty, sandy, or stromatolitic	
156-199 (43)		
Unit 8	Rubble and outcrop of dolostone, sandy and sandstone, dolomitic; horizontal and cross-lamination; some flat-pebble conglomerate	
150-156 (6)	At 155 ft. (5 cm) Pol. sect., thin sect. Sandstone, composed of quartz ranging from silt to coarse-grained sand, rounded to subrounded, poorly sorted; and dolomitic ooids, cryptocrystalline to microcrystalline; both cemented by dolomite, microcrystalline to very finely crystalline; vague horizontal lamination; light brown to greyish orange	
Unit 7	Covered with vegetation and rubble	
120-150 (30)		
Unit 6	Rubble and some outcrop of dolostone, stromatolitic, sandy, and of flat-pebble conglomerate, dolomitic and sandy, parting 2-5 cm	
114-120 (6)	At 114 ft. (5.5 cm) Pol. sect., thin sect. Club-shaped stromatolite, 8 cm wide at top, 5 cm at bottom, 6 cm high; linked at several levels with adjacent clubs by dolomitic laminae built of alternating, undulating laminae of dolostone, microcrystalline to very finely crystalline and sandstone, dolomitic; vugs to 2 mm between laminae; sandstone predominant in interstices between clubs; dolomitic laminae are partly brecciated there; terrigenous material consists of quartz and minor feldspar ranging from silt to coarse-grained sand with trace amounts of muscovite, tourmaline and zircon; quartz is rounded to subangular; yellowish grey to pale yellowish brown (Pl. 57)	
Unit 5	Covered with vegetation	
67-114 (47)		
Unit 4	Rubble and some outcrop of sandstone, quartzose, dolomitic and "glauconitic", parting 1-3 cm; some small-scale cross-lamination with steep inclination	
59-67 (8)	At 67 ft. (95 cm) Pol. sect., thin sect. Sandstone, dolomitic, originally glauconitic; composed of quartz, very fine to coarse grained, poorly	

Height above base of section and thickness (feet)	General lithology Description of selected specimens	Height above base of formation or member (feet)
	sorted, rounded to subrounded and original glauconite, greenish, botryoidal, now replaced by dolomite, cryptocrystalline to microcrystalline; matrix is dolomite, microcrystalline to very finely crystalline; bioturbated; greyish orange speckled with greenish grey. X-ray dolomite: 81; quartz: 19; feldspar: tr	
Unit 3 25-59 (34)	Covered with vegetation	
Unit 2 16-25 (9)	Rubble, probably in place, of dolostone, aphanitic, silty At 25 ft. (1 cm) Thin sect. Dolostone, microcrystalline to very finely crystalline, with small amounts of quartz silt; yellowish grey. X-ray dolomite: 81; quartz: 12; feldspar: 7	
Unit 1 0-16 (16)	Steep slope, covered with vegetation and rubble	
	Base of section: vegetation-covered flats, probably underlain by Precambrian crystalline rocks	

Northern Brodeur Peninsula
(NTS 48C)

UTM co-ordinates

Loc. Tm-68-9: zone 16X; 8162000N; 550600E
Loc. Tm-68-10: zone 16X; 8162300N; 550750E

Notes

The two localities visited, located on the steep, southwest-facing cliffs of the east coast of Brodeur Peninsula form part of the composite reference section of the Baillarge Formation (Trettin, 1969, p. 25-35). At both localities short sections were measured, searched for macrofossils, and sampled for conodont analysis. The base of both sections is formed by the top of the recessive interval that has yielded the Arctic Ordovician assemblage Ic (*see* Fig. 13; and op. cit., Table 1, p. 33-35). That interval may be correlative with the Irene Bay Formation of the Franklinian Geosyncline and, if so, the interval sampled would be correlative with Ordovician parts of the Allen Bay Formation. This assignment is neither proven nor disproven by the present conodont and sparse macrofossil identifications. Essentially identical conodont faunas appear to be present in the uppermost Thumb Mountain Formation, the Irene Bay Formation and the lower Allen Bay Formation (Fauna 12 of Sweet *et al.*, 1971; *see* Barnes, 1974).

Identification of macrofossils by B.S. Norford

GSC loc. C-2810
Field no. Tm-68-10; 62 ft. (18.9 m) above base of section
Grewingkia cf. *G. articum* (Wilson)
age: late Middle or Late Ordovician, possibly late Middle Ordovician

GSC loc. C-2811
Field no. Tm-68-10; 76 ft. (23.1 m) above base of section
indeterminate brachiopod and trilobite
Catenipora sp.
?Plaesiomys sp.
age: late Middle Ordovician to Silurian, probably Ordovician

Identification of conodonts by C.R. Barnes

GSC locs. C-2621 to C-2642 combined
Field no. Tm-68-9; samples collected at 4-ft. (1.2 m) intervals from 12 to 108 ft. (3.7-32.9 m)

The samples were small in amount and yields were correspondingly low; however, all samples produced conodonts and a full faunal list with total numbers of specimens is as follows:

Species (form-taxa)	No. of specimens
Acodus mutatus (Branson and Mehl)	4
A. n. sp.	1
A. sp.	2
Ambalodus triangularis Branson and Mehl	2
Amorphognathus sp.	6
Belodina compressa (Branson and Mehl)	3
B. aff. *B. compressa* (Branson and Mehl)	2
B. dispansa (Glenister)	4
B. grandis (Stauffer)	1
B. cf. *D. inclinata* (Branson and Mehl)	1
B. n. sp.	2
B. sp.	2
Cordylodus robustus Ethington and Furnish	4
C. sp.	2
Cyrtoniodus aff. *C. flexuosus* (Branson and Mehl)	1
C. sp.	1
Drepanodus homocurvatus Lindström	12
D. suberectus (Branson and Mehl)	6
D.? sp.	1
Eobelodina fornicala (Stauffer)	2
Keislognathus simplex Ethington	1
Oistodus inclinatus Branson and Mehl	2
O. venustus Stauffer	4
Ozarkodina tenuis Branson and Mehl	1
Panderodus compressus (Branson and Mehl)	122
P. gracilis (Branson and Mehl)	302
P. panderi (Stauffer)	9
P. sp.	6
Plegagnathus nelsoni Ethington and Furnish	5
Prioniodina furcata (Hinde)	1
Tetraprioniodus parvus Ethington	1
Trichonodella angulata Sweet, Turco, Warner, and Wilkie	1
TOTAL	514

Comments: Barnes states that the fauna does not change appreciably through the 108-foot (33 m) section and that it can be treated as a whole in a discussion of its biostratigraphic position.

The conodont fauna is dominated by panderodids, typical for the Middle and Upper Ordovician of western and northern North America. A minor component from the European province is the natural association of *Amorphognathus*, *Ambalodus triangularis*, *Keislognathus simplex*, and *Tetraprioniodus parvus*. Most of the other species represented range through the Barneveld to Richmond interval of the Ordovician.

Two species have a restricted stratigraphic range. *Cordylodus robustus* and *Plegagnathus nelsoni* have only been reported from Maysvillian and Richmondian strata. Sweet, Ethington, and Barnes have demonstrated that the European elements retreated eastwards during the early Maysvillian and Richmondian. The latest time that European elements are known to be associated with *Plegagnathus nelsoni* is during the late Maysvillian. The total fauna is closely comparable to those described from the Gunn Member of the Stony Mountain Formation of southern Manitoba (Ethington and Furnish, 1960), Shamattawa Limestone of northern Manitoba (Ethington and Furnish, 1959), upper Bighorn Dolomite of Wyoming (Stone and Furnish, 1959) and Allen Bay Formation (?) of Hoved Island, N.W.T. (Weyant, 1968). Collections from Bathurst Island yield a comparable fauna (with *Amorphognathus ordovicicus* and *Plegagnathus nelsoni*) in the uppermost Thumb Mountain Formation and in the Irene Bay Formation of the Cornwallis Group (Barnes, 1974).

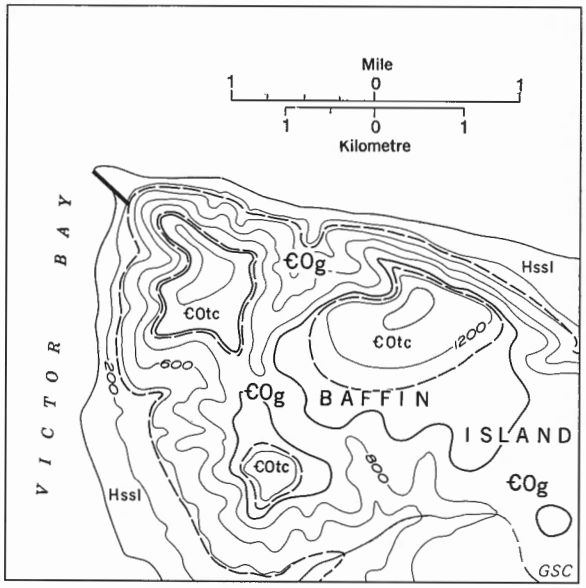

Figure 11. Revised geology, Victor Bay area, northwestern Baffin Island (NTS 48C).

In his original report, Barnes favoured a late Edenian to Maysvillian age assignment. In his latest summary of the conodont biostratigraphy of the Arctic (1974), however, he assigns the present collection to Fauna 12 of Sweet *et al.* (1971), which also characterized the Irene Bay and Allen Bay Formations and ranges in age from mid-Maysvillian throughout the Richmondian. "As the samples were collected from just above beds with abundant representatives of the Arctic Ordovician fauna, the conodont fauna (Fauna 12) could be Richmondian rather than late Maysvillian." The same fauna occurs in the Churchill River Group of the Hudson Platform.

East of Victor Bay, Arctic Bay area
(NTS 48C)

In this region, two stratigraphic sections of the lower Turner Cliffs Formation were sampled, unsuccessfully, for acritarchs. It was noted, however, that an outcrop area of that formation, near the northwestern extremity of the peninsula east of Victor Bay, is not shown on Map 1237A (Blackadar *et al.*, 1968c). A corrected sketch map of the area is included in the present report as Figure 11.

APPENDIX 2

LOG OF AQUITAINE *ET AL.* ROWLEY M-04 WELL

Selected well data

The following data are excerpts from the official completion report by Aquitaine Company of Canada Ltd.

Co-ordinates	Latitude:	69°03'58.48"N
	Longitude:	79°03'48.32"W
Elevations	Ground:	158 ft. (48.1 m)
	K.B.:	165.5 ft. (50.4 m)
Spudded	August 5, 1971	
Drilling completed	August 23, 1971	
Total depth	1,745 ft. (531.9 m)	
Well status	Dry - Well completed by Dept. of Energy, Mines and Resources, Earth Physics Branch as a Temperature Observation well.	
Hole sizes	8-3/4 in. to 105 ft. (32.0 m); 6-1/4 in. to 505 ft. (153.9 m); 3-25/32 in. to 1,745 ft. (531.9 m)	

Lost circulation zones

Depth	Amount of material lost
1,097 ft. (334.4 m)	50 barrels water
1,330 ft. (405.4 m)	Total loss - approx. 100 barrels water

Logs	Depth	Type of log
	0 ft. - 1,745 ft. (0 - 531.9 m)	Gamma Ray
	1,088 ft. - 1,745 ft. (331.6 - 531.9 m)	Electrical

The interval 0 to 505 feet (0-153.9 m) (below surface) is represented by well cuttings, and the interval 505 to 1,745 feet (153.9-531.9 m) by core.

Lithological descriptions and stratigraphic assignments are those of the writer.

Stratigraphic summary

Depth below head of well and thickness (feet)	Unit
0.0 - 450± (450±)	Map-unit OS_{cb}
450± - 1129.7 (679.7±)	Map-unit O_{ls}
1129.7 - 1406.6 (276.9)	Ship Point Formation, member B
1406.6 - 1467.3 (60.7)	Ship Point Formation, member A
1467.3 - 1612.0 (144.7)	Turner Cliffs Formation
1612.0 - 1677.8 (65.8)	Gallery Formation
1677.8 - 1745.0 (67.2)	Aphebian or older biotite gneiss

Explanation of some terms used in core description

Laminated	Thickness of strata is less than 1 cm; includes horizontal, undulating, and very small scale cross-lamination. Term is used only in summary description of well intervals; stratification is characterized more specifically in description of polished slabs.
Massive	Bedding not apparent at scale of polished slab. (Stratigraphic thickness of slab is indicated)
Argillaceous	Rocks are characterized by gamma ray anomalies of about 27 counts per second or more. These anomalies are caused by small amounts of clay and silt-size detrital mica. Comparable surface specimens have not been termed argillaceous because of the relatively low clay content.

For explanation of other terms and representation of X-ray diffraction analyses, *see* Appendix 4.

Footage corresponds to position in core boxes, not on electric log.

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	MAP-UNIT OS_{cb}	
Unit 234	(Well cuttings only)	
0.0 - 450± (450)	Limestone, mainly cryptocrystalline to microcrystalline, and commonly dolomitic, fossiliferous, and pelletal; minor dolostone (about 25%), cryptocrystalline to predominantly microcrystalline, partly calcareous, rarely cherty; trace amounts of sandstone, quartzose and feldspathic, quartz-cemented, very fine grained, in interval 100-110 ft.	450± - 0.0
	Lithological descriptions: Appendix 3, Table 2	
	Fossil collections: *see* Appendix 1, Rowley Island, locality 24	
	Contact relationships uncertain	
	MAP-UNIT O_{1s}	
Unit 233 450±-505.0 (55±)	Dolomitic limestone type 1 (*see* description below); well cuttings only Lithological descriptions: Appendix 3, Table 1, no. 1-6	679.7-624.7
Unit 232 505.0-566.0 (61.0)	Dolomitic limestone type 1 (fossil fragments, mostly of sand grade, supported by cryptocrystalline calcite matrix; microcrystalline dolomite scattered throughout the rock and concentrated in solution zones and burrows; solution zones and stylolites, enriched in argillaceous and carbonaceous matter, common; stratification obliterated by burrowing; burrows common) pale yellowish brown; dolomitic patches very pale orange to greyish orange; very minor amounts of calcareous dolostone, similar to limestone type 1, but containing more than 50% dolomite Lithological descriptions: Appendix 3, Table 1, no. 7-10	624.7-563.7
Unit 231 566.0-602.8 (36.8)	Dolomitic limestone type 1, brown and orange as above, alternating with dolomitic limestone type 1, light olive grey, dolomitic patches pale greenish grey to greenish grey 566.0-582.5 .... olive-green 582.5-587.0 .... brown-orange 587.0-593.0 .... olive-green 593.0-594.0 .... brown-orange 594.0-598.2 .... olive-green 598.2-598.7 .... brown-orange 598.7-600.0 .... olive-green 600.0-600.8 .... brown-orange 600.8-602.2 .... olive-green 602.2-602.8 .... brown-orange	563.7-526.9

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	(Pl. 63)	
	Lithological descriptions: Appendix 3, Table 1, no. 11-12	
	Fossil collections: GSC locs. C-17328 to C-17331	
Unit 230 602.8-792.0 (189.2)	Dolomitic limestone type 1, mainly olive-grey/light greenish grey with shades of brown in some intervals	526.9-337.7
	Lithological descriptions: Appendix 3, Table 1, no. 13-22 (Pls. 33, 34 and 35)	
	Fossil collections: GSC locs. C-17332 to C-17361	
Unit 229 792.0-1050.45 (258.45)	Dolomitic limestone type 1, mainly olive-grey/greenish grey as above with brown-orange beds in intervals:	337.7- 79.25
	792.2-792.8	
	795.6-795.8	
	840.5-842.0	
	872.5-875.0	
	919.0-920.7	
	976.3-976.5	
	(Pl. 62)	
	Lithological descriptions: Appendix 3, Table 1, no. 23-36	
	Fossil collections: GSC locs. C-17362 to C-17382	
Unit 228 1050.45-1051.1 (0.65)	Dolomitic limestone type 2 (calcareous burrow casts in calcareous-argillaceous-dolomitic matrix; casts to 3.5 cm long consist of cryptocrystalline calcite and fairly abundant fossil fragments with minor dolomite; matrix of cryptocrystalline calcite, clay, minor microcrystalline dolomite, and silt-size quartz and muscovite with rare fossil fragments)	79.25- 78.6
	Lithological description: Appendix 3, Table 1, no. 37	
Unit 227 1051.1-1057.8 (6.7)	Dolomitic limestone type 1, olive-grey/greenish grey as above	78.6- 71.9
Unit 226 1057.8-1058.1 (0.3)	Dolomitic limestone type 2; burrow casts more irregular in size and slightly smaller than in unit 228	71.9- 71.6

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 225 1058.1-1078.5 (20.4)	Dolomitic limestone type 1, mainly olive-green as above; concentric, irregular layers and patches of medium light grey to medium dark grey in intervals 1058.2-1060.0 and 1062.4-1062.9; the latter interval is overlain abruptly by rock intermediate in colour between brown-orange and olive-green; contact may represent minor diastem or disconformity	71.6- 51.2
	Lithological descriptions: Appendix 3, Table 1, no. 38-39	
	Fossil collection: GSC loc. C-17383	
Unit 224 1078.5-1078.85 (0.35)	Dolomitic mudstone, greenish grey; very vague horizontal lamination; slightly fissile	51.2- 50.85
	Lithological description: Appendix 3, Table 1, no. 40	
Unit 223 1078.85-1129.7 (50.85)	Dolomitic limestone type 1, mainly olive-green, minor brown-orange and grey as above; impurities of silt and very fine grained sand of quartz more common than in units 224-233; sharp contact at 1123.4 between underlying limestone, light greenish grey, moderately rich in dolomite and poor in fossils and overlying limestone, light olive grey to medium grey, rich in fossils, may represent minor diastem or disconformity	50.85- 0.0
	(Pls. 37, 38 and 61)	
	Lithological descriptions: Appendix 3, Table 1, no. 41-50	
	Fossil collection: GSC loc. C-17384	
	Disconformity	
	SHIP POINT FORMATION	
	Member B	
Unit 222 1129.7-1130.0 (0.3)	Dolostone, aphanitic, massive, bioturbated; large vugs filled with dolomite, silt and sand	337.6-337.3
	At 1129.7-1129.88 ft. Pol. sect., thin sect. Light olive grey, fractured; composed of dolomite, microcrystalline to very finely crystalline with scattered silt and very fine grained sand of quartz and minor feldspar, and trace amounts of muscovite; irregular cavities to 1 x 4 cm filled with: dolomite, microcrystalline to megacrystalline (6 mm); silt and very fine to very coarse grained sand of quartz and minor feldspar, subangular to subrounded; trace amounts of muscovite; and siderite, partly altered to limonite. X-ray dolomite: 80; quartz: 6; feldspar: 5; pyrite: 4; siderite: 3; calcite: 2	
Unit 221 1130.0-1131.2 (1.2)	Dolomitic flat-pebble conglomerate or breccia, bioturbated, with fossil fragments	337.3-336.1
	At 1130.0-1130.27 ft. Pol. sect., thin sect. Light olive grey mottled with medium grey; dolomitized fossil fragments [echinoderms, bryozoans(?), gastropods(?), trilobites(?)] and dolostone fragments to 5 mm in dolomitic matrix; rock is strongly bioturbated and slightly vuggy; composed mainly of dolomite, microcrystalline to finely crystalline with minor silt and very fine grained sand of quartz and feldspar. X-ray dolomite: 84; quartz: 8; feldspar: 5; pyrite: 3	

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 220 1131.2-1135.0 (3.8)	Dolostone, aphanitic, in part slightly argillaceous, massive; bioturbated; fissures filled with calcite, dolomite, silt and sand At 1133.3-1133.85 ft. Pol. sect., thin sect. Pale yellowish brown; original stratification probably destroyed by bioturbation but burrows indistinct; dolostone composed mainly of dolomite, microcrystalline to very finely crystalline with scattered silt and very fine grained sand of quartz and minor feldspar and trace amounts of muscovite; undulating, discontinuous, slightly argillaceous stringers may represent minor solution zones; some pyrite; irregular fissures filled with calcite (in part ferroan), dolomite, and silt to coarse grained sand of quartz and feldspar. X-ray dolomite: 86; quartz: 8; feldspar: 4; calcite: 2	336.1-332.3
Unit 219 1135.0-1135.9 (0.9)	Dolomitic flat-pebble conglomerate or breccia, slightly bioturbated; fragments to 1.4 cm; open vugs to about 1 mm; pyrite common	332.3-331.4
Unit 218 1135.9-1138.8 (2.9)	Dolostone, aphanitic, slightly argillaceous, laminated, moderately bioturbated At 1135.9-1136.0 ft. Pol. sect. Light olive grey to greenish grey; lamination horizontal, in part very thin; disturbed by burrows; pyrite common	331.4-328.5
Unit 217 1138.8-1139.8 (1.0)	Dolomitic flat-pebble conglomerate or breccia, slightly argillaceous, bioturbated; fragments to 3.5 cm; some open vugs; pyrite common	328.5-327.5
Unit 216 1139.8-1140.45 (0.65)	Dolostone, aphanitic, slightly argillaceous, laminated, weakly to moderately bioturbated	327.5-326.85
Unit 215 1040.45-1141.55 (1.1)	Dolomitic flat-pebble conglomerate or breccia, slightly argillaceous, bioturbated, with trilobite(?) fragments Fossil collection: GSC loc. C-23082	326.85-325.75
Unit 214 1141.55-1144.8 (3.25)	Dolostone, aphanitic, slightly argillaceous, moderately to strongly bioturbated	325.75-322.5
Unit 213 1144.8-1146.2 (1.4)	Dolomitic flat-pebble conglomerate or breccia, slightly argillaceous, bioturbated, with fragments of trilobites(?), brachiopods(?), echinoderms(?), etc.; vugs to 5 mm are crystal molds Fossil collection: GSC loc. C-23083	322.5-321.1
Unit 212 1146.2-1147.2 (1.0)	Dolostone, aphanitic, slightly argillaceous, laminated, moderately to strongly bioturbated At 1147.0-1147.2 ft. Thin sect. Dolomite is mainly microcrystalline; small amounts of silt and very fine grained sand of quartz and minor feldspar	321.1-320.1

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 211 1147.2-1148.6 (1.4)	Dolostone, aphanitic, slightly argillaceous, laminated, with interbedded dolomitic flat-pebble conglomerate or breccia and fossil fragments including trilobites(?), echinoderm columnals(?), coral(?); lithic fragments to about 1 cm; unit is strongly bioturbated and slightly argillaceous	320.1-318.7
Unit 210 1148.6-1149.2 (0.6)	Dolostone, aphanitic, slightly argillaceous, strongly bioturbated Fossil collection: GSC loc. C-23084	318.7-318.1
Unit 209 1149.2-1149.8 (0.6)	Dolomitic flat-pebble conglomerate or breccia, bioturbated, with poorly preserved fragments of ostracodes(?), echinoderms(?), etc.; lithic clasts to 2.2 cm; open vugs to 3 mm	318.1-317.5
Unit 208 1149.8-1150.0 (0.2)	Dolostone, aphanitic, slightly argillaceous, laminated, weakly bioturbated	317.5-317.3
Unit 207 1150.0-1150.2 (0.2)	Dolostone, fragmental, bioturbated At 1150.0-1150.15 ft. Pol. sect. Medium grey; dolostone fragments to 1.5 cm, coated grains, and fossil fragments(?) in matrix of microcrystalline dolomite; horizontal and vertical burrows; pyrite fairly common	317.3-317.1
Unit 206 1150.2-1150.9 (0.7)	Dolostone, aphanitic, laminated, somewhat brecciated; vertical burrows to 2 cm deep; open vugs to 1 x 4 mm	317.1-316.4
Unit 205 1150.9-1153.9 (3.0)	Dolostone, aphanitic, in part slightly argillaceous, laminated, moderately to strongly bioturbated; minor dolomitic breccia	316.4-313.4
Unit 204 1153.9-1154.4 (0.5)	Dolomitic flat-pebble conglomerate or breccia, bioturbated, with fossil fragments At 1154.15-1154.2 ft. Thin sect. Fragments of dolostone to 6 mm, in part thinly laminated, microcrystalline, and dolomitized fossil fragments [bryozoans(?), ostracodes(?)] in matrix of dolomite, cryptocrystalline to finely crystalline with scattered silt to very fine grained sand of quartz and minor feldspar; probably bioturbated but burrows indistinct. X-ray dolomite: 94; quartz: 4; feldspar: 1; calcite: 1; "illite": tr	313.4-312.9
Unit 203 1154.4-1154.75 (0.35)	Dolostone, aphanitic, laminated, strongly bioturbated, in part brecciated; may include some pyritized fossil fragments	312.9-312.55

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 202 1154.75-1155.0 (0.25)	Dolomitic flat-pebble conglomerate, bioturbated, with fossil fragments At 1154.8-1154.9 ft. Pol. sect. Light olive grey and medium light grey; flat pebbles of dolostone to 3.5+ cm and dolomitized fossil fragments (bryozoans, trilobites, etc.) in microcrystalline dolomitic matrix; appears bioturbated but burrows indistinct; pyrite relatively common	312.55-312.3
Unit 201 1155.0-1157.2 (2.2)	Dolostone, aphanitic, in part slightly argillaceous, laminated, moderately to strongly bioturbated; minor dolomitic flat-pebble conglomerate or breccia with fossil fragments, coated grains, etc.; open vugs to 4 x 10 mm At 1155.0-1155.3 ft. Pol. sect., thin sect. Dolostone, laminated: light olive grey; lamination horizontal and slightly undulating; composed of dolomite, cryptocrystalline to very finely crystalline with very minor amounts of scattered silt and very fine grained sand mainly of quartz; burrows inclined to vertical; burrows and mudcracks filled with dolostone, fragmental; minor vugs lined with pyrite; dolostone fragmental: medium grey to yellowish grey; dolomitized shell fragments, fragments of dolostone, aphanitic, coated grains, silt, and very fine grained sand (mainly quartz) in matrix of dolomite, cryptocrystalline to very finely crystalline. X-ray dolomite: 95; quartz: 3; feldspar: 2	312.3-310.1
Unit 200 1157.2-1179.0 (21.8)	Dolostone, aphanitic, in part silty and slightly argillaceous, laminated; lower part (to about 1162 ft.) weakly to moderately bioturbated; brecciation in intervals 1169.7-1170.2 and 1173.65-1173.75 At 1160.6-1160.75 ft. Pol. sect., thin sect. Dolostone, silty, greenish grey to medium bluish grey; vague, discontinuous lamination is mainly horizontal, partly disturbed by burrows; composed mainly of dolomite, cryptocrystalline to very finely crystalline, with considerable silt to very fine grained sand of quartz and minor feldspar, and small amounts of muscovite; pyrite relatively common. X-ray dolomite: 73; quartz: 14; feldspar: 5; calcite: 3; "illite": 3; chlorite: 1; pyrite: 1 At 1170.85-1171.05 ft. Pol. sect. Laminae of dolostone, pure to slightly argillaceous, alternate with laminae of dolostone, silty, yellowish grey; lamination mainly horizontal with shallow undulations and some lenticular stratification, some laminae rich in pyrite At 1175.0-1175.4 ft. Pol. sect. Dolostone, light olive grey, slightly argillaceous; vague horizontal lamination; medium grey discolouration seems to outline "folds" with horizontal axial planes and minor imbricate thrusts; "folds" do not represent bedding but may represent zones of reduction and/or solution controlled by curved zones of dilatation developed during (nearly horizontal) sediment movement (Pl. 60)	310.1-288.3

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 199 1179.0-1181.1 (2.1)	Dolostone, aphanitic, in part silty, sandy, and slightly argillaceous, interlaminated with sandstone, dolomitic At 1180.0-1180.5 ft. Pol. sect., thin sect. Lamination mainly horizontal with some undulation, low-angle planar crossbedding, and lenticular bedding; dolostone: light olive grey; composed mainly of dolomite, microcrystalline with scattered silt and very fine grained sand of quartz and minor feldspar; rhythmic vertical variations in concentration of carbonaceous and (?)argillaceous matter; silty to sandy dolostone and dolomitic sandstone: pale yellowish brown; contain quartz, feldspar, green biotite and muscovite; sandstone is very fine grained, well sorted, in part graded; quartz and feldspar subrounded (Pl. 59). X-ray dolomite: 52; quartz: 32; feldspar: 13; calcite: 3; siderite(?): tr	288.3-286.2
Unit 198 1181.1-1182.5 (1.4)	Dolostone, aphanitic, slightly argillaceous, laminated	286.2-284.8
Unit 197 1182.5-1183.5 (1.0)	Dolostone, aphanitic, in part slightly argillaceous, laminated, in part brecciated; some solution zones	284.8-283.8
Unit 196 1183.5-1196.0 (12.5)	Dolostone, aphanitic, in part silty and slightly argillaceous; minor siltstone, dolomitic; both laminated At 1185.0-1185.25 ft. Pol. sect. Mainly dolostone, light olive grey, with minor laminae and lenses of silty dolostone and siltstone, dolomitic; lamination mainly horizontal with some undulations, crossbedding (sets of cross-laminae 1-2 mm; concave up) and lenticular bedding; some stylolites; some brecciation At 1195.8-1196.2 ft. Pol. sect. Dolostone, light olive grey to yellowish grey; lamination mainly horizontal with shallow undulations; some brecciation; a few burrows	283.8-271.3
Unit 195 1196.0-1198.2 (2.2)	Dolostone, aphanitic, laminated, in part moderately to strongly bioturbated At 1197.85-1198.2 ft. Pol. sect. Stratification totally destroyed by burrowing; burrows very light grey, vague, probably mainly horizontal, comprise about 90% of rock; interstices medium light grey, rich in pyrite; dolomite is mainly microcrystalline	271.3-269.1
Unit 194 1198.2-1199.55 (1.35)	Dolostone, aphanitic, laminated; some minor open vugs	269.1-267.75
Unit 193 1199.55-1200.0 (0.45)	Dolomitic flat-pebble conglomerate with clasts to 3.5 cm; minor dolostone, aphanitic, bioturbated; burrows mainly horizontal	267.75-267.3

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 192 1200.0-1207.05 (7.05)	Mainly dolostone, aphanitic, minor siltstone, dolomitic; both laminated At 1200.0-1200.7 ft. Pol. sect. Dolostone is light olive grey, dolomitic siltstone yellowish grey; lamination mainly horizontal with minor lenticular and cross-stratification; sets of cross-laminae 2-3 mm; some burrows; mainly horizontal and flattened by compaction (1-2 x 4-10 mm); stylolite. (Pl. 58)	267.3-260.25
Unit 191 1207.05-1207.2 (0.15)	Dolomitic flat-pebble conglomerate; clasts to 6+ cm	260.25-260.1
Unit 190 1207.2-1211.45 (4.25)	Dolostone, aphanitic, moderately to strongly bioturbated with some lamination preserved	260.1-255.85
Unit 189 1211.45-1212.0 (0.55)	Dolostone, aphanitic, in part silty, with flat pebbles to 5 mm, laminated, weakly to moderately bioturbated; solution zone at top	255.85-255.3
Unit 188 1212.0-1220.65 (8.65)	Dolostone, aphanitic, in part slightly argillaceous, laminated, in part weakly to moderately bioturbated; a little dolomitic breccia At 1215.0-1215.45 ft. Pol. sect. Light grey; in part massive with very vague to distinct burrows; in part laminated; lamination mainly horizontal with discontinuous undulations; a few lenses and laminae of silty dolostone; pyrite relatively common	255.3-246.65
Unit 187 1220.65-1220.75 (0.1)	Dolomitic breccia, disturbed; fragments to about 2 cm	246.65-246.55
Unit 186 1220.75-1235.45 (14.7)	Dolostone, aphanitic, in part slightly argillaceous, laminated, in part weakly to moderately bioturbated; very minor flat-pebble conglomerate or breccia At 1233.0-1233.4 ft. Pol. sect. Dolostone, light olive grey with horizontal and undulating lamination; solution(?) contact with dolostone, light olive grey to yellowish grey, massive, with irregular, branching burrows; pyrite relatively common. (Pl. 57)	246.55-231.85
Unit 185 1235.45-1235.95 (0.5)	Dolostone, aphanitic, laminated, weakly bioturbated, with three minor flat-pebble conglomerate beds, 0.5-1 cm thick; clasts to 5 cm	231.85-231.35
Unit 184 1235.95-1238.6 (2.65)	Dolostone, aphanitic, laminated; strongly bioturbated in lower part, weakly in upper part; argillaceous solution zones in upper part	231.35-228.7

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 183	Dolomitic flat-pebble conglomerate, bioturbated	228.7-228.45
1238.6-1238.85 (0.25)	At 1238.6-1238.85 ft. Pol. sect. Flat pebbles are yellowish brown with darker rims, irregular in size and shape, to 25 mm long; horizontal to steeply inclined; matrix yellowish grey, mainly aphanitic, but coarser textured in disturbed areas; burrows, horizontal and vertical, common, diameters about 1 mm; some minor open vugs; some pyrite; abrupt upper contact may represent minor disconformity. (Pl. 56)	
Unit 182 1238.85-1252.05 (13.2)	Dolostone, aphanitic, in part slightly argillaceous, laminated, weakly to strongly bioturbated; more than six minor units of dolomitic flat-pebble conglomerate, each less than 3 cm thick; clasts to about 8 mm; some solution zones At 1238.85-1240.0 ft. Pol. sect. Dolostone, light olive grey; bedding destroyed by bioturbation; burrows horizontal, inclined, vertical, branching; diameters 1-2 mm, length to 6 mm; open vug 2 x 2 mm; some pyrite At 1246.5-1246.6 ft. Pol. sect. Dolomitic flat-pebble conglomerate; fragments greyish brown with darker rims; irregular in shape and size, to 8 mm long, aphanitic; matrix yellowish grey, slightly coarser in texture, with minor open vugs; some pyrite At 1246.6-1246.8 ft. Pol. sect., thin sect. Dolostone, light olive grey; strongly disturbed by mainly horizontal burrows with some relict horizontal lamination; very thin, undulating, argillaceous laminae pass laterally into solution zones; dolomite is mainly microcrystalline but ranges to medium crystalline in disturbed areas. X-ray quartz: 1; feldspar: tr; dolomite: 99 At 1251.8-1252.05 ft. Pol. sect. Dolostone, light olive grey to pale yellowish brown; stratification mostly destroyed, apparently by burrowing but burrows vague; very thin, discontinuous, undulating, argillaceous lamination; dolomite is mainly aphanitic but finely crystalline and vuggy in disturbed areas; open vugs to 2 mm; clasts to 5 mm in upper part; some pyrite; abrupt internal contacts may represent minor disconformities. (Pl. 55)	228.45-215.25
Unit 181	Dolomitic flat-pebble conglomerate	215.25-214.95
1252.05-1252.35 (0.3)	At 1252.05-1252.35 ft. Pol. sect. Clasts of dolostone, aphanitic to finely crystalline, moderate yellowish brown with greyish brown (darker) rims; rounded; from less than 1 mm to 2.5 cm long; horizontal to moderately inclined; matrix yellowish grey, mostly aphanitic; some pyrite	
Unit 180 1252.35-1254.5 (2.15)	Dolostone, aphanitic, laminated, weakly bioturbated; some solution zones	214.95-212.8
Unit 179 1254.5-1254.7 (0.2)	Dolomitic flat-pebble conglomerate; clasts to 1.5 cm; some open vugs	212.8-212.6

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 178 1254.7-1254.75 (0.05)	Dolostone, aphanitic, laminated	212.6-212.55
Unit 177 1254.75-1255.0 (0.25)	Dolomitic flat-pebble conglomerate; clasts to 3 cm	212.55-212.3
Unit 176 1255.0-1259.55 (4.55)	Dolostone, aphanitic, in part silty, laminated, weakly to moderately bioturbated, with two units of dolomitic flat-pebble conglomerate, 1-2.5 cm thick; clasts less than 2 cm long; lower unit fills depression 2 cm deep; solution zones enriched in carbonaceous matter At 1256.3-1257.15 ft. Pol. sect. Dolostone, aphanitic, partly silty, light olive grey; lamination mainly horizontal with some undulating and lenticular bedding; pyrite relatively common. At 1259.4-1259.45 ft. Pol. sect. Dolostone, aphanitic, light olive grey; horizontal lamination rather vague; slightly argillaceous lamina thins laterally from 6 to 1.5 mm (solution); some pyrite	212.3-207.75
Unit 175 1259.55-1259.8 (0.25)	Dolomitic flat-pebble conglomerate with abrupt lower contact At 1259.55-1259.7 ft. Pol. sect. Clasts light olive grey with greyish to dusky brown rims, aphanitic, 1-35 mm long, horizontal to moderately inclined; matrix yellowish grey, mostly aphanitic with minor open vugs; some pyrite	207.75-207.5
Unit 174 1259.8-1259.95 (0.15)	Dolostone, aphanitic, in part vaguely laminated	207.5-207.35
Unit 173 1259.95-1260.0 (0.05)	Dolomitic flat-pebble conglomerate; clasts to 2 cm	207.35-207.3
Unit 172 1260.0-1269.0 (9.0)	Dolostone, mainly aphanitic, in part silty, very fine grained sandy, and argillaceous, laminated, moderately to strongly bioturbated; minor bioclastic layers and(?) domal stromatolites; some solution zones At 1262.35-1262.55 ft. Pol. sect. Dolostone, light olive grey, generally aphanitic but up to finely crystalline in disturbed areas; undulating lamination disturbed by burrows; burrows vague, mainly horizontal, about 1-2 mm in diameter; slightly argillaceous layer thins laterally from 5 to 1 mm (solution) At 1265.7-1266.1 ft. Pol. sect. Dolostone, light olive grey to pale yellowish brown; discontinuous, nonparallel, undulating lamination strongly disturbed by burrows and soft-sediment deformation; it is marked by concentrations of dark (carbonaceous and/or argillaceous) matter; thin bioclastic layers include trilobites, ostracodes(?), echinoderm columnals, coated grains, in part silicified; rock is mainly aphanitic but ranges to finely crystalline	207.3-198.3

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	At 1267.2-1267.5 ft. Pol. sect., thin sect. Dolostone, microcrystalline, in part slightly argillaceous, light olive grey, interbedded with dolostone, microcrystalline to finely crystalline, pale yellowish brown; lamination mainly horizontal with some undulations and mud cracks(?); horizontal and vertical burrows, diameters 1-3 mm; open vug 5 x 10 mm. (Pl. 54)	
	X-ray dolomite: 97; quartz: 2; feldspar: 1	
	At 1268.2-1268.35 ft. Pol. sect. Dolostone, aphanitic to finely crystalline, in part silty and very fine grained sandy, alternatingly light olive grey, pale yellowish brown, and light brown; horizontal and cross-lamination; sets of cross-laminae to 5 mm, cosets to 23 mm; stylolites; open vug 1.5 mm	
Unit 171	Dolomitic flat-pebble conglomerate	198.3-196.85
1269.0-1270.45 (1.45)	At 1269.5-1269.9 ft. Pol. sect. Flat pebbles of dolostone, aphanitic, coloured in shades of brown and orange with darker rims, ranging from less than 1 mm to 4.5 cm, horizontal to moderately inclined; matrix light brown to pale yellowish brown, aphanitic with scattered open vugs to 3 mm; minor solution zones	
Unit 170	Dolostone, aphanitic, laminated with common slightly inclined cross-lamination, weakly to moderately bioturbated; some solution zones	196.85-194.25
1270.45-1273.05 (2.6)	At 1272.5-1272.7 ft. Pol. sect. Dolostone, aphanitic, alternatingly moderate brown, pale yellowish brown, and olive-grey, lamination mainly horizontal with shallow undulations and slightly to moderately inclined crossbedding; sets of cross-laminae to 5 mm; cosets to 2 cm; burrows 1-2 mm in diameter, horizontal, inclined, vertical	
Unit 169	Dolostone, aphanitic, laminated, weakly to moderately bioturbated; minor solution zones common; minor flat-pebble conglomerates,	194.25-193.65
1273.05-1273.65 (0.6)	0.5-1.5 cm thick; clasts to 1 cm	
Unit 168	Dolomitic flat-pebble conglomerate; clasts to 6.5+ cm	193.65-192.3
1273.65-1275.0 (1.35)		
Unit 167	Dolostone, mainly aphanitic, laminated, weakly to moderately bioturbated with one flat-pebble conglomerate, 3 cm thick; clasts to	192.3-191.0
1275.0-1276.3 (1.3)	8 mm	
Unit 166	Mainly dolomitic flat-pebble conglomerate; clasts to 2.5 cm; minor dolostone, aphanitic, laminated, weakly bioturbated	191.0-190.35
1276.3-1276.95 (0.65)		
Unit 165	Dolostone, aphanitic, laminated, weakly bioturbated	190.35-190.1
1276.95-1277.2 (0.25)		

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 164 1277.2-1279.35 (2.15)	Mainly dolomitic flat-pebble conglomerate and breccia; fragments to 4.5 cm; minor dolostone, aphanitic, laminated; domal stromatolite, 7 mm high, 1.5 cm in diameter, developed on flat-pebble conglomerate; stylolites common in upper part of unit	190.1-187.95
Unit 163 1279.35-1279.65 (0.3)	Dolostone, aphanitic, laminated	187.95-187.65
Unit 162 1279.65-1280.0 (0.35)	Dolomitic flat-pebble conglomerate; clasts to 3.5 cm; some open vugs	187.65-187.3
Unit 161 1280.0-1293.7 (13.7)	Dolostone, aphanitic, in part silty, very fine grained sandy and slightly argillaceous, laminated, weakly bioturbated; solution zones common; minor flat-pebble conglomerate, dolomitic, silty, and sandy; thrombolites and branching columnar stromatolites in interval 1289.0-1290.2 At 1286.4-1286.8 ft. Pol. sect. Dolostone, aphanitic, light olive grey; distinct to vague lamination is horizontal and slightly undulating; a few horizontal laminae rich in silt and very fine grained sand; horizontal burrows flattened by compaction (e.g. diameter 1 mm, length 20 mm); a few flat pebbles, to 5 mm long; some pyrite At 1291.3-1291.6 ft. Pol. sect. Dolostone, aphanitic, light olive grey to olive grey; lamination horizontal and undulating; three units of flat-pebble conglomerate, 0.3-1.2 cm thick, brownish with erosional basal contact; clasts to 6 mm, horizontal to slightly inclined At 1293.45-1293.75 ft. Pol. sect. Dolostone, aphanitic, in part silty and sandy, light olive grey, horizontally laminated; minor dolostone, silty and sandy, and dolomitic sandstone, very fine grained; generally horizontally laminated, but cross-laminated in troughs to 5 mm deep; minor intraformational conglomerate, nearly *in situ*, 3 mm thick; clasts to 6 mm	187.3-173.6
Unit 160 1293.7-1294.25 (0.55)	Dolostone, aphanitic, slightly argillaceous and in part silty and sandy, and dolomitic flat-pebble conglomerate, minor dolomitic siltstone and very fine grained sandstone; horizontal and slightly inclined cross-lamination; some shallow troughs	173.6-173.05
Unit 159 1294.25-1295.7 (1.45)	Dolostone, aphanitic, slightly argillaceous and in part silty, laminated; lamination mainly horizontal with troughs to 6 mm deep	173.05-171.6
Unit 158 1295.7-1296.15 (0.45)	Dolomitic flat-pebble conglomerate; clasts to 4 cm; and dolostone, aphanitic, in part slightly argillaceous, laminated; solution zones	171.6-171.15
Unit 157 1296.15-1297.2 (1.05)	Dolostone, aphanitic, slightly silty, sandy, and argillaceous, laminated	171.15-170.1

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 156 1297.2-1297.3 (0.1)	Dolomitic flat-pebble conglomerate; clasts to 2 cm	170.1-170.0
Unit 155 1297.3-1300.65 (3.35)	Dolostone, aphanitic, in part silty, sandy, and slightly argillaceous, laminated; solution zone at 1300.2 enriched in argillaceous matter; minor dolomitic siltstone and very fine grained sandstone At 1299.8-1300.0 ft. Pol. sect. Dolostone, aphanitic, light olive grey; lamination mainly horizontal; dolostone silty and sandy, and dolomitic siltstone; horizontal and slightly inclined cross-lamination; units are partly lenticular	170.0-166.65
Unit 154 1300.65-1300.75 (0.1)	Dolomitic flat-pebble conglomerate; clasts to 2 cm	166.65-166.55
Unit 153 1300.75-1301.3 (0.55)	Dolostone, aphanitic, laminated, weakly bioturbated	166.55-166.0
Unit 152 1301.3-1301.7 (0.4)	Dolostone, aphanitic, silty to sandy; minor dolomitic sandstone, very fine grained; highly bioturbated unit At 1301.3-1301.6 ft. Pol. sect. Burrows filled with dolomite, aphanitic, pale orange comprise about 90% of rock; vertical, inclined, horizontal, branching; outlines rounded, in part vague; interstitial dolomite is light olive grey to medium grey; laminae of sandstone deformed by burrows	166.0-165.6
Unit 151 1301.7-1303.6 (1.9)	Dolostone, aphanitic, silty, very fine grained sandy, and slightly argillaceous, horizontally laminated with some cross-lamination and diapiric structures	165.6-163.7
Unit 150 1303.6-1306.1 (2.5)	Dolostone, aphanitic, in part silty and very fine grained sandy; minor dolomitic siltstone and sandstone; all laminated, weakly bioturbated; unit is fractured, faulted, and contorted; normal fault at 1304 has 1.5 cm dip-slip; contortion strongest from 1304.5-1305.0 where fragments are vertical; fractures partly filled with calcite but numerous vugs remain open	163.7-161.2
Unit 149 1306.1-1306.65 (0.55)	Dolomitic flat-pebble conglomerate, silty and very fine grained sandy At 1306.1-1306.65 ft. Pol. sect. Clasts pale yellowish brown with darker rims, to 4 cm long, horizontal to moderately inclined; matrix yellowish grey; matrix and clasts consist both mainly of dolostone, aphanitic, silty and very fine grained sandy, with minor dolomitic siltstone and sandstone. (Pl. 53)	161.2-160.65
Unit 148 1306.65-1307.2 (0.55)	Dolostone, aphanitic, in part silty and very fine grained sandy, laminated; some brecciation	160.65-160.1

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 147 1307.2-1307.4 (0.2)	Dolostone, aphanitic, silty, laminated, brecciated	160.1-159.9
Unit 146 1307.4-1309.4 (2.0)	Dolostone, aphanitic, highly calcareous, light olive grey, laminated	159.9-157.9
Unit 145 1309.4-1310.0 (0.6)	Limestone, aphanitic, slightly dolomitic, pale yellowish brown; stylolites common	157.9-157.3
Unit 144 1310.0-1317.5 (7.5)	Dolostone, aphanitic, in part silty, laminated; bioturbation and solution zones rare At 1315.0-1315.3 ft. Pol. sect. Mainly light olive grey; distinct horizontal lamination, regular	157.3-149.8
Unit 143 1317.5-1318.15 (0.65)	Dolostone, aphanitic; discontinuous, crinkled lamination may represent algal mat; numerous open vugs, to 1 mm, are crystal molds	149.8-149.15
Unit 142 1318.15-1322.05 (3.9)	Dolostone, aphanitic, in part silty and slightly argillaceous; horizontal and cross-lamination; diapirs and other soft-sediment deformations in interval 1319.5-1320; mud cracks at top of unit, burrows below	149.15-145.25
Unit 141 1322.05-1322.25 (0.2)	Dolomitic flat-pebble conglomerate and breccia; fragments to 3.2 cm	145.25-145.05
Unit 140 1322.25-1325.0 (2.75)	Dolostone, aphanitic, in part silty and slightly argillaceous; minor siltstone, dolomitic; lamination mainly horizontal with some slightly inclined crossbedding; some bioturbation from 1322.5-1322.9	145.05-142.3
Unit 139 1325.0-1325.5 (0.5)	Breccia of dolostone and dolomitic siltstone with matrix of dolomitic siltstone; fragments contorted, probably owing to desiccation; open vug 1 x 1.5 cm; minor vugs common	142.3-141.8
Unit 138 1325.5-1328.95 (3.45)	Dolostone, aphanitic, in part silty and slightly argillaceous, laminated; some dolomitic breccias, about 1 cm thick At 1325.5-1325.75 ft. Pol. sect. Dolostone, aphanitic, light olive grey to light grey; lamination horizontal and slightly undulating, generally vague and partly discontinuous; open vug 1 mm; fractures, partly filled with dolomite and calcite.	141.8-138.35
Unit 137 1328.95-1329.3 (0.35)	Dolostone, aphanitic, in part silty to fine grained sandy, and slightly argillaceous, laminated and partly brecciated; minor dolomitic flat-pebble conglomerate; clasts to 2 cm; strongly bioturbated unit; pyrite relatively common	138.35-138.0

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 136 1329.3-1333.3 (4.0)	Dolostone, aphanitic, in part silty, and slightly argillaceous, minor dolomitic siltstone; unit is laminated, in part moderately to strongly bioturbated At 1332.7-1333.1 ft. Pol. sect. Mainly dolostone, aphanitic, minor dolomitic siltstone, light grey; burrow casts comprise about 90% of rock; about 1 mm in diameter, vague in outline, horizontal to moderately inclined; interstitial areas somewhat darker, rich in pyrite; some horizontal lamination preserved	138.0-134.0
Unit 135 1333.3-1334.1 (0.8)	Dolostone, aphanitic, slightly argillaceous, in part silty, laminated; minor dolomitic flat-pebble conglomerate; unit is moderately to strongly bioturbated	134.0-133.2
Unit 134 1334.1-1334.55 (0.45)	Flat-pebble conglomerate, dolomitic, silty, and very fine grained sandy; minor dolostone, aphanitic, silty and sandy, and dolomitic siltstone and very fine grained sandstone; unit is slightly argillaceous; truncated by minor disconformity At 1334.0-1334.6 ft. Pol. sect. Flat pebbles and matrix both consist of dolostone, aphanitic to finely crystalline, in part silty and sandy and dolomitic siltstone and very fine grained sandstone; flat pebbles from less than 1 mm to 3.5 cm long, horizontal to moderately inclined, olive-grey to medium light grey with darker rims. (Pl. 52)	133.2-132.75
Unit 133 1334.55-1337.3 (2.75)	Dolostone, aphanitic, in part slightly argillaceous, laminated, in part moderately to strongly bioturbated	132.75-130.0
Unit 132 1337.3-1337.5 (0.2)	Dolomitic flat-pebble conglomerate; clasts to 3.5 cm	130.0-129.8
Unit 131 1337.5-1338.4 (0.9)	Dolostone, aphanitic, slightly argillaceous and in part silty and sandy, laminated; minor dolomitic siltstone and very fine grained sandstone, laminated; channel 2 cm deep, and some flat-pebble conglomerate at 1338.1-1338.2; unit is weakly bioturbated	129.8-128.9
Unit 130 1338.4-1338.65 (0.25)	Flat-pebble conglomerate and breccia of dolostone, aphanitic, in part silty and sandy, and of dolomitic siltstone and very fine to medium-grained sandstone; unit is weakly bioturbated	128.9-128.65
Unit 129 1338.65-1340.2 (1.55)	Dolostone, aphanitic, in part silty, sandy, and slightly argillaceous with some solution zones; minor dolomitic sandstone, fine- to coarse-grained, flat-pebble conglomerate, and breccia; fragments and clasts to 2 cm; stratification mostly destroyed by burrowing At 1338.7-1339.1 ft. Pol. sect. Dolostone, aphanitic, in part silty and sandy, light olive grey, interbedded with dolomitic sandstone, medium to coarse grained, pale brown, poorly sorted; sandy laminae 5-25 mm thick, highly bioturbated; burrows abundant, horizontal and vertical, mostly 1-2 mm in diameter; pyrite fairly common; vugs to 1 mm; solution zones. (Pl. 51)	128.65-127.1

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 128	Dolostone, aphanitic, in part slightly argillaceous, bioturbated	127.1-124.9
1340.2-1342.4 (2.2)	At 1341.0-1341.4 ft. Pol. sect. Burrow casts, light grey, vague, mainly horizontal, form about 95% of rock; interstitial matter medium grey, rich in pyrite. (Pl. 50)	
Unit 127	Dolostone, aphanitic, slightly argillaceous and in part silty and sandy; and dolomitic siltstone and sandstone, very fine to very coarse grained; minor flat-pebble conglomerate; clasts to 1.5 cm; unit is laminated (including some cross-lamination), partly brecciated, and weakly bioturbated	124.9-123.4
1342.4-1343.9 (1.5)		
Unit 126	Dolostone, aphanitic, silty, sandy, and slightly argillaceous; minor dolomitic sandstone, brecciated, highly bioturbated	123.4-122.9
1343.9-1344.4 (0.5)	At 1342.8-1342.85 ft. Thin sect. Dolomite is predominantly microcrystalline; terrigenous fraction comprises mainly quartz, minor feldspar, and trace amounts of muscovite and green biotite; quartz is bimodal, very fine grained and medium to very coarse grained, subrounded to subangular. X-ray dolomite: 70; quartz: 20; feldspar: 8; calcite: 2	
	At 1344.0 X-ray dolomite: 51; quartz: 38; feldspar: 9; calcite: 2; "illite": tr; siderite(?): tr	
Unit 125	Dolostone, aphanitic, slightly argillaceous, laminated, weakly to moderately bioturbated	122.9-122.3
1344.4-1345.0 (0.6)		
Unit 124	Dolostone, aphanitic, slightly argillaceous and in part silty, and siltstone, dolomitic with lens of sandstone, dolomitic, coarse grained; horizontally laminated, in part brecciated, moderately bioturbated; open vugs to 1 x 1 cm	122.3-120.6
1345.0-1346.7 (1.7)		
Unit 123	Dolostone, aphanitic, sandy and sandstone, dolomitic, mainly coarse to very coarse grained, mostly bioturbated with some horizontal lamination preserved; open vugs to 1 cm are partly molds of bladed (evaporitic?) mineral	120.6-119.35
1346.7-1347.95 (1.25)		
Unit 122	Dolostone, aphanitic, and in part slightly argillaceous, partly laminated, partly bioturbated and brecciated; flat pebbles to 1.5 cm and dolomitized gastropod shells(?); open vugs to 1.2 cm	119.35-117.65
1347.95-1349.65 (1.7)		
Unit 121	Dolostone, aphanitic, silty, sandy, and argillaceous, and sandstone, dolomitic; unit is laminated and partly brecciated; sand ranges from very fine to coarse grained and is (at least in part) bimodal. (Pl. 49)	117.65-116.35
1349.65-1350.95 (1.3)		
Unit 120	Dolostone, aphanitic to finely crystalline, in part slightly argillaceous with flat pebbles and gastropod fragments; mostly bioturbated with some horizontal lamination preserved; laminae and solution zones in upper part enriched in argillaceous and carbonaceous matter; some brecciation; vugs to 4 mm	116.35-113.3
1350.95-1354.0 (3.05)		
	Fossil collections: GSC locs. C-18107, C-18108	

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 119 1354.0-1354.7 (0.7)	Dolostone, aphanitic, in part silty, and siltstone, dolomitic; both laminated, moderately bioturbated; lamination mainly horizontal with some undulation and slightly inclined cross-lamination; vertical pipes to 4 cm deep, 3 mm in diameter may be diagenetic features. (Pl. 48)	113.3-112.6
Unit 118 1354.7-1356.25 (1.55)	Dolostone, mostly aphanitic, in part slightly argillaceous with some dolomitized gastropod shells; brecciated, moderately to strongly bioturbated; open vugs to 1.5 cm Fossil collection: GSC loc. C-18109	112.6-111.05
Unit 117 1356.25-1358.5 (2.25)	Dolostone, aphanitic, in part silty, and slightly argillaceous, sandy and dolomitic siltstone and very fine grained sandstone; both laminated; minor flat-pebble conglomerate	111.05-108.8
Unit 116 1358.5-1359.0 (0.5)	Dolostone, aphanitic, with dolomitized gastropod shells; mainly bioturbated with some vague, undulating lamination preserved; vugs to 6 mm	108.8-108.3
Unit 115 1359.0-1360.7 (1.7)	Flat-pebble conglomerate of dolostone and dolomitic siltstone and very fine grained sandstone; clasts to 2 cm; minor dolostone, aphanitic, slightly argillaceous, laminated at 1360.0-1360.1 ft. Thin sect. Dolomite ranges from microcrystalline to coarsely crystalline; phaneritic crystals relatively clear, aphanitic crystals cloudy. X-ray dolomite: 99; quartz: 1; feldspar: tr	108.3-106.6
Unit 114 1360.7-1364.1 (3.4)	Mainly dolostone, aphanitic, in part silty and slightly argillaceous with some solution zones; minor dolomitic flat-pebble conglomerate and dolomitic siltstone; unit is mostly bioturbated with some horizontal and cross-lamination preserved; open vugs to 7 mm At 1362.7-1363.2 ft. Pol. sect. Dolostone, aphanitic, yellowish grey with minor siltstone, dolomitic; both highly bioturbated; burrows horizontal, inclined, vertical, branching; stylolites. (Pl. 47)	106.6-103.2
Unit 113 1364.1-1365.0 (0.9)	Dolostone, fragmental, with dolomitized gastropod shells; open vugs to 5 mm; in lower part 2 cm of dolostone, aphanitic, silty, laminated	103.2-102.3
Unit 112 1365.0-1365.8 (0.8)	Dolostone, fragmental, aphanitic to finely crystalline; original texture obscured by dolomitization	102.3-101.5
Unit 111 1365.8-1367.3 (1.5)	Flat-pebble conglomerate of dolostone and minor dolomitic siltstone; clasts to 6 cm	101.5-100.0
Unit 110 1367.3-1371.7 (4.4)	Dolostone, aphanitic and slightly argillaceous, and in part silty and sandy, with some solution zones; minor dolomitic siltstone and very fine grained sandstone; unit is slightly to extremely bioturbated; vugs to 2 mm Fossil collections: GSC locs. C-18110, C-18111	100.0- 95.6

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 109	Chert, light grey, laminated, fossiliferous	95.6- 95.5
1371.7-1371.8 (0.1)	At 1371.75-1371.8 ft. Thin sect. Mainly chert with minor dolomite, microcrystalline to finely crystalline, chalcedony, and quartz; silicified gastropods, ostracodes; vague horizontal lamination. X-ray quartz: 90; dolomite: 9; feldspar: 1	
Unit 108	Dolostone, aphanitic to finely crystalline, in part silty, very fine grained sandy, and slightly argillaceous; minor dolomitic	95.5- 93.7
1371.8-1373.6 (1.8)	siltstone; unit is moderately to strongly bioturbated; open vugs to 2 cm	
Unit 107	Flat-pebble conglomerate and *in situ* breccia of dolostone and dolomitic siltstone; clasts and fragments to 3.5 cm; inter-	93.7- 93.3
1373.6-1374.0 (0.4)	bedded dolostone, aphanitic to finely crystalline	
Unit 106	Dolostone, aphanitic to finely crystalline, in part silty, very fine grained sandy, calcareous, and slightly argillaceous;	93.3- 89.3
1374.0-1378.0 (4.0)	minor siltstone, dolomitic; moderately to extremely bioturbated, some solution zones	
Unit 105	Dolostone, aphanitic, silty, in part slightly argillaceous with minor chert, very light grey; some solution zones	89.3- 89.1
1378.0-1378.2 (0.2)		
Unit 104	Dolostone, aphanitic, in part silty, very fine grained sandy, and slightly argillaceous; solution zones and stylolites common;	89.1- 77.8
1378.2-1389.5 (11.3)	moderately to strongly bioturbated; vugs to 3+ cm	
Unit 103	Flat-pebble conglomerate of dolostone, aphanitic, in part slightly argillaceous and dolomitic siltstone	77.8- 77.0
1389.5-1390.3 (0.8)	At 1390.0-1390.25 ft. Pol. sect. Clasts of dolostone and dolomitic siltstone, mostly pale brown with darker rims; horizontal and slightly inclined; matrix of dolomite, aphanitic to medium crystalline with vugs to 1 mm	
Unit 102	Dolostone, aphanitic, slightly argillaceous, and in part silty, moderately to strongly bioturbated	77.0- 76.1
1390.3-1391.2 (0.9)		
Unit 101	Flat-pebble conglomerate of dolostone, aphanitic, in part slightly argillaceous and dolomitic siltstone; clasts to 5+ cm; in part	76.1- 74.8
1391.2-1392.5 (1.3)	slightly to moderately bioturbated	
Unit 100	Dolostone, aphanitic, slightly argillaceous, vaguely laminated, weakly bioturbated	74.8- 74.6
1392.5-1392.7 (0.2)		
Unit 99	Flat-pebble conglomerate of dolostone, aphanitic, slightly argillaceous and dolomitic siltstone; clasts to 3.5+ cm	74.6- 74.35
1392.7-1392.95 (0.25)		

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 98 1392.95-1395.1 (2.15)	Dolostone, aphanitic, in part silty and slightly argillaceous, minor dolomitic siltstone; weakly to strongly bioturbated with some lamination preserved; some solution zones	74.35-72.7
Unit 97 1395.1-1395.8 (0.7)	Flat-pebble conglomerate and *in situ* breccia of dolostone, aphanitic, in part silty and slightly argillaceous; clasts to 3.5 cm; weakly bioturbated; open vug 2+ cm	72.7- 71.5
Unit 96 1395.8-1397.5 (1.7)	Dolostone, aphanitic, in part silty and slightly argillaceous with some flat pebbles; moderately to strongly bioturbated; some solution zones and stylolites; open vugs to 2 cm	71.5- 69.8
Unit 95 1397.5-1402.0 (4.5)	Dolomitic flat-pebble conglomerate, in part slightly argillaceous; clasts to 4 cm; coated grains in upper part; vugs to 2 mm	69.8- 65.3
Unit 94 1402.0-1405.0 (3.0)	Dolomitic flat-pebble conglomerate and breccia with echinoderm columnals and coated grains in upper part; minor dolostone, aphanitic, in part slightly argillaceous, laminated; in part weakly to moderately bioturbated; some stylolites; vugs to 8 mm At 1404.7-1404.95 ft. Pol. sect. Dolostone, aphanitic, greyish orange to pale yellowish brown with coated grains, medium grey, 0.2-2 mm, commonly medium to coarse sand grade; stylolites enriched in pyrite	65.3- 62.3
Unit 93 1405.0-1406.6 (1.6)	Dolostone, in part silty and very fine grained sandy, minor dolomitic siltstone; laminated, weakly to strongly bioturbated, vuggy At 1405.0-1405.4 ft. Pol. sect. Dolostone, in part silty to very fine grained sandy, medium light grey, strongly bioturbated with some undulating lamination preserved; vugs to 7 x 27 mm	62.3- 60.7
	Member A	
Unit 92 1406.6-1407.7 (1.1)	Flat-pebble conglomerate and breccia of dolostone, silty and sandy; clasts to 2 cm; interbedded dolostone, aphanitic, silty and sandy At 1407.2-1407.45 ft. Thin sect. Dolomite ranges from microcrystalline to medium crystalline; quartz and feldspar range from silt to medium-grained sand, moderately sorted, mostly subangular; trace amounts of muscovite. X-ray dolomite: 92; quartz: 4; feldspar: 4	60.7- 59.6
Unit 91 1407.7-1410.0 (2.3)	Dolostone, sandy and sandstone, dolomitic, vaguely laminated; sand mainly fine grained; vugs to 1 cm At 1409.55-1409.6 ft. Thin sect. Dolomite microcrystalline to medium crystalline; quartz and minor feldspar, silt to medium-grained sand grade, scattered, poorly sorted, subangular to subrounded; trace of zircon. X-ray dolomite: 90; quartz: 9; feldspar: 1	59.6- 57.3

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 90 1410.0-1411.7 (1.7)	Dolostone, aphanitic to finely crystalline, silty, sandy, and slightly argillaceous with some solution zones; minor sandstone, dolomitic, very fine to medium grained; extremely bioturbated unit; some open vugs	57.3- 55.6
Unit 89 1411.7-1415.6 (3.9)	Sandstone, dolomitic, mainly very fine to medium grained with coated grains; dolostone, sandy, and slightly argillaceous with some stylolites; both laminated; minor flat-pebble conglomerate; vugs common, to 5 mm	55.6- 51.7
	At 1414.7-1414.9 ft. Thin sect. Dolomite, mainly microcrystalline but ranging to medium crystalline; some coated grains are single dolomite crystals, some have a quartz nucleus; quartz and feldspar range from silt to very coarse grained sand, subangular to rounded; stylolite. X-ray dolomite: 72; quartz: 26; feldspar: 2; calcite: tr; siderite(?): tr	
Unit 88 1415.6-1416.8 (1.2)	Flat-pebble conglomerate of dolomitic siltstone and sandstone; clasts to 4.5 cm; overlain by dolostone, sandy, with coated grains and shell fragments	51.7- 50.5
	At 1416.0-1416.2 ft. Pol. sect. Dolostone, greyish orange; abundant coated grains, dolomitic, less quartz, very fine to coarse grained, and minor amounts of gastropod shells to 5 mm in dolomitic matrix.	
	Fossil collection: GSC loc. C-22952	
Unit 87 1416.8-1418.7 (1.9)	Dolostone, silty, sandy, and in part slightly argillaceous and sandstone, dolomitic, mostly medium grained; both laminated; coated grains common; domal stromatolites; minor breccia of dolostone in sandy and silty matrix; fragments to 1 cm; some stylolites	50.5- 48.6
	At 1417.0-1417.5 ft. Pol. sect., thin sect. Dolostone, aphanitic, silty, light olive grey, interlaminated with sandstone, dolomitic, light grey; laminae 3-5 mm thick, undulating with some vague cross-stratification; sets of cross-laminae 2-3 mm, coset 6 mm thick; dolomite mostly microcrystalline; terrigenous fraction mostly quartz with less feldspar (microcline common) and trace amounts of biotite and muscovite; quartz and feldspar range from silt to fine-grained sand, poorly sorted, mostly subangular; dolostone contains coated grains with preserved micritic texture	
	At 1417.2-1417.3 ft. Pol. sect. Alternating dolostone and sandstone as above form dome, 4 cm in diameter; relief on individual laminae 8 mm, total height 15 mm; possibly stromatolite	
Unit 86 1418.7-1419.7 (1.0)	Breccia of dolostone, aphanitic, in part argillaceous, silty, and sandy, laminated	48.6- 47.6
	At 1419.2-1419.7 ft. Pol. sect. Breccia, light olive grey to light grey; irregular, contorted fragments of dolostone, aphanitic, laminated, in matrix of dolomite, aphanitic with quartz to medium-grained and coated grains; vugs common, to 3 x 9 mm; some are molds of crystals, including anhydrite(?). (Pl. 46)	

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 85 1419.7-1423.6 (3.9)	Dolostone, silty, sandy, and in part slightly argillaceous; sandstone, very fine to medium grained, partly quartz-cemented, porous, friable, partly dolomitic with coated grains, ooids, and fossils; laminated; interval 1423.1-1423.4 brecciated and distorted	47.6- 43.7
	At 1421.0-1421.2 ft. Pol. sect., thin sect. Dolostone, silty, sandy, in part slightly carbonaceous and micaceous, light olive grey, alternating with sandstone, dolomitic, mostly very fine to fine grained with some coarse grains, very light grey; lamination horizontal and undulating with molds of crystals, possibly gypsum; dolomite mainly microcrystalline; terrigenous fraction includes quartz, feldspar, biotite, muscovite; quartz and feldspar mostly subangular; some ferroan calcite. (Pl. 28) X-ray dolomite: 45; quartz: 31; feldspar: 20; "illite": 2; calcite: 2; siderite: tr; pyrite: tr	
	At 1422.0-1422.35 ft. Pol. sect. Dolostone, pale to dark yellowish brown; abundant coated grains and common quartz silt to coarse-grained sand with echinoderm columnals to 5 mm and oolites in matrix of dolomite, aphanitic; bedding not apparent	
Unit 84 1423.6-1433.5 (9.9)	Sandstone, partly dolomitic, partly quartz cemented, porous, friable, and dolostone, silty, sandy, and in part slightly argillaceous; mostly massive, partly laminated; sand is very fine to coarse grained; some coated grains, fossil fragments	43.7- 33.8
	At 1426.2-1426.4 ft. Pol. sect. Sandstone, quartz cemented, porous, friable; fine to medium, mainly fine grained, moderately sorted, very light grey; vague, discontinuous, undulating lamination; some greenish grey, argillaceous laminae	
	At 1430.0-1430.2 ft. Pol. sect. Dolostone, pale yellowish brown; coated grains, silt to coarse-grained sand of quartz, and dolomitized gastropod shell fragments in dolomitic matrix; vague horizontal stratification	
	Fossil collection: GSC loc. C-22953	
Unit 83 1433.5-1435.0 (1.5)	Sandstone, quartz-cemented, porous, friable, very fine to coarse grained; horizontal and cross-lamination; sets of cross-laminae to 2 cm thick	33.8- 32.3
	At 1434.8-1434.97 ft. Pol. sect. Sandstone, mainly quartz-cemented, porous, friable with minor calcite and dolomite cement; bimodal, very fine to fine and coarse grained; very light grey and pale olive; vague horizontal stratification with some undulations; some argillaceous crusts; pyrite altered to limonite. X-ray quartz: 96; feldspar: 2; calcite: 1; dolomite: 1; "illite": tr	
Unit 82 1435.0-1446.8 (11.8)	Sandstone, partly dolomitic and calcareous, partly quartz-cemented, very fine to very coarse grained, mostly poorly sorted, mostly massive and brecciated, rarely laminated; vug at 1442.5 is 2 x 5 cm	32.3- 20.5
	At 1442.5-1442.75 ft. Pol. sect. Sandstone, calcite cemented, very fine to very coarse grained, poorly sorted; brecciated with irregular, near-vertical argillaceous, calcareous and dolomitic stringers; pale brown and very light grey; vugs to 2 x 5 mm	

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 81 1446.8-1449.0 (2.2)	Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained, poorly sorted; horizontal lamination At 1447.5-1447.55 ft. Thin sect. Quartz ranges from silt to coarse-grained sand, poorly sorted, rounded to subrounded; some pressure solution; trace amounts of tourmaline	20.5- 18.3
Unit 80 1449.0-1449.6 (0.6)	Sandstone, calcareous, very fine to coarse grained; vague lamination is horizontal and slightly inclined At 1449.0-1449.15 ft. Pol. sect., thin sect. Sandstone, very fine to coarse, mainly medium grained, very light grey; composed of quartz, subrounded to rounded (except for matrix replacement) in matrix of calcite, partly cryptocrystalline-anhedral (micritic), partly microcrystalline-rhombohedral (probably pseudomorphous after dolomite). X-ray quartz: 52; calcite: 48	18.3- 17.7
Unit 79 1449.6-1452.1 (2.5)	Sandstone, quartz-cemented, porous, friable; medium grained, horizontally laminated	17.7- 15.2
Unit 78 1452.1-1452.25 (0.15)	?Mudstone, dolomitic, quartz-silty. (Core may have been misplaced)	15.2- 15.05
Unit 77 1452.25-1452.5 (0.25)	Sandstone, mainly quartz-cemented, porous, friable, slightly calcareous, fine grained, massive	15.05-14.8
Unit 76 1452.5-1453.8 (1.3)	No core recovered; probably argillaceous (gamma ray anomaly)	14.8- 13.5
Unit 75 1453.8-1456.6 (2.8)	Sandstone, mostly quartz-cemented, porous, friable, partly calcareous, fine to medium grained, massive, bioturbated; about 1 cm of mudstone at 1454.7; rounded pebbles to 2.5 cm of silicified oolitic sediment at 1455.0-1455.6 At 1453.9-1454.15 ft. Pol. sect., thin sect. Sandstone, fine to medium grained, moderately sorted, massive, very light to medium light grey; rounded quartz is cemented partly by quartz and partly by ordinary and ferroan calcite; calcite is rhombohedral, apparently pseudomorphous after dolomite	13.5- 10.7
Unit 74 1456.6-1458.2 (1.6)	Shale; minor sandstone, medium grained, laminated At 1457.1-1457.15 ft. Pol. sect. Shale, dark greenish grey with lenses of sandstone, medium grained; lamination horizontal with minor undulations; burrows rare; pyrite common. X-ray quartz: 57; "illite": 27; feldspar: 5; pyrite: 5; calcite: 3; dolomite: 3	10.7- 9.1
Unit 73 1458.2-1467.3 (9.1)	Sandstone, mostly quartz-cemented, porous, friable with some calcite cement; lower part fine to medium grained, massive, bioturbated, with vugs to 3 mm; upper part fine to coarse, mostly medium grained, with vague horizontal and cross-lamination; sets of cross-laminae 3 mm thick at 1465.2	9.1- 0.0

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	At 1462.5-1462.55 ft. Thin sect. Quartz ranges from silt to coarse-grained sand, poorly sorted, rounded; trace amounts of muscovite and feldspar; cement mainly quartz with some ferroan and ordinary calcite, microcrystalline to finely crystalline, rhombohedral (probably pseudomorphous after dolomite). X-ray quartz: 69*; calcite: 28; dolomite: 1; feldspar: 1; pyrite: 1; "illite": tr	
	Contact abrupt, possibly disconformable; solution features absent from upper 6.5 feet below contact, but note chert in interval 1473.8-1475.05	
	ADMIRALTY GROUP	
	TURNER CLIFFS FORMATION	
Unit 72 1467.3-1469.0 (1.7)	Dolostone, aphanitic, silty, slightly argillaceous, laminated; minor dolomitic siltstone, mudstone	144.7-143.0
	At 1467.3-1467.45 ft. Pol. sect., thin sect. Dolostone, in part silty and slightly argillaceous, with minor interlaminated dolomitic siltstone and mudstone; lamination horizontal; laminae alternatingly light olive grey and pale greenish grey; dolomite generally microcrystalline, finely microcrystalline in argillaceous layers; terrigenous fraction includes quartz, muscovite, and minor feldspar; quartz commonly elongate, pseudomorphous after bladed or columnar mineral; pyrite common in some layers. X-ray dolomite: 83; quartz: 10; feldspar: 4; calcite: 2; "illite": 1	
Unit 71 1469.0-1472.65 (3.65)	Dolostone, aphanitic, laminated, in part slightly argillaceous; lamination mainly horizontal	143.0-139.35
Unit 70 1472.65-1473.8 (1.15)	Dolostone, aphanitic; vague lamination in lower 0.3 feet, otherwise massive; lens or large clast of chert, light grey, dolomitic, 1 cm thick	139.35-138.2
Unit 69 1473.8-1475.05 (1.25)	Dolostone, aphanitic, massive, in part brecciated; minor chert, light grey, dolomitic, silty; chert occurs as 8 mm lamina, replacement, angular clasts, and vug fill	138.2-136.95
	At 1474.85-1475.1 ft. Pol. sect., thin sect. Dolostone, medium light grey, massive, composed of dolomite, microcrystalline to finely crystalline with scattered silt and very fine to fine-grained sand of quartz; vugs filled with light grey mixture of dolomite, microcrystalline and chert, "chalky" in appearance. X-ray dolomite: 93; quartz: 6; feldspar: 1	
Unit 68 1475.05-1478.5 (3.45)	Dolostone, aphanitic, in part argillaceous, mostly massive, bioturbated, partly laminated; open vugs to 5 mm; some chert replacement at 1478.3	136.95-133.5

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 67 1478.5-1480.25 (1.75)	Dolostone, aphanitic, laminated; lamination in part vague, brecciated at top At 1480.0-1480.25 ft. Pol. sect., thin sect. Dolostone, olive-grey to medium grey, brecciated; fragments 1-5 mm long, horizontal, with vague internal lamination; some fractures filled with pyrite; composed of dolomite, microcrystalline to very finely crystalline with scattered silt and very fine grained sand of quartz and minor feldspar, subangular to subrounded. X-ray dolomite: 93; quartz: 5; feldspar: 1; pyrite:1; calcite: tr	133.5-131.75
Unit 66 1480.25-1481.3 (1.05)	Dolomitic breccia; fragments to 2.5 x 3 cm; open vugs between fragments	131.75-130.7
Unit 65 1481.3-1486.4 (5.1)	Dolostone, partly brecciated, bioturbated, with columnar stromatolites; open vugs At 1485.0-1485.5 ft. Pol. sect. Dolostone, light grey mottled with yellowish grey; dolomite is microcrystalline to finely crystalline; columnar stromatolites to 3.5 cm high, branching with some lateral linkage; some bioturbation; open vug 1.5 x 1.7 cm	130.7-125.6
Unit 64 1486.4-1486.6 (0.2)	Dolomitic flat-pebble conglomerate with ooids At 1486.4-1486.6 ft. Pol. sect. Flat pebbles light grey with medium light grey rims, 0.2-3 cm long, moderately to steeply inclined; dolomitic matrix includes abundant ooids	125.6-125.4
Unit 63 1486.6-1487.05 (0.45)	Dolostone, oolitic, laminated At 1486.6-1487.05 ft. Pol. sect. Light olive grey, laminated to massive; closely packed ooids, medium sand grade, well sorted	125.4-124.95
Unit 62 1487.05-1487.5 (0.45)	Dolostone, aphanitic, laminated, in part brecciated; lamination mostly horizontal; lower part rich in pyrite	124.95-124.5
Unit 61 1487.5-1498.8 (11.3)	Dolostone, aphanitic, in part silty, sandy, and slightly argillaceous; minor sandstone, dolomitic, very fine to fine grained; lamination mainly horizontal; molds of gypsum(?) to 5 mm at 1494.9 At 1487.2-1487.4 ft. Pol. sect., thin sect. Dolostone is yellowish grey and light grey with vague horizontal stratification; silty and sandy dolostone and dolomitic sandstone are yellowish grey to light grey with discontinuous, undulating lamination; dolomite is mainly microcrystalline; quartz and minor feldspar range from silt to fine-grained sand; poorly sorted, subrounded to subangular; trace amounts of muscovite. X-ray dolomite: 88; quartz: 9; feldspar: 3; calcite: tr	124.5-113.2
Unit 60 1498.8-1499.1 (0.3)	Dolomitic flat-pebble conglomerate; clasts to 2.5 cm; open vugs to 3 mm represent mineral molds	113.2-112.9

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 59 1499.1-1500.2 (1.1)	Dolostone, aphanitic, laminated; lamination horizontal	112.9-111.8
Unit 58 1500.2-1500.3 (0.1)	Dolomitic flat-pebble conglomerate or breccia; clasts to 3 cm, nearly *in situ*	111.8-111.7
Unit 57 1500.3-1504.4 (4.1)	Dolostone, aphanitic, laminated; lamination horizontal and undulating, some cross-lamination	111.7-107.6
Unit 56 1504.4-1505.6 (1.2)	Dolomitic flat-pebble conglomerate; clasts to 5.5+ cm At 1505.0-1505.4 ft. Pol. sect. Flat pebbles light olive grey with medium light grey rims; horizontal and moderately inclined; matrix consists of microcrystalline dolomite, minor calcite with quartz of silt and very fine sand grade	107.6-106.4
Unit 55 1505.6-1510.3 (4.7)	Dolostone, aphanitic, laminated; lamination mainly horizontal; some brecciation; one flat-pebble conglomerate, 6 mm thick with clasts to 5 mm; lenses of chalky calcite at 1505.9	106.4-101.7
Unit 54 1510.3-1512.0 (1.7)	Flat-pebble conglomerate of dolostone and dolomitic sandstone, very fine grained, and siltstone; clasts to 5 cm, some nearly *in situ*; open vugs to 2 mm	101.7-100.0
Unit 53 1512.0-1519.25 (7.25)	Dolostone, aphanitic, laminated; lamination mainly horizontal At 1515.0-1515.2 ft. Pol. sect. Dolostone, light olive grey; vague horizontal lamination, in part discontinuous; some pyrite	100.0- 92.75
Unit 52 1519.25-1519.35 (0.1)	Dolomitic flat-pebble conglomerate; clasts to 5 cm	92.75- 92.65
Unit 51 1519.35-1535.8 (16.45)	Dolostone, aphanitic, slightly argillaceous at 1532; minor dolomitic siltstone and very fine grained sandstone; dolomitic flat-pebble conglomerate at 1528.3 (1 cm thick; clasts to 1 cm long) and 1528.9; lamination of dolostone mostly horizontal	92.65- 76.2
Unit 50 1535.8-1537.1 (1.3)	Flat-pebble conglomerate of dolostone, in part silty and sandy, dolomitic siltstone, and dolomitic sandstone, very fine grained; clasts to 2 cm; contact with underlying unit is abrupt, possibly disconformable At 1536.8-1537.1 ft. Thin sect. Dolomite is microcrystalline to finely crystalline; terrigenous fraction includes silt to fine-grained sand of quartz and minor feldspar, subangular to subrounded, and trace amounts of green and brown biotite and muscovite; flat pebbles have darkened rims. X-ray dolomite: 79; quartz: 13; feldspar: 6; calcite: 1; "illite": 1; pyrite: tr	76.2- 74.9

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 49 1537.1-1542.0 (4.9)	Dolostone, aphanitic, in part silty and slightly argillaceous (approx. at 1539-1540); minor dolomitic breccia; unit is laminated; open vug (1 cm) at 1540.9	74.9- 70.0
Unit 48 1542.0-1542.5 (0.5)	Flat-pebble conglomerate of dolostone, in part silty; clasts to 1.6 cm	70.0- 69.5
Unit 47 1542.5-1544.55 (2.05)	Dolostone, aphanitic, laminated	69.5- 67.45
Unit 46 1544.55-1544.75 (0.2)	Flat-pebble conglomerate of dolostone and dolomitic siltstone; clasts to 2 cm have relatively dark rims	67.45- 67.25
Unit 45 1544.75-1547.0 (2.25)	Dolostone, aphanitic, laminated At 1546.25-1546.32 ft. Pol. sect. Light olive grey to olive grey; lamination mainly horizontal; streaks of pyrite	67.25- 65.0
Unit 44 1547.0-1547.5 (0.5)	Flat-pebble conglomerate of dolostone and silty dolostone At 1547.0-1547.5 ft. Pol. sect. Clasts to 5 cm; horizontal to steeply inclined, inclination in opposing directions; open vugs to 2 x 7 mm; some pyrite	65.0- 64.5
Unit 43 1547.5-1550.0 (2.5)	Dolostone, aphanitic, in part silty and siltstone, dolomitic; both laminated; open vug, 2 cm, at 1547.9 At 1549.7-1549.95 ft. Pol. sect., thin sect. Dolostone, light olive grey, alternating with dolomitic siltstone, pale orange; lamination mainly horizontal, also undulating, partly discontinuous; dolostone consists of microcrystalline dolomite with small amounts of scattered quartz and feldspar; siltstone mainly of quartz and dolomite with small amounts of muscovite and biotite, and trace amounts of "glauconite". X-ray dolomite: 65; quartz: 22; feldspar: 12; "illite": 1	64.5- 62.0
Unit 42 1550.0-1550.7 (0.7)	Breccia of dolostone and minor dolomitic siltstone; possibly of tectonic origin At 1550.0-1550.2 ft. Pol. sect. Angular fragments of laminated dolostone to 4 x 3+ cm, horizontal to steeply inclined, in matrix of dolomite, aphanitic, with silt and very fine grained sand of quartz; vugs to 3 x 10 mm	62.0- 61.3
Unit 41 1550.7-1551.0 (0.3)	Dolostone, aphanitic, in part silty, laminated; stratification partly disturbed by tectonic and(?) sedimentary processes	61.3- 61.0
Unit 40 1551.0-1551.8 (0.8)	Flat-pebble conglomerate of dolostone and dolomitic siltstone; clasts to 3.5 cm; minor dolostone, aphanitic, laminated	61.0- 60.2

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 39 1551.8-1558.6 (6.8)	Dolostone, aphanitic, in part silty and slightly argillaceous and siltstone, dolomitic; both laminated At 1555.8-1555.87 ft. Pol. sect., thin sect. Dolostone is light olive grey, silty dolostone very pale orange; lamination horizontal and slightly inclined with some shallow undulations; dolomite microcrystalline; terrigenous fraction consists mainly of quartz, less feldspar, and minor biotite, muscovite, "glauconite". X-ray dolomite: 64; quartz: 20; feldspar: 13; calcite: 2; "illite": 1; pyrite: tr; siderite(?): tr	60.2- 53.4
Unit 38 1558.6-1558.7 (0.1)	Dolomitic flat-pebble conglomerate; clasts to 2 cm	53.4- 53.3
Unit 37 1558.7-1571.9 (13.2)	Dolostone, aphanitic, in part silty; minor dolomitic siltstone; laminated, some breccia and flat-pebble conglomerate At 1561.0-1561.5 ft. Pol. sect. Dolostone is light olive grey; silty dolostone and dolomitic siltstone are greyish orange; lamination mainly horizontal with minor undulations; desiccation(?) fractures and 5 cm of flat-pebble conglomerate. (Pl. 45) At 1570.0-1570.3 ft. Pol. sect., thin sect. Dolostone, light olive grey, with interlaminated dolomitic siltstone, yellowish grey; lamination undulating; horizontal burrows, 1-2 mm in diameter; dolostone consists of dolomite, microcrystalline to very finely crystalline with scattered silt of quartz and feldspar and trace amounts of muscovite. X-ray dolomite: 89; quartz: 5; feldspar: 5; calcite: 1; "illite": tr; siderite: tr	53.3- 40.1
Unit 36 1571.9-1572.05 (0.15)	Dolomitic flat-pebble conglomerate; clasts to 2.5 cm	40.1- 39.95
Unit 35 1572.05-1592.5 (20.45)	Dolostone, aphanitic, in part silty and slightly argillaceous; minor dolomitic siltstone; laminated, weakly bioturbated At 1590.0-1590.3 ft. Pol. sect. Dolostone, light olive grey, aphanitic, with less than a few per cent of dolomitic siltstone, orange-grey; undulating, in part discontinuous lamination weakly disturbed by vague, mainly horizontal burrows (diameters 1-2 mm)	39.95- 19.5
Unit 34 1592.5-5194.1 (1.6)	Flat-pebble conglomerate of dolostone, in part slightly argillaceous and minor dolomitic siltstone; clasts to 6 cm At 1594.0-1594.15 ft. Pol. sect. Flat pebbles light olive grey to medium light grey with darker (medium grey) rims; to 2 cm long; horizontal to slightly inclined; fractures filled with coarsely crystalline dolomite; some pyrite	19.5- 17.9
Unit 33 1594.1-1605.0 (10.9)	Dolostone, aphanitic, in part silty and slightly argillaceous; minor dolomitic siltstone; both laminated, weakly to moderately bioturbated	17.9- 7.0

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	At 1597.5-1597.8 ft. Pol. sect. Dolostone, light olive grey; discontinuous, undulating lamination disturbed by mainly horizontal burrows about 1.5-2 mm in diameter; some pyrite	
Unit 32	Dolostone, aphanitic, slightly argillaceous and in part silty; minor dolomitic siltstone; both laminated	7.0- 6.15
1605.0-1605.85 (0.85)	At 1605.0-1605.4 ft. Pol. sect., thin sect. Dolostone, light olive grey, with interlaminated dolostone, silty and dolomitic siltstone, yellowish grey to light brownish grey; lamination mainly horizontal with some undulations; silty dolostone forms lens (or boudin) 4+ cm long; dolomite microcrystalline to finely crystalline; terrigenous fraction includes quartz and minor feldspar, mainly of silt grade with minor amounts of muscovite and biotite; some layers rich in submicroscopic carbonaceous and/or argillaceous matter	
Unit 31	Dolomitic breccia; minor dolostone, aphanitic, slightly argillaceous, laminated	6.15- 4.5
1605.85-1607.5 (1.65)	At 1605.85-1606.05 ft. Pol. sect. Fragments to 1 cm, partly angular; "glauconite" common in interstices; some pyrite	
Unit 30	Dolostone, aphanitic, in part silty and slightly argillaceous, minor siltstone, dolomitic and flat-pebble conglomerate with clasts to 1.5 cm; laminated, moderately bioturbated	4.5- 3.9
1607.5-1608.1 (0.6)		
Unit 29	Dolomitic breccia; angular fragments to 8 mm (similar to unit 31)	3.9- 3.65
1608.1-1608.35 (0.25)		
Unit 28	Dolostone, aphanitic, in part silty to very fine grained sandy and slightly argillaceous; minor dolomitic siltstone; laminated, weakly to strongly bioturbated	3.65- 2.25
1608.35-1609.75 (1.4)	At 1609.6-1609.8 ft. Pol. sect. Dolostone, aphanitic, light olive grey; minor dolomitic siltstone, greyish orange-pink; laminated, considerably bioturbated; burrows horizontal to near-vertical (e.g. 1 x 6 mm, steeply inclined); solution zones; pyrite relatively common	
Unit 27	Dolostone, aphanitic, in part silty and slightly argillaceous; minor dolomitic siltstone and very fine grained sandstone and flat-pebble conglomerate of dolostone and dolomitic siltstone; clasts to 4 cm; unit is moderately to strongly bioturbated	2.25- 0.0
1609.75-1612.0 (2.25)	At 1610.4-1610.75 ft. Pol. sect. Dolostone, aphanitic, mainly light olive grey, also greyish and brownish; in part silty to very fine grained sandy; minor dolomitic siltstone and very fine grained sandstone, "glauconitic"; horizontal lamination partly destroyed by burrowing; a relatively large burrow is 10 x 15 mm, vertical; solution zones, stylolites, pyrite	
	Contact probably conformable.	

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
	GALLERY FORMATION	
Unit 26 1612.0-1612.5 (0.5)	Dolostone, sandy, with "glauconite" and coated grains; mostly massive, bioturbated, partly laminated At 1612.0-1612.5 ft. Pol. sect. Mostly yellowish brown; lower part strongly bioturbated; middle part has discontinuous, undulating lamination; upper part massive; coated grains to 11 mm; silt to coarse-grained sand of quartz abundant; "glauconite" common; pyrite fairly common; burrows vague, in part vertical	65.8- 65.3
Unit 25 1612.5-1616.3 (3.8)	Sandstone, mostly dolomitic, partly quartz-cemented, porous, friable; very fine to very coarse grained, with some dolomitized ooids and coated grains; partly laminated, partly brecciated and massive At 1612.5-1612.6 ft. Pol. sect., thin sect. Medium light grey, vaguely laminated; about 2/3 of framework is quartz and minor feldspar, 1/3 is dolomitized ooids; quartz and feldspar range from silt to coarse-grained sand, mainly medium grained, poorly sorted, rounded (except for matrix replacement); matrix is dolomite, microcrystalline to finely crystalline At 1613.5-1613.7 ft. Pol. sect., thin sect. Very light to light grey, partly laminated, partly brecciated; fragments to 1.3 cm; some stylolites; framework consists of quartz and minor feldspar with some dolomitized ooids or coated grains and trace amounts of tourmaline; quartz, very fine to very coarse grained, poorly sorted, rounded (except for matrix replacement); matrix is dolomite, mostly microcrystalline; some silica cementation where quartz grains touch. X-ray quartz: 49; dolomite: 49; feldspar: 2; calcite: tr At 1614.65-1615.0 ft. Pol. sect., thin sect. Sandstone, brecciated; light grey fragments to 2 cm in very light grey matrix; composed of quartz, minor feldspar, very fine to very coarse grained, poorly sorted, rounded (except for matrix replacement) in matrix of dolomite, microcrystalline to very finely crystalline; one quartz grain is coated by cryptocrystalline to microcrystalline carbonate. X-ray dolomite: 66; quartz: 34; feldspar: tr	65.3- 61.5
Unit 24 1616.3-1620.0 (3.7)	Sandstone, quartz cemented, porous, friable, very fine to coarse grained; horizontal and cross-lamination At 1617.3-1617.4 ft. Pol. sect. Very light grey; cross-laminated; set of cross-laminae 1.5 cm thick; very fine to coarse grained At 1619.7-1619.9 ft. Pol. sect. Very light grey; lamination mainly horizontal; very fine to coarse, mainly fine to medium grained	61.5- 57.8
Unit 23 1620.0-1621.5 (1.5)	Sandstone, dolomitic, pebbly, massive, bioturbated At 1620.7-1621.1 ft. Pol. sect., thin sect. Sandstone, yellowish grey to light grey, mostly massive with some disturbed lamination; pebbles of dolostone, yellowish grey, aphanitic; framework of sandstone mainly quartz, less dolomitic (coated?) grains, minor feldspar, and trace amounts of muscovite and zircon; quartz very fine to coarse grained, moderately to poorly sorted (bioturbation), subrounded to rounded (except for matrix replacement); coarse quartz grain is composite (metaquartzite?); some grains coated by carbonate; matrix is dolomite, microcrystalline	57.8- 56.3

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 22 1621.5-1621.9 (0.4)	Sandstone, mostly quartz-cemented, porous, friable, medium and coarse grained; horizontal and low-angle planar cross-lamination; set of cross-laminae 6 cm	56.3- 55.9
Unit 21 1621.9-1623.25 (1.35)	Sandstone, dolomitic, very fine to very coarse grained, with composite coated grains and oncolites; laminated and brecciated At 1622.7-1623.0 ft. Pol. sect., thin sect. Yellowish grey to pale yellowish brown; partly laminated and brecciated; fragments to 1.5 x 4+ cm; simple and composite coated grains to 2.8 cm with well-developed radial and concentric structure; quartz very fine to very coarse, mostly fine grained, poorly sorted, rounded (except for matrix replacement); dolomite mainly microcrystalline with relict cryptocrystalline texture in coated grains and oncolites. X-ray quartz: 68; dolomite: 32	55.9- 54.55
Unit 20 1623.25-1623.8 (0.55)	Sandstone, mainly quartz-cemented, porous, friable, partly dolomitic with minor coated grains and ooids; very fine to coarse grained; cross-laminated At 1623.25-1623.65 ft. Pol. sect., thin sect. Very light grey; vague lamination is moderately inclined; framework consists mainly of quartz with some dolomite grains, in part ooids, and trace amounts of feldspar; quartz is very fine to coarse grained, moderately sorted, rounded. X-ray quartz: 98*; feldspar: 2	54.55- 54.0
Unit 19 1623.8-1625.0 (1.2)	Sandstone, mainly quartz-cemented, porous, friable with some dolomitic patches and dolomitic coated grains; very fine to coarse, mainly fine to medium grained; vague lamination is horizontal to moderately inclined; upper part brecciated At 1624.7-1625.0 ft. Pol. sect., Very light grey; vague lamination horizontal to slightly inclined; brecciated, fragments to 2 x 4+ cm; mostly quartz-cemented, porous, friable with some dolomitic matrix; quartz very fine to medium, mostly fine grained; some dolomitic coated grains; some oxidized pyrite	54.0- 52.8
Unit 18 1625.0-1626.0 (1.0)	Sandstone, quartz-cemented, porous, friable; fine to coarse, mainly medium-grained; lamination horizontal to moderately inclined	52.8- 51.8
Unit 17 1626.0-1626.4 (0.4)	Sandstone, dolomitic, very fine to coarse, mainly medium grained; vague horizontal and undulating lamination; some oxidized pyrite	51.8- 51.4
Unit 16 1626.4-1626.6 (0.2)	Sandstone, dolomitic, pebbly, with coated grains, massive At 1626.4-1626.6 ft. Pol. sect., thin sect. Yellowish grey to medium light grey; rounded pebbles of dolomitic sandstone and sandy dolostone (in part coated) to 1.5 cm, quartz, and minor feldspar in matrix of microcrystalline dolomite with minor calcite (in part ferroan); quartz very fine to very coarse grained, poorly sorted, rounded to subrounded (except for matrix replacement). X-ray quartz: 65; dolomite: 35; feldspar: tr	51.4- 51.2

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 15 1626.6-1629.8 (3.2)	Sandstone, dolomitic, fine to coarse grained; horizontal and cross-lamination; sets of cross-laminae 1.5 to 2.5 cm; some oxidized pyrite	51.2- 48.0
Unit 14 1629.8-1644.0 (14.2)	Sandstone, quartz cemented, porous friable; fine to coarse, mainly medium grained; horizontal and cross-lamination; sets of cross-laminae to 2 cm; some oxidized pyrite	48.0- 33.8
Unit 13 1644.0-1645.9 (1.9)	Sandstone, mainly dolomitic, minor quartz cemented, medium to very coarse grained with some ooids, mostly massive At 1644.0-1647.5 ft. Thin sect. Quartz, dolomitized ooids, and trace amounts of feldspar and muscovite in matrix of microcrystalline dolomite; quartz medium to very coarse grained, poorly sorted, rounded; matrix of dolomite is partly pseudomorphous after evaporite(?) minerals, probably including anhydrite; some ferroan calcite. X-ray quartz: 86; dolomite: 12; calcite: 2	33.8- 31.9
Unit 12 1645.9-1646.8 (0.9)	Sandstone, mainly quartz-cemented, porous, friable, minor dolomitic, fine to coarse, mainly fine to medium grained; vague horizontal and cross-lamination; some oxidized pyrite	31.9- 31.0
Unit 11 1646.8-1647.5 (0.7)	Sandstone, mainly dolomitic, partly quartz-cemented, porous, friable; fine to very coarse grained, brecciated; fragments to 2 x 6+ cm; open vug 0.5 x 1.5 cm	31.0- 30.3
Unit 10 1647.5-1649.8 (2.3)	Sandstone, mainly quartz-cemented, porous, friable, minor dolomitic; fine to very coarse grained; horizontal and cross-lamination; some oxidized pyrite	30.3- 28.0
Unit 9 1649.8-1652.5 (2.7)	Sandstone, mostly dolomitic; partly quartz-cemented, porous, friable; very fine to very coarse grained; minor dolostone, aphanitic; mostly bioturbated and massive; some horizontal and cross-lamination At 1650.0-1650.1 ft. Thin sect. Dolomitic sandstone, probably bioturbated; quartz, fine to coarse grained, poorly sorted, rounded (except for matrix replacement), with trace amounts of feldspar, zircon, tourmaline in abundant matrix of microcrystalline dolomite; some coarse-grained quartz is composite. X-ray dolomite: 56; quartz: 44; feldspar: tr At 1650.5-1650.65 ft. Pol. sect., thin sect. Dolostone, pale yellowish brown, massive, bioturbated; composed of dolomite, microcrystalline; irregular lenses and stringers of sandstone, dolomitic, very fine to very coarse grained, poorly sorted, composed mainly of quartz and minor feldspar, rounded to subrounded (except for matrix replacement) with trace amounts of tourmaline; veinlets of calcite, in part ferroan. X-ray dolomite: 53; quartz: 44; calcite: 2; feldspar: 1	28.0- 25.3
Unit 8 1652.5-1653.15 (0.65)	Sandstone, mainly quartz cemented, porous, friable, minor dolomitic; fine to coarse grained; mostly bioturbated; some horizontal and cross-lamination	25.3- 24.65

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 7 1653.15-1654.0 (0.85)	Sandstone, quartz-cemented, porous, friable, very fine to coarse grained, with inarticulate brachiopod fragments(?) and derived secondary phosphate; minor siltstone, micaceous At 1653.16-1653.22 ft. Pol. sect., thin sect. Mainly sandstone, very light grey, coarse grained, moderately sorted; composed mainly of quartz and minor feldspar, rounded to subrounded, with trace amounts of mica, zircon, tourmaline; minor siltstone, similar in composition to sandstone but richer in muscovite and (green) biotite; some ferroan calcite At 1653.3-1653.45 ft. Pol. sect., thin sect. Mainly sandstone, very light grey, quartz-cemented, porous, friable, very fine to medium grained, well sorted; linguloid brachiopod fragments(?) and streaks of derived phosphate; minor siltstone, light greenish grey; both horizontally laminated; sandstone composed of quartz and feldspar (rel. common), subrounded to rounded; minor muscovite, biotite, zircon, tourmaline. X-ray quartz: 75; feldspar: 17; calcite: 4; dolomite: 4; "illite": tr	24.65- 23.8
Unit 6 1654.0-1659.8 (5.8)	Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained with inarticulate brachiopod fragments(?) and derived phosphate; horizontal and cross-lamination; sets of cross-laminae about 1 cm thick, cosets 4 cm	23.8- 18.0
Unit 5 1659.8-1669.0 (9.2)	Sandstone, mostly quartz-cemented, porous, friable, very fine to very coarse grained, in part pebbly; with small amounts of dolomite and calcite, inarticulate brachiopod fragments(?) and derived secondary phosphate; minor siltstone, micaceous; horizontal and cross-lamination; sets of cross-laminae to 3 cm thick; some bioturbation At 1660.3-1660.45 ft. Pol. sect., thin sect. Sandstone, pale grey to light brownish grey; mainly quartz-cemented, porous, friable with some calcite and dolomite matrix; very fine to medium grained, moderately to well sorted; composed mainly of quartz and minor feldspar, subrounded to rounded, with less muscovite and biotite, and trace amounts of zircon and tourmaline; linguloid shell fragments(?) and derived secondary phosphate cement; interlaminated siltstone, greyish green, is similar in composition but richer in mica and carbonate. X-ray (probably represents sandstone only) quartz: 93*; feldspar: 5; calcite: 1; dolomite: 1 At 1667.6-1667.7 ft. Pol. sect. Sandstone, very light grey, quartz-cemented, porous, friable, mostly fine grained but with coarse to very coarse grained quartz, and granules and pebbles to 1.3 cm of quartz and gneiss; vague horizontal and cross-lamination; some bioturbation At 1667.7-1668.2 ft. Pol. sect. Sandstone, light grey, mostly fine grained, and siltstone, greenish grey, rich in biotite; mostly bioturbated; some horizontal lamination; burrows in lower part are vertical (e.g. 5 x 15 mm). (Pl. 44)	18.0- 8.8
Unit 4 1669.0-1670.9 (1.9)	Sandstone, quartz-cemented, porous, friable, fine to coarse grained; horizontal and cross-lamination; sets of cross-laminae to 2.5 cm	8.8- 6.9

Lithological Log

Depth below head of well; thickness (feet)	General lithology Description of selected specimens	Height above base of formation (feet)
Unit 3 1670.9-1675.7 (4.8)	Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained, pebbly; horizontal and cross-lamination; sets of cross-laminae to 3 cm At 1670.9-1671.0 ft. Pol. sect., thin sect. Sandstone, very light grey, fine to coarse grained, poorly sorted, with quartz pebbles to 1 cm; vague horizontal lamination; composed mainly of quartz with relatively common feldspar and trace amounts of muscovite, zircon, tourmaline; quartz rounded to subangular; larger grains composite	6.9- 2.1
Unit 2 1675.7-1677.6 (1.9)	Sandstone, quartz-cemented, porous, friable, very fine to very coarse grained, with granules; in part silty, micaceous; horizontal and cross-lamination; sets of cross-laminae to 1.3 cm; some oxidized pyrite	2.1- 0.2
Unit 1 1677.6-1677.8 (0.2)	Pebble conglomerate, sandy At 1677.6-1677.8 ft. Pol. sect., thin sect. Pebbles to 3.5 cm, rounded, in sandy and argillaceous matrix; pebbles composed of quartz and quartz-feldspar aggregates; sand very fine to very coarse grained, poorly sorted; composed mainly of quartz and minor feldspar, subrounded to subangular, less biotite, and trace amounts of muscovite and zircon; clay minerals(?) in interstices Nonconformity.	0.2- 0.0
	PRECAMBRIAN	
1677.8-1745.0 (67.2)	Biotite gneiss; upper one foot fractured and extremely altered; macroscopically visible alteration extends to about 1700 feet At 1684.9 ft. Pol. sect., thin sect. Composed mainly of quartz, feldspar, and biotite, with minor muscovite, zircon, carbonate, epidote; pink K-feldspar to 6 mm; identifiable feldspar is mainly microcline; much of the feldspar altered beyond recognition by clay minerals; some myrmekitic intergrowths; biotite partly chloritized At 1744.8 ft. Thin sect. Composed mainly of quartz, microcline, orthoclase, plagioclase (prob. calcic oligoclase), biotite; myrmekitic and perthitic intergrowths common; plagioclase and, to a lesser extent, K-feldspar show argillaceous alteration, but much less so than in specimen at 1684.9; feldspar is altered, also, by sericite and epidote; biotite partly altered by chlorite	

Identification of macrofossils by B.S. Norford

(Map-unit O_{1s})

Depth in feet and GSC loc.	Fauna
578.5 (C-17328)	*Catenipora* cp.
590 (C-17329)	indeterminate streptelasmid coral
600 (C-17330)	*Bighornia parva* Duncan *Catenipora* aff. *C. rubra* Sinclair and Bolton
601 (C-17331)	indeterminate streptelasmid coral
605 (C-17332)	*Bighornia parva* Duncan *?Deiracorallium* sp.
611 (C-17333)	*Bighornia parva* Duncan
613 (C-17334)	*Catenipora* sp.
615 (C-17335)	bored and abraded indeterminate streptelasmid coral
616 (C-17336)	indeterminate streptelasmid coral *?Catenipora* sp.
621 (C-17337)	*Palaeophyllum* sp. *Catenipora* sp.
622 (C-17338)	indeterminate streptelasmid coral
626.5 (C-17339)	*Bighornia* sp. *Catenipora* sp.
628.5 (C-17340)	*Deiracorallium* sp.
633.5 (C-17341)	*?Deiracorallium* sp. *Catenipora* sp.
641.5 (C-17342)	*Bighornia* sp.
644.5 (C-17343)	dendroid graptolite(?) *Bighornia* sp.
645.5 (C-17344)	*Bighornia parva* Duncan
648 (C-17345)	indeterminate gastropod
656.5 (C-17346)	indeterminate fossil
665 (C-17347)	*Bumastoides* sp.
666.5 (C-17348)	indeterminate fossil
680 (C-17349)	large inarticulate brachiopod
686 (C-17350)	bryozoan (to Bolton for study)
690 (C-17351)	indeterminate fragment of large trilobite
693.5 (C-17352)	*?Deiracorallium* sp.
695 (C-17353)	*?Lobocorallium* sp.
700 (C-17354)	bryozoans (to Bolton for study)
701 (C-17355)	*Deiracorallium manitobense* Nelson *Catenipora* sp.
705.5 (C-17356)	indeterminate fossil
772.5 (C-17357)	*Catenipora* cf. *C. stearni* Nelson
774 (C-17358)	*Catenipora* sp.
777.5 (C-17359)	indeterminate streptelasmid coral
785 (C-17360)	strophomenid brachiopod
788.5 (C-17361)	*Grewingkia robusta* (Whiteaves)
795 (C-17362)	undetermined tabulate coral *Catenipora* 2 spp.
802 (C-17363)	*Grewingkia* sp. *Catenipora* sp.
803 (C-17364)	*?Grewingkia* sp.
812.5 (C-17365)	*Catenipora* sp.
813.5 (C-17366)	*Catenipora* sp.
814 (C-17367)	*Catenipora* cf. *C. stearni* Nelson
816 (C-17368)	*Grewingkia* sp.
856 (C-17369)	indeterminate streptelasmid coral
898 (C-17370)	indeterminate high-spired gastropod
899 (C-17371)	*?Maclurites* sp.

Depth in feet and GSC loc.	Fauna
913 (C-17372)	*Maclurites* sp. *Catenipora* sp.
924 (C-17373)	*Catenipora* sp.
943 (C-17374)	*Catenipora* sp.
969 (C-17375)	*Catenipora* sp.
970 (C-17376)	indeterminate streptelasmid coral
974 (C-17377)	*?Maclurites* sp.
1014.5 (C-17378)	indeterminate large high-spired gastropod
1031.5 (C-17379)	*?Maclurites* sp.
1033 (C-17380)	*?Grewingkia* sp.
1039 (C-17381)	indeterminate streptelasmid coral undetermined tabulate coral
1045 (C-17382)	*?Maclurites* sp.
1066 (C-17383)	*?Grewingkia* sp.
1124.5 (C-17384)	*?Chaetetipora* sp.

Comments

Many of the collections contain fragments of echinoderms, bryozoans, gastropods, trilobites and brachiopods in addition to the listed forms.

Two assemblage zones can be discriminated. The upper zone extends from 600 to 701 feet (182.9-213.7 m), is about Ashgillian in age, and corresponds to Division B in the Kaskattama Province No. 1 well of northern Manitoba (Norford, 1970). The Churchill River Group of the surface rocks of northern Manitoba contains faunules (Nelson, 1963) representing Division B. The assemblage from 600 to 701 feet (182.9-213.7 m) in the Rowley M-04 well is more like the faunules from the lower part of the Churchill River Group (Caution Creek and basal Chasm Creek Formations) than to those from the upper part. Division B is about 290 feet (88.4 m) thick in the Kaskattama well and the interval in the Rowley Island well probably represents the lower half of the biostratigraphic division.

The lower zone extends from at least 772.5 to 1,066 feet (235.5-324.9 m) and perhaps to beyond 1,124.5 feet (342.7 m). It is about late Caradocian in age and corresponds to Division A in the Kaskattama Province No. 1 well and to the Bad Cache Rapids Group of the northern Manitoba outcrops. Division A is about 325 feet (99.1 m) thick in the Kaskattama well.

Identification of conodonts by C.R. Barnes

In the following identifications, the suffix s.f. designates form species, otherwise multi-element taxonomy is employed. The number of specimens also is recorded (in brackets).

Ship Point Formation

Member B

Depth in feet and GSC loc.	Fauna
1140.45-1141.1 (C-23082)	*Acodus auritus* Harris s.f. (2) *Belodella* n. sp. s.f. (3) *Chosonodina?* sp. A s.f. of Sweet *et al.* (1971) (1) *Drepanoistodus* cf. *D. homocurvatus* Lindström (6) *Multioistodus compressus* Harris and Harris (1) *Oistodus* n. sp. (3) *Oulodus* n. sp. (5) *Phragmodus* n. sp. A of Sweet *et al.* (1971) (15) *Scolopodus?* sp. (1)
1145.7-1146.2 (C-23083)	*Acodus auritus* Harris s.f. (2) *Belodella* n. sp. s.f. (1) *Drepanoistodus* sp. cf. *D. homocurvatus* Lindström (5) *Oulodus* n. sp. (3) *Phragmodus* n. sp. A of Sweet *et al.* (1971) (9) hyaline prioniodiniform elements (2)
1148.0-1148.75 (C-23084)	*Acodus auritus* Harris s.f. (7) *Belodella* n. sp. s.f. (8) *Drepanoistodus* cf. *D. homocurvatus* Lindström (21) *Multioistodus compressus* Harris and Harris (4) *Oistodus* n. sp. (1) *Oneotodus* cf. *O. ovatus* (Stauffer) s.f. (1) *Oulodus* n. sp. (3) *Phragmodus* n. sp. A of Sweet *et al.* (1971) (29) *Scolopodus* sp. (1)
1351.85-1352.15 (C-18107)	*Acodus auritus* Harris and Harris s.f. (2) *Cordylodus* sp. s.f. (1) *Distacodus stola* Lindstrom s.f. (1) *Drepanodus* sp. cf. *D. homocurvatus* Lindström (1) *Oistodus* sp. cf. *O. inclinatus* Branson and Mehl s.f. (2)

Depth in feet and GSC loc.	Fauna
1352.5-1352.95 (C-18108)	*Acodus auritus* Harris and Harris s.f. (6) *A.* n. sp. s.f. (2) *Distacodus stola* Lindström s.f. (3) *Drepanodus* sp. cf. *D. homocurvatus* Lindström s.f. (3) *D.* sp. s.f. (3) *Oistodus* sp. cf. *O. inclinatus* Branson and Mehl s.f. (7)
1355.3-1356.0 (C-18109)	*Acontiodus* n. sp. s.f. (1)(of Ethington and Clark, 1965) *Cordylodus* sp. s.f. (1) *Distacodus stola* Lindström s.f. (1) *Drepanodus subarcuatus* Furnish s.f. (2) *Oistodus* sp. cf. *O. inclinatus* Branson and Mehl s.f. (1) *O.* n. sp. s.f. (1) *Paltodus* sp. s.f. (1)
1370.0-1370.5 (C-18110)	*Acontiodus* sp. cf. *A. staufferi* Furnish s.f. (1) fibrous conodont indet. (1)
1370.5-1371.2 (C-18111)	*Cordylodus* sp. s.f. (1) *Erismodus?* sp. s.f. (1) *Oistodus* sp. s.f. (1) *Scolopodus* sp. cf. *S. gracilis* Ethington and Clark (2) *S. quadraplicatus* Branson and Mehl (1)
	Member A
1416.3 (C-22952)	*Acodus auritus* Harris s.f. (3) *Drepanoistodus* cf. *D. homocurvatus* Lindström (1)
1430.5 (C-22953)	*Acodus auritus* Harris s.f. (5) *Acontiodus* cf. *A. staufferi* Furnish s.f. (1) *Drepanoistodus* cf. *D. homocurvatus* Lindström (6) *Scandodus* sp. s.f. (1) *Scolopodus quadraplicatus* Branson and Mehl (3) *Stolodus stola* Lindström (3)

Comments

Samples from GSC localities C-23082 to C-23084 yielded a diverse fauna that has been recognized previously from the upper Ship Point Formation. The fauna, with the distinctive new species of *Phragmodus*, *Belodella*, and *Oulodus*, is Fauna 4 of Sweet *et al.* (1971), and these elements from the Arctic are discussed and illustrated by Barnes (1974). The age of the fauna is late Whiterockian to Porterfieldian (i.e. Chazyan; late Llanvirnian to earliest Caradocian).

The conodonts from GSC localities C-18107 to C-18111 and C-22952 to C-22953 also are characteristic of the Ship Point Formation but do not permit a specific assignment within the late Early to early Middle Ordovician range of the formation. The more stratigraphically restricted components [*Acodus auritus* (transition series) *Distacodus stola*, *Drepanodus subarcuatus*, *Acontiodus* sp. cf. *A. staufferi*, *Scalopodus gracilis*] are all known from strata of late Early Ordovician (late Arenigian) and early Middle Ordovician (Llanvirnian; Whiterockian) age. The species present also are known from the Eleanor River Formation of Devon Island.

Potassium-argon age determination
by R.K. Wanless and others

Depth: 1744-1745 feet

Material dated: biotite - clean, fresh, pale brownish olive colour, with no visible contamination

Age: 1623±40 m.y.

K: 7.55%

Radiogenic Ar: 98.8%

Comments (by H.P.T.): The age determination conforms with other apparent ages from the Churchill Province and suggests recrystallization or argon loss during the "Hudsonian orogeny". The relatively young age within the broad group of "Hudsonian" ages may be due to a moderate amount of alteration related to the sub-lower Paleozoic unconformity.

APPENDIX 3

TABULATION OF SOME PETROGRAPHIC DATA

TABLE 1: MAP-UNIT O_{1s}

(Specimens from Rowley Island well and surface localities)

Organization of table and abbreviations

General information (1-6)

(2) Loc. = abbreviated location

(3) Loc. no. = field or well no.

(4) Ftge., sp. no. = footage in well or measured section; specimen no. where deviating from footage.

(5) Recd. = Record
TS = thin section
PL = peel
CD = X-ray diffractogram of calcite and dolomite
WR = X-ray diffractogram of whole rock

(6) Rk. tp. = rock types
Ls 1 = dolomitic limestone type 1
Ls 2 = dolomitic limestone type 2
Dol 1 = calcareous dolostone, related to dolomitic limestone type 1
Mdst. = dolomitic mudstone

Optical analysis (7-30)

Gross features (7-11)

(7) Col. = colour of polished surface
BN = pale yellowish brown
BN/OR = pale yellowish brown with irregular patches, stringers, or tubes of very pale orange to greyish orange
OL = light olive grey with or without patches of light greenish grey to greenish grey
OL/GR = light olive grey with irregular patches and/or concentric but irregular crusts of medium grey
GNGY = greenish grey

(8) Bdg. = bedding
M = massive at scale of specimen
HOR/ID/1-3 = horizontal lamination, indistinct; laminae 1 to 3 mm thick

(9) Sol. zn. = solution zones

(10) Opgs. = openings
FS 1/10 CAL = fissure, about 1 mm wide, 10 mm long; filled with calcite
VG/30+/P/CAL = vug, more than 30 mm in diameter, partly filled with calcite

(11) Burr. = burrows
TRNS 3-5 = transverse sections of burrows; diameters 3-5 mm
LONG 1-2/-10 hor, incl, vert = longitudinal sections of burrows; 1-2 mm in diameter, up to 10 mm long; horizontal, inclined, vertical

Fossils and ooids (12-23)

(12) Foss. cont. - fossil content
H = high
M = medium
L = low

(13) Mx. len. = maximum length of fossil fragments in mm

Abundance of the most diagnostic elements (14-23)

XX = relatively common
X = present

(14) Alg. cyc. - cyclocrinitid algae

(15) Cor. sol. = solitary corals

(16) Cor. col. = colonial corals
CH = chain coral
O = other

(17) Bryo. = bryozoans

(18) Brach. = brachiopods

(19) Gastr. = gastropods

(20) Ostr. = ostracodes

(21) Tril. = trilobites

(22) Ech. = echinoderms

(23) Oth. = others
SP = siliceous sponge spicule
PEL = pelecypod
OOL = ooids

Mineral composition (24-30)

Carbonates (24-25)

(24) Tot. cb. = total carbonate content
VH = very high
H = high
M = medium
L = low

(25) Dol. = Proportions of dolomite within total carbonate fraction
H = high
M = medium
L = low

Noncarbonates (26-30)

XX = relatively common with noncarbonate fraction
X = present
TR = trace amount
ST = silt grade
VFSD = very fine grained sand grade

(26) Qzt. = quartz

(27) Cht. = chert

(28) Fsp. = feldspar

(29) Mus. = muscovite

(30) Pyr. = pyrite

X-Ray diffraction analysis

Dolomite/calcite ratios (31-32)

(31) dol/dol + cal = percentage of dolomite within total carbonate fraction expressed as: (dolomite peak/ dolomite peak + calcite peak) x 100

(32) dol/dol + cal* = corrected dolomite percentage according to Royse *et al.* (1971); value of (31) + 2.3; confidence limits are ± 6% at the 95% confidence level

Peak heights (37-43)

(Expressed as percentage of sum of peak heights)

(33) Cal. pk. = calcite peak

(34) Dol. pk. = dolomite peak

(35) Qtz. pk. = quartz peak; represents quartz plus chert

(36) Fsp. pk. = feldspar peak

(37) Ill. pk. = illite peak; represents illite plus muscovite

(38) Chl. pk. = chlorite peak

(39) Pyr. pk. = pyrite peak

In most instances, analyses were repeated if a peak projected beyond the diffractogram. An asterisk (*) indicates cases where a peak projects beyond the diffractogram and the analysis was not repeated.

DATA																			
GENERAL INFORMATION	(1) #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	(2) Loc.	Rowley S																
	(3) Loc. no.	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04
	(4) Ftge., sp. no.	450-460	460-470	470-480	480-490	490-500	500-505	505.0-505.4	520.0-520.25	540.0-540.3	560.0-560.25	580.0-580.5	600.0-600.4	620.0-620.1	640.0-640.85	660.0-660.1	680.0-680.1	699.0-700.0
	(5) Recd.	TS/WC	TS/WC	TS/WC	TS/WC	TS/WC	TS/WC	TS, PL, WR	PL	PL	TS, WR	PL	PL	TS, WR	PL	TS, WR	PL	PL
	(6) Rk. tp.	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1
OPTICAL ANALYSIS	(7) Col.							BN/OR	BN	BN/OR	BN/OR	BN/OR-OL	BN/OR-OL	OL	OL	OL	OL	OL-BN
	(8) Bdg.							M	M	M	M	M	M	M	M	M	M	M
	(9) Sol. zn.							X	X	X	X	XX	XX	X	XX	XX	XX	X
	(10) Opgs.								FS 0.5/7 CAL		FS 0.2/15 CAL				FS 0.5/17 CAL	FS 0.1/13 CAL		
	(11) Burr.							TRNS 3-5		TRNS 3		TRNS 1		TRNS 4	TRNS 1-2			TRNS 1-4 LONG 1.3/11 hor.
	(12) Foss. ct.	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H
	(13) Mx. len.							4	2.4	2	2.5	7	4	4	8	1.4	1.4	8
	(14) Alg. cyc.	XX	XX	XX			X	XX	XX	XX	XX	XX	XX	XX	X	X	X	X
	(15) Cor. sol.												X		X			
	(16) Cor. col.					?CH		?CH	X				X		X,CH,O			X
	(17) Bryo.							X					X	?	X	X		X
	(18) Brach.	X		?	X		X	X	X	X	X	X	X	X	X	X		X
	(19) Gastr.							X	X	X		X	X	X			X	X
	(20) Ostr.	X	X	?		X		X	X	X				X				X
	(21) Tril.	X	X	X	X	X	X	XX	X	X	X	XX	XX	X	XX	X	X	XX
	(22) Ech.	X	X	X	X	X	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	X	XX
	(23) Oth.																	
	(24) Tot. cb.	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	H	VH
	(25) Dol.	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	(26) Qtz.							TR/ST			TR/ST			TR/ST		TR/ST		
	(27) Cht., Chalc.																	
	(28) Fsp.																	
	(29) Mus.																	
	(30) Pyr.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XX	X
X-RAY DIFFRACTION ANALYSIS	(31) dol/dol+cal							3.5			1.8			5.2		21.6		
	(32) dol/dol+cal *							5.8			4.1			7.5		23.9		
	(33) Cal. pk.							94			91			89		61		
	(34) Dol. pk.							3			2			5		17		
	(35) Qtz. pk.							2			5			5		17		
	(36) Fsp. pk.							1			1			1		2		
	(37) Ill. pk.							tr			1			tr		1		
	(38) Chl. pk.															2		
	(39) Pyr. pk.																	

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Table 1. Map-unit Ols

DATA																			
GENERAL INFORMATION	(1) #	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	(2) Loc.	Rowley S																
	(3) Loc. no.	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04
	(4) Ftge., sp. no.	720.0-720.7	740.0-740.7	760.0-760.65	780.0-780.3	785.0-785.4	820.0-820.45	840.0-840.3	860.0-860.25	880.0-880.3	900.0-900.6	920.0-920.5	934.75-935.0	940.0-940.3	960.0-960.4	980.0-980.4	1000.0-1000.4	1020.0-1020.4
	(5) Recd.	PL	TS, PL, WR	PL		TS, WR	TS, PL, WR	PL	PL	PL	TS, PL, WR	PL	PL	PL	TS, PL, WR	PL	PL	PL
	(6) Rk. tp.	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1
OPTICAL ANALYSIS	(7) Col.	OL-BN	OL	OL	OL	OL	OL	OL	OL	OL	OL	BN/OR	OL	OL	OL-BN	OL	OL	OL
	(8) Bdg.	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
	(9) Sol. zn.	X	X	X	XX	XX	X	X	X	X	X	X	X	X	X	X	X	X
	(10) Opgs.												VG 30+P/CAL					
	(11) Burr.	TRNS 2-4	TRNS 2-5	TRNS 2-3	TRNS 1-3	TRNS 1.5	TRNS 1-5	TRNS 1	TRNS 2		TRNS 2	TRNS 2-3	TRNS 2.5	TRNS 1.5-2.5				TRNS 1.5
	(12) Foss. ct.	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
	(13) Mx. len.	11	13	11	3.5	7	8	6	5	4	15	4	6.3	4	10	5	12	6.8
	(14) Alg. cyc.	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	X	XX	X	X	X	XX	X
	(15) Cor. sol.														X			
	(16) Cor. col.	X		?		X				X	X,CH	X			X,CH		X	
	(17) Bryo.		X		?	X		X	X	X	X		X					
	(18) Brach.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	(19) Gastr.	X	X	XX	X	X	X	X	X	X	X	X	X	X	XX	X	XX	X
	(20) Ostr.	X	X		?	X	X			X	X	?		?	X	X		X
	(21) Tril.	XX	XX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	(22) Ech.	XX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	X
	(23) Oth.						PEL?				PEL?		PEL?					
	(24) Tot. cb.	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH
	(25) Dol.	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
	(26) Qtz.		TR/ST				TR/VFSD				TR/ST							
	(27) Cht., Chalc.																	
	(28) Fsp.										?TR/VFSD							
	(29) Mus.																	
	(30) Pyr.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
X-RAY DIFFRACTION ANALYSIS	(31) dol/dol+cal		4.8			2.5	15.3				15.8				12.8			
	(32) dol/dol+cal*		7.1			4.8	17.6				18.1							
	(33) Cal. pk.		92			94	79				79				82			
	(34) Dol. pk.		4			3	14				15				12			
	(35) Qtz. pk.		4			3	7				3				5			
	(36) Fsp. pk.						tr				2				1			
	(37) Ill. pk.										tr				tr			
	(38) Chl. pk.																	
	(39) Pyr. pk.										1							

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Table 1. Continued

DATA																		
GENERAL INFORMATION	(1) #	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	(2) Loc.	Rowley S																Foley
	(3) Loc. no.	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	M-04	45
	(4) Ftge., sp. no.	1040.0-1040.05	1049.5-1049.95	1050.5-1050.95	1059.4-1060.0	1062.5-1063.1	1078.55-1078.6	1080.0-1080.55	1100.0-1100.2	1105.0-1105.45	1110.0-1110.3	1120.0-1120.4	1123.2-1123.4	1123.4-1123.6	1128.1-1128.8	1129.0-1129.45	1129.45-1129.65	243
	(5) Recd.	TS, WR	PL	TS, PL	TS, PL, WR	PL	TS, WR	PL	PL	TS, PL, WR	PL	PL	PL	TS, PL, WR	PL	PL, WR	TS, WR	TS, WR
	(6) Rk. tp.	LS 1	LS 1	LS 2	LS 1	LS 1	Mudst.	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1
OPTICAL ANALYSIS	(7) Col.	OL	OL	OL	OL/GR	OL/GR BN/OR	GNGY	OL	OL	OL/GR	BN/OR-OL	OL/GR	GNGY	OL/GR	OL-BN	OL	OL	BN/OR
	(8) Bdg.	M	M	M	M	M		M	M	M	M	M	M	M	M	M	M	M
	(9) Sol. zn.	X	X	X	X	X	?HOR/ID/1-3	X	X	X	X	X	X	X	XX	XX	XX	X
	(10) Opgs.																	
	(11) Burr.	TRNS 1.5		CASTS 2.5-4/35 hor, incl, vert	TRNS 1-3.5 LONG 0.7/7 hor	TRNS 1.5-2.5		TRNS 1-2	TRNS 1-2.5	TRNS 0.5	LONG 2-3/20 hor, incl, vert	TRNS 3	TRNS 2	TRNS 2-4	TRNS 2-4 LONG 1/9 incl	TRNS 1 LONG 1/8 incl, hor		LONG -7/-45 hor, incl, vert
	(12) Foss. ct.	H	H	M	M	M-H	L	H	H	H	L	M	L	M	M	M-H	M	H
	(13) Mx. len.	3.5	10	2	11	4	1	11	4	3	6	5	1	3	5	16	4	7
	(14) Alg. cyc.	XX		X														X
	(15) Cor. sol.																	
	(16) Cor. col.				?			X										
	(17) Bryo.			X	X	XX			X	X		X	X		X	X		
	(18) Brach.	XX	X		X	X	X	XX	X	X			X	X	X	X	X	X
	(19) Gastr.									X	X	X		X		X		
	(20) Ostr.	X	?	X	X	?		X	?	X		?			X	X	X	X
	(21) Tril.	XX	XX	X	XX	XX	X	XX	X	XX	X	X	X	X	XX	XX	XX	XX
	(22) Ech.	XX	XX	X	XX	XX		XX	XX	XX		XX	X	X	X	X	X	X
	(23) Oth.																	
	(24) Tot. cb.	VH	H	M-H	VH	VH	M	VH	VH	VH	VH	VH	VH	VH	VH	VH	H	VH
	(25) Dol.	L	L	L	L	L	VH	L	L	L	L	L	L-M	L	L	L	L	L
	(26) Qtz.			TR/ST			XX,ST			X(RX CHT?)				X/ST-FSD			XX/ST-FSD	XX/ST-VFSD
	(27) Cht., Chalc.									X,CHT							TR/CHALC	
	(28) Fsp.			TR/ST			? ST										X/ST-FSD	TR/ST-VFSD
	(29) Mus.						X,ST											
	(30) Pyr.	X	XX	X	X	XX	X	X	X	X	X	X	X	X	X	X	X	X
X-RAY DIFFRACTION ANALYSIS	(31) dol/dol+cal	6.0			19.3		78.3			1.8				5.3			5.1	1.8
	(32) dol/dol+cal*				21.6		80.3			4.1				7.6			7.4	4.1
	(33) Cal. pk.	89		79*	67		10			96				84			87	94
	(34) Dol. pk.	5		5	16		36			2				5			5	2
	(35) Qtz. pk.	4		13	15		36			2				8			7	4
	(36) Fsp. pk.	1		1	2		3							2			1	tr
	(37) Ill. pk.	1		1	tr		8											
	(38) Chl. pk.						6											
	(39) Pyr. pk.			1			1							1				

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Table 1. Continued

DATA																			
GENERAL INFORMATION	(1) #	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66		
	(2) Loc.	Foley	Koch NE	Koch SW	Munk W	Steensby SW		Inuktorfik NE	Roche W		Roche E		Quilliam S	Igloolik				
	(3) Loc. no.	45	22	23b	53a	25	25	16	35	35	36b	36	34	37	37a	62		
	(4) Ftge., sp. no.	246 (No. 1)	(No. 1)		(No. 2)	(No. 13)	(No. 14)		93	148		269	242	27.5				
	(5) Recd.	TS, WR	TS, CD	TS, PL, CD	PL	TS	PL, WR	PL, CD	PL, CD	TS, CD	TS	TS	PL, CD	TS, PL, CD	TS	TS, CD		
	(6) Rk. tp.	LS 1	LS 1	Dol. 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	LS 1	Dol. 1		
OPTICAL ANALYSIS	(7) Col.	BN	BN/OR	OL	OL-BN/OR	BN/OR	OL	BN/OR	BN/OR	BN/OR	OL	BN	BN/OR	OL	BN/OR	OL		
	(8) Bdg.	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M		
	(9) Sol. zn.	X			X	X	X	X	X	X	X		X					
	(10) Opgs.														FS 0.5/-1 CAL			
	(11) Burr.	LONG 0.7-13 hor	TRNS 1	TRNS 3-4	TRNS 0.8-3.5	TRNS 3-4		TRNS 2	TRNS 2		TRNS 1.5	TRNS 2		TRNS 2-3	TRNS 1.5-3.5	TRNS 4		
	(12) Foss. ct.	H	H	M	H	H	M	H	H	H	H	M	H	H	L	H		
	(13) Mx. len.	10	3	3	4	10	4	7	7	4	10	3	2	3	6	3.5		
	(14) Alg. cyc.	X	X		X	X	?	?	X	X	X	X	X					
	(15) Cor. sol.										X							
	(16) Cor. col.										X							
	(17) Bryo.				X	X			X	X	X	X		X				
	(18) Brach.	X	X		X	X	X	X		X	X	X	X	X	X	X		
	(19) Gastr.				X			X	X	X		X	X	X	X			
	(20) Ostr.	X	?	?	?	X	X	X		X	X	X	X	X		X		
	(21) Tril.	XX	XX	X	X	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX		
	(22) Ech.	XX	XX	XX	X	X	X	XX	X	X	X	XX	X	X	X	X		
	(23) Oth.	SP FOR								OOL						PEL?		
	(24) Tot. cb.	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH	VH		
	(25) Dol.	L	L	M	L	L	L	L	L	L	L	L	L-M	M	L	M		
	(26) Qtz.	TR/ST-VFSD	TR/ST	X/ST-VFSD		TR/ST-VFSD				TR/ST-VFSD	TR/ST	TR/ST-VFSD	X					
	(27) Cht., Chalc.	X																
	(28) Fsp.	TR/VFSD		TR/ST-VFSD														
	(29) Mus.																	
	(30) Pyr.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
X-RAY DIFFRACTION ANALYSIS	(31) dol/dol+cal	7.1	19.0	58.1			6.0	9.5	17.8	7.8			31.2	40.9		58.1		
	(32) dol/dol+cal*	9.4	21.3	60.4			8.3	11.8	20.1	10.1			33.5	43.2		60.4		
	(33) Cal. pk.	84					86											
	(34) Dol. pk.	6					6											
	(35) Qtz. pk.	9					6											
	(36) Fsp. pk.	1					1											
	(37) Ill. pk.																	
	(38) Chl. pk.						1											
	(39) Pyr. pk.																	

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Table 1. Continued

TABLE 2: MAP-UNIT OS_{cb}

(Thin-section analysis of drill cuttings from Rowley Island well)

Method

Four to five cuttings from each ten-foot (3.048 m) interval were mounted on a glass slide, ground to standard thin-section thickness, and stained prior to covering. Some cuttings and one entire interval were lost during the grinding. The stain consisted of alizarine red S (to distinguish calcite and dolomite) and potassium ferricyanide (to distinguish ferroan calcite) but was not totally satisfactory in every case so that the identification of calcite and dolomite is somewhat interpretative.

Organization of table and abbreviations

General information

Ftge. = footage; depth below head of well in feet

Cutting # = cuttings are referred to in clockwise order, beginning in the upper left

Optical analysis

Limestones

crypto- to microcrystalline

plain = fossils or pellets not recognized
fossil. = fossiliferous
pell. = pelletal
fossil. & pell. = fossiliferous and pelletal

micro- to medium crystalline = rocks are mainly microcrystalline to finely crystalline but range up to medium crystalline in some cases

Dolostones

crypto- to microcrystalline = crypto-crystalline grains are present, but microcrystalline grains predominate

plain = fossils not recognized
fossil. = fossiliferous

Fossils = identified fossil fragments; undetermined fossil fragments are not listed

algae = probably mainly cyclocrinitid algae
cherty spicules = probably mainly sponge spicules
brachs. = brachiopods
gastr. = gastropods
ostr. = ostracodes
tril. = trilobites
ech. = echinoderm columnals

Other abbreviations

X = lithology or fossil identified
D = dolomitic; dolomite is mainly microcrystalline
CA = calcareous; calcite is mostly crypto-crystalline to microcrystalline
CH = cherty
ST = silty
IN = intraclast(s)
LAM = laminated

FTGE.	CUTTING#	LIMESTONE					DOLOSTONE		SANDSTONE	FOSSILS							
		CRYPTO- TO MICROCRYSTALLINE				MICRO- TO MEDIUM CRYST.	CRYPTO- TO MICROCRYSTALLINE			ALGAE	CHERTY SPICULES	BRACHS.	GASTR.	OSTR.	TRIL.	ECHIN.
		PLAIN	FOSSIL.	PELL.	FOSS. & PELL.		PLAIN	FOSSIL.								
0-10	1		X,D													?
	2	X,D														
	3						X,CA									
	4			X,D												
20-30	1		X,D									X			X	X
	2		X,D													X
	3	X														
	4		X,D													X
30-40	1		X,D													
			X									X				X
	3							X, CA								
40-50	1		X,D													X
	2		X,D									X				
	3		X,D									X				
50-60	1				X, D							X			X	
	2							X,CH				X				
	3						X,CH									
60-70	1				X, D,CH											
	2		X,D													
	3		X							X		X				
	4		X,D									X				
80-90	1							X,CA				X				
	2		X,D													X
	3						X,CA,IN									
90-100	1						X,CH,CA									
	2		X,CH													
	3 *		X									X				
	4				X,D											
100-110	1				X							X			X	
	2		X									X				X
	3								X							
	4						X,CH,CA									
110-120	1		X,D									X				
	2				X, D,CH											?
	3				X,D							X				
120-130	1				X,D						X				X	
	2				X,D											X
	3		X,D									X				X
	4				X,CH,D						X					
130-140	1				X,CH					X	?				X	X
	2			X,D												
	3			X,D												
	4		X,D													X
140-150	1				X,D							X			X	X
	2	X,D														
	3				X,D							X				X
	4				X											X

GSC

Table 2. Map-unit OScb

FTGE.	CUTTING#	LIMESTONE					DOLOSTONE		SANDSTONE	FOSSILS						
		CRYPTO- TO MICROCRYSTALLINE				MICRO- TO MEDIUM CRYST.	CRYPTO- TO MICROCRYSTALLINE			ALGAE	CHERTY SPICULES	BRACHS.	GASTR.	OSTR.	TRIL.	ECHIN.
		PLAIN	FOSSIL.	PELL.	FOSS. & PELL.		PLAIN	FOSSIL.								
150-160	1	X														
	2	X,D														
	3	X,D														
	4	X,D														
	5				X,D,CH							X	X			X
160-170	1	? ,D														
	2		X													X
	3						X									
	4					X										
170-180	1						X									
	2						X									
	3						X									
	4						X									
180-190	1		X,D													
	2		X													
190-200	1		X											X		
	2		X							?		X	X		X	
	3		X,D													
	4		X,D													
200-210	1		X,D									X				X
	2		X									X				X
	3		X									X				
	4		X									X				
210-220	1		X,D											?		
	2				X										?	
	3						X									
	4						X									
220-230	1			X,D												
	2	X														
	3						X									
	4					X,CH										
230-240	1					X										
	2			X,D												
	3			X,D												
	4			X,D,IN?												
240-250	1						X									
	2	X														
	3	X														
	4	X														
250-260	1						X									
	2						X									
	3						X									
	4						X									
260-270	1	X														
	2						X, CA									
	3	X														
	4						X									

GSC

Table 2. Continued

FTGE.	CUTTING#	LIMESTONE					DOLOSTONE CRYPTO- TO MICROCRYSTALLINE		SANDSTONE	FOSSILS							
		CRYPTO- TO MICROCRYSTALLINE				MICRO- TO MEDIUM CRYST.				ALGAE	CHERTY SPICULES	BRACHS.	GASTR.	OSTR.	TRIL.	ECHIN.
		PLAIN	FOSSIL.	PELL.	FOSS. & PELL.		PLAIN	FOSSIL.								
270-280	1	X,D														
	2	X,D														
	3						X									
	4						X, CA									
280-290	1	X														
	2						X									
	3						X, LAM									
290-300	1			? ,D												
	2	X,D														
	3				X,D,IN											X
	4	X														
300-310	1	? ,D														
	2		X										X			
	3	X														
	4		? ,D										X			
310-320	1						X,CA									
	2		X													X
	3		X													
	4	X														
320-330	1		X,D									X				
	2		X									X				
	3						X									
	4	X, D														
330-340	1		X,D													
	2							X,CA				X				
340-350	1		X									X				
	2	X, D														
	3		? ,D									X				?
350-360	1	X,D														
	2	X,D														
	3	X,D														
	4	X,D														
360-370	1	X,D														
	2	X,D														
	3						X,CA									
	4	X,D														
370-380	1	X,D														
	2	X,D														
	3	X,D														
	4	X,D														
	5	X,D														
380-390	1	X,D														
	2	X,D														
	3						X, CA									
	4	X														
390-400 (a)	1	X														
	2						X									
	3	X,ST														

GSC

Table 2. Continued

FTGE.	CUTTING#	LIMESTONE					DOLOSTONE CRYPTO- TO MICROCRYSTALLINE		SANDSTONE	FOSSILS						
		CRYPTO- TO MICROCRYSTALLINE				MICRO- TO MEDIUM CRYST.				ALGAE	CHERTY SPICULES	BRACHS.	GASTR.	OSTR.	TRIL.	ECHIN.
		PLAIN	FOSSIL.	PELL.	FOSS. & PELL.		PLAIN	FOSSIL.								
390-400 (b)	1															
	2					X,D										
	3			X,D												
	4		X													
400-410	1	X														
	2		X,D,IN?													
	3	X														
	4	X,D														
420-430	1	X,D														
	2	X,D														
	3				X									X		
	4	X,D														
430-440	1						X									
	2						X									
	3						X									
	4						X									
440-450	1						X,ST									
	2	X,D														
	3						X									

GSC

Table 2. Continued

Statistical Evaluation

Note: Uncertainties of interpretation are disregarded in this evaluation. Confidence limits cannot be stated but probably are in the order of a few per cent (rather than decimals of one per cent as suggested by the figures here).

Limestone		75.0	
Impurities:	dolomitic	64.1%	(of limestone fraction)
	cherty	5.9	
	silty	0.8	
Crystal size:	cryptocrystalline to microcrystalline	96.7	
	microcrystalline to medium crystalline	3.3	
Components:	no fossils, no pellets	43.3	
	fossils, no pellets	35.1	
	fossils plus pellets	14.1	
	fossils, with/without pellets (total)	49.2	
	pellets, no fossils	7.5	
	pellets plus fossils	14.1	
	pellets, with/without fossils (total)	21.6	

Relationship between crystal size and composition:

Fossils and pellets recognized only in cryptocrystalline to microcrystalline cuttings

Dolostone, cryptocrystalline to microcrystalline		24.4%	
Impurities:	calcareous	25.8%	(of dolostone fraction)
	cherty	10.2	
	silty	2.5	
Components:	fossils	13.5	
Sandstone		0.6%	

Recognition of fossils fragments

algae	in 4.2%	of cuttings
cherty spicules	in 4.2%	of cuttings
brachiopods	in 38.9%	of cuttings
gastropods	in 5.6%	of cuttings
ostracodes	in 4.2%	of cuttings
echinoderms	in 31.9%	of cuttings

APPENDIX 4

TERMINOLOGY AND PRESENTATION OF X-RAY DIFFRACTION ANALYSES

TERMS USED TO INDICATE THE SIZE RANGES OF CARBONATE CRYSTALS

The grades distinguished correspond to the Wentworth scale, and the nomenclature used has been adapted from Leighton and Pendexter (1962) and Drummond (1963). In this nomenclature, carbonate grains of sand size are described in terms of sand grades (i.e. as fine, medium, coarse, etc.), those of silt size are termed microcrystalline, and those of clay size, cryptocrystalline. Although the so-called cryptocrystalline grains are visible in thin section under the highest power objective, the term cryptocrystalline seems justified as optical tests cannot be made on these crystals.

2-1 mm.....very coarsely crystalline
1-0.5 mm.....coarsely crystalline
0.5-0.25 mm.....medium crystalline
0.25-0.12 mm.....finely crystalline
0.12-0.06 mm.....very finely crystalline

0.06-0.004 mm.....microcrystalline
0.06-0.03 mm.....coarsely microcrystalline
0.03-0.004 mm.....finely microcrystalline

0.004 mm or less.....cryptocrystalline

The term aphanitic should perhaps be restricted to microcrystalline and cryptocrystalline aggregates (e.g. Drummond, 1963). Many of the dolostones of Turner Cliffs and Ship Point Formations, however, range from microcrystalline to very finely crystalline. The term, therefore, is applied here to very finely crystalline and finer grained rocks that are not well enough known from thin-section studies to be described more specifically.

PRESENTATION OF X-RAY DIFFRACTION ANALYSES AND MINERAL TERMINOLOGY IN ROCK DESCRIPTIONS OF APPENDICES 1 AND 2

The numbers (e.g. quartz: 8) indicate the height of the main peak of the respective mineral expressed as a percentage of the sum of the main peaks of all minerals listed. Asterisks (e.g. dolomite: 80*) indicate peaks that project beyond the diffractogram.

It is well known that the peak-height ratios of different minerals are not proportional directly to the relative abundances of these minerals but also are dependent upon the minerals, their crystallinity, etc. The following correction factors were applied to the principal peak heights of the non-clay minerals by Bayliss *et al.* (1970) in a semiquantitative study:

quartz x 10
feldspar x 5
calcite x 4
dolomite x 3

A ratio of 2:8 was used for the principal peaks of chlorite:illite, which were analyzed separately.

The term "illite", when used with respect to refractograms, includes both illite *sensu stricto* and mica.

The term glauconite is used for "any small (up to a few mm in diameter) greenish clay pellets found in sedimentary rocks. This broad definition includes pellets which may contain the clay minerals chlorite, montmorillonite, and kaolinite" (Triplehorn, 1966).

COLOUR TERMINOLOGY

The colour designations used are those of the rock colour chart prepared by the Geological Society of America (Goddard, 1963).

PLATES 1-63

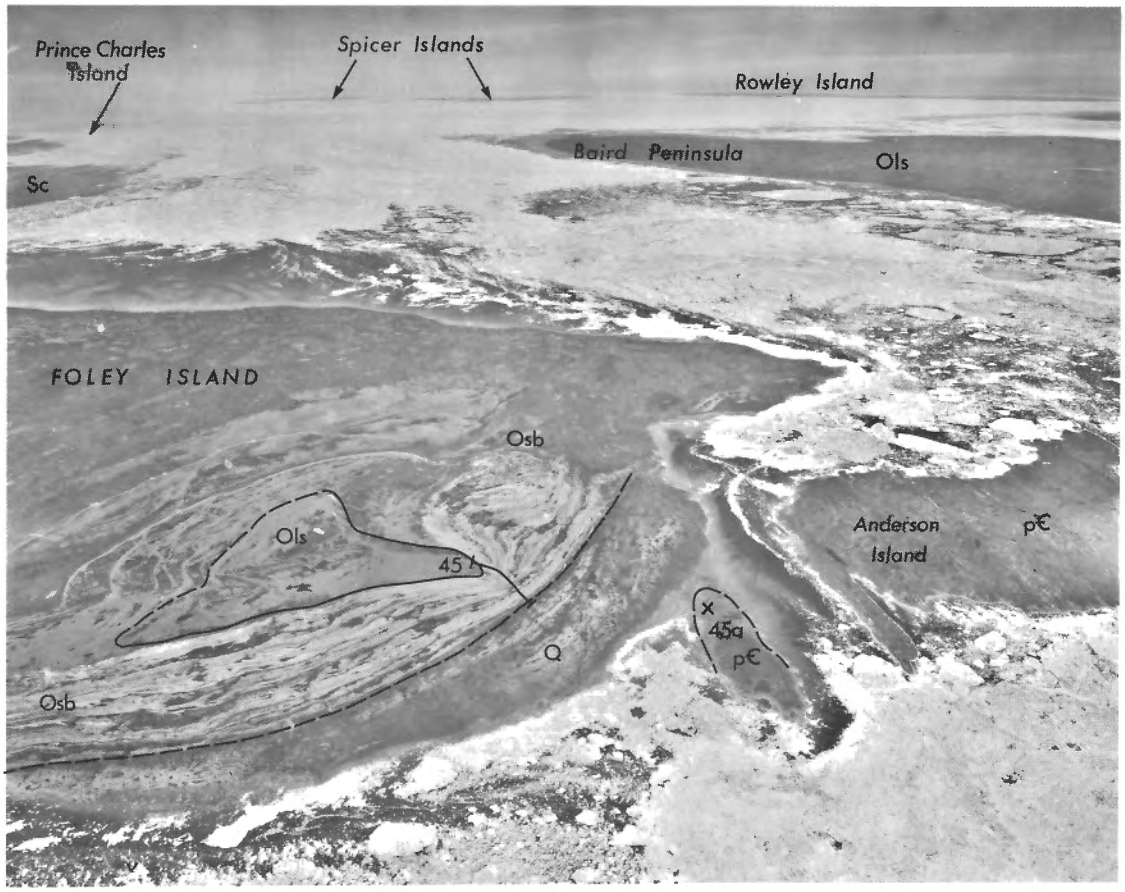


Plate 1. Anderson Bluff, Foley Island; view to the west. (Symbols as on geological map). Oblique aerial photograph T-221-L-8

Plate 2. Fault zone west of Parry Bay; view to the west. (Symbols as on geological map). The Precambrian rocks form a plateau that probably represents the elevated, stripped, and somewhat eroded surface on which the lower Paleozoic succession was deposited. The vertical separation of the fault probably exceeds 1,000 feet (300 m). Oblique aerial photograph T-247-R-102

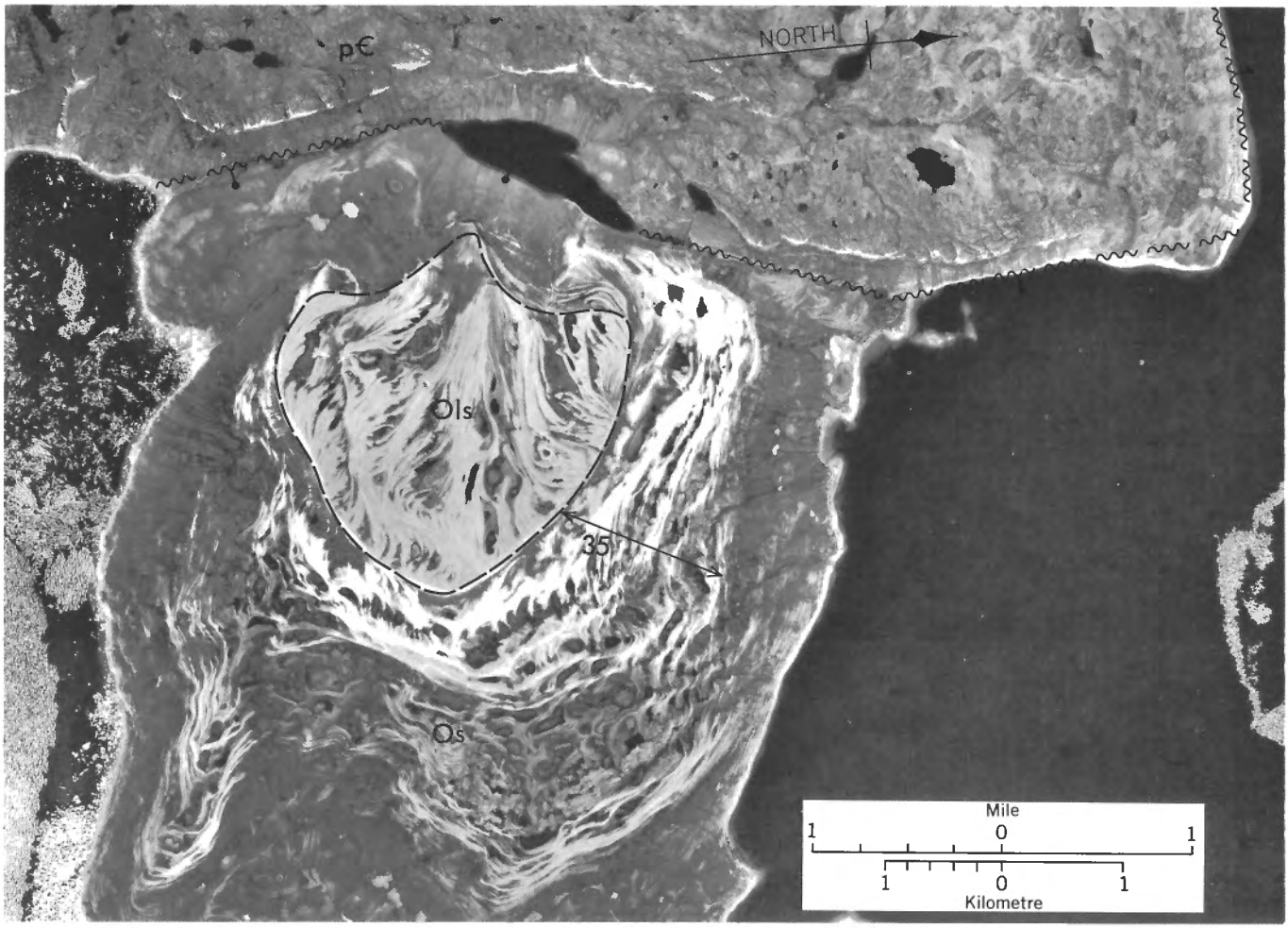


Plate 3. Peninsula south of Roche Bay. Note rectilinear coast lines controlled by faults and fractures in the basement; raised beaches developed on the lower Paleozoic strata; and differences in tone and weathering resistance of Ship Point Formation and map-unit Ols. Arrow indicates photogrammetric section. (Symbols as on geological map). Vertical aerial photograph A-15741-7

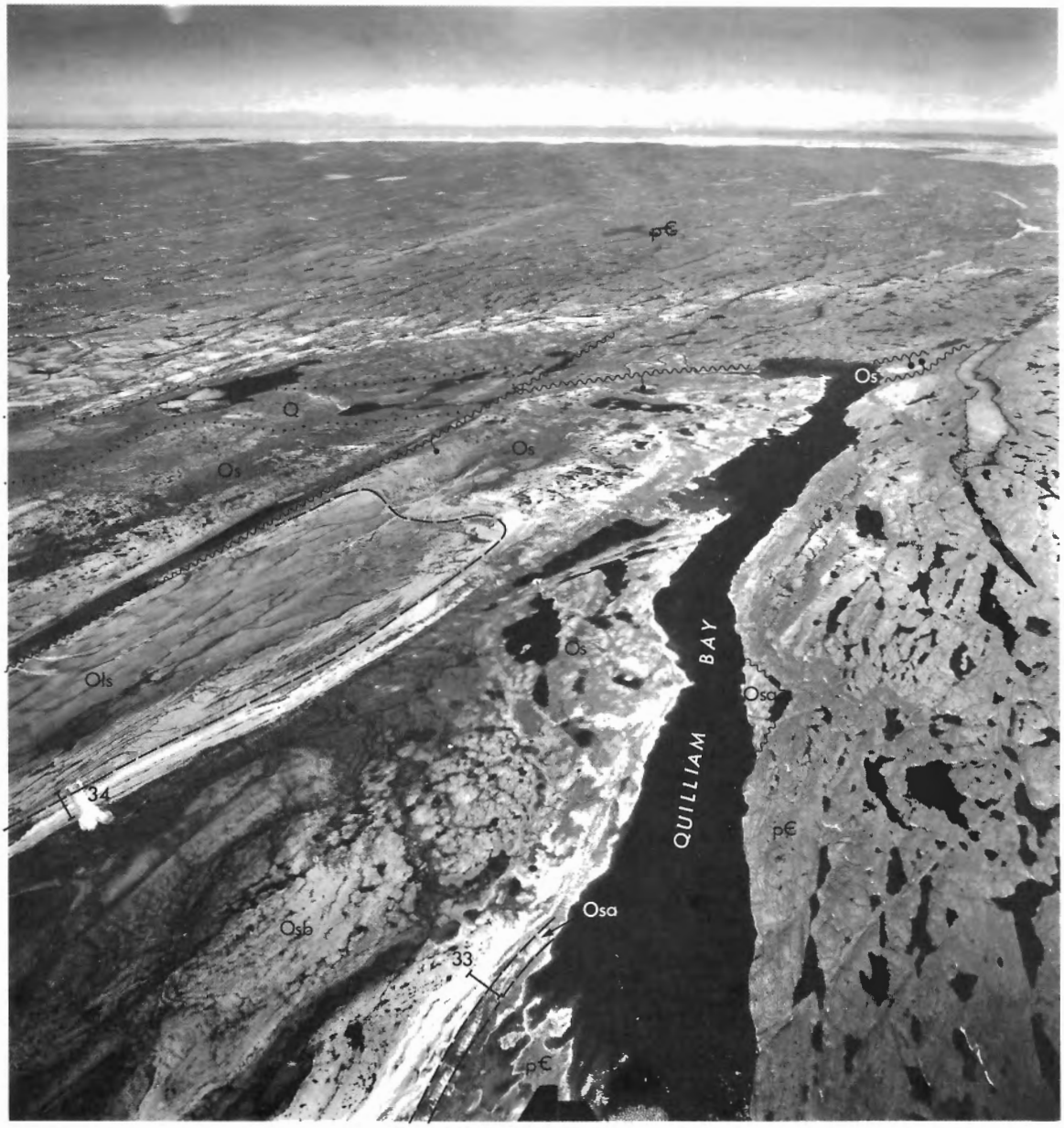


Plate 4. Quilliam Bay; view to the west. (Symbols as on geological map). Oblique aerial photograph T-335-L-68

Plate 5. Peninsula west of Steensby Inlet, view to the east. (Symbols as on geological map). Oblique aerial photograph T-222-L-133

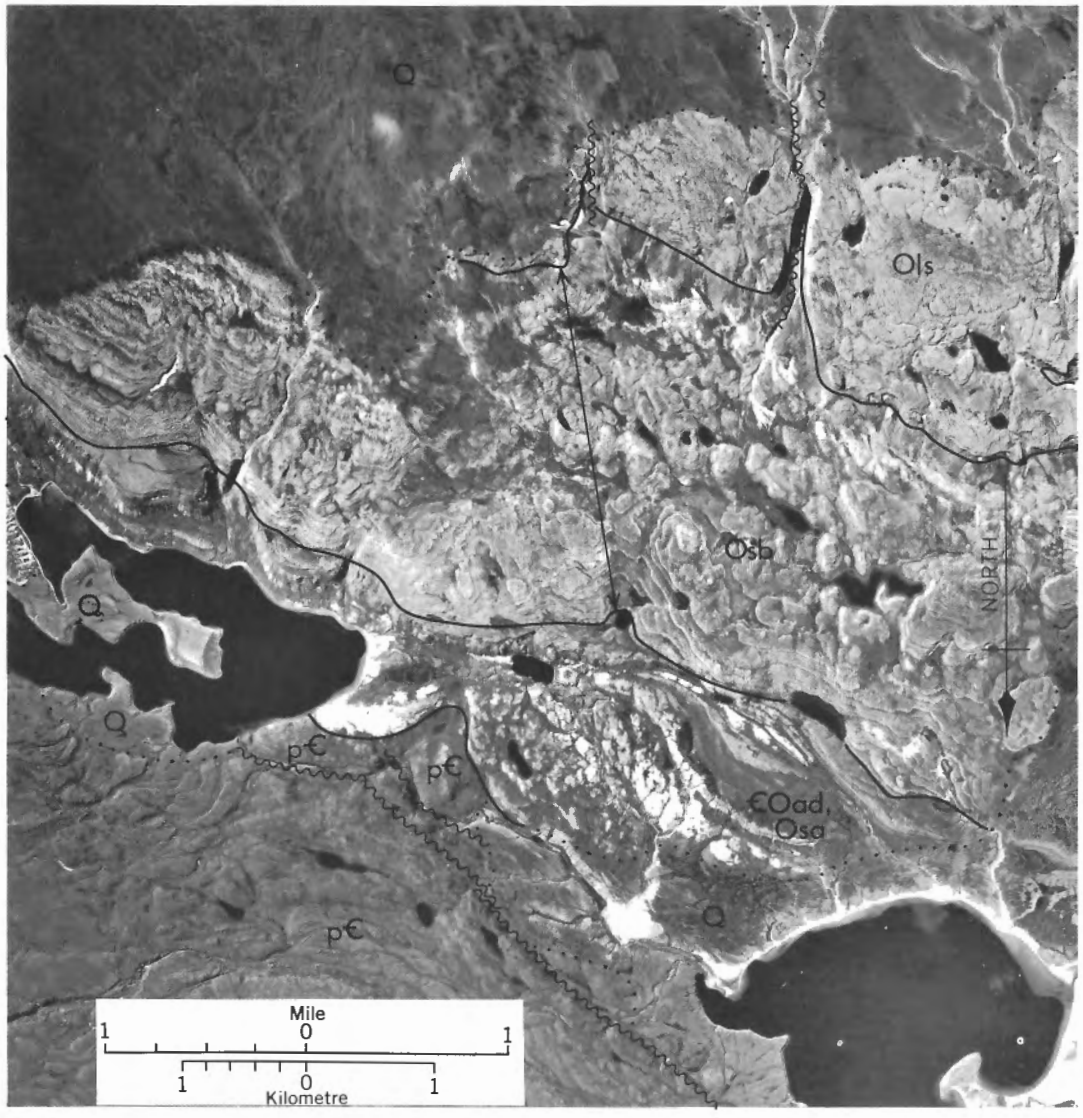


Plate 6. Environs of Inuktorfik-northeast II section. Arrow indicates photogrammetric section. €Oad, Osa = Admiralty Group and member A, Ship Point Formation undivided; other symbols as on geological maps. Vertical aerial photograph A-16264-17

Plate 7. Part of Igloolik and Neerlonakto Islands; view to the east. Note ledge-forming unit 5 of Igloolik sections. (Symbols as on geological map). Oblique aerial photograph T-465-R-31

Plate 8. Igloolik around August 20, 1968. GSC 199072

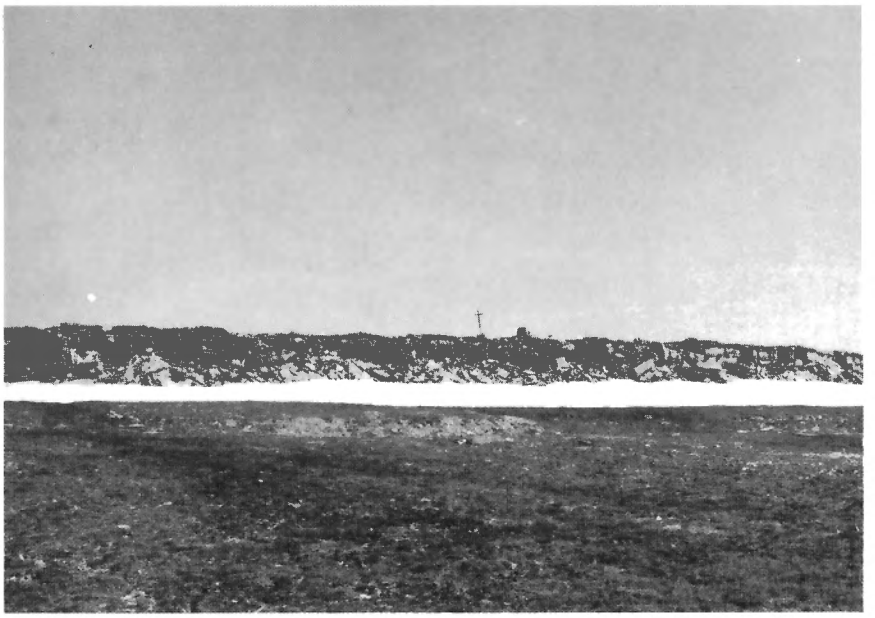


Plate 9. Resistant uppermost part of Ship Point Formation (unit 5 of Igloolik sections) at graveyard; view to the north. GSC 199071

Plate 10. Igloolik graveyard; slabs of dolostone from uppermost Ship Point Formation, weathered *in situ*, are used for monuments. GSC 199070

Plate 11. Typical outcrops of map-unit Ols; northeastern Melville Peninsula, about 1 mile north of Foster Bay, locality Tm-73-405e, view to the east. GSC 199074

Plate 12. Large-scale domal stromatolite on top of carbonate mound; four-foot staff gives scale; map-unit Orf, northeastern Melville Peninsula, locality 405a. GSC 199073

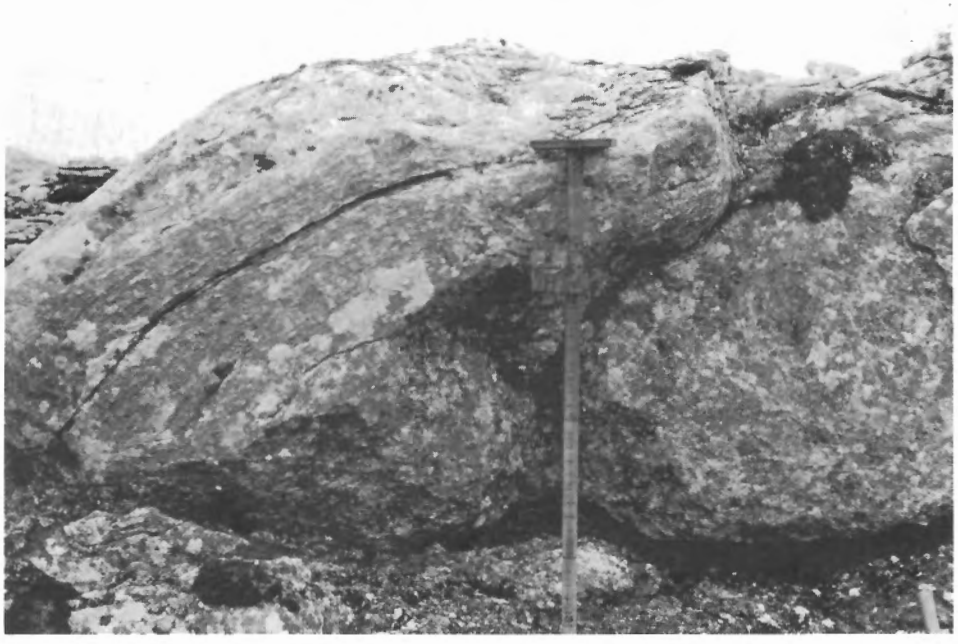


Plate 13. Flank of stromatolite; note steeply dipping lamination. GSC 199082

Plate 14. Teepee structure underlying domal stromatolite at locality 405a; hammer handle, one foot long, gives scale. GSC 199069

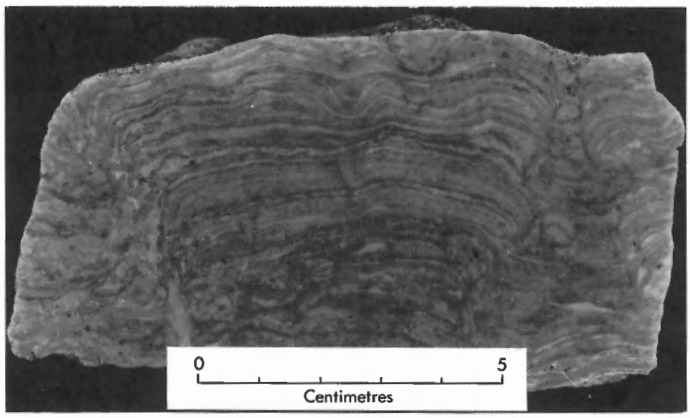


Plate 15. Dolomitic stromatolite with quartz sand; Ship Point Formation, Erichsen Lake, section II, unit 6, 114 feet (spec. Tm-68-58-114). HPT-71-L-11

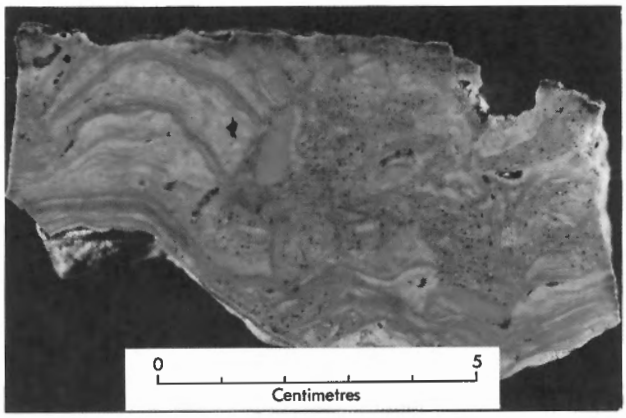


Plate 16. Brecciated dolomitic stromatolites in Ship Point Formation, member B, Igloolik Island, locality 56a (spec. Tm-68-56a). HPT-71-L-14

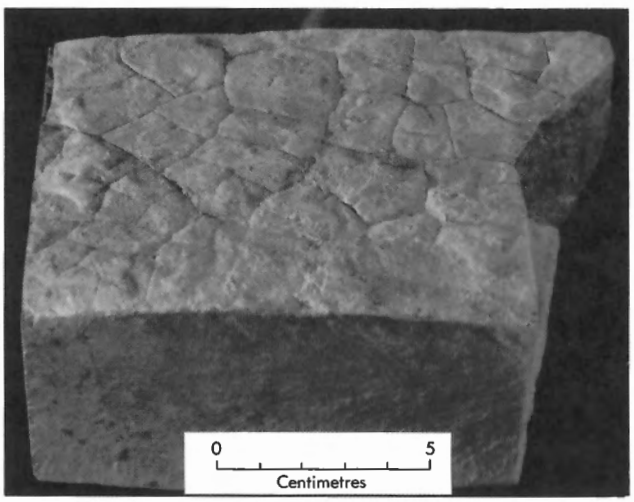


Plate 17. Dolostone showing mudcracks; Ship Point Formation, member B, section Quilliam Bay II, unit 4, 110 feet. Note that cracks are limited to upper few millimetres of specimen (spec. Tm-68-34-110). HPT-71-L-8

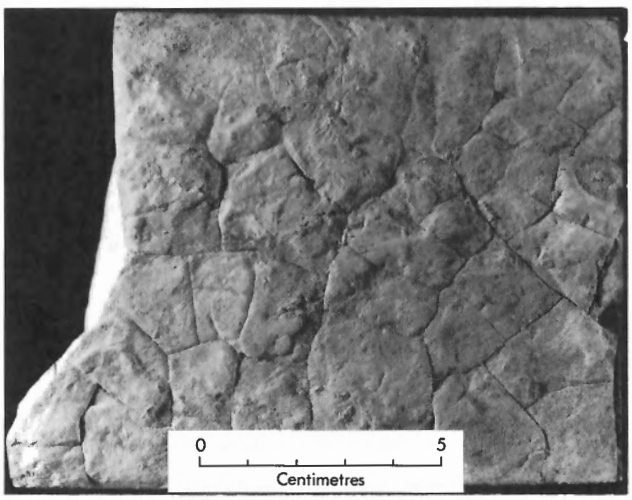


Plate 18. Upper surface of specimen shown in Plate 17. HPT-71-L-9

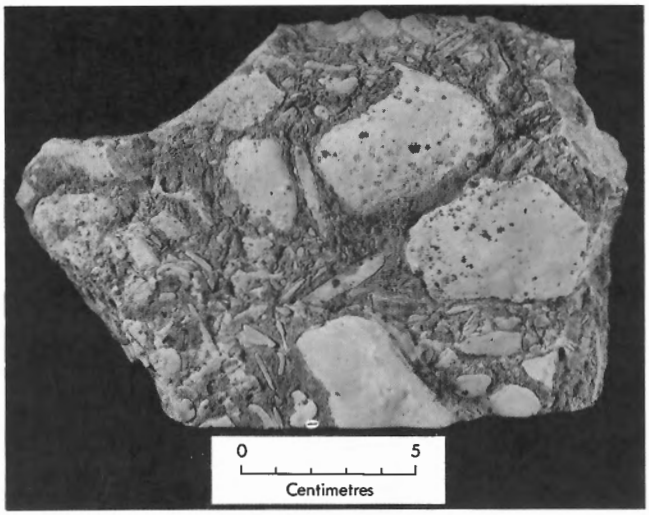


Plate 19. Dolomitic flat-pebble conglomerate in matrix of dolomitic sandstone; Ship Point Formation, member B, Igloolik Island, locality 56b; view of bedding plane (spec. Tm-68-56b). HPT-71-L-10

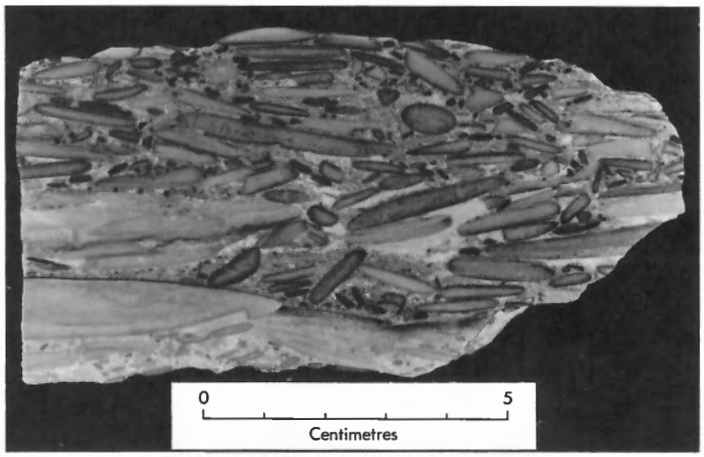


Plate 20. Dolomitic flat-pebble conglomerate; fragments have oxidized brownish rims; Ship Point Formation, member B, unnamed small island north of Koch Island, locality 30 (spec. Tm-68-30-2). HPT-71-L-12

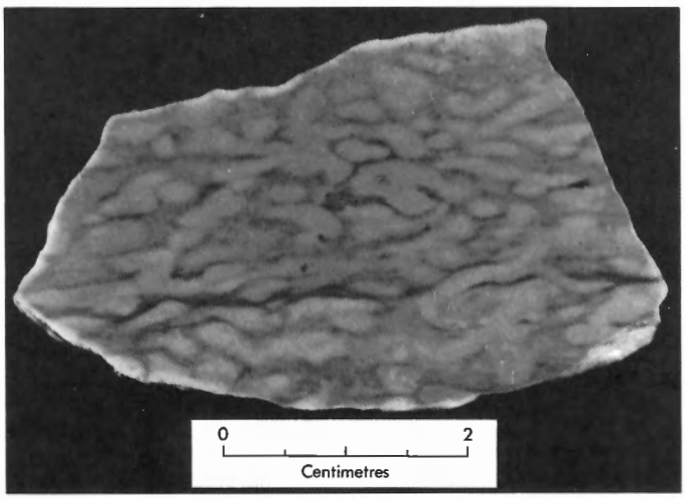


Plate 21. Highly bioturbated dolostone in member B, Ship Point Formation, Anderson Bluff section, Foley Island, unit 4, 29 to 30 feet. Matrix between sausage-shaped burrow casts is somewhat darker owing to submicroscopic organic impurities and oxidized pyrite (spec. Tm-68-45-30). HPT-71-L-17

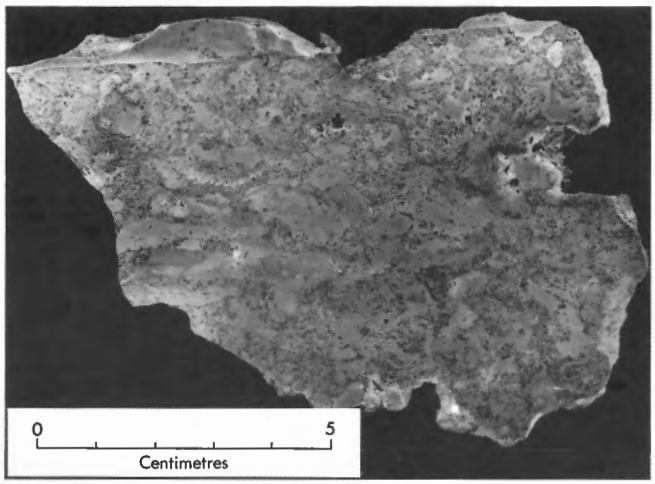


Plate 22. Highly bioturbated dolostone near top of Ship Point Formation, member B, Anderson Bluff section, Foley Island, unit 19, 237 feet. Dark material between relatively pale dolomitic areas consists of wisps of organic matter replaced by oxidized pyrite (spec. Tm-68-45-237). HPT-71-L-18

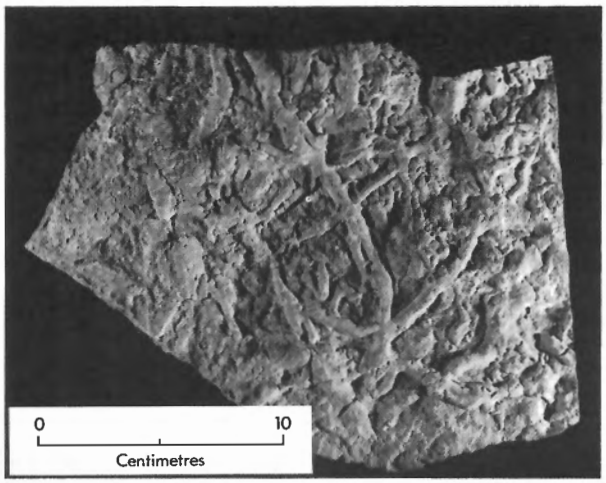


Plate 23. Dolostone with burrow casts on bedding plane; Ship Point Formation, member B, Igloolik Island, section II, unit 5 (spec. Tm-68-1-4). HPT-71-L-22

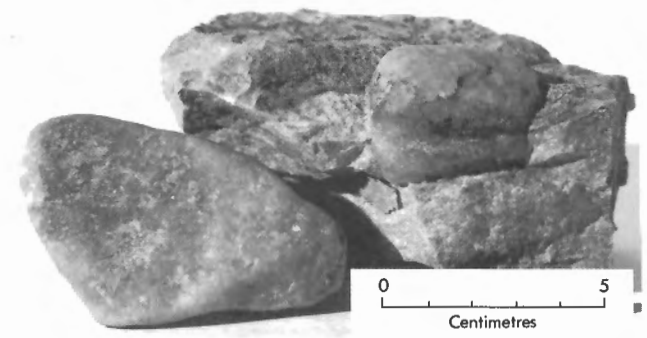


Plate 24. Quartz pebble and cobble in silty and sandy dolostone at top of Ship Point Formation, Igloolik Island, locality 50a (spec. Tm-68-50a). Photo 356-1

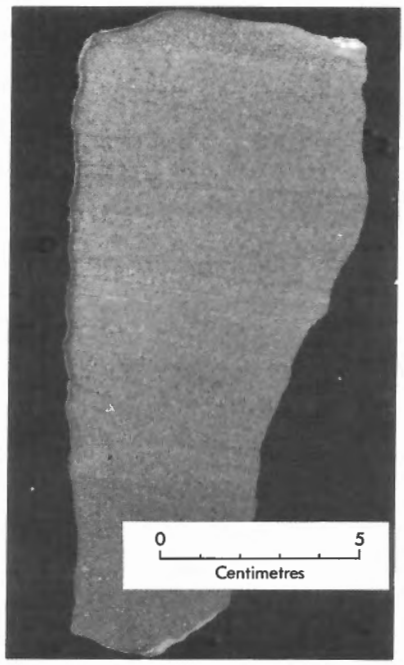


Plate 25. Dolomitic sandstone showing horizontal and cross-lamination and mutual truncation of lamina sets; Ship Point Formation, member B, Igloolik Island, section II, unit 2 (spec. Tm-68-7-1). HPT-71-L-13 (compare Pl. 26)

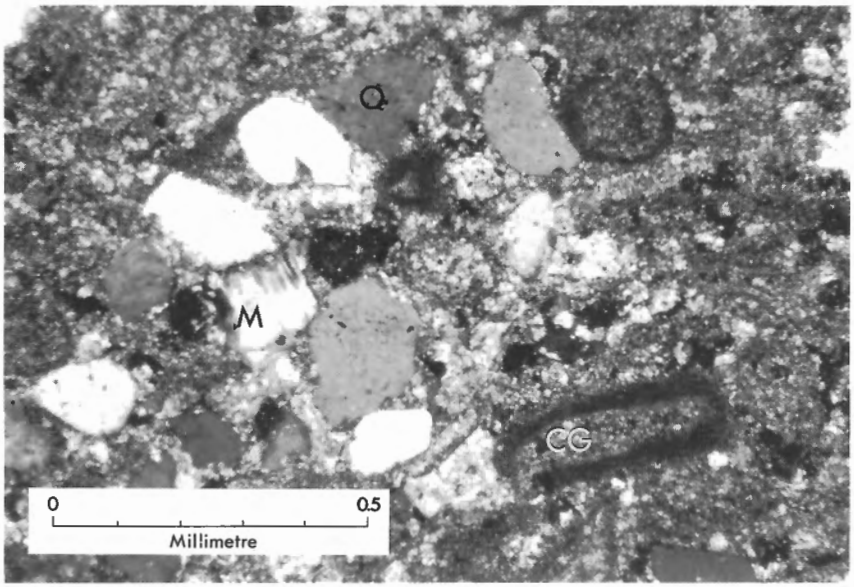


Plate 26. Dolomitic sandstone of Plate 25; coated grains (CG), quartz (Q), and microcline (M), in microcrystalline dolomite matrix; photomicrograph, nicol prisms crossed. HPT-73-L-1

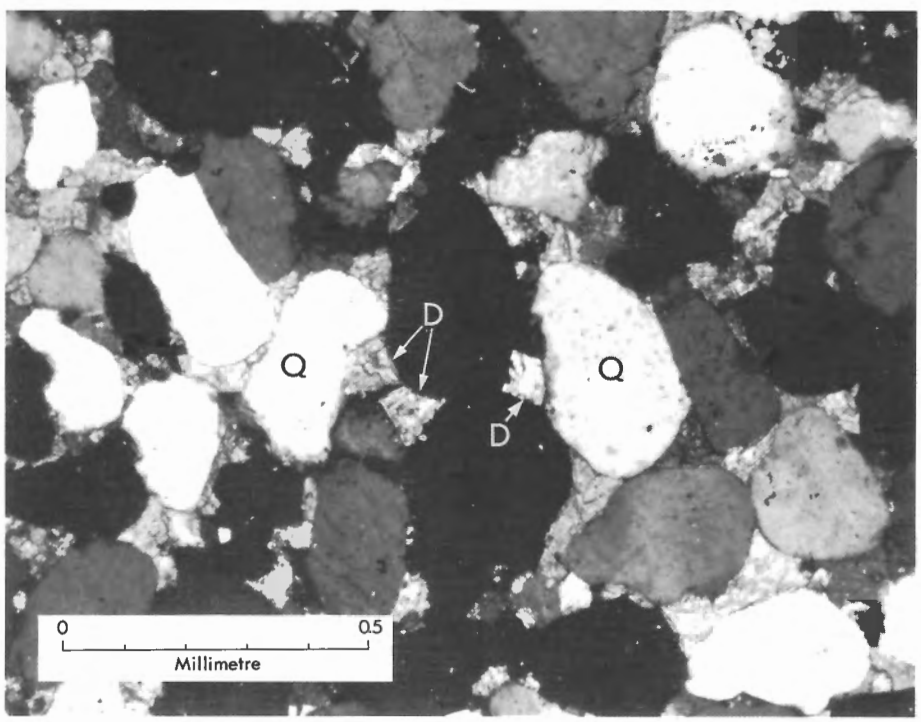


Plate 27. Sandstone composed mainly of quartz with interstitial, microcrystalline to very finely crystalline dolomite; photomicrograph, nicol prisms crossed; probably member A, Ship Point Formation, section Inuktorfik-south, unit 11 (spec. Tm-68-18-8). HPT-73-L-14

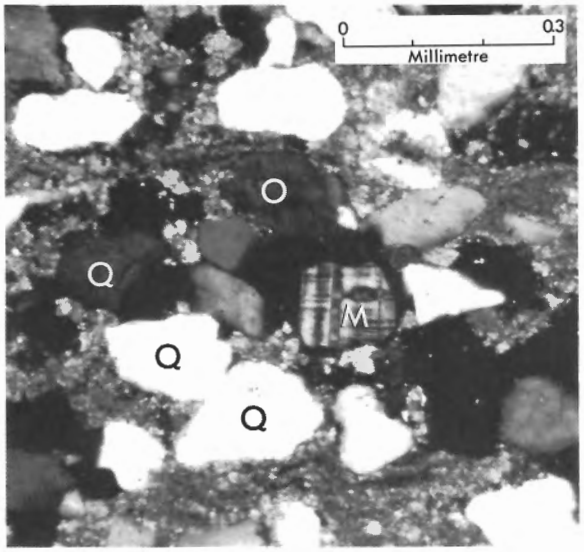


Plate 28. Microcline (M), orthoclase (O), and quartz (Q) in matrix of predominantly microcrystalline dolomite; photomicrograph, nicol prisms crossed; Ship Point Formation, member A, Rowley Island well, unit 85, 1,421 feet. HPT-73-L-17

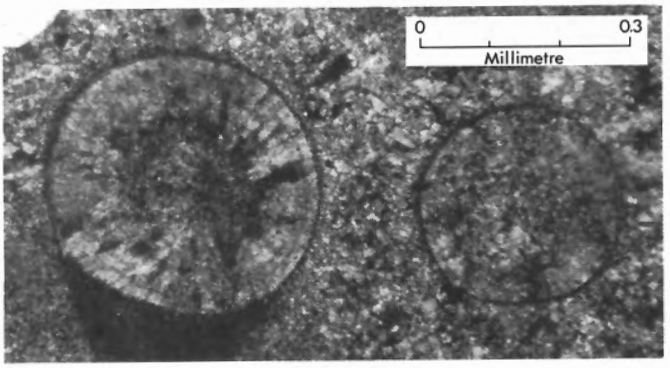


Plate 29. Remnants of ooids in dolomitic sandstone; photomicrograph, nicol prisms crossed; Ship Point Formation, member A, section Inuktorfik-northeast I, unit 14, 182 feet (spec. Tm-68-14-182). HPT-73-12-A

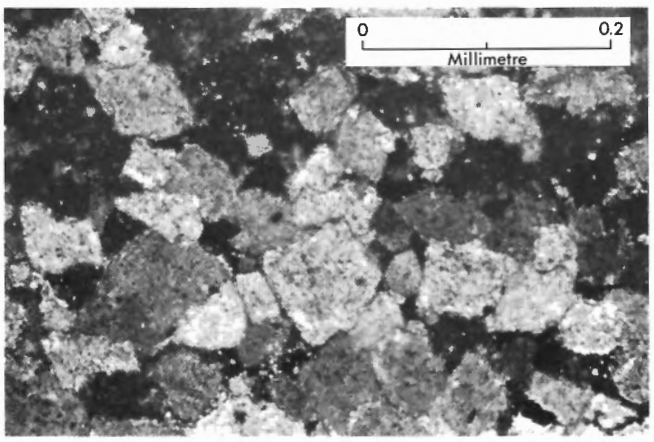


Plate 30. Microcrystalline to very finely crystalline texture in dolostone; photomicrograph, nicol prisms crossed; Ship Point Formation, member B, section Quilliam Bay II, unit 1, 15 feet (spec. Tm-68-34-15). HPT-73-L-3

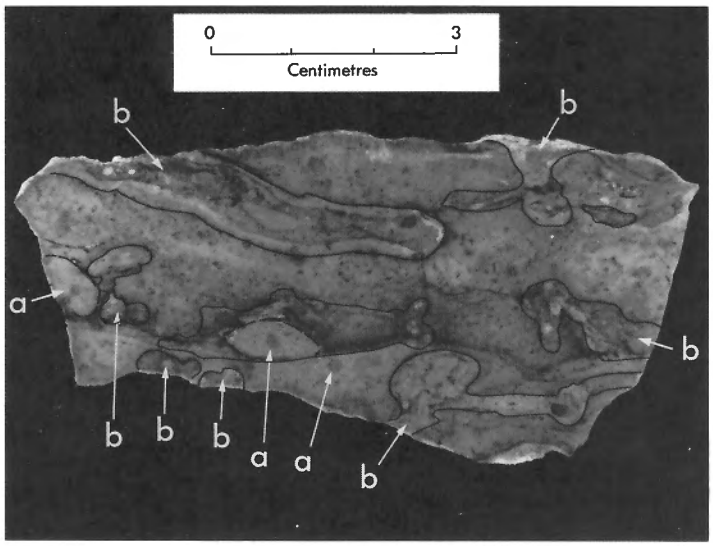


Plate 31. Burrows in fossiliferous cryptocrystalline limestone of map-unit Ols; Foley Island, Anderson Bluff section, unit 20, 243 feet. Type-a burrows show a regular, concentric structure with a dark core; type-b burrows form irregular, branching tubes (spec. Tm-68-45-243). HPT-71-L-19

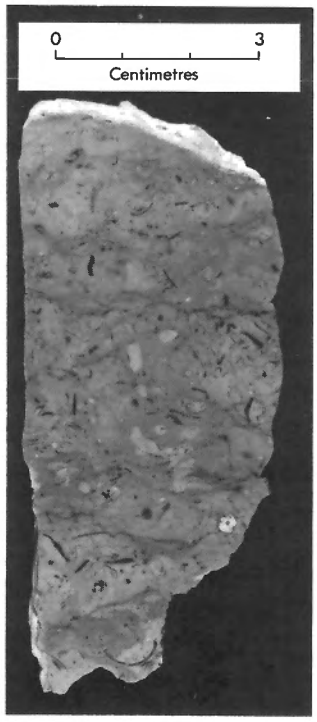


Plate 32. Cryptocrystalline limestone, bioturbated, slightly dolomitic, fossiliferous with fairly abundant trilobite fragments; map-unit Ols, section Quilliam Bay II, unit 11, 185 feet (spec. Tm-68-34-185). HPT-71-L-20

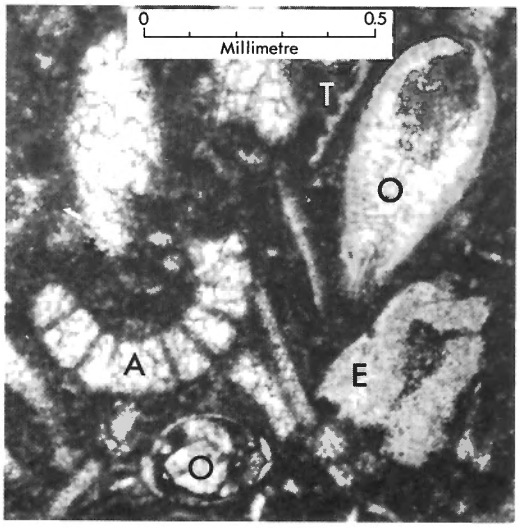


Plate 33. Cyclocrinitid algae (A), ostracodes (O), echinoderm columnal (E), and trilobite fragment (T) in richly fossiliferous cryptocrystalline limestone; photomicrograph, ordinary light; map-unit Ols, Rowley Island well, unit 230, 785.0 feet. HPT-73-L-5

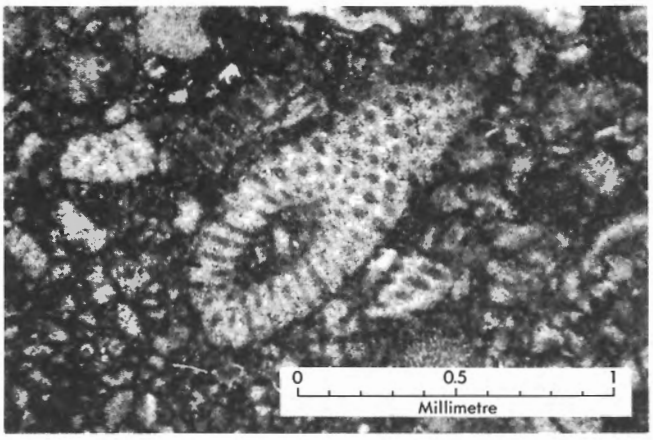


Plate 34. Oblique section of cyclocrinitid alga in richly fossiliferous cryptocrystalline limestone; photomicrograph, ordinary light; map-unit Ols, Rowley Island well, unit 230, 620 feet. HPT-73-L-2

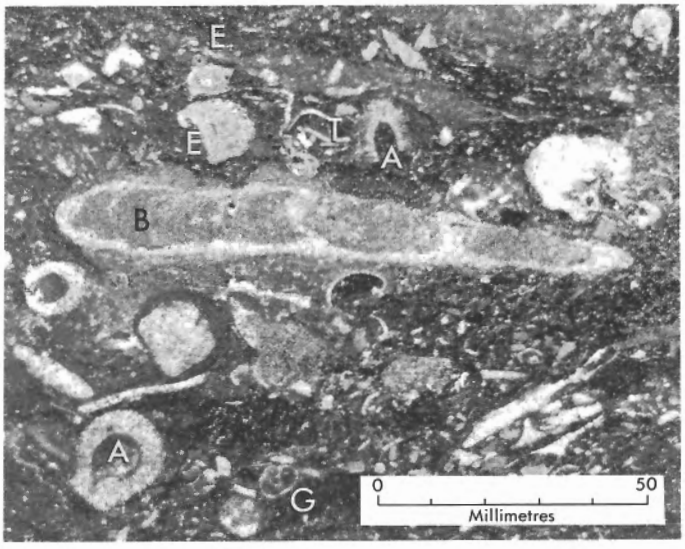


Plate 35. Longitudinal section of burrow (B), cyclocrinitid algae (A), gastropod (G), echinoderm columnals (E), trilobite appendices (T), etc. in cryptocrystalline limestone; map-unit Ols, Rowley Island well, unit 230, 730 feet. Photo 346-2

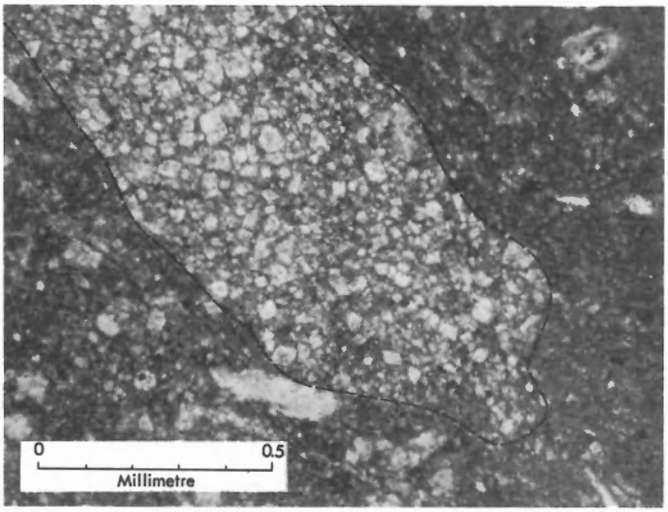


Plate 36. Burrow, enriched in microcrystalline dolomite, in fossiliferous cryptocrystalline limestone; photomicrograph, ordinary light; map-unit Ols, Igloolik Island, locality 37 (spec. Tm-68-37-5). HPT-73-L-15

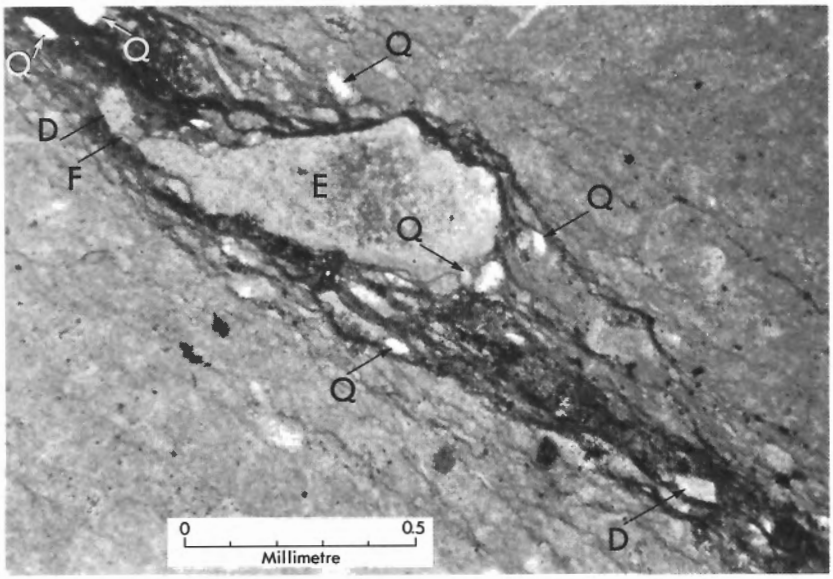


Plate 37. Solution zone in impure cryptocrystalline limestone. The zone is enriched in argillaceous and carbonaceous matter (dark), and silt and very fine grained sand of quartz (Q) and feldspar (F), and contains the remnant of an echinoderm columnal (E), which is represented by a single crystal of calcite. Secondary, euhedral dolomite (D) has preferentially developed in this zone; photomicrograph, nicol prisms crossed; map-unit Ols, Rowley Island well, unit 223, 1129.4 feet. HPT-73-L-16

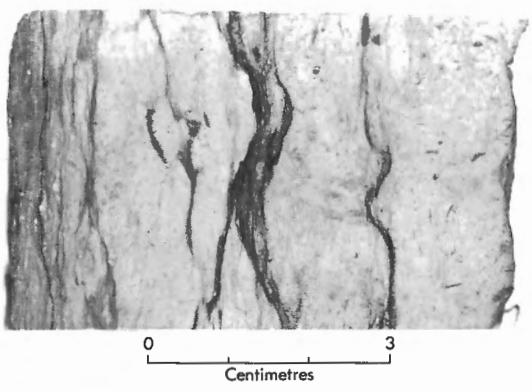


Plate 38. Solution zones in cryptocrystalline limestone of map-unit Ols; Rowley Island well, unit 223, 1129.4 feet. Photo 369-2

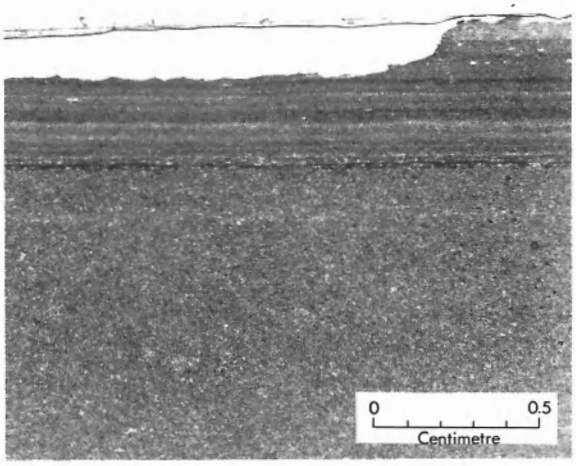


Plate 39. Variably calcareous microcrystalline dolostone showing very thin and regular horizontal lamination; photomicrograph, ordinary light; map-unit Orf, northeastern Melville Peninsula, locality 405b (spec. Tm-68-405b). Photo 346-3

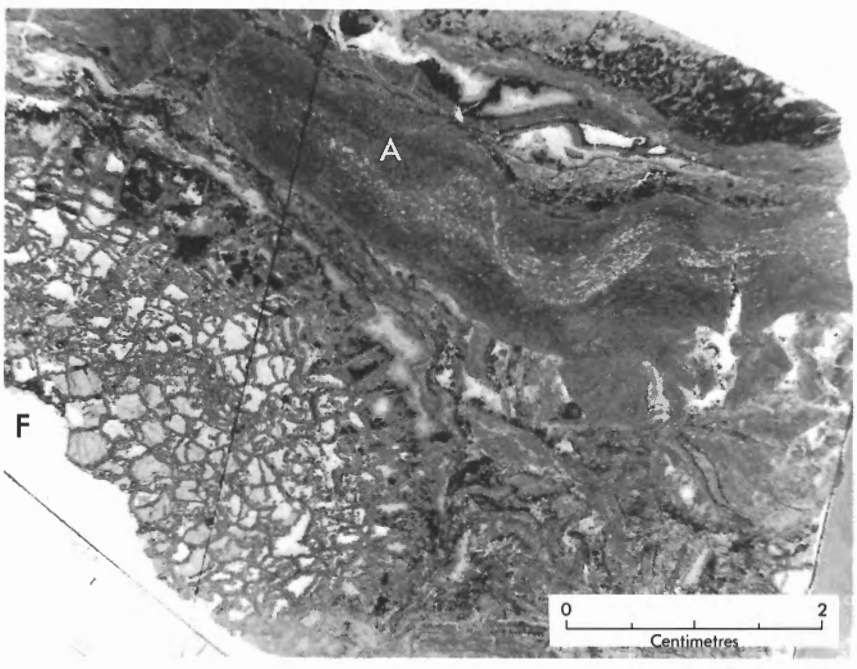


Plate 40. *Favosites* sp. (F) overlain by unidentified alga (A); photomicrograph, ordinary light; map-unit Orf, northeastern Melville Peninsula, locality 525c (spec. Tm-73-525c-1a). Photo 346-10

Plate 41. Dolomitic flat-pebble conglomerate in map-unit OScb; central western Prince Charles Island, locality 40 (spec. Tm-68-40-4). HPT-71-L-15

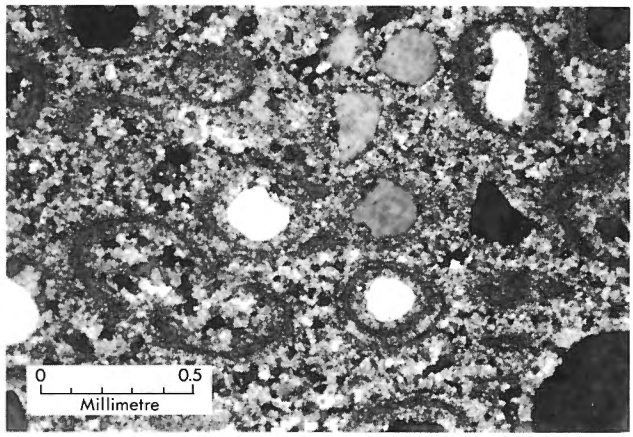


Plate 42. Coated grains with and without quartz nucleus in matrix of microcrystalline dolomite; photomicrograph, nicol prisms crossed; map-unit OScb, Rowley Island, locality 19 (spec. Tm-68-19-21). HPT-73-L-4

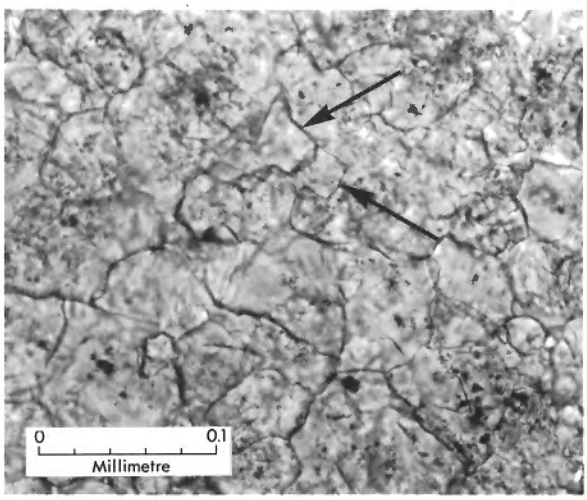


Plate 43. Microcrystalline to very finely crystalline limestone, the rhombic habit of some calcite crystals (arrows) suggests that they may have replaced dolomite; photomicrograph, ordinary light; map-unit OScb, Rowley Island, locality 19 (spec. Tm-68-19-5). HPT-73-L-11

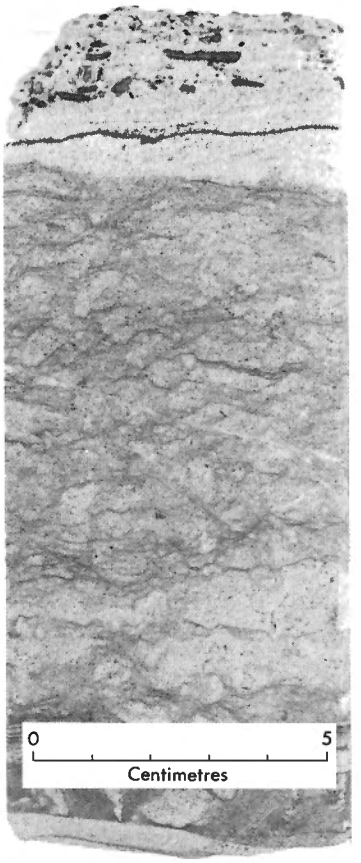


Plate 44. Pebbly sandstone showing vague horizontal and cross-lamination, underlain by bioturbated sandstone and interlaminated siltstone; vertical burrows in lower part; Gallery Formation, unit 5, 1667.6 to 1668.2 feet. PRA-033-21

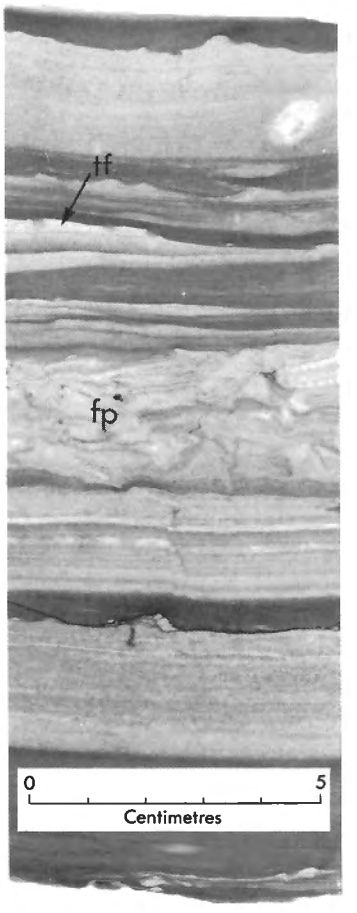


Plate 45. Dolostone, aphanitic, in part silty with minor interlaminated siltstone, dolomitic; tension fractures (tf) and interbedded flat-pebble conglomerate (fp); Turner Cliffs Formation, unit 37, 1561.0 to 1.561.5 feet. PRA-033-19

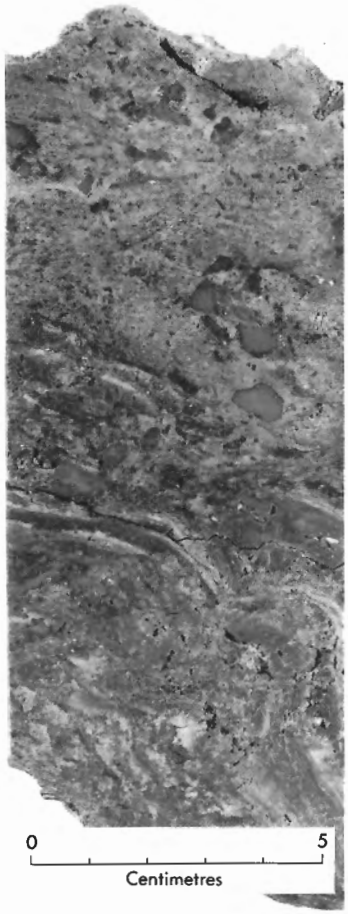


Plate 46. Breccia of dolostone, in part silty to medium-grained sandy, vuggy; some vugs appear to be molds of crystals; Ship Point Formation, member A, unit 86, 1419.2 to 1419.7 feet. PRA-033-15

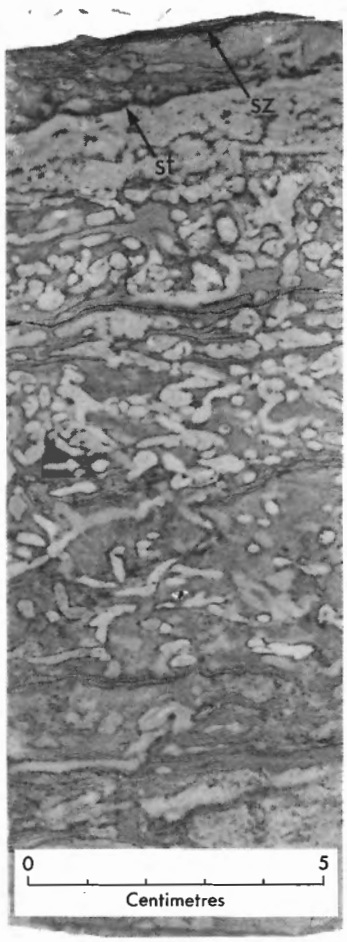


Plate 47. Dolostone, aphanitic, with minor amounts of interlaminated siltstone, dolomitic, both highly bioturbated; stylolites (st) in upper part, solution zone (sz) near top; Ship Point Formation, member B, unit 114, 1362.7 to 1363.2 feet. PRA-033-11

Plate 48. Dolostone, aphanitic, silty, with interlaminated siltstone, dolomitic; vertical pipes probably are diagenetic features and not burrows, because they pass through undisturbed laminae; some bioturbation is apparent in upper left; Ship Point Formation, member B, unit 119, 1354.0 to 1354.6 feet. PRA-033-7

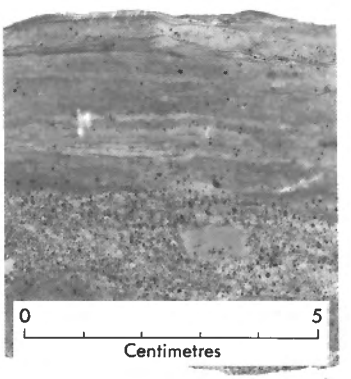


Plate 49. Dolostone, aphanitic, silty and sandy, with interlaminated dolomitic sandstone, very fine to very coarse grained; some brecciation; Ship Point Formation, member B, unit 121, 1350.0 to 1350.2 feet. PRA-033-13

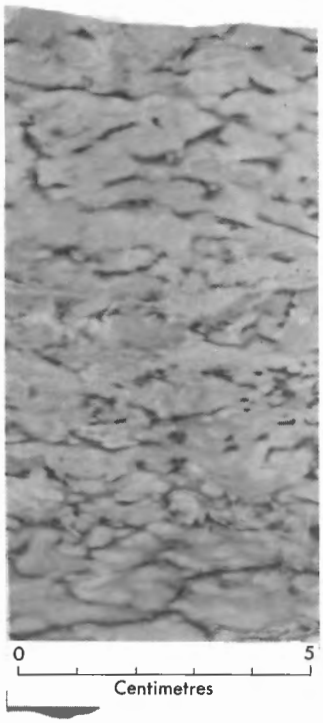


Plate 50. Dolostone, aphanitic, highly bioturbated; material between sausage-shaped burrow casts is dark owing to submicroscopic organic impurites and pyrite; Ship Point Formation, member B, unit 128, 1341.0 to 1341.4 feet. PRA-033-18

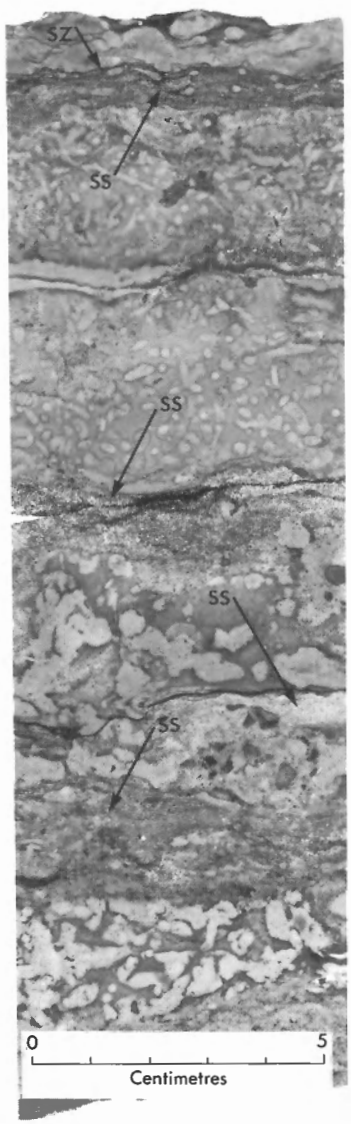


Plate 51. Dolostone, aphanitic, in part silty and sandy, with interlaminated sandstone (ss), medium to coarse grained, both highly bioturbated; solution zones (sz) in upper part; Ship Point Formation, member B, unit 129, 1338.7 to 1339.1 feet. PRA-033-20

Plate 52. Dolomitic flat-pebble conglomerate underlain by bioturbated dolostone and truncated by minor disconformity (d); Ship Point Formation, member B, units 133-135, 1334.0 to 1334.6 feet. PRA-033-12

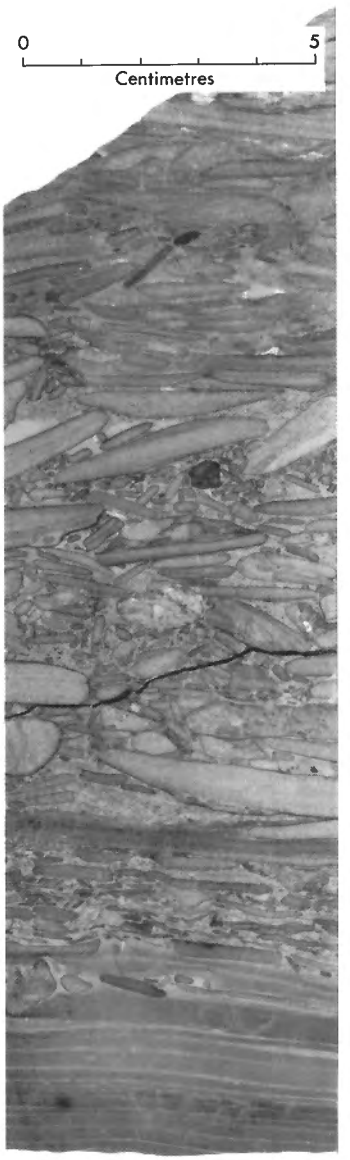


Plate 53. Dolomitic flat-pebble conglomerate, silty and very fine grained sandy, underlain by laminated dolostone; Ship Point Formation, member B, unit 149, 1306.1 to 1306.65 feet. PRA-033-22

Plate 54. Dolostone, microcrystalline, slightly argillaceous, light olive-grey; interbedded with dolostone, microcrystalline to finely crystalline, pale yellowish brown; horizontal and vertical burrows; open vug; Ship Point Formation, member B, unit 172, 1267.2 to 1267.5 feet. PRA-033-17

Plate 55. Dolomitic flat-pebble conglomerate overlain and underlain by bioturbated aphanitic dolostone; abrupt internal contacts (d) may represent minor disconformities; Ship Point Formation, member B, unit 182, 1251.8 to 1252.05 feet. PRA-033-16

Plate 56. Highly bioturbated dolomitic flat-pebble conglomerate underlain and overlain by bioturbated aphanitic dolostone; abrupt upper contact may represent minor disconformity (d); Ship Point Formation, member B, unit 183, 1238.6 to 1238.85 feet. PRA-033-9

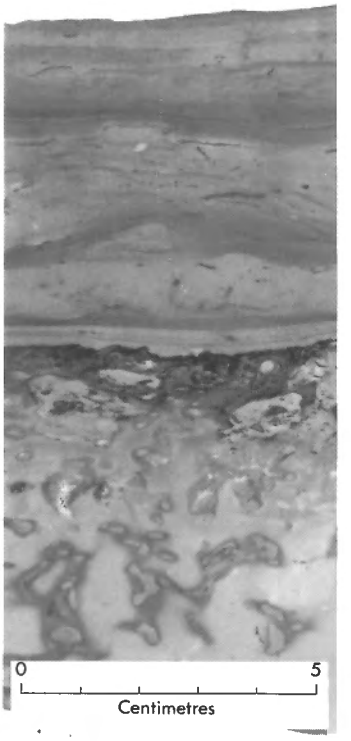


Plate 57. Highly bioturbated aphanitic dolostone overlain, with solution(?) contact, by weakly bioturbated, in part laminated dolostone; Ship Point Formation, member B, unit 186, 1233.0 to 1233.4 feet. PRA-033-8

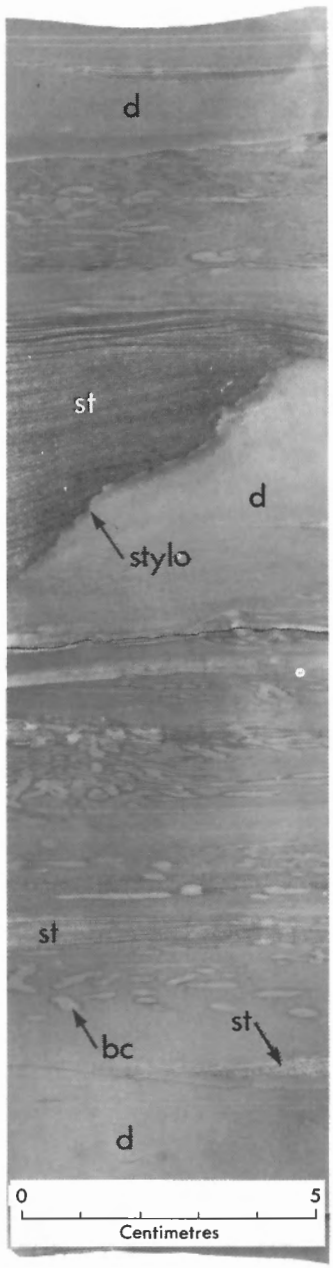
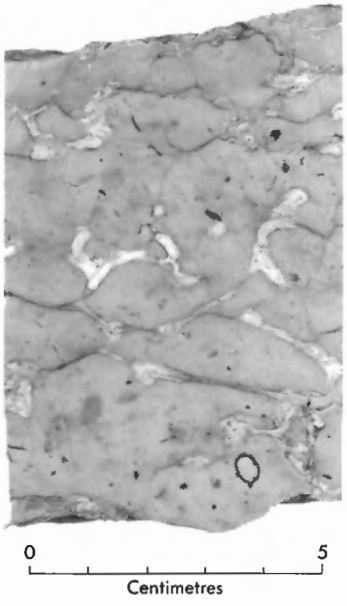


Plate 58. Mainly dolostone (d), aphanitic, with flattened burrow casts (bc); minor interlaminated dolomitic siltstone (st) showing some slightly inclined cross-lamination; stylolite (stylo); Ship Point Formation, member B, unit 192, 1200.0 to 1200.7 feet. PRA-033-1

Plate 59. Dolostone, aphanitic, in part silty, interlaminated with silty and sandy dolostone, and very fine grained dolomitic sandstone; lamination mainly horizontal with minor undulations, slightly inclined planar crossbedding, and lenticular bedding; some sandy beds are graded; Ship Point Formation, member B, unit 199; 1180.0 to 1180.5 feet. PRA-033-2

Plate 60. Dolostone, aphanitic, slightly argillaceous; argillaceous solution zones show structurally complex patterns whereas bedding appears undisturbed; Ship Point Formation, member B, unit 200, 1175.0 to 1175.4 feet. PRA-033-6

Plate 61. Limestone, cryptocrystalline, sparsely fossiliferous with gastropod and trilobites; pale yellowish brown (greyish on photograph); yellow patches (very light grey on photo) represent dolomitized burrows; map-unit Ols, unit 223, 1110.0 to 1110.3 feet. PRA-033-10



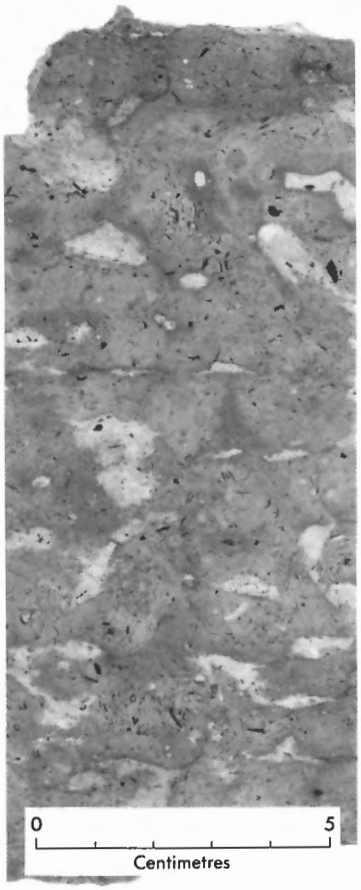


Plate 62. Limestone, cryptocrystalline, slightly dolomitic, fossiliferous, bioturbated, mainly pale yellowish brown with irregular patches of light to greyish orange; map-unit Ols, unit 229, 920.0 to 920.4 feet. PRA-033-4

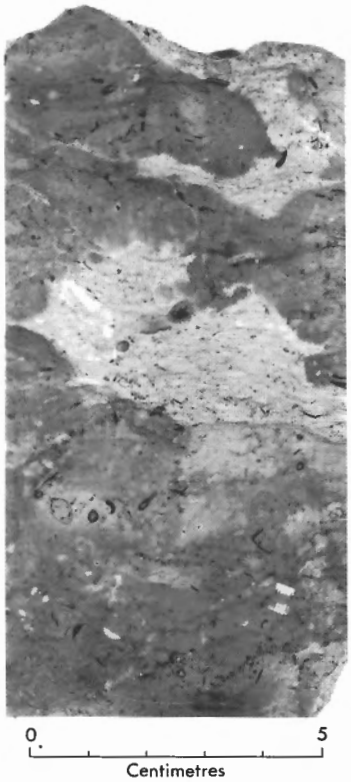


Plate 63. Limestone, cryptocrystalline, slightly dolomitic, fossiliferous, bioturbated, mainly light olive-grey, with irregular patches of pale yellowish brown; map-unit Ols, unit 231, 600.0 to 600.4 feet. PRA-033-5