GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

PROVISIONAL EDITION

47 H

LEGEND

CENOZOIC

QUATERNARY

Q — *Drift and unconsolidated sediments*

PALAEOZOIC

ORDOVICIAN AND SILURIAN
LATE MIDDLE ORDOVICIAN TO MIDDLE SILURIAN

OSba — *BAILLARGE FORMATION: dolomitic limestone, in part shaly; minor dolomite*

ORDOVICIAN
MIDDLE AND (?) LOWER ORDOVICIAN

Osp — *SHIP POINT FORMATION: dolomite, in part silty and shaly; dolomitic intraformational conglomerate*

CAMBRIAN AND/OR ORDOVICIAN
CAMBRIAN AND/OR EARLY LOWER ORDOVICIAN
ADMIRALTY GROUP

€Oad — *GALLERY AND TURNER CLIFFS FORMATIONS UNDIVIDED: quartzose sandstone; minor siltstone, conglomerate, shale; a little breccia: dolomite, shaly, silty, sandy, pure quartzose sandstone, in part dolomitic; dolomitic intraformational conglomerate; minor siltstone, shale, mostly dolomitic*

MIDDLE AND LOWER ORDOVICIAN AND (?) CAMBRIAN

€Oad,sp — *Admiralty Group and Ship Point Formations undivided*

(?) CAMBRIAN TO MIDDLE SILURIAN

€OS ad,sp,ba — *Admiralty Group, Ship Point and Baillarge Formations undivided*

PROTEROZOIC

HELIKIAN

Hg — *Gabbro dykes*

Hab — *ARCTIC BAY FORMATION: calcareous shale; dolomite*

APHEBIAN

Al — *Granitic and gneissic rocks; Ag, granite, quartz-feldspar gneiss; Amg, migmatite; Abd, banded and lit-par-lit gneiss*

P — *Proterozoic undivided; probably Al*

Geological boundary (defined, approximate, assumed)
Bedding, tops known (inclined)
Foliation (inclined, vertical)
Structural trend (in part from air photographs)
Lineament (from air photographs)
Fault (defined)

Geology of Precambrian rocks by R. G. Blackadar and W. L. Davison, 1963
Geology of Palaeozoic rocks by H. P. Trettin, 1963

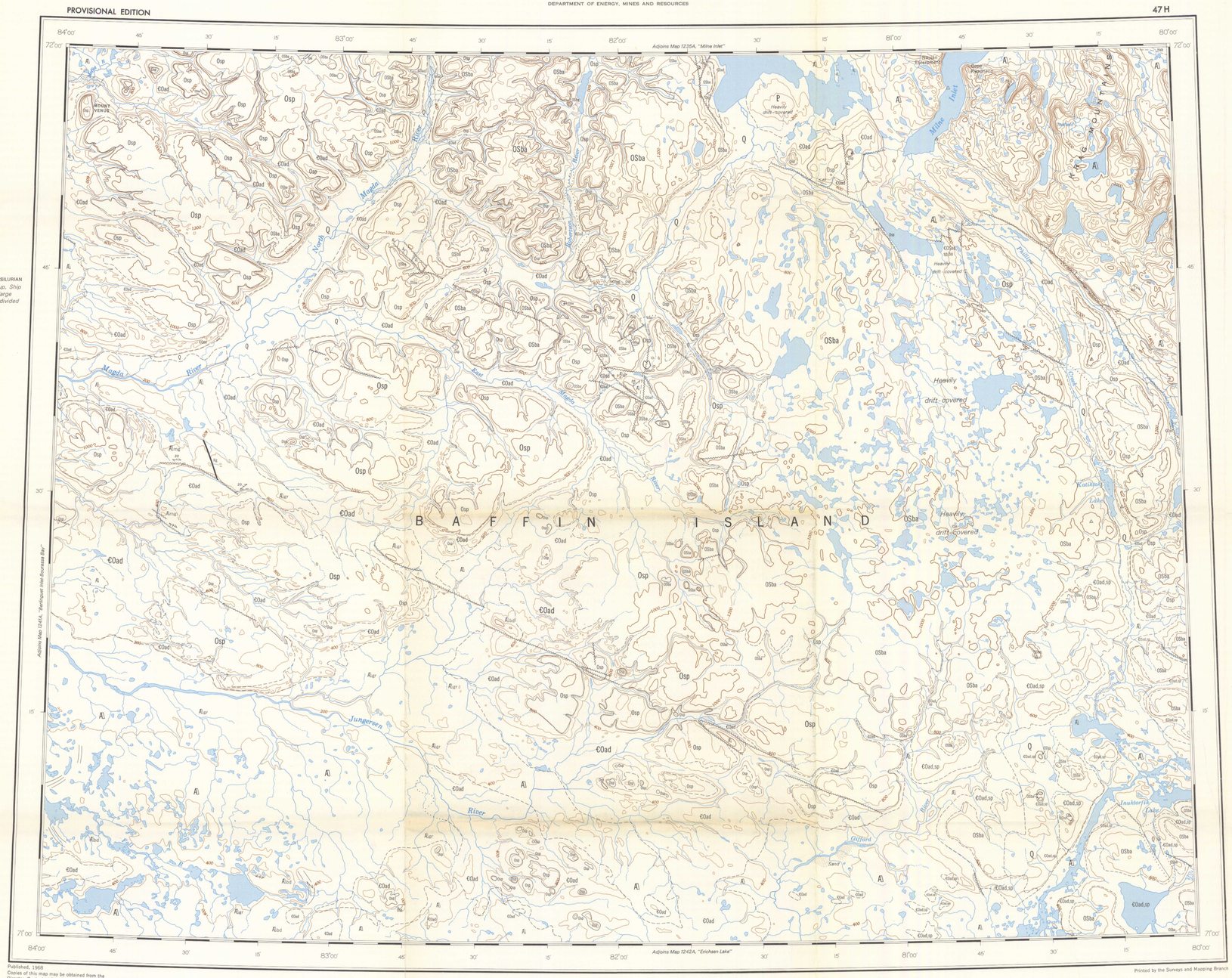
Geological cartography by the Geological Survey of Canada, 1967

Horizontal control point
Intermittent stream
Dry river bed with channel
Rapids, falls
Contours (interval 200 feet)

Base-map compiled and drawn by the Surveys and Mapping Branch, 1964

Magnetic declination 1967 varies from 62°49′ westerly at centre of west edge to 65°37′ westerly at centre of east edge. Mean annual change, decreasing 29.5′.

INDEX MAP



Published, 1968
Copies of this map may be obtained from the Director, Geological Survey of Canada, Ottawa

Printed by the Surveys and Mapping Branch

MAP 1239A

GEOLOGY

PHILLIPS CREEK

DISTRICT OF FRANKLIN

Scale 1:253,440
1 inch to 4 miles

Miles 4 0 4 8 12 Miles
Kilometres 6 0 6 12 18 Kilometres

DESCRIPTIVE NOTES

The area is a few miles west of Mary River, site of Baffinland Iron Mines high-grade iron deposit. The head of Milne Inlet in the northern part of the area is the site of proposed harbour and bulk-fuel installations. The southern boundary of the area lies 160 miles north of Hall Beach, a principal DEW line site served by commercial aircraft from Montreal. The head of Milne Inlet is 80 miles southwest of Pond Inlet, a settlement that includes offices of the Department of Indian Affairs and Northern Development, a school, Hudson's Bay Company, Roman Catholic and Anglican missions, R. C. M. Police, and a nursing station.

Several physiographic divisions are included in the map-area. The northern two-thirds except for a small area north of Phillips Creek, is characterized by a highly dissected plateau surface into which rivers are deeply incised. The elevation of this surface rises gradually from 1,000 feet in the southeast to 1,500 feet in the northwest. The largest rivers, Jungersen, Magda, and Robertson, flow in broad, flat-floored valleys often 500 feet or more below the plateau surface. The upper limits of the valley walls are generally steep-sided owing to the nearly horizontal sedimentary strata on which the plateau surface has been developed, and merge abruptly with the gently undulating plateau surface. Vegetation is sparse on the plateau surface and headward erosion of many tributary valleys is progressing rapidly. This physiographic division is the southeastern limit of Jones-Lancaster Plateau, a feature that includes most of Borden and Brodeur Peninsulas.

North of Phillips Creek, Krag Mountains rise abruptly to elevations in excess of 2,300 feet. Small snowfields crown several of the summits. This terrain has developed on Precambrian crystalline rocks and is the western margin of the great physiographic division known as Baffin Upland.

The southern contact of Jones-Lancaster Plateau is in places marked by a scarp, as along Jungersen River, but elsewhere merges gradually with an area of low undulating hills. Much of this area is underlain by Precambrian rocks, but drift cover is extensive and here and there are low masses of Palaeozoic strata. Vegetation is more abundant in this low-lying area than elsewhere in the map-area. Near Quartz Lake patterned ground is well displayed. This low-lying area is part of Boothia-Regent Lowlands (also referred to as Boothia Plain), a physiographic feature that extends eastward from the Gulf of Boothia through Berlinguet Inlet, Quartz and Erichsen Lakes, to Steensby Inlet, and which separates Jones-Lancaster Plateau from the uplands of Melville Peninsula and the north side of Fury and Hecla Strait.

Precambrian rocks in this map-area are limited to gneissic rocks of Aphebian age and several gabbro dykes of presumed Neohelikian age. A determination (K-Ar 895) made on a specimen of gneiss collected about 20 miles north of the western border of the map-area, gave an age of 1,975 m.y. The gneissic complex comprises mainly massive to slightly foliated reddish to grey quartz-microcline-plagioclase gneiss with varying amounts of biotite, hornblende, and pyroxene. Apatite and sphene are common accessory minerals. Garnet is present in a few specimens examined. Banded gneisses composed of mafic-rich rocks alternating with quartz-feldspar rocks outcrop here and there. Rocks showing schlieren and vein structures are less common.

A gabbro dyke (Hg) similar in all respects to those forming the dyke swarms in Navy Board Inlet and Moffet Inlet map-areas cuts gneissic rocks near the western border of the area. It is presumed to be Neohelikian in age.

The Lower Palaeozoic strata rest with pronounced unconformity on Aphebian rocks.

The Admiralty Group [4, 5], which forms the basal part of the Palaeozoic succession, comprises the predominantly fluviatile Gallery Formation [4], and the predominantly inter-tidal Turner Cliffs Formation [4]. The Gallery Formation is possibly correlative with the late Lower Cambrian Rabbit Point and the Turner Cliffs with the Middle Cambrian Bear Point and Ooyagsh Formations of Dundas Harbour, Devon Island [3], and with Middle Cambrian strata on Boothia Peninsula and Somerset Island [2], but diagnostic fossils are lacking. The Gallery Formation consists mainly of quartzose sandstone showing trough- and high-angle planar cross-lamination with lesser siltstone, conglomerate, shale, etc. The lower part of the formation is predominantly red and the upper part predominantly light grey. The Turner Cliffs Formation is composed of two alternating assemblages of rock types: 1) finely microcrystalline dolomite, which is mostly shaly, silty, or sandy, and commonly forms ripple marks and flat-pebble conglomerates, and associated dolomitic siltstone and shale; 2) pure and dolomitic quartz sandstones commonly showing cross-lamination, as in the Gallery Formation. The Turner Cliffs Formation weathers generally in light hues of grey, green, and orange. The only fossils known – besides abundant worm markings and some stromatolites – are linguloid brachiopods, mainly Lingulella s. s. The Admiralty Group was deposited in a basin, the axis of which plunges across central Borden Peninsula in an easterly or southeasterly direction.

Phillips Creek map-area lies on the southeast side of that basin, and the thickness of both formations decreases in a southerly to southeasterly direction. Measured thicknesses of the Gallery Formation range between 80 and 320 feet, and those of the Turner Cliffs Formation between 50 and 450 feet. In the southeastern extremity of the map-area, where the Admiralty Group is generally less than 100 feet thick and poorly exposed, it has not been distinguished from the Ship Point Formation. Crossbedding attitudes indicate that in Phillips Creek map-area the currents that deposited the Gallery sands came from southerly directions.

The Middle and (?) Lower Ordovician Ship Point Formation [4] overlies the Turner Cliffs Formation. The contact between them is a paraconformity that may represent a major hiatus involving the Upper Cambrian. The formation consists mainly of fine crystalline to predominantly microcrystalline dolomite. Vaguely stratified, thick-bedded units of nearly pure dolomite alternate with well-stratified, thin-bedded to laminated, shaly, silty, and sandy dolomite partly characterized by worm borings, ripple marks, and flat-pebble conglomerates. It seems that the proportion of clastic impurities in the lower part of the formation increases to the south or southwest. The formation weathers in shades of light grey. At the type section on Baillarge Bay, the formation has yielded early Middle Ordovician fossils [5]. Late Lower Ordovician (Arenigian) graptolites found by Blackadar [1], on Jens Munk Island (Foxe Basin) are believed to have come from the lower part of the formation.

An incomplete section measured in the northeastern part of the map-area is about 430 feet thick. The topographic map indicates that the thickness of the formation decreases in a southerly direction from between 400 and 500 feet in the northwestern parts to between 200 and 400 feet in the southeastern parts of the area.

A paraconformity separates the Ship Point Formation from the overlying Baillarge Formation [4, 5]. In Navy Board Inlet map-area a disconformable relationship has been inferred from anomalously low thicknesses and a solution zone at the top of the formation. In the present area the only evidence for a disconformity is the abrupt lithological change at the contact. Member A of the Baillarge Formation, probably late Middle Ordovician in age, is characterized by recessive slopes and dark grey talus. In the present area only shaly limestone has been observed, which is partly dolomitized, but shale and thinly stratified dolomite, recognized on Brodeur Peninsula, may also be present. The upper member, B, consists mainly of cryptocrystalline, dark reddish brown limestone, which is partly replaced by microcrystalline to fine-crystalline dolomite. Vaguely stratified, highly resistant units of pure carbonate rock are interbedded with thinly stratified, argillaceous units that form ledges and plateaux. In the western and southeastern parts of the map-area only the lower part of this member, which contains the Arctic Ordovician fauna is preserved. The upper part, which ranges up to Niagaran (Middle Silurian), may be represented on the extensive plateau south of Milne Inlet, but this heavily drift-covered area has not been investigated.

In most of the area the Palaeozoic strata are nearly horizontal. They are locally disturbed, however, by several fault zones. The most important is a group of southeasterly striking normal faults that mark the northeastern boundary of the Palaeozoic outcrop area. This zone was probably in existence before the deposition of the Palaeozoic strata, and has been reactivated in post-Silurian time. It continues into Milne Inlet area. Other faults which also trend predominantly southeast, bound small horsts of Aphebian rocks within the Palaeozoic outcrop area.

The drainage is partly rectilinear and is controlled, to some extent, by a complicated pattern of bedrock fractures that affect bedrock as old as Precambrian as well as unconsolidated sediments of Recent age. The most important fracture directions have the following azimuths, listed in the order of frequency: 334–336, 328–330, 346–348, 318–320, 58–60, 292–294, 324–326, 22–24, 286–288, 6–8, 46–48, 52–54, 274–276, 282–284, 354–356, 270–272, 356–358, 4–6 degrees. A sheet of till extends from the head of Milne Inlet to the southeastern extremity of the map-area and locally obscures the bedrock geology.

[1] Blackadar, R. G.: Additional notes to accompany Map 3-1958 (Fury and Hecla Strait map-area) and Map 4-1958 (Foxe Basin North map-area); Geol. Surv. Can., Paper 62-35 (1963).

[2] Blackadar, R. G., and Christie, R. L.: Geological reconnaissance, Boothia Peninsula, and Somerset, King William, and Prince of Wales Islands, District of Franklin; Geol. Surv. Can., Paper 63-19 (1963).

[3] Kurtz, V. E., McNair, A. H., and Wales, D. B.: Stratigraphy of the Dundas Harbour area, Devon Island, Arctic Archipelago; Amer. Jour. Sci., vol. 250, pp. 636-655 (1952).

[4] Lemon, R. R. H., and Blackadar, R. G.: Admiralty Inlet area, Baffin Island, District of Franklin; Geol. Surv. Can., Mem. 328 (1963).

[5] Trettin, H. P.: Lower Palaeozoic sediments of northwestern Baffin Island, District of Franklin; Geol. Surv. Can., Paper 64-47 (1965).

MAP 1239A
PHILLIPS CREEK
DISTRICT OF FRANKLIN
47H

1239A