GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

LEGEND

CENOZOIC

QUATERNARY

Qu — *Extensively drift covered*

APHEBIAN

Adb — *Diabase (Adb), gabbro (Agb)*

Apd — *Peridotite*

Agr — *Granite; includes granodiorite*

Agg — *Gneissic granitic rocks (Agg); chiefly granodiorite composition with local granite and tonalite; inclusions and bands of amphibolite common (Agga); inclusions and bands of paragneiss common (Aggp)*

Amg — *Migmatite (Amg); includes small areas of gneissic granitic rocks (Agg) and paragneiss (Apg)*

Agl — *Granulite (Agl); chiefly quartz-feldspar gneiss with small amounts of hypersthene and biotite; local clinopyroxene; locally includes minor amounts of gneissic granitic rocks (Agg)*

Aab — *Amphibolite*

LAKE HARBOUR GROUP

Apg — *Paragneiss (Apg); chiefly biotite-quartz-feldspar gneiss; rare cordierite, sillimanite and clinopyroxene; garnet-quartz-feldspar gneiss (Apgg); locally includes minor amounts of amphibolite (Aab); thin bands of gneissic granitic rocks (Agg) common; locally includes thin bands of rusty graphitic gneiss (Arc)*

Atf — *Mafic tuff; includes rare mafic volcanic rocks; also includes interbanded quartzite and micaceous quartzite; local lenses of amphibolite*

Arc — *Rusty, graphitic quartz-rich gneiss (Arc); locally includes small amounts of paragneiss (Apg) and gneissic granitic rocks (Agg)*

Als — *Limestone (Als), crystalline; includes small amounts of paragneiss (Apg), gneissic granitic rocks (Agg) and rusty, graphitic gneiss (Arc)*

Aqz — *Quartzite; includes rare sillimanite-biotite-quartz and schist, metafeldspathic quartzite and meta-arkose*

- *Small outcrop*
- *Geological boundary (defined, assumed)*
- *Bedding, tops known (inclined)*
- *Bedding, tops unknown (inclined)*
- *Foliation (horizontal, inclined, vertical, dip unknown)*
- *Lineation (direction and plunge)*
- *Trend line*
- *Fault (approximate, assumed)*
- *Joints (inclined, vertical)*
- *Antiform (upright, overturned)*
- *Synform (upright, overturned)*
- *Moraine*
- *Esker*
- *Locality where age has been determined (K - Ar method), millions of years* (A 1688)

Geology by Y.O. Fortier, 1952; R.G. Blackadar, 1958; R.N. McNeely, 1965; F.C. Taylor, 1965

Compiled by F.C. Taylor, 1983

Geological cartography by N. Grenier, Geological Survey of Canada

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

Base map assembled by the Geological Survey of Canada from maps published at the same scale by Surveys and Mapping Branch in 1963

Copies of the topographical editions covering this map area may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, Ontario, K1A 0E9

Mean magnetic declination 1985, 37°49' West, decreasing 20' annually. Readings vary from 34°48' in the SW corner to 40°51' in the NE corner of the map area

Elevations in feet above mean sea level

DESCRIPTIVE NOTES

This map was compiled from coastal observations in the south and west (Y.O. Fortier, unpublished), ground traversing and coastal observations in the Cape Dorset area (Blackadar, 1959), helicopter geological traversing by F.C. Taylor and R.N. McNeely (1965), and air photograph interpretation. Blackadar (1967a) previously reported on this reconnaissance survey.

The Cape Dorchester-Cape Dorset map area forms part of the Dorset Fold Belt (Jackson and Taylor, 1972) of the Churchill Structural Province. All the bedrock is Precambrian and probably Proterozoic (Aphebian). However, some of the highly deformed and/or metamorphosed rocks, such as the migmatite and granulite, may contain elements of Archean rocks or even consist primarily of such rocks. Only one isotopic age determination has been made on samples from this map area, a K-Ar biotite age of 1668 Ma revised (Lowdon, 1960) from a granitic gneiss. This cooling age is undoubtedly related to the close of the Hudsonian Orogeny.

The layered rocks are considered to form part of the Lake Harbour Group that extends from northeastern Quebec (Taylor, 1979) through the Lake Harbour district (Davison, 1959) and westward along southern Baffin Island (Blackadar, 1962, 1967b) to this area. The stratigraphic sequence of these layered rocks, which are predominantly sedimentary in origin, is not known. Structure suggests, however, that the quartzite (**A**qz) predates the paragneiss (**A**pg), mafic tuff (**A**tf) and rusty graphitic gneiss (**A**rc). Limestone (**A**ls), for similar reasons, locally may be older than the paragneiss and rusty graphitic gneiss. The basement for these rocks is not known.

The quartzite unit (**A**qz) consists chiefly of a medium grained, white to pinkish-grey and light grey, variously well bedded to massive quartzite. Oscillation ripple marks and crossbeds occur locally. Small amounts of biotite, muscovite and chlorite are present, chiefly lying along bedding planes. Pink feldspar metacrysts, commonly lying normal to bedding planes, are present in some outcrops. Brown weathering muscovite-sillimanite-biotite-quartz schist also occurs along bedding planes in some places. Included in this unit are light pink quartzofeldspathic rocks that are probably meta-arkose and meta-feldspathic quartzite. Some of these rocks are well exposed north of Lona Bay.

The limestone (**A**ls) is all crystalline, is various shades of grey to white, and ranges from fine- to very coarse-grained. Bedding is poorly preserved in may places but in others it is well shown by layers of metamorphic minerals. These layers are characteristically contorted and broken. An extensively serpentinized limestone horizon within gneissic granitic rocks (**A**gg), 13 km south of the Saunders River, includes a limestone conglomerate containing subangular to well rounded limestone clasts ranging in diameter from 1 to 60 cm. Weathering has reduced many limestone outcrops to a coarse carbonate sand. One or more of the following minerals are commonly present: diopsite, tremolite, muscovite, phlogopite, scapolite, serpentine and graphite.

Rusty, graphitic quartz-rich gneiss (**A**rc) is a fine- to medium-grained, equigranular rock that is light grey on fresh surfaces and a moderate yellowish brown on weathered surfaces. Small amounts of disseminated pyrite are commn and their weathering produces the characteristic weathered surface. Graphite occurs as tiny, disseminated flakes throughout most of this unit. Muscovite and sillimanite are present locally.

The mafic tuff (**A**tf) is light to medium green, fine- to medium-grained, chiefly schistose, but locally also well- and thinly-bedded. Included with these rocks are local amphibolite lenses and a few massive greenstone layers probably derived from flows. Interbedded with the volcanic rocks are well defined bands, up to 30 m thick, of well bedded quartzite and micaceous quartzite. The former is medium grained, white to dark grey and variously bedded or massive, whereas the latter is fine- to medium-grained, light to dark grey, well and thinly bedded, and is commonly rusty due to small amounts of disseminated pyrite.

Paragneiss (**A**pg) is dominantly a medium grey, medium grained, equigranular, fairly well foliated and partly banded biotite-quartz-feldspar gneiss. Locally, cordierite and sillimanite are also present, the latter commonly is schistose zones. Garnet-bearing paragneiss (**A**pgg) is typically a white weathering, medium grained, foliated rock that locally is nearly massive. Biotite is present rarely.

Amphibolite (**A**ab) is a fine- to medium-grained, dark grey-green, weakly foliated to massive rock. By far the largest part occurs as irregularly shaped bodies or as distinct layers in lit-par-lit migmatite (**A**mg) and gneissic granite rocks (**A**gg). Areas of amphibolite large enough to show on this map are rare.

Granulite (**A**gl) is essentially a quartz-plagioclase rock with small amounts (up to 5 per cent) of biotite, which is foxy reddish brown in thin section, and ubiquitous but scarce hypersthene. A greyish orange to pale yellowish brown, fine-to medium-grained and moderately foliated rock is typical. Although comprising a significant area in the east-central part, more detailed mapping would probably disclose this rock to be present much more widely than currently shown.

Granitic rocks occur in three indistinct groups, massive, foliated and migmatitic. The latter two grade into one another over both short and extensive distances. The massive rocks (**A**gr) consist of fine- to medium-grained, equigranular, locally graphic, moderate orange-pink granite and granodiorite. Biotite is the only common varietal mineral and in many places is absent. Intrusive relationships exist between these massive rocks and the foliated and layered metasedimentary rocks. Randomly oriented, thin, red granite dykes are common in the southwest, particularly within the quartzite unit (**A**qz). The gneissic granitic rocks (**A**gg) are fine- to medium-grained, well foliated and partly layered, equigranular, moderate orange-pink to pale red and greyish pink. Rarely are greyish shades present. Biotite forms 5 to 10 per cent in these rocks which range in composition from granite through granodiorite to tonalite. Locally, aplite and narrow pegmatite dykes are present. Where amphibolite and paragneiss fragments are abundant they are shown as Agga and Aggp, respectively. Migmatite (**A**mg) consists chiefly of mixed gneissic granitic rocks and elements of paragneiss and/or amphibolite, which form most of the paleosome. Lit-par-lit structure is common, particularly in the east-central part. Elsewhere, structures are complex, with highly contorted foliation planes plus randomly oriented and numerous aplite, granite and pegmatite dykes forming the neosome.

Peridotite (**A**pd) is confined to two tiny, dark reddish brown weathering stocks less than 100 m in diameter. One is 1.25 km east of Lloyd Point and the second is 3 km northeast of the Saunders River. It is weakly foliated to massive, medium grained, dark greenish grey and is serpentinized.

Gabbro (**A**gb), which is medium grained, massive, dark greenish grey biotite, hornblende and clinopyroxene-bearing rock, forms a 6 m dyke in gneissic granitic rocks (**A**gg) 22 km southeast of Finnie Bay near the Weston Escarpment. Diabase (**A**db) forms a small dyke east of Cape Enaulik.

Folds in general trend easterly to southeasterly with a few in the southwest oriented toward the northeast. In the few places where the plunge is known it is of low dip either to the east or west. Numerous small subsidiary folds are present in the layered rocks, chiefly reflecting the larger structures. However, in the limestone (**A**ls) folding is commonly chaotic because of extensive flowage. Faults are considered to be mostly post-folding as in several places folds are offset. Some strike faults may well be closely related to fold development, however. Prominent northwesterly trending faults, such as those along the north coast, the northeast side of Finnie Bay, and the one extending from Cape Enaulik to West Inlet near Dorset Island, are believed to be related to major block faulting that affected much of Baffin Island. This block faulting was probably initiated in the late Aphebian and reactivated several times, as elsewhere it is known to offset Paleozoic and Mesozoic strata. Movement on these faults probably has a major dip-slip component as layered rocks in some places show only small strike separations.

All the rocks, except for some of the intrusive rocks, have been metamorphosed. Whereas most are in the amphibolite metamorphic facies, other facies are also represented. For example, in the southwest, rocks in the mafic tuff unit (**A**tf) are in the greenschist facies with the volcanic rocks typically with albite-actinolite assemblages and biotite in the sedimentary rocks. The extent of this area of greenschist rocks is not known with certainty, but present data suggest they are confined to the area between Lonebutte Bay and Schooner Harbour. The east-central part is underlain by granulite facies rocks with biotite-hypersthene-plagioclase assemblages that locally contain clinopyroxene. Isolated occurrences of these rocks are also present at Finnie Bay and east of MacNabb Lake. The amphibolite facies rocks are characterized by assemblages containing biotite, garnet, cordierite and sillimanite in the quartzofeldspathic rocks, and diopside, tremolite and olivine in the calcareous rocks. Retrogression in the form of chlorite and serpentine occurs locally.

There are no known economic mineral occurrences. The limestone and paragneiss areas are worth prospecting, particularly for lead-zinc mineralization

References

Blackadar, R.G.
1959: Cape Dorset, Baffin Island, District of Franklin, Northwest Territories; Geological Survey of Canada, Map 11-1959
1962: Andrew Gordon Bay-Cory Bay, Baffin Island, District of Franklin; Geological Survey of Canada, Map 5-1962
1967a: Geological reconnaissance southern Baffin Island, District of Franklin; Geological Survey of Canada, Paper 66-47
1967b: Geology of Mingo Lake-Macdonald Island Map Area, Baffin Island, District of Franklin; Geological Survey of Canada, Memoir 345

Davison, W.L.
1959: Lake Harbour, Baffin Island, District of Franklin; Geological Survey of Canada, Map 29-1958

Jackson, G.D. and Taylor, F.C.
1972: Correlation of Major Aphebian Rock Units in the Northeastern Canadian Shield; Canadian Journal of Earth Sciences, v. 9, no. 12, p. 1650-1699

Lowdon, J.A.
1960: Age Determinations by the Geological Survey of Canada, Report 1, Isotopic Ages; Geological Survey of Canada, Paper 60-17

Taylor, F.C.
1979: Reconnaissance Geology of a part of the Precambrian Shield, Northeastern Quebec, Northern Labrador and Northwest Territories; Geological Survey of Canada, Memoir 393

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Copies of this map may be obtained from the Geological Survey of Canada:
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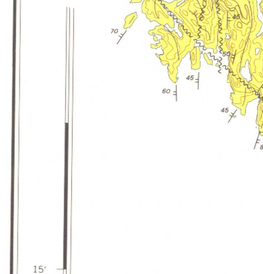

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MAP 1607A

GEOLOGY

CAPE DORCHESTER-CAPE DORSET

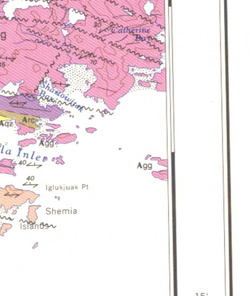
DISTRICT OF FRANKLIN

NORTHWEST TERRITORIES

Scale 1:250 000

Kilometres 5 0 5 10 15 20 Kilometres

Transverse Mercator Projection
CM 75°, Scale Factor 0.9996



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

CAPE DORCHESTER-CAPE DORSET
DISTRICT OF FRANKLIN
NORTHWEST TERRITORIES

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