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DEPARTMENT OF ENERGY, MINES AND RESOURCES

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GEOLOGY OF MINGO LAKE–MACDONALD ISLAND MAP-AREA, BAFFIN ISLAND, DISTRICT OF FRANKLIN

R. G. Blackadar

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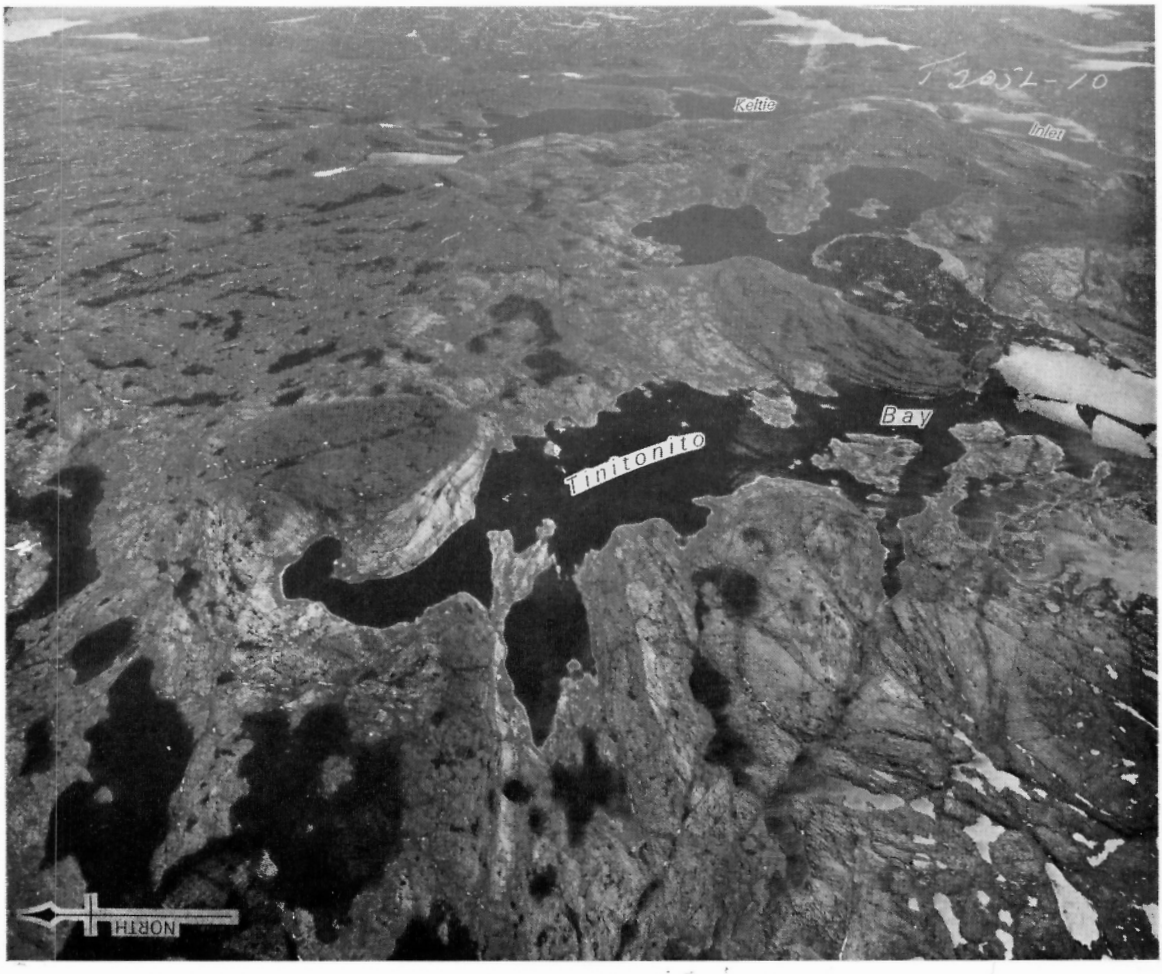

PLATE I. Synclinal structure of pyroxene gneiss (dark), north arm, Tinitonito Bay. Note also the northwest-trending diabase dyke on extreme right of photo. *(RCAF T205L-10)*

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By
R. G. Blackadar

DEPARTMENT OF
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PREFACE

When the importance of the iron deposits of the Labrador Trough was recognized it became obvious that the possibility of the structure continuing across to southern Baffin Island needed investigation. Between 1951 and 1953 reconnaissance geological surveys were made in this region and iron deposits were indeed found.

Although these differed from the type of deposit important in the Trough their potential significance warranted further study of the area. This study was carried out in 1959 and 1960 and the results are reported here.

J. M. HARRISON,
Director, Geological Survey of Canada

OTTAWA, May 6, 1964

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Von R. G. Blackadar

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Р. Г. Блейкадар

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GEOLOGY OF MINGO LAKE–MACDONALD ISLAND MAP-AREA, BAFFIN ISLAND, DISTRICT OF FRANKLIN

Abstract

Interest in iron deposits of possible economic importance was aroused following reconnaissance geological studies made in southern Baffin Island between 1951 and 1953. A more detailed geological examination was made in 1959 and 1960 of NTS map-sheets 36A and 35P, which include many of the deposits.

The rocks are mainly Precambrian, and a K-Ar age determination (1,700 m.y.) indicates an Early Proterozoic age for the metamorphism of the area. The Precambrian rocks, lithologically like the rocks of the Grenville Province, comprise an assemblage of granulite, granitic gneiss, *lit-par-lit* gneiss, pyroxene-hornblende gneiss, rusty graphite schist and gneiss, and crystalline limestone. The iron deposits are commonly associated with pyroxene-hornblende gneiss. Diabase dykes intrude all exposed Precambrian rocks. Relatively flat-lying limestone and shale units of Palaeozoic age are presumed to outcrop in the northeastern part of the map-area.

Exploratory work, including diamond drilling, carried out by companies holding claims in the region indicated that the iron deposits are not of ore grade under present economic conditions.

Résumé

L'intérêt dans les gisements de fer d'importance économique s'est accru à la suite d'études géologiques de reconnaissance effectuées dans le sud de l'île Baffin entre 1951 et 1953. En 1959 et en 1960, on a fait un examen géologique plus détaillé des coupures de carte 36A et 35P du système topographique national, sur lesquelles figurent plusieurs des gisements.

Les roches sont surtout précambriennes et la détermination de l'âge par la méthode K-Ar (1,700 millions d'années) indique que le métamorphisme de la région remonte au Protérozoïque inférieur. Les roches précambriennes, lithologiquement semblables aux roches de la province de Grenville, forment une collection de granulite, de gneiss granitique, de gneiss lit-par-lit, de gneiss à pyroxène et à hornblende, de schiste à graphite rouillé et de gneiss, et de calcaire cristallin. On associe communément les gisements de fer au gneiss à pyroxène et à hornblende. Des dykes de diabase pénètrent toutes les roches précambriennes qui affleurent. On suppose que des unités de calcaire et de schiste du Paléozoïque affleurent dans la partie nord-est de la région.

Les travaux d'exploration, y compris le forage au diamant, effectués par les sociétés détenant des concessions dans la région, indiquent que les gisements de fer n'ont pas la qualité de minerai requise dans les conditions économiques présentes.

Chapter I

INTRODUCTION

Location

Mingo Lake–Macdonald Island map-area comprises that part of southern Baffin Island south of latitude 65 degrees between longitudes 72 and 74 degrees (NTS map-sheets 36A and 35P).

Settlement

There are no permanent settlements in the area today, although the now abandoned Hudson's Bay Company post at Amadjuak was the trading centre of the region for about 15 years. This post was set up in conjunction with a venture by the Hudson's Bay Company to introduce a reindeer herd into southern Baffin Island. In the autumn of 1921 several Lapp herders with about 550 reindeer arrived at the post but the herd could not be successfully established, due in part to lack of suitable forage but also to the attitude of the local Eskimo hunters towards this new source of game. The trading post continued in operation until 1934 and, although unoccupied for more than 30 years, the buildings are still in fair condition and were used by the Geological Survey party as a base camp for part of one season.

Cape Dorset, about 100 miles west of the western border of the map-area, is now the trading and administrative centre of southwestern Baffin Island. The administrative offices of the Department of Northern Affairs and National Resources, Hudson's Bay Company store, nursing station, Eskimo-owned Co-operative store and other co-operative activities, Federal day school, and an Anglican Mission are all located at Cape Dorset. A private-commercial radio station is operated by the Hudson's Bay Company, Frobisher Bay being the centre through which most messages are passed.

Accessability

Normally southwestern Baffin Island can be reached by sea through Hudson Strait from early June until late October, but unfavourable ice conditions may result in a much shorter season. As in most parts of the arctic, travel by air is by far the most important means of transportation. Frobisher Bay, accessible from Montreal on a thrice weekly commercial schedule, is the starting point for charter service to

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such smaller settlements as Cape Dorset and to uninhabited areas such as the present map-area. Both ski-equipped and amphibious aircraft are used, depending on the season. A recent extension of the commercial service along the east coast of Hudson Bay to Sugluk, Quebec and Cape Dorset now links southwestern Baffin Island with Moosonee, Ontario.

There are times during freeze-up and break-up when air flights cannot be made. The development of land strips at the smaller settlements would release flying from its present seasonal control but in many places, especially on Precambrian terrain, there is scarcely enough level land for erecting buildings let alone constructing airstrips. Only an increased economic importance of a settlement seems likely to justify the large construction costs of building a permanent airstrip.

Population

More than 350 Eskimos live in southwestern Baffin Island, mostly near Cape Dorset. The white population varies, but rarely exceeds 10 persons. When field work in Mingo Lake–Macdonald Island map-area was started there were Eskimos camped in the area, but most have since moved either west to Cape Dorset or east to Lake Harbour.

History of Exploration

South coast of Baffin Island was undoubtedly first seen by Henry Hudson who in July 1610 "Anchored by three Rockie Islands. We called them the Isles of Gods Mercie (sic)." These islands apparently were not the similarly named cluster of islets near Fair Ness but were somewhere east of Big Island in the vicinity of Lake Harbour. In 1615 William Baffin and Robert Bylot sailed along the south coast of Baffin Island in the *Discovery,* a 55-ton ship with many years of arctic exploration. On this voyage they probably traversed parts of the map-area and named Fair Ness, a prominent headland in the extreme southeastern part of the district. Luke Foxe in 1631 explored the Foxe Channel coasts of Baffin Island and may have sailed near the coastal areas of the region under study.

The dominant factor in all polar exploration from earliest times until the loss of the Franklin Expedition in 1848 was the search for the Northwest Passage and once it became apparent that any passage would lie west or north of southern Baffin Island, there was no incentive to explore these coasts. None of the complexity of the coast shows on maps of the time, although many expeditions passed through Hudson Strait between 1631 and the mid-nineteenth century and indeed, following the establishment of the Hudson's Bay Company in 1670, the strait became a commercial route for vessels carrying supplies to and from posts on Hudson Bay.

The last half of the nineteenth century saw the beginning of the period of scientific exploration. Dr. Franz Boas, an ethnologist, made a trip in 1884 from the head of Amadjuak Bay to Amadjuak Lake, and the next year Dr. Robert Bell of the Geological Survey made a brief examination of the area around Amadjuak Bay. In 1897, Dr. Bell returned to make a coastal reconnaissance between Big Island

and Chorkbak Inlet, thus covering the coastal parts of the area considered in this report. Several of the names on the map reflect his work — Diamond and Jubilee Islands for example. Bell back-packed inland towards Amadjuak Lake following the northward-trending chain of lakes just west of Amadjuak Bay.

Travel throughout the area became more common following the establishment at Lake Harbour in 1909 of the Anglican Mission, and in 1911 of the Hudson's Bay Company post. Settlements in widely separated parts of Baffin Island facilitated scientific studies, and several trips were made in the 1920's through the map-area by scientific parties. In 1924 Major Burwash of the Department of the Interior when crossing from Pangnirtung to Cape Dorset followed Bell's route down to Amadjuak post; J. D. Soper of the National Museum made a similar trip in 1926. These and other journeys are more fully described by Millward (1930)[1].

Acknowledgments

The writer was assisted by K. Murphy in 1958, by R. Addison in 1959, and by R. M. Williams in 1960. Arksangiuk and Echalook served as traversing assistants in 1958 and 1959 and Echalook and Kovianatilliuk in 1960.

During the three seasons spent in mapping the area, members of the party were greatly helped and hospitably received by the residents of Cape Dorset. Particular thanks are due to Mr. and Mrs. Bill Hall and Mr. and Mrs. A. R. Pedersen of the Hudson's Bay Company, and to Mr. and Mrs. J. A. Houston of the Department of Northern Affairs and National Resources.

Field Work

Reconnaissance geological mapping by the Geological Survey of Canada in 1951 and 1952 disclosed the presence of magnetite-bearing rocks in the vicinity of Chorkbak Inlet. In 1953 further studies were made of these rocks by W. L. Davison, and during 1956 and 1957 most of the area containing iron-bearing rocks was staked. Because of the economic potential, in 1958 the author was assigned to make a more detailed study of parts of this geologically complex area.

In 1958 the southwestern Baffin Island coasts were choked with ice until late August, and only a few weeks of field work could be done. However, mapping of the southeast quadrant of Cape Dorset map-area (36C) was completed. Field work in Mingo Lake–Macdonald Island map-area was continued in 1959 and was completed in 1960.

Method of Traversing

Dog-teams, canoes, a 45-foot Peterhead boat, the *Aivik,* and back-packing were all used for travel. In late May of 1959 the writer and his assistant reached Cape Dorset from Churchill, Manitoba by DC-3 aircraft, and after picking up two Eskimo helpers went on to Amadjuak post. There a successful landing was made despite soft snow resulting from the lateness of the season. Fortunately provisions

[1]Names and/or dates in parentheses are those of *References* listed at end of report.

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and two canoes had been cached in the old Hudson's Bay Company buildings the preceding autumn, and only one aircraft landing was required. Several trips by dog-team were made inland and food caches established to the north. Early in June back-packing traverses inland were started; these trips lasted a week or more. Each geologist worked independently, and was accompanied by an Eskimo assistant.

The sea ice cleared from Amadjuak Bay in mid-July, and the *Aivik,* owned and operated by Paulassie Pootogook, arrived from Cape Dorset shortly thereafter. For the next two months this boat was used as a mobile base, and work was concentrated in coastal areas. The basic technique used was as follows. In the morning, a geologist and his Eskimo assistant were landed at the starting point of their traverse. The boat then went on to the finishing point of this party where the second party was put ashore to start their day's work. The boat remained at this point until the arrival of the first party and after taking this group aboard, proceeded to the end point of the second traversing group. The innumerable small rocky islands, peninsulas and deep inlets result in a terrain well suited to this method of work. Exposures are especially good in coastal areas, and the intricate structural details of the rocks are well displayed on wave-washed surfaces. Additional coastal traverses were made by canoe to gain a better understanding of the complex geology.

In 1960 the writer left Churchill in mid-April, again using a DC-3 aircraft, intending to set up a base camp at the head of Keltie Inlet. Unfortunately sastrugi (hard snow ridges) prevented landing on the ice of the inlet and the entire load was left on the ice at Chorkbak Inlet. By the use of two dog-teams obtained from Cape Dorset, the base camp was finally established on Tinitonito Bay. A traverse by dog-team was made through the northern part of the map-area and food caches were set out for use during back-packing traverses. The writer then returned to Cape Dorset. Soon after, a ski-equipped Otter aircraft from Frobisher Bay brought the writer's assistant and two Eskimo helpers, and also two dogs for use as pack dogs. The party then moved to the base at Tinitonito Bay. Once again during June and early July back-packing traverses were made, and from mid-July to mid-September the *Aivik* served as the mobile base camp. A fuller description of the methods used will be found in Blackadar 1958, 1960, 1961.

Chapter II

PHYSIOGRAPHY

Throughout northern Canada the dominant features of the landscape were developed during preglacial times by geomorphic processes active over long periods, whereas the fine details of the scenery are the product of Pleistocene and post-glacial geomorphic processes. Thus the grand physiographic features of southern Baffin Island, the southwest-tilted land surface with steep east-facing scarps, the Baffin Upland of Fortier (1957), and the low-lying plains of the Foxe Basin coast existed long before the relatively recent advance of the ice. On the other hand, the smoothly contoured hills, the boulder-strewn uplands, and the drift-filled valleys are of much more recent origin.

Topography

An undulating plateau surface modified by glaciation characterizes all but the northeastern part of the map-area where a lower, plains-type topography prevails. From the coast or from valley floors the surface appears rugged, but from the top of the hills its peneplained nature is obvious. In general, the land rises gradually towards the northeast; the maximum elevation, slightly in excess of 1,300 feet, is southwest of Mingo Lake.

Drainage is mainly to the south, towards Hudson Strait, although the northern third of the map-area drains north to Foxe Basin by way of Aukpar River to Bowman Bay, or through Mingo Lake to Koukdjuak River. The main rivers are commonly deeply incised and their courses are typical of drainage in Precambrian Shield areas. They are characterized by short stretches of rapid water followed by lakes, some several miles long, which in turn fall into other small rivers. The upper reaches of the rivers and streams generally lack well-defined channels and instead spill from a lake basin in a sheet-like manner over the bedrock. Many lakes form as a result of structurally controlled features in the bedrock but others merely occupy shallow depressions in bedrock or boulder till. Very often the lake shores are indistinct. Drift-covered areas are characterized by shallow ponds that lack visible drainage.

Physiographic Divisions

Two main physiographic units are found within the map-area: the Baffin Uplands and the Foxe Basin Lowlands (Fortier, 1957, p. 398). The part of the Foxe Basin Lowlands within the region has been named the Mingo Plain, and the part of the Baffin Upland within the map-area has been subdivided into the Chorkbak

Hills and the Frobisher Plateau (Rand Report, 1958, p. 150). All these subdivisions extend beyond the limits of the map-area.

Mingo Plain

This part of the area is markedly different from the remainder. It is presumably underlain by Palaeozoic strata composed of limestone and minor shale, and is mantled by a relatively thick limestone-clay till. The surface is undulating, and from its southern limit looks as if it rises steeply to the north. No outcrops were seen along the southern margin; they probably occur only low in stream valleys.

In spring or early summer, or after prolonged rain, the surface of Mingo Plain is extremely wet and all but impassable. Late summer when it is usually much drier is the best time to travel across it. The surface rises from an elevation of about 400 feet at the southern margin to a little above 800 feet in the northeastern part of the area.

Frobisher Plateau

This subdivision forms the central part of Meta Incognita Peninsula. It extends from near the mouth of Frobisher Bay northwestwards to Mingo Lake–Macdonald Island map-area where it merges with the lower Chorkbak Hills and the still lower plains areas of central Foxe Peninsula.

The surface of Frobisher Plateau is highly dissected, but local relief rarely exceeds a few hundred feet. Eastward the surface rises from about 500 feet where it merges with Chorkbak Hills to a maximum of 1,300 feet within the map-area and to almost 3,000 feet near the southeastern limit of the Plateau. The surface itself is covered with drift, but this appears to be thin, and bedrock ridges can be found in most parts.

Snowbanks, especially on north-facing slopes, persist well into the summer and some appear to be semi-permanent, melting only in unusually warm summers. A slight decrease in the mean annual maximum temperature would probably result in the formation of small but permanent icefields.

Chorkbak Hills

This unit occupies the western and southern parts of the map-area. These hills are commonly steep, in places vertical, with gently inclined upper surfaces and flattened to convex tops. In coastal areas elevations are usually less than 300 feet but inland elevations are higher, and the hilly country gradually merges with Frobisher Plateau.

Major valleys have been drowned in the coastal region, and inlets, some more than 20 miles long, penetrate inland. These trend at about right angles to the coastline, which is marked by an archipelago studded with innumerable small islands. Although many of these islets and reefs are awash at high tide, others are rugged and rise abruptly from the sea to the elevation of the nearby Chorkbak Hills. Bell (1898) noted "The whole coast is rugged and for the most part mountainous. The innermost islands interlock with bays and points of the mainland in such a manner that it is impossible to know without the aid of a guide whether or not one has

reached the main shore. . . . Viewed from the top of a distant hill so that the intervening channels cannot be seen, the eye fails to detect any difference between the general appearance of the islands and the mainland. The condition can best be described if we imagine a rough mountainous country rising as a whole gradually to the northward, to have been half submerged."

Geomorphic Processes

In arctic regions chemical weathering is much less important than mechanical weathering, and removal of the products of erosion by water is subordinate to processes of mass movement. Within Mingo Lake–Macdonald Island map-area rock surfaces are relatively fresh except for rocks such as pyrite-rich graphite schists and gneisses where rusty zones show that some chemical weathering is in progress.

Even the freshest bedrock is riven by the effects of alternate freezing and thawing along joints and smaller fractures. Blocks weighing many tons have been moved several feet and as these in turn are broken into smaller pieces the whole mass begins to move to lower levels. Near steep slopes even the largest blocks lie at the bottom and in falling add to the mechanical breakdown of all rock they hit. With finer material solifluction is undoubtedly the most important process. Under the increased weight of accumulated meltwater in the spring, large patches of drift slide to lower levels, thus forming uneven, terrace-like deposits in valleys, and leaving scalloped scars on the hillsides. No individual flow is thick as the permafrost table is near the surface, but as the process continues thick deposits are built up in the lower land.

The rivers, on the other hand, seem to carry little material. Even during the spring run-off, between mid-June and mid-July, the water is clear. Deltaic deposits at the mouths of these rivers are all but non-existent, and the rivers fall directly into the sea through a bouldery bed. During the run-off there is, however, some movement of boulders in the beds of the rivers.

Some bays and coasts have extensive tidal flats, but in many places no rivers enter them and the deposits must be of marine origin. Due to the short ice-free period, the effects of marine erosion are more limited than in more southern coastal areas. However, autumn storms combined with high tides result in extensive erosion of beaches, and after such a storm suspended material turns the coastal waters greyish green instead of the usual blue.

A peculiar feature noted on many tidal flats is that the low-tide mark commonly is characterized by a boulder rampart several feet high, shoreward of which the flats are silty with isolated boulders. In winter the sea water freezes to depths of 5 feet or more and along a considerable margin of the coast it freezes to the bottom. In spring the ice in a belt between high- and low-tide marks breaks up first because of tidal activity, and each day at high tide the broken ice moves about within this belt. Ice pans collect thus along the seaward margin of the open patch, against the still solid bay ice. As melting progresses, the load of boulders and silts picked up during the freezing is dropped. Sometimes of course all the ice in a bay begins to move at once and then the bottom-derived detritus is scattered over a wide area.

Chapter III

GENERAL GEOLOGY

The crystalline rocks of the map-area are of Precambrian age. By analogy with similar rocks to the west near Chorkbak Inlet and at Cape Dorset, where dates of 1,700 m.y. and 1,685 m.y. respectively have been obtained by K-Ar dating methods, the crystalline rocks are considered to be Early Proterozoic and to form part of the Churchill Province (Stockwell, 1963).

The rocks consist of stratified gneisses of high metamorphic grade and minor, bands of coarsely crystalline limestone (marble). Veins and dykes of granitic material cut all units, and internal relationships indicate that there were different periods of intrusion. The pegmatite intrusive stage apparently followed the final deformation of the area but accompanied a period of faulting. Dykes of pegmatite are offset by other dykes and both in turn are offset by still later intrusions.

Major lineaments, commonly marked by drift-filled valleys, may represent major fault zones that post-date the period of pegmatite intrusion. Northwest-trending gabbro dykes cut all Precambrian units. In the northeastern part of the map-area the crystalline rocks are overlain by flat-lying sedimentary strata presumed to be of Ordovician age.

All parts of the region appear to have been glaciated and features indicative of marine submergence are widespread.

Precambrian Rocks

The association of relatively high-grade gneisses and crystalline limestone is characteristic of large parts of eastern Ontario, western Quebec, and northern New York State, in the so-called Grenville Province. At one time it was thought that the similar assemblage present throughout much of southern Baffin Island might be of comparable age. However, the radioactive dates from the Baffin Island succession are much earlier than those from the Grenville Province. Despite this, lithologically and structurally the southern Baffin Island rocks are so like the Grenville successions that concepts applicable to the latter are useful in understanding the sequence in Mingo Lake–Macdonald Island map-area.

The separation of these rocks into mappable units is difficult due to the metamorphism to which most of the Precambrian rocks have been subjected. Although broad differences are readily visible and quickly comprehended, it proves less easy to translate these features into definite criteria whereby the various units

can be defined. It must be appreciated that the divisions shown on Map 1185A are subjective and often reflect the bias of the observer. For example, it is not difficult to delineate the contact between amphibolite or crystalline limestone and quartzo-feldspathic gneiss, but the separation of banded gneiss and hybrid gneiss, or garnet-quartz-feldspar gneiss and quartzo-feldspathic gneiss containing infrequent garnet is not easily made, although any one of the last named rock-types forms, within a limited area, an easily recognized entity.

The scale of mapping carried out necessitated the use of generalized units. Although in detail minor disagreement may exist between the results presented on Map 1185A and those of other workers, the author considers such disagreements to be inherent in mapping gneissic terrains and to be a reflection of the complexity of the problem rather than the incompetence of the observer.

The intricate structures within the map-area preclude accurate determination of the thickness of the succession, but it appears that many tens of thousand feet of strata is involved.

Granitic Rocks (1)

Here and there throughout the gneissic complex are areas of massive quartz-feldspar rock. In texture and mineral content these rocks resemble granite but contacts between them and other units are gradational rather than intrusive. For example, along the west shore of Keltie Inlet quartz-feldspar gneiss with prominent gneissic structures grades into rocks with less and less prominent structure until finally the rock is massive.

Lithology

Various shades of red characterize the weathered surface of the granitoid rocks that on fresh surfaces are predominantly greyish pink (5R8/2)[1] to light red (5R6/6). The texture of the granitic rocks varies from medium to coarse grained.

Plagioclase, microcline, perthite, antiperthite, and quartz with lesser amounts of biotite, chlorite, hornblende, and trace amounts of magnetite and apatite are the minerals most commonly seen in thin section of these rocks. Plagioclase forms rectangular grains usually slightly but sometimes highly altered to white mica. Twinning may be well developed, but commonly is indistinct. Quartz forms large, inclusion-free grains which may deeply embay the feldspars. Both perthite and antiperthite may be present in these granitic rocks although not usually in the same thin section. Some rocks were examined in which no perthite was detected. Braid and patch perthites were noted. In antiperthite, potassic feldspar has the form of rods and blebs; it may also occur along grain boundaries, which suggests a replacement origin. This mode of occurrence and the presence of antiperthite, which is generally thought to be of replacement origin, suggest that potassic metasomatism took place following the crystallization of the granitoid rocks.

[1] Colours are stated in terms of values presented in the *Rock Color Chart* prepared by E. N. Goddard, *et al.*, and distributed by the Geological Society of America; 2nd printing 1951.

The mineral composition of selected specimens of the granitic rocks given in Table I indicates that both granitic and granodioritic rocks are included in map-unit 1.

Table I
(volume %)

plagioclase	38.7	46.8	18.6
K-feldspar	29.9	10.6	48.9
quartz	27.3	34.0	30.5
magnetite	0.2	–	0.1
chlorite	3.9	1.8	1.0
biotite	–	6.6	–
hornblende	–	–	0.9
apatite	–	0.2	–

These analyses reflect the varying abundance of microcline, perthite, and antiperthite. Where antiperthite is abundant, the volume per cent of potassic feldspar is relatively low.

Banded Gneisses (2)

Gneisses composed of alternating bands of mafic-rich and felsic-rich rock form distinct, mappable units within the map-area. In places the felsic phase is thought to be of igneous origin and the rocks may be termed injection gneiss, elsewhere the nature of the light coloured phase is less obvious and the term banded gneiss, one with no genetic implication, is applied. Migmatite and *lit-par-lit* gneiss equally well describe parts of these rock assemblages.

The structure of the banded gneisses is particularly well exposed on wave-washed surfaces where lichen cover is absent. The bands vary in thickness from a few inches to several feet and usually display a sharp contact with one another. These rocks are associated with quartz-feldspar gneiss (4) and hornblende-pyroxene gneiss (9). Gradational contacts with these units are common, but here and there the change from banded gneiss to the widespread quartz-feldspar gneiss is abrupt and there is no difficulty in separating the two rock types.

Lithology

The principal constituents of the light coloured, felsic phase of these rocks are white quartz and greyish pink (5R8/2) to moderate reddish orange (10R6/6) feldspar. Biotite or hornblende may be present but more commonly these minerals have been replaced by chlorite. In the darker phase, biotite, hornblende, quartz, and plagioclase are the main constituents. Although usually medium to coarse grained, a pegmatitic texture is observed in some of the banded gneisses.

Modal analyses in Table II were calculated on specimens from light and dark bands about 3 inches apart.

Table II
(volume %)

	Light	Dark
quartz	26.9	16.2
plagioclase	21.3	31.2
K-feldspar	44.0	–
pyroxene	–	39.2
hornblende	–	0.8
biotite	0.4	tr.
chlorite	7.2	–
magnetite	0.2	11.5
apatite	–	1.2

In the felsic rock the potassic feldspar is usually perthite and the accompanying plagioclase is extensively altered to white mica, whereas in the mafic phase potassic feldspar is absent and plagioclase is only slightly altered.

The modal analyses in Table III are from rocks of map-unit 2 selected from widely separated localities.

Table III
(volume %)

	1	2
quartz	33.0	11.9
K-feldspar	20.6	–
plagioclase	35.0	39.2
pyroxene	–	26.8
hornblende	2.8	6.5
biotite	4.5	3.0
chlorite	2.7	8.7
magnetite	1.0	3.3
apatite	0.2	0.3

1—felsic phase; average of 4 analyses
2—mafic phase; average of 6 analyses

From these data it will be seen that the mafic phase is a pyroxene gneiss; pyroxene in varying proportions is present in all thin sections examined. The ubiquitous occurrence of this mineral in the dark bands of the banded gneiss and the presence of large, mappable areas of pyroxene gneiss (9) in various parts of the map-area suggest a common origin for these rocks, an aspect discussed in more detail when the origin of the gneissic complex as a whole is considered (p. 22).

Hybrid Gneisses (3)

Large parts of the map-area consist of a pinkish quartz-feldspar granitic-textured rock containing varying amounts of mafic rocks. These mafic rocks form discontinuous patches, a feature that distinguishes the hybrid gneiss from the banded gneiss (map-unit 2). The mafic rocks may display intense contortion and the general appearance of an outcrop surface is one of swirls and disarticulated bands of mafic rock lying within a light coloured matrix (Pl. II). The entire mass was probably at one time in a plastic, if not a fluid, state.

Dykes of pegmatite cut both the mafic and felsic phases of the hybrid gneiss. Here and there these are emplaced along small faults; elsewhere pegmatite seems to have been intruded along fractures having no displacement. In addition to pegmatitic masses, medium-grained quartz-feldspar and quartz-garnet veinlets are present.

For mapping purposes all rocks showing intense contortion of basic inclusions resulting in the development of agmatites and similar rocks have been grouped together. Because of the arbitrary nature of this division, gradational contacts exist between hybrid gneiss and most other rock units.

Lithology

The granitic phase of this complex is generally medium to coarse grained. Quartz is milky, although smoky and clear quartz may also be found. Pink feldspar phenocrysts, some more than 3 inches in greatest dimension, impart a pinkish cast to many of these rocks. In the quartz-feldspar phase of this assemblage, lenses, several feet long, composed solely of pinkish feldspar are common; elsewhere white feldspar is predominant. Garnet may be present in the granitic phase and is especially common in those outcrops north of the main band of crystalline limestone. The garnet is light red (5R6/6) to moderate red (5R4/6), and may form as much as 10 per cent of the felsic phase. Although biotite and hornblende may be present in the felsic rocks, it is not unusual to traverse wide areas composed only of quartz and feldspar that contain lenses, schlieren, and similar relics of mafic rocks.

Rusty bands and schlieren in some parts of the felsic phase were seen in thin section to be mainly quartz with less than 10 per cent of mafic minerals and only a few per cent of potassic feldspar.

The mafic phase of the hybrid gneiss is hornblende-pyroxene-quartz-feldspar gneiss and, like the banded gneiss, is similar in mineral content to the pyroxene gneisses of the region. The inclusions vary from mere wisps and schlieren to masses many tens of feet long and wide. For the most part they are intricately folded and like the felsic rocks, they are cut by veins and dykes of quartz-feldspar pegmatite and quartz pegmatite.

The modal analyses in Table IV are averages of specimens from various parts of the map-area.

Table IV

(volume %)

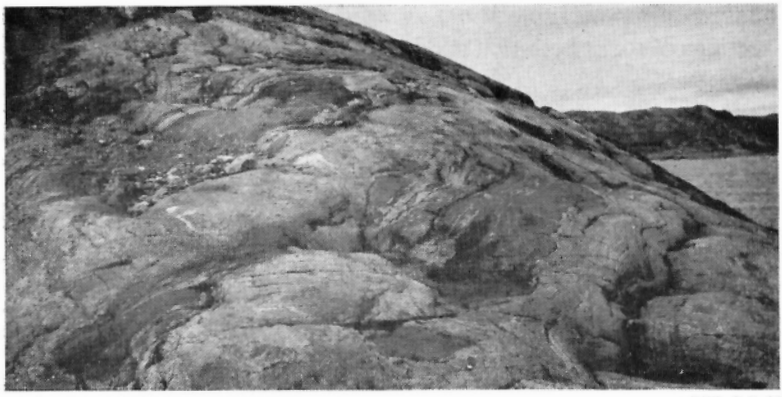
	Mafic Inclusions	Felsic Groundmass
quartz	24.8	39.9
plagioclase	19.6	7.5
K-feldspar	–	46.4
pyroxene	39.7	–
hornblende	10.1	3.7
biotite	1.0	0.9
magnetite	2.9	1.2
apatite	tr.	0.3
pyrite	1.7	–

RGB, 3-13-60

RGB, 3-14-60

PLATE II

Hybrid gneiss (3) outcrop on wave-washed west shore of Keltie Inlet. The sharp contact between felsic and mafic phases and the habit of the younger pegmatite dykelets are readily seen.



RGB, 3-3-60

Biotite-Quartz-Feldspar Gneisses (4)

Buff weathering, granular, biotite-quartz-feldspar gneiss outcrops throughout the map-area and is particularly abundant south of the northwest-trending crystalline limestone zone. These rocks are thus most abundant in the coastal areas of the region.

Lithology

Quartz and feldspar with minor amounts of hornblende, pyroxene, and biotite are the principal constituents of map-unit 4. A granoblastic texture with more or less equidimensional grains characterizes these gneisses. Large areas characterized by smoky quartz, dusky yellow feldspar, and minor amounts of biotite or pyroxene have previously been referred to as granulite. Such rocks exhibit a granular texture and weather dark yellowish orange (10YR6/6). Lenses of pyroxene-hornblende rock, rarely more than a few feet in greatest dimension, are a most distinctive feature. They may be relics of once continuous layers of mafic rock, possibly sills or even flows.

Although areas of granulite are widespread, there seems to be no clear separation of such areas from those characterized by a more granitic appearance. Bands of sillimanite gneiss less than an inch thick are interbedded with quartz-feldspar gneiss in a few places. Other than these occurrences, sillimanite was not seen in the map-area. Cordierite was noted at at least two place, one occurrence was at the north end of Tessioyaluk Inlet and the other southeast of the mouth of Aberdeen Bay.

In general appearance rocks of map-unit 4 show little gneissosity, because of the relatively small amounts of mafic minerals present, but in detail some banding is visible. Quartz-rich layers a few tenths of an inch wide impart a distinct planar appearance to some outcrops. Biotite when present is usually oriented parallel with planes of foliation and serves to emphasize the gneissose structure.

Under the microscope, quartz, potassic feldspar, and plagioclase, in varying proportions, are seen to be the principal constituents. Although potassic feldspar usually has the form of discrete crystals of microcline or perthite in several sections this feldspar forms in narrow, irregular masses along grain boundaries. This mode of occurrence and the presence of antiperthite suggest that replacement of sodium and calcium of plagioclase by potassium (potash metasomatism) took place. Plagioclase in these rocks (4) is usually unaltered oligoclase.

The modal analyses given in Table V are averages of the principal constituents measured in thin sections of rocks both rich and poor in potassic feldspar.

Table V

(volume %)

	1	2
K-feldspar	12.7	41.5
plagioclase	45.0	18.6
quartz	34.5	36.2

1—average of 12 thin sections low in K-feldspar (less than 25%
2—average of 8 thin sections high in K-feldspar (more than 25%)

One of the mafic rocks from a boudin in the granular quartz-feldspar gneiss was seen in thin section to have the mineral composition (volume %) shown in Table VI.

Table VI

quartz	7.4
plagioclase An_{52}	26.4
K-feldspar	4.9
hornblende	37.8
pyroxene	15.2
magnetite	7.0
biotite	0.7
apatite	0.6

Diopside Gneisses (5)

A distinct variety of pyroxene-bearing gneiss, a rock totally unlike the pyroxene gneiss of map-unit 9, outcrops on the north shore of the west arm of Tinitonito Bay. Similar although more highly altered rocks are found south of the west arm.

Lithology

Many outcrops of this unit have a spotted appearance, reflecting the presence of greenish grey (10G4/2) pyroxene. Although the average length of these crystals is about 2 inches, crystals more than 12 inches long were observed. Quartz and feldspar, the matrix-forming minerals of the diopside gneiss, impart an overall light coloured appearance to the rock. In common with most of the rock units in the map-area, the diopside gneiss is intruded by quartz, feldspar, or quartz and feldspar pegmatite dykes. Some of these contain pyroxene similar in colour to that in the intruded rock.

A thin section study shows that the pyroxene is slightly pleochroic with colours varying from moderate yellowish green (10GY6/4) to moderate yellow-green (5GY7/4). This pyroxene is considered to be diopside. Some thin sections show the replacement of this pyroxene in whole or in part by chlorite.

Table VII gives the results of a point counter analysis (volume %) of a specimen of diopside gneiss.

Table VII

quartz	31.7
plagioclase	45.6
diopside	11.4
chlorite	8.9
sphene	1.8
apatite	tr.

Other thin sections contain, in addition to the minerals listed above, garnet, perthite, scapolite, epidote, and carbonate. In one section examined the amount of sphene exceeded 5 per cent of the total mineral content. In most thin sections plagioclase is seen to be extensively altered to minerals of the epidote group.

Rusty Schists and Gneisses (6)

Closely associated with both crystalline limestone (8) and garnet-quartz-feldspar gneiss (7) are well-defined, mappable bands of gneiss and schist that weather readily, resulting in rusty streaks or even extensive gossan zones. Relatively fresh specimens consist of quartz, or feldspar and quartz, with minor amounts of biotite, garnet, and pyrite. Many such bands may be classed as quartzite or arkose; others with a more varied mineral content are more properly called gneiss. Graphite is common in these rocks, usually as minute flakes scattered through the rock but here and there forming larger plates. A very dusky red-purple (5RP2/2) patina covers the surface of many of the more siliceous outcrops of map-unit 6.

The rocks of map-unit 6 also occur interlayered with crystalline limestone. Flowage in the carbonate commonly resulted in a complete fragmentation of such layers and tectonic breccias were formed. The rusty appearance of the rocks of this map-unit is in marked contrast to the white surfaces of the crystalline limestone, and such a feature tends to emphasize the extremely complex structures in the carbonate bands.

A thin section examination shows that these rocks are relatively siliceous. The principal feldspar is perthite; plagioclase is rarely present in significant amounts. The rusty schists and gneisses are thought to represent the metamorphic equivalents of sandy or shaly sediments.

Garnet-Quartz-Feldspar Gneisses (7)

North of the northwest-striking bands of crystalline limestone (8) is a succession of medium- to fine-grained, grey to white, well-banded to massive, garnet-bearing biotite-quartz-feldspar schists and gneisses. These rocks outcrop across widths of between 10 and 15 miles. Some of the rocks in this unit are extremely siliceous. Their gneissic or commonly schistose nature and the light grey colour of the weathered surface set them apart from the quartz-feldspar gneisses (4) that outcrop both to the north and south.

Lithology

Garnet is a common though not invariable accessory mineral. It is pale red-purple (5RP6/2) to moderate red (5R5/4), and its random distribution throughout the rocks of this map-unit often imparts a 'measle-like' appearance. The garnets seem to have formed without regard to the banding and commonly intersect the band boundaries, some indeed cut completely across the narrower quartz-feldspar bands. Such a habit suggests that the garnet formed late in the paragenesis.

Here and there, for example east of White Bear Bay, rusty rocks, similar to map-unit 6, are interbedded with the garnetiferous gneisses. These serve to emphasize the intricate folding commonly encountered in the rocks of unit 7.

Banding in this unit is much finer than that of the banded gneisses of map-unit 2, and results from local concentrations of quartz and feldspar, or biotite, quartz, and feldspar. Although the overall impression is one of extensive bands, in detail it is readily seen that most bands are limited. Quartz and feldspar form lenses a few

tenths of an inch thick, some are several feet long, others shorter, in places they occur as irregular blobs in the darker, biotite-rich rock. These structures when seen from a distance impart the banded appearance to the rock.

In common with most of the gneissic units in the map-area, the rocks of this complex are cut by dykes and sills of feldspar or quartz-feldspar pegmatite. Many of these contain large, extensively fractured garnet crystals. Here and there narrow bands of pegmatite parallel the foliation of the gneisses resulting in a *lit-par-lit* gneiss.

Micrometric analyses of two specimens from map-unit 7 are given in Table VIII. The first is a garnetiferous quartzite, typical, except for the high magnetite content, of the siliceous bands common in the succession; the second analysis is representative of the principal component of the map-unit.

Table VIII

(volume %)

	1	2
quartz	38.8	58.3
garnet	34.5	8.3
amphibole	10.1	—
magnetite	16.2	0.4
plagioclase	—	24.5
K-feldspar	—	1.8
chlorite	—	6.5

The wide variation in mineral content that characterizes these rocks suggests that the rocks were formed by metamorphism of sedimentary rocks of widely varying composition. Arkoses and quartzites with differing contents of argillaceous material are likely source rocks.

Crystalline Limestone (8)

The zone of crystalline limestone that extends northwesterly across the map-area stands in marked contrast to the surrounding gneissic rocks. In general its presence is reflected by low topography, the surface material commonly being coarse 'sand' composed of carbonate crystals. Small lakes and ponds are common along the zone. The carbonate rocks are usually white to very light grey although a few patches are brilliant orange. The orange colour is particularly characteristic of the carbonate rocks that outcrop along the coast southeast of Fair Ness.

Crystalline limestone in southern Baffin Island was first observed by Bell (1898) who reported the rocks to consist of well-stratified gneisses interstratified with great bands of crystalline limestone conformable to the strike of the gneisses. He reported the presence of ten bands, and estimated their total thickness to be 30,000 feet. To Bell the presence of crystalline limestone 'goes far to prove that the newer Laurentian rocks are sedimentary and not a foliated granite series' (Bell, 1901) — an observation still valid.

The mapping carried out by the writer does not, however, substantiate the number of bands or the thickness assigned by Bell. The accompanying map shows

99068—3

that although the crystalline limestone outcrops in a well-defined zone beyond the boundaries of which carbonate outcrops are rare, the bands are discontinuous and change abruptly in thickness from a few feet to several hundred feet. As would be expected, the smaller bands tend to be discontinuous. They pinch and swell and terminate abruptly along strike only to reappear some distance farther on still apparently in the same stratigraphic zone. The larger outcrop areas generally include other rock types as well as crystalline limestone. Most common are rusty schists and gneisses and siliceous rocks but in some outcrops, for example those in northeastern Korok Inlet, quartz-feldspar rock is intimately associated with the carbonates. White feldspar pegmatite is also commonly found.

Due to the coarse crystallinity of the carbonate rocks, many outcrops have crumbled to a coarse calcite gravel. Elsewhere solution along cleavages in calcite has resulted in sharp serrated outcrop surfaces, which are rough to cross.

A section measured across the large crystalline limestone band in northern White Bear Bay illustrates the varied rock types that may be present in the carbonate rocks.

Table IX

		Thickness	(feet)
	overlying rocks; rusty garnetiferous gneiss		
16	garnet-graphite-quartz-feldspar gneiss; a few 5-foot thick bands of limestone near top	413	3,367
15	crystalline limestone	508	2,954
14	garnet-graphite-quartz-feldspar gneiss	207	2,446
13	crystalline limestone	19	2,239
12	garnet-graphite-quartz-feldspar gneiss	38	2,220
11	crystalline limestone	19	2,182
10	garnet-graphite-quartz-feldspar gneiss	66	2,163
9	crystalline limestone	47	2,097
8	crystalline limestone; many patches of white quartz-feldspar pegmatite	404	2,050
7	garnet-graphite-quartz-feldspar gneiss	19	1,646
6	crystalline limestone	1,015	1,627
5	pink, quartz-feldspar pegmatite	85	612
4	crystalline limestone; diopside crystals abundant	310	527
3	quartzite	19	217
2	crystalline limestone	188	198
1	quartzite	10	10
	sea-level		

The crystalline limestone appears to have attained a highly plastic state at some time and in the larger outcrops a most intricate fold pattern has developed. Bands of different composition or differently crystallized now follow a most convoluted course. Where orange calcite or rusty graphite schist remnants are present, the convolutions present a most spectacular appearance especially on wave-washed surfaces.

The crystalline limestone is typically composed of medium- to coarse-grained, white to grey calcite crystals. Due to the presence of impurities, diopside, muscovite,

biotite, graphite, pyrrhotite, pyrite, serpentine, and scapolite are common in the carbonate rocks. Serpentine forms raised, yellow granules and veinlets on weathered surfaces and diopside also imparts a granular texture. Magnetite, found associated with these rocks, is more fully discussed in Chapter VI, *Economic Geology*.

Amphibolite and Pyroxene Gneisses (9)

Mafic inclusions, which impart a nebulitic appearance to some outcrops of felsic rock units, have already been mentioned in the descriptions of map-units 2, 3, and 4. Hornblende and pyroxene with lesser amounts of quartz and feldspar are the principal constituents of these inclusions. Although usually in small lenses, streaks or discontinuous bands, there are, within the map-area, well-defined mafic rock units, some of which are traceable for many miles. Such rocks are most abundant in the west-central part of the region, in the vicinity of Tinitonito Bay and Keltie Inlet, where they form cappings to high hills (Pl. I). Davison (1959) considered that these rocks unconformably overlie the felsic gneisses; the writer was unable to confirm this. Rather, the contact appears conformable, although the absence of readily identifiable bedding in the gneissic rocks makes this difficult to prove. The cake-shaped hills are commonly synclinal, and frequently the structures have been overturned.

In the field most mafic rocks were considered to be amphibolites, and not until petrographic examination was completed were the relative abundance and widespread occurrence of pyroxene appreciated. Where field investigation cannot be checked by reference to petrographic data, such as in areas where few specimens could be collected, it is probable that some rocks mapped as amphibolite are pyroxene-bearing. For this reason and because many pyroxene-rich and hornblende-rich rocks commonly are found associated, pyroxene gneiss and amphibolite are grouped together in map-unit 9.

Lithology

Although in general appearance the larger masses of mafic rock look homogeneous, in detail their diverse nature is readily apparent, due mainly to irregular masses of quartz-feldspar rock.

On the north side of the outcrop of mafic rocks on central Tinitonito Bay, the innumerable quartz and quartz-feldspar lenses are arranged *en échelon* and parallel with the foliation. Many however dip in a direction opposite to that of the hornblende-pyroxene gneisses in which they form. Crosscutting masses of aplite and granite also occur within these rocks, and in places coarse-grained biotite and hornblende crystals are found.

Similarly the large pancake mass at the north end of Tinitonito Bay shows inhomogeneities. On the east side of the outcrop, patches of pinkish quartz-feldspar granite and pegmatite are abundant. There the host rock is more felsic than its dark colour suggests (*see* Table X). The hornblende-pyroxene rocks south of Tinitonito Bay exhibit similar features, and dykes, veins, and irregular-shaped masses of

quartz-feldspar rock are common. In some places the contact between the mafic rocks and the surrounding gneisses is sharp but elsewhere a much less definite boundary can be discerned and schlieren of hornblende-pyroxene rock become more abundant as the contact is approached.

Mafic rocks are abundant in the large synclinal structure of eastern Tinitonito Bay and there perhaps the complex interbedding of lithological types is best displayed. Although the map-units are shown with well-defined boundaries, in reality all gradations exist between adjoining units. Hornblende-pyroxene gneisses (9) and banded *lit-par-lit* biotite gneisses (2) grade imperceptibly one into the other and although felsic material is less abundant in the former yet the contact zone between hornblende-pyroxene gneiss and map-unit 2 is marked by a zone characterized by an increasing preponderance of mafic inclusions. Map-unit 9 is most readily recognized by its rusty, sugary, weathered surface.

A modal analysis of a thin-section examination of a mafic rock from map-unit 2 (the *lit-par-lit* gneiss) is given in Table X, column 2. In this specimen amphibole crystals intimately penetrate pyroxene and in some instances appear to be derived by alteration of pyroxene.

Elsewhere in the map-area (with the few exceptions discussed below) large outcrops of map-unit 9 are not abundant. The north end of an island at latitude 64°11′N, longitude 75°10′W is composed of mafic rock. The western contact is marked by several thin bands of crystalline limestone less than 2 feet thick. The entire outcrop is intruded by lenses and dykes of granitic rock and along the southeastern contact such felsic rocks become more and more continuous until they comprise about 20 per cent of the outcrops and the rock assumes a *lit-par-lit* appearance. Biotite then becomes the predominant mafic mineral resulting in a well-developed gneissosity.

The southern side of an island at latitude 63°48′N, 72°38′W comprises hornblende-pyroxene gneiss. This rock appears to overlie conformably banded gneisses (2). Granitic material is not abundant within the mafic rocks but streaks of hornblende-bearing quartz-feldspar pegmatite are present. Narrow bands composed almost exclusively of hornblende occur in a successsion essentially of quartz-feldspar-hornblende gneiss, although pyroxene may be present. The contacts of the mafic rocks with the surrounding gneisses are abrupt and little evidence of an intermingling of mafic and felsic types could be discerned. Analysis 3, Table X gives the results of a micrometric analysis of a specimen from this outcrop.

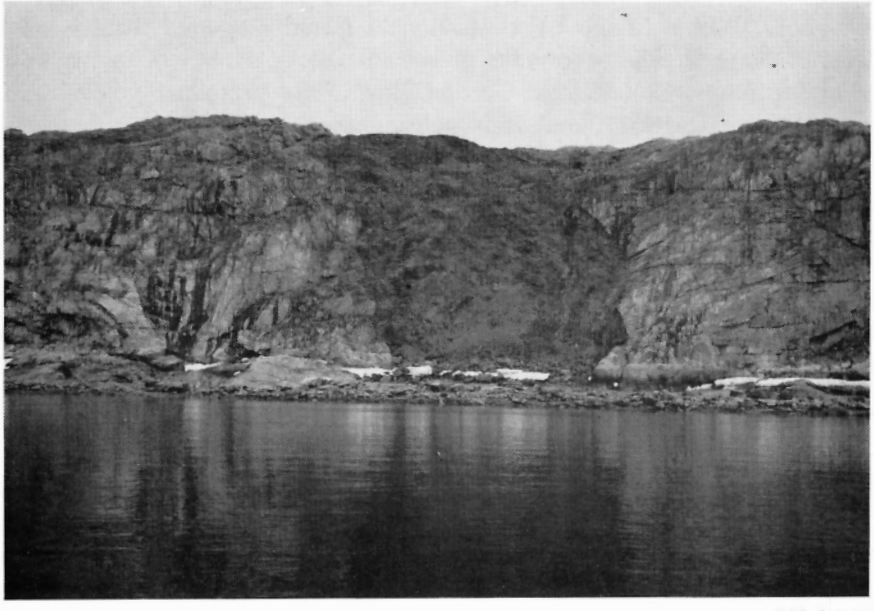
The thin section study of this rock also disclosed that magnetite forms along grain boundaries of amphibole and also as embayments in it. This mode of occurrence may result from a remobilization of magnetite, possibly derived from the constituents of the amphibolite, and its subsequent injection.

In addition to large and obvious cake-shaped hills of hornblende-pyroxene rock, many narrow dark coloured bands, some traceable for many miles, are of similar composition. Plate III shows the typical appearance of this habit of the rocks of map-unit 9. The most outstanding of these bands extends southeastwards from Korok Inlet, and carries the most important magnetite-bearing rocks in the map-area (*see* Chapter VI). Many other mafic bands up to several feet thick also

contain relatively high percentages of magnetite, some of which is massive. These too are discussed in Chapter VI.

The islands north of Macdonald Island in the southeastern part of the map-area are particularly rich in mafic bands and inclusions. Plate III shows part of one of these islands. Not many of the bands are more than a few tens of feet thick but some are large enough to be shown on the map. Like the mafic rocks already described, these also contain dykes and lenses of quartz-feldspar granite and pegmatite. Many seem to have been derived from pyroxene-rich rocks but others are of the amphibole-rich type. Modal analyses (Table X, 4, 5) give representative compositions for both the amphibole-rich and pyroxene-rich types, both of which are sometimes found in the same band. Analyses 6 to 10 further illustrate the mineral compositions of the pyroxene-rich element of map-unit 9. These data represent specimens from various outcrops in the map-area.

The widespread occurrence of boudins and lenses of hornblende-pyroxene rock throughout the gneissic terrain suggests that bands similar to those described were once abundant but that through mechanical deformation they have become disarticulated, leaving only relics. Although many bands, particularly those rich in amphibole, may be metamorphosed sedimentary rocks, others are probably metamorphosed sills or possibly even metavolcanic rocks. No detailed structural mapping has been carried out and it is impossible to say whether the widespread outcrops of map-unit 9 represent many beds or whether they are parts of a few, formerly extensive formations.



RGB, 1-3-59

PLATE III. Magnetite-bearing amphibolite (9) band. The sharp contact between the amphibolite and the surrounding gneisses is well illustrated.

Origin of the Gneisses

Some salient facts emerge from the foregoing lithological and petrographic descriptions. Despite an appearance that suggests an igneous origin of certain of the rock units, there is abundant evidence for a sedimentary origin for most of the Precambrian rocks in the map-area.

Within the quartzo-feldspathic gneisses graphite, garnet, cordierite and sillimanite occur sporadically indicating that an original sedimentary source for these rocks is likely. West of the map-area near Cape Dorset, the author has mapped quartzites that can be traced gradationally into quartzo-feldspathic gneisses (Blackadar, 1959). Potassic feldspar, both perthite and microcline, shows a gradual increase from quartzite to gneiss. Similar quartzites were not seen in this map-area but it is most probable that parts of map-unit 4 (particularly 4a) were before metamorphism, sandstones or arkosic sandstones.

Isolated lenses of crystalline limestone are in places surrounded by quartzo-feldspathic gneisses. Although these could have been fortuitously preserved as inclusions in an igneous-derived rock, their presence, often along the same horizon, is more indicative of a sedimentary origin for the enclosing rocks.

The original nature of the rocks composing map-unit 9 and the mafic bands and lenses common in many other units (e.g., 2, 3, 4, and 7) is uncertain. In a few places these mafic rocks are associated with crystalline limestone and may themselves have been derived from impure carbonate rocks. Elsewhere, particularly in map-unit 5, the abundance of scapolite, sphene, and diopside also suggests an impure carbonate source. Other mafic rocks may have been derived from altered volcanic rocks. Within Mingo Lake–Macdonald Island map-area there is no unequivocal evidence for the occurrence of volcanic rocks. However, to the west in the adjoining map-area (Andrew Gordon Bay, 36B) presumed volcanic rocks outcrop (Blackadar, 1962), and it is not unreasonable to assume that similar though more highly metamorphosed rocks occur in the succession in Mingo Lake–Macdonald Island map-area.

Table X. Modal Analyses, Amphibolite and Pyroxene-Hornblende Gneiss
(volume %)

quartz	48.1	18.5	—	11.1	17.8	16.0	7.8	19.7	10.8	32.9
plagioclase	30.4	14.3	23.7	16.1	23.4	23.2	31.9	23.7	36.8	32.9
% An	42	39	—	—	—	—	—	—	—	—
pyroxene	3.0	4.3	2.7	4.8	39.7	47.6	14.4	7.5	37.8	19.4
hornblende	3.9	61.5	64.7	50.5	11.0	8.6	—	13.4	13.5	2.5
biotite	11.4	—	—	7.3	1.0	0.2	9.0	1.8	0.6	11.6
chlorite	0.2	—	—	4.1	—	—	—	—	—	—
muscovite	—	—	—	2.9	—	—	—	—	—	—
serpentine	—	—	—	—	2.6	—	—	—	—	—
magnetite	—	1.2	6.8	2.8	3.9	3.4	1.2	4.4	0.3	0.4
apatite	0.2	tr.	tr.	0.3	tr.	—	—	—	—	—
carbonate	—	—	—	—	0.5	—	—	—	—	—
alteration	—	—	—	—	—	—	35.4[1]	29.5[1]	—	—
pyrite	—	—	0.2	—	—	—	—	—	—	—

[1]alteration includes chlorite, epidote, and serpentine

Magnetite in the deposit east of Korok Inlet (as described in Chapter VI) is very low in phosphorus and totally deficient in titanium — facts that suggest a sedimentary origin for the iron. These iron occurrences are associated with pyroxene-hornblende gneisses and amphibolites. Elsewhere similar mafic rocks contain as much as 10 per cent magnetite and if, as is suggested, the iron deposits are of a sedimentary origin and derived from sedimentary rocks, then it is not unreasonable to consider their host rocks as metasedimentary rocks even though they do not always contain magnetite deposits.

The mineral composition of map-unit 7 — quartz-feldspar gneiss, locally very garnetiferous and invariably containing some garnet — and the associated rusty, graphite-pyrite-quartz-feldspar schists of map-unit 6 are both strongly suggestive of a sedimentary origin for these units.

The preceding evidence indicates a strong probability for the derivation from sedimentary sources for most rock units in the map-area. Areas of massive granitoid rock (map-unit 1) probably reflect metamorphic effects rather than igneous origin. The widespread and varied-aged pegmatite dykes are the only rocks with undeniable intrusive relationships, but they too were in all likelihood formed by remobilization of constituents during metamorphism of the sedimentary succession. The discontinuous and restricted spatial habit of many pegmatite veins and dykelets supports such an origin.

Diabase Dykes (10)

Throughout a vast region of the Canadian Arctic, including Baffin Island, Boothia Peninsula, Somerset Island, and southern Ellesmere Island, the Precambrian crystalline rocks have been intruded by a predominantly northwest-trending series of relatively unaltered basic dykes which Fortier (1957) named the 'Diabase Series'.

In the map-area there are two sets of these dykes, both striking northwest parallel with the regional structural trend. The best exposed group extends from southeast of White Bear Bay to Tessioyaluk Inlet. Exposures are not continuous because the trend of these dykes crosses the archipelago but all exposures seem part of the same group. A second group extends southeastwards from north of Tinitonito Bay. East of Keltie Inlet the continuity of this dyke group could not be proved although the diabase that outcrops at the north end of Stevenson Lake is probably part of this group. The two groups are 10 to 12 miles apart. The dykes are referred to as groups because, although each intrusion may be a single dyke several hundred feet wide, it commonly comprises several narrow anastomosing dykes. Many narrow dykes are discontinuous and form an *en échelon* pattern.

Where the dykes have split into several intrusions the dykelets are most often close together yet dykelets less than a foot wide and parallel with the regional trend were seen upwards of a mile from the main dyke group. Elsewhere the "secondary" dykes may diverge from the dominant northwest trend. Examples of this are to be found north of Tinitonito Bay and northwest of the site of Amadjuak post.

Contact effects between dykes and intruded rock are limited to a chilled margin. Here and there minute stringers of diabase have penetrated along fractures in the

country rock. Inclusions of country rock are sometimes present within the dyke rocks. The dykes weather a moderate brown (5YR3/4) and the larger ones are well jointed. They are therefore conspicuous and stand out in marked contrast to most of the rocks they intrude.

The results of two micrometric analyses of specimens of dyke rock are given in Table XI.

Table XI

(volume %)

quartz	6.9	6.9
plagioclase	61.1	50.3
pyroxene	—	7.8
hornblende	8.9	18.1
chlorite	16.7	5.5
micropegmatite	—	1.4
magnetite	6.1	9.3
apatite	tr.	0.3

Plagioclase in both rocks is altered to white mica but the original composition appears to have been labradorite. Amphibole and chlorite are alteration products of pyroxene. The low quartz content and the plagioclase composition place these rocks in the gabbro class and the sub-doleritic texture displayed by both classifies them as diabase.

Palaeozoic

Limestone and Shaly Limestone (11)

The southern margin of the Foxe Basin Lowlands physiographic division crosses the northeastern part of the map-area. This lowland was the site of deposition of sedimentary strata in lower Palaeozoic time and is characterized by the almost flat-lying nature of the argillaceous and carbonate beds.

No outcrops were observed near the southern edge of this area — the only part that could be examined during the course of the field work. The surface is covered with drift composed of clay-sized material containing subrounded pebbles and angular fragments of carbonate rock. This material is extremely soft in early summer and was impassable at the time field work was done.

The Precambrian rocks to the southwest appear to be separated from the Palaeozoic rocks to the northeast by a fault. Topographically this is expressed by a steep north-facing scarp in the Precambrian, rising about 500 feet above the drift-covered Palaeozoic area. The Aukpar River, draining into Foxe Basin and the main drainage feature north of the height of land, follows this feature and is the locus of three large lakes lying northwest of Mingo Lake. Smaller block faults may be responsible for the light coloured areas south of Mingo Lake seen on air photographs and presumed to be Palaeozoic outcrops.

Fossils are common in the drift, especially within 10 miles south of the contact, and are presumed to have been derived from nearby Palaeozoic strata. Although

most are considerably weathered, those examined are similar to the "Arctic Ordovician" fauna and include such forms as *Maclurites* sp. and *Rafinesquina* sp.

An area of Palaeozoic outcrops about 25 miles north of the map-area was examined by Gould in 1927 (Putnam, 1928, pp. 32-34). This is the Putnam Highland, a mesa rising about 600 feet above the extremely low swampy terrain of the Blue Goose Prairie. Gould reported (*op. cit.*) that the outcrops consist of blue-grey, fissile, calcareous shale and irregularly spaced limestone beds, and that the topmost 30 to 50 feet comprises a more resistant limestone horizon, the cause of the mesa profile of the highland.

Palaeozoic strata from Silliman's Fossil Mountain near the head of Frobisher Bay have been described by Roy (1941) and Miller, *et al.* (1954). This feature, a 340-foot hill discovered and named by C. F. Hall in 1861, has yielded a wide variety of marine invertebrates from limestone and shale beds. The fauna is primarily molluscan, and cephalopods are particularly well developed.

Miller, *et al.* (1954, p. 43) considered that the formation represented by the beds at Silliman's Fossil Mountain and similar small outliers near Frobisher Bay is also present at Putnam Highland and elsewhere in southern Baffin Island. On the basis of the fauna examined, they consider the rocks to be of early Middle Ordovician ("Arctic Ordovician") age. It is most probable that the flat-lying sedimentary strata north of Aukpar River are also of this age and are part of a widespread, lithologically similar formation, found in southern and west-central Baffin Island.

Pleistocene and Recent (12)[1]

The entire Mingo Lake–Macdonald Island map-area was apparently glaciated during the recent past, and glacial deposits are widespread. In addition, deposits derived from now active geomorphic processes (p. 7) are extensive, particularly on upland surfaces.

Glaciation

Glaciation within the area is expressed in the various types of surficial deposits. Although bedrock exposures are generally good, glacial striae are surprisingly rare, a fact noted by other workers. The large erratic blocks found here and there on otherwise clean-swept rock surfaces, together with perched boulders and extensive till, indicate ice activity. Indeed, even under present thermal conditions parts of the area lie close to the snow line as witnessed by the persistence of snowdrifts until late August, and even from year to year. A slight deterioration in the present climate could result in expansion of two small ice-caps, Grinnell and Terra Nivea, near the south end of Meta Incognita Peninsula.

Features indicative of ice movement are plotted on Figure 1. Glacial striae include two sets of data: first, those recorded by Bell in 1898, and secondly those made in the course of mapping this map-area. Movement from the northeast is clearly indicated. Bell (1898) stated that the ice flowed south or southeast to the Atlantic.

[1]A more comprehensive discussion of this subject, based on field work carried out by W. Blake, Jr. in 1965, is contained in Geological Survey of Canada Paper 66-26.

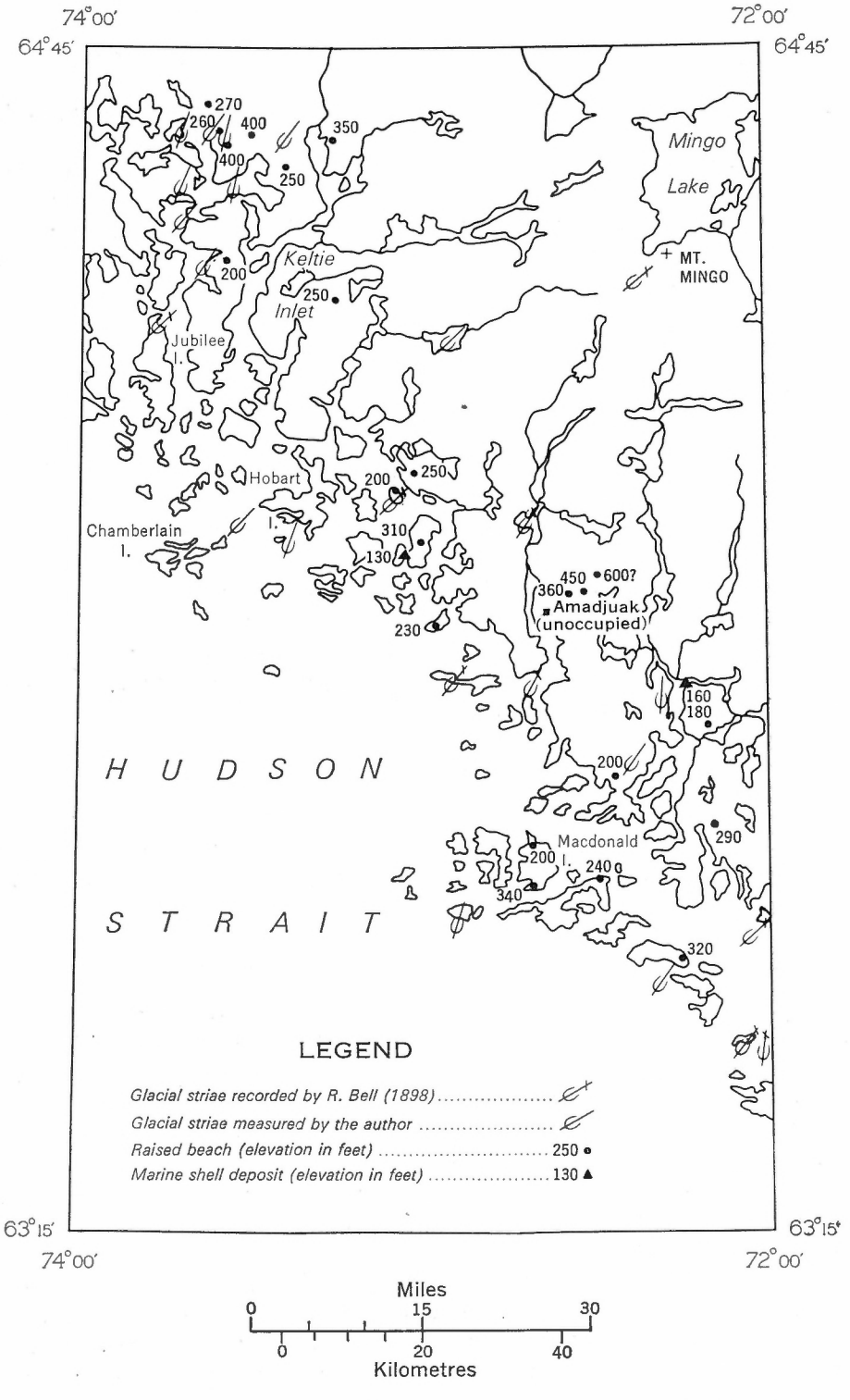


FIGURE 1. Sketch map illustrating directions of ice movement and limits of marine submergence, Mingo Lake–Macdonald Island map-area.

None of the data contained in this report substantiates Bell's contention, which seems to have been based on theoretical considerations involving the nature of Hudson Strait basin.

The Rand Report (1958) suggested that the south-trending striae represent movement from a dispersal-centre located over the site of Foxe Basin, and that ice flowed southeast from that centre through three gaps in the high eastern coast of Baffin Island, one of these gaps being the Foxe Peninsula–Hudson Strait route. Following the disappearance of this centre it is postulated that the ice on the highlands, that is on the present Meta Incognita, Hall, and Cumberland Peninsulas was rejuvenated. The northeast oriented striae within this map-area would represent this activity. Until more field data are available from all of southern Baffin Island the above idea must remain hypothetical.

Many of the south-oriented striae in this map-area are in north-trending valleys which may pre-date the last glaciation, and the contained striae may merely show the effect of local topography on the movement of the ice.

Marine Submergence and Emergence

The coastal regions of the map-area present a drowned appearance attributable to the depression of the land caused by the weight of the ice that is thought to have covered most if not all of the area until recent times. The deep, winding inlets and the island-studded coast offer good evidence for this drowning. That the coast has been emerging is testified to by the presence of raised beaches, deposits of marine shells now well above sea-level, and wave-washed surfaces that are sharply separated from till deposits or surfaces on which perched boulders abound.

Local evidence, although not subject to rigorous scientific proof, would seem to suggest that recovery of the land to its previous elevation is still in progress. Channels that the Eskimo state were navigable 50 years ago by whale boats now scarcely allow the passage of a canoe. More definite evidence is the presence of former Eskimo camps now many tens of feet above sea-level.

Selected measurements on raised beaches and marine shell deposits are shown on Figure 1.

Surface Deposits

The surficial deposits of the region fall conveniently into two main divisions: bedrock-derived deposits (shattered rock) and glacial deposits. The glacial deposits are further subdivided into five units: boulder till, limestone till, clay till, terminal moraines, and fluvioglacial deposits.

Bedrock-derived Deposits

Shattered Rock

In arctic regions mechanical weathering is far more important than chemical weathering. By the process of frost riving the relatively smooth surface that probably obtained when the most recent ice-cover melted became broken up and in places felsenmeer formed. Often it is difficult to distinguish between felsenmeer and

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deposits of boulder from which fines have been removed. True felsenmeer is found between the Palaeozoic area and the head of Keltie Inlet. Almost invariably such areas grade into areas where the subrounded habit of the rock pieces suggests a till origin. The fragments in the felsenmeer are commonly of great size; 10 feet or more in greatest dimension is by no means uncommon.

Actively growing talus slopes are present at the base of most cliffs. On less steep slopes, the products of rock shattering tend to collect in declivities and, under the influence of gravity, move downwards as rock glaciers or boulder streams. Movement of this sort must be slow; the surface of such a boulder stream is relatively stable — few of the boulders move when walked upon. Lichens cover all exposed surfaces giving a dull grey appearance to the stream. If movement in the boulder stream were abrupt, fresh, lichen-free surfaces should be exposed.

Glacial Deposits

Deposits of glacial origin are widespread but are less obvious than in many Arctic localities. The extensive drumlinoid features as seen elsewhere are not developed in this area. Three types of till were found: boulder, limestone, and clay.

Boulder Till

Boulder till is the most widespread glacial deposit, and, as previously noted, may be confused with felsenmeer when the fines have been removed. The size of the boulders varies from about 6 inches to many feet in diameter. Most are subangular to subrounded, and are set in a matrix of silt or fine sand. In many places the fine material has been removed by glacial meltwater or more probably by the annual cyclical precipitation, and true boulder fields result. Some of these boulder fields cover tens of square miles (especially on Frobisher plateau), and are most difficult to traverse on foot. Elsewhere the finer material has been preserved and the boulders project through a sparse cover of vegetation. In the spring meltwater collects in depressions in this terrain, which results in boulder-filled ponds or marshes.

Limestone Till

Palaeozoic rocks presumably underlie the northern part of the map-area, where a particular type of till has formed. Fragments of limestone are common and in places are so abundant that the deposit has been confused with shattered bedrock. Elsewhere the finer, clay fraction predominates and the surface, although rock-hard after a few days of sunny weather, soon turns to a mire after rain. Boulders of gneiss are randomly distributed through the deposit. This till was examined south of Aukpar River and the large lake drained by that river, where the deposit is about 300 feet thick at the base of the north-facing scarp of Precambrian rocks. The till is deeply dissected and rounded hillocks characterize the topography. These deposits rise to an elevation of about 400 feet, above which the steep slopes of the scarp rise to the surface of the Frobisher plateau. Thin isolated deposits of limestone drift are present on the plateau surface for several miles south of the scarp edge, but

the amount of limestone detritus decreases rapidly and the drift deposits grade into a clayey till. A study of aerial photographs shows that this till is characterized by northwest-trending drumlinoids.

Clay Till

Between the large lake southwest of Aukpar River and Keltie Inlet the plateau surface is extensively drift covered. This drift is higher in clay fractions than the boulder drift but in other respects the two are similar. Areas covered with clay till show some drumlinization, a feature absent in boulder-till areas, and on aerial photographs the surface is distinctly lighter in tone than areas where boulder till predominates. Boulder fields and boulder streams are equally well developed on this terrain.

Terminal Moraines

Several areas of well-developed terminal moraines occur within the map-area. The best formed are in the valley extending north from the west arm of Keltie Inlet. There many low ridges, 10 to 20 feet high, trend at right angles to the valley. These project as little points into the lakes; away from the lakes or in the higher levels of the valley they merge into kame-like topography comprising bouldery, 50-foot hills. A few miles from the head of Stevenson Lake is a group of randomly oriented boulder-hills that are also probable terminal moraine features.

Fluvioglacial Deposits

Fluvioglacial deposits are not abundant in this part of southern Baffin Island but several eskers were seen in the area between the north end of Keltie Inlet and Stevenson Lake. There the valleys are filled with poorly sorted gravels, which grade into terrace-like deposits and hillocky forms away from the valley floors. Some of these deposits are sinuous and are undoubtedly eskers, others may be 'aprons' deposited at the ice-margin.

Chapter IV

METAMORPHISM

All rocks in Mingo Lake–Macdonald Island map-area older than the diabase dykes show the effects of high-grade regional metamorphism, although parts were later subjected to retrograde metamorphism. Most of the rocks fall within the granulite or almandine-amphibolite facies, and the distribution of rock types in the area reflects a surprising uniformity in the degree of metamorphism.

Mineral associations observed in thin sections from various groups of rocks are presented in Tables XII to XV. It is sometimes difficult to be certain if minerals are primary or if they represent retrograde metamorphism. This is especially true of biotite and hornblende. In some thin sections these minerals appear to be alterations of pyroxene but in others they appear primary.

Metamorphic Facies

Quartz-feldspar Gneiss, Hybrid Gneiss, Granite, Banded Gneiss (felsic phase), Garnet-quartz-feldspar Gneiss

These rocks are essentially composed of quartz and microcline or quartz, microcline and plagioclase. The microcline is commonly perthitic. Pyroxene rarely exceeds 1 per cent of the mineral content and is usually pleochroic, in pale tints of pink and green, suggesting the presence of hypersthene. More commonly the pyroxene appears to have been altered to amphibole, chlorite, or biotite. Although neither garnet nor sillimanite appears in Tables XII and XV, both minerals were seen in the field associated with map-units 3 and 4. Garnet, dark red, appears in isolated crystals in some outcrops of quartzo-feldspathic gneiss and sillimanite was observed in less than one-inch bands in similar rocks.

The mineral assemblages are consistent with the pyroxene granulite subfacies of the granulite facies. The virtual absence of cordierite in these rocks is consistent with this classification. In some of the rocks brownish green hornblende may be primary, suggesting that the hornblende granulite subfacies also is represented. Rocks of the granulite facies are indicative of metamorphism that took place under conditions of high temperature and pressure. Fyfe, Turner, and Verhoogen (1958, p. 232) observed that both subfacies of the granulite facies may be intimately associated in the field — an observation consistent with their apparent association in this map-area.

Pyroxene Gneiss, Banded Gneiss (mafic phase), and Crystalline Limestone

Many of the mineral associations of this group suggest that these rocks could possibly be placed in the almandine amphibolite facies. For instance, the association plagioclase-diopside-hornblende-quartz, common in the pyroxene gneisses, is indicative of the sillimanite-almandine subfacies. However, as Fyfe, *et al.,* pointed out (*op. cit.,* p. 233) there must be considerable overlap between the granulite facies and the almandine amphibolite facies, and thus it seems likely that most of these rocks (map-units 2 and 9) can be placed in either the pyroxene granulite or the hornblende granulite subfacies of the granulite facies. The widespread occurrence of hypersthene in rocks of map-unit 9 supports this classification.

The mineral content of the crystalline limestone, where, due to original impurities, such associations as diopside-phlogopite and calcite-scapolite-diopside occur, also suggests the almandine amphibolite or granulite facies.

Metasomatism

It is apparent from the mineral content of many of the rocks in the map-area that potassium was added during metasomatism. In many quartz-feldspar gneisses the potassic feldspar occurs only along grain boundaries, in others, antiperthite, thought by many to be the product of replacement, is present as rods and blebs.

The age of the potassium metasomatism is uncertain. Marmo (1962) from work in Finland, divided quartzo-feldspathic (granitic) rocks into three main groups, synkinematic, late-kinematic, and post-kinematic. The first group, formed early in the orogenic cycle, includes large gneissose, concordant intrusions, often extremely heterogeneous due to the presence of incorporated relics of earlier rock. The similarities between this group and the gneisses of the map-area are obvious. In synkinematic granites, microcline is the principal potassic feldspar and occurs mainly as infillings of fissures or is interstitial. Marmo (*op. cit.*) suggested that in synkinematic areas a process of granodioritization takes place first and may or may not be followed by granitization. Granodioritization is a process whereby potash and possibly silica are removed from the original rock and may later appear as pegmatites or quartz schlieren so common in these gneissic terrains.

Marmo found that the potash feldspar in synkinematic rocks was 300 to 500 million years younger than biotite whereas in late kinematic and post-kinematic rocks (rocks less gneissose) the potash feldspar is very nearly the same age as the biotite. No such data are available from this map-area, but the ubiquitous quartz-feldspar dykes strongly support the idea of remobilization of the original constituents.

Modal analyses from quartz-feldspar gneisses and granites (*see* Tables I and V) show that both granodiorite and granitic rocks are present within the groups. The random distribution of these types lends support to the hypothesis that there has been potassium metasomatism. The presence of cross-hatched microcline indicates relatively low temperature of formation, and the fact that both microcline and plagioclase occur as well-formed crystals suggests a very sluggish introduction of material. Marmo pointed out (*op. cit.*) that at high temperature only orthoclase will crystallize from potassium-bearing material but if temperature is relatively low then the rate of in-

Table XII. Mineral Associations — Quartz-Feldspar Gneiss (4)

Microcline	x		x	x	x		x		x	x		x		x	x	x		x	x	x
Quartz	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Oligoclase							x		x	x		x	x							
Andesine																				
Labradorite																				
Plagioclase (indeterminate)		x	x	x	x	x		x			x			x	x	x	x	x	x	x
Perthite		x		x	x	x	x	x	x						x		x	x		x
Antiperthite										x	x	x	x							
Hypersthene					x								x	x			x	x		
Apatite		x			x								x	x		x	x			
Magnetite	x	x		x	x	x	x	x	x	x	x		x	x	x	x	x	x		x
Biotite		x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x
Green hornblende	x		x	x																
Brown hornblende					x		x	x		x	x						x	x		
Chlorite	x			x	x					x	x		x		x		x		x	x
Epidote	x																			
Sphene	x																			
Calcite										x								x		x
Sericite	x																		x	

NOTE: In Tables XII to XV each vertical column represents the mineral composition of one thin section and each cross indicates the presence of a particular mineral. No indication is given of the relative proportions of the minerals.

Table XIII. Mineral Associations — Pyroxene-Hornblende Gneiss (amphibolite phase) (9) and Banded Gneiss (mafic phase) (2)

	Pyroxene-hornblende gneiss (9)						Banded gneiss (2)						
Microcline													
Quartz	x	x	x	x	x	x	x	x	x	x	x	x	x
Oligoclase													
Andesine						x		x	x	x			
Labradorite	x			x			x						
Plagioclase (indeterminate)		x	x		x						x	x	
Perthite													
Garnet													x
Hypersthene	x	x	x	x	x	x	x	x	x	x	x	x	x
Diopside													
Apatite	x		x		x	x	x	x	x	x			x
Magnetite	x	x	x	x	x	x	x	x	x	x	x	x	x
Biotite	x			x	x		x	x	x	x		x	
Green hornblende													
Brown hornblende	x	x	x	x	x	x	x				x	x	
Chlorite		x						x					
Epidote													
Sphene													
Calcite													x
Sericite													

Table XIV. Mineral Associations — Garnet-Quartz-Feldspar Gneiss (7) and Pyroxene-Hornblende Gneiss (pyroxene phase) (9)

	Garnet-quartz-feldspar gneiss (7)					Pyroxene-hornblende gneiss (9)									
Microcline		x	x						x						
Quartz	x	x	x	x		x	x	x	x	x	x	x	x	x	
Oligoclase															
Andesine										x		x			
Labradorite						x									
Plagioclase (indeterminate)		x					x	x	x				x	x	
Perthite				x					x				x		
Garnet	x		x						x						
Hypersthene						x	x	x		x	x	x	x		x
Diopside									x		x			x	
Olivine															x
Apatite							x				x	x	x		
Magnetite	x	x	x	x		x	x	x	x	x	x	x			x
Biotite		x		x		x	x	x	x	x		x			
Green hornblende	x											x			
Brown hornblende						x	x			x					x
Chlorite		x	x				x	x						x	
Epidote							x		x					x	
Sphene									x					x	
Calcite		x	x			x								x	
Sericite		x													

Table XV. Mineral Associations — Granite (1), Banded Gneiss (felsic phase) (2), Hybrid Gneiss (3)

	Granite				Banded Gneiss				Hybrid Gneiss					Hybrid Gneiss (Inclusions)			
Microcline	x	x	x				x	x	x	x	x	x	x				
Quartz	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Oligoclase			x														
Andesine					x				x								
Labradorite														x	x		
Plagioclase (indeterminate)		x				x	x			x	x	x	x			x	
Perthite		x				x	x	x				x					
Antiperthite		x		x	x												
Hypersthene														x	x	x	
Apatite		x		x		x	x		x	x					x	x	
Magnetite	x		x			x	x	x	x	x				x	x	x	
Biotite		x			x	x		x	x	x	x	x			x	x	
Brown hornblende			x			x	x		x	x				x	x	x	
Chlorite	x	x	x	x	x	x		x									
Epidote				x													
Sericite	x		x	x				x			x			x			
Saussurite								x									

troduction is critical. If material is introduced rapidly, patches of microcline may form; if the speed is slower, perthitic feldspar will predominate; if very slow, both potassic and sodic feldspars will be found.

The widespread occurrence of microcline and perthite in the rocks under consideration indicates that relatively low temperatures prevailed during this metamorphism and that the potassic material was introduced at different rates.

Retrograde Metamorphism

Northeast of the head of Keltie Inlet the principal outcrops are quartz-feldspar gneiss and hybrid gneiss. Epidote is widespread; in places it is so abundant that the rocks are distinctly greenish. The epidote is thought to have developed during retrograde metamorphism.

Similar features are encountered in the diopside gneiss of map-unit 5 where epidote is locally abundant.

Chlorite is also widespread throughout the map-area, and it, too, may reflect retrograde metamorphism. This mineral is commonly the principal or only ferromagnesian mineral present in felsic rocks near many of the linear zones, which may in part be shear zones. Epidote is also present near some of these features.

Thus it is seen that although a high grade of metamorphism was attained by most of the rocks in the map-area, this has been modified locally by retrograde metamorphism.

Chapter V

STRUCTURAL GEOLOGY

The dominant structural feature of southern Baffin Island is the northwest trend of the structure obvious even on a small-scale map (Fig. 2). The largest topographical features, Hudson Strait, Frobisher Bay, and Cumberland Sound, as well as the major rivers and chains of lakes all reflect this trend. On a lower order of magnitude the coastal islands, such as those in Andrew Gordon Bay, also conform to this trend.

The dominance of this northwest trend in Mingo Lake–Macdonald Island map-area is most readily seen in the outcrop pattern of the belt of crystalline limestone, in the strike of the gabbro dykes, and in the orientation of the major linear features. The structural fabric although simple in gross pattern is most complex in detail. The high grade of metamorphism attained by the rocks in the area renders the determination of tops difficult, and, like the stratigraphy, the detailed structural history of the region has yet to be solved.

Two tectonic styles are represented: that of the gneissic areas and that of the crystalline limestone areas. The former is characterized by broadly folded stratiform rocks, which show only local signs of post-crystalline movement. In the crystalline limestone areas, plastic deformation apparently continued after similar movements had ceased in the gneissic areas, and a most intricate pattern, accentuated by the presence of bands of rusty graphitic schists and other more siliceous rocks, was developed.

Structural Elements

Foliation

The gneissic rocks, which comprise the bulk of the rocks in the map-area, are markedly stratiform, a structure that may represent original sedimentary layering. Bands within the gneissic rocks with widely varying mineral compositions can hardly be other than relics of original sedimentary layers, although by some they might be considered a result of metamorphic differentiation in igneous rocks. However, the writer considers that the presence of crystalline limestone in widely separated parts of the region and other evidence presented in Chapter III are strongly indicative of the sedimentary origin for the greater part of the succession. Banding is most obvious in the banded gneiss of map-unit 2. The grade of metamorphism, pyroxene granulite subfacies, reached by many of the rocks in the district, results in the virtual absence of platy minerals such as biotite or hornblende, and as

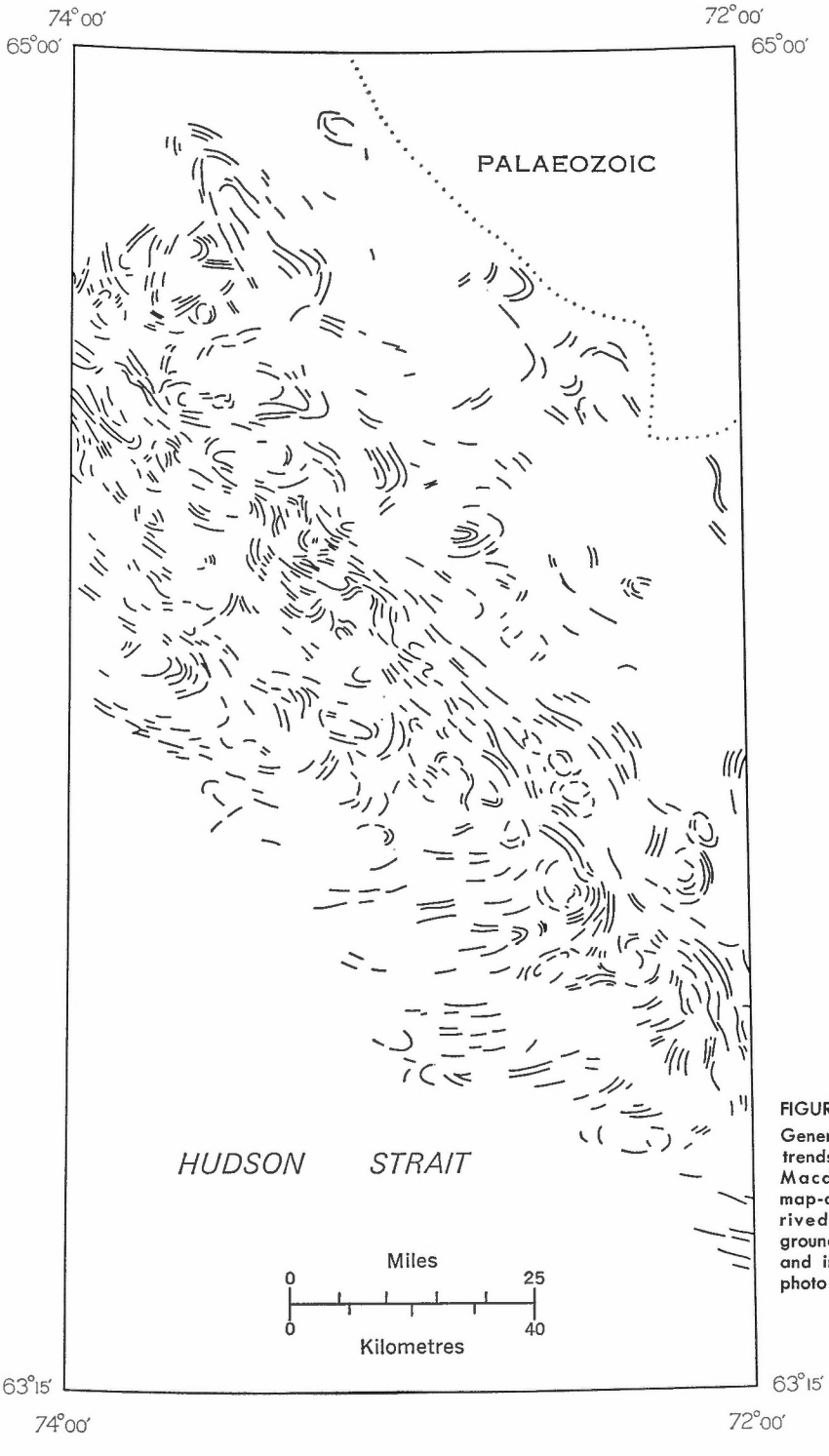

FIGURE 2
Generalized structural trends, Mingo Lake–Macdonald Island map-area. Data derived in part from ground observations and in part from air-photo interpretation.

a result rocks such as quartz-feldspar gneiss (4) or hybrid gneiss (3) appear rather massive. Where relics of more mafic rocks, such as pyroxene gneiss or amphibolite, are included in such gneisses they can be useful in determining the structure. However, even where platy minerals are absent, granulitic and other quartzo-feldspathic gneisses show a distinct foliation on weathered surfaces. Too coarse to be recognized close up, this feature is probably also a reflection of primary bedding.

Boudinage

Boudins are confined to certain rock types, particularly the granulitic quartzo-feldspathic gneisses, and are composed of pyroxene gneiss or pyroxene amphibolite. Whether boudinage structure, pinch and swell structure, or banded gneisses develop probably depends on the degree of plastic deformation undergone by the original sedimentary strata. Pegmatite frequently has formed at the nodes of the boudins. The structures are rarely more than a few inches thick but may be several feet long. On joint surfaces perpendicular to a foliation plane the boudins can be seen to pinch out in a few feet, the structures thus being rather elliptical. On a sufficiently large joint surface the boudins present an *en échelon* appearance and the attitude of the enclosing gneisses is readily determined.

Joints

Joints are commonly abundant in the more crystalline rocks but no systematic study was made because of the difficulty of usefully interpreting results in an area so extensive and so highly deformed as that under study. Several sets of joints occur in a single outcrop. One is usually perpendicular to the bedding plane and others trend at various angles to the bedding (foliation).

Folds

The dominance of the northwest trend is reflected in the major folds. Such structures are best expressed near Tinitonito Bay where the presence of more varied lithological units makes them easy to trace. There a belt of crystalline limestone, pyroxene gneiss, and rusty garnetiferous schists and gneisses outlines an S-shaped fold with a northwest-trending axis. Similarly the belt of pyroxene-amphibolite southwest of Keltie Inlet has been folded along a northwest direction and there is a marked increase in thickness of strata in the noses of the northwest-trending folds.

The outlines of similar broad folds discernible on the islands of the archipelago are indicated on the accompanying map by structural trend lines, derived in part from ground observations and in part from airphoto interpretation.

Despite the prevalence of northwest-oriented structures in the area, a different fabric obtains south of Amadjuak Bay and southwest of the main, northwest-trending crystalline limestone belt. There the dominant trend is west-southwest. Six miles south of the mouth of Amadjuak Bay the nose of a west-trending synclinal structure is exposed on several small islets. There the beds seem highly contorted and many fragments of rusty schist and siliceous bands are present. The limbs of this structure can be traced westward to the outer fringes of the archipelago. Similar

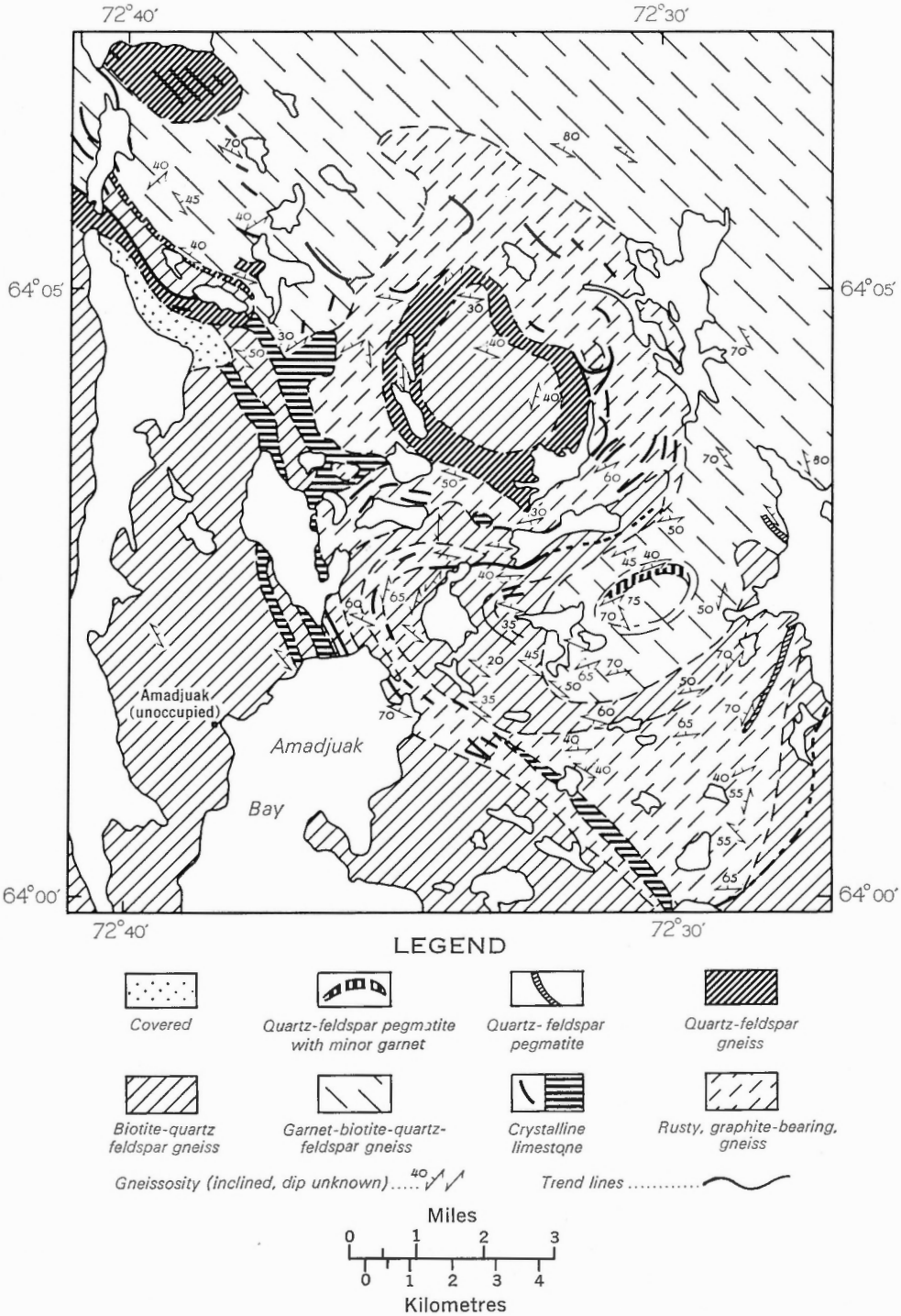

FIGURE 3. Geological and structural map of complex structures northeast of Amadjuak Bay. Compare with Plate IV.

trends characterize Macdonald Island and islands both north and south of it, and several synclinal structures were mapped. The limbs of these folds do not appear to have been overturned.

The structural trends of the map-area shown in Figure 2 illustrate clearly the dominant northwest trend and divergence to a nearly west orientation in the southern part of the region.

Several remarkable dome and basin structures occur in or near the zone of crystalline limestone bands east of Amadjuak Bay. Figure 2 also illustrates the form of these structures and shows the characteristic grain imparted to the land by the foliated rocks. The development of the dome and basin features appears to have distorted the crystalline limestone bands so that they now seem to flow around the more massive gneisses. The intricate nature of these structures is illustrated by Figure 3 and Plate IV, and the discontinuous nature of the limestone bands is obvious from the figure.

PLATE IV. Complex structures northeast of Amadjuak Bay. For geological data compare this photograph with Figure 3. *(RCAF T265-R-120)*

Faults and Linear Features

Major linear features reflect the prevailing northwest-structural trend but, in the western part of the area particularly, this trend is complemented by northeast-trending linear features. The trace of most of these structures is to be found in narrow inlets, straight channels separating islands, or narrow, steep-sided, drift-filled valleys. Here and there however, bedrock exposures are visible in these features and reddish mylonite and highly chloritized rocks are common. Furthermore, slickensides can be discerned in some places. It is therefore likely that there has been movement along these features but the absence, especially in the gneissic rocks, of traceable marker beds renders it impossible to evaluate such movement.

A fault line scarp marks the northwest-trending contact between the Precambrian and Palaeozoic strata of the northwestern part of the map-area. The north side appears to be down-dropped, and in places along the contact Precambrian rocks rise abruptly for several hundred feet above the gently undulating Palaeozoic-derived plain to the north.

Mechanics of Deformation

Deformation within the gneisses does not seem to have resulted in the formation of any new strain planes; fracture cleavage has not formed but rather the strain seems to have been taken up along the S-surface, i.e., the foliation planes. In the more massive quartz-feldspar gneisses, where foliation planes are absent due to a lack of platy minerals, deformation strains were probably taken up by intergranular movement and again no new S-surfaces were developed. In rocks rich in platy minerals such as rusty graphitic schists and certain of the more schistose biotite-garnet gneisses, deformation has accentuated the foliation and here and there minor crenulations, b-lineation, have been formed.

Within the bands of crystalline limestone deformation effects are most highly developed. This rock has deformed less competently than the surrounding crystalline rocks. Marble is particularly susceptible to plastic deformation, and by glide twinning a single calcite crystal can become enormously elongated. The presence of disarticulated blocks of rusty graphite gneiss in crystalline limestone indicates that the marble remained plastic after the more siliceous rocks had become more or less competent. In many of the thickest limestone bands the intensely contorted bedding and apparent repetition of beds suggest that the thicker parts are the result of flowage.

The complexity of the structures developed in the crystalline rocks of southern Baffin Island, their varying orientation, and the abrupt changes in foliation direction seem impossible to explain entirely on the basis of directed stresses. To account for the diversely oriented folds, domes, and basins such directed stresses would need to have been applied in constantly varying directions. If, however, as pointed out by Wynne-Edwards (1959) in discussing an area of somewhat similar rocks, the deformation of the area is considered in terms of fluid flow, the structural history of the area can be explained by a single long-acting stress system. Because of differing competencies, different effects will result. In Mingo Lake–Macdonald

Island map-area the greatest contrasts should be found between marble and the most highly crystalline rocks such as quartzo-feldspathic gneiss (granulite). Some of these effects have been described in the foregoing.

Where rocks of different competencies are exposed to the same force, those with lower competency will be the first to flow, and swelling and thinning of beds can take place. The intricate nature of the outcrop pattern of much of the crystalline limestone is readily explicable on this basis as well as the discontinuous habit of the carbonate rocks along strike. Crystalline limestone bands seem to maintain more or less regular stratigraphic positions, but along any one level, usually a foliation plane in more crystalline rocks, the carbonate rock may be present or absent. Differential flowage would also explain many boudinage structures and other disarticulated mafic bands and lenses common in the quartzo-feldspathic rocks but whose habit does not seem to result from either intrusion or metasomatism.

In summary, the writer considers that the deformation, which in the map-area and indeed in much of southern Baffin Island gave a pronounced northwest grain to the terrain, was accompanied by plastic flow. A high grade of metamorphism was attained by the rocks and it is probable that temperatures were high enough to render them all, at one time or another, plastic. The absence of cataclastic rocks suggests that all deformation took place when the rocks were in a plastic or semi-plastic state.

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Chapter VI

ECONOMIC GEOLOGY

At present the only mineral deposits of potential economic importance are the iron showings and the soapstone deposits. The former have been examined by several mining companies but are currently dormant. The soapstone deposits although small are of considerable importance to the local economy because they are the source of much of the carving stone used by the Eskimo of southwestern Baffin Island for carvings sold on the world market.

Iron

Interest in southern Baffin Island as a potential source of iron was aroused following reconnaissance geological studies conducted in 1951 and 1953 by W. L. Davison of the Geological Survey of Canada. Prospecting was carried out in 1956 and extensive staking followed the next year. Ultra Shawkey Mines Ltd., dispatched a small freighter to the area in 1957 and established a camp on the west side of Chorkbak Inlet west of the map-area. The operation was accomplished without mishap, a remarkable feat in the uncharted, treacherous waters of this part of the coast. This company carried out an extensive exploration program, part of which was within the Mingo Lake–Macdonald Island map-area although their main emphasis was in the adjoining Andrew Gordon Bay (36B) map-area. One hundred and twenty claims were staked in the vicinity of Korok Inlet. A company report published June 13, 1957, stated that "... the iron structures in the Korok Inlet group have been traced intermittently for a length of 10 miles along strike. Thickness of the iron-formation was discernible and varied from 100 to 500 feet. Much of the ore here consists of blue magnetite and in numerous places high grade coarse magnetite was apparent." The magnetite was reported to be free from specularite, and no objectionable impurities, carbonates, or silicates were noted. Samples tested showed no titanium and only a very low phosphorus content. Diamond drilling was carried out on the Korok group of claims in 1958 but the results apparently did not show enrichment at depth or establish the continuity of the deposits. In a report dated January 23, 1959, the company stated that tonnages sufficient to warrant further exploration were not apparent either in the Korok group or in the claims staked west of Chorkbak Inlet, and that the decision had been made to discontinue further efforts in southern Baffin Island. The camp was dismantled in 1960.

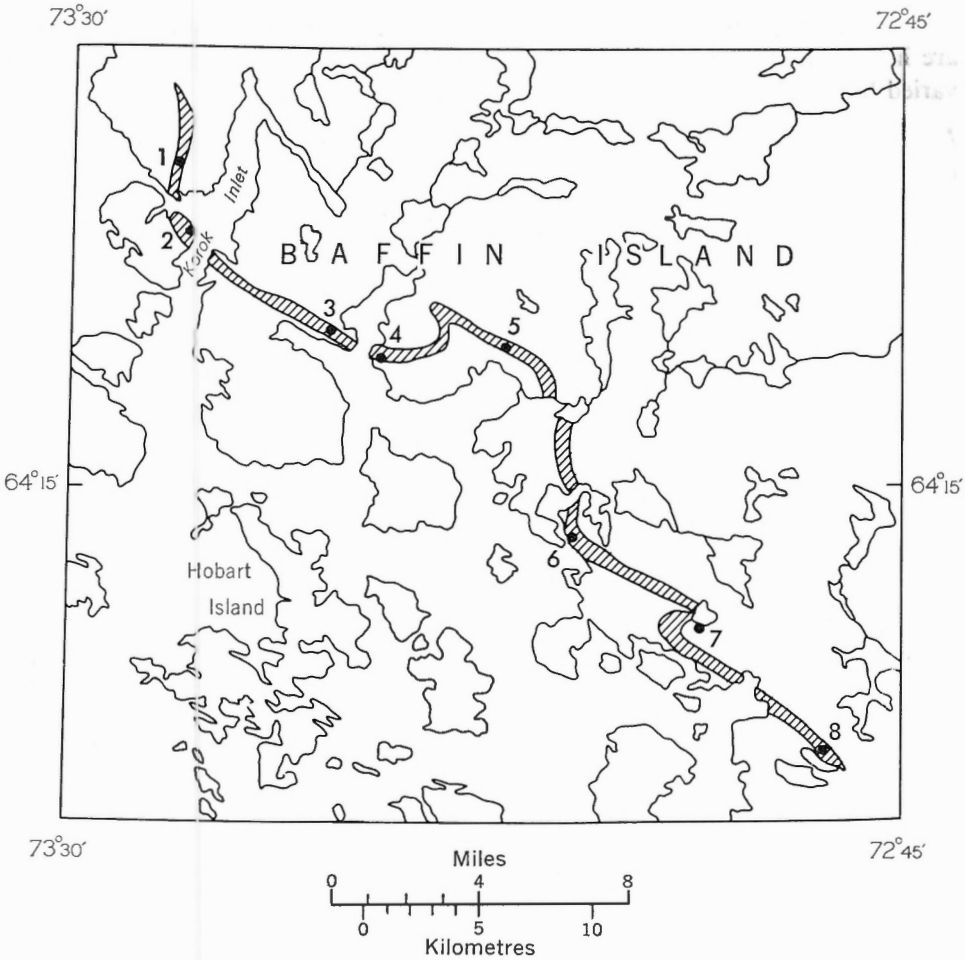

FIGURE 4. Location of selected sites along mineralized zone southeast of Keltie Inlet.

The most continuous magnetite-bearing zone in the map-area is in a northerly dipping band of hornblende and pyroxene-rich rocks that extends for about 25 miles in a southeasterly direction from a point midway between Keltie and Korok Inlets (Fig. 4). The band has been folded during regional deformation of the area and its trace as shown on the map reflects the regional trends of the district. Although shown as a unit on the map it is in reality a collection of diverse lithological types characterized by the presence of variable amounts of magnetite. The band is several thousand feet wide, but the "iron formation" is rarely more than 100 feet and commonly is marked only by narrow 1- to 2-foot magnetite-rich bands.

Throughout its length the band contains varying amounts of quartz-feldspar rock, in part conformable with the gneissosity but elsewhere showing crosscutting relationships. The north contact of this band with the overlying quartz-feldspar gneisses is commonly gradational, and the pyroxene-hornblende gneiss becomes streaked with felsic rock and eventually it in turn forms only streaks in the gneiss.

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The trend of the iron-bearing zone is outlined on Figure 4 and several places are indicated where a study of the zone was made. These localities exemplify the varied lithology and are discussed in the following sections:

Locality 1. The following section was measured by pacing across the band near its northwestern end.

Table XVI

Top	quartz-feldspar gneiss
700′	graphite schist with minor garnet; biotite schist; pyroxene-rich bands
75′	pyroxene-rich magnetite-bearing rocks, in part garnetiferous; numerous bands of massive, coarse-grained magnetite
120′	biotite-quartz-feldspar gneiss; minor amounts of pink garnet; some pyroxene-hornblende gneiss with thin bands containing up to 10% magnetite
Bottom	quartz-feldspar gneiss

Both the upper and lower contacts of the band are sharp and little granitic material is found within the mineralized band, there about 900 feet thick. Within the iron-bearing zone itself bands of massive magnetite are present in a magnetite-bearing quartz-garnet-amphibole rock. The modal analysis (volume %) in Table XVII is typical of the host rock.

Table XVII

garnet	26.9
quartz	23.0
pyroxene	8.7
hornblende	31.0
magnetite	4.8
biotite	1.8
plagioclase	3.6

In this rock amphibole and biotite are alterations of pyroxene, usually hypersthene. Magnetite forms along the cleavage planes of pyroxene.

Locality 2. At this point on the mineralized band the rocks are laced with quartz and quartz-feldspar pegmatite veinlets some of which form parallel with the gneissosity. Thin, purplish weathering bands of magnetite-amphibole rock are common. These are composed of about equal parts of quartz-feldspar-amphibole and magnetite. In places the amphibole is deeply weathered resulting in the development of a "magnetite sand".

Locality 3. On the south side of the mineralized band the rock is well-banded, medium-grained, pyroxene-hornblende gneiss and contains numerous, thin, discontinuous bands of biotite-magnetite-quartz-feldspar amphibolite. Within the main

zone, which weathers dark brown, is a band of light brown weathering rock that contains the greatest amount of magnetite.

Thin section study indicates these rocks to be highly serpentinized, with magnetite occurring as vermiform masses in the serpentine and along the margins and cleavages of biotite flakes. The following is the approximate mineral composition (volume %) of these rocks.

Table XVIII

serpentine	50
pyroxene	35
magnetite	8
biotite	7

Locality 4. In contrast to the relatively sharp contact observed on the south side of the band at locality 3, numerous lenses and bands of magnetite-bearing pyroxene amphibolite are present in the quartz-feldspar gneiss south of the band at this locality. Within the band the same light and dark brown weathering bands noted at locality 3 are present and narrow bands of 80 per cent magnetite and 20 per cent quartz-feldspar-hornblende rock are present.

Locality 5. At this locality both magnetite and pyrite are included in the mafic rocks, which there consist of garnet-hornblende-biotite-quartz-feldspar gneiss. The light brown weathering, serpentinized band noted at localities 3 and 4 outcrops here and may contain as much as 25 per cent magnetite.

Locality 6. Magnetite is most abundant in the flexure of the pyroxene amphibolite band at this place. Here the band includes a section up to 50 feet thick that contains as much as 75 per cent magnetite.

Locality 7. As the band swings southeast the mafic rocks become less rich in magnetite and granitic material becomes more and more abundant. Magnetite is most abundant in the apex of the large fold near this locality. There bands of magnetite 10 to 15 feet thick were observed, but as the band again swings southeast only a few bands of magnetite 1 foot to 2 feet thick are present.

Locality 8. Here magnetite is disseminated through the pyroxene amphibolite and garnet-biotite-hornblende-quartz-feldspar gneisses and definite magnetite bands are absent. Quartz-feldspar lenses, dykes, and similar features become abundant, and the well-defined mafic band begins to lose its identity. Magnetite occurrences near the site of Amadjuak post may represent a southeastward continuation of this band, but southeast of locality 8 the band could not be recognized in the field.

On Diamond Islands, and particularly near the shores of the channel separating the two largest islands, many small magnetite occurrences were noted. On the north shore of the channel a band of nearly massive magnetite 3 to 5 feet wide is part of a 30-foot-wide amphibolite band included in sheared and chloritized quartz-feldspar gneiss. South of this and a few hundred feet inland from the

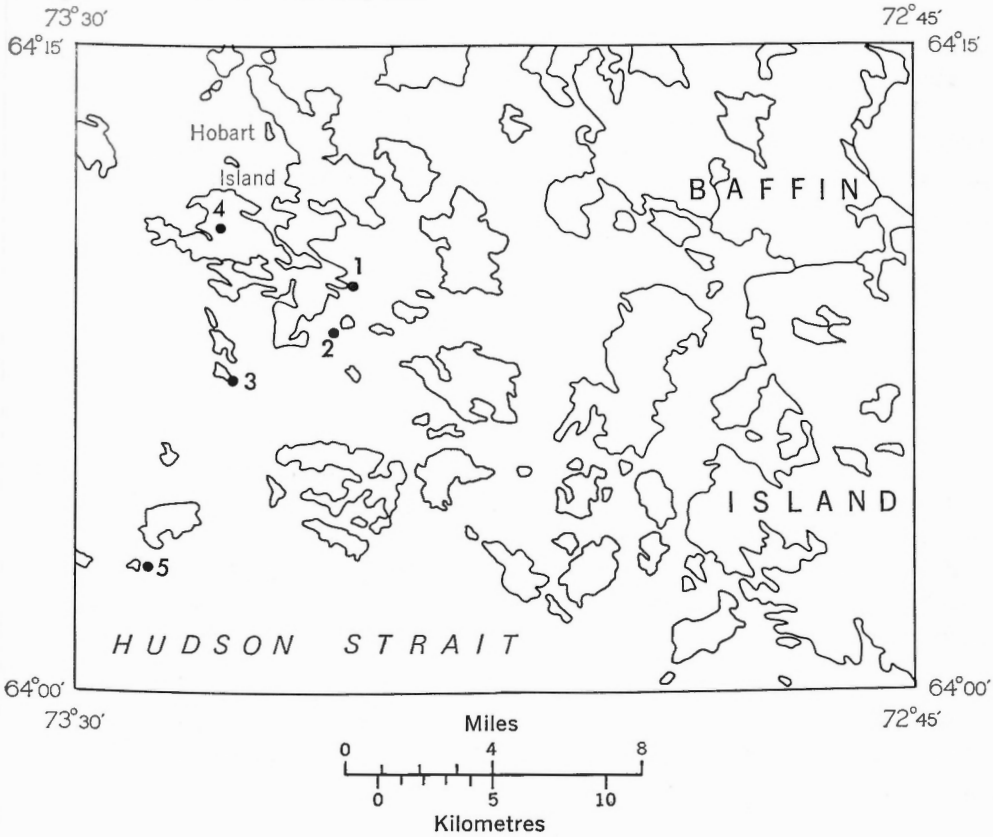


FIGURE 5. Occurrences of magnetite in the vicinity of Hobart Island.

coast, a rusty 100-foot-wide band of garnet-hornblende-biotite schist interlayered with granitic rocks contains irregular bands rich in magnetite.

Other magnetite occurrences on the north island are similar; the magnetite bands there usually are less than 5 feet thick. Most are discontinuous and may be separated by bands of hornblende-biotite-quartz-feldspar gneiss containing disseminated magnetite. Many of the bands and lenses of pyroxene-amphibolite are rich in magnetite and some contain as much as 15 per cent. None of these occurrences is of any significant size.

Small magnetite occurrences are also common on Hobart Island and on smaller islands to the east and south. The localities discussed in the following sections are shown on Figure 5.

Locality 1. Several bands of massive magnetite between 1 foot and 2 feet thick are present at this locality. The bands are at least 1,000 feet long and are included in a succession of well-banded hornblende-pyroxene-quartz-feldspar gneisses.

Locality 2. At this point bands of pyroxene-hornblende gneiss are interbedded with quartz-feldspar gneisses. One band, about 20 feet thick, is garnetiferous and contains varying amounts of magnetite. This band extends along most of the west shore of the island.

Locality 3. Numerous, relatively thin bands of magnetite-bearing rocks are found on the islands of this group. On the northern island, just south of Hobart Island, there is a 6-foot-thick band of magnetite-rich rock in a pyroxene-hornblende gneiss band. The latter is part of a succession of granular quartz-feldspar gneisses. In addition to the magnetite included in the mafic band, several small pockets of magnetite are present in the gneissic rocks.

Elsewhere on this group of islands magnetite-rich bands are commonly associated with garnetiferous gneisses and pyroxene-hornblende rocks. Here and there complex folding gives a great apparent thickness to certain of the magnetite bands.

Locality 4. A group of garnetiferous gneisses, rusty graphite schists and gneisses, and pyroxene-hornblende rocks outcrops on southern Hobart Island. In common with many of the pyroxene-amphibolite bands in the map-area, similar bands at this locality are relatively rich in magnetite and on weathered surfaces, where a coarse granular 'sand' has formed, grains of magnetite are abundant.

Locality 5. At least ten bands of magnetite-rich rock, from 1 foot to 10 feet thick, are present in pyroxene-amphibolite bands included in the quartz-feldspar gneissic succession on these islands.

Magnetite occurrences south and east of Amadjuak Bay (*see* Map 1185A) have a similar setting to those described above. The modal analyses in Table XIX are illustrative of the mineralogy (volume %) of rocks from both areas.

Table XIX

quartz	40.6	16.3	55.6	15.1
pyroxene	43.5	15.0	17.9	23.0
magnetite	15.7	14.0	7.2	15.3
apatite	tr.	4.1	—	0.5
plagioclase	—	17.4	10.1	17.6
hornblende	—	1.3	0.6	27.4
chlorite	—	29.1	0.6	0.7
biotite	—	—	0.1	—
carbonate	—	1.5	—	—
pyrite	—	—	5.6	0.2

Pyroxene in these rocks is mainly hypersthene, although diopside is present. Magnetite appears to have formed later than the other mineral components. It forms along grain boundaries, embays other minerals and frequently encloses them. Grains of apatite and pyrite completely surrounded by magnetite were noted in several thin sections.

Although most of the magnetite showings in Mingo Lake–Macdonald Island map-area are associated with mafic rocks such as pyroxene gneiss or pyroxene amphibolite, a showing at the northwest head of Korok Inlet is associated with crystalline limestone. The limestone is coarse grained and contains muscovite, diopside, pyrite, magnetite, and pyrrhotite. It forms a lens about 1,500 feet long and 300 feet wide which, from regional considerations, is known to be a pinched out part of a more extensive band of crystalline limestone within quartz-feldspar gneiss. Magnetite is found in two bands 5 to 10 feet from the contacts of the limestone

and gneiss. The band on the northeast side of the limestone thickens to 5 or 10 feet at the centre, pinches to one or 2 inches at the south and becomes disseminated to the north. Adjacent to the band, magnetite is sparsely distributed through the carbonate rock. The magnetite band on the southwest side of the crystalline limestone band is less well defined, and there magnetite is mainly in the form of disseminated grains within the carbonate rock. Weathering of the carbonate leaves a hackly surface composed of rough, minute (less than $\frac{1}{4}$ inch diameter) magnetite crystals.

Thin section examination of the magnetite-bearing pyroxene gneisses and pyroxene amphibolites indicates that magnetite formed late in the paragenesis of these rocks. The widespread occurrence of magnetite and apparent absence of hematite and iron-formation suggest that these deposits may be due to a concentration of magnetite originally present in the mafic rocks. The nature of the occurrence of magnetite in crystalline limestone at Korok Inlet also indicates that magnetite may in part be of intrusive origin.

Soapstone

The carving of stone figures, long practised by various groups of Eskimo, has in recent years become a source of considerable income, and for this reason the availability of readily obtainable supplies of suitable carving stone is important.

The Eskimo of Cape Dorset district have long been noted for their artistic work and although in recent years the West Baffin Eskimo Co-operative has concentrated on other art forms, considerable volume of carving is still done. The blocks from which some of the currently (1964) produced prints are made are commonly of stone. Although suitable stone can be shipped into an art centre, such as Cape Dorset, from commercial sources in southern Canada, and indeed this is done for settlements where local supply does not exist but where the Eskimo show aptitude for carving, yet for some collectors the use of local material adds to the value of the carving.

Several deposits of carving stone were examined within the map-area; all were previously known and have been worked by the Eskimo from time to time in the past few decades. Although the term soapstone is commonly used to describe the carving rock, in reality most rocks are pale green to greenish black serpentinized amphibolites.

Aberdeen Bay Deposits

The most extensive deposit is in the extreme southeastern part of the map-area on the west shore of Aberdeen Bay, near the head of the bay. Two varieties of stone occur: a dark greenish black, and a pale green. This diversity adds to the value of the deposit. In the past, the Hudson's Bay Company or Department of Northern Affairs and National Resources has sponsored a yearly trip to these deposits. One Peterhead boat with a crew of about five men can quarry in a day or two sufficient stone to meet most of the demand at Cape Dorset. Both varieties of stone outcrop at and below high-tide mark, and although this limits quarrying operations to times of low tide, it also facilitates loading and no "overland" transport

is required. In the case of the dark stone lightering by canoe is required, but the light green stone can be loaded directly from the outcrop into the Peterhead boat.

The dark stone is associated with an amphibolite band that intersects the northwest shoreline of a small circular bay on the northwest side of Aberdeen Bay. The stone used for carving is an altered amphibolite and is associated with small transverse shears in the main mass.

The green carving stone forms a lens along the contact between quartz-feldspar gneiss, the predominant country rock of the area, and a band of crystalline limestone, which is the most southerly of a belt of carbonate rocks (map-unit 8). The stone is fine grained and moderately well bedded and in outcrops weathers into easily quarried slabs. Contact with the limestone on the east is gradational, but the deposit itself sits in a pocket in quartz-feldspar gneiss. The offset is so sharp that a fault is presumed, although there is no evidence of shearing or brecciation in the gneiss. The rock used for carving appears to be a serpentinized phase of the limestone. Similar rocks outcrop on the eastern shores of Aberdeen Bay but, although these rocks show in places the development of a variety of accessory minerals, no "soapstone" deposits were seen.

Occurrence of good carving stone in the amphibolite is very irregular. When making a selection the Eskimo try each piece with a file, thus even in the fractured zones, which geologically might be considered a favourable area, up to 90 per cent of the rock may be rejected as being too hard. The pale green variety on the other hand is fairly uniform in quality, and only the presence or absence of fractures determines the suitability of the stone. Highly fractured pieces are useless as they may shatter during carving. About 75 per cent of this deposit appears to be suitable for use as carving stone.

Evaluation of the amount of available carving stone at Aberdeen Bay is difficult, but at the present rate of usage of a few tons a year these deposits should continue to be a source for many years.

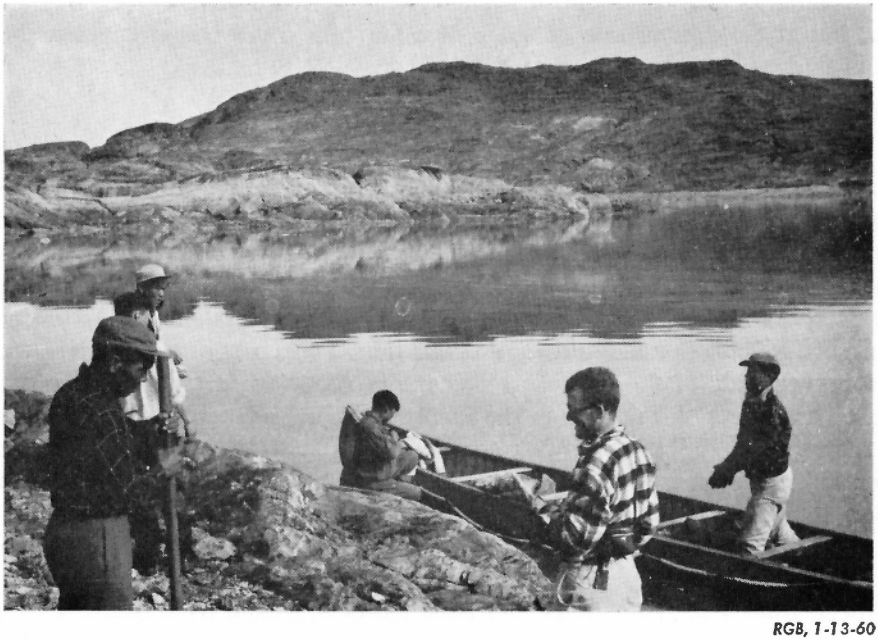
Korok Inlet Deposit

Several bands of crystalline limestone, part of the northwesterly trending belt that crosses the map-area, outcrop near the head of Korok Inlet; one of these outcrops, on the south shore of the northwest arm of the inlet, contains a small deposit of soapstone in addition to the magnetite described on page 47. The soapstone is found along the contacts between steeply southwest-dipping limestone and gneissic rocks (Pl. V). Like many of the exposures of crystalline limestone, this occurrence is actually a lens although at one time it was part of a continuous band. On the north side of the lens the soapstone is about 70 feet thick and 600 feet long, on the south side, although the limestone is too shattered for the extent of the soapstone to be accurately determined, it appears to have about the same dimensions. The gneissic rocks nearby are highly chloritized and epidotized, and epidote is present in the many fractures that cut the limestone.

This deposit is much closer to Cape Dorset and although it has been quarried extensively it still contains some suitable carving stone. Like the deposits at Aberdeen Bay, it is at tidewater and most pieces are hand tried before selection.

RGB, 1-3-60

PLATE V. Quarrying and loading soapstone at Korok Inlet. In upper photograph the crystalline limestone band separating the narrow soapstone band in foreground from the gneissic rocks forming the low cliff in the background is easily seen. The soapstone is exposed only at low tide and is partly covered with seaweed.



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