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PAPER 71-48

RECONNAISSANCE GEOLOGY OF A PART OF THE PRECAMBRIAN SHIELD, NORTHEASTERN QUEBEC AND NORTHERN LABRADOR; PART III

(Report and Map 9-1971)

F. C. Taylor

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ABSTRACT

The report area comprises about 12,000 square miles underlain almost entirely by Precambrian rocks. Triassic rocks outcrop in a small area at Mistastin Lake. No economic mineral deposits are known from the area.

RÉSUMÉ

La superficie de la région étudiée est d'environ 12,000 milles carrés et repose presque entièrement sur des roches du Précambrien. Les roches triasiques affleurent dans une petite région près du lac Mistastin. On ne connaît aucun gisement de minéraux exploitables dans la région.

RECONNAISSANCE GEOLOGY OF A PART OF THE PRECAMBRIAN SHIELD, NORTHEASTERN QUEBEC AND NORTHERN LABRADOR; PART III

INTRODUCTION

This report and map provide preliminary results of the third and final phase of Operation Torngat, a helicopter-assisted geological mapping program in northeastern Quebec and northern Labrador. The first and second phases of this program, involving approximately 50,000 square miles, were reported in Taylor (1969, 1970). The present report describes about 12,000 square miles of territory.

A Bell G4A helicopter was used for traversing and local transportation. Supplies and camps were moved by aircraft under casual charter from Schefferville, Quebec, the point from which all food and gasoline were obtained.

Field work started on 20 June, the day Squaw Lake, the seaplane base at Schefferville, was free of ice. Weather conditions throughout June and early July were fair but with many days of low cloud and numerous showers which made field work uncomfortable. In the latter part of the season weather conditions were much improved and only a few days were lost due to fog and low cloud.

Hopedale and Davis Inlet, two coastal communities in Labrador, are chiefly inhabited by Eskimos. CN coastal ships make frequent calls to these ports during ice-free seasons but neither are adequate as a major supply centre. The Department of Transport maintains a weather station at Border Beacon in the central part of the map-area. This facility is served by an unpaved runway capable of handling C-46 and DC-3 aircraft.

Schefferville, Quebec lies 75 miles west-southwest of the southwest corner of the map-area and Goose Bay, Labrador is 145 miles south of Hopedale, Labrador.

PHYSIOGRAPHY

The region shows two major topographic types. The most prominent consists of rugged bedrock hills with local relief up to 2,000 feet which in coastal areas display extensive fiords. This terrain is dominant in areas of anorthosite and adamellite in the eastern half of the map-area. The second type consists of low lying almost flat terrain with local relief of 200 to 300 feet where bedrock hills project through a cover of glacial debris. This topography is common in the George River valley and to the east and south of Mistastin Lake in areas underlain by gneissic rocks. Eskers and kames are common in these areas and bedrock is scarcer than elsewhere.

Where elevations are less than 600 feet forest cover is locally heavy, particularly east of Shapio Lake. Sufficient timber for local consumption is available in much of the region.

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GENERAL GEOLOGY

The bedrock is almost entirely Precambrian. A few small boulders of limestone, possibly Paleozoic, occur along the coast at a few points. Rocks of limited areal extent, present at Mistastin Lake, are of Triassic age (Taylor, in Wanless et al., 1966).

The area contains elements of both the Churchill and Nain structural provinces as defined by Taylor (1971) and includes both Archean and Proterozoic rocks.

ARCHEAN

Archean rocks form the major part of the coastal area extending from the north boundary southward to Bay of Islands with a few small occurrences in Kaipokok Bay district. They extend inland to north-northwest of Shapio Lake but in most places have been intruded by anorthosite and adamellite.

Included with these are rocks called Hopedale Gneiss by Kranck (1953) and Gandhi et al. (1969). As the Hopedale Gneiss is an extension of Archean rocks to the north (Taylor, 1970) this name would appear to have only a local significance.

Migmatite (unit 1)

The Archean of unit 1 is characterized by a great diversity of rock types that for the most part must be mapped as migmatite on the present scale of exploration. The granitic elements of the migmatite are predominantly granodioritic but granitic, aplitic and pegmatitic phases are common. The granitic rocks commonly contain either or both biotite and hornblende which are in some places replaced by chlorite. Muscovite occurs rarely. The mafic portions of the migmatites are commonly amphibolitic and comprise volcanic and sedimentary rocks.

Small amounts of marble and lime-silicate rock, garnet-biotite-quartz-feldspar gneiss, and other well-layered metasedimentary rocks are erratically distributed throughout the Archean terrain. Only in a few places is it possible to separate these rocks on the present scale of mapping.

Bands of marble (1a), up to 1 inch thick, interlayered with granodiorite, amphibolite and biotite-quartz-feldspar paragneiss occur at South Tikigakjuk Point. The marble is light green, equigranular and fine grained and contains small amounts of biotite. A few bands of feldspathic quartzite up to 5 inches thick are also present.

Limy Argillite (unit 2)

A fault bounded block between Adlatok Bay and Ugjoktok Bay consists chiefly of limy argillite, and siltstone with small amounts of amphibolite. The limy argillite and siltstone are light to medium grey rocks which are variously well banded or extensively brecciated. In places the banding can be determined to be primary bedding. Calcite is present in the matrix and locally fills tiny fractures. A few beds, up to 6 inches thick, contain disseminated pyrite. These are rusty on weathered surfaces. Amphibolite, which is locally common and probably interbanded with the argillite, is medium grey-green, fine grained, equigranular and foliate. Garnet is a minor constituent. This unit is assigned to the Archean because it is intruded by diabase dykes which in this part of the map-area are primarily Archean.

Amphibolite (unit 3)

South of Hunt River amphibolite and smaller amounts of metasedimentary rocks form a mappable unit up to 1 1/2 miles wide. A banded, dark grey-green, fine-grained, equigranular rock is typical of most of this amphibolite. In part garnet-bearing, it is also locally medium grained, foliate or schistose. In places metasedimentary rocks are interbanded with the amphibolite. These consist primarily of light to dark grey or grey-green, equigranular, medium-grained biotite and/or hornblende-quartz-feldspar paragneiss. Garnet occurs in some places and primary bedding is locally discernible. A light grey, banded equigranular fine-grained dolomite is present in the central part of this unit forming three layers, the largest five feet thick, interbanded with the amphibolite.

In part, contacts with the bordering rocks are faults but in some places the metasedimentary rocks grade into granitic gneiss and migmatite.

Andesite (unit 4)

A single outcrop of medium grey-green, equigranular, fine-grained andesite lies 12 miles north of the east end of Harp Lake. In part the outcrop consists of flow breccia with fragments up to 24 inches by 6 inches. Plagioclase grains form clusters up to 1/4 inch in diameter in the andesite and calcite is present in small amounts. Much of the outcrop is schistose the attitude of which may be parallel to flow breccia layers. Relationship of this andesite to other rock units is not known for certain and it is assumed to be Archean.

Ultrabasic Rocks (unit 5)

Ultrabasic rocks form several small plutons chiefly near and west of Hopedale. Consisting primarily of brown weathering serpentinized peridotite and locally also amphibolite, these plutons are commonly linear and conformable with host gneisses. None of these plutons is more than 500 feet thick or, with one exception, more than 1,000 feet long. A sill, up to 125 feet thick, of white weathering serpentinized peridotite lying within amphibolite (unit 3) can be traced for 3 1/2 miles.

PROTEROZOIC

The Proterozoic rocks form five distinct groups: (1) the gneissic rocks in map-areas 23P (east half) and 13M which extend into the westernmost part of the map-area 13N; (2) the metamorphosed layered rocks of the Aillik Group; (3) the post-Aillik intrusive granites, syenites and gabbros in the Makkovik region; (4) the large anorthosite and adamellite intrusives and their related rocks; (5) unmetamorphosed red arkosic sandstone in the central part of map-area 13M.

Aillik Group (units 6 and 7)

Layered rocks near Aillik Bay were first reported by Daly (1902). Subsequently these were named "Aillik formation" by Kranck (1939) and later referred to as "Aillik series" by Kranck (1953) and Douglas (1953). Recently Stevenson (1970) renamed an extension of these rocks in the map-area to the south of the Aillik Group.

Most of the area underlain by rocks of the Aillik Group has been mapped by Gandhi et al. (1969) and the areal extent of the amphibolite and granitic rocks shown on the present map has been taken from their work.

Until recently, the Aillik Group has been considered to consist chiefly of metasedimentary rocks with small amounts of mafic volcanic rocks. Daly (1902), Kranck (1939, 1953), Douglas (1953) and Gandhi et al. (1969) all reported large areas of metasedimentary rocks dominated by various types of quartzite with some conglomerate. Clark (1971) re-examined the area east of Long Island and recognized that many of the rocks previously believed to be quartzite are acidic volcanic derivatives. The present mapping has shown that most of the rocks beyond the limit of Clark's work are also of acidic volcanic origin.

Most of the Aillik Group (unit 6) consists of a light buff, porphyritic, massive to foliate, fine- to medium-grained siliceous meta-tuff. A faint banding, possibly originally bedding, is present in some places and extremely rare crossbedding also occurs. These rocks consist dominantly of feldspar, up to 75 per cent, with subordinate quartz, biotite and hornblende. Minor amounts of calcite are present in many places. Local poorly banded to well banded rhyolite, up to 30 feet thick, is present. Rhyolite horizons are discontinuous and can be followed for only short distances. Rocks previously called conglomerate are predominantly volcanic breccia, composed chiefly of angular fragments of the associated siliceous tuffs. The breccia is well exposed on an island 3 miles north-northwest of Aillik Village. The matrix consists chiefly of fine-grained, dark grey, equigranular biotite and/or hornblende-quartz-feldspar rock. The same rock also forms some of the fragments. Very rare, well rounded, small granitic and quartz pebbles are present in this breccia east of the north end of Long Island.

A few quartzitic sedimentary rocks occur interlayered with the tuffs. These rocks are light to medium grey to grey-green, fine to medium grained, thinly bedded and commonly crossbedded. Variable amounts of feldspar along with scarcer biotite, garnet, calcite and epidote are present. Clark (1971) reported imperfectly developed ripple-marks. The presence of quartzite with mudcracks and ripple-marks reported to occur near Aillik Village by Kranck (1953) was not confirmed.

Sedimentary rocks near Kaipokok Bay (unit 6a) consist predominantly of equigranular, well banded, fine-grained, light grey, biotite, metagreywacke. Associated with this on the east side of the bay are schist bands consisting of medium grey biotite-muscovite-quartz-feldspar schist. In the same area a 100-foot-thick bed of rusty, pyritiferous feldspathic quartzite is interlayered with the schist and greywacke. West of the bay a medium green, fine-grained, banded amphibolite comprising 30 per cent of the unit is interlayered with the metagreywacke.

Amphibolite (unit 7) which has been derived from mafic volcanic rocks, is about 500 feet thick and generally conformable with the layered rocks (Gandhi et al., 1969). Pillows are present near the west shore of Makkovik Bay attesting to a volcanic origin. A nearly massive, medium- to coarse-grained rock consisting chiefly of hornblende and plagioclase with small amounts of biotite and epidote is characteristic.

Long Island Gneiss (unit 8)

Gandhi et al. (1969) named a gneiss that intrudes both the Aillik Group and the Archean rocks Long Island Gneiss after Long Island in Kaipokok Bay where it outcrops extensively. This gneiss is an equigranular, light to medium grey, fine- to medium-grained, weakly foliated to massive rock. Biotite and hornblende are the chief mafic minerals and garnet occurs in places. Lens-shaped to well rounded, inclusions, up to 2 feet long, of darker grey but similar rock are common. This rock is described fully by Gandhi et al. (1969), who consider it to be a pre-metamorphic intrusion of granodioritic composition.

Gabbro (unit 9)

Gabbro of this unit is shown separately from that in unit 18 as it is closely related to the other plutonic rocks in the Makkovik district and is petrographically distinct. The layered silicic rocks of the Aillik Group are cut by gabbro at Big Bight and in other areas to the south (Gandhi et al., 1969; Stevenson, 1970). Small granite plutons intrude the gabbro at Big Bight and on and near West Turnavik Island, hence the gabbro pre-dates the granitic rocks.

A dark grey-green, massive, equigranular rock predominates. Locally a porphyritic dark green rock is present with augite grains up to 1/2 inch long. A weakly layered rock occurs in a few localities along with dioritic phases, the latter commonly finer grained that most of the gabbro. Biotite is present in most outcrops and hornblende occurs locally. Kranck (1953) reported olivine in the gabbro on the island at the mouth of Makkovik Bay.

Syenite (unit 10)

Syenite occurs at Big Bight, Adlavik Harbour, Rugged Islands and Dunn Island. These are typically dark buff, coarse-grained, equigranular rocks with 50 per cent or more potash feldspar. Hornblende and biotite, along with smaller amounts of pyroxene, are present in most places. Quartz is present in some samples in small amounts. The syenite at Big Bight, which is light pink, fine grained, and equigranular, is characterized by the presence of numerous amphibolite and other mafic inclusions. This pluton and the one at Adlavik Harbour are both intruded by granite dykes. Angular inclusions of Aillik Group rocks occur in the syenite of Dunn Island. Kranck (1953) gave a petrographic description and analysis of the Dunn Island pluton.

Granite, Granodiorite (unit 11)

Granite and granodiorite of unit 11 are dominant in the batholith which in the Bay of Islands area intrudes Archean migmatites. Smaller plutons occur in the Makkovik district and to the east where they intrude the Aillik Group, gabbro and syenite. Whereas much of this granite and granodiorite is a massive, equigranular rock some of it is gneissic. Gandhi et al. (1969) reported that inclusions of the gneissic granitic rocks occur in the massive rocks, but these rocks are grouped together in this report. The contact zones, although clearly intrusive in many places, commonly consist of migmatitic zones up to 1/2 mile wide. The granitic rocks are variously fine- to coarse-grained, chiefly equigranular but locally porphyritic and light to medium grey to light pink. Biotite is the most common mafic mineral but hornblende occurs with it in some places. Fluorite occurs sporadically. Gandhi et al. (1969) and Kranck (1953) provided more extensive descriptions.

Lamprophyre dykes occur commonly throughout the Aillik Group and post-Aillik intrusive rocks. They are up to 15 feet thick and although they have various attitudes many are nearly horizontal. Kranck (1953) described several in detail. K-Ar isotopic ages on biotite from a minette at Aillik Bay average 570 m.y. (Stockwell and King in Leech et al., 1963).

Amphibolite (unit 12)

Amphibolite is widespread throughout the gneissic terrain but only locally occurs in large enough areas to be shown on the present scale of mapping. Most amphibolite displays strong, well developed foliation and some is banded. Dark to greyish green, medium-grained rocks are most common but fine- and coarse-grained varieties are also present. Although hornblende and plagioclase are the dominant minerals locally biotite and less commonly garnet and pyroxene form significant percentages. The origin of the amphibolite is unknown as primary sedimentary, volcanic or intrusive characteristics are not preserved.

Marble and Lime Silicate Rocks (unit 13)

Marble and lime silicate rocks are rare. North of Harp Lake pluton, marble, which forms a band about 550 feet thick within lime silicate rocks and rusty biotite-quartz-feldspar paragneiss, is light grey, fine to medium grained. It contains diopside with smaller amounts of quartz and plagioclase. Bedding planes within the limestone, which are well defined, are commonly contorted although these in the adjacent rocks show uniform attitudes.

The lime silicate rocks are chiefly grey-green with bright green diopside grains disseminated throughout. Typically they are poorly banded but a foliation is commonly well developed. Small amounts of calcite are present in most places and brown mica and garnet may occur. Thin beds of quartzite, 6 to 20 inches thick, are interbanded with lime silicate rocks at the north end of Whitegull Lake.

Muscovite and Biotite Schist (unit 14)

Muscovite-biotite schist and biotite schist are present only near the George River where they form thin but well-defined bands in the gneissic terrain. They are variously associated with lime silicate rocks (unit 13), hornblende-biotite-quartz-feldspar gneiss and small amounts of quartzite, the latter locally with garnet.

These schists are fine to medium grained, light brown to medium grey and commonly display pods and lenses of quartz lying parallel to the schistosity. Although characterized by well-defined schistosity a layering, probably bedding, is also discernible locally. These rocks may be closely related to those in the western half of map-area 23P (unit 7 in Taylor, 1969).

Paragneiss (unit 15)

This unit of metasedimentary rocks shows a wide diversity of colour, texture and mineralogy. Grey rocks of various shades are the most common, the colour depending upon the content of biotite or hornblende. Whereas medium-grained rocks are most characteristic fine- and coarse-grained rocks are also well represented. Some paragneiss displays feldspar augen. A well-defined foliation is ubiquitous and locally a layering, that is probably relict bedding, is also evident.

Quartz and feldspar are the essential minerals with biotite the commonest mafic mineral. Hornblende occurs in some rocks both with biotite and alone. Garnet is locally abundant but is on the whole sporadically distributed. Sillimanite is present in a few places, particularly in the more schistose rocks.

Small amounts of amphibolite, rusty graphitic quartz-rich paragneiss and granitic gneiss are included in this unit. Contacts with other than intrusive rocks, such as pegmatite, diabase, anorthosite and adamellite, are gradational.

Pyroxenite (unit 16)

A massive, dark grey-green, equigranular, medium-grained pyroxenite forms a small outcrop near the east shore of Whitegull Lake. The relationship to the gneisses in the area is unknown because of lack of outcrop but the pyroxenite is probably syntectonic.

Granulite (unit 17)

Although common in the map-area to the north, granulite forms only a very small part of the present area. Along the western edge of map-area 23P (east half) this hypersthene-bearing rock is typically light brown, massive to weakly foliated and porphyritic with feldspars up to 2 inches long. It contains rare mafic inclusions which impart a foliation in some places. The granulite north of the Harp Lake anorthosite pluton is chiefly a well banded, grey to dark grey-green, medium-grained rock. The excellent banding is probably relict bedding. Biotite is common and hornblende is also present in a few places. Hypersthene forms discrete crystals up to 1/2 inch long in this granulite.

Gabbro and Diorite (unit 18)

Gabbro outcrops at Lake Raude and west of Lake Lacasse in map-area 23P (east half). At the former locality the gabbro is a medium- to coarse-grained, massive to ophitic, equigranular rock. Both biotite and hornblende are present in the grey-green gabbro and in part quartz is present in small amounts. At the latter locality the rock is a light grey, medium-grained, equigranular, massive to weakly foliated gabbro with hornblende and clinopyroxene, probably augite. Both gabbro bodies are possibly related to the Wakuach Gabbro in the area to the west (unit 4, Taylor, 1969).

Diorite near the headwaters of the Notakwanon River is a well foliated, medium green, equigranular, medium-grained rock containing hornblende, biotite and minor amounts of epidote. Associated with the diorite are several rusty amphibolite dykes ranging from 2 inches to over 15 feet thick, which have been deformed along with the diorite. Parts of these dykes display extensive gossans and contain minor amounts of pyrite, pyrrhotite and chalcopyrite.

Migmatite, Granitic Gneiss (units 19, 20)

Migmatite and granitic gneiss are the common Proterozoic rock types throughout much of map-area 23P (east half) and central 13M. The granitic gneiss is a grey to pink rock that is generally biotite-rich but locally contains hornblende either with biotite or alone. Compositionally these rocks are dominantly granodioritic but granite and diorite are also represented. The granitic gneiss probably is of metasedimentary origin and grades into well-defined paragneiss (unit 15) in many places. Intrusive massive granitic rocks, in the form of small dykes and sills, are included with the granitic gneiss unit. Numerous schlieren, fragments, and blocks of metasedimentary rocks and amphibolite are characteristic, and where these form a significant part of the rock mass they are mapped as migmatite (unit 19). Where dykes and sills of granitic rocks have penetrated metasedimentary rocks, amphibolite, or granitic gneiss and form the major part of the rocks, they are mapped as agmatite. All gradations exist between units 19 and 20, and therefore, within areas shown as either units 19 or 20, rocks of the other unit may be represented.

Foliation is well defined in both map-units and banding is present in some places. Elsewhere these rocks are highly contorted and structures are chaotic, especially over short distances.

Granodiorite and Granite (unit 21)

Whereas the granitic rocks of unit 20 show diverse textures and colours, the granodiorite and granite of unit 21 is typically massive, chiefly coarse grained, and is dominantly pink or grey. Biotite is the main mafic mineral but hornblende is also present in many places. Most of this rock in map-area 23P (east half) is porphyritic with feldspar crystals up to 4 inches long in a medium- to coarse-grained matrix. In some places these feldspar crystals show a preferred orientation but elsewhere they are randomly oriented. Inclusions of amphibolite and paragneiss are locally common, such as west of Advance Lake, and these may also impart a foliation to this rock.

Anorthosite (unit 22)

Anorthosite forms a major portion of the map-area. The largest pluton, part of the Harp Lake intrusive, forms a semicircular mass along the south border of the map-area and embraces 1,400 square miles. Smaller areas of anorthosite lie in the northern part of map-area 13N where they are extensively intruded by adamellite. Anorthosite also occurs at Mistastin Lake, chiefly on the central island, well within the adamellite pluton. A few tiny outcrops are also present along the north and south shores of the lake.

The anorthosite shows intrusive relationships with both Proterozoic and Archean gneisses and migmatites, displaying contact metamorphism, the presence of inclusions of gneiss, and structural disconformity. In some contact zones the anorthosite is finer grained than elsewhere.

The anorthosite is primarily a medium grey, massive, equigranular coarse-grained rock that in many places is almost pure plagioclase. However colour ranges from very dark grey to light grey, and grain size from fine to pegmatitic. In part the anorthosite is layered, a feature that is marked by a variation in grain size and content of mafic minerals. Mafic minerals are chiefly monoclinic pyroxene but hypersthene is also common. Small amounts of grey-green, massive, equigranular, medium- to coarse-grained hornblende gabbro are present locally in the northeastern part of the map-area.

Adamellite (unit 23)

Adamellite and related rocks form the largest rock-unit in the map-area. They underlie most of the west half and the northeast quarter of map-area 13M and most of the northwest quarter of map-area 13N. Adamellite also forms smaller areas bordering much of the Harp Lake anorthosite pluton. Intrusive relationships with the anorthosite and the older rocks are present in many places. For example near the north end of Whitegull Lake contact metamorphism of paragneiss has resulted in extensive development of cordierite in the gneiss. Dykes of adamellite cut the older rocks in many places and inclusions, some of them large, occur fairly commonly in the adamellite.

The adamellite is chiefly coarse grained, equigranular and massive. Locally a medium-grained rock is typical. Colour is commonly masked by deep, extensive, rust-coloured weathering so that only in recent rock falls or along the sea coast can fresh surfaces be obtained. In these places the rock is chiefly pale pink or greyish green. In a few places, especially in the large pluton near Mistastin Lake a rapakivi texture is present. Mineralogically this rock is composed primarily of potash feldspar, plagioclase and quartz with small quantities of hornblende, clinopyroxene, hypersthene, biotite and olivine forming the mafic fractions. Fluorite occurs as tiny grains in some places.

In part this rock, on the basis of field examination, is a granodiorite and where this phase of the intrusive is encountered weathering is less severe and hornblende the commonest mafic mineral.

In a few places, notably north of Hunt River and at the headwaters of Sango Brook, a green, buff or medium olive quartz-feldspar porphyry (unit 23a) occurs within the adamellite. This porphyry contains inclusions of adamellite in some places and also grades into it. Round and oval quartz and feldspar grains, up to 1/4 inch in diameter, lie in a fine-grained to aphanitic matrix. Hornblende is present in some places. Locally flow lines and flow breccia are present in the porphyry but characteristically it is massive.

North of Hunt River rhyolite (23b) occurs near the top of a prominent hill. The base of the hill and surrounding area consists of adamellite whereas the top of the hill is diabase. A gradation from fine- to medium-grained adamellite at the base of the hill upwards through a sequence of miarolitic, spherulitic and very fine grained adamellite to rhyolite is apparent. The rhyolite is variously massive to well layered and locally consists of breccia. Rhyolite is chiefly greyish pink to pink or orange but at the top of the sequence is yellowish green and in places contains abundant purple fluorite. At one point adamellite shows intrusive relationships with the diabase. Near the contact adamellite grades into quartz-feldspar porphyry which shows a good chill against the diabase. Elsewhere outcrop distribution indicates that the diabase truncates banding in the rhyolite. Preliminary interpretation is that the rhyolite represents an extrusive phase of the adamellite.

Diabase (unit 24)

Diabase dykes of several ages are present within the map-area. They are most common in the Archean rocks in map-area 13N where two dominant swarms, with an east trend and a northeast trend. More than one age for each of these trends is probable as some dykes are deformed and probably pre-date the metamorphism. Whereas most dykes are fine to medium grained a few coarse-grained rocks are present particularly in the northeast trending dykes, several of which are almost 1/2 mile thick. Some dykes are porphyritic and display plagioclase crystals up to 4 inches long.

Only a few dykes occur in the Proterozoic rocks. These possibly pre-date the anorthosite and adamellite although none are known to cut those rocks within the present map-area. In the map-area to the north diabase cuts both (Taylor, 1970).

No attempt has been made to distinguish the various ages of dykes in this preliminary report. However it is known that some are confined to the Archean whereas others are younger and intrude Proterozoic rocks. For example, three dykes in the Makkovik district have K-Ar whole rock ages of 956, 992 and 995 m.y. (Gandhi et al., 1969).

Arkosic Sandstone (unit 25)

Near the centre of map-area 13M abundant debris of red arkosic sandstone, some of which is possibly outcrop, may represent the youngest Precambrian rock unit. Blocks of similar rock occur along lake shores to the south of the area shown as underlain by unit 25 and this unit may underlie that area also. Glacial debris of this sandstone occurs commonly to the east, the glacially downstream direction, almost to the coast suggesting this rock was once widespread.

A mottled dusky red, medium- to coarse-grained, slightly friable, arkosic sandstone is typical. Feldspar content is variable however and some of the rock is sandstone and some arkose. Bedding planes are well defined and ripple-marks are common. Crossbeds occur rarely and gypsum casts are present at one locality. No data as to thickness of this unit are available because of the poor exposure.

Although close to the Harp Lake anorthosite and large adamellite plutons no fragments of either rock were identifiable in the sandstone. However, because of its unmetamorphosed state and horizontal attitude, it probably post-dates the plutonic rocks.

This rock may be correlative with either or both the Siamarnekh Formation (Wheeler, 1964; Taylor, 1970) which lies 120 miles to the north or with a flat-lying red arkose and conglomerate 60 miles to the south reported by Emslie (1964). The latter rock is associated with tuffs which have been dated by K-Ar whole-rock method at 843 ± 125 m.y. (Emslie, *in* Wanless *et al.*, p. 118, 1967).

TRIASSIC (unit 26)

The youngest rock unit occurs at Mistastin Lake where rocks of Triassic age (Taylor, *in* Wanless *et al.*, 1965) outcrop in a restricted area. These rocks chiefly form a butte-like hill southwest of the lake but smaller occurrences are present near the lake so that the outcrop area is roughly circular and parallel with the lakeshore.

The rock is chiefly medium grey, with local medium dark grey and light olive-grey shades. Textures range from rarely aphanitic to a fine- to medium-grained massive rock, to a breccia with fragments up to 10 cm in diameter but chiefly less than 1 cm. The fragments are angular to subrounded. Some parts are porphyritic with plagioclase laths up to 5 mm in a fine-grained matrix. Locally the rock is vesicular and in some places the vesicles are wholly or partly filled with stilbite.

Currie (1968) considered that these Triassic rocks are volcanics associated with a ring dyke intrusion, whereas Taylor and Dence (1969) suggested an origin due to meteorite impact. A paleomagnetic study (Currie and Larochelle, 1969) gave a Jurassic pole position suggesting an age slightly younger than the isotopic age.

STRUCTURAL GEOLOGY

The structure of the area has not been analyzed so that only the broadest features are considered. Three structural units are present: the Archean, the Aillik Group, and the remainder of the Proterozoic gneissic rocks.

The Archean rocks show predominantly north to northeasterly trends with the latter being more prominent in the extreme eastern part of the terrain. Within the major directions many local variations occur and in places trends are normal to the regional pattern. For example, near Hopedale a west-northwesterly trend is present.

Northerly trending faults are common within the Archean and most linear valleys are probably fault lines. The major north-northeast fiords, such as Ugjoktok Bay and Kanairiktok Bay, are probably fault controlled as mylonitized rocks are present along and close to them. Other faults form much of the contacts for map-units 2 and 5. In places diabase dykes are offset by east and northwest oriented faults. These are possibly younger than the northerly trending displacements.

The structural features of the Aillik Group, which trends north-northeastward, are described in detail by Gandhi et al. (1969). The area is dominated by two broad open anticlines separated by a zone of more intense folding. Axial planes are nearly vertical and plunges range up to 30 degrees both north and south. Faults in the Aillik Group trend north-northwest and east-northeast. Horizontal displacement of a few hundred feet is present along some (Gandhi et al., 1969).

The Proterozoic rocks in map-areas 23P (east half) and 13M trend consistently northerly or north-northwesterly except south of the adamellite in southwest 13M. There the foliation closely parallels the outline of the pluton and foliation attitudes may have been modified by the intrusion. In other locations however, such as the Harp Lake pluton, no such affect has occurred and regional trends are transected at right angles by the anorthosite. Axial planes of minor folds are chiefly vertical with low plunges to both north and south.

The few faults recognized trend northerly as do local mylonite zones. The latter occur mainly in 23P (east half) notably north of Whitegull Lake. West-northwest faults north of Harp Lake pluton are possibly related to the emplacement of the intrusion.

A few east-northeast to northeast faults cut adamellite and anorthosite in northwestern map-area 13N. The absence of marker horizons in these plutonic rocks makes recognition of faults difficult.

ECONOMIC GEOLOGY

No economic mineral deposits are known in the area. Earlier discoveries of uranium minerals, fluorite, molybdenite, chalcopyrite, and other sulphides are summarized in Gandhi et al. (1969). No new mineral occurrences were located during the present survey.

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