GEOLOGICAL SURVEY OF CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES

PAPER 68-43

RECONNAISSANCE GEOLOGY OF A PART OF THE PRECAMBRIAN SHIELD, NORTHEASTERN QUEBEC AND NORTHERN LABRADOR, 14L (N½), 14M, 23P (W½), 24B, G, J, I, P, 25A

F. C. Taylor

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The Queen's Printer
Ottawa, Canada
1969

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Illustration

Map 13 - 1968 Geology of northeastern Quebec and northern Labrador ..... in pocket

ABSTRACT

Although the Torngat Mountains, in the northeast part of the area, rise to 5,000 feet, much of the region comprises plains and plateaus that are seldom more than 3,000 feet above sea level.

All exposed bedrock is Precambrian and all is Proterozoic in age with the exception of a narrow zone of Archean gneiss that extends from Saglek to Trout Trap Fiord on the Labrador coast. Proterozoic rocks form three main divisions; (1) rocks of the Labrador Trough; (2) a large area of gneisses north of the Labrador Trough; (3) the Ramah Group.

No mineral occurrences of economic importance were discovered but the area has not been thoroughly prospected. Areas underlain by Labrador Trough rocks, rusty graphitic gneisses, and the Ramah Group offer the best prospecting opportunities.

RECONNAISSANCE GEOLOGY OF A PART OF THE PRECAMBRIAN SHIELD, NORTHEASTERN QUEBEC AND NORTHERN LABRADOR (14 L (north half), 14 M, 23 P (west half), 24 B, G, J, I, P, 25 A)

INTRODUCTION

This report and map provide the preliminary results of the initial phase of Operation Torngat, a helicopter-assisted, geological mapping program designed to complete the reconnaissance mapping of an extensive, relatively little-known area of northeastern Quebec and northern Labrador. Approximately 30,000 square miles were mapped during the 1967 phase of the project.

Operation Torngat utilized two helicopters for traversing and a float-equipped Otter aircraft for camp moves, minor gas-caching and service flights. Major gas-caching was carried out using a Canso aircraft operating from Fort Chimo and Schefferville, Quebec, in late June and early July.

Prior to break-up the area to the northeast of Schefferville (map-area 23 P (west half)) was mapped using Schefferville as a base. Squaw Lake which is the seaplane base at Schefferville was free of ice on 15 June, 1967 and field camps were established in the area to be mapped. Throughout the summer all supplies and provisions were obtained in Schefferville, which is adequately served by both railway and aircraft. Fort Chimo, Quebec, which lies only 15 miles west of the map-area and is near Ungava Bay, receives frequent air service but most supplies to this village are sent by summer sea transport.

The only communities within the map-area are George River, Quebec, and Port Burwell, Northwest Territories. Inhabitants of both villages are chiefly Eskimo with a few white residents in administrative and educational roles. Both communities rely extensively on fishing and are equipped with freezing facilities. Small aircraft provide intermittent service to each village from Fort Chimo.

PHYSIOGRAPHY

Physiographically the region displays a diversity of land forms. In the south, near the headwaters of The Pas River, relief is low, rarely

Project 660013
Ms. received 31 May, 1968
Author's address: Geological Survey of Canada,
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more than 200 feet, whereas in the Torngat Mountains in the northeast, relief locally attains 5,000 feet. The area north of Schefferville, with the exception of a relatively small part underlain by rocks of the Labrador Trough in Romanet Lake area, is a hilly plain that slopes gently toward Ungava Bay and is typical of large parts of the Canadian Shield. Bedrock hills in this region, although locally prominent, such as along parts of Whale River valley, are in general low and rounded. Outcrop in this area is generally scattered and scarce because of an extensive covering of glacial debris in the form of eskers, drumlinoid ridges, outwash plains and till. Excellent exposures occur along the shores of Ungava Bay where a large tide washes many square miles of outcrop free of lichens and drift. Romanet Lake area is more rugged with large bare hills up to 1,500 feet above the valley floors.

East of George River a gradual increase in summit elevations is evident so that in the general area bisected by Korok River a westward-sloping plateau surface is reached with elevations from 2,700 to 3,000 feet. This plateau contains a few wide and deep valleys now occupied by major streams such as Korok and Abloviak rivers. Rare higher hills are present in this area with the highest exceeding 4,000 feet. North of Eclipse River the plateau area gradually slopes down to sea level without a major topographic break.

East of the plateau area higher elevations and extensive Pleistocene valley glacial erosion has produced the alpine topography typical of the Torngat Mountains. These mountains display most alpine features such as cirques, arêtes, hanging valleys, and along the east side show many well-defined fiords. No glaciers are known in the area but permanent snow fields are present in several places. Outcrop in this alpine terrain is not as abundant as casual examination might suggest for the tops of many mountains commonly consist of rubble or felsenmeer. Much outcrop occurs in vertical or steep cliff faces and is inaccessible in many places.

The southern part of the area is sparsely forested but south of Ungava Bay trees are confined chiefly to valleys and close to lake shores. In the plateau and mountainous parts of the area trees occur only sporadically in valleys and that portion of the map-area north of Korok River lies beyond the limit of tree growth.

GENERAL GEOLOGY

All the bedrock is Precambrian and the only younger rocks encountered consist of a few large boulders of lower Paleozoic limestone lying close to tide line on the southeast side of Killinek Island, Northwest Territories. The area contains elements of the Churchill and Nain Provinces (Stockwell, 1963) and includes both Archean and Proterozoic rocks.

ARCHEAN

Granitic and Granodioritic Gneiss (Unit 1)

Archean rocks (1) form a narrow zone along the Labrador coast extending from Saglek Fiord to Trout Trap Fiord. They display a great diversity of rock types but are dominated by leucocratic, foliated, or banded gneisses of granitic and granodioritic composition in which hornblende is the chief mafic mineral. Smaller amounts of biotite and pyroxene are present in these silicic rocks with local rare muscovite. Quartz is commonly bluish in the area shown as Archean. Locally agmatite and migmatite are abundant. Scattered throughout the granitic rocks are amphibolite bands, lenses and fragments that form up to 60 per cent of the rock mass in some places. The amphibolites show a wide range in percentage of mineral constituents, grain size, and textures. Some are probably metamorphosed sills but others may be of sedimentary origin. Pyroxene and garnet are sparsely present. Small local remnants of metamorphosed sedimentary rocks now consisting of well-foliated quartzite and garnet-biotite-quartz-feldspar gneiss with rare pyroxene, occur in some parts of the Archean terrain. Some of these rocks are probably granulites but subdivision has not been attempted during this study. Small pegmatite dykes, a few with abundant biotite, occur in many places and show diverse attitudes, from vertical to horizontal. No apparent consistent orientation was observed.

Some of the granitic rocks in the western part of the area may also be Archean. Thus, Dimroth (1964) shows granitic rocks east of Wheeler River as older than Labrador Trough strata. However, as granitic dykes and stringers intrude Knob Lake Group rocks adjacent to the granitic rocks (here shown as unit 22), an Archean age has not been assigned to the granitic body (unit 22) in this locality. It is expected that isotopic age data will aid in solving this problem. Other granitic areas may also be Archean or reworked Archean as an age of 2,160 m.y. was obtained on biotite from a massive to weakly foliated granitic rock 10 miles east of George River at lat. 57°19'N. and east of the area shown on the accompanying map.

PROTEROZOIC

Proterozoic rocks occur in three major divisions: (1) those rocks considered to be part of the Labrador Trough; (2) the large area of gneissic rocks lying east and northeast of the Labrador Trough; (3) the Ramah Group.

Knob Lake, Doublet and Montagnais Groups (Units 2, 3, 4, 5)

The Labrador Trough rocks (2, 3, 4 and 5) include parts of the Knob Lake, Doublet and Montagnais groups. The Knob Lake Group (2) rocks

are undivided and form a heterogeneous sedimentary rock-unit consisting of grey and black slate, white or light grey quartzite, pale red arkose, grey to white or locally pink limestone, brown weathering dolomite, grey argillite, sandy dolomite, quartz-muscovite schist and small amounts of greywacke. The carbonate rocks may belong to the Denault Formation that extends into the map-area from the south where it was mapped by Baragar (1963). That part shown as Knob Lake Group in the Lake Vannes area (24 B) is more highly metamorphosed than most and consists chiefly of more schistose rocks; garnet-biotite-muscovite schist is typical.

The Doublet Group (3) consists predominantly of basic volcanic rocks with small amounts of intercalated dark grey to black slates, and argillaceous quartzites. The volcanic rocks are light grey to green, chiefly massive but locally pillowed, in places schistose, and include minor amounts of agglomerate and thin pyroclastic bands. Some of the rocks shown as Doublet Group may in fact be basic sills belonging to the Wakuach Formation (4).

Rocks of the Montagnais Group (4, 5) consist of the Wakuach Gabbro (4) and Retty Peridotite formations (5). The Wakuach Gabbro consists of thick, brown weathering, massive equigranular sills, gabbro, metagabbro, and lesser amounts of diorite form that outcrop as prominent hills in Romanet Lake area. Thin bands of argillite, slate and small amounts of volcanic rocks occur intercalated with the gabbro. Columnar jointing is a prominent feature in the rocks of this formation along with a series of sheet-like joints that are well displayed in many cliff faces. The Retty Peridotite (5) is confined chiefly to the Griffis Lake area mapped by Fahrig (1964), but smaller elongate concordant plutons of ultrabasic rocks that occur in map-areas 23 P (west half) 24 B, and in southwestern 24 G are also included in this unit. Other ultrabasic rocks (16) are not presently considered to be part of this formation. The large ultrabasic plutons in map-area 23 P are fully described by Fahrig (1962) and only the small sills lying to the northeast are described here. These rocks, which form elongate (and probably lens-shaped) masses up to 500 feet thick, consist mainly of coarse-grained fibrous amphibole and equidimensional pyroxenes with only rare occurrences of serpentine and peridotite. Chlorite and minor carbonate occur locally.

An increase in metamorphic grade east and northeastward from the Labrador Trough has converted what were probably Aphebian strata into various types of sedimentary and volcanic schists and gneisses. These rocks include those mapped as the Laporte Group (Complex) by Fahrig (1964).

Amphibolite (Unit 6)

Amphibolites (6) immediately east of the Labrador Trough are chiefly of the massive, green to dark green, banded and feather type. In this area they were probably derived mainly from volcanic rocks, possibly the

Doublet Group. Many bodies show strong, well-developed foliation as well as banding. They are chiefly medium grained but local coarse-grained representatives are common. A few are schistose and show chlorite development but hornblende is the most common mafic mineral. Rocks of this unit, where remote from the Labrador Trough, show greater diversity of composition, grain size and texture. Some of the latter are undoubtedly of sedimentary origin, such as those south of the Korok River within the large area of quartzite (11). Others however may be metamorphosed sills, dykes or volcanic rocks but no definite origin can be assigned to most. Amphibolite also forms many small, irregular shaped masses in many of the other rock units.

Muscovite and Biotite Schist (Unit 7)

Grey to light grey muscovite and biotite schists comprise unit 7. These rocks, although characterized by schistosity, also show well-defined layering. Subordinate amounts of black to dark grey argillite are present along with small amounts of quartzite. Small garnets occur in some places and metamorphism locally reaches the sillimanite grade. Rare staurolite is present in the northwestern part of map-area 23 P (west half). A few quartz veinlets are commonly present in many outcrops. In map area 23 P west half) this unit is dominantly a metagreywacke and is medium to dark grey, well-bedded, and contains pods and lenses of quartz. Locally pods consisting chiefly of hornblende crystals occur in these schists and in other places these rocks grade into amphibolites or well-layered, hornblende-rich rock.

Biotite-Quartz-Feldspar Paragneiss (Unit 8)

Biotite-quartz-feldspar paragneiss (8) is a light to medium grey, rarely dark grey, well-laminated or foliated rock that is fine to medium grained but never coarse grained. Biotite forms up to 10 per cent and minor garnet occurs locally. A few limy concretions and minor carbonate in the matrix are present in a few places. Unlike unit 7 these rocks are not schistose and usually lack well-defined layering. Locally small amounts of quartz-pebble conglomerate may be present.

Limestone (Unit 9)

Limestone (9) forms isolated outcrops immediately east of the Labrador Trough but north of Korok River and east of Ungava Bay limestone forms a significant part of the bedrock. Almost all the limestone is grey to white both on fresh and weathered surfaces. A small amount in the area east of Ungava Bay is orange. Tremolite and diopside are commonly developed and are characteristic of the limestones as a whole. Grain size is generally medium but locally coarse-grained rock is present. Bedding is

commonly well preserved and made readily distinguishable by the existence of various metamorphic minerals. Contacts with bordering rocks, unlike those of the majority of the rock units, are abrupt and clearly defined. The relationship between the limestones east of Ungava Bay (9) and those of the Labrador Trough (Knob Lake Group, unit 2) is not known.

Arkose (Unit 10)

In map-areas 23 P (west half) and 24 P beds of medium- to coarse-grained, pale red to greyish orange-pink arkose (10) can be traced for a considerable distance. Constituents, chiefly feldspar, quartz and muscovite, are commonly subangular to rounded. Locally, conglomerate is present in these beds and in a few places it contains well-rounded pebbles up to 2 inches in diameter. Unit 10 is known to grade into quartzites (11) in some places both along and across strike. The relationship of the conglomeratic rock to some of the granitic rocks (unit 22) is in doubt. It may be that some of the arkosic conglomerate is a basal formation that rests directly on Archean rock; however, at present this is not established. Certainly some of the arkose lies within a larger metasedimentary terrain.

Quartzite (Unit 11)

Quartzite (11) occurs sporadically throughout the area, in many places in amounts too small to map on the present scale. Significant and readily traceable bands of quartzite outcrop in map-area 23P (west half) where it forms prominent ridges. In this area it ranges from a medium-grained, grey to white, well-bedded rock with local ripple-marks and cross-beds to a coarse-grained, massive, white, virtually pure quartzite. Commonly this grades into feldspathic quartzite and arkose (10), the colour of the quartzite becoming increasingly darker as the amount of biotite increases. Contacts with other rock units such as unit 7 are reasonably sharp but with granitic rocks they are gradational. Quartzite also forms a large mass south of Korok River. There, it is chiefly a pure grey to white or more rarely light brown rock that shows excellent bedding. Rare cross-beds and ripple-marks are also present. Minor thin intercalated argillaceous beds occur in several places and some of these contain sillimanite. Biotite and more rarely graphite occur sporadically.

Volcanic Rocks (Unit 12)

A few outcrops of volcanic rocks (12) are present south of Korok River. These are green to light green, fine grained, chiefly well-laminated but also massive andesites that are conformable and intercalated with the quartzite (11) and biotite-quartz-feldspar gneiss. Epidote is a common constituent locally, especially in the upper part of the volcanic sequence.

Flow breccia and a suggestion of pillows are present in one locality. These andesites, quartzites and biotite-quartz-feldspar gneisses are conformable with the foliation in the underlying granitic gneiss (22). The relationship of these volcanic rocks (12) to the Doublet volcanic rocks (3) is not known.

Garnet-Biotite-Quartz-Feldspar Gneiss (Unit 13)

In the northern part of the map-area a garnet-biotite-quartz-feldspar gneiss (13), that shows good banding and a less well-developed foliation, is common. These rocks are chiefly medium to coarse grained, with local development of garnets up to 1/2 inch in diameter. Commonly these grey to medium grey rocks have a salt and pepper appearance. The matrix is equigranular throughout, even where garnets are large. Small amounts of quartzite, amphibolite, and biotite-quartz-feldspar gneiss are present within the area shown as unit 13.

Rusty Graphitic Paragneiss (Unit 14)

Distinctive rusty weathering graphitic paragneiss (14) is closely associated with the limestone (9) and garnet-biotite-quartz-feldspar gneiss (13) north of Korok River. Smaller amounts of similar rocks also occur in a few other places. The characteristic rusty surface of these rocks contrasts sharply with the surfaces of other rock types and hence is readily distinguished from the air. This unit consists of well-banded, creamy to white, fine- to medium-grained graphitic quartz-rich rock containing variable amounts of feldspar. The weathering of tiny, widely disseminated pyrite grains no doubt produces the rusty character. Small amounts of garnet and biotite are also present. Scattered throughout much of this unit are irregular-shaped, white pegmatite dykes.

These latter rocks (units 13 and 14) along with the limestone (9) are similar to and on strike with identical rocks outcropping on the southwestern coast of Baffin Island (Blackadar, 1967). This correlation suggests that no major dislocation of Precambrian strata has occurred in Hudson Strait.

Lime Silicate Rocks (Unit 15)

Lime silicate rock (15) is widely dispersed throughout the terrain east of the Labrador Trough but only rarely attains mappable proportions. It is typically grey-green, poorly banded to well foliated, with diopside characteristically present. Small amounts of carbonate are present in all specimens examined along with brown mica and garnet in most. This rock shows many associations and appears and disappears along strike over short distances.

Ultrabasic Rocks (Unit 16)

Ultrabasic rocks (16) occur as small concordant lens-shaped plutons, rarely more than 400 feet thick and less than 1/2 mile long. These rocks have a distinctive, moderate yellowish brown weathered surface that is readily recognized from the air. Lithologically these small plutons consist of serpentinized peridotite and amphibolite. The peridotite is dark greenish black, fine to coarse grained, partly foliated and locally banded. Contacts with the associated amphibolite, a dark green, massive almost pure hornblende rock, are gradational over a few inches.

Paragneiss (Unit 17)

The paragneisses of unit 17 consist of a great variety of metasedimentary rocks. In general they are more highly altered and tectonically disturbed than those in units 13 and 14. Feldspar augen are locally present and unit 17 includes some rocks that are typically augen-gneiss. Thin laminae of white feldspar form a significant part of the rock in many places. Banding and foliation are poorly to well developed, and highly contorted planar features are characteristic in part. The rocks are chiefly medium to coarse grained but fine-grained representatives also occur. Medium to dark grey rocks predominate but light grey to slightly pinkish varieties are also present. In addition to quartz and feldspar, biotite and hornblende are present, either singly or together, with biotite as the more abundant constituent where both are present. Biotite content reaches a maximum of 30 per cent and quartz content is extremely variable. Garnet and sillimanite are present sporadically with sillimanite being more common in the highly foliated rocks. In some places these rocks have slightly rusty weathered surfaces which are never as prominent as the rusty graphitic schists of unit 14.

Garnet-Quartz-Feldspar Gneiss (Unit 18)

A white, well-banded, fine- to coarse-grained garnet-quartz-feldspar gneiss (unit 18) characterized by extensive mylonitization, is a highly distinctive rock in the northern part of the map-area. Quartz and feldspar form lenticular grains with dark reddish brown to locally pale purple garnets up to 1/4 inch in diameter scattered throughout. The garnets appear to have been rotated in many specimens. Graphite is present in small amounts with even scarcer biotite, pyrite and sillimanite.

Anorthosite (Unit 19)

Concordant and commonly elongate masses of anorthosite (unit 19) also contain significant amounts of amphibolite and garnet-pyroxene (or amphibole)-feldspar gneiss. The anorthosite is variously fine to coarse

grained, silvery white on weathered surfaces, white to cream on fresh surfaces, massive to well foliated, and locally brecciated. Whereas much of the anorthosite consists solely of feldspar, hornblende crystals are scattered through the rock in much of this unit and all gradations exist from the pure feldspar rock to a hornblende-rich amphibolite. Dark reddish brown garnets, a few up to 2 inches in diameter, are present in some plutons. Biotite, pyroxene and magnetite are locally prominent. Amphibolite forms discrete dykes and sills, up to 50 feet thick, in the anorthosite as well as being gradational with it. Irregular bands of garnet-pyroxene (or hornblende)-feldspar gneiss are also present in some plutons such as that at Four Peaks. Contacts between the anorthosite and the garnet-pyroxene (or hornblende)-feldspar gneiss are gradational. These rocks are fine to coarse grained and variously dark green to grey depending on the feldspar content. Biotite-rich pegmatite dykes intrude rocks of unit 19 in some places and in others granitic veinlets form an agmatitic border in the anorthosite.

Granulite (Unit 20)

Rocks shown as granulite (unit 20) are characterized by the presence of hypersthene which is disseminated through a dominantly quartzofeldspathic gneiss. This gneiss is light rusty brown on weathered surfaces and pale yellowish brown on fresh surfaces. Prominent layering in the rock may be due to relict bedding but some streaky foliation is also apparent. Biotite may be present and garnet occurs locally. Included in this unit are massive or weakly foliated hypersthene-bearing granitic rocks or charnockites. Many of the rocks in the eastern part of map-area 23 P (west half) are of this type.

Granitic Gneiss (Units 22, 23)

By far the commonest rock type is a granitic gneiss (unit 22). This grey to pink rock is generally rich in biotite but locally hornblende may be present with or without biotite. Compositionally these rocks are dominantly granodiorite but granite and diorite are also represented. Most of the granitic gneiss is probably of metasedimentary origin and it grades into well-defined paragneiss in many places. Included in this unit are some massive granitic rocks which occur for the most part as narrow dykes and sills. Numerous schlieren, fragments, and blocks of metasedimentary rocks, are characteristic and where these form the major part of the rock mass they have been mapped as migmatite (unit 21). Where dykes and sills of granitic rocks have penetrated metasedimentary rocks and form the major part of the rocks, they are mapped as agmatite (unit 21). Both agmatite and migmatite are intimately mixed with one another and with the granitic gneiss and form a bewildering mixture of dominantly granitic rock (units 21 and 22) in many parts of the area. These complex granitic rocks are well displayed on the tide-washed shores of Ungava Bay.

Along the northern part of the Atlantic coast granitic gneiss is characterized by the presence of many amphibolite bands that form up to 40 per cent of the rock. These mixed rocks are shown as unit 23. A well-layered rock is typical but in part contorted foliation is common. Hornblende is probably more abundant in these granitic gneisses than in unit 22 and it forms thin streaks that impart a striped appearance to the rock in many outcrops. Amphibolite, some of which is garnetiferous, forms boudins and streaks as well as bands in the gneiss. Small amounts of migmatite are present.

Granite and Granodiorite (Unit 24)

Granite and granodiorite of unit 24 are separated from unit 22 because they contain fewer inclusions and show a more uniform texture and colour. In general they are pink, medium- to coarse-grained rocks with biotite as the main mafic mineral. Hornblende is present locally. Minor amounts of these rocks show various shades of grey. Quartz content is variable but generally is about 15 per cent although in a few localities it is much lower and a syenitic composition is approached. Many of the rocks south of Tunilik River are highly mylonitized and contain large pink feldspar crystals, up to 3 inches long, in a dark grey cataclastic matrix.

Granite (Unit 25)

A white, coarse-grained, pegmatitic, massive granite (unit 25) containing scattered biotite and muscovite outcrops in a few places in map-area 24 B. As outcrop is scarce these scattered outcrops may be dykes but as their field relationships are doubtful they have been shown as larger plutons. A few inclusions of biotite-quartz-feldspar paragneiss are present in some outcrops.

Diabase (Unit 26)

Diabase dykes (26), locally abundant throughout much of the area, do not occur in map-areas 23 P (west half) and 24 B. Some dykes are known to cut others but, on the present map, all are shown the same age for simplicity. The most extensive zone of dykes is near Big Lake (west of the mouth of George River) where several deeply weathered, northwesterly trending, shallow dipping dykes occur. There, mesa-like hills are capped by virtually flat-lying, massive, coarse-grained diabase. The diabase that occurs near the mouth of False River is similar to the larger dykes near Big Lake and is also deeply weathered in some places. Diabase dykes are abundant in Archean rocks along the Atlantic seaboard where they form an easterly trending swarm. Dips, although commonly vertical, show a great variation and some are horizontal or almost so. These dykes are chiefly

grey-green, fine grained and have an altered appearance. They pinch and swell and are over two hundred feet thick. To the west of the Ramah Group, dykes are also common in the Proterozoic rocks. There too, some are horizontal and can be traced in cliff walls for over a mile. The age of these dykes relative to those in the Archean is not known but they are unaltered and on the basis of this meagre information they are assumed to be younger than those in the Archean.

Ramah Group (Unit 27)

The Ramah Group, unit 27, which was named by Daly (1902), forms a conspicuous linear rock unit lying unconformably on Archean rocks on the Atlantic coast. The western contact of the Ramah Group is in part a reverse fault dipping west at 45 degrees, so that older gneisses overlie the Ramah in the contact zone. The eastern contact is a well-defined angular unconformity. The Ramah consists chiefly of sedimentary rocks, approximately 4,000 feet thick, with rare volcanic rocks near the base and several amphibolite sills. Several partial sections have been measured by Douglas (1953) and Christie (1952). The sediments are chiefly light to dark grey shales, argillite and slate, many of which are carbonaceous. Pure and impure, grey, white and brown weathering quartzites along with some arkose and small amounts of quartz-pebble conglomerate are present at and near the base. Impure yellow buff or light brown sandy dolomite is locally present. Scattered outcrops of amygdaloidal and locally pillowed andesite are present near the base at several locations. Small amounts of chert occur sporadically. Amphibolite sills are common in some upper parts of the section. These are bright green, massive to weakly schistose rocks.

STRUCTURAL GEOLOGY

The structure of the map-area has not been analyzed but in general the major elements, in both the Archean and Proterozoic rocks, have northwest to north-northwest trends. These trends have many local variations and in some places trends normal to the major regional directions were noted. Dips of axial surfaces of folds, although commonly steep are in some areas, particularly in the higher mountains, at low to medium angles. A few cliff faces show recumbent folds with horizontal axial surfaces. Axial plunges for the most part are at low angles or horizontal in many places. There are however, many smaller folds with steep to vertical plunges. The most prominent fault structures are marked by extensive zones of mylonite south of Tunilik River, east of George River, and in the white garnet-quartz-feldspar gneiss (unit 18). These zones are wide, in places exceeding a mile and possibly up to 2 miles wide near Nachvak Fiord, but the magnitude of the movements involved are not known. Less prominent northeast-trending cross-faults occur southwest of Nachvak Fiord. Many others of similar trend

are not shown. Between Ungava Bay and Labrador Sea numerous small faults with a northwesterly strike are present. Undoubtedly the faults are of several ages ranging from Archean to Proterozoic or younger.

Although most of the deformation is related to the Hudsonian Orogeny, the Archean rocks were deformed during the Kenoran and the Ramah Group probably by a younger deformation. It is not known whether the Archean rocks were deformed during the Hudsonian Orogeny but as the unconformity between the Ramah Group and the Archean rocks is folded, the Archean rocks were re-folded during the deformation of the Ramah. A few age determinations from the vicinity of Saglek Fiord suggest that the last metamorphism in that particular area was about 1,300 m.y. ago and Stockwell (1964) assigned this time to the Elsonian Orogeny.

ECONOMIC GEOLOGY

No mineral occurrences of economic importance were located during the present survey. Extensive rust zones associated with the graphitic gneisses (unit 14) locally contain small massive pyrite or pyrrhotite lenses a few of which show copper staining. Assays of picked material did not show more than trace amounts of copper or zinc. The massive sulphide bed in the Ramah Group reported by Coleman (1921) and Douglas (1953) also shows copper staining in some places. An assay from one locality showed 0.1 per cent copper. Although these results are not overly encouraging, the area has not yet been thoroughly prospected. Present knowledge suggests that the Labrador Trough rocks (units 2, 3, 4, and 5), the areas underlain by the rusty graphitic gneisses (unit 14), and the Ramah Group offer the best prospecting opportunities.

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